# CHAPTER 21

# AIR CONDITIONING

## CHAPTER 21
## AIR CONDITIONING

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| O 6 | Sep 15/2023 | |
| O 7 | Sep 15/2023 | |
| 8 | Jan 15/2023 | |
| O 9 | Sep 15/2023 | |
| 10 | Sep 15/2021 | |
| 11 | Sep 15/2021 | |
| O 12 | Sep 15/2023 | |
| 13 | May 15/2023 | |
| 14 | Sep 15/2021 | |
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| 21 | May 15/2022 | |
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| 23 | May 15/2022 | |
| 24 | May 15/2022 | |
| 25 | May 15/2022 | |
| 26 | May 15/2022 | |
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| 28 | May 15/2022 | |
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| 903 | Jan 15/2023 | |
| 904 | Jan 15/2023 | |
| R 905 | Sep 15/2023 | |
| R 906 | Sep 15/2023 | |
| O 907 | Sep 15/2023 | |
| O 908 | Sep 15/2023 | |
| 909 | Sep 15/2021 | |
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| 913 | Sep 15/2021 | |
| 914 | Sep 15/2021 | |
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| 922 | Sep 15/2021 | |
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| 924 | Jan 15/2022 | |
| 925 | Jan 15/2022 | |
| 926 | Sep 15/2021 | |
| 927 | Sep 15/2021 | |
| 21-00-00 (cont) | | |
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| R 936 | Sep 15/2023 | |
| R 937 | Sep 15/2023 | |
| R 938 | Sep 15/2023 | |
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| O 958 | Sep 15/2023 | |
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A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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| O 974 | Sep 15/2023 | |
| O 975 | Sep 15/2023 | |
| O 976 | Sep 15/2023 | |
| O 977 | Sep 15/2023 | |
| O 978 | Sep 15/2023 | |
| O 979 | Sep 15/2023 | |
| O 980 | Sep 15/2023 | |
| O 981 | Sep 15/2023 | |
| O 982 | Sep 15/2023 | |
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| O 985 | Sep 15/2023 | |
| O 986 | Sep 15/2023 | |
| O 987 | Sep 15/2023 | |
| O 988 | Sep 15/2023 | |
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| 21-20-02 | | |
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| R 802 | Sep 15/2023 | |
| 803 | Jan 15/2022 | |
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| 805 | Sep 15/2021 | |
| 806 | Sep 15/2021 | |
| 807 | Sep 15/2021 | |
| R 808 | Sep 15/2023 | |
| O 809 | Sep 15/2023 | |
| R 810 | Sep 15/2023 | |
| R 811 | Sep 15/2023 | |
| R 812 | Sep 15/2023 | |
| R 813 | Sep 15/2023 | |
| R 814 | Sep 15/2023 | |
| R 815 | Sep 15/2023 | |
| O 816 | Sep 15/2023 | |
| O 817 | Sep 15/2023 | |
| O 818 | Sep 15/2023 | |
| R 819 | Sep 15/2023 | |
| O 820 | Sep 15/2023 | |
| R 821 | Sep 15/2023 | |
| O 822 | Sep 15/2023 | |
| R 823 | Sep 15/2023 | |
| O 824 | Sep 15/2023 | |
| R 825 | Sep 15/2023 | |
| O 826 | Sep 15/2023 | |
| O 827 | Sep 15/2023 | |
| R 828 | Sep 15/2023 | |
| O 829 | Sep 15/2023 | |
| O 830 | Sep 15/2023 | |
| O 831 | Sep 15/2023 | |
| O 832 | Sep 15/2023 | |
| O 833 | Sep 15/2023 | |
| O 834 | Sep 15/2023 | |
| O 835 | Sep 15/2023 | |
| O 836 | Sep 15/2023 | |
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| O 840 | Sep 15/2023 | |
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| O 845 | Sep 15/2023 | |
| O 846 | Sep 15/2023 | |
| O 847 | Sep 15/2023 | |
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| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
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| 412 | Sep 15/2021 | |
| 413 | Sep 15/2021 | |
| 414 | Sep 15/2021 | |
| 415 | Sep 15/2021 | |
| 416 | Sep 15/2021 | |
| 417 | Sep 15/2021 | |
| 418 | Sep 15/2021 | |
| 419 | Sep 15/2021 | |
| 420 | Sep 15/2021 | |
| 421 | Jan 15/2023 | |
| 422 | Jan 15/2023 | |
| 21-22-01 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 21-22-02 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 21-22-02 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 21-22-05 | | |
| R 401 | Sep 15/2023 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Jan 15/2023 | |
| 407 | Jan 15/2023 | |
| 21-22-05 (cont) | | |
| 408 | Jan 15/2023 | |
| 21-22-07 | | |
| R 701 | Sep 15/2023 | |
| 702 | Sep 15/2021 | |
| 703 | Sep 15/2021 | |
| 704 | Sep 15/2021 | |
| 705 | Sep 15/2021 | |
| 706 | Sep 15/2022 | |
| 707 | Jan 15/2023 | |
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| O 206 | Sep 15/2023 | |
| O 207 | Sep 15/2023 | |
| O 208 | Sep 15/2023 | |
| O 209 | Sep 15/2023 | |
| O 210 | Sep 15/2023 | |
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| 212 | Sep 15/2021 | |
| 213 | Sep 15/2021 | |
| 214 | Sep 15/2021 | |
| 21-23-02 | | |
| 201 | Sep 15/2021 | |
| 202 | Sep 15/2021 | |
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| 201 | Sep 15/2021 | |
| 202 | Sep 15/2021 | |
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| 21-23-04 | | |
| 401 | Jan 15/2023 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2022 | |
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| 406 | Jan 15/2022 | |
| 407 | Jan 15/2022 | |
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| 21-24-04 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
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| 406 | Sep 15/2022 | |
| 21-25-00 | | |
| 201 | Sep 15/2021 | |
| 202 | Sep 15/2021 | |
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| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
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| 504 | Sep 15/2021 | |
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| 21-25-01 | | |
| R 401 | Sep 15/2023 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
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| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
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| 21-25-02 | | |
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| R 402 | Sep 15/2023 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| R 405 | Sep 15/2023 | |
| R 406 | Sep 15/2023 | |
| R 407 | Sep 15/2023 | |
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| R 401 | Sep 15/2023 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| R 405 | Sep 15/2023 | |
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| R 602 | Sep 15/2023 | |
| R 603 | Sep 15/2023 | |
| R 604 | Sep 15/2023 | |
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| 21-26-01 | | |
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| 407 | Sep 15/2021 | |
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| 21-26-03 | | |
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| 203 | Sep 15/2021 | |
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| R 202 | Sep 15/2023 | |
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| O 510 | Sep 15/2023 | |
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| O 516 | Sep 15/2023 | |
| O 517 | Sep 15/2023 | |
| O 518 | Sep 15/2023 | |
| O 519 | Sep 15/2023 | |
| R 520 | Sep 15/2023 | |
| R 521 | Sep 15/2023 | |
| R 522 | Sep 15/2023 | |
| R 523 | Sep 15/2023 | |
| R 524 | Sep 15/2023 | |
| O 525 | Sep 15/2023 | |
| O 526 | Sep 15/2023 | |
| O 527 | Sep 15/2023 | |
| O 528 | Sep 15/2023 | |
| R 529 | Sep 15/2023 | |
| R 530 | Sep 15/2023 | |
| O 531 | Sep 15/2023 | |
| O 532 | Sep 15/2023 | |
| R 533 | Sep 15/2023 | |
| R 534 | Sep 15/2023 | |
| O 535 | Sep 15/2023 | |
| O 536 | Sep 15/2023 | |
| A 537 | Sep 15/2023 | |
| A 538 | Sep 15/2023 | |
| A 539 | Sep 15/2023 | |
| A 540 | Sep 15/2023 | |
| 21-27-01 | | |
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| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| R 407 | Sep 15/2023 | |
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| 21-27-02 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
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| 203 | Sep 15/2021 | |
| 204 | Sep 15/2021 | |
| R 205 | Sep 15/2023 | |
| R 206 | Sep 15/2023 | |
| R 207 | Sep 15/2023 | |
| 208 | May 15/2023 | |
| 21-27-04 | | |
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| 403 | Sep 15/2021 | |
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| 407 | Sep 15/2021 | |
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| 409 | Sep 15/2021 | |
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| 701 | Sep 15/2021 | |
| 702 | Sep 15/2021 | |
| 21-27-07 | | |
| R 401 | Sep 15/2023 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
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| 21-27-10 | | |
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| 402 | Sep 15/2021 | |
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| 21-31-00 | | |
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| 21-31-00 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
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| 501 | Sep 15/2022 | |
| 502 | Sep 15/2022 | |
| 503 | Sep 15/2022 | |
| 504 | Sep 15/2022 | |
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| 507 | Sep 15/2021 | |
| 508 | Sep 15/2021 | |
| 509 | Sep 15/2021 | |
| 510 | Sep 15/2021 | |
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| 527 | Sep 15/2022 | |
| 528 | Sep 15/2022 | |
| 529 | Sep 15/2022 | |
| 530 | Sep 15/2022 | |
| 21-31-01 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
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| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
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| 401 | Sep 15/2022 | |
| 402 | Sep 15/2022 | |
| 403 | Sep 15/2022 | |
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| 410 | Sep 15/2022 | |
| 411 | Sep 15/2022 | |
| 412 | May 15/2023 | |
| 413 | Sep 15/2022 | |
| 414 | Sep 15/2022 | |
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| 416 | Sep 15/2022 | |
| 417 | Sep 15/2022 | |
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| 402 | Sep 15/2021 | |
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| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
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| 508 | Sep 15/2022 | |
| 509 | Sep 15/2022 | |
| 510 | Sep 15/2022 | |
| 21-32-02 | | |
| R 401 | Sep 15/2023 | |
| 402 | Sep 15/2022 | |
| 403 | Sep 15/2022 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2022 | |
| 21-32-03 | | |
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| 202 | Sep 15/2021 | |
| 203 | Sep 15/2021 | |
| 204 | Sep 15/2021 | |
| 205 | Sep 15/2021 | |
| 206 | Sep 15/2021 | |
| 207 | Sep 15/2021 | |
| 208 | BLANK | |
| 21-32-05 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
| 410 | Sep 15/2021 | |
| 21-33-00 | | |
| R 501 | Sep 15/2023 | |
| R 502 | Sep 15/2023 | |
| R 503 | Sep 15/2023 | |

| Subject/Page | Date | COC |
|---|---|---|
| 21-33-00 (cont) | | |
| R 504 | Sep 15/2023 | |
| R 505 | Sep 15/2023 | |
| 506 | May 15/2023 | |
| 507 | May 15/2023 | |
| 508 | BLANK | |
| 21-33-01 | | |
| 401 | Sep 15/2021 | |
| R 402 | Sep 15/2023 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2022 | |
| 21-33-02 | | |
| 401 | Sep 15/2022 | |
| 402 | Sep 15/2021 | |
| R 403 | Sep 15/2023 | |
| 404 | Sep 15/2021 | |
| R 405 | Sep 15/2023 | |
| 406 | Sep 15/2021 | |
| 21-33-04 | | |
| R 401 | Sep 15/2023 | |
| R 402 | Sep 15/2023 | |
| R 403 | Sep 15/2023 | |
| 404 | BLANK | |
| 21-33-07 | | |
| 401 | Sep 15/2021 | |
| R 402 | Sep 15/2023 | |
| 403 | Sep 15/2022 | |
| 404 | BLANK | |
| 21-43-01 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

# 21-EFFECTIVE PAGES


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## CHAPTER 21
## AIR CONDITIONING

| Subject/Page | Date | COC |
|---|---|---|
| 21-45-00 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | BLANK | |
| 21-45-01 | | |
| R 401 | Sep 15/2023 | |
| R 402 | Sep 15/2023 | |
| R 403 | Sep 15/2023 | |
| O 404 | Sep 15/2023 | |
| O 405 | Sep 15/2023 | |
| O 406 | Sep 15/2023 | |
| O 407 | Sep 15/2023 | |
| R 408 | Sep 15/2023 | |
| A 409 | Sep 15/2023 | |
| A 410 | Sep 15/2023 | |
| A 411 | Sep 15/2023 | |
| A 412 | BLANK | |
| 21-45-02 | | |
| R 401 | Sep 15/2023 | |
| R 402 | Sep 15/2023 | |
| 403 | Sep 15/2021 | |
| R 404 | Sep 15/2023 | |
| R 405 | Sep 15/2023 | |
| R 406 | Sep 15/2023 | |
| R 407 | Sep 15/2023 | |
| O 408 | Sep 15/2023 | |
| R 409 | Sep 15/2023 | |
| R 410 | Sep 15/2023 | |
| R 411 | Sep 15/2023 | |
| O 412 | Sep 15/2023 | |
| A 413 | Sep 15/2023 | |
| A 414 | Sep 15/2023 | |
| 21-51-00 | | |
| 201 | Sep 15/2022 | |
| 202 | Sep 15/2022 | |
| 21-51-00 (cont) | | |
| 203 | Sep 15/2022 | |
| 204 | May 15/2022 | |
| 205 | Sep 15/2022 | |
| 206 | Sep 15/2022 | |
| 207 | Sep 15/2022 | |
| 208 | Sep 15/2022 | |
| 21-51-00 | | |
| 501 | May 15/2023 | |
| 502 | May 15/2023 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | Sep 15/2021 | |
| 21-51-00 | | |
| 601 | Sep 15/2022 | |
| 602 | Sep 15/2022 | |
| 603 | Sep 15/2022 | |
| 604 | Sep 15/2022 | |
| 605 | Sep 15/2022 | |
| 606 | Sep 15/2022 | |
| 607 | Sep 15/2022 | |
| 608 | Sep 15/2022 | |
| 21-51-01 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | May 15/2023 | |
| 408 | May 15/2023 | |
| 409 | May 15/2023 | |
| 410 | May 15/2023 | |
| 411 | May 15/2023 | |
| 412 | May 15/2023 | |
| 413 | May 15/2023 | |
| 414 | Sep 15/2021 | |
| 21-51-01 (cont) | | |
| 415 | Sep 15/2021 | |
| 416 | Sep 15/2021 | |
| 417 | May 15/2023 | |
| 418 | May 15/2023 | |
| 419 | May 15/2023 | |
| 420 | May 15/2023 | |
| 21-51-02 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | BLANK | |
| 21-51-02 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Jan 15/2023 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | Sep 15/2021 | |
| 507 | Sep 15/2021 | |
| 508 | Sep 15/2021 | |
| R 509 | Sep 15/2023 | |
| 510 | Sep 15/2021 | |
| 21-51-03 | | |
| 201 | May 15/2022 | |
| 202 | May 15/2022 | |
| 203 | May 15/2022 | |
| 204 | May 15/2022 | |
| 205 | May 15/2022 | |
| 206 | May 15/2022 | |
| 207 | May 15/2022 | |
| 208 | May 15/2022 | |
| 21-51-03 | | |
| R 401 | Sep 15/2023 | |
| R 402 | Sep 15/2023 | |
| R 403 | Sep 15/2023 | |

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# 21-EFFECTIVE PAGES


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| Subject/Page | Date | COC |
|---|---|---|
| 21-51-03 (cont) | | |
| R 404 | Sep 15/2023 | |
| R 405 | Sep 15/2023 | |
| R 406 | Sep 15/2023 | |
| R 407 | Sep 15/2023 | |
| O 408 | Sep 15/2023 | |
| O 409 | Sep 15/2023 | |
| O 410 | Sep 15/2023 | |
| R 411 | Sep 15/2023 | |
| R 412 | Sep 15/2023 | |
| R 413 | Sep 15/2023 | |
| O 414 | Sep 15/2023 | |
| O 415 | Sep 15/2023 | |
| O 416 | Sep 15/2023 | |
| O 417 | Sep 15/2023 | |
| O 418 | Sep 15/2023 | |
| O 419 | Sep 15/2023 | |
| O 420 | Sep 15/2023 | |
| O 421 | Sep 15/2023 | |
| O 422 | Sep 15/2023 | |
| O 423 | Sep 15/2023 | |
| R 424 | Sep 15/2023 | |
| R 425 | Sep 15/2023 | |
| O 426 | Sep 15/2023 | |
| R 427 | Sep 15/2023 | |
| O 428 | Sep 15/2023 | |
| R 429 | Sep 15/2023 | |
| R 430 | Sep 15/2023 | |
| R 431 | Sep 15/2023 | |
| R 432 | Sep 15/2023 | |
| A 433 | Sep 15/2023 | |
| A 434 | BLANK | |
| 21-51-03 | | |
| 601 | Sep 15/2021 | |
| 602 | Jan 15/2023 | |
| 603 | Jan 15/2023 | |
| 604 | Jan 15/2023 | |
| 21-51-03 (cont) | | |
| 605 | Sep 15/2021 | |
| 606 | BLANK | |
| 21-51-03 | | |
| 701 | Jan 15/2023 | |
| 702 | May 15/2022 | |
| 703 | Jan 15/2023 | |
| 704 | Jan 15/2023 | |
| 705 | May 15/2022 | |
| 706 | May 15/2022 | |
| 707 | Jan 15/2023 | |
| 708 | May 15/2022 | |
| 709 | Sep 15/2021 | |
| 710 | Jan 15/2023 | |
| 711 | Sep 15/2021 | |
| 712 | Sep 15/2021 | |
| 713 | May 15/2022 | |
| 714 | Jan 15/2023 | |
| 715 | May 15/2022 | |
| 716 | May 15/2022 | |
| 717 | Jan 15/2023 | |
| 718 | Jan 15/2023 | |
| 719 | May 15/2022 | |
| 720 | May 15/2022 | |
| 721 | May 15/2022 | |
| 722 | BLANK | |
| 21-51-04 | | |
| 401 | May 15/2022 | |
| 402 | Jan 15/2022 | |
| 403 | Jan 15/2022 | |
| 404 | Jan 15/2022 | |
| 405 | Jan 15/2022 | |
| 406 | Jan 15/2022 | |
| 407 | Jan 15/2022 | |
| 408 | Jan 15/2022 | |
| 409 | Jan 15/2022 | |
| 410 | Jan 15/2022 | |
| 411 | Jan 15/2022 | |
| 21-51-04 (cont) | | |
| 412 | Sep 15/2022 | |
| 413 | Sep 15/2022 | |
| 414 | Sep 15/2022 | |
| 415 | Sep 15/2022 | |
| 416 | May 15/2023 | |
| R 417 | Sep 15/2023 | |
| R 418 | Sep 15/2023 | |
| 21-51-07 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
| 410 | Sep 15/2021 | |
| 411 | Sep 15/2021 | |
| 412 | May 15/2023 | |
| 413 | Sep 15/2021 | |
| 414 | Sep 15/2021 | |
| 21-51-08 | | |
| 401 | Jan 15/2023 | |
| 402 | Jan 15/2023 | |
| 403 | May 15/2023 | |
| 404 | Jan 15/2023 | |
| 405 | Jan 15/2023 | |
| 406 | Jan 15/2023 | |
| 407 | Jan 15/2023 | |
| 408 | May 15/2023 | |
| 409 | May 15/2023 | |
| 410 | May 15/2023 | |
| 411 | May 15/2023 | |
| 412 | May 15/2023 | |
| 413 | May 15/2023 | |
| 414 | BLANK | |

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## CHAPTER 21
## AIR CONDITIONING

| Subject/Page | Date | COC |
|---|---|---|
| 21-51-10 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-51-11 | | |
| 401 | Jan 15/2022 | |
| 402 | Jan 15/2022 | |
| 403 | Jan 15/2022 | |
| 404 | Sep 15/2021 | |
| 405 | Jan 15/2022 | |
| 406 | Jan 15/2022 | |
| 407 | Sep 15/2021 | |
| R 408 | Sep 15/2023 | |
| R 409 | Sep 15/2023 | |
| R 410 | Sep 15/2023 | |
| R 411 | Sep 15/2023 | |
| O 412 | BLANK | |
| 21-51-12 | | |
| 401 | Jan 15/2023 | |
| 402 | Jan 15/2023 | |
| 403 | Sep 15/2021 | |
| 404 | Jan 15/2023 | |
| 405 | May 15/2023 | |
| 406 | May 15/2023 | |
| 21-51-13 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | BLANK | |
| 21-51-14 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2022 | |
| 406 | Sep 15/2022 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-51-15 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-51-16 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 21-51-16 | | |
| 601 | Sep 15/2021 | |
| 602 | Sep 15/2021 | |
| 603 | Sep 15/2021 | |
| 604 | Sep 15/2021 | |
| 605 | Sep 15/2021 | |
| 606 | Sep 15/2021 | |
| 607 | Sep 15/2021 | |
| 608 | BLANK | |
| 21-51-17 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 21-51-21 | | |
| 401 | Jan 15/2023 | |
| 402 | Jan 15/2023 | |
| 403 | Jan 15/2022 | |
| 404 | Jan 15/2022 | |
| 405 | Jan 15/2022 | |
| 406 | Jan 15/2022 | |
| 407 | Jan 15/2022 | |
| 408 | Jan 15/2022 | |
| 409 | Jan 15/2022 | |
| 410 | May 15/2023 | |
| 411 | Jan 15/2023 | |
| R 412 | Sep 15/2023 | |
| O 413 | Sep 15/2023 | |
| R 414 | Sep 15/2023 | |
| R 415 | Sep 15/2023 | |
| O 416 | Sep 15/2023 | |
| 21-51-22 | | |
| 401 | May 15/2023 | |
| 402 | May 15/2023 | |
| 403 | May 15/2023 | |
| 404 | May 15/2023 | |
| 405 | May 15/2023 | |
| 406 | May 15/2023 | |
| 407 | May 15/2023 | |
| 408 | May 15/2023 | |
| 409 | May 15/2023 | |
| 410 | May 15/2023 | |
| 411 | May 15/2023 | |

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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| Subject/Page | Date | COC |
|---|---|---|
| 21-51-22 (cont) | | |
| 412 | May 15/2023 | |
| 413 | May 15/2023 | |
| 414 | May 15/2023 | |
| 21-51-22 | | |
| R 501 | Sep 15/2023 | |
| R 502 | Sep 15/2023 | |
| R 503 | Sep 15/2023 | |
| O 504 | Sep 15/2023 | |
| R 505 | Sep 15/2023 | |
| R 506 | Sep 15/2023 | |
| R 507 | Sep 15/2023 | |
| R 508 | Sep 15/2023 | |
| R 509 | Sep 15/2023 | |
| O 510 | Sep 15/2023 | |
| O 511 | Sep 15/2023 | |
| O 512 | Sep 15/2023 | |
| O 513 | Sep 15/2023 | |
| O 514 | Sep 15/2023 | |
| 21-51-22 | | |
| 601 | Sep 15/2021 | |
| 602 | Sep 15/2021 | |
| 603 | Sep 15/2021 | |
| 604 | BLANK | |
| 21-51-23 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | May 15/2022 | |
| 408 | May 15/2022 | |
| 409 | Sep 15/2021 | |
| 410 | May 15/2022 | |
| 411 | May 15/2022 | |
| 412 | BLANK | |
| 21-51-24 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
| 410 | Sep 15/2021 | |
| 411 | Sep 15/2021 | |
| 412 | Sep 15/2022 | |
| 413 | May 15/2022 | |
| 414 | May 15/2022 | |
| 415 | May 15/2022 | |
| 416 | May 15/2022 | |
| 417 | May 15/2022 | |
| 418 | BLANK | |
| 21-51-24 | | |
| 801 | Sep 15/2022 | |
| 802 | Sep 15/2021 | |
| 803 | Sep 15/2021 | |
| R 804 | Sep 15/2023 | |
| 805 | Jan 15/2022 | |
| 806 | Jan 15/2022 | |
| 807 | Sep 15/2021 | |
| R 808 | Sep 15/2023 | |
| R 809 | Sep 15/2023 | |
| R 810 | Sep 15/2023 | |
| R 811 | Sep 15/2023 | |
| R 812 | Sep 15/2023 | |
| A 813 | Sep 15/2023 | |
| A 814 | BLANK | |
| 21-51-27 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | May 15/2023 | |
| R 409 | Sep 15/2023 | |
| 410 | Sep 15/2021 | |
| O 411 | Sep 15/2023 | |
| R 412 | Sep 15/2023 | |
| A 413 | Sep 15/2023 | |
| A 414 | BLANK | |
| 21-51-40 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 21-51-40 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | BLANK | |
| 21-51-41 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 21-51-41 | | |
| 501 | Sep 15/2022 | |
| 502 | Jan 15/2022 | |
| 503 | Jan 15/2022 | |
| 504 | Jan 15/2022 | |
| 505 | Jan 15/2022 | |
| 506 | Sep 15/2021 | |

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## AIR CONDITIONING

| Subject/Page | Date | COC |
|---|---|---|
| 21-51-42 | | |
| 401 | Jan 15/2022 | |
| 402 | Jan 15/2022 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Jan 15/2022 | |
| 406 | Jan 15/2022 | |
| 21-51-50 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-51-51 | | |
| 201 | Jan 15/2022 | |
| 202 | Jan 15/2022 | |
| 203 | Sep 15/2021 | |
| 204 | Sep 15/2021 | |
| 205 | Jan 15/2022 | |
| 206 | Jan 15/2022 | |
| 21-51-51 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | BLANK | |
| 21-51-52 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | BLANK | |

| Subject/Page | Date | COC |
|---|---|---|
| 21-51-52 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 21-51-53 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 21-51-60 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | May 15/2022 | |
| 405 | May 15/2022 | |
| 406 | BLANK | |
| 21-51-65 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2022 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-61-00 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | Sep 15/2021 | |
| 21-61-04 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |

| Subject/Page | Date | COC |
|---|---|---|
| 21-61-04 (cont) | | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-61-04 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | Sep 15/2021 | |
| 505 | Sep 15/2021 | |
| 506 | Sep 15/2021 | |
| 507 | May 15/2022 | |
| 508 | Sep 15/2021 | |
| 21-61-05 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 21-61-06 | | |
| R 201 | Sep 15/2023 | |
| 202 | Jan 15/2022 | |
| 203 | Sep 15/2021 | |
| 204 | Sep 15/2021 | |
| 205 | Sep 15/2021 | |
| 206 | Sep 15/2021 | |
| 207 | Sep 15/2021 | |
| 208 | Sep 15/2021 | |
| 209 | Jan 15/2023 | |
| 210 | Sep 15/2022 | |

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| Subject/Page | Date | COC |
|---|---|---|
| 21-61-07 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | May 15/2022 | |
| 21-61-09 | | |
| 401 | Sep 15/2021 | |
| 402 | Jan 15/2023 | |
| 403 | Jan 15/2023 | |
| 404 | Jan 15/2023 | |
| 405 | Jan 15/2023 | |
| 406 | Jan 15/2023 | |
| R 407 | Sep 15/2023 | |
| 408 | Jan 15/2023 | |
| 409 | Jan 15/2023 | |
| 410 | BLANK | |
| 21-61-09 | | |
| 601 | May 15/2022 | |
| 602 | May 15/2022 | |
| 21-61-10 | | |
| 201 | Sep 15/2021 | |
| 202 | Sep 15/2021 | |
| 203 | Sep 15/2021 | |
| 204 | Sep 15/2021 | |
| 205 | Sep 15/2021 | |
| 206 | Sep 15/2021 | |
| 207 | Sep 15/2021 | |
| 208 | Sep 15/2022 | |
| R 209 | Sep 15/2023 | |
| R 210 | Sep 15/2023 | |
| 21-61-10 | | |
| 601 | Sep 15/2021 | |
| 602 | Sep 15/2021 | |
| 603 | Sep 15/2021 | |
| 604 | Sep 15/2021 | |
| 605 | Sep 15/2021 | |

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| 606 | Sep 15/2021 | |
| 607 | Sep 15/2021 | |
| 608 | Sep 15/2021 | |
| 609 | Sep 15/2021 | |
| 610 | Sep 15/2021 | |
| 611 | Sep 15/2021 | |
| 612 | BLANK | |
| 21-61-11 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | May 15/2022 | |
| 405 | May 15/2022 | |
| 406 | Sep 15/2021 | |
| 407 | May 15/2022 | |
| 408 | May 15/2022 | |
| 409 | May 15/2022 | |
| R 410 | Sep 15/2023 | |
| 411 | Jan 15/2023 | |
| 412 | BLANK | |
| 21-61-12 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | Sep 15/2021 | |
| 409 | Sep 15/2021 | |
| 410 | Sep 15/2021 | |
| 411 | Sep 15/2021 | |
| 412 | BLANK | |
| 21-61-14 | | |
| 201 | Sep 15/2021 | |
| 202 | Sep 15/2021 | |
| 203 | Sep 15/2021 | |

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| 204 | Sep 15/2021 | |
| 205 | Sep 15/2021 | |
| 206 | Sep 15/2021 | |
| 207 | May 15/2022 | |
| 208 | May 15/2022 | |
| 209 | May 15/2022 | |
| 210 | May 15/2022 | |
| 211 | May 15/2022 | |
| 212 | May 15/2022 | |
| 213 | Sep 15/2022 | |
| 214 | May 15/2022 | |
| 215 | Sep 15/2022 | |
| 216 | BLANK | |
| 21-61-15 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 21-61-21 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | May 15/2023 | |
| 407 | May 15/2023 | |
| R 408 | Sep 15/2023 | |
| A 409 | Sep 15/2023 | |
| A 410 | BLANK | |
| 21-61-22 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 21-61-23 | | |
| 401 | Sep 15/2022 | |
| 402 | Sep 15/2021 | |


A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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| 404 | Sep 15/2021 | |
| 405 | Sep 15/2022 | |
| 406 | Sep 15/2021 | |
| 407 | Sep 15/2021 | |
| 408 | BLANK | |
| 21-61-23 | | |
| 701 | May 15/2023 | |
| 702 | May 15/2023 | |
| 703 | May 15/2023 | |
| 704 | May 15/2023 | |
| 705 | May 15/2023 | |
| 706 | BLANK | |
| 21-61-24 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | May 15/2023 | |
| 405 | Sep 15/2021 | |
| 406 | Sep 15/2021 | |
| 21-61-30 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | May 15/2022 | |
| 405 | May 15/2022 | |
| 406 | May 15/2022 | |
| 407 | Sep 15/2022 | |
| 408 | May 15/2022 | |
| 21-61-31 | | |
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| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | May 15/2022 | |
| R 405 | Sep 15/2023 | |
| O 406 | Sep 15/2023 | |
| 21-61-32 | | |
| 401 | May 15/2022 | |
| 402 | May 15/2022 | |
| 403 | May 15/2022 | |
| 404 | Sep 15/2022 | |
| 405 | May 15/2022 | |
| 406 | BLANK | |
| 21-62-00 | | |
| 501 | Sep 15/2021 | |
| 502 | Sep 15/2021 | |
| 503 | Sep 15/2021 | |
| 504 | May 15/2022 | |
| 21-62-01 | | |
| 401 | Sep 15/2021 | |
| 402 | Sep 15/2021 | |
| 403 | Sep 15/2021 | |
| 404 | Sep 15/2021 | |
| 405 | Sep 15/2021 | |
| 406 | May 15/2023 | |
| 407 | May 15/2023 | |
| 408 | May 15/2023 | |
| 409 | May 15/2023 | |
| 410 | BLANK | |
| | | |

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| Ram Air Inlet Modulation Panels Installation<br>TASK 21-51-23-400-801 | | | 407 | SIA ALL |
| **RAM AIR DUCTS - REMOVAL/INSTALLATION** | 21-51-24 | | 401 | SIA ALL |
| Ram Air Ducts Removal<br>TASK 21-51-24-000-801 | | | 401 | SIA ALL |
| Ram Air Ducts Installation<br>TASK 21-51-24-400-801 | | | 412 | SIA ALL |
| **RAM AIR DUCTS - REPAIRS** | 21-51-24 | | 801 | SIA ALL |
| Resin Damage - Fiberglass Ducts<br>TASK 21-51-24-340-801 | | | 801 | SIA ALL |
| External Patch - Fiberglass Ducts<br>TASK 21-51-24-340-802 | | | 803 | SIA ALL |
| Structural Repair - Fiberglass Ducts<br>TASK 21-51-24-340-803 | | | 808 | SIA ALL |
| **RAM AIR EXHAUST ACTUATOR - REMOVAL/INSTALLATION** | 21-51-27 | | 401 | SIA ALL |
| Ram Air Exhaust Actuator - Removal<br>TASK 21-51-27-000-801 | | | 401 | SIA ALL |
| Ram Air Exhaust Actuator - Installation<br>TASK 21-51-27-400-801 | | | 408 | SIA ALL |



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CHAPTER 21
AIR CONDITIONING


| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| **COMPRESSOR DISCHARGE OVERHEAT SWITCH - REMOVAL/INSTALLATION** | 21-51-40 | | 401 | SIA ALL |
| Compressor Discharge Overheat Switch Removal TASK 21-51-40-000-801 | | | 401 | SIA ALL |
| Compressor Discharge Overheat Switch Installation TASK 21-51-40-400-801 | | | 405 | SIA ALL |
| **COMPRESSOR DISCHARGE OVERHEAT SWITCH - ADJUSTMENT/TEST** | 21-51-40 | | 501 | SIA ALL |
| Compressor Discharge Overheat Switch Operational Test TASK 21-51-40-710-801 | | | 501 | SIA ALL |
| **TURBINE INLET OVERHEAT SWITCH - REMOVAL/INSTALLATION** | 21-51-41 | | 401 | SIA ALL |
| Turbine Inlet Overheat Switch Removal TASK 21-51-41-000-801 | | | 401 | SIA ALL |
| Turbine Inlet Overheat Switch Installation TASK 21-51-41-400-801 | | | 405 | SIA ALL |
| **TURBINE INLET THERMAL SWITCH - ADJUSTMENT/TEST** | 21-51-41 | | 501 | SIA ALL |
| Turbine Inlet Thermal Switch - Operational Test TASK 21-51-41-710-801 | | | 501 | SIA ALL |
| **PACK DISCHARGE OVERHEAT SWITCH - REMOVAL/INSTALLATION** | 21-51-42 | | 401 | SIA ALL |
| Pack Discharge Overheat Switch Removal TASK 21-51-42-000-801 | | | 401 | SIA ALL |
| Pack Discharge Overheat Switch Installation TASK 21-51-42-400-801 | | | 405 | SIA ALL |
| **RAM AIR CONTROL TEMPERATURE SENSOR - REMOVAL/INSTALLATION** | 21-51-50 | | 401 | SIA ALL |
| Ram Air Control Temperature Sensor Removal TASK 21-51-50-000-801 | | | 401 | SIA ALL |
| Ram Air Control Temperature Sensor Installation TASK 21-51-50-400-801 | | | 405 | SIA ALL |



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## CHAPTER 21
## AIR CONDITIONING


| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| **MIX MANIFOLD TEMPERATURE SENSOR - MAINTENANCE PRACTICES** | 21-51-51 | | 201 | SIA ALL |
| Mix Manifold Temperature Sensor Removal TASK 21-51-51-000-801 | | | 201 | SIA ALL |
| Mix Manifold Temperature Sensor Cleaning TASK 21-51-51-110-801 | | | 205 | SIA ALL |
| Mix Manifold Temperature Sensor Installation TASK 21-51-51-400-801 | | | 205 | SIA ALL |
| **MIX MANIFOLD TEMPERATURE SENSOR - ADJUSTMENT/TEST** | 21-51-51 | | 501 | SIA ALL |
| Mix Manifold Temperature Sensor Test TASK 21-51-51-710-801 | | | 501 | SIA ALL |
| **PACK TEMPERATURE SENSOR - REMOVAL/INSTALLATION** | 21-51-52 | | 401 | SIA ALL |
| Pack Temperature Sensor Removal TASK 21-51-52-000-801 | | | 401 | SIA ALL |
| Pack Temperature Sensor Installation TASK 21-51-52-400-801 | | | 404 | SIA ALL |
| **PACK TEMPERATURE SENSOR - ADJUSTMENT/TEST** | 21-51-52 | | 501 | SIA ALL |
| Pack Temperature Sensor Test TASK 21-51-52-720-801 | | | 501 | SIA ALL |
| **HEAT EXCHANGER TEMPERATURE SENSOR - REMOVAL/INSTALLATION** | 21-51-53 | | 401 | SIA ALL |
| Heat Exchanger Temperature Sensor Removal TASK 21-51-53-000-801 | | | 401 | SIA ALL |
| Heat Exchanger Temperature Sensor Installation TASK 21-51-53-400-801 | | | 405 | SIA ALL |
| **PACK TEMPERATURE BULB - REMOVAL/INSTALLATION** | 21-51-60 | | 401 | SIA ALL |
| Pack Temperature Bulb Removal TASK 21-51-60-000-801 | | | 401 | SIA ALL |
| Pack Temperature Bulb Installation TASK 21-51-60-400-801 | | | 404 | SIA ALL |



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CHAPTER 21
AIR CONDITIONING


| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| **AIR CONDITIONING MODULE - REMOVAL/INSTALLATION** | 21-51-65 | | 401 | SIA ALL |
| Air Conditioning Module Removal TASK 21-51-65-000-801 | | | 401 | SIA ALL |
| Air Conditioning Module Installation TASK 21-51-65-400-801 | | | 404 | SIA ALL |
| **ZONE TEMPERATURE CONTROL AND INDICATION - ADJUSTMENT/TEST** | 21-61-00 | | 501 | SIA ALL |
| Cabin Temperature Control and Indication - Operational Test TASK 21-61-00-700-801 | | | 501 | SIA ALL |
| Duct Overheat Switch - Operational Test TASK 21-61-00-700-802 | | | 502 | SIA ALL |
| **DUCT TEMPERATURE LIMIT SENSOR - REMOVAL/INSTALLATION** | 21-61-04 | | 401 | SIA ALL |
| Duct Temperature Limit Sensor Removal TASK 21-61-04-000-801 | | | 401 | SIA ALL |
| Duct Temperature Limit Sensor Installation TASK 21-61-04-400-801 | | | 407 | SIA ALL |
| **DUCT TEMPERATURE LIMIT SENSOR - ADJUSTMENT/TEST** | 21-61-04 | | 501 | SIA ALL |
| Duct Temperature Limit Sensor Test TASK 21-61-04-000-802 | | | 501 | SIA ALL |
| **DUCT OVERHEAT SWITCH - REMOVAL/INSTALLATION** | 21-61-05 | | 401 | SIA ALL |
| Duct Overheat Switch Removal TASK 21-61-05-000-801 | | | 401 | SIA ALL |
| Duct Overheat Switch Installation TASK 21-61-05-400-801 | | | 407 | SIA ALL |
| **CABIN TEMPERATURE SENSOR ASSEMBLY FILTER - MAINTENANCE PRACTICES** | 21-61-06 | | 201 | SIA ALL |
| Cabin Temperature Sensor Assembly Filter Removal TASK 21-61-06-000-801 | | | 201 | SIA ALL |



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CHAPTER 21
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| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| Cabin Temperature Sensor Assembly Filter Installation<br>TASK 21-61-06-400-801 | | | 209 | SIA ALL |
| **CABIN TEMPERATURE SELECTOR - REMOVAL/INSTALLATION** | 21-61-07 | | 401 | SIA ALL |
| Cabin Temperature Selector Removal<br>TASK 21-61-07-000-801 | | | 401 | SIA ALL |
| Cabin Temperature Selector Installation<br>TASK 21-61-07-400-801 | | | 405 | SIA ALL |
| **TRIM AIR CHECK VALVE - REMOVAL/INSTALLATION** | 21-61-09 | | 401 | SIA ALL |
| Trim Air Check Valve Removal<br>TASK 21-61-09-000-801 | | | 401 | SIA ALL |
| Trim Air Check Valve Installation<br>TASK 21-61-09-400-801 | | | 407 | SIA ALL |
| **TRIM AIR CHECK VALVE - INSPECTION/CHECK** | 21-61-09 | | 601 | SIA ALL |
| Trim Air Check Valve Inspection<br>TASK 21-61-09-200-801 | | | 601 | SIA ALL |
| **CABIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES** | 21-61-10 | | 201 | SIA ALL |
| Cabin Temperature Sensor Removal<br>TASK 21-61-10-000-801 | | | 201 | SIA ALL |
| Cabin Temperature Sensor Cleaning<br>TASK 21-61-10-100-801 | | | 208 | SIA ALL |
| Cabin Temperature Sensor Installation<br>TASK 21-61-10-400-801 | | | 208 | SIA ALL |
| **CABIN TEMPERATURE SENSOR - INSPECTION/CHECK** | 21-61-10 | | 601 | SIA ALL |
| Cabin Temperature Sensor Resistance Check<br>TASK 21-61-10-200-801 | | | 601 | SIA ALL |
| **CABIN TEMPERATURE SENSOR FAN - REMOVAL/INSTALLATION** | 21-61-11 | | 401 | SIA ALL |
| Cabin Temperature Sensor Fan Removal<br>TASK 21-61-11-000-801 | | | 401 | SIA ALL |



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| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| Cabin Temperature Sensor Fan Installation<br>TASK 21-61-11-400-801 | | | 409 | SIA ALL |
| **TRIM AIR DUCT PRESSURE SEAL - REMOVAL/INSTALLATION** | 21-61-12 | | 401 | SIA ALL |
| Trim Air Duct Pressure Seal Removal<br>TASK 21-61-12-000-801 | | | 401 | SIA ALL |
| Trim Air Duct Pressure Seal Installation<br>TASK 21-61-12-400-801 | | | 408 | SIA ALL |
| **TEMPERATURE SENSOR ASSEMBLY DUCT/HOUSING - MAINTENANCE PRACTICES** | 21-61-14 | | 201 | SIA ALL |
| Flight Compartment Temperature Sensor Assembly Housing Removal<br>TASK 21-61-14-000-801 | | | 201 | SIA ALL |
| Flight Compartment Temperature Sensor Assembly Housing Installation<br>TASK 21-61-14-400-801 | | | 205 | SIA ALL |
| Passenger Cabin Temperature Sensor Assembly Duct Removal<br>TASK 21-61-14-000-802 | | | 206 | SIA ALL |
| Passenger Cabin Temperature Sensor Assembly Duct Installation<br>TASK 21-61-14-400-802 | | | 212 | SIA ALL |
| Flight Compartment Temperature Sensor Assembly Housing Cleaning<br>TASK 21-61-14-100-801 | | | 213 | SIA ALL |
| Passenger Cabin Temperature Sensor Assembly Duct Cleaning<br>TASK 21-61-14-100-802 | | | 214 | SIA ALL |
| **TEMPERATURE CONTROL MODULE - REMOVAL/INSTALLATION** | 21-61-15 | | 401 | SIA ALL |
| Temperature Control Module Removal<br>TASK 21-61-15-000-801 | | | 401 | SIA ALL |
| Temperature Control Module Installation<br>TASK 21-61-15-400-801 | | | 403 | SIA ALL |



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CHAPTER 21
AIR CONDITIONING


| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| **ZONE TRIM AIR MODULATING VALVE - REMOVAL/INSTALLATION** | 21-61-21 | | 401 | SIA ALL |
| Zone Trim Air Modulating Valve Removal TASK 21-61-21-000-801 | | | 401 | SIA ALL |
| Zone Trim Air Modulating Valve Installation TASK 21-61-21-400-801 | | | 406 | SIA ALL |
| **INTEGRATED AIR SYSTEMS CONTROLLER - REMOVAL/INSTALLATION** | 21-61-22 | | 401 | SIA ALL |
| Integrated Air Systems Controller (IASC) Removal TASK 21-61-22-000-801 | | | 401 | SIA ALL |
| Integrated Air Systems Controller (IASC) Installation TASK 21-61-22-400-801 | | | 403 | SIA ALL |
| **INLET PRESSURE SENSOR - REMOVAL/INSTALLATION** | 21-61-23 | | 401 | SIA ALL |
| Inlet Pressure Sensor Removal TASK 21-61-23-000-801 | | | 401 | SIA ALL |
| Inlet Pressure Sensor Installation TASK 21-61-23-400-801 | | | 405 | SIA ALL |
| **PACK PRESSURE SENSOR SENSE LINE - CLEANING/PAINTING** | 21-61-23 | | 701 | SIA ALL |
| Pack Inlet Pressure Sensor Sense Line Cleaning TASK 21-61-23-100-801 | | | 701 | SIA ALL |
| **FLOW SENSOR - REMOVAL/INSTALLATION** | 21-61-24 | | 401 | SIA ALL |
| Flow Sensor Removal TASK 21-61-24-000-801 | | | 401 | SIA ALL |
| Flow Sensor Installation TASK 21-61-24-400-801 | | | 404 | SIA ALL |
| **DUCT TEMPERATURE BULB - REMOVAL/INSTALLATION** | 21-61-30 | | 401 | SIA ALL |
| Duct Temperature Bulb Removal TASK 21-61-30-000-801 | | | 401 | SIA ALL |
| Duct Temperature Bulb Installation TASK 21-61-30-400-801 | | | 407 | SIA ALL |



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CHAPTER 21
AIR CONDITIONING


| SUBJECT | CHAPTER SECTION SUBJECT | CONF | PAGE | EFFECT |
|---|---|---|---|---|
| **CABIN TEMPERATURE BULB - REMOVAL/INSTALLATION** | 21-61-31 | | 401 | SIA ALL |
| Cabin Temperature Bulb Removal TASK 21-61-31-000-801 | | | 401 | SIA ALL |
| Cabin Temperature Bulb Installation TASK 21-61-31-400-801 | | | 405 | SIA ALL |
| **CABIN TEMPERATURE INDICATOR - REMOVAL/INSTALLATION** | 21-61-32 | | 401 | SIA ALL |
| Cabin Temperature Indicator Removal TASK 21-61-32-000-801 | | | 401 | SIA ALL |
| Cabin Temperature Indicator Installation TASK 21-61-32-400-801 | | | 404 | SIA ALL |
| **TRIM AIR PRESSURE REGULATION AND SHUTOFF CONTROL - ADJUSTMENT/TEST** | 21-62-00 | | 501 | SIA ALL |
| Trim Air Pressure Regulating and Shutoff Valve - Operational Test TASK 21-62-00-710-801 | | | 501 | SIA ALL |
| **TRIM AIR PRESSURE REGULATING AND SHUTOFF VALVE - REMOVAL/INSTALLATION** | 21-62-01 | | 401 | SIA ALL |
| Trim Air Pressure Regulating and Shutoff Valve Removal TASK 21-62-01-000-801 | | | 401 | SIA ALL |
| Trim Air Pressure Regulating and Shutoff Valve Installation TASK 21-62-01-400-801 | | | 406 | SIA ALL |



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## 1. General

A. This procedure has these tasks:

(1) Supply Conditioned Air to the Airplane

(2) Remove Conditioned Air from the Airplane

(3) Supply Conditioned Air with a Cooling Pack

(4) Remove Conditioned Air Supplied by a Cooling Pack

(5) Supply Conditioned Air with a Ground Air Source

(6) Remove Conditioned Air Supplied by a Ground Air Source

B. It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling pack (SL 737-21-053).

**TASK 21-00-00-800-801**

## 2. Supply Conditioned Air to the Airplane

(Figure 201)

### A. General

**SUBTASK 21-00-00-860-001**

(1) It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs. To supply conditioned air, do this task: Supply Conditioned Air with a Ground Air Source, TASK 21-00-00-800-805.

### B. Procedure

**SUBTASK 21-00-00-860-002**

(1) Do one of these tasks to supply conditioned air to the airplane:

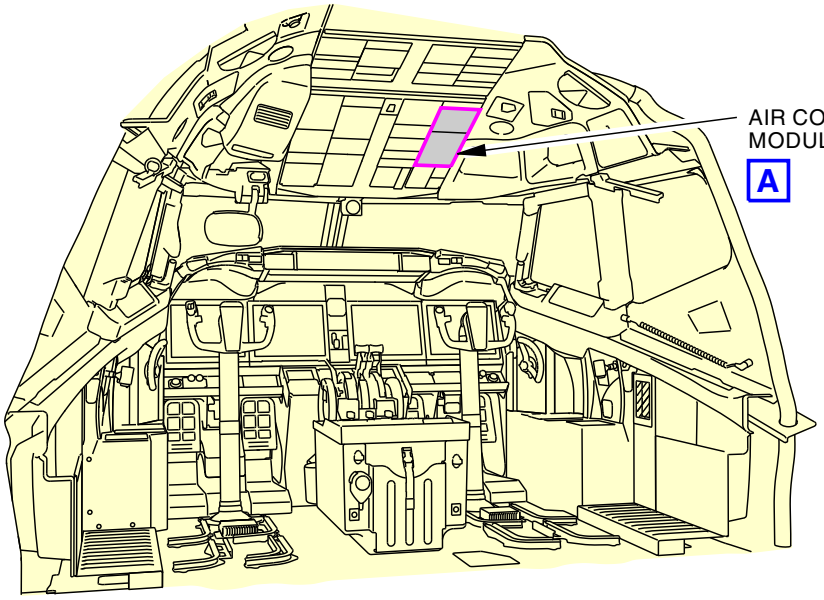
(a) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

(b) Do this task: Supply Conditioned Air with a Ground Air Source, TASK 21-00-00-800-805.

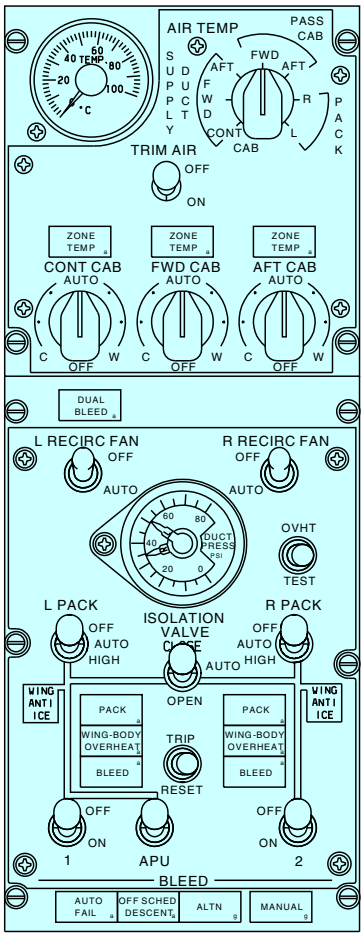
**——— END OF TASK ———**



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FLIGHT COMPARTMENT




AIR CONDITIONING MODULE

A

2411231 S00061527313_V2

**Air Conditioning - General - Maintenance Practices**
**Figure 201/21-00-00-990-801**



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**TASK 21-00-00-800-802**

**3. Remove Conditioned Air from the Airplane**

(Figure 201)

**A. Procedure**

SUBTASK 21-00-00-860-003

(1) Do one of these tasks to remove conditioned air from the airplane:

(a) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

(b) Do this task: Remove Conditioned Air Supplied by a Ground Air Source, TASK 21-00-00-800-806.

——— END OF TASK ———

**TASK 21-00-00-800-803**

**4. Supply Conditioned Air with a Cooling Pack**

(Figure 201)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**C. General**

SUBTASK 21-00-00-860-004

(1) It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs. To supply conditioned air, do this task: Supply Conditioned Air with a Ground Air Source, TASK 21-00-00-800-805.

SUBTASK 21-00-00-860-005

(2) When conditions permit, open the doors for the air conditioning packs when they operate.

**D. Prepare to Supply Conditioned Air with a Cooling Pack**

SUBTASK 21-00-00-860-007

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-00-00-860-008

**WARNING** MAKE SURE THAT THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NO EXIT FOR THE AIR, THE PRESSURE IN THE CABIN WILL INCREASE. THIS CAN CAUSE INJURIES TO PERSONNEL.

(2) Do one of these steps to make sure there is an exit for the conditioned air:

(a) Make sure the cabin pressure outflow valve is open.

(b) Make sure at least one passenger entry door is open.



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SUBTASK 21-00-00-860-009

**CAUTION**

DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE. IF YOU OPERATE THEM AT THE SAME TIME, DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Make sure that the ground air source is disconnected.

**E. Supply Conditioned Air with a Cooling Pack**

SUBTASK 21-00-00-860-010

(1) Turn these selectors on the P5-17 Cabin Temperature Control Panel to the AUTO position:

(a) CONT CAB

(b) FWD CAB

(c) AFT CAB

SUBTASK 21-00-00-860-011

(2) Set the applicable L PACK switch or the R PACK switch, on the P5-10 Air Conditioning Panel, to the AUTO position.

**——— END OF TASK ———**

**TASK 21-00-00-800-804**

## 5. Remove Conditioned Air Supplied by a Cooling Pack

(Figure 201)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**C. Remove Conditioned Air Supplied by a Cooling Pack**

SUBTASK 21-00-00-860-012

(1) Set the applicable L PACK switch or the R PACK switch, on the P5-10 Air Conditioning Panel, to the OFF position.

**D. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-00-00-860-013

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**——— END OF TASK ———**

**TASK 21-00-00-800-805**

## 6. Supply Conditioned Air with a Ground Air Source

**A. Location Zones**

| Zone | Area |
|---|---|
| 100 | Lower Half of Fuselage |



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**B. Access Panels**

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

**C. Supply Conditioned Air with a Ground Air Source**

SUBTASK 21-00-00-010-001

(1) Get access to the ground conditioned air connector, do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

SUBTASK 21-00-00-210-001

(2) Make sure that the swing check valve in the ground conditioned air connector can move freely.

SUBTASK 21-00-00-860-015

(3) Do these steps to connect the duct from the ground air source to the ground conditioned air connector:

(a) Engage the fasteners on the duct with the slots in the ground conditioned air connector.

(b) Turn the duct until it is locked to the ground conditioned air connector.

SUBTASK 21-00-00-860-016

**WARNING** MAKE SURE THAT THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NO EXIT FOR THE AIR, THE PRESSURE IN THE CABIN WILL INCREASE. THIS CAN CAUSE INJURIES TO PERSONNEL.

(4) Do one of these steps to make sure that there is an exit for the conditioned air:

(a) Make sure that the cabin pressure outflow valve is open.

(b) Make sure that at least one passenger entry door is open.

SUBTASK 21-00-00-860-017

**CAUTION** DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE. IF YOU OPERATE THEM AT THE SAME TIME, DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are set to the OFF position.

NOTE: It is optional to make sure that the L RECIRC FAN and R RECIRC FAN switches are set to the OFF position.

SUBTASK 21-00-00-860-019

(6) Operate the ground air source to supply conditioned air to the airplane.

(a) Make sure that the conditioned air pressure does not exceed 15 in/$H_2O$ (0.54 psi).

(b) Make sure that the conditioned air temperature does not exceed 160°F (71°C).

**END OF TASK**



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**TASK 21-00-00-800-806**

**7. Remove Conditioned Air Supplied by a Ground Air Source**

**A. Location Zones**

| Zone | Area |
|---|---|
| 100 | Lower Half of Fuselage |

**B. Access Panels**

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

**C. Procedure**

**SUBTASK 21-00-00-860-020**

(1) Stop the operation of the ground air source.

**SUBTASK 21-00-00-020-001**

(2) Remove the duct for the ground air source from the ground conditioned air connector.

**SUBTASK 21-00-00-010-002**

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

**——— END OF TASK ———**



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## AIR CONDITIONING - GENERAL - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tests:

(1) 21 Air Conditioning, System Test, Air Conditioning IBIT - Left

(2) 21 Air Conditioning, System Test, Air Conditioning IBIT - Right

(3) 21 Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test - Left

(4) 21 Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test - Right

**TASK 21-00-00-730-801**

### 2. Air Conditioning, System Test, Air Conditioning IBIT

#### A. General

(1) This test makes sure that the air conditioning valves and ram air door actuators operate correctly.

(a) Air conditioning valves and ram air doors will open and close.

#### B. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| 46-13-02-710-801 | Onboard Maintenance Function Ground Test (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

#### C. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |
| 221 | Passenger Compartment - Aft of Control Compartment to Forward Entry Door - Left |

#### D. Prepare for the Test

**SUBTASK 21-00-00-860-021**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-00-00-860-022**

(2) If the GND TEST switch on the P61–4 panel is in NORM position, set the GND TEST switch to ENABLE position.

**SUBTASK 21-00-00-700-001**

(3) Make sure that the airplane is in “ON GROUND” mode.

(a) If necessary, do this task to set the airplane to ON GROUND mode: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

**SUBTASK 21-00-00-860-023**

(4) Do these steps on the P5-10 Air Conditioning Panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the AUTO position.

(b) Set the BLEED 1 and 2 switches to the OFF position.

(c) Set the BLEED APU switch to the OFF position.



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(d) Set the L and R RECIRC FAN switches to the AUTO position.

(e) Set the ISOLATION VALVE switch to the OPEN position.

SUBTASK 21-00-00-860-024

(5) Do these steps on the P5-17 Cabin Temperature Panel (located on the P5 forward overhead panel):

(a) Set the CONT CAB, FWD CAB, and AFT CAB selectors to the AUTO position.

(b) Set the TRIM AIR switch to the ON position.

**E. System Test - Air Conditioning IBIT**

SUBTASK 21-00-00-730-001

(1) Start the applicable ground test (TASK 46-13-02-710-801):

(a) 21 Air Conditioning, System Test, Air Conditioning IBIT - Left.

(b) 21 Air Conditioning, System Test, Air Conditioning IBIT - Right.

(2) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(3) If FAILED shows, then do the fault isolation procedure for the maintenance message (IFIM and do the applicable procedure(s)).

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-00-00-860-025

(1) Put the switches back to the usual condition.

SUBTASK 21-00-00-860-026

(2) If all maintenance on the airplane is completed, set the GND TEST switch on the P61–4 panel to the NORM position.

——— END OF TASK ———

**TASK 21-00-00-730-802**

**3. Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test**

**A. General**

(1) This test makes sure that the air conditioning valves, ram air door actuators, and flow sensor operate correctly.

(a) Air conditioning valves and ram air doors will open and close.

(2) This test will take approximately 4-5 minutes to complete.

(3) If the Air Conditioning System has been running, prior to this test, or if it is a hot day, shut down the Air Conditioning System for at least 10 minutes before running this test. This will prevent setting a drift fault.

**B. References**

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 31-65-00-970-801 | System Maintenance Data Pages Function (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| 46-13-02-710-801 | Onboard Maintenance Function Ground Test (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |
| 221 | Passenger Compartment - Aft of Control Compartment to Forward Entry Door - Left |

**D. Prepare for the Test**

SUBTASK 21-00-00-710-012

(1) On the MAX Display System (MDS), go to the 21 AIR CONDITIONING display under the MAINT DATA PGS (TASK 31-65-00-970-801).

(a) Make sure that the PACK INLET TEMP is less than 150°F (66°C) before running the IBIT with Flow Sensor Test.

NOTE: If the PACK INLET TEMP is greater than 150°F (66°C), then the test will cause a fault to occur.

1) If necessary, do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

SUBTASK 21-00-00-860-028

(2) If the GND TEST switch on the P61–4 panel is in NORM position, set the GND TEST switch to ENABLE position.

SUBTASK 21-00-00-860-029

(3) Make sure that the airplane is in “ON GROUND” mode.

(a) If necessary, do this task to set the airplane to ON GROUND mode: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-00-00-860-030

(4) Do these steps on the P5-10 Air Conditioning Module:

(a) Set the L and R PACK switches to the AUTO position.

(b) Set the BLEED 1 and 2 switches to the OFF position.

(c) Set the BLEED APU switch to the OFF position.

(d) Set the L and R RECIRC FAN switches to the AUTO position.

(e) Set the ISOLATION VALVE switch to the OPEN position.

(5) On the P5-11 Engine and Wing Anti-Ice Panel, set the WING ANTI-ICE switch to the OFF position.

SUBTASK 21-00-00-860-031

(6) Do these steps on the P5-17 Cabin Temperature Selector:

(a) Set the CONT CAB, FWD CAB, and AFT CAB selectors to the AUTO position.

(b) Set the TRIM AIR switch to the ON position.

**E. System Test - Air Conditioning IBIT**

SUBTASK 21-00-00-730-002

(1) Do this task and select the ground test: Onboard Maintenance Function Ground Test, TASK 46-13-02-710-801.

(a) 21 Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test - Left.

(b) 21 Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test - Right.



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(2) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(3) If FAILED shows, go to IFIM and do the applicable procedure(s).

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-00-00-860-032**

(1) Put the switches back to the usual condition.

**SUBTASK 21-00-00-860-033**

(2) If all maintenance on the airplane is completed, set the GND TEST switch on the P61–4 panel to the NORM position.

**——— END OF TASK ———**



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## AIR CONDITIONING - DDG MAINTENANCE PROCEDURES

### 1. General

A. This procedure has the maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Guide (DDG). These tasks prepare the airplane for flight with certain systems/components inoperative.

B. This procedure also has the tasks that put the airplane back to its usual condition.

C. These are the tasks for the air conditioning components:

(1) DDG 21-21-01 Ground Conditioned Air Connector Check Valve Inoperative - Preparation

(2) DDG 21-21-01 Ground Conditioned Air Connector Check Valve Inoperative - Restoration

(3) DDG 21-23-01 Return Air Grille Broken or Missing - Preparation

(4) DDG 21-23-01 Return Air Grille Broken or Missing - Restoration

(5) DDG 21-27-01 Equipment Cooling Supply and Exhaust Fans Inoperative - Preparation

(6) DDG 21-27-02A Overboard Exhaust Valve Inoperative - Valve in SMOKE Position - Preparation

(7) DDG 21-27-02A Overboard Exhaust Valve Inoperative - Valve in SMOKE Position - Restoration

(8) DDG 21-27-02B Overboard Exhaust Valve Inoperative - Valve Fully Open - Preparation

(9) DDG 21-27-02B Overboard Exhaust Valve Inoperative - Valve Fully Open - Restoration

(10) DDG 21-27-03 Equipment Cooling Low Flow Detector System Inoperative - Preparation

(11) DDG 21-27-03 Equipment Cooling Low Flow Detector System Inoperative - Restoration

(12) DDG 21-27-04 Equipment Cooling Air Filter Removed - Preparation

(13) DDG 21-27-04 Equipment Cooling Air Filter Removed - Restoration

(14) DDG 21-27-05 Enhanced E6 Rack Equipment Cooling Exhaust Fan Inoperative - Preparation

(15) DDG 21-27-05 Enhanced E6 Rack Equipment Cooling Exhaust Fan Inoperative - Restoration

(16) DDG 21-31-01-01A Cabin Pressure Control System - One Automatic Mode Inoperative - Preparation

(17) DDG 21-31-01-01A Cabin Pressure Control System - One Automatic Mode Inoperative - Restoration

(18) DDG 21-31-01-01B Cabin Pressure Control System - Both Automatic Modes Inoperative - Preparation

(19) DDG 21-31-01-01B Cabin Pressure Control System - Both Automatic Modes Inoperative - Restoration

(20) DDG 21-31-01-02 Cabin Pressure Control System - Manual Mode Inoperative - Preparation

(21) DDG 21-31-01-02 Cabin Pressure Control System - Manual Mode Inoperative - Restoration

(22) DDG 21-31-02 Main Outflow Valve Inoperative - Preparation

(23) DDG 21-31-02 Main Outflow Valve Inoperative - Restoration

(24) DDG 21-32-01A Positive Pressure Relief Valve Inoperative - Valve Closed - Preparation

(25) DDG 21-32-01A Positive Pressure Relief Valve Inoperative - Valve Closed - Restoration

(26) DDG 21-32-01B Positive Pressure Relief Valve Inoperative - Valve Open - Preparation

(27) DDG 21-32-01B Positive Pressure Relief Valve Inoperative - Valve Open - Restoration

(28) DDG 21-33-01 Cabin Rate of Climb Indicator Inoperative - Preparation



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(29) DDG 21-33-01 Cabin Rate of Climb Indicator Inoperative - Restoration
(30) DDG 21-33-02–02 Cabin Differential Pressure Indication Inoperative - Preparation
(31) DDG 21-33-02–02 Cabin Differential Pressure Indication Inoperative - Restoration
(32) DDG 21-33-03–02 Cabin Altitude Indication Inoperative - Preparation
(33) DDG 21-33-03–02 Cabin Altitude Indication Inoperative - Restoration
(34) DDG 21-33-05 Outflow Valve Position Indicator Inoperative - Preparation
(35) DDG 21-45-01 Door Area Heater System Inoperative - Preparation
(36) DDG 21-45-01 Door Area Heater System Inoperative - Restoration
(37) DDG 21-51-01 Air Conditioning Packs Inoperative - Preparation
(38) DDG 21-51-01 Air Conditioning Packs Inoperative - Restoration
(39) DDG 21-51-02 Pack Flow Control and Shutoff Valves Inoperative - Preparation
(40) DDG 21-51-02 Pack Flow Control and Shutoff Valves Inoperative - Restoration
(41) DDG 21-51-04 Pack Flow Sensor Inoperative - Preparation
(42) DDG 21–51–05 Pack Temperature Control Valves Inoperative - Preparation
(43) DDG 21–51–05 Pack Temperature Control Valves Inoperative - Restoration
(44) DDG 21-51-09 Pack Ram Air Systems Inoperative - Preparation
(45) DDG 21-51-09 Pack Ram Air Systems Inoperative - Restoration
(46) DDG 21-61-01 Trim Air Modulating Valve Inoperative - Preparation
(47) DDG 21-61-01 Trim Air Modulating Valve Inoperative - Restoration
(48) DDG 21-61-04 Trim Air Check Valve Inoperative - Preparation
(49) DDG 21-61-04 Trim Air Check Valve Inoperative - Restoration
(50) DDG 21-62-01 Trim Air Pressure Regulating and Shutoff Valve Inoperative - Preparation
(51) DDG 21-62-01 Trim Air Pressure Regulating and Shutoff Valve Inoperative - Restoration

**TASK 21-00-00-040-844**

## 2. DDG 21-21-01 Ground Conditioned Air Connector Check Valve Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the ground conditioned air connector check valve inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Prepare for Unpressurized Flight.

**SUBTASK 21-00-00-040-001**

(1) For dispatch with the ground preconditioned air connection check valve inoperative in the open position, do these steps:

(a) On the P5 overhead panel, do these steps:

1) Put the pressurization mode selector in the MAN position.


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2) Hold the outflow valve toggle switch in the OPEN position until the outflow valve position indicator shows FULL OPEN.

(b) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**——— END OF TASK ———**

**TASK 21-00-00-440-831**

## 3. DDG 21-21-01 Ground Conditioned Air Connector Check Valve Inoperative - Restoration

### A. General

(1) This task puts the airplane to its usual condition after operation with the ground conditioned air connector check valve inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Ground Preconditioned Air Connection Check Valve Restoration.

**SUBTASK 21-00-00-760-001**

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**SUBTASK 21-00-00-710-001**

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

**——— END OF TASK ———**

**TASK 21-00-00-040-845**

## 4. DDG 21-23-01 Return Air Grille Broken or Missing - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the return air grille broken or missing.

### B. References

| Reference | Title |
|---|---|
| 21-23-03 P/B 201 | RETURN AIR GRILLES (DECOMPRESSION VENTS) - MAINTENANCE PRACTICES |
| 25 | EQUIPMENT/FURNISHINGS |

### C. Location Zones

| Zone | Area |
|---|---|
| 231 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Left |
| 232 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Right |



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(Continued)

| Zone | Area |
|---|---|
| 241 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**D. Return Air Grille Preparation**

SUBTASK 21-00-00-010-003

(1) Find the damaged return air grille.

SUBTASK 21-00-00-200-001

(2) Determine if the damaged return air grille is in a location that is permitted to have a damaged or missing return air grille.

(a) It is permitted for a return air grille to be missing or damaged in these locations:

1) Station 887-907.

NOTE: For a damaged return air grille not located in the listed locations, it is permitted to replace the damaged return air grille with one in the allowed location if the two return air grille assemblies have the same part number.

SUBTASK 21-00-00-010-004

(3) Remove interior furnishings that block access to the damaged return air grille (CHAPTER 25).

SUBTASK 21-00-00-020-002

(4) Remove the damaged return air grille (PAGEBLOCK 21-23-03/201).

SUBTASK 21-00-00-400-001

(5) Install a solid panel that fully covers the opening caused by removing the damaged return air grille.

NOTE: Only one return air grille can be blocked at a time.

**E. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-00-00-420-001

(1) Install the interior furnishings removed for access to the damaged return air grille (CHAPTER 25).

**——— END OF TASK ———**

**TASK 21-00-00-440-832**

**5. DDG 21-23-01 Return Air Grille Broken or Missing - Restoration**

**A. General**

(1) This task puts the airplane back to its usual condition after operation with a broken or missing return air grille.

**B. References**

| Reference | Title |
|---|---|
| 21-23-03 P/B 201 | RETURN AIR GRILLES (DECOMPRESSION VENTS) - MAINTENANCE PRACTICES |
| 25 | EQUIPMENT/FURNISHINGS |

**C. Location Zones**

| Zone | Area |
|---|---|
| 231 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Left |
| 232 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Right |



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(Continued)

| Zone | Area |
|---|---|
| 241 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**D. Procedure**

SUBTASK 21-00-00-010-005

(1) Remove the interior furnishings necessary to access the blocked return air grille location (CHAPTER 25).

SUBTASK 21-00-00-020-003

(2) Remove the solid panel used in the location of the damaged return air grille (PAGEBLOCK 21-23-03/201).

SUBTASK 21-00-00-400-002

(3) Install a new return air grille (PAGEBLOCK 21-23-03/201).

**E. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-00-00-410-001

(1) Install the interior furnishings removed for access to the damaged return air grille (CHAPTER 25).

——— END OF TASK ———

**TASK 21-00-00-040-846**

**6. DDG 21-27-01 Equipment Cooling Supply and Exhaust Fans Inoperative - Preparation**

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with an electronic equipment cooling supply or exhaust fan inoperative.

NOTE: A fan may be inoperative as long as all remaining fans and both low flow detectors are inspected to operate normally.

**B. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**C. Equipment Cooling Supply And Exhaust Fan Inspection**

SUBTASK 21-00-00-720-001

(1) On the P5 Equipment Cooling Panel, put the applicable SUPPLY or EXHAUST switch to the operative fan position (NORM or ALTN).

(a) Make sure that the applicable cooling supply or exhaust OFF light goes off.

SUBTASK 21-00-00-720-002

(2) When the supply system has two fans operative, do these steps:

(a) Put the EQUIP COOLING SUPPLY switch to the NORM position.

(b) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(c) Make sure the equipment cooling supply OFF light comes on.



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(d) Put the EQUIP COOLING SUPPLY switch to the ALTN position.

(e) Make sure the equipment cooling supply OFF light goes off.

(f) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00935 | EQPT CLG SPLY FAN PWR-ALTN |

(g) Make sure the equipment cooling supply OFF light comes on.

(h) Remove the safety tags and close these circuit breakers:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00935 | EQPT CLG SPLY FAN PWR-ALTN |

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(i) Make sure that the equipment cooling supply OFF light goes off.

(j) Put the EQUIPMENT COOLING SUPPLY switch to the NORM position.

**SUBTASK 21-00-00-720-003**

(3) When the exhaust system has the two fans operative, do these steps:

(a) Put the EQUIP COOLING EXHAUST switch to the NORM position.

(b) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

(c) Make sure the equipment cooling exhaust OFF light comes on.

(d) Put the EQUIP COOLING EXHAUST switch to the ALTN position.

(e) Make sure the equipment cooling exhaust OFF light goes off.

(f) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 12 | C00837 | EQPT CLG EXH FAN PWR-ALTN |

(g) Make sure the equipment cooling exhaust OFF light comes on.

(h) Remove the safety tags and close these circuit breakers:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 12 | C00837 | EQPT CLG EXH FAN PWR-ALTN |

(i) Make sure that the equipment cooling exhaust OFF light goes off.


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(j) Put the EQUIPMENT COOLING EXHAUST switch to the NORM position.

——— END OF TASK ———

**TASK 21-00-00-040-847**

**7. DDG 21-27-02A Overboard Exhaust Valve Inoperative - Valve in SMOKE Position - Preparation**
(Figure 901)

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the overboard exhaust valve inoperative with the valve in the SMOKE position.

**B. References**

| Reference | Title |
|---|---|
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**C. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-3907 | Mirror - Dental |

**D. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. Equipment Cooling Overboard Exhaust Valve Inspection**

SUBTASK 21-00-00-010-006

(1) To get access to the equipment cooling overboard exhaust valve, do these steps:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(b) Remove the equipment cooling cover panel [27].

1) Remove the screws [28].

2) Remove the equipment cooling cover panel [27].

SUBTASK 21-00-00-210-002

(2) Use a dental mirror, STD-3907, to make sure the position indicator shows that the valve is in the SMOKE position.

**G. If the overboard exhaust valve has not failed in the SMOKE position, do these steps to put and deactivate the valve in the SMOKE position:**

SUBTASK 21-00-00-860-034

(1) Do this task to put the airplane in the air mode: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-00-00-860-035

(2) Put the applicable PACK switches to the HIGH position.

(3) Put the R RECIRC FAN switch to the OFF position.



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(4) Make sure that the overboard exhaust valve is in the SMOKE position.

NOTE: This will take approximately 10 seconds.

(5) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

(6) Return the applicable PACK switches to the AUTO position.

(7) Return the R RECIRC FAN switch to the AUTO position.

## H. Equipment Cooling Overboard Exhaust Valve Deactivation

SUBTASK 21-00-00-860-036

(1) Make sure that these circuit breakers are open and have safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

(2) Disconnect, cap and stow the electrical connector [34] D11880 on the overboard exhaust valve.

(3) Make sure the equipment cooling overboard exhaust valve is in the SMOKE position.

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-00-00-410-018

(5) Install the equipment cooling cover panel [27].

(a) Put the equipment cooling cover panel [27] in place.

(b) Install the screws [28].

SUBTASK 21-00-00-410-017

(6) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-00-00-860-037

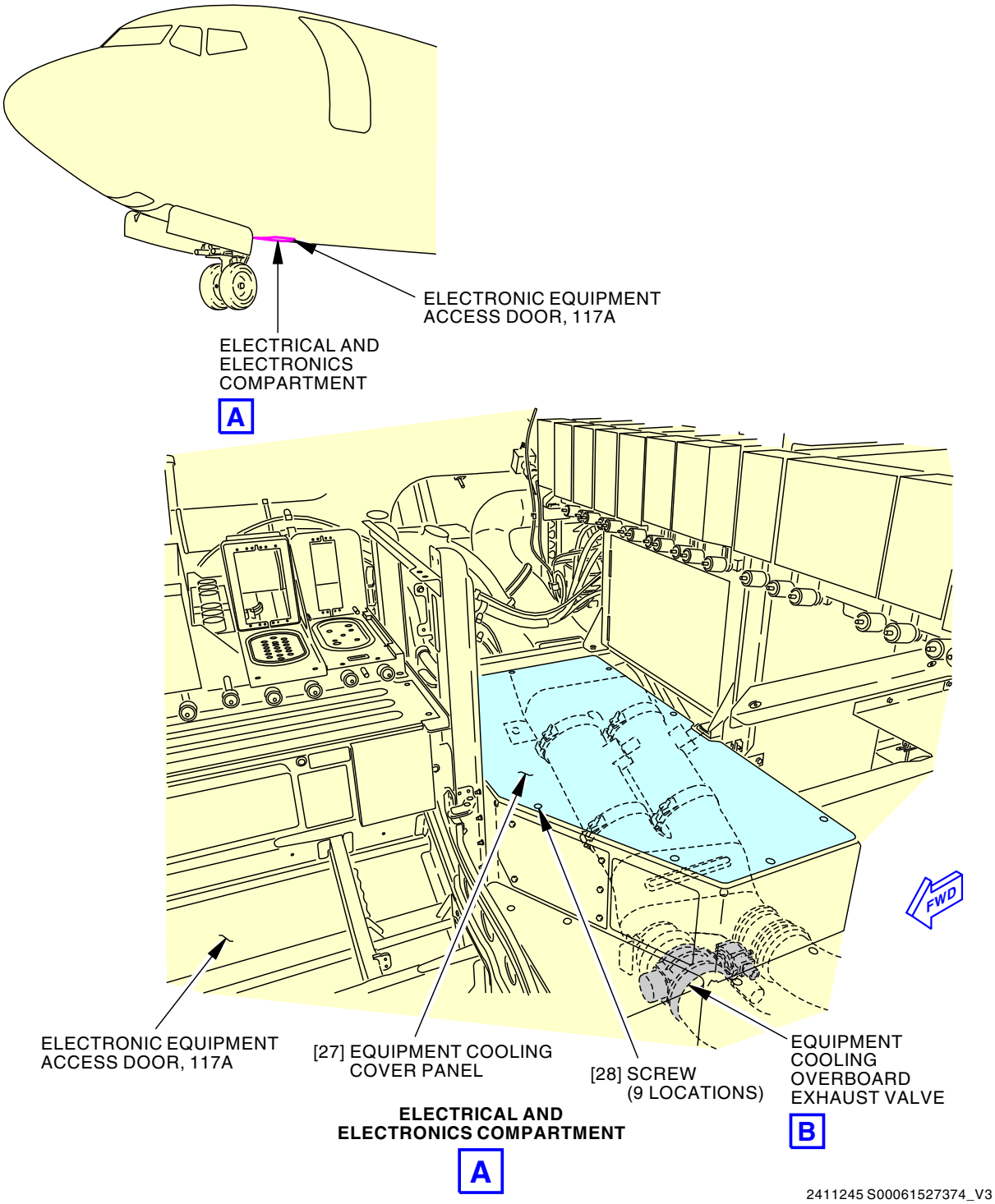
(7) Make sure that the airplane is in “ON GROUND” mode.

(a) If necessary, do this task to set the airplane to ON GROUND mode: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

**——— END OF TASK ———**



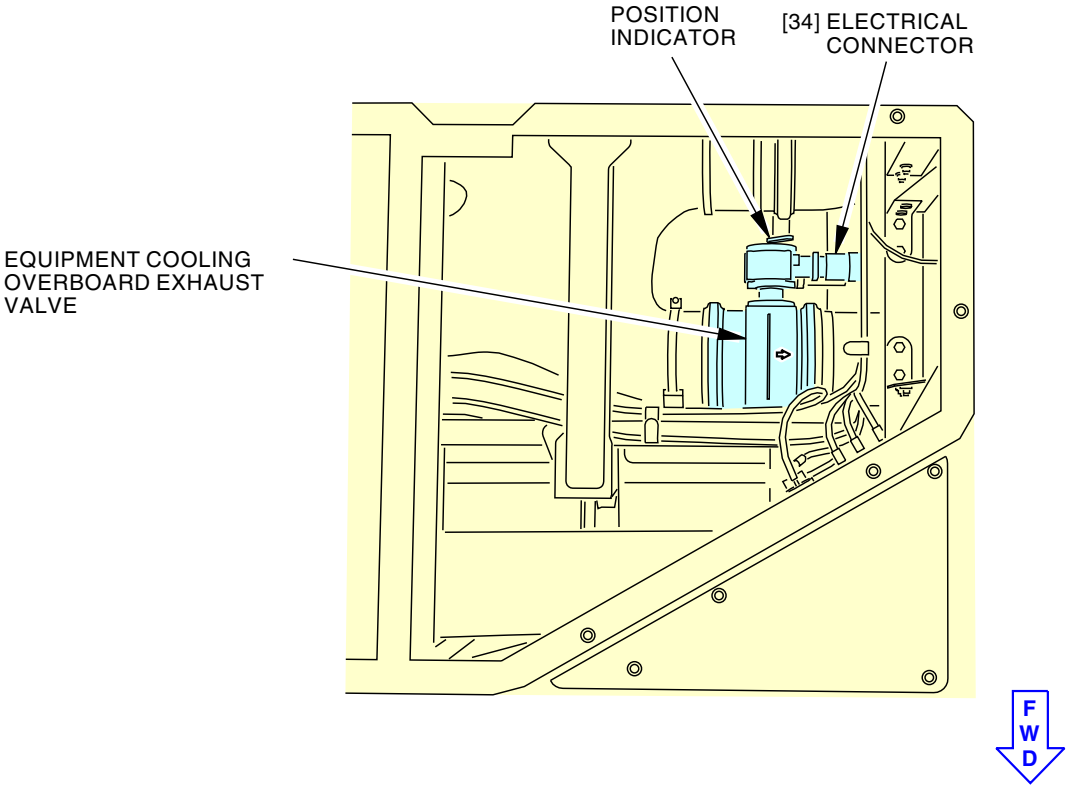
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**Equipment Cooling Overboard Exhaust Valve Deactivation**
**Figure 901/21-00-00-990-809 (Sheet 1 of 2)**



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**EQUIPMENT COOLING OVERBOARD EXHAUST VALVE**
**(OXYGEN BOTTLE INSTALLATION NOT SHOWN FOR CLARITY)**
**(VIEW IN THE DOWN DIRECTION)**

**B**

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**Equipment Cooling Overboard Exhaust Valve Deactivation**
**Figure 901/21-00-00-990-809 (Sheet 2 of 2)**



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**TASK 21-00-00-440-833**

## 8. DDG 21-27-02A Overboard Exhaust Valve Inoperative - Valve in SMOKE Position - Restoration

(Figure 901)

### A. General

(1) This task puts the airplane back to its usual condition after operation with an equipment cooling overboard exhaust valve inoperative with the valve in the SMOKE position.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Procedure

**SUBTASK 21-00-00-010-038**

(1) To get access to the equipment cooling overboard exhaust valve, do these steps:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(b) Remove the equipment cooling cover panel [27].

1) Remove the screws [28].

2) Remove the equipment cooling cover panel [27].

**SUBTASK 21-00-00-860-102**

(2) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**SUBTASK 21-00-00-860-103**

(3) Connect the electrical connector [34] D11880 on the overboard exhaust valve.

**SUBTASK 21-00-00-860-104**

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**SUBTASK 21-00-00-410-019**

(5) Install the equipment cooling cover panel [27].

(a) Put the equipment cooling cover panel [27] in place.

(b) Install the screws [28].



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SUBTASK 21-00-00-410-016

(6) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

——— END OF TASK ———

TASK 21-00-00-040-848

## 9. DDG 21-27-02B Overboard Exhaust Valve Inoperative - Valve Fully Open - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the overboard exhaust valve inoperative with the valve in the fully open position.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

### C. Prepare for Unpressurized Flight.

SUBTASK 21-00-00-040-002

(1) On the P5 overhead panel, do these steps:

(a) Put the pressurization mode selector in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the outflow valve position indicator shows FULL OPEN.

(2) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

——— END OF TASK ———

TASK 21-00-00-440-834

## 10. DDG 21-27-02B Overboard Exhaust Valve Inoperative - Valve Fully Open - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with an equipment cooling overboard exhaust valve inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

### C. Put the Airplane Back to Its Usual Condition

SUBTASK 21-00-00-960-002

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |



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SUBTASK 21-00-00-710-013

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

——— END OF TASK ———

TASK 21-00-00-040-849

11. DDG 21-27-03 Equipment Cooling Low Flow Detector System Inoperative - Preparation
(Figure 902)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with an equipment cooling low flow detector system inoperative.

B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

D. Equipment Cooling Supply and Exhaust Fan Inspection

SUBTASK 21-00-00-010-008

(1) To get access to the equipment cooling overboard exhaust valve, do these steps:

Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-00-00-710-002

(2) If the supply system low flow detector does not operate, then do these steps:

(a) Put the SUPPLY switch to the NORMAL position on the Equipment Cooling Panel.

(b) Make sure the normal equipment cooling supply fan operates.

1) Put your hand on the fan to feel for vibration.

NOTE: If you feel vibration, the fan is on.

(c) Put the SUPPLY switch to the ALTERNATE position.

(d) Make sure the alternate equipment cooling supply fan operates.

1) Put your hand on the fan to feel for vibration.

NOTE: If you feel vibration, the fan is on.

SUBTASK 21-00-00-710-003

(3) If the exhaust system low flow detector does not operate, then do these steps:

(a) Put the EXHAUST switch to the NORMAL position on the Equipment Cooling Panel.

(b) Remove the equipment cooling cover panel [35].

1) Remove the nine screws [36].

2) Remove the equipment cooling cover panel [35].

(c) Make sure that the normal equipment cooling exhaust fan operates.



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1) Put your hand on the fan to feel for vibration or feel for air exiting the overboard exhaust vent at the bottom of the airplane near the centerline at STA 370.

NOTE: If you feel vibration from the fan or air from the vent, the fan is on.

(d) Put the EXHAUST switch to the ALTERNATE position.

(e) Make sure that the alternate equipment cooling exhaust fan operates.

1) Put your hand on the fan to feel for vibration or feel for air exiting the overboard exhaust vent at the bottom of the airplane near the centerline at STA 370.

NOTE: If you feel vibration from the fan or air from the vent, the fan is on.

(f) Install the equipment cooling cover panel [35].

1) Put the nine screws [36] in place.

2) Install the equipment cooling cover panel [35].

**SUBTASK 21-00-00-010-010**

(4) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-00-00-930-001**

(5) To make sure that the remaining detector system operates normally, do this task: DDG 21-27-01 Equipment Cooling Supply and Exhaust Fans Inoperative - Preparation, TASK 21-00-00-040-846.

**SUBTASK 21-00-00-860-038**

(6) Put the SUPPLY and the EXHAUST switches on the Equipment Cooling Panel to their usual positions.

**SUBTASK 21-00-00-040-003**

(7) For the ground crew call horn sounding on the ground with a low flow detector system inoperative (high alarm condition), open the applicable circuit breaker:

(a) Open these circuit breakers and install safety locks:

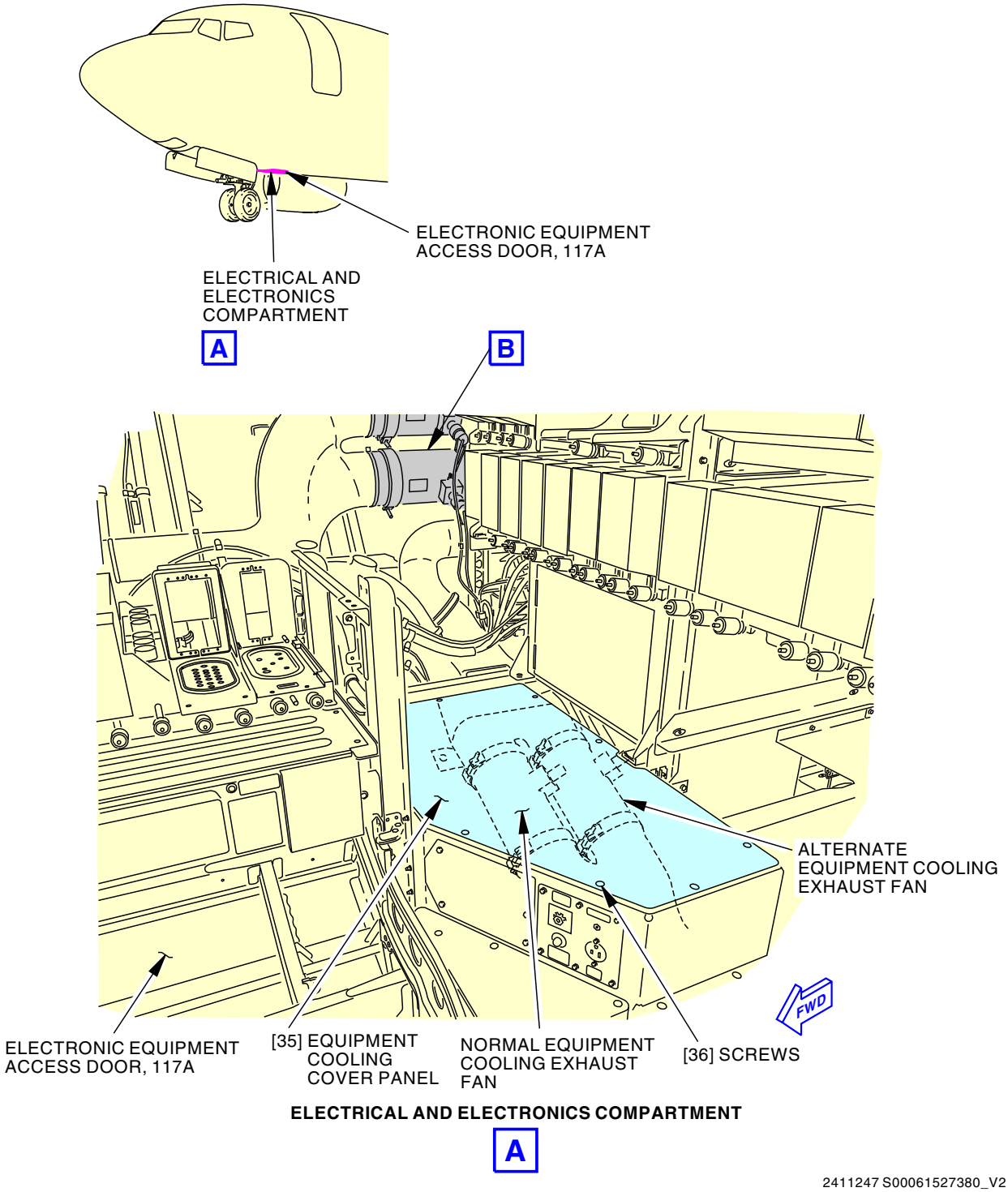
**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 17 | C01433 | EQPT COOLING LOW FLOW DETECT SUPPLY |
| A | 18 | C01434 | EQPT COOLING LOW FLOW DETECT EXHAUST |

**——— END OF TASK ———**



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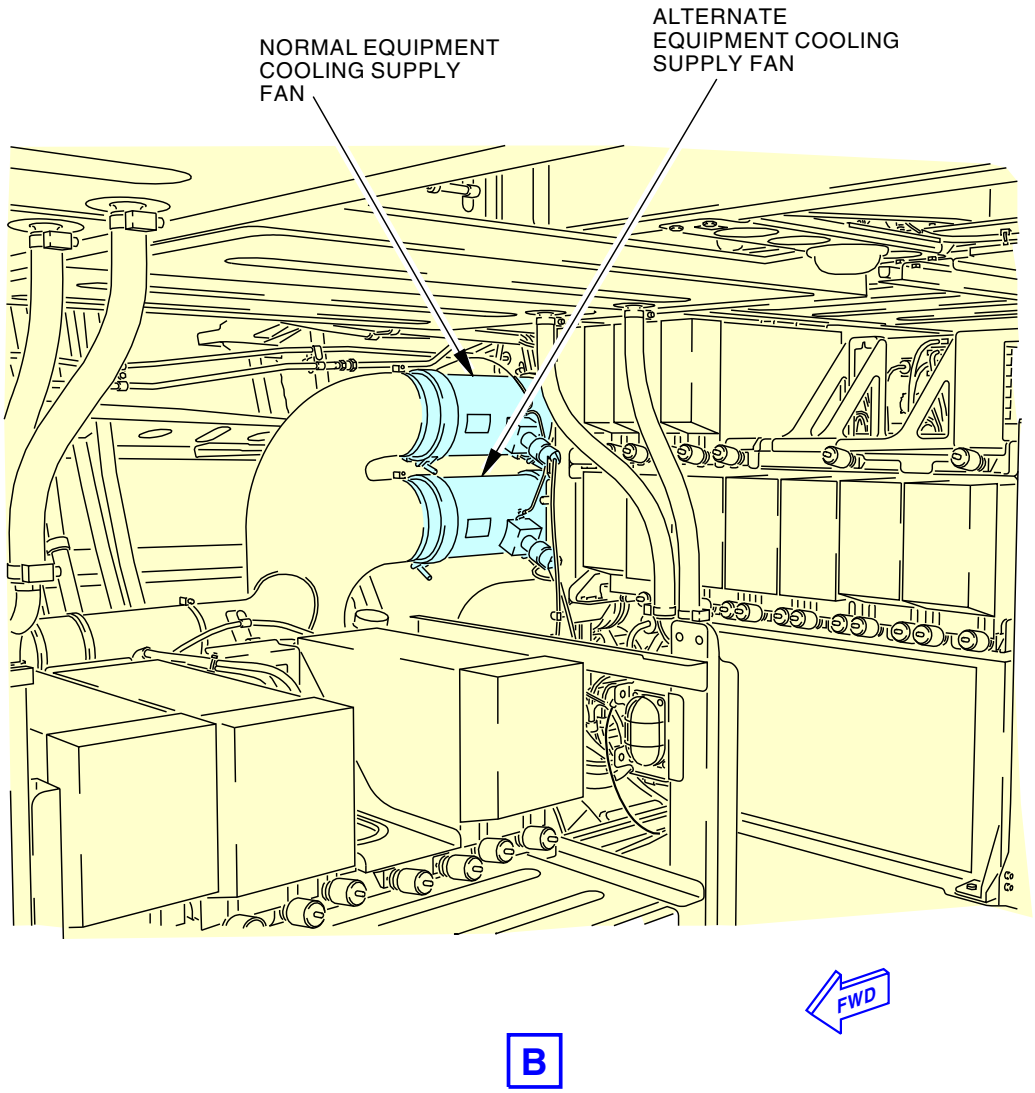



2411247 S00061527380_V2

**Equipment Cooling Low Flow Detector System Deactivation**
**Figure 902/21-00-00-990-810 (Sheet 1 of 2)**



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**Equipment Cooling Low Flow Detector System Deactivation**
**Figure 902/21-00-00-990-810 (Sheet 2 of 2)**



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**TASK 21-00-00-440-835**

## 12. DDG 21-27-03 Equipment Cooling Low Flow Detector System Inoperative - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with an equipment cooling low flow detector system inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-00-00-860-039**

(1) Close the applicable circuit breaker

(a) Remove the safety locks and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 17 | C01433 | EQPT COOLING LOW FLOW DETECT SUPPLY |
| A | 18 | C01434 | EQPT COOLING LOW FLOW DETECT EXHAUST |

**——— END OF TASK ———**

**TASK 21-00-00-040-850**

## 13. DDG 21-27-04 Equipment Cooling Air Filter Removed - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the equipment cooling air filter removed.

### B. References

| Reference | Title |
|---|---|
| 21-27-01-000-801 | Equipment Cooling Air Filter Removal (P/B 401) |
| 50-11-01-400-801 | Forward Cargo Compartment Forward Bulkhead Liner Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 122 | Forward Cargo Compartment - Right |

### D. Equipment Cooling Air Filter Removal

**SUBTASK 21-00-00-020-004**

(1) Do this task: Equipment Cooling Air Filter Removal, TASK 21-27-01-000-801.

### E. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-00-00-410-002**

(1) Install the forward right bulkhead liner in the forward cargo compartment (TASK 50-11-01-400-801).

**——— END OF TASK ———**



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**TASK 21-00-00-440-836**

## 14. DDG 21-27-04 Equipment Cooling Air Filter Removed - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with the equipment cooling air filter removed.

### B. References

| Reference | Title |
|---|---|
| 21-27-01-400-801 | Equipment Cooling Air Filter Installation (P/B 401) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 50-11-01-000-801 | Forward Cargo Compartment Forward Bulkhead Liner Removal (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 122 | Forward Cargo Compartment - Right |

### D. Prepare for the Installation

**SUBTASK 21-00-00-860-040**

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802

**SUBTASK 21-00-00-410-003**

(2) Remove the forward right bulkhead liner in the forward cargo compartment (TASK 50-11-01-000-801).

### E. Equipment Cooling Air Filter - Installation

**SUBTASK 21-00-00-020-005**

(1) Do this task: Equipment Cooling Air Filter Installation, TASK 21-27-01-400-801.

**——— END OF TASK ———**

**TASK 21-00-00-040-870**

## 15. DDG 21-27-05 Enhanced E6 Rack Equipment Cooling Exhaust Fan Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the enhanced E6 rack equipment cooling exhaust fan inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Enhanced E6 Rack Equipment Cooling Exhaust Fan Deactivation

**SUBTASK 21-00-00-860-132**

(1) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-5**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C04069 | EQUIPMENT COOLING E6 RACK FAN POWER |
| D | 10 | C04070 | EQUIPMENT COOLING E6 RACK FAN CONTROL |



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SUBTASK 21-00-00-020-022

(2) Do one of these steps:

(a) Remove all actively and passively cooled equipment found on the E6-1 and E6-3 rack.

(b) Open and install safety lock on the applicable circuit breakers for all actively and passively cooled equipment found on the E6-1 and E6-3 rack.

——— END OF TASK ———

TASK 21-00-00-440-856

## 16. DDG 21-27-05 Enhanced E6 Rack Equipment Cooling Exhaust Fan Inoperative - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with the enhanced E6 rack equipment cooling exhaust fan inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Enhanced E6 Rack Equipment Cooling Exhaust Fan Activation

SUBTASK 21-00-00-860-133

(1) Remove the safety locks and close these circuit breakers:

**F/O Electrical System Panel, P6-5**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C04069 | EQUIPMENT COOLING E6 RACK FAN POWER |
| D | 10 | C04070 | EQUIPMENT COOLING E6 RACK FAN CONTROL |

SUBTASK 21-00-00-420-022

(2) Do the applicable step:

(a) Install all actively and passively cooled equipment found on the E6-1 and E6-3 rack.

(b) Remove the safety lock and close the applicable circuit breakers for all actively and passively cooled equipment found on the E6-1 and E6-3 rack.

——— END OF TASK ———

TASK 21-00-00-040-851

## 17. DDG 21-31-01-01A Cabin Pressure Control System - One Automatic Mode Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one automatic mode of the cabin pressure control system inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |



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**C. One Automatic Cabin Pressure Controller Inoperative - Deactivation Procedure**

**SUBTASK 21-00-00-860-041**

(1) When the manual mode operates and one of the two automatic modes does not operate, then deactivate the controller that is Inoperative.

(2) Open the applicable circuit breaker to deactivate the inoperative Cabin Pressure Controller:

(a) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |

(b) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**——— END OF TASK ———**

**TASK 21-00-00-440-837**

**18. DDG 21-31-01-01A Cabin Pressure Control System - One Automatic Mode Inoperative - Restoration**

**A. General**

(1) This task puts the airplane to its usual condition after operation with one automatic mode of the cabin pressure control system inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Cabin Pressure Controller Reactivation.**

**SUBTASK 21-00-00-960-004**

(1) Close the applicable circuit breaker:

(a) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |

(b) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**——— END OF TASK ———**



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**TASK 21-00-00-040-852**

**19. DDG 21-31-01-01B Cabin Pressure Control System - Both Automatic Modes Inoperative - Preparation**

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with two modes of the cabin pressure control system inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Prepare for Unpressurized Flight.**

**SUBTASK 21-00-00-860-042**

(1) Do these steps to prepare for unpressurized flight:

(a) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**——— END OF TASK ———**

**TASK 21-00-00-440-838**

**20. DDG 21-31-01-01B Cabin Pressure Control System - Both Automatic Modes Inoperative - Restoration**

**A. General**

(1) This task puts the airplane back to its usual condition after operation with two modes of the cabin pressure control system inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Cabin Pressure Control System Reactivation**

**SUBTASK 21-00-00-860-043**

(1) Remove the safety locks and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |



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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

SUBTASK 21-00-00-710-014

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

——— END OF TASK ———

**TASK 21-00-00-040-853**

**21. DDG 21-31-01-02 Cabin Pressure Control System - Manual Mode Inoperative - Preparation**

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the manual modes of the cabin pressure control system inoperative.

**B. References**

| Reference | Title |
|---|---|
| 21-31-03-000-801 | Aft Outflow Valve Assembly Removal (P/B 401) |
| 71-00-00-910-801-G00 | Prepare the Engine for Operation (P/B 201) |
| 71-00-00-910-802-G00 | Start the Engine (Selection) (P/B 201) |
| 71-00-00-910-806-G00 | Stop the Engine (Usual Engine Stop) (P/B 201) |

**C. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**D. Prepare for Unpressurized Flight.**

SUBTASK 21-00-00-860-044

(1) Do these steps to put the outflow valve in the FULL OPEN position:

(a) Put the airplane in a position where it is safe to do high power engine run and set the parking brake.

(b) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00

(c) To start the engines do this task: TASK 71-00-00-910-802-G00

(d) Let the engines become stable at the idle-power position for two minutes.

(e) Slowly move the forward thrust levers until N1 is greater than 60% and N2 is greater than 89%

(f) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(g) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(h) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |



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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

(i) Slowly move the forward thrust levers to the idle-power position.

(j) To stop the engines, do this task: TASK 71-00-00-910-806-G00.

SUBTASK 21-00-00-000-006

(2) If the outflow valve can not be put to the FULL OPEN position, then remove the outflow valve.

(a) Do this task: Aft Outflow Valve Assembly Removal, TASK 21-31-03-000-801.

(b) Cap and stow the electrical connectors.

SUBTASK 21-00-00-040-046

(3) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

**——— END OF TASK ———**

**TASK 21-00-00-440-839**

## 22. DDG 21-31-01-02 Cabin Pressure Control System - Manual Mode Inoperative - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with the manual mode of the cabin pressure control system inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-31-03-400-801 | Aft Outflow Valve Assembly Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

### D. Cabin Pressure Control System Reactivation

SUBTASK 21-00-00-440-018

(1) Remove the safety locks and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |



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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

SUBTASK 21-00-00-420-002

(2) If the outflow valve was removed, do these steps:

(a) Remove the caps from the electrical connectors.

(b) Do this task to install the outflow valve: TASK 21-31-03-400-801.

SUBTASK 21-00-00-860-119

(3) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

——— END OF TASK ———

**TASK 21-00-00-040-854**

## 23. DDG 21-31-02 Main Outflow Valve Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the main outflow valve inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-31-03-000-801 | Aft Outflow Valve Assembly Removal (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

### D. Prepare for Unpressurized Flight.

SUBTASK 21-00-00-860-046

(1) Do these steps to put the outflow valve in the FULL OPEN position:

(a) Put the pressurization mode selector, on the P5-6 pressurization control panel, in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

SUBTASK 21-00-00-000-001

(2) If the outflow valve can not be put to the FULL OPEN position, then remove the outflow valve.

(a) Do this task: Aft Outflow Valve Assembly Removal, TASK 21-31-03-000-801.

(b) Cap and stow the electrical connectors.



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SUBTASK 21-00-00-040-004

(3) Open these circuit breakers and install safety locks:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

**END OF TASK**

**TASK 21-00-00-440-840**

## 24. DDG 21-31-02 Main Outflow Valve Inoperative - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with the main outflow valve inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-31-03-400-801 | Aft Outflow Valve Assembly Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

### D. Cabin Pressure Control System Reactivation

SUBTASK 21-00-00-440-002

(1) Remove the safety locks and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

SUBTASK 21-00-00-420-003

(2) If the outflow valve was removed, do these steps:

(a) Remove the caps from the electrical connectors.

(b) Do this task to install the outflow valve: TASK 21-31-03-400-801.

SUBTASK 21-00-00-710-015

(3) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

**END OF TASK**



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**TASK 21-00-00-040-855**

## 25. DDG 21-32-01A Positive Pressure Relief Valve Inoperative - Valve Closed - Preparation

(Figure 903)

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one of the Positive Pressure Relief Valves Inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-32-01-000-801 | Positive Pressure Relief Valve Removal (P/B 401) |
| 50-12-02-000-801 | Aft Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-12-02-400-801 | Aft Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00095 | Lubricant - Dry Film - MS122 | |

### D. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |

### E. Positive Pressure Relief Valve Deactivation

**SUBTASK 21-00-00-010-011**

(1) To get access to the positive pressure relief valves, do the steps that follow:

(a) To remove the aft bulkhead liner in the aft cargo compartment, do this task: TASK 50-12-02-000-801.

**SUBTASK 21-00-00-020-006**

(2) To remove the positive pressure relief valve that does not operate, do this task: TASK 21-32-01-000-801

(a) Keep the clamp [23] and the gasket [21].

**SUBTASK 21-00-00-350-001**

(3) Make a plate from 0.1250 +0.0625 / -0.0000 in. (3.1750 +1.5875 / -0.0000 mm) 2024 T3 aluminum to seal the pedestal:

(a) Use the gasket [21] as a template to calculate the circumference of the plate [22].

(b) Drill three holes in the plate [22] with dimensions and locations the same as the gasket [21].

(c) Set the plate [22] on the pedestal, make sure the fitment is correct.

**SUBTASK 21-00-00-640-001**

(4) Apply the MS122 lubricant, D00095 to both sides of the gasket [21].

**SUBTASK 21-00-00-420-004**

(5) Install the gasket [21], plate [22], and the clamp [23] on the pedestal.

**SUBTASK 21-00-00-020-007**

(6) Put an airtight cap on the ambient sense tube.



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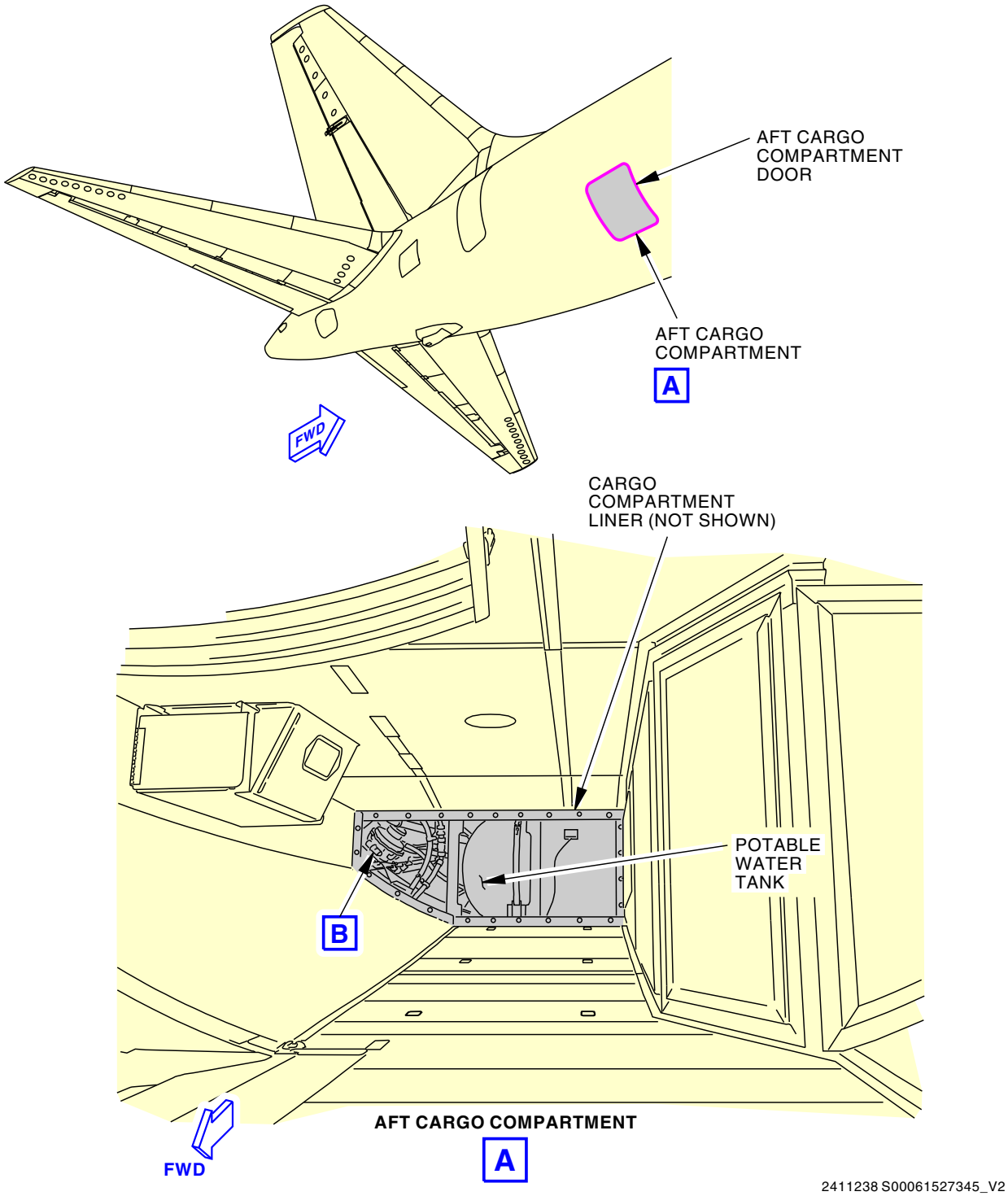
SUBTASK 21-00-00-410-004

(7) Install the aft bulkhead liner of the aft cargo compartment. Do this task: TASK 50-12-02-400-801.

——— END OF TASK ———



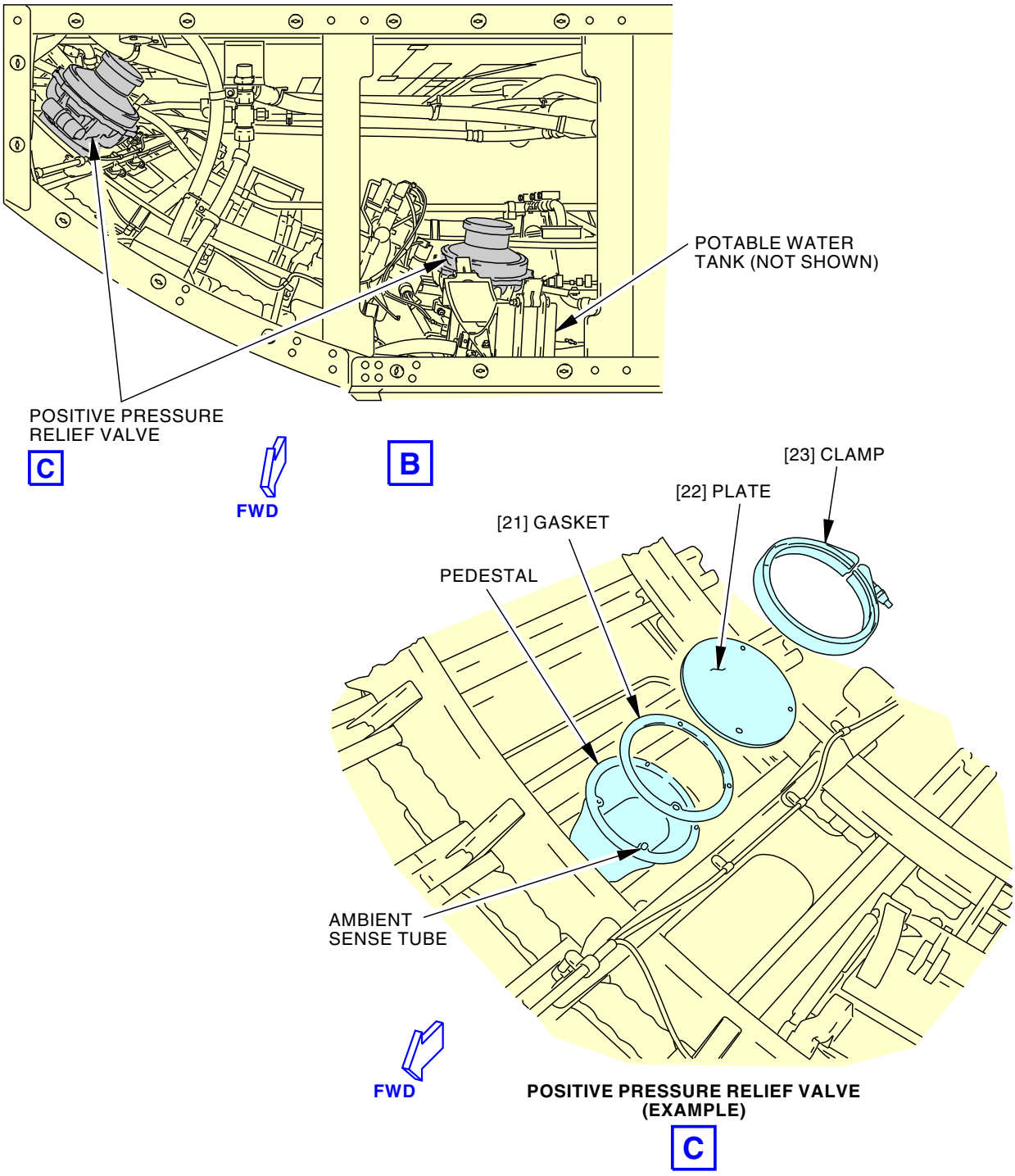
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**Positive Pressure Relief Valve Deactivation**
**Figure 903/21-00-00-990-805 (Sheet 1 of 2)**



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**Positive Pressure Relief Valve Deactivation**
**Figure 903/21-00-00-990-805 (Sheet 2 of 2)**



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**TASK 21-00-00-440-841**

## 26. DDG 21-32-01A Positive Pressure Relief Valve Inoperative - Valve Closed - Restoration

(Figure 903)

### A. General

(1) This task puts the airplane to its usual condition after operation with one of the positive pressure relief valves inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-32-01-400-801 | Positive Pressure Relief Valve Installation (P/B 401) |
| 21-32-01-700-802 | Positive Pressure Relief Valve - System Test with the Use of Boeing Test Equipment (P/B 501) |
| 50-12-02-000-801 | Aft Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-12-02-400-801 | Aft Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |

### D. Positive Pressure Relief Valve Reactivation

**SUBTASK 21-00-00-010-012**

(1) Remove the aft bulkhead liner in the aft cargo compartment. Do this task: TASK 50-12-02-000-801.

**SUBTASK 21-00-00-020-008**

(2) Remove the clamp [23] and the plate [22].

**SUBTASK 21-00-00-020-009**

(3) Remove the cap from the ambient sense tube.

**SUBTASK 21-00-00-420-005**

(4) Install the positive pressure relief valve. Do this task: TASK 21-32-01-400-801.

**SUBTASK 21-00-00-720-004**

(5) Do this task: Positive Pressure Relief Valve - System Test with the Use of Boeing Test Equipment, TASK 21-32-01-700-802.

NOTE: If a new positive pressure relief valve was installed you do not need to do this test.

**SUBTASK 21-00-00-010-013**

(6) Install the aft bulkhead liner in the aft cargo compartment. Do this task: TASK 50-12-02-400-801.

**——— END OF TASK ———**

**TASK 21-00-00-040-856**

## 27. DDG 21-32-01B Positive Pressure Relief Valve Inoperative - Valve Open - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the positive pressure relief valves inoperative.



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**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Prepare for Unpressurized Flight.**

SUBTASK 21-00-00-040-047

(1) Do these steps to prepare for unpressurized flight:

(a) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**——— END OF TASK ———**

**TASK 21-00-00-440-842**

## 28. DDG 21-32-01B Positive Pressure Relief Valve Inoperative - Valve Open - Restoration

**A. General**

(1) This task puts the airplane back to its usual condition after operation with the positive pressure relief valves inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Cabin Pressure Control System Reactivation**

SUBTASK 21-00-00-860-048

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-00-00-710-016

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

**——— END OF TASK ———**

**TASK 21-00-00-040-857**

## 29. DDG 21-33-01 Cabin Rate of Climb Indicator Inoperative - Preparation

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the cabin rate of climb indicator inoperative.



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**B. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

**C. Prepare for Unpressurized Flight.**

SUBTASK 21-00-00-860-050

(1) Do these steps to prepare for unpressurized flight:

(a) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**——— END OF TASK ———**

**TASK 21-00-00-440-843**

## 30. DDG 21-33-01 Cabin Rate of Climb Indicator Inoperative - Restoration

**A. General**

(1) This task puts the airplane to its usual condition after operation with the cabin rate of climb indicator inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

**C. Cabin Rate of Climb Indicator Restoration.**

SUBTASK 21-00-00-760-002

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-00-00-710-017

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

**——— END OF TASK ———**



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**TASK 21-00-00-040-858**

## 31. DDG 21-33-02–02 Cabin Differential Pressure Indication Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the cabin differential pressure indication inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Prepare for Unpressurized Flight.

**SUBTASK 21-00-00-040-048**

(1) Do these steps to prepare for unpressurized flight:

(a) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**——— END OF TASK ———**

**TASK 21-00-00-440-844**

## 32. DDG 21-33-02-02 Cabin Differential Pressure Indication Inoperative - Restoration

### A. General

(1) This task puts the airplane to its usual condition after operation with the cabin differential pressure indicator inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Cabin Differential Pressure Indicator Restoration.

**SUBTASK 21-00-00-440-003**

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |



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SUBTASK 21-00-00-710-018

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

——— END OF TASK ———

TASK 21-00-00-040-859

## 33. DDG 21-33-03–02 Cabin Altitude Indication Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the cabin altitude indication inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Prepare for Unpressurized Flight.

SUBTASK 21-00-00-040-049

(1) Do these steps to prepare for unpressurized flight:

(a) Put the pressurization mode selector on the P5-6 pressurization control panel in the MAN position.

(b) Hold the outflow valve toggle switch in the OPEN position until the valve position indicator indicates FULL OPEN.

(c) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

——— END OF TASK ———

TASK 21-00-00-440-845

## 34. DDG 21-33-03–02 Cabin Altitude Indication Inoperative - Restoration

### A. General

(1) This task puts the airplane to its usual condition after operation with the cabin altitude indication inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |
| 212 | Flight Compartment - Right |



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**C. Cabin Altitude Indication Restoration.**

SUBTASK 21-00-00-860-054

(1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-00-00-710-019

(2) Put the pressurization mode selector on the P5-6 pressurization control panel in the AUTO position.

——— END OF TASK ———

**TASK 21-00-00-040-860**

**35. DDG 21-33-05 Outflow Valve Position Indicator Inoperative - Preparation**

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the outflow valve position indicator inoperative.

**B. Location Zones**

| Zone | Area |
|---|---|
| 145 | Aft Cargo Compartment Equipment Bay - Left |
| 212 | Flight Compartment - Right |

**C. Preparation - Outflow Valve Operational Test**

SUBTASK 21-00-00-860-057

(1) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

SUBTASK 21-00-00-210-003

(2) Look at the aft outflow valve to make sure it moved to the fully open position.

**D. Outflow Valve Operational Test**

SUBTASK 21-00-00-710-005

(1) On the P5-6 Pressurization Control Panel, put the mode selector to MAN.

SUBTASK 21-00-00-710-006

(2) Make sure the MANUAL light goes on.

SUBTASK 21-00-00-710-007

(3) Hold the VALVE switch in the CLOSED position for 30 seconds.

SUBTASK 21-00-00-710-008

(4) Look at the aft outflow valve to make sure it moved to the fully closed position.

SUBTASK 21-00-00-710-009

(5) On the P5-6 Pressurization Control Panel, put the mode selector to AUTO.



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SUBTASK 21-00-00-210-004

(6) Make sure the MANUAL light goes out.

SUBTASK 21-00-00-710-010

(7) Wait 30 seconds and then look at the aft outflow valve to make sure it moved to the fully open position.

——— END OF TASK ———

**TASK 21-00-00-040-861**

## 36. DDG 21-45-01 Door Area Heater System Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with any of these door area heater systems inoperative:

(a) Forward Door Area Heater System

(b) Overwing Emergency Exit Door Heater Systems

(c) Aft Door Area Heater Systems

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 830 | Subzone - Passenger Compartment Doors, Left |
| 840 | Subzone - Passenger Compartment Doors, Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Door Area Heater System Deactivation

SUBTASK 21-00-00-010-047

(1) To get access to the P91 panel, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-00-00-865-001

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) To deactivate the forward door area or the overwing emergency exit door heater systems:



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Open this circuit breaker and install safety lock:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

NOTE: Opening the circuit breaker deactivates both the forward entry door area heater and all overwing exit door heaters.

SUBTASK 21-00-00-865-002

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) To deactivate the aft door area heater system:

Open this circuit breaker and install safety lock:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01279 | DOOR AREA HTR-AFT |

SUBTASK 21-00-00-410-032

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**

**TASK 21-00-00-440-847**

## 37. DDG 21-45-01 Door Area Heater System Inoperative - Restoration

### A. General

(1) This task puts back the airplane to its usual condition after operation with any of these door area heater systems inoperative.

(a) Forward Door Area Heater System

(b) Overwing Emergency Exit Door Heater Systems

(c) Aft Door Area Heater Systems

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 830 | Subzone - Passenger Compartment Doors, Left |



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(Continued)

| Zone | Area |
|---|---|
| 840 | Subzone - Passenger Compartment Doors, Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Door Area Heater System Activation**

SUBTASK 21-00-00-010-048

(1) To get access to the P91 panel, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-00-00-440-010

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) To activate the forward door area or the overwing emergency exit door heater systems:

Remove the safety lock and close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-00-00-440-008

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) To activate the aft door area heater system:



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Remove the safety lock and close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01279 | DOOR AREA HTR-AFT |

SUBTASK 21-00-00-410-031

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**

**TASK 21-00-00-040-862**

## 38. DDG 21-51-01 Air Conditioning Packs Inoperative - Preparation

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with both air conditioning packs inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### C. Both Air Conditioning Packs Inoperative - Deactivation Procedure

SUBTASK 21-00-00-040-006

(1) Follow this task to make both pack flow control and shutoff valves inoperative and to prepare for unpressurized flight:TASK 21-00-00-040-863

**END OF TASK**

**TASK 21-00-00-440-848**

## 39. DDG 21-51-01 Air Conditioning Packs Inoperative - Restoration

### A. General

(1) This task puts the airplane back to its usual condition after operation with both air conditioning packs inoperative.

### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### C. Both Air Conditioning Packs Inoperative - Restoration

SUBTASK 21-00-00-440-004

(1) Follow this task to restore the plane from unpressurized flight with both air conditioning packs inoperative: TASK 21-00-00-440-849

**END OF TASK**



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**TASK 21-00-00-040-863**

## 40. DDG 21-51-02 Pack Flow Control and Shutoff Valves Inoperative - Preparation

(Figure 904)

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with a pack flow control and shutoff valve inoperative.

NOTE: When the pack flow control and shutoff valve is locked closed you will not be able to operate the related pack.

### B. References

| Reference | Title |
|---|---|
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |
| STD-15135 | Cable - Jumper (Make from 0.5 inch length 20 AWG wire, crimp or solder both end to pin contact size 16 P/N M39029/31-228) |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for Deactivation

**SUBTASK 21-00-00-860-059**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-00-00-860-060**

(2) Do this step to deactivate the pack flow control and shutoff valve for the left cooling pack:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-00-00-860-061**

(3) Do this step to deactivate the pack flow control and shutoff valve for the right cooling pack:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |



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SUBTASK 21-00-00-010-014

(4) To get access to the flow control and shutoff valve for the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-010-015

(5) To get access to the flow control and shutoff valve for the right cooling pack, open these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

## G. Flow Control and Shutoff Valve Deactivation (Locked Closed)

SUBTASK 21-00-00-020-010

(1) For the left pack flow control and shutoff valve disconnect and stow the D15830 electrical connector.

SUBTASK 21-00-00-020-011

(2) For the right pack flow control and shutoff valve disconnect and stow the D15834 electrical connector.

SUBTASK 21-00-00-020-012

(3) Disconnect and stow both D15830 and D15834 electrical connectors to deactivate the left and right flow control and shutoff valves. This will prevent the operation of both packs and prevent the airplane from being pressurized.

SUBTASK 21-00-00-040-007

(4) If the left pack airflow shut-off valve limit switch has failed in the open position, do these steps at connector D15832 at the left pack flow control and shutoff valve:

(a) Disconnect connector D15832 from the left pack flow control and shutoff valve.

(b) Install a jumper cable, STD-15135, between pins 1 and 3 of connector D15832.

(c) Make sure there is continuity to airplane ground at pin 3 of connector D15832.

(d) Cap and stow the electrical connector D15832 with the jumper cable, STD-15135, installed between pins 1 and 3.

SUBTASK 21-00-00-040-008

(5) If the right pack airflow shut-off valve limit switch has failed in the open position, do these steps at connector D15836 at the right pack flow control and shutoff valve:

(a) Disconnect connector D15836 from the right flow control and shutoff valve.

(b) Install a jumper cable, STD-15135, between pins 1 and 3 of connector D15836.

(c) Make sure there is continuity to airplane ground at pin 3 of connector D15836.

(d) Cap and stow the electrical connector D15836 with the jumper cable, STD-15135, installed between pins 1 and 3.

SUBTASK 21-00-00-040-009

(6) Do these steps to lock the applicable pack flow control and shutoff valve in the closed position:

(a) Push in the manual override. If it is already in, pull it out and push it back in to verify that the valve is in the closed position.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-860-062

(7) If you deactivated the flow control and shutoff valve for the left cooling pack, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-00-00-860-063

(8) If you deactivated the flow control and shutoff valve for the right cooling pack, do this step:

Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-00-00-040-010

(9) If both pack airflow shutoff valves are inoperative, do these steps:

(a) Manually position the outflow valve in the FULL OPEN position:

1) Put the Pressurization Mode selector to MAN.

2) Hold the valve toggle switch in the OPEN position until valve position indicator indicates FULL OPEN.

(b) Do this step to put the recirculation fan in the INOP ON condition:

1) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

(c) Put one of the L or R PACK switches in the HIGH position and attach a DO NOT OPERATE tag, STD-858.

(d) If installed, shut off power to the air/ground public telephone system.

SUBTASK 21-00-00-410-005

(10) If you deactivated the flow control and shutoff valve for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-006

(11) If you deactivated the flow control and shutoff valve for the right cooling pack, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

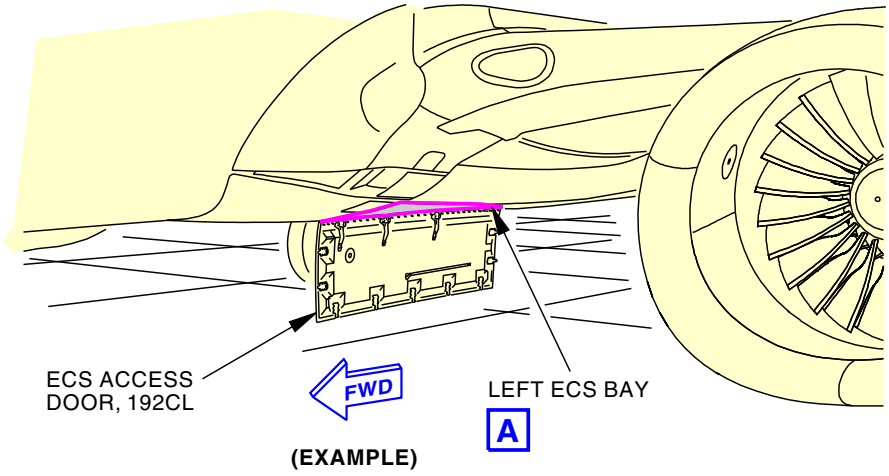
SUBTASK 21-00-00-810-006

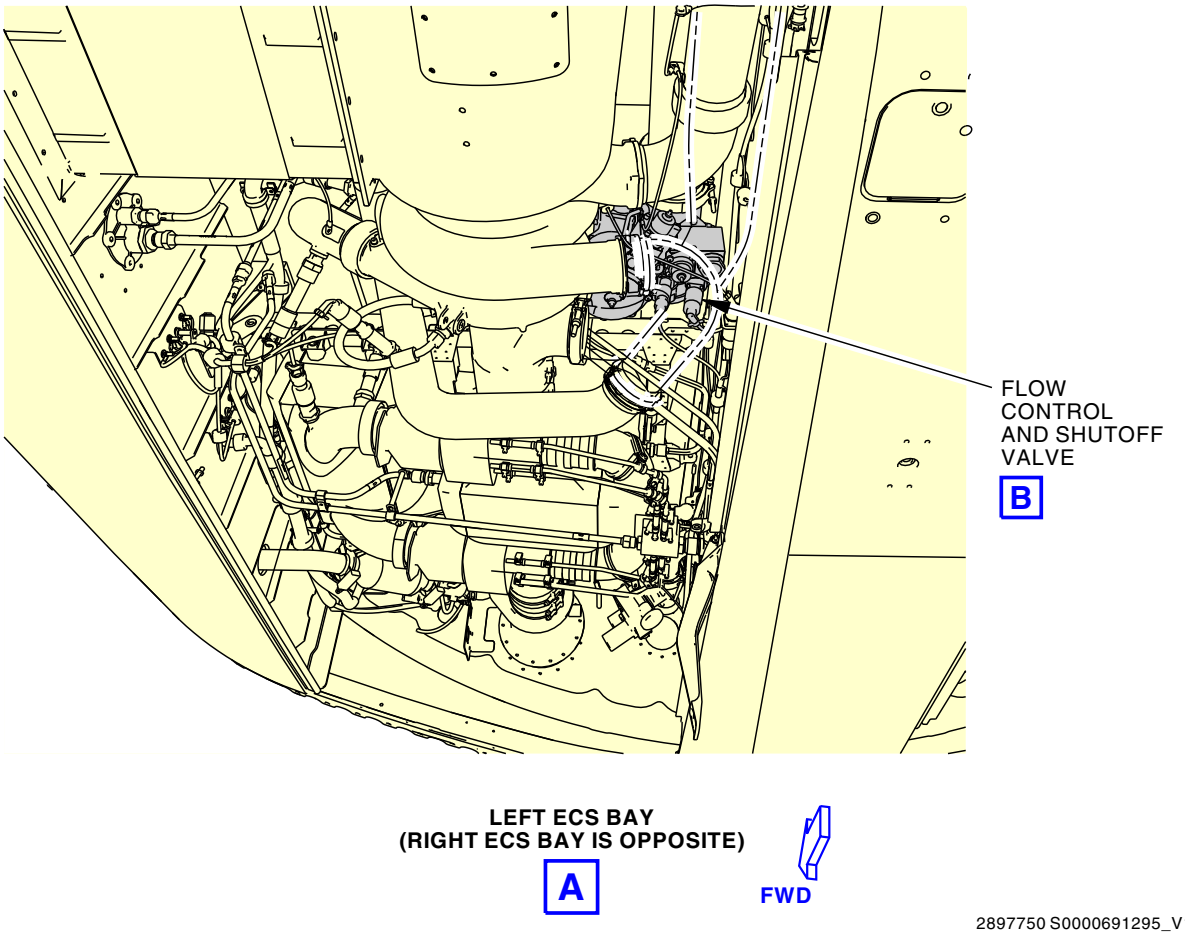
(12) If necessary, extinguish the MAINT light on the P5-1 panel. Do this task: Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



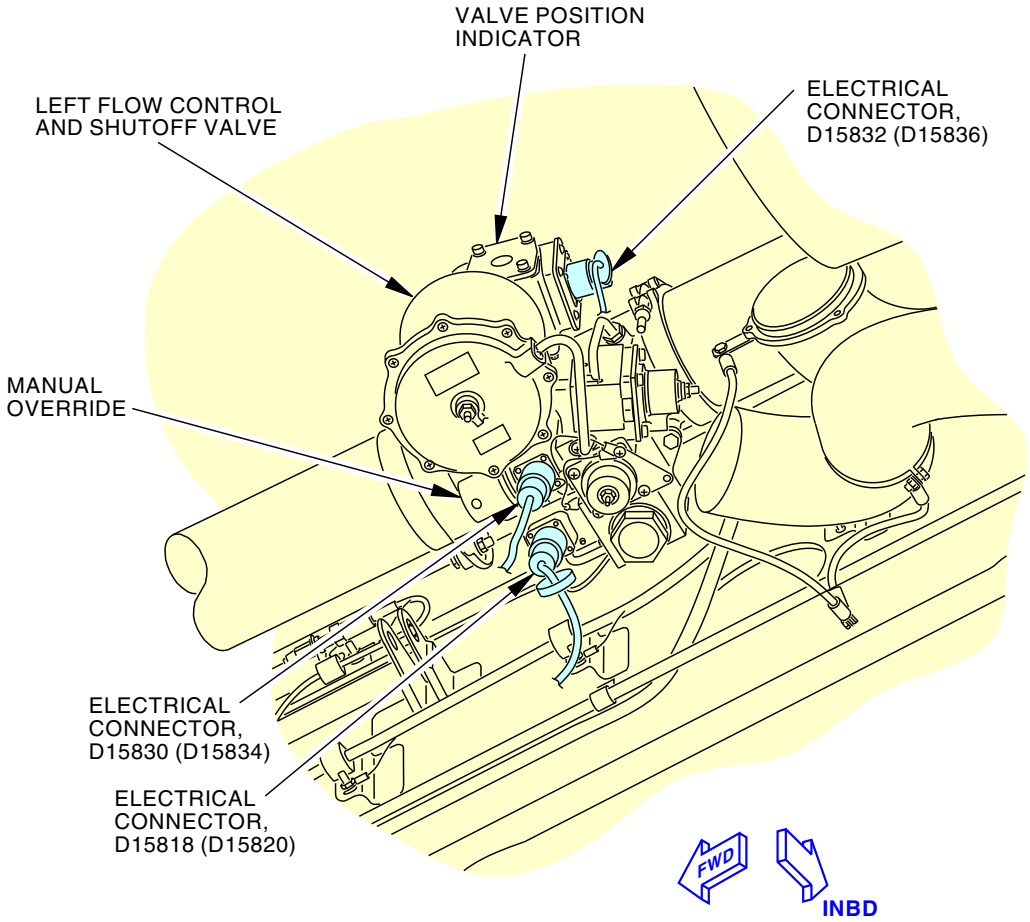




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**Flow Control and Shutoff Valve Deactivation**
**Figure 904/21-00-00-990-802 (Sheet 1 of 2)**



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**LEFT ECS BAY**
**(RIGHT SIDE IS EQUIVALENT)**

**B**

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**Flow Control and Shutoff Valve Deactivation**
**Figure 904/21-00-00-990-802 (Sheet 2 of 2)**



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**TASK 21-00-00-440-849**

## 41. DDG 21-51-02 Pack Flow Control and Shutoff Valves Inoperative - Restoration

(Figure 904)

### A. General

(1) This task puts the airplane back to its usual condition after operation with a pack flow control and shutoff valves inoperative.

### B. References

| Reference | Title |
|---|---|
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |
| STD-15135 | Cable - Jumper (Make from 0.5 inch length 20 AWG wire, crimp or solder both end to pin contact size 16 P/N M39029/31-228) |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for Reactivation

**SUBTASK 21-00-00-860-064**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-00-00-860-065**

(2) If you deactivated the pack flow control and shutoff valve for the left cooling pack, do this step:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-00-00-860-066**

(3) If you deactivated the pack flow control and shutoff valve for the right cooling pack, do this step:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-010-016

(4) To get access to the flow control and shutoff valve for the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-010-017

(5) To get access to the flow control and shutoff valve for the right cooling pack, open these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

## G. Flow Control Valve and Shutoff Valve Reactivation

SUBTASK 21-00-00-440-011

(1) For the left pack flow control and shutoff valve connect the D15830 electrical connector.

SUBTASK 21-00-00-440-012

(2) For the right pack flow control and shutoff valve connect the D15834 electrical connector.

SUBTASK 21-00-00-440-013

(3) Connect both D15830 and D15834 electrical connectors to activate the left and right flow control and shutoff valves if both pack flow control and shutoff valves were inoperative.

SUBTASK 21-00-00-440-005

(4) Do these steps at connector D15832 at the left flow control and shutoff valve if capped and stowed:

(a) Remove the cap from connector D15832.

(b) If installed, remove the jumper cable, STD-15135, between pins 1 and 3 of connector D15832.

SUBTASK 21-00-00-440-006

(5) Do these steps at connector D15836 at the right flow control and shutoff valve if capped and stowed:

(a) Remove the cap from connector D15836.

(b) If installed, remove the jumper cable, STD-15135, between pins 1 and 3 of connector D15836.

SUBTASK 21-00-00-860-067

(6) If you put the flow control and shutoff valve for the left cooling pack in its usual condition, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-00-00-860-068

(7) If you put the flow control and shutoff valve for the right cooling pack in its usual condition, do this step:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-00-00-860-069

(8) If both pack flow control and shutoff valves where inoperative:

(a) Do this step to put the recirculation fan in the usual condition:

1) Remove the safety lock and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

(b) Put the pressurization mode selector to the AUTO position.

(c) Put the PACK switches in the AUTO position and remove the DO NOT OPERATE tag, STD-858.

(d) If installed, supply power to the air/ground public telephone system.

SUBTASK 21-00-00-410-027

(9) If you deactivated the flow control and shutoff valve for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-028

(10) If you deactivated the flow control and shutoff valve for the right cooling pack, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**H. MAINT Light Status Message**

SUBTASK 21-00-00-750-001

(1) Uncheck the applicable MAINT light Status Message(s) on the MAINT LIGHT menu (TASK 31-65-00-750-801).

**——— END OF TASK ———**

**TASK 21-00-00-040-871**

## 42. DDG 21-51-04 Pack Flow Sensor Inoperative - Preparation

**A. General**

(1) This task gives the maintenance steps that prepare the airplane for flight with the pack flow sensors inoperative.

**B. References**

| Reference | Title |
|---|---|
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |
| 31-65-00-860-802 | Scheduled Maintenance Task (SMT) Messages Check (P/B 201) |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**C. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Dispatch the Airplane with the Pack Flow Sensor Inoperative**

SUBTASK 21-00-00-200-004

(1) Make sure that scheduled maintenance is not necessary for the applicable pack inlet pressure sensors (TASK 31-65-00-860-802):

(a) For the left pack flow sensor:

1) Make sure that PACK CONTROL CHANNEL L scheduled maintenance task does not show.

(b) For the right pack flow sensor:

1) Make sure that PACK CONTROL CHANNEL R scheduled maintenance task does not show.

SUBTASK 21-00-00-860-135

(2) If it is necessary, extinguish the MAINT light (TASK 31-65-00-750-801).

——— END OF TASK ———

**TASK 21-00-00-040-869**

**43. DDG 21-51-05 Pack Temperature Control Valves Inoperative - Preparation**

(Figure 905)

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the pack temperature control valves inoperative in closed position provided that the associated standby pack temperature control valve is verified to operate normally.

**B. References**

| Reference | Title |
|---|---|
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for Deactivation**

SUBTASK 21-00-00-860-070

(1) Make sure that the pneumatic pressure is removed from the pneumatic system (TASK 36-00-00-860-806).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-860-071

(2) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are on the OFF position.

SUBTASK 21-00-00-860-128

(3) To deactivate the left temperature control valve, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-00-00-860-129

(4) To deactivate the right temperature control valve, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-00-00-010-018

(5) Get access to the left temperature control valve as follows:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-010-019

(6) Get access to the right temperature control valve as follows:

Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-040-013

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(7) Deactivate the applicable temperature control valve in closed position:

(a) Disconnect and stow the electrical connector from temperature control valve.

(b) Turn the manual override on the valve until the visual position indicator shows that the valve is fully closed.

SUBTASK 21-00-00-860-131

(8) If the left pack Temperature Control Valve was deactivated, do this step:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-00-00-860-130

(9) If the right pack Temperature Control Valve was deactivated, do this step:

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-00-00-410-009

(10) If the left temperature control valve was deactivated, do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-010

(11) If the right temperature control valve was deactivated, do this step:

Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-750-004

(12) Make sure that the MAINT light does not turn on for the associated active status message (TASK 31-65-00-750-801).

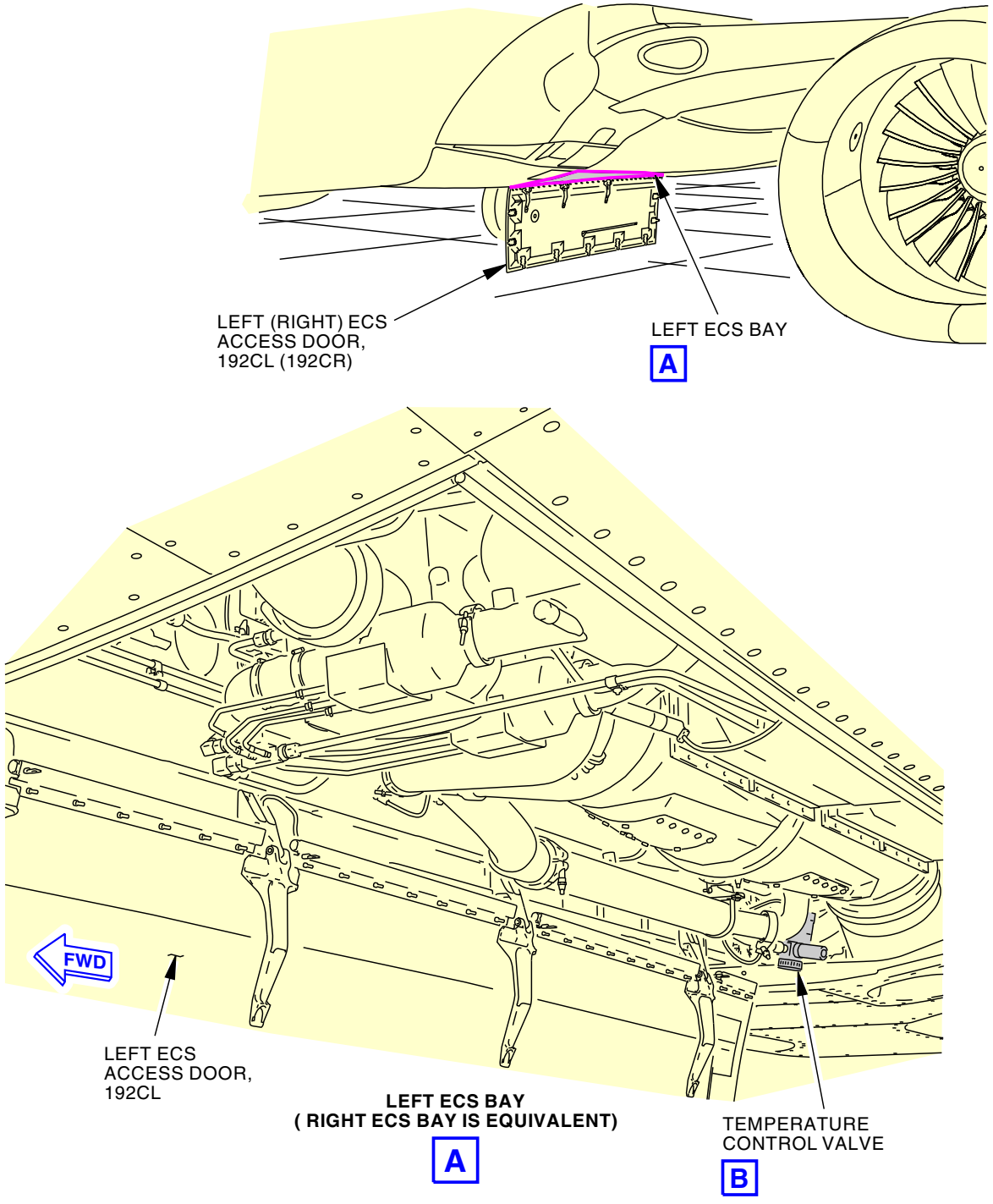
SUBTASK 21-00-00-750-005

(13) If it is necessary, extinguish the MAINT light, on the P5-1 panel, do this task: Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801.

**——— END OF TASK ———**



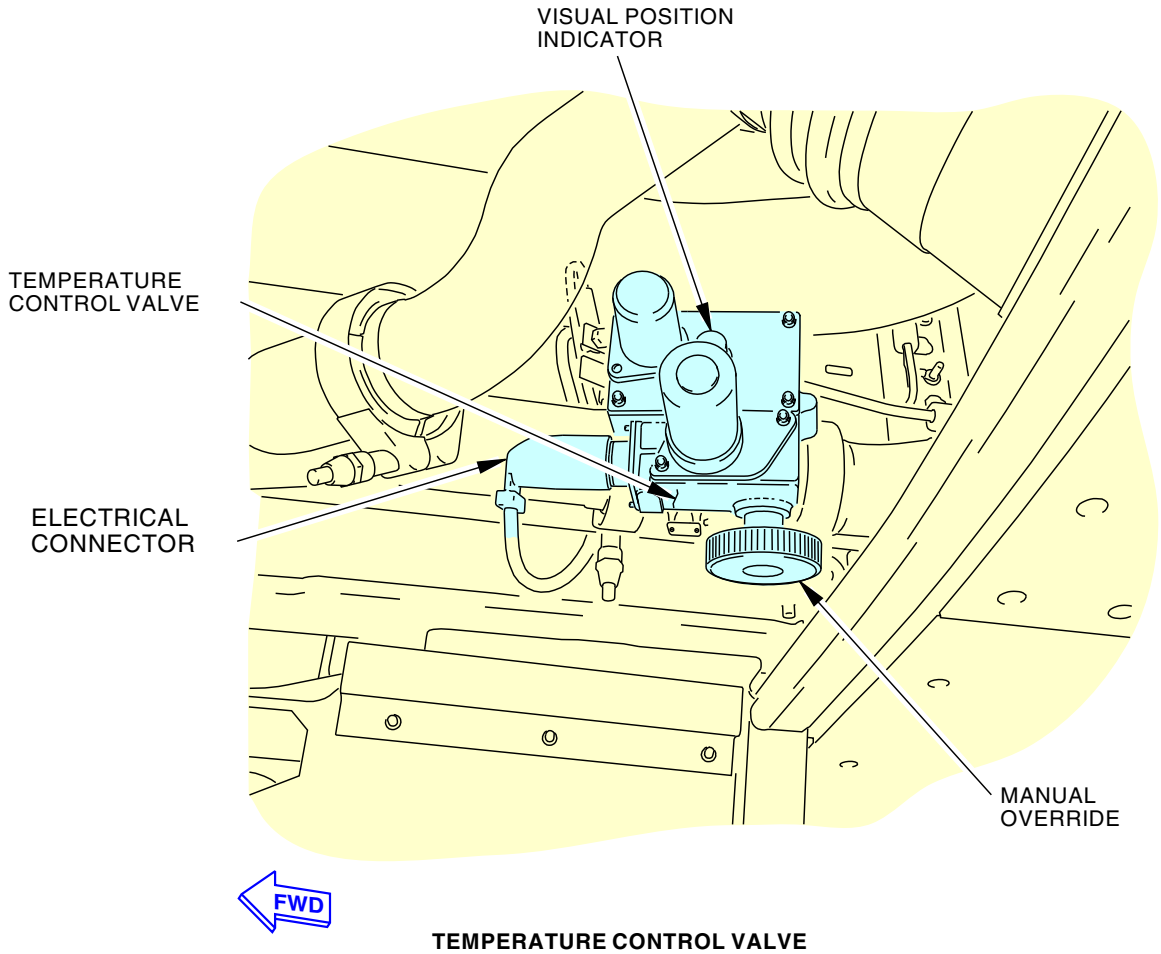
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Temperature Control Valve**
**Figure 905/21-00-00-990-811 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Temperature Control Valve**
**Figure 905/21-00-00-990-811 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-00-00-440-855**

## 44. DDG 21-51-05 Pack Temperature Control Valves Inoperative - Restoration

(Figure 905)

### A. General

(1) This task puts the airplane to its usual condition after operation with the pack temperature control valves inoperative.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Prepare for Reactivation

**SUBTASK 21-00-00-860-120**

(1) Make sure that the pneumatic pressure is removed from the pneumatic system (TASK 36-00-00-860-806).

**SUBTASK 21-00-00-860-121**

(2) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are on the OFF position.

**SUBTASK 21-00-00-860-126**

(3) To restore the left temperature control valve, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-00-00-860-127**

(4) To restore the right temperature control valve, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**SUBTASK 21-00-00-010-045**

(5) Get access to the left deactivated temperature control valve as follows:


ECCN 9E991 BOEING PROPRIETARY - See title page for details

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-010-046

(6) Get access to the right deactivated temperature control valve as follows:

Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-440-019

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(7) Restore the applicable temperature control valve as follows:

(a) Turn the manual override on the valve until the visual position indicator shows that the valve is between the OPEN and CLOSED positions.

(b) Connect the electrical connector to the temperature control valve.

SUBTASK 21-00-00-860-122

(8) If the left pack Temperature Control Valve was restored, do this step:

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-00-00-860-123

(9) If the right pack Temperature Control Valve was restored, do this step:

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-00-00-410-029

(10) If the left temperature control valve was restored, do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-030

(11) If the right temperature control valve was restored, do this step:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

——— END OF TASK ———

**TASK 21-00-00-040-864**

**45. DDG 21-51-09 Pack Ram Air Systems Inoperative - Preparation**

(Figure 906)

**A. General**

(1) This task gives the maintenance steps which prepare the airplane for flight with the pack ram air systems inoperative

NOTE: If the ram air inlet panels are put into an inoperative flight open condition, the ram air modulated exhaust duct louvers must also be in an open condition. Conversely, the ram air inlet panels must be into an inoperative flight open condition if the fault condition is with the ram air modulated exhaust system.

**B. References**

| Reference | Title |
|---|---|
| 21-51-27-000-801 | Ram Air Exhaust Actuator - Removal (P/B 401) |
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |

**C. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-14767 | Link - Stowage SRADA<br>Part #: C21009-1 Supplier: 81205 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |
| 191GR | Ram Air Actuator Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

**F. Prepare for Deactivation**

**SUBTASK 21-00-00-020-013**

(1) When the ram air inlet door and ram air exhaust duct louvers for the left cooling pack will be deactivated, do this step:


ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |

SUBTASK 21-00-00-020-014

(2) When the ram air inlet door and ram air exhaust duct louvers for the right cooling pack will be deactivated, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

SUBTASK 21-00-00-010-020

(3) To get access to the ram air inlet door actuator for the left cooling pack, do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-010-021

(4) To get access to the ram air inlet door actuator for the right cooling pack, do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 191GR | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-010-022

(5) To get access to the ram air exhaust door actuator for the left cooling pack, do this step:

(a) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-010-023

(6) To get access to the ram air exhaust door actuator for the right cooling pack, do this step:

Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192JR | Air Conditioning Panel - Aft |

## G. Ram Air Inlet Modulating System Deactivation (Secured Open)

Figure 906

SUBTASK 21-00-00-020-015

(1) Disconnect and stow the electrical connectors [1].

SUBTASK 21-00-00-020-016

(2) Remove the bolt [2], washer [3], washer [7], bushing [8], and nut [6] that connects the actuator rod [9] end to the bellcrank [4].



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SUBTASK 21-00-00-420-006

(3) Remove the actuator rod [9] end from the bellcrank [4] and reinstall the bolt [2], washer [3], washer [7], bushing [8], and nut [6] back to the bellcrank [4].

SUBTASK 21-00-00-980-001

(4) Do these steps to secure the door in the flight open position:

(a) Turn the bellcrank [4] to align the rigging pin holes on the shaft assembly with the holes on the bearing housing support [5].

(b) Install the bolt [10] through the rigging pin holes.

1) Use a BACB30UU3P36D bolt or an equivalent bolt with a 0.1875 in. (4.7625 mm) shank diameter and 2.2 in. (55.9 mm) shank length.

2) If necessary, drill the shank end of bolt [10] for a cotter pin [12].

(c) Install the nut [11] and cotter pin [12] on the bolt [10].

1) Use a BACN10JD3 nut or an equivalent nut.

2) Use a BACP18BC01D06P cotter pin or an equivalent cotter pin with a 0.047 in. (1.194 mm) diameter and a 0.75 in. (19.05 mm) length.

SUBTASK 21-00-00-420-007

(5) Use lockwire [13] to connect the actuator rod [9] end to the bolt [2].

SUBTASK 21-00-00-860-072

(6) If you deactivated the ram air inlet door for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-860-073

(7) If you deactivated the ram air inlet door for the right cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 191GR | Ram Air Actuator Panel - Forward |

## H. Ram Air Exit Modulating System Deactivation (Secured Open)

Figure 907

SUBTASK 21-00-00-000-002

(1) Disconnect the electrical connectors [26] for the ram air exhaust actuator [25].

(2) If necessary, remove the ram air exhaust actuator [25]. Do this task: Ram Air Exhaust Actuator - Removal, TASK 21-51-27-000-801.

NOTE: If you will keep the ram air exhaust actuator [25] installed you must install the Link - Stowage SRADA, SPL-14767 tool.

SUBTASK 21-00-00-040-015

(3) Cap and stow the electrical connectors [26] for the ram air exhaust actuator [25].

SUBTASK 21-00-00-000-003

(4) Remove the nut [20], washer [19], washer [17], and bolt [16] that attach the most forward louver drive arm [14] to the link assembly [15].

SUBTASK 21-00-00-820-001

(5) Move the link assembly [15] to open the exit louvers until the most forward hole in the link assembly [15] lines up with the hole in the most forward louver drive arm [14].



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SUBTASK 21-00-00-420-008

(6) In the same order that they were removed, install the bolt [16], washer [17], washer [19], and nut [20] through the most forward hole in the link assembly [15] and the most forward hole in the louver drive arm [14].

NOTE: The louvers should be open approximately 56°arc (1 rad) relative to the airplane skin.

SUBTASK 21-00-00-420-020

(7) If the ram air exhaust actuator [25] will stay installed, then install the Link - Stowage SRADA, SPL-14767 tool:

(a) Attach the SRADA stowage link [31] to the actuator rod [24] end using the bolt [29], countersunk washer [30], washer [33], nut [32] that are included in Link - Stowage SRADA, SPL-14767 tool kit.

(b) Attach the other end of the SRADA stowage link [31] to the actuator drive arm [18] using the nut, washer, washer, and bolt, which had been used to attach the actuator rod [24] end to the actuator drive arm [18].

SUBTASK 21-00-00-410-011

(8) Close these panels that were removed for access to the left ram air exhaust duct:

(a) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-410-012

(9) Close these panels that were removed for access to the right ram air exhaust duct:

(a) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192JR | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-420-009

(10) If you deactivated the ram air exhaust louvers for the left cooling pack, do this step:

(a) Remove the safety tags and close these circuit breakers:

Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-00-00-420-010

(11) If you deactivated the ram air exhaust louvers for the right cooling pack, do this step:

(a) Remove the safety tags and close these circuit breakers:

Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |



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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

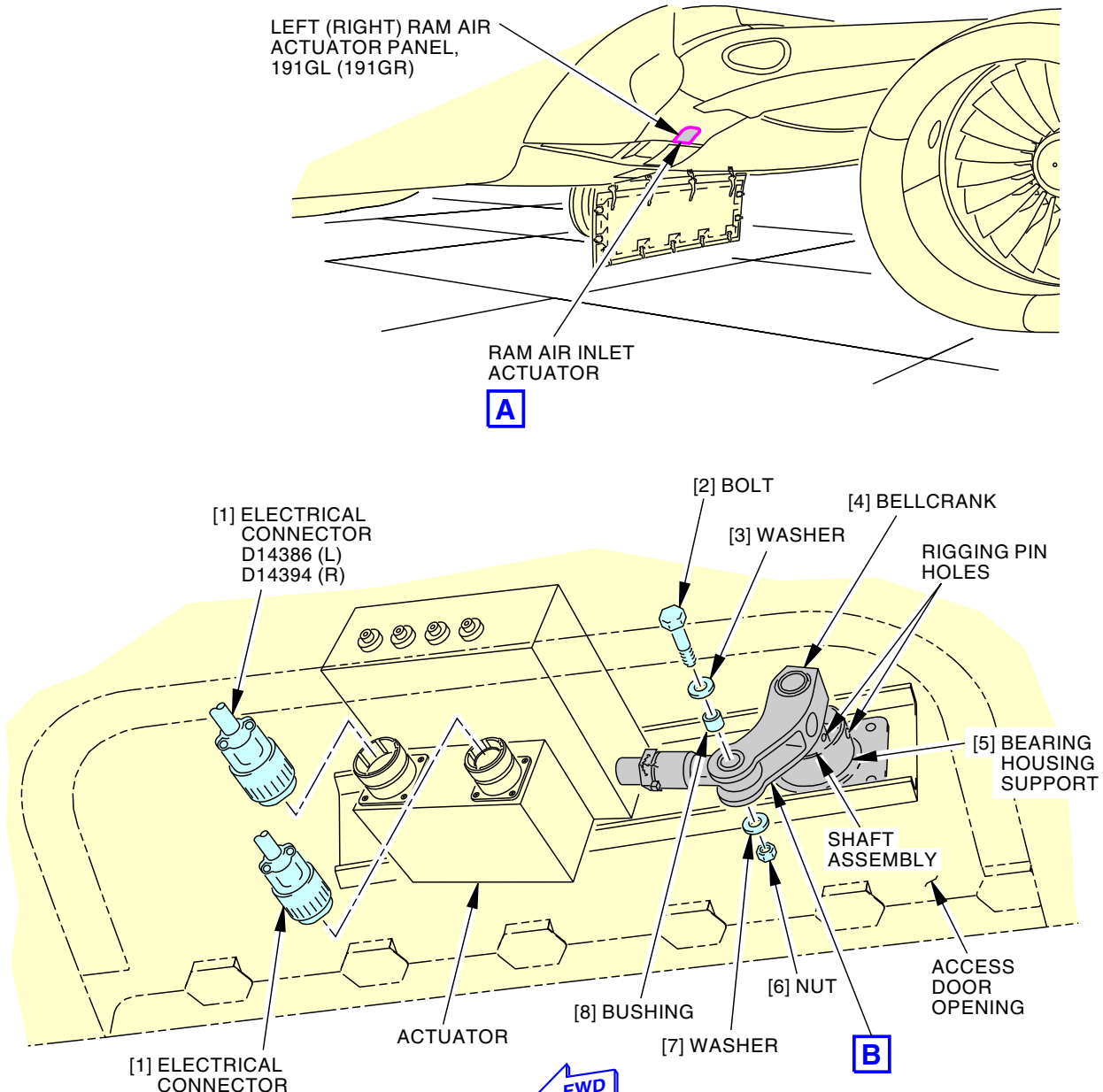
**SUBTASK 21-00-00-810-007**

(12) If necessary, extinguish the MAINT light on the P5-1 panel. Do this task: Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801.

**——— END OF TASK ———**



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**LEFT RAM AIR INLET ACTUATOR**
**(RIGHT RAM AIR INLET ACTUATOR IS OPPOSITE)**

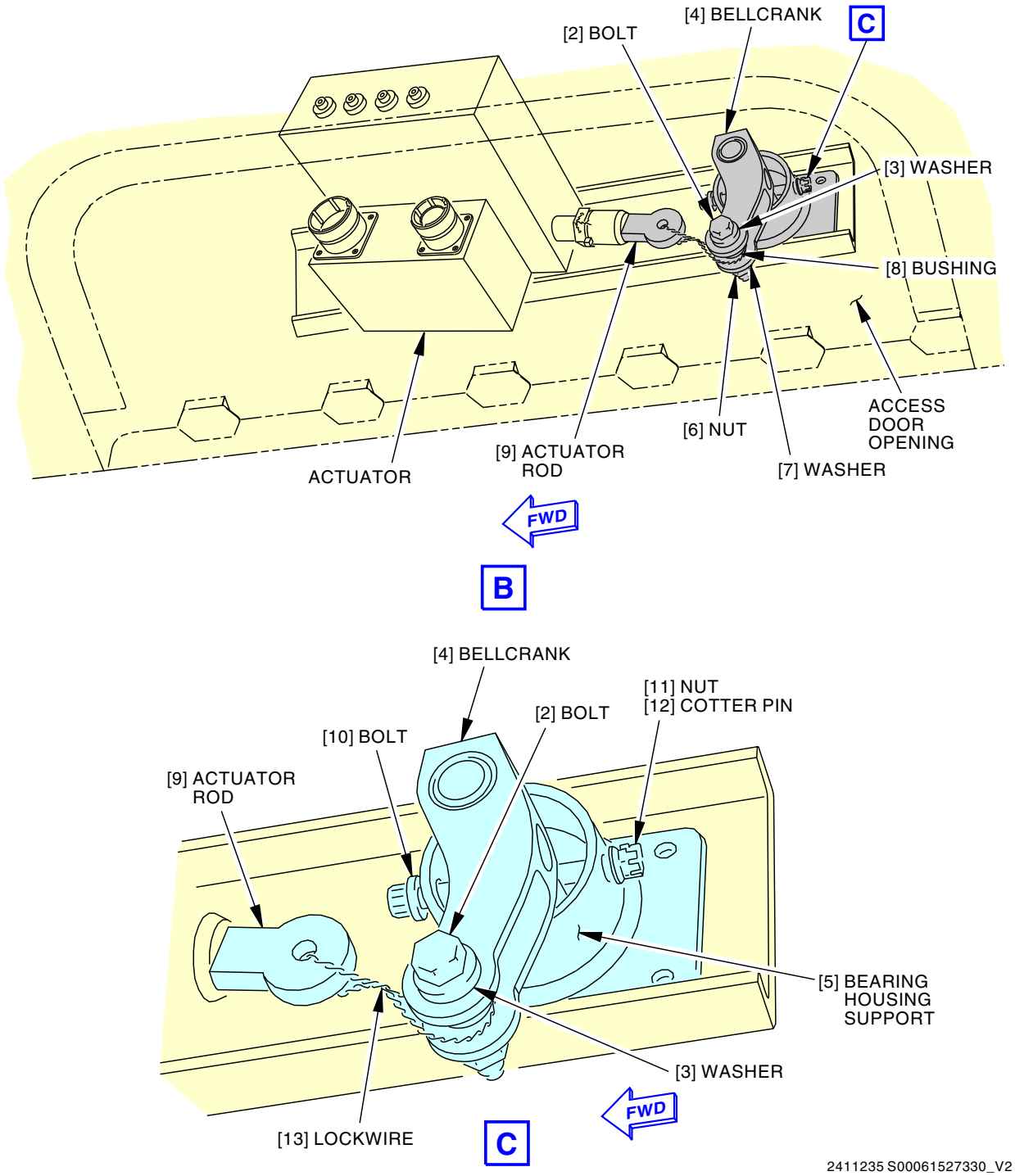
A

2411234 S00061527329_V2

**Ram Air Modulation System Deactivation**
**Figure 906/21-00-00-990-803 (Sheet 1 of 2)**



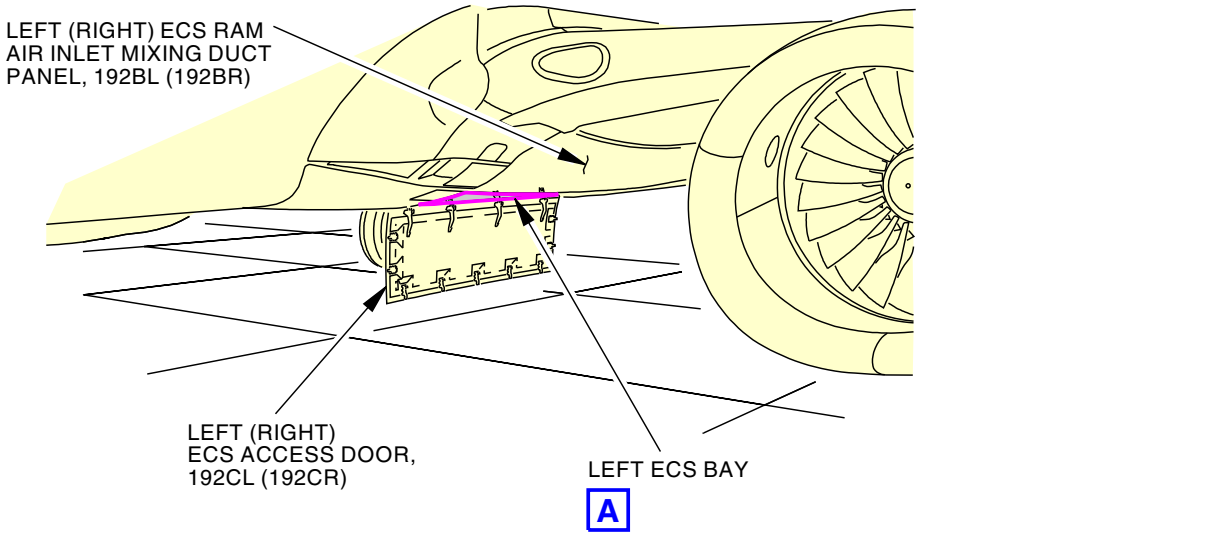
ECCN 9E991 BOEING PROPRIETARY - See title page for details

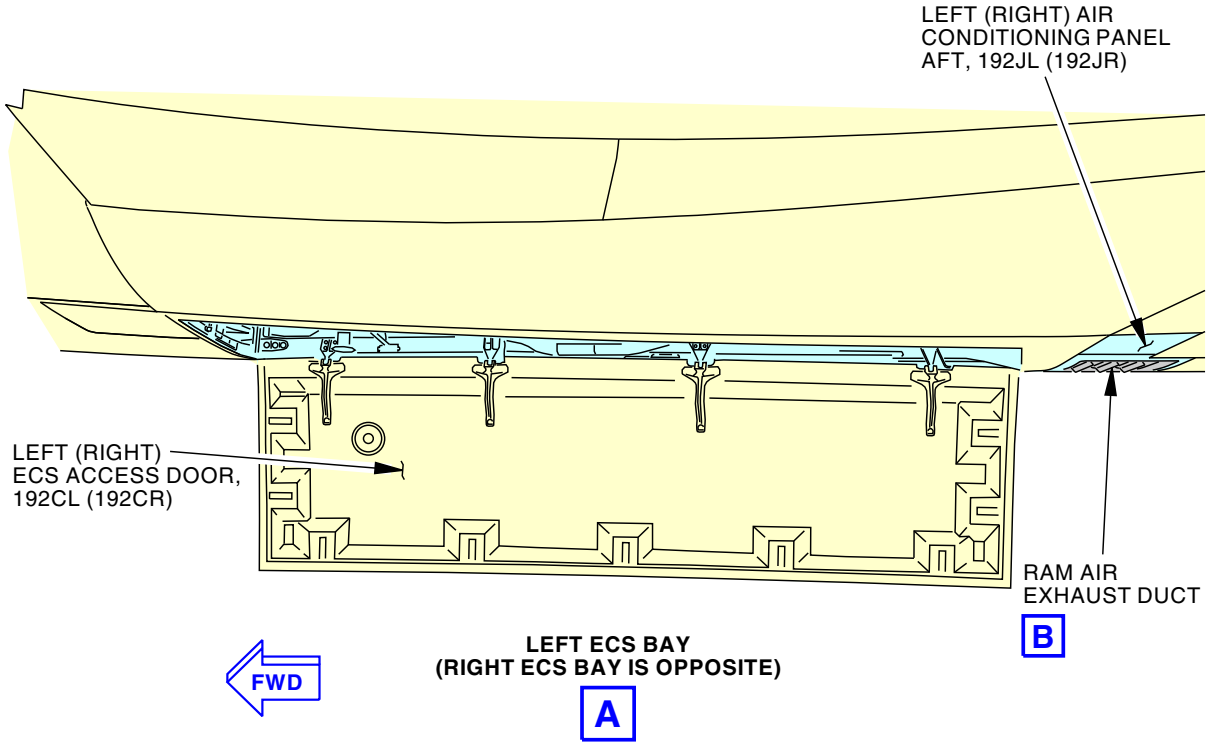



**Ram Air Modulation System Deactivation**
**Figure 906/21-00-00-990-803 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



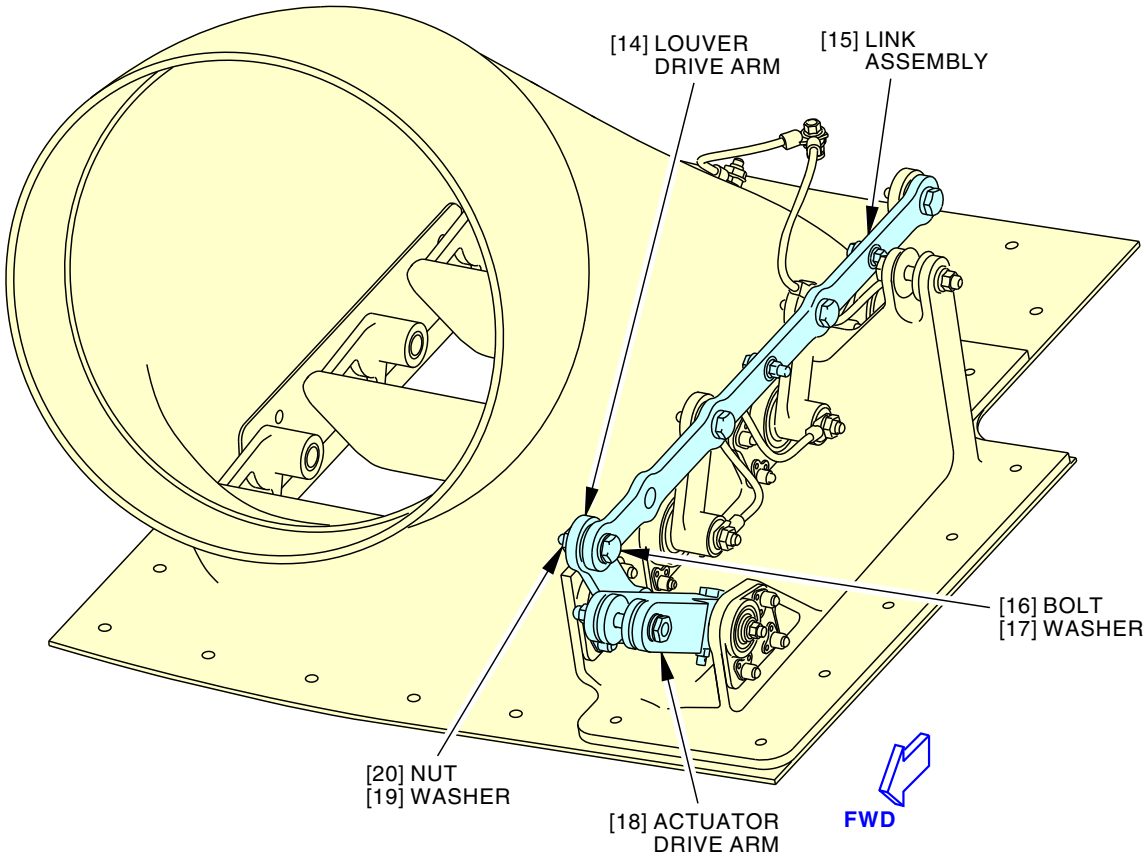




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**Ram Air Exit Louvers Modulation System Deactivation**
**Figure 907/21-00-00-990-804 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR EXHAUST DUCT**
**(RAM AIR EXHAUST ACTUATOR REMOVED)**

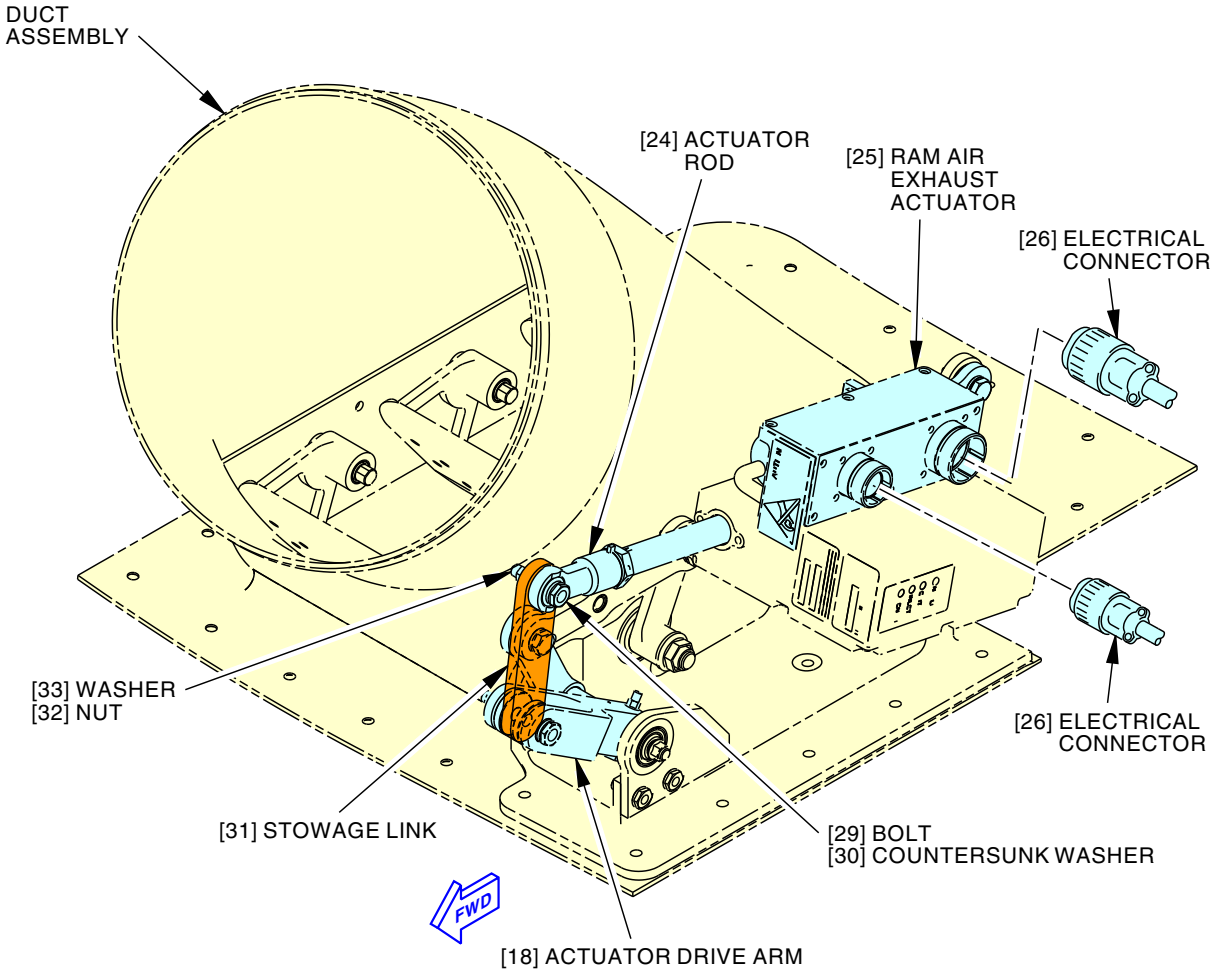
**B**

2411237 S00061527332_V3

**Ram Air Exit Louvers Modulation System Deactivation**
**Figure 907/21-00-00-990-804 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR EXHAUST DUCT**
**(RAM AIR EXHAUST ACTUATOR INSTALLED WITH STOWAGE LINK)**

B

2502308 S0000588651_V3

**Ram Air Exit Louvers Modulation System Deactivation**
**Figure 907/21-00-00-990-804 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-00-00-440-850**

## 46. DDG 21-51-09 Pack Ram Air Systems Inoperative - Restoration

(Figure 906)

### A. General

(1) This task restores the airplane to its usual condition after operation with the pack ram air systems inoperative

### B. References

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-51-27-400-801 | Ram Air Exhaust Actuator - Installation (P/B 401) |
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-14767 | Link - Stowage SRADA<br>Part #: C21009-1 Supplier: 81205 |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |
| 191GR | Ram Air Actuator Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

### F. Prepare for Reactivation

**SUBTASK 21-00-00-860-074**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-00-00-020-017**

(2) If the ram air inlet door and ram air exhaust duct louvers for the left cooling pack were deactivated, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-420-011

(3) If the ram air inlet door and ram air exhaust duct louvers for the right cooling pack were deactivated, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-00-00-010-024

(4) To get access to the ram air inlet door actuator for the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-010-025

(5) To get access to the ram air inlet door actuator for the right cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 191GR | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-010-026

(6) To get access to the ram air exhaust duct louvers for the left cooling pack, open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-010-027

(7) To get access to the ram air exhaust duct louvers for the right cooling pack, open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192JR | Air Conditioning Panel - Aft |

## G. Ram Air Inlet Modulating System Reactivation

Figure 906

SUBTASK 21-00-00-420-012

(1) Remove the lockwire [13] from the actuator rod end and the bolt [2].

SUBTASK 21-00-00-020-018

(2) Remove the cotter pin [12], nut [11], and bolt [10].

SUBTASK 21-00-00-020-021

(3) Remove and retain the bolt [2], washer [3], washer [7], bushing [8] and nut [6] from the bellcrank [4].

SUBTASK 21-00-00-820-002

(4) Turn the bellcrank [4] to align with the actuator rod [9] end.



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SUBTASK 21-00-00-420-013

(5) Install the bolt [2], washer [3], washer [7], bushing [8] and nut [6] that connect the actuator rod [9] end to the bellcrank [4].

SUBTASK 21-00-00-420-014

(6) Install the electrical connectors [1] on the actuator.

SUBTASK 21-00-00-860-075

(7) If you put the ram air inlet door for the left cooling pack to its usual condition, close this access panel:

| Number | Name/Location |
|---|---|
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-00-00-860-076

(8) If you put the ram air inlet door for the right cooling pack to its usual condition, close this access panel:

| Number | Name/Location |
|---|---|
| 191GR | Ram Air Actuator Panel - Forward |

## H. Ram Air Exit Modulating System Reactivation

Figure 907

SUBTASK 21-00-00-000-004

(1) If the ram air exhaust actuator [25] was still installed and deactivated, then remove the Link - Stowage SRADA, SPL-14767 tool:

(a) Disconnect the SRADA stowage link [31] from the actuator rod [24] end by removing the bolt [29], countersunk washer [30], washer [33], and nut [32] that are part of the Link - Stowage SRADA, SPL-14767 tool kit.

(b) Disconnect the other end of the SRADA stowage link [31] from the actuator drive arm [18] by removing the bolt, washers, and nut which will be used to attach the actuator rod [24] end to the actuator drive arm [18].

SUBTASK 21-00-00-820-003

(2) Remove the nut [20], washer [19], washer [17], and bolt [16] that are attaching the most forward louver drive arm [14] to the most forward hole in the link assembly [15].

SUBTASK 21-00-00-820-004

(3) Move the link assembly [15] until the hole in the most forward louver drive arm [14] aligns with the second most forward hole in the link assembly [15].

SUBTASK 21-00-00-420-015

(4) Install the bolt [16], washer [17], washer [19], and nut [20] through the hole in the most forward louver drive arm [14]and the second most forward hole in the link assembly [15].

SUBTASK 21-00-00-420-023

(5) If necessary, install the ram air exhaust actuator [25]. Do this task: Ram Air Exhaust Actuator - Installation, TASK 21-51-27-400-801.

SUBTASK 21-00-00-420-024

(6) Connect the electrical connectors [26] to the ram air exhaust actuator [25].

SUBTASK 21-00-00-410-013

(7) Close these panels that were removed for access to the left ram air exhaust duct:



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Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-410-014

(8) Close these panels that were removed for access to the right ram air exhaust duct:

Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192JR | Air Conditioning Panel - Aft |

SUBTASK 21-00-00-420-017

(9) If the ram air exhaust duct louvers for the left cooling pack were put back to their usual condition, do this step:

Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-00-00-420-018

(10) If the ram air exhaust duct louvers for the right cooling pack were put back to their usual condition, do this step:

Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

## I. Ram Air Modulating System Check

SUBTASK 21-00-00-730-003

(1) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

## J. MAINT Light Status Message

SUBTASK 21-00-00-750-002

(1) Uncheck the applicable MAINT light Status Message(s) on the MAINT LIGHT menu (TASK 31-65-00-750-801).

**END OF TASK**



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**TASK 21-00-00-040-865**

## 47. DDG 21-61-01 Trim Air Modulating Valve Inoperative - Preparation

(Figure 908)

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with a Zone Trim Air Modulating Valve Inoperative.

NOTE: There are three zone trim air modulating valves. The valve for the control cabin is in the left ECS bay. The valves for the forward and the aft passenger cabin zones are in the right ECS bay.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Prepare for Deactivation

**SUBTASK 21-00-00-860-077**

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**SUBTASK 21-00-00-860-078**

(2) Set the CONT CAB, FWD CAB and/or AFT CAB temperature selectors on the P5-17 temperature control panel to OFF.

**SUBTASK 21-00-00-010-028**

(3) To get access to the control compartment trim air modulating valve, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-00-00-010-029**

(4) To get access to the aft and forward passenger compartment trim air modulating valves in the right ECS bay, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



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## F. Zone Trim Air Modulating Valve Deactivation (Locked Closed)

SUBTASK 21-00-00-040-017

(1) Turn the manual override on the inoperative trim air modulating valve until the visual position indicator shows that it is in the full closed position.

SUBTASK 21-00-00-040-016

**WARNING** DO NOT TOUCH AIR CONDITIONING PARTS UNTIL THEY BECOME COOL. AFTER THE AIR CONDITIONING SYSTEM OPERATES, SOME AIR CONDITIONING PARTS CAN STAY HOT FOR ALMOST ONE HOUR. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

(2) Disconnect and stow the electrical connector for the inoperative valve.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-00-00-410-020

(1) When the control compartment trim air modulating valve was deactivated, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-021

(2) When a trim air modulating valve in the right ECS bay was deactivated, close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-860-109

(3) Set the temperature selector associated with the deactivated trim air modulating valve to AUTO.

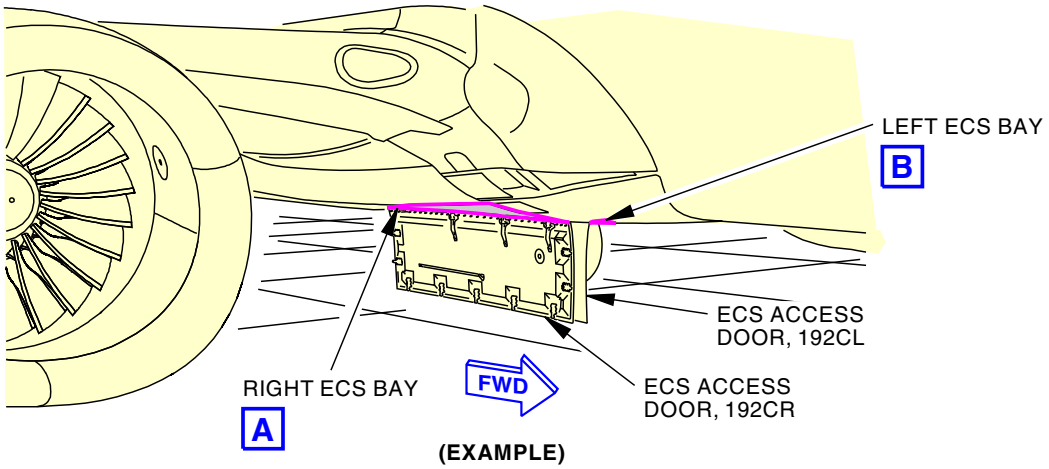
SUBTASK 21-00-00-810-008

(4) If necessary, extinguish the MAINT light on the P5-1 panel. Do this task: Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801.

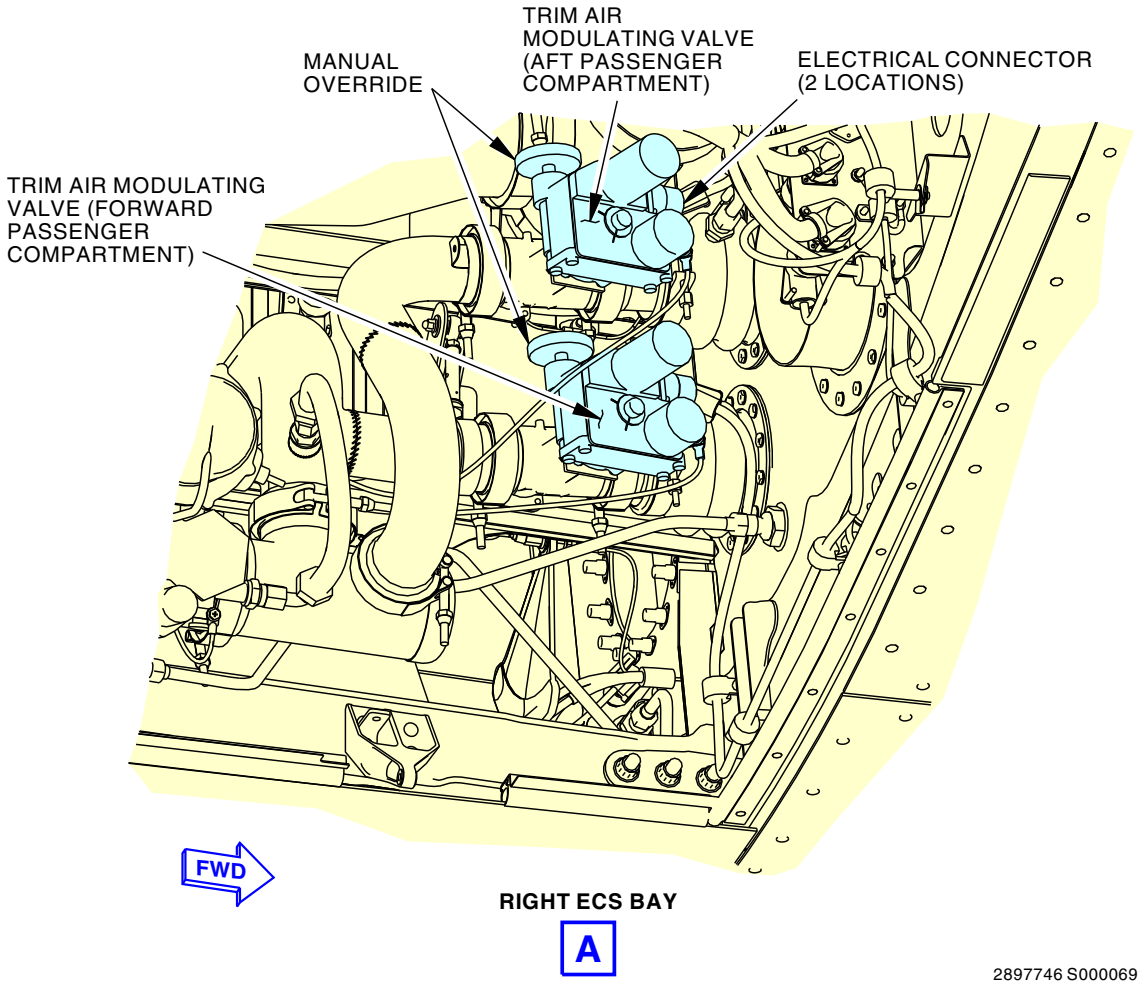
——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**(EXAMPLE)**

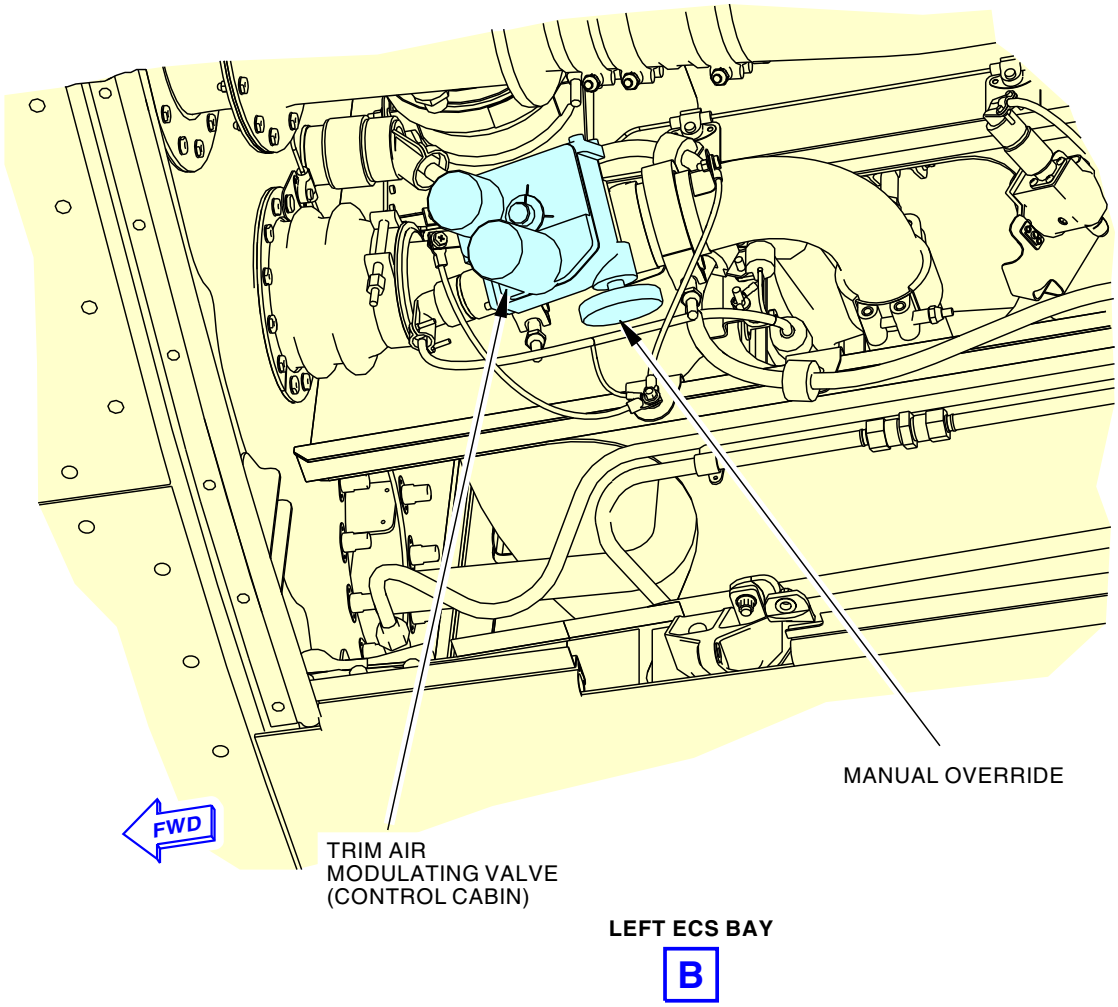



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**Zone Trim Air Modulating Valve Deactivation**
**Figure 908/21-00-00-990-807 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Zone Trim Air Modulating Valve Deactivation**
**Figure 908/21-00-00-990-807 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-00-00-440-851**

## 48. DDG 21-61-01 Trim Air Modulating Valve Inoperative - Restoration

(Figure 908)

### A. General

(1) This task puts the airplane to its usual condition after operation with a Zone Trim Air Modulating Valve Inoperative.

NOTE: There are three Zone Trim Air Modulating Valves. The valve for the control cabin is in the left ECS bay. The valves for the forward and the aft passenger cabin zones are in the right ECS bay.

### B. References

| Reference | Title |
|---|---|
| 31-65-00-750-801 | Fault Interrogation for a Maintenance Message (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Zone Trim Air Modulating Valve Restoration

**SUBTASK 21-00-00-860-110**

(1) Set the CONT CAB, FWD CAB and/or AFT CAB temperature selectors on the P5-17 temperature control panel to OFF.

**SUBTASK 21-00-00-010-039**

(2) To get access to the control compartment trim air modulating valve, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-00-00-010-040**

(3) To get access to the aft and forward passenger compartment trim air modulating valves in the right ECS bay, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-400-003

**WARNING** DO NOT TOUCH AIR CONDITIONING PARTS UNTIL THEY BECOME COOL. AFTER THE AIR CONDITIONING SYSTEM OPERATES, SOME AIR CONDITIONING PARTS CAN STAY HOT FOR ALMOST ONE HOUR. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

(4) Connect the electrical connector for the inoperative valve.

### F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-00-00-410-022

(1) When the control compartment trim air modulating valve was deactivated, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-023

(2) When a trim air modulating valve in the right ECS bay was deactivated, close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-860-111

(3) Set the temperature selector associated with the deactivated trim air modulating valve to AUTO.

### G. MAINT Light Status Message

SUBTASK 21-00-00-750-003

(1) Uncheck the applicable MAINT light Status Message(s) on the MAINT LIGHT menu (TASK 31-65-00-750-801).

——— END OF TASK ———

**TASK 21-00-00-040-866**

## 49. DDG 21-61-04 Trim Air Check Valve Inoperative - Preparation

(Figure 909)

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with a trim air check valve inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 21-61-09-000-801 | Trim Air Check Valve Removal (P/B 401) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |



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**C. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-11158 | Blank-Off Plate, Trim Air Check Valve (Dispatch)<br>Part #: A21015-8 Supplier: 81205 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**F. Prepare for Deactivation**

SUBTASK 21-00-00-040-019

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-00-00-040-020

(2) Do these steps on the P5-10 air conditioning panel:

(a) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

SUBTASK 21-00-00-010-031

(3) To get access to the trim air check valve in the left ECS bay, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-010-032

(4) To get access to the trim air check valve in the right ECS bay, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

**G. Trim Air Check Valve Deactivation**

SUBTASK 21-00-00-040-021

(1) Do these steps to deactivate the trim air check valve:

(a) Do the steps in this task to remove the duct connection clamp on the check valve: Trim Air Check Valve Removal, TASK 21-61-09-000-801.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Install the blank-off plate, SPL-11158 between the check valve and the duct flange.

NOTE: If blank-off plate, SPL-11158 is not available, then fabricate a blanking plate which has these specifications:

Allowable materials:

1. Titanium 6AL-4V per MIL-T-9046 Type 3 Comp C
2. Inconel 718 per AMS 5596
3. 301 CRES per MIL-S-5059 1/2, 3/4, or Fullhard

Dimensions:

Diameter; 3.10 +0.10 / -0.00 in. (78.74 +2.54 / -0.00 mm)

Thickness; 0.040 in. (1.016 mm)

(c) Do the steps in this task to install the clamp on the check valve and duct connection: Ram Air Ducts Installation, TASK 21-51-24-400-801.

**SUBTASK 21-00-00-700-002**

(2) Perform a leakage test:

(a) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

1) Set the BLEED 1 and 2 switches to the ON position and remove the DO-NOT-OPERATE tags.

2) Set the BLEED APU switch to the ON position and remove the DO-NOT-OPERATE tag.

(b) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

(c) Put the applicable PACK switch to the AUTO position.

(d) Put the TRIM AIR switch to the OFF position.

(e) Check valve flange for leakage.

1) Diffused leakage is satisfactory.

2) Jet blast leakage must be repaired by joint or clamp realignment.

## H. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-00-00-010-034**

(1) When the trim air check valve in the left ECS bay is deactivated, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-00-00-010-035**

(2) When the trim air check valve in the right ECS bay is deactivated, close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |



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SUBTASK 21-00-00-860-080

(3) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-00-00-440-016

(4) Do these steps on the P5-10 air conditioning panel:

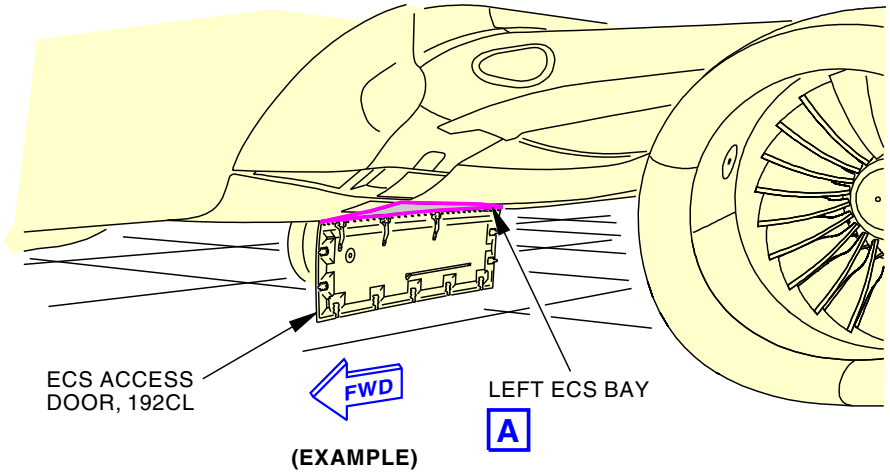
(a) Set the BLEED 1 and 2 switches to the ON position and remove the DO-NOT-OPERATE tags.

(b) Set the BLEED APU switch to the ON position and remove the DO-NOT-OPERATE tag.

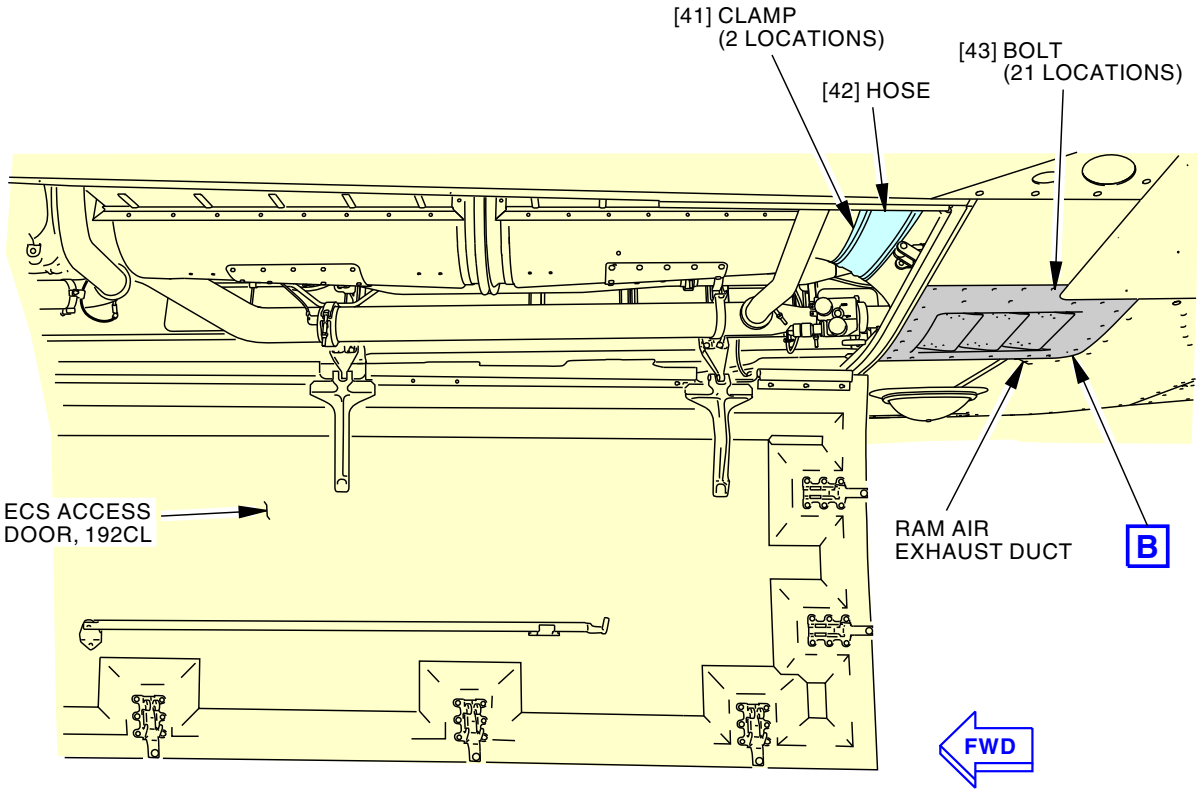
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**(EXAMPLE)**




**LEFT ECS BAY**
**(RIGHT ECS BAY IS OPPOSITE)**

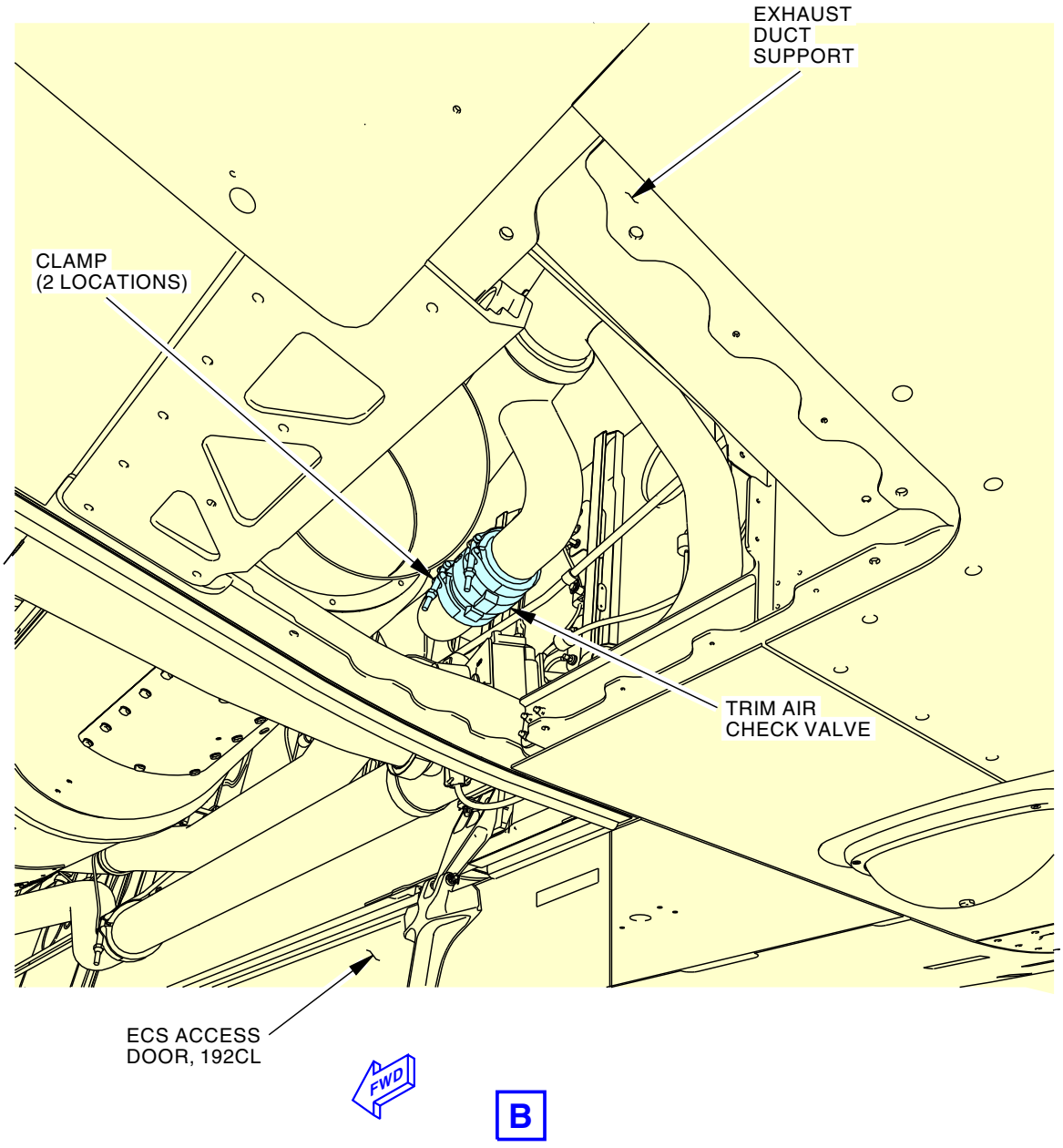
A

2897755 S0000691297_V1

**Trim Air Check Valve Deactivation**
**Figure 909/21-00-00-990-808 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Trim Air Check Valve Deactivation**
**Figure 909/21-00-00-990-808 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-00-00-440-852**

## 50. DDG 21-61-04 Trim Air Check Valve Inoperative - Restoration

(Figure 909)

### A. General

(1) This task puts the airplane to its usual condition after operation with a trim air check valve inoperative.

### B. References

| Reference | Title |
|---|---|
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 21-61-09-000-801 | Trim Air Check Valve Removal (P/B 401) |
| 21-61-09-400-801 | Trim Air Check Valve Installation (P/B 401) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Prepare for Reactivation

**SUBTASK 21-00-00-040-044**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-00-00-040-045**

(2) Do these steps on the P5-10 air conditioning panel:

(a) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-00-00-010-041**

(3) To get access to the trim air check valve in the left ECS bay, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-00-00-010-042**

(4) To get access to the trim air check valve in the right ECS bay, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Trim Air Check Valve Reactivation

SUBTASK 21-00-00-960-018

(1) Remove the blanking plate installed between the trim air check valve and duct flange.

(a) Do the steps in this task to remove the blanking plate: Trim Air Check Valve Removal, TASK 21-61-09-000-801

1) Be sure the blanking plate used between the duct assembly and the inoperative trim air check valve is removed at the completion of task: Trim Air Check Valve Installation, TASK 21-61-09-400-801.

NOTE: Blanking plate material specifications are as follows: Titanium 6AL-4V per MIL-T-9046 Type 3 Comp C, Inconel 718 per AMS 5596, and 301 CRES per MIL-S-5059 1/2, 3/4, or Fullhard. Blanking plate dimension specifications are as follows: Diameter is 3.10 +0.10 / -0.00 in. (78.74 +2.54 / -0.00 mm) and Thickness is 0.040 in. (1.016 mm).

(b) Do the steps in this task to install the clamp on the check valve and duct connection: Ram Air Ducts Installation, TASK 21-51-24-400-801.

SUBTASK 21-00-00-700-003

(2) Perform a leakage test:

(a) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

1) Set the BLEED 1 and 2 switches to the ON position and remove the DO-NOT-OPERATE tags.

2) Set the BLEED APU switch to the ON position and remove the DO-NOT-OPERATE tag.

(b) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801

(c) Put the applicable PACK switch to the AUTO position.

(d) Put the TRIM AIR switch to the OFF position.

(e) Check valve flange for leakage.

1) Diffused leakage is satisfactory.

2) Jet blast leakage must be repaired by joint or clamp realignment.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-00-00-410-024

(1) When the trim air check valve in the left ECS bay was deactivated, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-00-410-025

(2) When the trim air check valve in the right ECS bay was deactivated, close these panels in the specified sequence:



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Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-860-112

(3) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-00-00-440-017

(4) Do these steps on the P5-10 air conditioning panel:

(a) Set the BLEED 1 and 2 switches to the ON position and remove the DO-NOT-OPERATE tags.

(b) Set the BLEED APU switch to the ON position and remove the DO-NOT-OPERATE tag.

**——— END OF TASK ———**

**TASK 21-00-00-040-867**

## 51. DDG 21-62-01 Trim Air Pressure Regulating and Shutoff Valve Inoperative - Preparation

(Figure 910)

### A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with a Trim Air Pressure Regulating and Shutoff Valve Inoperative.

### B. References

| Reference | Title |
|---|---|
| 20-10-44-000-801 | Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401) |
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for Deactivation

SUBTASK 21-00-00-860-082

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-00-00-860-084

(2) On the P5-17 Cabin Temperature Panel, put the TRIM AIR switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-00-00-860-083

(3) Open this circuit breaker and install safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

SUBTASK 21-00-00-010-036

(4) To get access to the trim air pressure regulating and shutoff valve, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## G. Trim Air Pressure Regulating and Shutoff Valve Deactivation (Locked Closed)

SUBTASK 21-00-00-040-022

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

**WARNING** DO NOT TOUCH AIR CONDITIONING PARTS UNTIL THEY BECOME COOL. AFTER THE AIR CONDITIONING SYSTEM OPERATES, SOME AIR CONDITIONING PARTS CAN STAY HOT FOR ALMOST ONE HOUR. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

(1) Disconnect, cap and stow the electrical connector from the shutoff valve.

SUBTASK 21-00-00-040-023

(2) Lock the shutoff valve in the closed position.

(a) Remove the lockwire from the manual override hex (TASK 20-10-44-000-801).

(b) Turn the manual override hex on the shutoff valve until LOCKED shows.

(c) Install lockwire on the manual override hex (TASK 20-10-44-400-801).

SUBTASK 21-00-00-010-037

(3) Close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

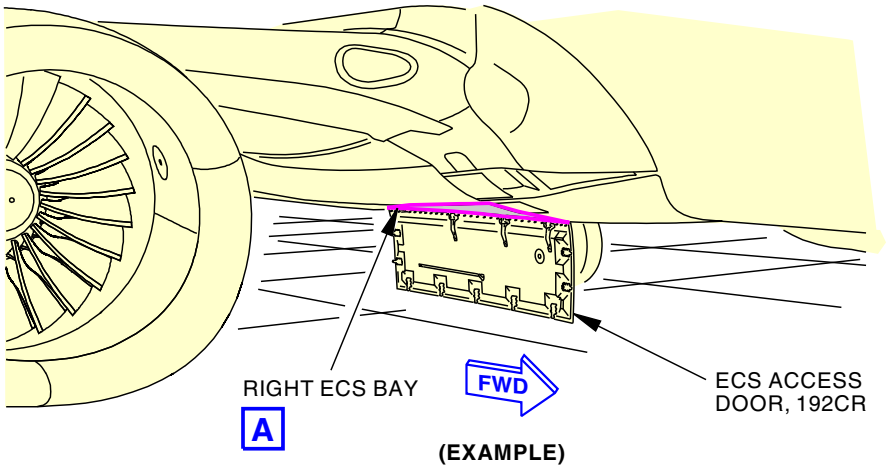


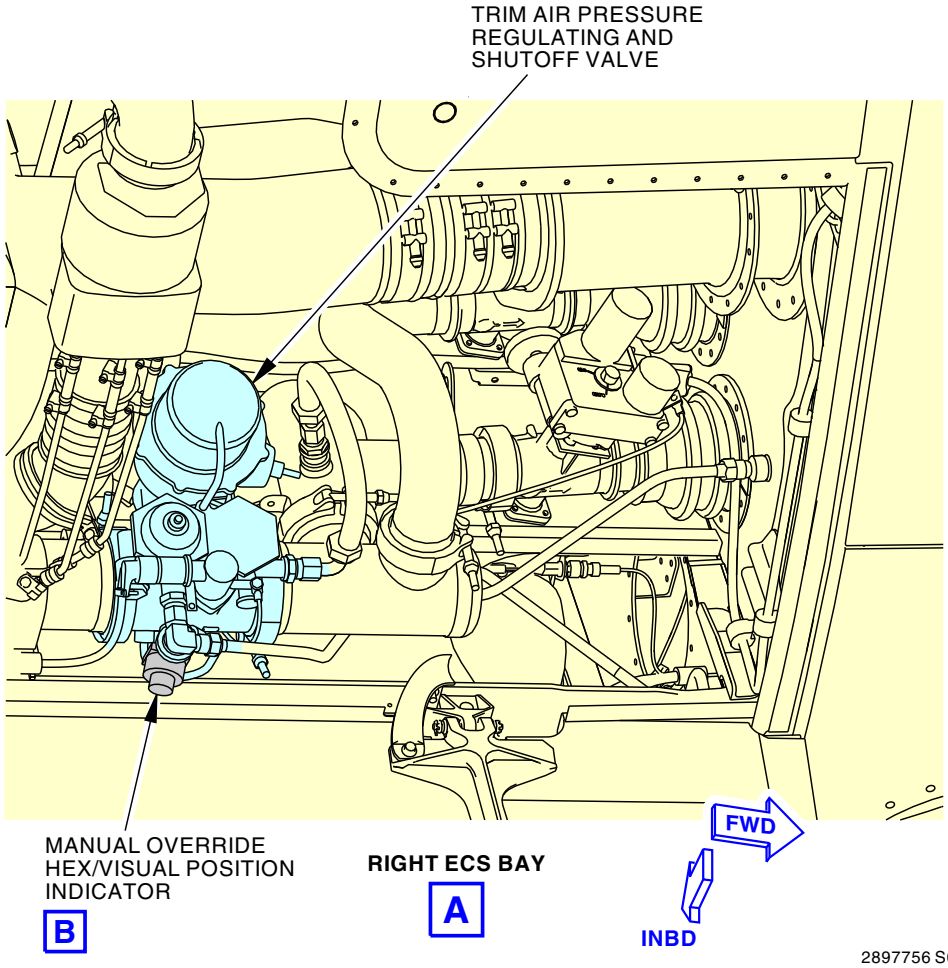
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END OF TASK



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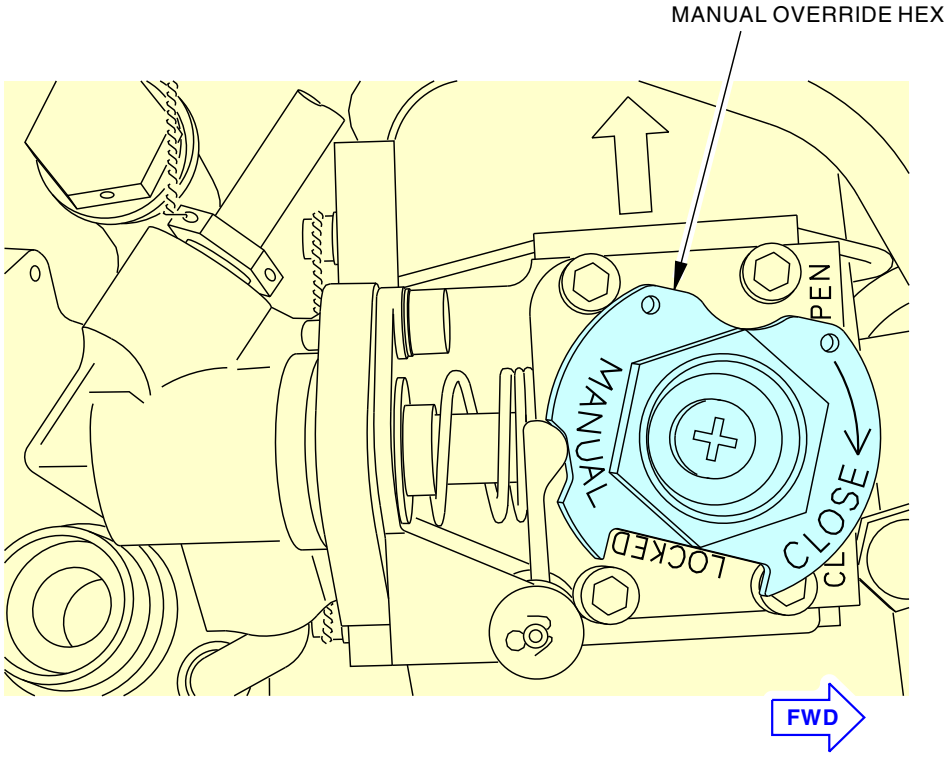



**Trim Air Pressure Regulating and Shutoff Valve Deactivation**
**Figure 910/21-00-00-990-806 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**MANUAL OVERRIDE HEX/VISUAL POSITION INDICATOR**

**B**

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**Trim Air Pressure Regulating and Shutoff Valve Deactivation**
**Figure 910/21-00-00-990-806 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-00-00-440-853**

## 52. DDG 21-62-01 Trim Air Pressure Regulating and Shutoff Valve Inoperative - Restoration

(Figure 910)

### A. General

(1) This task gives the maintenance steps which return the airplane to its usual condition after flight with the Trim Air Pressure Regulating and Shutoff Valve Inoperative.

### B. References

| Reference | Title |
|---|---|
| 20-10-44-000-801 | Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401) |
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for Reactivation

**SUBTASK 21-00-00-860-113**

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**SUBTASK 21-00-00-860-114**

(2) Make sure that the TRIM AIR switch, on the P5-17 cabin temperature panel, is on the OFF position and has a DO NOT OPERATE tag, STD-858.

**SUBTASK 21-00-00-860-117**

(3) Make sure that this circuit breaker is open and has a safety lock:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

**SUBTASK 21-00-00-010-044**

(4) To get access to the trim air pressure regulating and shutoff valve, open these panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## G. Trim Air Pressure Regulating and Shutoff Valve Restoration

SUBTASK 21-00-00-440-015

(1) Unlock the shutoff valve.

(a) Remove the lockwire from the manual override hex (TASK 20-10-44-000-801).

(b) Turn the manual override hex on the shutoff valve until LOCKED does not show.

(c) Install lockwire on the manual override hex (TASK 20-10-44-400-801).

SUBTASK 21-00-00-440-014

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

**WARNING** DO NOT TOUCH AIR CONDITIONING PARTS UNTIL THEY BECOME COOL. AFTER THE AIR CONDITIONING SYSTEM OPERATES, SOME AIR CONDITIONING PARTS CAN STAY HOT FOR ALMOST ONE HOUR. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

(2) Remove the cap and connect the electrical connector to the shutoff valve.

SUBTASK 21-00-00-410-026

(3) Close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-00-00-860-134

(4) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

SUBTASK 21-00-00-860-115

(5) On the P5-17 Cabin Temperature Panel, put the TRIM AIR switch to the ON position and remove the DO NOT OPERATE tag, STD-858.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## AIR CONDITIONING SYSTEM OIL CONTAMINATION REMOVAL - MAINTENANCE PRACTICES

### 1. General

A. The oil fumes and the smoke from an APU/engine failure can get into the airplane cabin and cause contamination of the conditioned air. This procedure gives instructions to remove the oil contamination from the air conditioning and pneumatic systems. You must first isolate the cause of the oil contamination and repair the problem before you do this procedure.

B. The APU is the most likely source of the smoke or odors in the airplane. The smoke or odors can be caused by either an internal APU failure which can release oil into the pneumatic and/or air conditioning systems. Another source of smoke or odor is oil, glycol or hydraulic fluid being ingested into the inlet of the APU or engines where it then can enter the pneumatic and/or air conditioning systems and vaporize at higher temperatures.

C. Do not do this procedure with the crew and passengers on the airplane, since this procedure can generate smoke in the airplane.

**TASK 21-00-01-100-801**

### 2. Oil Contamination Removal from Air Conditioning and Pneumatic Systems

(Figure 201)

#### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 21-25-01-000-801 | Recirculation Air Filter - Removal (P/B 401) |
| 21-25-01-400-801 | Recirculation Air Filter - Installation (P/B 401) |
| 21-51-03-000-802 | Heat Exchanger and Plenum/Diffuser Assembly Cleaning (P/B 701) |
| 21-51-04-000-801 | Air Cycle Machine Removal (P/B 401) |
| 21-51-04-400-801 | Air Cycle Machine Installation (P/B 401) |
| 21-51-08-000-801 | High Pressure Water Separator Removal (P/B 401) |
| 21-51-08-400-801 | High Pressure Water Separator Installation (P/B 401) |
| 21-51-12-000-801 | Condenser Removal (P/B 401) |
| 21-51-12-400-801 | Condenser Installation (P/B 401) |
| 49-11-00-860-801 | APU Starting and Operation (P/B 201) |
| 71-00-00-800-801-G00 | Engine Ground Safety Precautions (P/B 201) |
| 71-00-00-910-802-G00 | Start the Engine (Selection) (P/B 201) |
| 71-00-00-910-806-G00 | Stop the Engine (Usual Engine Stop) (P/B 201) |

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-2462 | Deactivator - Check Valve<br>Part #: C21006-7 Supplier: 81205<br>Opt Part #: C21006-1 Supplier: 81205<br>Opt Part #: PF80-012-500 Supplier: 053H3 |


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**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Procedure**

SUBTASK 21-00-01-010-001

(1) To get access to the cooling packs, open the access panels in the sequence that follows:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

SUBTASK 21-00-01-020-001

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(2) Install the deactivator, SPL-2462, in the ground air connector as follows:

(a) Put the deactivator, SPL-2462, in the ground air connector so that the check valve flappers are open.

(b) Install the coupling on the supply hose from the ground air cart onto the nipple of the ground air connector check valve assembly so that the deactivator, SPL-2462, is held in position.

NOTE: The supply hose should not be connected to the ground cart as the exhaust from the hose should be vented to ambient.

SUBTASK 21-00-01-860-002

(3) Make sure these switches on the P5 overhead panel, are set to the indicated positions:

(a) On the P5-10 air conditioning panel:

1) L PACK and R PACK switches are set to OFF.

2) L RECIRC FAN and R RECIRC FAN switches are set to OFF.

(b) On the P5-11 thermal anti-ice panel:

1) WING, ENGINE 1, and ENGINE 2, ANTI-ICE switches are set to OFF.



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SUBTASK 21-00-01-860-003

(4) Start the APU and let the APU operation become stable (TASK 49-11-00-860-801).

SUBTASK 21-00-01-860-004

(5) Do the steps which follow to remove the oil contamination from the APU pneumatic ducts:

NOTE: This procedure will remove the oil contamination from the APU bleed air. The APU bleed air will go out through the check valve in the pneumatic ground air connector.

(a) Make sure the ISOLATION VALVE switch on the P5-10 air conditioning panel is set to OPEN.

(b) Make sure the APU BLEED switch, on the P5-10 air conditioning panel, is set to ON.

**WARNING** DO NOT PUT YOUR HAND OR BODY IN THE AIR THAT COMES OUT OF THE PNEUMATIC GROUND CONNECTOR. THE HOT AIR WILL CAUSE INJURIES.

(c) Let the APU operate until the air that comes out of the pneumatic ground connector has no smell of the oil contamination.

SUBTASK 21-00-01-860-005

(6) Set the ISOLATION VALVE switch on the P5-10 air conditioning panel to CLOSE.

SUBTASK 21-00-01-860-006

(7) Start the left engine and let the engine operate at ground idle speed (TASK 71-00-00-910-802-G00).

(a) Use the APU to start the engine as it is still in operation.

(b) Set the APU BLEED switch, on the P5-10 air conditioning panel, to OFF.

(c) Set the ISOLATION VALVE switch on the P5-10 air conditioning panel to OPEN.

SUBTASK 21-00-01-860-007

(8) Do the steps which follow to remove the oil contamination from the left engine pneumatic ducts:

(a) Set the engine pneumatic BLEED 1 switch, on the P5-10 air conditioning panel, to ON.

**WARNING** OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

(b) Make sure that you obey all safety precautions when you are near an engine that is in operation (TASK 71-00-00-800-801-G00).

**WARNING** DO NOT PUT YOUR HAND OR BODY IN THE AIR THAT COMES OUT OF THE PNEUMATIC GROUND CONNECTOR. THE HOT AIR WILL CAUSE INJURIES.

(c) Let the engine 1 pneumatic air flow until the air that comes out of the pneumatic ground connector has no smell of the oil contamination.

(d) Set the engine pneumatic BLEED 1 switch to OFF.

SUBTASK 21-00-01-860-008

(9) Stop the operation of the left engine (TASK 71-00-00-910-806-G00).



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SUBTASK 21-00-01-080-001

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(10) Remove the ground cart supply hose coupling from the nipple on the ground air connector check valve assembly.

SUBTASK 21-00-01-090-001

(11) Remove the deactivator, SPL-2462, from the pneumatic ground air connector.

SUBTASK 21-00-01-860-009

(12) Set the APU BLEED switch, on the P5-10 air conditioning panel, to ON.

SUBTASK 21-00-01-860-010

(13) Start the right engine and let the engine operate at ground idle speed (TASK 71-00-00-910-802-G00).

(a) Use the APU to start the engine as it is still in operation.

(b) Set the APU BLEED switch, on the P5-10 air conditioning panel, to OFF.

**WARNING** OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

(c) Make sure that you obey all safety precautions when you are near an engine that is in operation (TASK 71-00-00-800-801-G00).

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(d) Install the deactivator, SPL-2462, in the ground air connector:

1) Put the deactivator, SPL-2462, in the ground air connector so that the check valve flappers are open.

2) Install the coupling on the supply hose from the ground air cart onto the nipple of the ground air connector check valve assembly so that the deactivator, SPL-2462, is held in position.

NOTE: The supply hose should not be connected to the ground cart as the exhaust from the hose should be vented to ambient.

(e) Set the ISOLATION VALVE switch on the P5-10 air conditioning panel to CLOSE.

SUBTASK 21-00-01-860-011

(14) Do the steps which follow to remove the oil contamination from the right engine pneumatic ducts:

(a) Set the engine pneumatic BLEED 2 switch, on the P5-10 air conditioning panel, to ON.



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**WARNING** OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

(b) Make sure that you obey all safety precautions when you are near an engine that is in operation (TASK 71-00-00-800-801-G00).

**WARNING** DO NOT PUT YOUR HAND OR BODY IN THE AIR THAT COMES OUT OF THE PNEUMATIC GROUND CONNECTOR. THE HOT AIR WILL CAUSE INJURIES.

(c) Let the engine 2 pneumatic air flow until the air that comes out of the pneumatic ground connector has no smell of the oil contamination.

(d) Set the engine pneumatic BLEED 2 switch to OFF.

SUBTASK 21-00-01-860-012

(15) Stop the operation of the right engine (TASK 71-00-00-910-806-G00).

SUBTASK 21-00-01-800-001

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(16) Remove the ground cart supply hose and deactivator, SPL-2462, from the pneumatic ground connector.

SUBTASK 21-00-01-860-013

(17) Do the steps which follow to remove the oil contamination from the air conditioning packs and the ducts that are downstream of the packs:

(a) Supply conditioned air with the left and right cooling packs (TASK 21-00-00-800-803).

(b) Put the TRIM AIR switch to the ON position.

(c) Turn the CONT CAB, FWD CAB, AND AFT CAB temperature selectors, on the P5-17 cabin temperature control panel, to the full WARM position.

(d) Let the packs operate until the air that goes into the control cabin and the passenger cabin has no smell of the oil contamination.

(e) Shut down the cooling packs (TASK 21-00-00-800-804).

SUBTASK 21-00-01-200-001

(18) Do this inspection of the air cycle machine:

(a) Remove the air cycle machine (TASK 21-51-04-000-801).

(b) Make sure that you can turn the rotating components of the ACM with 20 in-lb (2 N·m) of torque applied on the axial nut just aft of the fan impeller.

(c) If the ACM does not rotate with 20 in-lb (2 N·m) of torque, replace the ACM with a serviceable unit.

(d) Do this task: Air Cycle Machine Installation, TASK 21-51-04-400-801.



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SUBTASK 21-00-01-100-001

(19) Clean the heat exchanger and plenum/diffuser assembly, if contamination is found (TASK 21-51-03-000-802).

NOTE: Cleaning of the heat exchanger and plenum/diffuser assembly is recommended once the contamination has been rectified.

SUBTASK 21-00-01-210-001

(20) Examine the high pressure water separator and condenser for contamination.

NOTE: Removal and cleaning of these components is recommended once the contamination has been rectified.

(a) Do this task: High Pressure Water Separator Removal, TASK 21-51-08-000-801.

(b) Do this task: Condenser Removal, TASK 21-51-12-000-801.

(c) Clean the components that have contamination, replace the components if they have too much contamination.

(d) Do this task: Condenser Installation, TASK 21-51-12-400-801.

(e) Do this task: High Pressure Water Separator Installation, TASK 21-51-08-400-801.

SUBTASK 21-00-01-160-001

(21) Clean the pneumatic ducts and the components where you can see the oil contamination.

SUBTASK 21-00-01-960-001

(22) Replace the components if they have too much contamination.

SUBTASK 21-00-01-210-002

(23) Examine the recirculation air filters for contamination:

(a) Replace the filters if they have contamination.

These are the tasks:

Recirculation Air Filter - Removal, TASK 21-25-01-000-801,

Recirculation Air Filter - Installation, TASK 21-25-01-400-801.

## F. Put the Airplane Back to its Usual Condition

SUBTASK 21-00-01-010-002

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-00-01-010-003

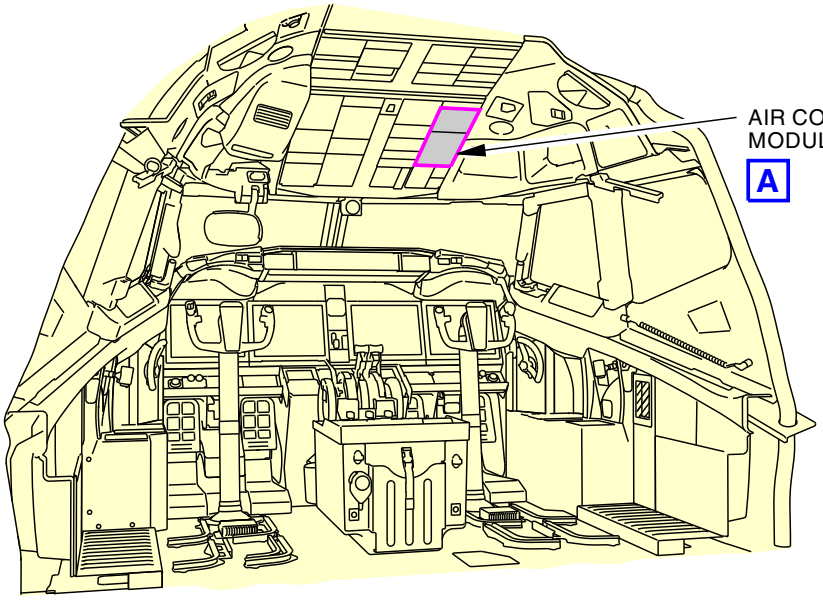
(2) Close these panels, in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

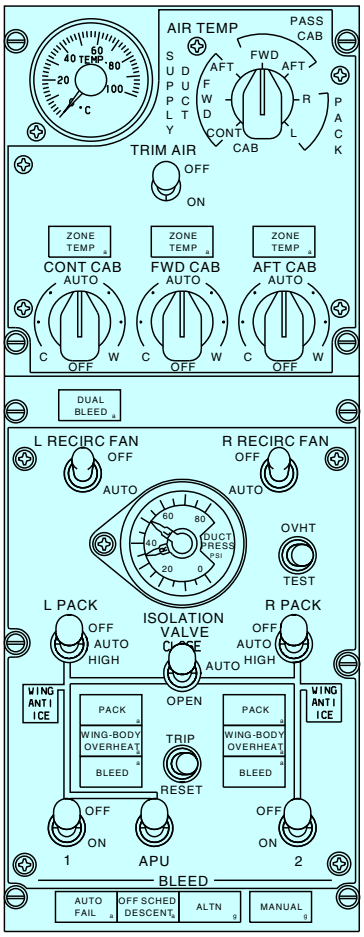
**END OF TASK**



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FLIGHT COMPARTMENT




AIR CONDITIONING MODULE

A

2411231 S00061527313_V2

**Air Conditioning System Oil Contamination - Removal**
**Figure 201/21-00-01-990-801**



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# CONFIDENCE CHECK OF AIRPLANE ABILITY TO MAINTAIN CABIN PRESSURE IN FLIGHT - MAINTENANCE PRACTICES

## 1. General

A. The function of this procedure is to do a ground check of the capability of the air conditioning pack(s) to pressurize the airplane when it is in flight. This test can be accomplished prior to dispatch at an interval best determined by the operator.

**TASK 21-00-05-780-801**

## 2. Airplane Pack Operation - Confidence Check

### A. General

(1) This confidence check consists primarily of these tests:

(a) Phase I Test - pressurize cabin from 0 psid (0 kPa) to 4 psid (28 kPa) using the APU, and the packs.

(b) Phase II Test - perform a cabin leak down test from 4 psid (28 kPa) cabin pressure and note the cabin differential pressure for 120 seconds at 10 second intervals.

(2) Figure 201, Figure 202 provide graphical representation of the confidence check tests.

(3) Table 201 and Table 202 use to record the Phase I and II test results.

(4) Figure 203 provides supplemental troubleshooting information.

### B. References

| Reference | Title |
|---|---|
| 32-00-01-080-801 | Landing Gear Downlock Pins Removal (P/B 201) |
| 32-00-01-480-801 | Landing Gear Downlock Pins Installation (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| 49-11-00-860-801 | APU Starting and Operation (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Phase I Test. Airplane Pressurization

**SUBTASK 21-00-05-860-002**

(1) Prepare for airplane pressurization as follows:

(a) Make sure that the nose and main landing gear are pinned.

1) To install the downlock pins, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

(b) Inspect the condition of the following items for evidence of wear and tear:

1) The forward and aft cargo door seals



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2) The main entry door seals

3) The service door seals

4) The duct pressure seals.

NOTE: The duct pressure seals are the seals on the ducts that go from an unpressurized compartment such as the ECS bays to the pressurized distribution bay compartment or aft cargo compartment.

(c) Record the condition of the door seals and the duct seals on the Table 201.

**Table 201/21-00-05-993-802 Initial Cabin Pressurization (0.0 to 4.0 psid) - Confidence Check**

| **Airplane** _____ | **Hours** _____ | **Cycles**_____ | **Date**_____ | |
|---|---|---|---|---|
| Phase I - Initial Cabin Pressurization (0.0 to 4.0 psid) | | | | |
| Condition of cargo and main entry door seals | | | | |
| Flow control valve indicator modulation | | Left valve _____ | Right valve_____ | |
| Any obvious air leak noise from inside cabin | | | | |
| Any obvious leaks outside airplane | | | | |
| Estimated time to pressurize from 0.0 to 4.0 psid | | | | |
| Bleed source(s) used to achieve 4.0 psid | | Left engine_____ | Right engine____ | APU_____ |

(d) Open this access panel:

| **Number** | **Name/Location** |
|---|---|
| 192CL | ECS Access Door |

(e) Open this access panel:

| **Number** | **Name/Location** |
|---|---|
| 192DR | ECS High Pressure Access Door |

(f) Open this access panel:

| **Number** | **Name/Location** |
|---|---|
| 192CR | ECS Access Door |

**SUBTASK 21-00-05-480-001**

(2) Make sure that there is audio communication between the flight compartment personnel and ground personnel.

**SUBTASK 21-00-05-860-003**

(3) Do these steps on the Flight Management Computer (FMC) to display the FMCS ANALOG page 1/4:

NOTE: Pack and isolation valve operation/position information can be obtained from the FMC Maintenance Discrete page.

(a) Press the INIT REF function key on the CDU front panel.

(b) Push the LSK adjacent to <INDEX (LSK 6L) to show the INIT REF INDEX 1/1 page.

(c) Push the LSK adjacent to MAINT> (LSK 6R) to show the MAINT BITE INDEX page.

(d) Push the LSK adjacent to <FMCS (LSK 1L) to show the FMCS BITE 1/1 page.

(e) Push the LSK adjacent to <DISCRETES (LSK 4L) to show the FMCS ANALOG DISC 1/4 page.

(f) Use the ECS PACK H/L (high flow, low flow) line entry on the ANALOG DISC 1/4 page.



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(g) The following information can be displayed on the FMC:

1) ECS PACK ON/OFF (LEFT and RIGHT)

a) Indicates if the left or right pack is on or off.

2) ECS PACK H/L LO HI (LEFT and RIGHT)

a) Indicates the pack is in the low flow mode or if it has been commanded to the high flow mode. A pack can be commanded to the high flow mode even if it is off.

3) ISOLATION VALVE OPEN (CLOSED)

a) Indicates if the valve is open or closed.

**SUBTASK 21-00-05-860-004**

(4) Do this task: APU Starting and Operation, TASK 49-11-00-860-801.

(a) Let the APU become stable at the governed speed.

**SUBTASK 21-00-05-860-005**

(5) Position the ISOLATION VALVE switch to OPEN.

**SUBTASK 21-00-05-860-006**

(6) Set the BLEED 1 and BLEED 2 switches on the P5-10 air conditioning panel to the ON position.

NOTE: The cabin is not being pressurized at this point.

**SUBTASK 21-00-05-710-001**

(7) Do these steps to make sure that the pack flow control and shutoff valves operate correctly:

(a) Pressurize the pneumatic system with the APU (TASK 36-00-00-860-803).

(b) Set the APU BLEED switch, on the P5-10 air conditioning panel, to ON position.

(c) Set the L and R PACK switches, on the P5-10 air conditioning panel, to AUTO position.

(d) Make sure that the ECS PACK H/L indication on the FMC display shows LO for both packs.

(e) Set the L PACK switch to HIGH.

(f) Make sure that the ECS PACK H/L indication on the FMC display shows HI for the left pack and LO for the right pack.

(g) Set the R PACK switch to HIGH.

(h) Make sure that the ECS PACK H/L indication on the FMC display shows HI for both packs.

(i) Put the L and R PACK switches, on the P5-10 air conditioning panel, to AUTO position.

(j) Make sure that the ECS PACK H/L indication on the FMC display shows LO for both packs.

(k) Put the L and R PACK switches to OFF.

**SUBTASK 21-00-05-780-001**

(8) Pressurize the airplane with both packs as follows:

(a) Pressurize the airplane to 4 psid (28 kPa) as follows:

1) Make sure that the APU BLEED switch is set to ON.

2) Make sure that the ISOLATION VALVE switch is set to OPEN.

3) Make sure that the engine BLEED1 and BLEED 2 switches are set to OFF.



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4) Make sure that the L PACK and R PACK switches are set to AUTO.

(b) Manually operate the outflow valve MANUAL VALVE CLOSE/OPEN switch to maintain the cabin pressure of 4 psid (28 kPa) as follows:

NOTE: Pressurizing the airplane to 4 psid (28 kPa) for the short duration of the test will not harm the airplane.

1) Make sure that the pressurization mode selector is set to MAN.

2) Move the MANUAL VALVE CLOSE/OPEN toggle switch as necessary to maintain 4 psid (28 kPa) on the DIFF PRESS gauge.

(c) If a differential pressure of 4 psid (28 kPa) cannot be maintained, either a pack supply or airplane leakage problem exists.

1) To repair leakage, do the applicable fault isolation tasks.

## F. Phase II Test. Airplane Leak Down Check

**SUBTASK 21-00-05-200-001**

(1) Do this check of the leakage of the cabin pressure.

(a) Make a record of the cabin temperature.

**SUBTASK 21-00-05-210-001**

(2) Inspect these components for any sign of leakage:

NOTE: This step is optional.

(a) Doors

(b) Hatches

(c) Equipment cooling valve

(d) Bilge drains

(e) Flight deck windows

(f) Safety relief valves

(g) APU duct seals at the pressure bulkhead penetrations at Sta. 727 and Sta. 1016

(h) Duct seals in the air conditioning bays at Sta. 540

(i) Outflow valve seal.

**SUBTASK 21-00-05-860-007**

(3) When 4.2 psid (29.0 kPa)±0.1 psid (0.7 kPa) on the DIFF PRESS gauge has been achieved and stabilized, fully close (manually) the aft outflow valve.

(a) Make sure that the indication on the gauge above the CLOSE/OPEN switch, on the P5-17 pressurization control panel, shows that the valve is fully closed.

**SUBTASK 21-00-05-040-001**

(4) Put the L PACK and R PACK switches to OFF.

**SUBTASK 21-00-05-780-004**

**CAUTION**

KEEP THE APU IN OPERATION. IF YOU DO NOT KEEP THE APU IN OPERATION, EQUIPMENT DAMAGE COULD OCCUR.

(5) Continue to operate the APU.

**SUBTASK 21-00-05-700-001**

(6) Let the cabin pressure leak down to 4 psid (28 kPa) (time zero) then start the timer.



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(a) Record of the pressure differential indications on the Table 202 at 10 second intervals until the cabin pressure reduces to 2.5 psid (17.2 kPa).

**Table 202/21-00-05-993-803 Airplane Leak Down (No Pack Operation) - Confidence Check**

| Airplane_____ Hours_____ Cycles_____ Date_____ | | |
|---|---|---|
| **Phase II - Airplane Leak Down (No Pack Operation)** | | |
| Cabin temperature _____ | | |
| Time (seconds) | Cabin (psid) | Cabin (rate of change) |
| 10 | | |
| 20 | | |
| 30 | | |
| 40 | | |
| 50 | | |
| 60 | | |
| 70 | | |
| 80 | | |
| 90 | | |
| 100 | | |
| 110 | | |
| 120 | | |

1) See the table in Performance Summary for system performance evaluation.

**SUBTASK 21-00-05-860-008**

(7) Depressurize the airplane and restore it to its unpressurized condition as follows:

(a) Turn on either pack by putting the appropriate PACK switch to ON.

(b) Modulate the outflow valve to depressurize the airplane at approximately 500 feet per minute.

**SUBTASK 21-00-05-860-009**

(8) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

(9) Make sure that the mode selector switch, on the P5-6 cabin pressurization control panel, is returned to the AUTO position.

**SUBTASK 21-00-05-080-001**

(10) Remove the nose and main landing gear safety locks (TASK 32-00-01-080-801).

## G. Performance Summary

**SUBTASK 21-00-05-780-005**

(1) Best performance of the air conditioning packs and airplane structure is as follows:



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**Table 203/21-00-05-993-801**

| SYSTEM | BEST PERFORMANCE |
|---|---|
| Cabin Leakage Rate from 4 psid (28 kPa) to 2.5 psid (17.2 kPa) | 120-130 seconds is optimum; Airplane will maintain pressure in flight even with slightly degraded inflow.<br>110-120 seconds is acceptable; Airplane will maintain pressure in flight with normal inflow.<br>100-110 seconds is marginally acceptable; Airplane will maintain pressure in flight with normal inflow.<br>Less than 100 seconds is unacceptable: Airplane will not maintain pressure in flight. Perform maintenance. |

**SUBTASK 21-00-05-780-006**

(2) If the test data agrees with the best performance data for the packs (inflow) and the airplane structure (outflow), you can be very sure that cabin pressure can be maintained at cruise (FL250) on a single pack.

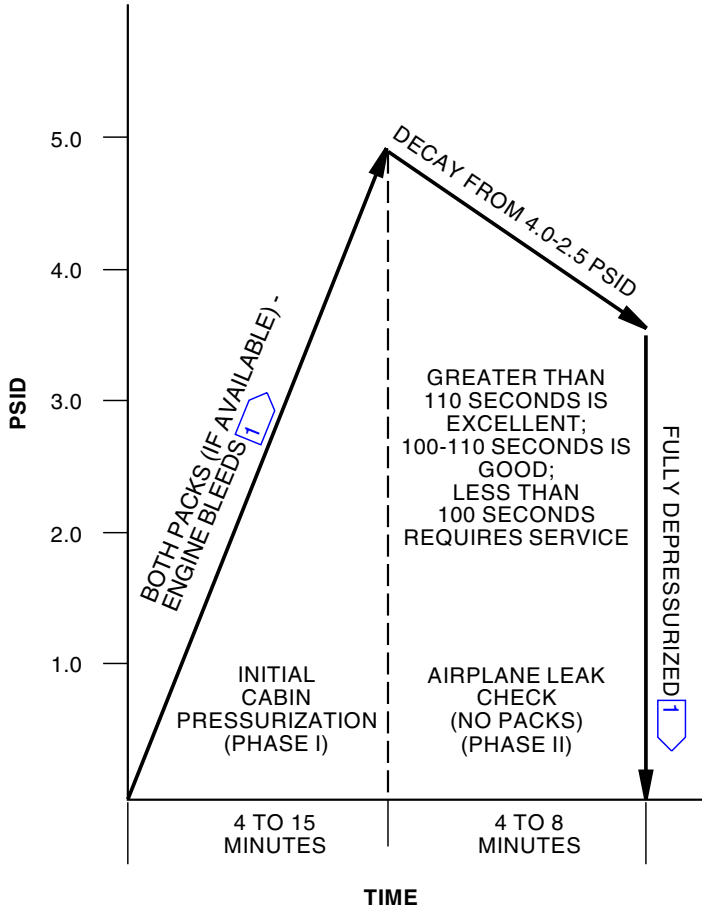
**SUBTASK 21-00-05-780-007**

(3) Refer to the data in Figure 202, Table 201, and Table 202 and the troubleshooting information in Figure 203 to better determine the condition of the packs and the airplane and what action if any is recommended.

**——— END OF TASK ———**



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**NOTE:**

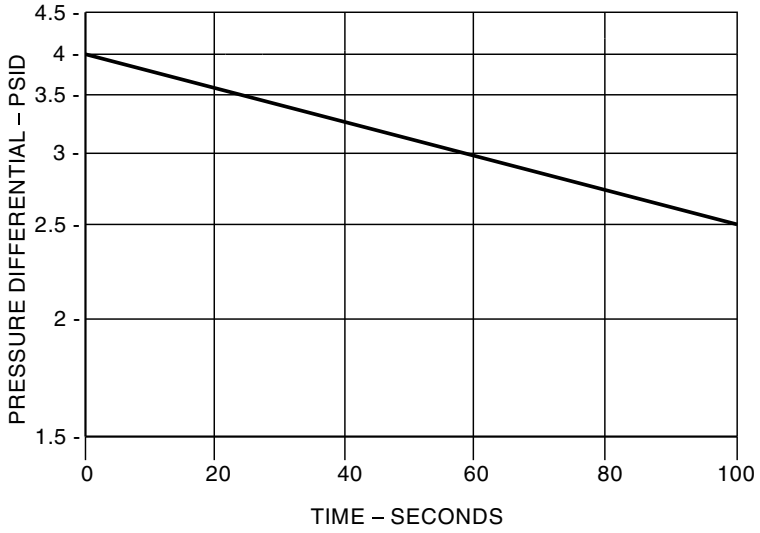
1 OUTFLOW VALVE IN MANUAL MODE

2411250 S00061527394_V2

**Airplane Dispatch with Single Pack Operation - Confidence Check**
**Figure 201/21-00-05-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2411251 S00061527395_V3

**Airplane Dispatch with Single Pack Operation - Confidence Check**
**Figure 202/21-00-05-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

| SYSTEM | MINIMUM REQUIREMENT | REQUIREMENT SATISFIED | |
|---|---|---|---|
| | | YES | NO |
| AIRPLANE/ STRUCTURE AIR LEAKAGE | LEAK DOWN RATE FROM 4.0 TO 2.5 PSID IS GREATER THAN OR EQUAL TO A MINIMUM OF 100 SECONDS (110 TO 120 SECONDS IS THE TARGET) | CABIN LEAKAGE IS ACCEPTABLE.<br><br>OPERATORS MAY WISH TO CONSIDER CONDUCTING AMM 05-51-91/201 LEAKAGE TEST AT THE NEXT HEAVY MAINTENANCE CHECK BASIS AND MONITOR PERFORMANCE. | INSPECT AND REPAIR ANY AIR LEAKAGE AS NOTED ON THE DATA SHEET. SPECIFICALLY:<br><br>DOORS AND HATCHES – MISSING OR TORN SEALS, POOR CONTACT BETWEEN DOOR SEALS AND AIRPLANE DUE TO DIRT, ETC., INSPECT SEALING COMPOUND AREAS AND REPAIR DOOR SEALS (AMM 52-09-10/801).<br><br>OVERBOARD EXHAUST VALVE – P/N 20798-01 OEV SHOULD CLOSE AT 0.7 TO 1.1 PSID.<br><br>**NOTE:**<br><br>ALL BILGE DRAINS OPEN IS EQUIVALENT TO A 3.75 INCH (95.25 mm) DIAMETER HOLE IN THE PRESSURE VESSEL.<br><br>BILGE DRAINS – SHOULD CLOSE AT APPROXIMATELY 2.0 PSID:<br>– CABIN PRESSURE SAFETY RELIEF VALVE<br>– OUTFLOW VALVE SEAL<br>– NEGATIVE PRESSURE RELIEF VALVE SEAL<br>– WATER SERVICE PANEL<br>– FLIGHT DECK WINDOWS<br>– PRESSURE BULKHEAD PENETRATIONS SHOULD ALL HAVE MINIMAL LEAKAGE<br>– SIGNIFICANT LEAKS SHOULD BE RESOLVED AS REQUIRED. |
| | | | |

2411253 S00061527397_V2

**Airplane Dispatch with Single Pack Operation - Troubleshooting**
**Figure 203/21-00-05-990-803**



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## AIR CONDITIONING SYSTEM DUCTS - REPAIRS

### 1. General

A. This procedure gives instructions for the repair of air conditioning ducts that are made of these materials:
   (1) Fiberglass
   (2) Kevlar
   (3) Polyurethane foam
   (4) Ducts wrapped with Foam Insulation
   (5) Ducts with Fiberglass Insulation/Flame-Resistant Covering

B. This procedure has these tasks:
   (1) Fiberglass or Kevlar Ducts
      (a) Taped Joint Repair
      (b) External Patch Repair
      (c) Structural Repair
   (2) Polyurethane Foam Duct
      (a) Taped Joint Repair
      (b) Duct End Repair
      (c) External Patch Repair
      (d) Structural Repair
      (e) Inner Lining Repair
      (f) Duct Section Replacement
   (3) Ducts wrapped with Foam Insulation
      (a) Tape Replacement
      (b) Insulation Repair
      (c) Insulation Replacement
   (4) Ducts with Fiberglass Insulation/Flame-Resistant Covering
      (a) Tape Replacement
      (b) Insulation and Covering Repair
      (c) Insulation and Covering Replacement

C. This procedure also uses these materials
   (1) Tape - pressure sensitive glass cloth (Scotch No. 361)
   (2) Polyurethane foam - rigid (BMS8-131 Type I Grade 20 Form A)
   (3) Polyurethane foam duct (to match damaged duct)
   (4) Plastic sheet - polyethylene or vinyl (commercially available)
   (5) Potting compound - BMS 5-28, Type 19 (Epocast 1619A/B)
   (6) Sandpaper - 320 grit (commercially available)

D. Some of the ducts in the air distribution system are wrapped with insulation material. CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.


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(1) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

(2) BMS 8-385 Type 4 is the preferred foam insulation material that meets the flame propagation requirement. BMS 8-385 Type 6 and BMS 8-300 Type VIII insulation are new, qualified materials optional to BMS 8-385 Type 4.

(3) If BMS 8-300, Type II, Grade 5 foam insulation material is used, it must be completely covered with BMS 5-157, Type I, Class 1, Grade B, composition MPVF tape or BMS 5-157, Type I, Class 2, Grade C, composition MPEEK that meets the flame propagation requirement.

(4) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(5) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(a) Tape specifications BMS 5-157, Type I, Class 1, Grade B, composition MPVF and BMS 5-157, Type I, Class 2, Grade C, composition MPEEK are qualified tapes used to secure insulation to ducts.

**TASK 21-20-02-330-801**

## 2. Taped Joint Repair - Fiberglass/Kevlar Duct

(Figure 801)

### A. General

(1) This procedure is for the repair of a taped joint that connects two sections of Fiberglass or Kevlar air conditioning ducts.

(2) This procedure may also be used to make a temporary repair to a damaged Fiberglass or Kevlar air conditioning duct when time is not available to make a permanent repair or if the materials are not available to make a permanent repair. If a temporary repair is made, make the permanent repair as soon as possible.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A00066 | Sealant - RTV - Dow Corning 90-006 | |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00580 | Primer - Adhesive Bonding, RTV - PR-1200 (Formerly DC 1200) | |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

## D. Prepare for the Repair

SUBTASK 21-20-02-840-001

(1) Do this task:Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-002

(2) Gain access to the damaged air conditioning duct joint.

SUBTASK 21-20-02-840-003

(3) If insulation is installed on the duct joint, then remove the insulation.

SUBTASK 21-20-02-840-004

(4) Do these steps to remove loose tape and unwanted adhesive from the duct joint.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.

(b) Sand the duct joint area to remove any adhesive that remains on the duct joint.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.

SUBTASK 21-20-02-840-005

(5) Cut a piece of the glass fabric, G00031 that is 3 inches wide and is long enough to go around the duct a minimum of two times.

## E. Repair the Taped Joint

SUBTASK 21-20-02-340-001

(1) Apply a thin, smooth layer of the PR-1200 primer, C00580 to the duct joint area and let it dry at room temperature for a minimum of 1 hour.

SUBTASK 21-20-02-340-002

(2) Apply the Dow Corning 90-006 sealant, A00066 to one side of the Fiberglass glass fabric, G00031.



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SUBTASK 21-20-02-340-003

(3) Wrap the Fiberglass glass fabric, G00031 around the duct joint a minimum of two times.

NOTE: Make sure that the sealant on the Fiberglass glass fabric, G00031 touches the PR-1200 primer, C00580 on the duct.

SUBTASK 21-20-02-340-004

(4) Smooth the Fiberglass glass fabric, G00031 to remove any bubbles or any wrinkles.

SUBTASK 21-20-02-340-005

(5) Wrap the glass cloth tape around the two edges of the Fiberglass fabric repair. Make sure the tape lies flat with no wrinkles or gaps.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-006

(1) If insulation was removed from the duct joint, install new insulation:

(a) You must install insulation that meets one of these specifications:

1) BMS 8-385 Type 4 foam insulation, G50449

2) BMS 8-385 Type 6 foam insulation, G51169

3) BMS 8-300 Type VIII foam insulation, G51170.

(b) Use BMS 5-157 MPVF tape, G50327, tape, G51202 or BMS 5-157 MPEEK tape, G50789 to install the insulation.

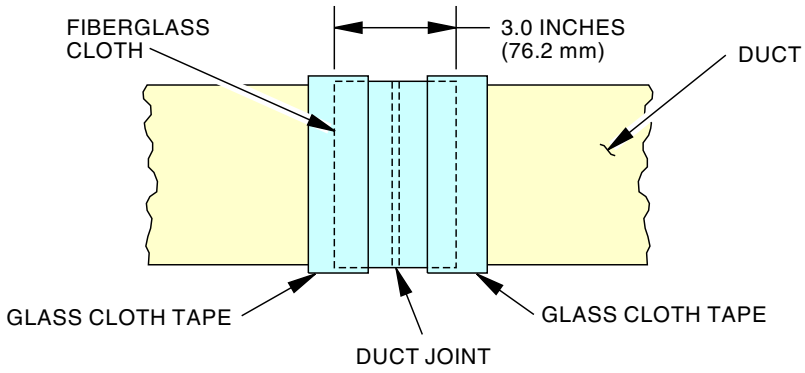
SUBTASK 21-20-02-840-007

(2) Replace the panels or other airplane structure removed to gain access to the duct joint.

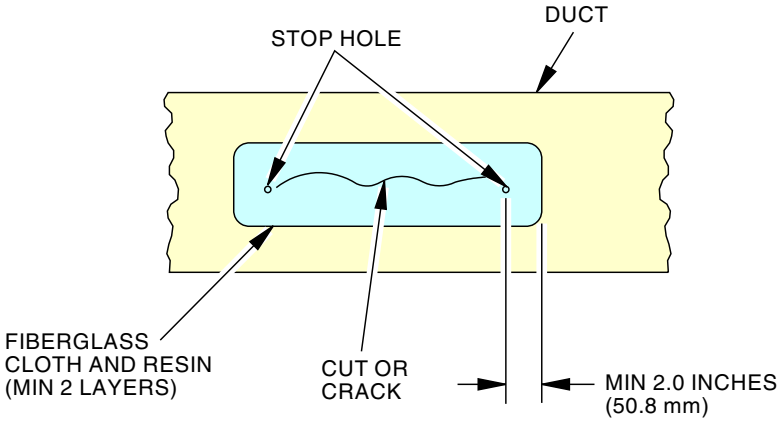
**——— END OF TASK ———**



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**TAPED JOINT REPAIR - FIBERGLASS/KEVLAR DUCT**



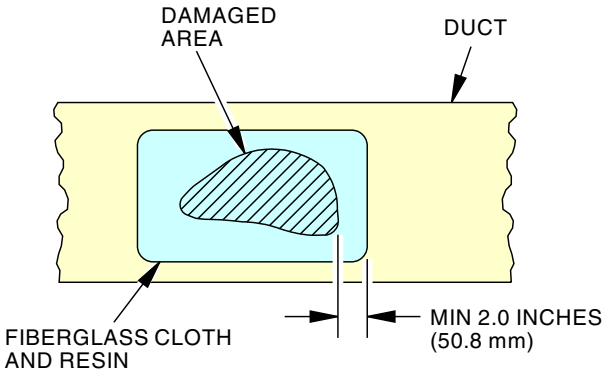

**EXTERNAL PATCH - FIBERGLASS/KEVLAR DUCT**

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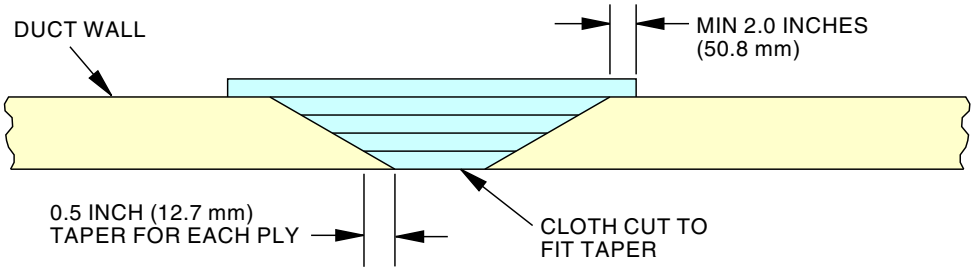
**Air Conditioning System Ducts Repair**
**Figure 801/21-20-02-990-801 (Sheet 1 of 3)**



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**STRUCTURAL REPAIR - FIBERGLASS/KEVLAR DUCT - OVERHEAD VIEW**



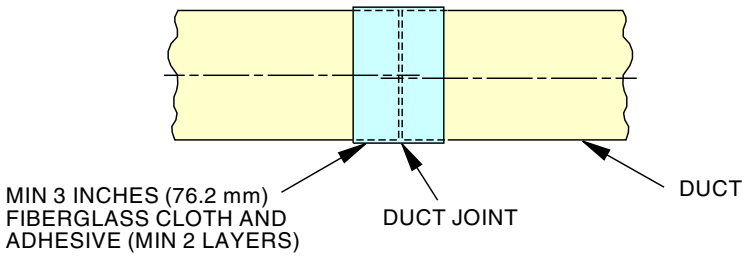

**STRUCTURAL REPAIR - FIBERGLASS/KEVLAR DUCT - CROSS-SECTION VIEW**

2411256 S00061527404_V1

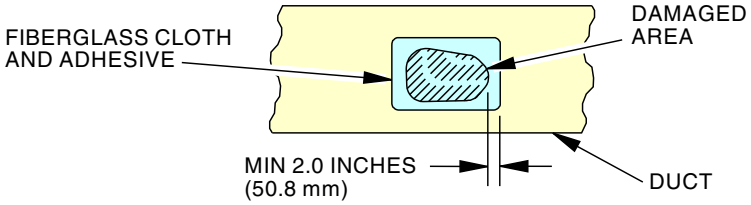
**Air Conditioning System Ducts Repair**
**Figure 801/21-20-02-990-801 (Sheet 2 of 3)**



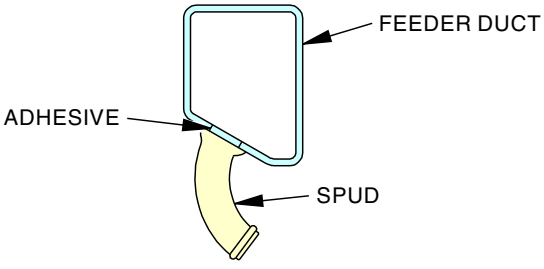
ECCN 9E991 BOEING PROPRIETARY - See title page for details



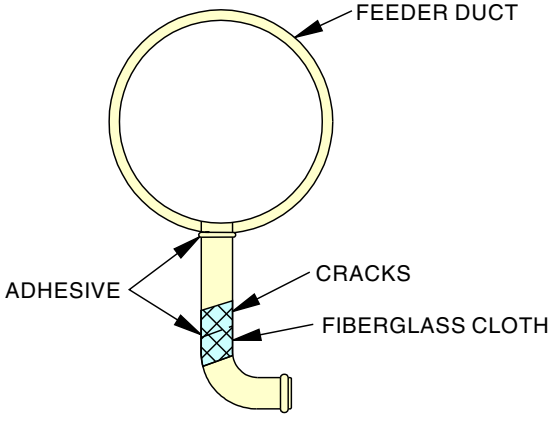

**REPAIR FOR THE TAPE CONNECTION AT THE DUCT JOINT AREA**




**REPAIR OF A DUCT WITHOUT INNER LINING DAMAGE**




**FEEDER DUCT REPAIR**




**FEEDER DUCT REPAIR**

2411257 S00061527405_V1

**Air Conditioning System Ducts Repair**
**Figure 801/21-20-02-990-801 (Sheet 3 of 3)**



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**TASK 21-20-02-330-802**

## 3. External Patch - Fiberglass/Kevlar Duct

(Figure 801)

### A. General

(1) This procedure gives instructions for the repair of a crack or cut in a Fiberglass or Kevlar air conditioning duct with an external patch.

(2) An external patch is applicable when the cut or the crack is less than 1/4 inch wide and is less than 3 inches long.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A00040 | Resin - Self-Extinguishing Laminating - Epocast 50-A1 with Epocast 9816 | BMS8-201 Type III (Long work life) |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02137 | Resin - Polyester - Hetron 92 | |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |

### D. Prepare for the Repair

**SUBTASK 21-20-02-840-008**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-009**

(2) Gain access to the damaged air conditioning duct joint.

**SUBTASK 21-20-02-840-010**

(3) If insulation is installed on the duct, then remove the insulation.

**SUBTASK 21-20-02-840-011**

(4) Do these steps to prepare the damaged area of the duct.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.



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(b) Drill a hole at each end of the cut or crack to prevent the cut or crack from getting larger. The holes should be a maximum of 1/16 inch diameter.

(c) Sand the damaged area to remove any unwanted contamination from the duct.

(d) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.

SUBTASK 21-20-02-840-012

(5) Cut sufficient pieces of the Fiberglass glass fabric, G00031 to equal the thickness of the duct. Cut the Fiberglass glass fabric, G00031 pieces 1/2 inch larger on all sides than the damage. Round the corners of the pieces of the Fiberglass fabric.

SUBTASK 21-20-02-840-013

(6) Prepare the applicable resin:

(a) Fiberglass duct repair - Hetron 92 resin, G02137

(b) Kevlar duct repair - resin, A00040

## E. Repair the Air Conditioning Duct

SUBTASK 21-20-02-340-006

(1) Apply a thin, smooth layer of the applicable Hetron 92 resin, G02137 or resin, A00040 to the duct where the Fiberglass fabric will be applied. Make sure the area of the resin is a minimum of the size and shape of the Fiberglass fabric pieces.

SUBTASK 21-20-02-340-007

(2) Place a piece of the Fiberglass fabric on the resin so that it extends beyond the cut or crack a minimum of 1/2 inch on all sides.

SUBTASK 21-20-02-340-008

(3) Soak the Fiberglass fabric with the applicable resin.

SUBTASK 21-20-02-340-009

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly to remove any bubbles or any wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-010

(5) Remove the plastic sheet from the Fiberglass fabric piece and remove any unwanted resin with a wiping cloth.

SUBTASK 21-20-02-340-011

(6) Place another piece of the Fiberglass fabric on the first piece, soak it with resin, and smooth it. Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

SUBTASK 21-20-02-340-012

(7) Allow the resin to cure for 24 hours at room temperature.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-014

(1) If insulation was removed from the duct joint, install new insulation:

(a) You must install insulation that meets one of these specifications:

1) BMS 8-385 Type 4, foam insulation, G50449

2) BMS 8-385 Type 6, foam insulation, G51169

3) BMS 8-300 Type VIII, foam insulation, G51170I.

(b) Use BMS 5-157 MPVF or BMS 5-157 MPEEK tape to install the insulation.



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SUBTASK 21-20-02-840-015

(2) Replace the panels or other airplane structure removed to gain access to the duct joint.

——— END OF TASK ———

TASK 21-20-02-330-803

4. Structural Repair - Fiberglass/Kevlar Duct

(Figure 801)

A. General

(1) This procedure gives instructions for making a structural repair to a Fiberglass or Kevlar air conditioning duct.

(2) A structural repair is applicable when the damage to the air conditioning duct is a cut or a hole that is more than 0.25 in. (6.35 mm) wide and more than 3 in. (76.2 mm) long but less than 5 percent of the total surface area of the duct. If the damage is more than 5 percent of the total surface area of the duct, then replace the duct section.

B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-122 | Brush |
| STD-821 | Squeegee - Plastic |

D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02137 | Resin - Polyester - Hetron 92 | |
| G50104 | Film, FEP or TFE Solid Parting Film, .001 inch Thick Minimum | |
| G50173 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type H-3 Style 7781 |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50399 | Resin - Fiberglass Layup, Long Worklife, Non-Brominated | BMS8-201 Type III (Supersedes BMS8-201 Type I) |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G50797 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type D Style 120 |
| G50798 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type D-1 Style 220 |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |
| G51266 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type H-2 Style 1581 |

## E. Prepare for the Repair

SUBTASK 21-20-02-840-016

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-017

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-840-018

(3) If insulation is installed on the duct, then remove the insulation.

SUBTASK 21-20-02-840-019

(4) Do these steps to prepare the damaged area of the duct.

(a) Cut away the damaged area to make a rounded opening with a smooth shape. Cut the sides of the opening at an angle to make a taper of 0.5 in. (12.7 mm) between each ply of material.

(b) Sand the edge of the opening to make a smooth surface.

(c) Sand the surface of the duct around the opening a distance of 0.5 in. (12.7 mm) for each ply in the duct. For example, if there are 6 plies, sand 3 in. (76.2 mm) from the opening on all sides (1/2 x 6 = 3 inches) or (12.7 x 6 = 76.2 millimeters).

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(d) Use the solvent, B00148 and a cotton wiper, G00034 to clean the edge of the opening and the sanded surface of the duct.



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SUBTASK 21-20-02-840-020

(5) Cut sufficient pieces of the Fiberglass glass fabric, G00031, fabric, G50173, or fabric, G51266, to equal the thickness of the duct. Cut each piece of the Fiberglass fabric 0.5 in. (12.7 mm) larger to fit the taper of the opening. Cut one piece of the Fiberglass fabric a minimum of 2 in. (50.8 mm) larger on all sides than the opening in the duct.

SUBTASK 21-20-02-840-021

(6) Cut a piece of solid parting film, G50104, 2 in. (50.8 mm) to 3 in. (76.2 mm) inches larger on all sides than the opening. Cut a piece of cardboard or aluminum 2 in. (50.8 mm) to 3 in. (76.2 mm) inches larger than the opening on all sides.

SUBTASK 21-20-02-840-022

(7) Attach the solid parting film, G50104, to the inside of the opening with adhesive tape so that it covers the opening. Attach the cardboard or aluminum to the inside of the opening with adhesive tape so that it covers the opening and provides support for the solid parting film, G50104.

SUBTASK 21-20-02-840-023

(8) Prepare the applicable resin:

(a) Fiberglass duct repair - Hetron 92 resin, G02137, or resin, G50399

(b) Kevlar duct repair - resin, G50399, or resin, G50400

**F. Repair the Air Conditioning Duct**

SUBTASK 21-20-02-340-013

(1) Apply a thin, smooth layer of resin to the solid parting film, G50104, in the opening in the duct.

SUBTASK 21-20-02-340-014

(2) Place a piece of the Fiberglass fabric in the opening over the solid parting film, G50104, so that it covers the opening completely.

SUBTASK 21-20-02-340-015

(3) Soak the Fiberglass fabric with the applicable resin.

SUBTASK 21-20-02-340-016

(4) Put a piece of solid parting film, G50104, on the Fiberglass fabric and press lightly with a squeegee or with your hand. Smooth from the center to the edges of the Fiberglass fabric to remove bubbles or wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-017

(5) Remove the solid parting film, G50104, from the patch and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-018

(6) Place the next piece of the Fiberglass fabric on the first piece so that it covers the opening. Trim the Fiberglass fabric if necessary. Soak the Fiberglass fabric with resin and smooth it. Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

SUBTASK 21-20-02-340-019

(7) Place the last piece of the Fiberglass fabric on top of the patch so it extends beyond the opening a minimum of 2 in. (50.8 mm) on all sides. Smooth the Fiberglass fabric to remove bubbles or winkles.



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SUBTASK 21-20-02-340-020

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Wipe the duct around the patch with a cotton wiper, G00034, and solvent, B00148, to remove unwanted resin.

SUBTASK 21-20-02-340-021

(9) Allow the resin to cure for 24 hours at room temperature.

**G. Repair the Beaded End**

NOTE: More repair plies are necessary on the external and internal surfaces. If no damage is found on the duct plies (the plies below the bead), do the bead repairs and not the duct plies repairs. Only repair the ply that attaches to the bead.

SUBTASK 21-20-02-340-090

(1) Apply a thin, smooth layer of resin, G50399, or resin, G50400, to the solid parting film, G50104, in the opening in the duct.

SUBTASK 21-20-02-340-091

(2) Put a piece of fabric in the opening on the solid parting film, G50104.

(a) Use fabric, G50797, fabric, G50798, fabric, G50173, glass fabric, G00031, fabric, G50173, or fabric, G51266, to repair the duct and beaded end.

(b) Make sure that the fabric is on all of the opening.

SUBTASK 21-20-02-340-092

(3) Soak the fabric with resin.

SUBTASK 21-20-02-340-093

(4) Put a piece of the solid parting film, G50104, on the fabric.

(a) Apply light pressure to the solid parting film, G50104 with a plastic squeegee, STD-821, or with your hand.

(b) From the center of the fabric to the edges, remove all bubbles, wrinkles, and unwanted resin.

SUBTASK 21-20-02-340-094

(5) Remove the solid parting film, G50104, from the patch.

(a) Remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-095

(6) Put the next piece of fabric on the first piece of fabric.

(a) Make sure that the fabric is on all of the opening.

(b) Cut the fabric if necessary.

(c) Soak the fabric with resin.

1) Make the resin smooth.

(d) Continue with the same procedure with fabric until the bead agrees with the necessary duct end dimensions.



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SUBTASK 21-20-02-340-096

(7) Cut the last piece of fabric to the necessary dimensions:

NOTE: The dimensions can include the repaired bead and the internal and external surfaces of the full diameter of the duct.

(a) Make sure that the external layer of the Outer Mold Line (OML) is on all of the repaired bead and is around the part end.

(b) Make sure that the external layer extends more than 0.5 in. (12.7 mm) from the repair layer of the Inner Mold Line (IML).

(c) From the center of the fabric to the edges, remove all bubbles or wrinkles.

SUBTASK 21-20-02-340-097

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Clean the duct around the patch with a cotton wiper, G00034, and solvent, B00184, to remove unwanted resin.

SUBTASK 21-20-02-340-098

(9) To cure the resin, G50399, or resin, G50400 (Structural Repair Manual (SRM) 51-30-10):

(a) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-20-02-340-099

(10) If necessary, sand the patch on the outer duct surface to get a correct fit.

(a) Keep a wall thickness of 0.045 in. (1.143 mm) - 0.065 in. (1.651 mm) in this area.

NOTE: Wrinkles, creases, and unwanted resin are not permitted in this area. Sand these items flush where necessary.

SUBTASK 21-20-02-340-100

(11) Use a brush, STD-122, to seal exposed fabric with a layer of resin, G50399, or resin, G50400.

SUBTASK 21-20-02-340-101

(12) Let the resin, G50399, or resin, G50400, cure.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-102

(1) Remove the solid parting film, G50104, the cardboard or aluminum, and the adhesive tape you used to support the repair.

SUBTASK 21-20-02-840-024

(2) If insulation was removed from the duct joint, install new insulation:

(a) You must install insulation that meets one of these specifications:

1) BMS 8-385 Type 4 foam insulation, G50449

2) BMS 8-385 Type 6 foam insulation, G51169

3) BMS 8-300 Type VIII foam insulation, G51170.

(b) Use BMS 5-157 MPVF tape, G50327, tape, G51202, or BMS 5-157 MPEEK tape, G50789, to install the insulation.



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SUBTASK 21-20-02-840-025

(3) Replace the panels or other airplane structure removed to gain access to the duct joint.

END OF TASK

TASK 21-20-02-330-804

5. Taped Joint Repair - Polyurethane Foam Duct

(Figure 802)

A. General

(1) This procedure gives instructions for the repair of the taped joint that connects sections of polyurethane foam air conditioning duct.

(2) This procedure may also be used to make a temporary repair to a damaged polyurethane foam air conditioning duct when time is not available to make a permanent repair or if the materials are not available to make a permanent repair. If a temporary repair is made, make the permanent repair as soon as possible.

B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

D. Prepare for the Repair

SUBTASK 21-20-02-840-026

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-027

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-840-028

(3) Do these steps to remove loose tape and unwanted adhesive from the duct joint.

WARNING

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.

(b) Sand the duct joint area to remove any adhesive that remains on the duct joint.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to clean any dust from the duct joint area.



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SUBTASK 21-20-02-840-029

(4) Examine the end of each air conditioning duct.

SUBTASK 21-20-02-840-030

(5) If the duct lining is damaged so that the foam core of the duct shows, then do the Duct End Repair - Polyurethane Foam Duct procedure below.

SUBTASK 21-20-02-840-031

(6) Cut a piece of the Fiberglass glass fabric, G00031 that is 3 inches wide and is long enough to go around the duct a minimum of two times.

SUBTASK 21-20-02-840-032

(7) Prepare the applicable resin.

**E. Repair the Taped Joint**

SUBTASK 21-20-02-340-022

(1) Apply resin to the duct ends. Allow the resin to partially dry until it is sticky. Press the duct ends together by aligning the installation checkmarks.

SUBTASK 21-20-02-340-023

(2) Apply a thin, smooth layer of resin to the joint area a minimum of 2 inches wider than the duct joint.

SUBTASK 21-20-02-340-024

(3) Apply resin to one side of the Fiberglass glass fabric, G00031.

SUBTASK 21-20-02-340-025

(4) Wrap the Fiberglass fabric around the duct joint a minimum of two times. Make sure the resin on the Fiberglass fabric is in contact with the duct.

SUBTASK 21-20-02-340-026

(5) Smooth the Fiberglass fabric to remove bubbles or wrinkles.

SUBTASK 21-20-02-340-027

(6) Allow the resin to cure for 24 hours at room temperature.

**F. Put the Airplane Back to Its Usual Condition**

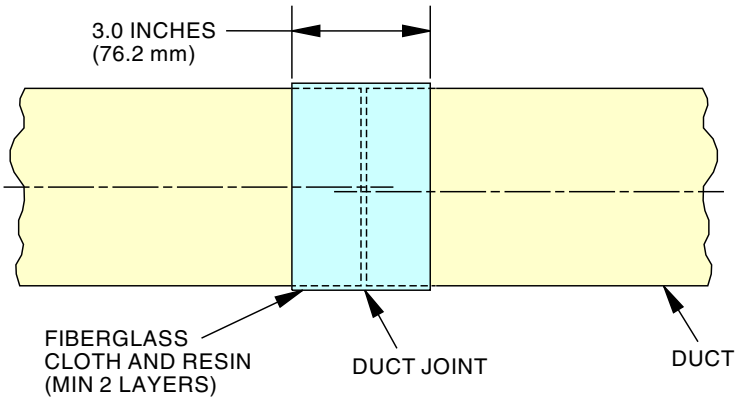
SUBTASK 21-20-02-840-033

(1) Replace the panels or other airplane structure removed to gain access to the duct joint.

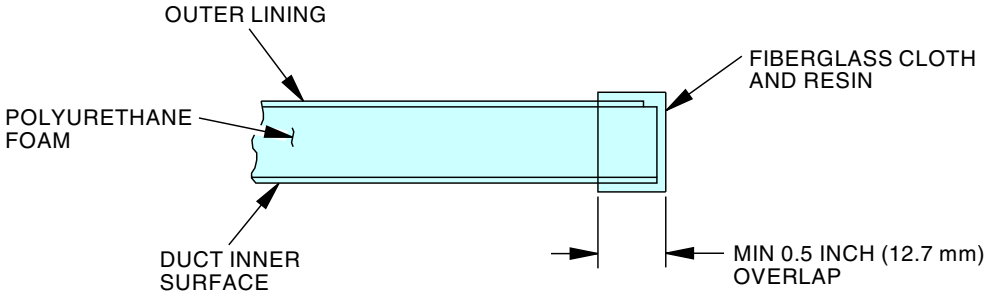
**——— END OF TASK ———**



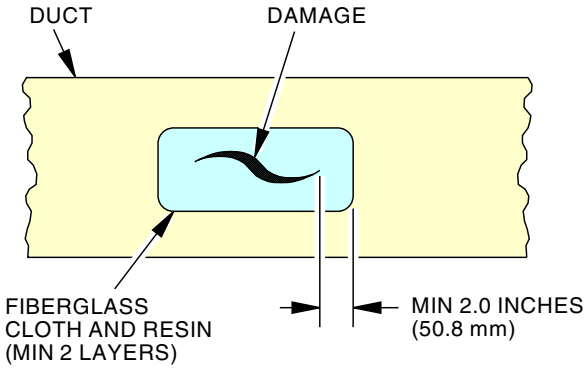
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**TAPED JOINT REPAIR - POLYURETHANE FOAM DUCT**




**DUCT END REPAIR - POLYURETHANE FOAM DUCT**



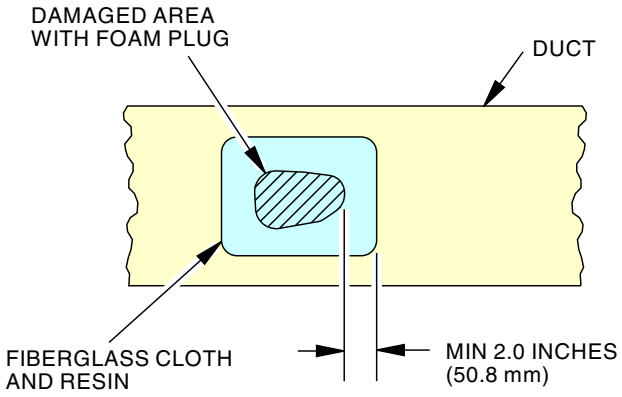

**EXTERNAL PATCH - POLYURETHANE FOAM DUCT**

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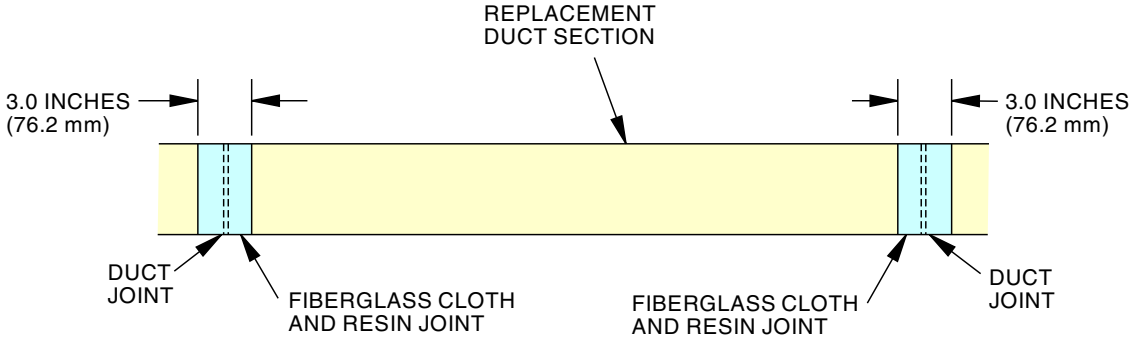
**Air Conditioning System Ducts Repair**
**Figure 802/21-20-02-990-802 (Sheet 1 of 2)**



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**STRUCTURAL REPAIR - POLYURETHANE FOAM DUCT**




**DUCT SECTION REPLACEMENT - POLYURETHANE FOAM DUCT**

2411259 S00061527410_V1

**Air Conditioning System Ducts Repair**
**Figure 802/21-20-02-990-802 (Sheet 2 of 2)**



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**TASK 21-20-02-330-805**

## 6. Duct End Repair - Polyurethane Foam Repair

(Figure 802)

### A. General

(1) This procedure gives instructions for the repair of the end of a polyurethane foam air conditioning duct. This procedure is done if the lining that covers the polyurethane foam at the duct end is damaged and the polyurethane foam is exposed.

(2) This procedure may be required when doing the repair of a taped duct joint.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00834 | Cloth - Lint-free Cotton | |

### D. Prepare for the Repair

**SUBTASK 21-20-02-840-034**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-035**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-036**

(3) Do these steps to remove loose tape and unwanted adhesive from the duct end area.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use solvent, B00148 and a lint-free cloth, G00834 to clean the duct end area.

NOTE: Clean the inner surface and the outer surface of the duct a minimum of 1 inch from the duct end.

(b) Sand the duct end area to remove any adhesive that remains.

(c) Use the solvent, B00148 and a lint-free cloth, G00834 to clean any dust from the duct end area.



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SUBTASK 21-20-02-840-037

(4) Cut a piece of the Fiberglass glass fabric, G00031 the length of the outside circumference of the duct. The Fiberglass fabric should have the width needed to overlap the duct end and the inside and outside of the duct a minimum of 1/2 inch.

SUBTASK 21-20-02-840-038

(5) Prepare the resin.

**E. Repair the Duct End**

SUBTASK 21-20-02-340-028

(1) Apply a thin, smooth layer of resin on the duct end and on the surface of the duct a minimum of 1/2 inch from the duct end.

SUBTASK 21-20-02-340-029

(2) Wrap the Fiberglass fabric around the duct end so that it overlaps a minimum of 1/2 inch on both sides of the end.

SUBTASK 21-20-02-340-030

(3) Soak the Fiberglass fabric with resin.

SUBTASK 21-20-02-340-031

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly with your hand to smooth the edges of the Fiberglass fabric and to remove bubbles or wrinkles.

SUBTASK 21-20-02-340-032

(5) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-20-02-340-033

**WARNING**

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(6) Clean the area with a cotton wiper, G00034 and solvent, B00148 to remove unwanted resin.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-20-02-840-039

(1) Replace the panels or other airplane structure removed to gain access to the duct joint.

**——— END OF TASK ———**

**TASK 21-20-02-330-806**

## 7. External Patch - Polyurethane Foam Duct

(Figure 802)

**A. General**

(1) This procedure gives instructions for the repair of a polyurethane foam air conditioning duct if the damage is less than 1/4 inch deep and less than 1 inch long and the inner lining is not damaged. If the damage is larger, do the Structural Repair - Polyurethane Foam Duct procedure below.



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**B. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

**D. Prepare for the Repair**

SUBTASK 21-20-02-840-040

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-041

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-210-001

(3) Examine the inner surface of the duct.

SUBTASK 21-20-02-210-002

(4) If the inner lining is damaged, then do the Duct Section Replacement - Polyurethane Foam Duct procedure below.

SUBTASK 21-20-02-210-003

(5) Examine the damage to the duct. If the damage is more than 3 inches long or more than 5 square inches in area, then do the Duct Section Replacement - Polyurethane Foam Duct procedure below.

SUBTASK 21-20-02-840-042

(6) Do these steps to prepare the air conditioning duct:

**WARNING**

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(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the damaged area.

(b) Sand the damaged area to remove any unwanted contamination.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to clean any dust from the damaged area.

SUBTASK 21-20-02-840-043

(7) Cut two pieces of the Fiberglass glass fabric, G00031 1/2 inch larger on all sides than the damaged area. Round the corners of the Fiberglass fabric pieces.

SUBTASK 21-20-02-840-044

(8) Prepare the applicable resin.



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### E. Repair the Duct

SUBTASK 21-20-02-340-034

(1) Apply a thin, smooth layer of resin to the duct where the Fiberglass fabric will be applied. Make sure the area of the resin is a minimum of the size and shape of the Fiberglass fabric.

SUBTASK 21-20-02-340-035

(2) Place a piece of the Fiberglass glass fabric, G00031 on the resin so that it extends beyond the damaged area a minimum of 1/2 inch to all sides.

SUBTASK 21-20-02-340-036

(3) Soak the Fiberglass fabric with resin.

SUBTASK 21-20-02-340-037

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly with a squeegee or with your hand. Smooth from the center to the edges of the Fiberglass fabric to remove bubbles or wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-038

(5) Remove the plastic sheet from the Fiberglass fabric and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-039

(6) Follow the same procedure to apply the second piece of the Fiberglass fabric.

SUBTASK 21-20-02-340-040

(7) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-20-02-340-041

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Remove unwanted resin from the edges of the Fiberglass fabric with a cotton wiper, G00034 soaked with solvent, B00148.

### F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-045

(1) Replace the panels or other airplane structure removed to gain access to the duct joint.

**END OF TASK**

**TASK 21-20-02-330-807**

## 8. Structural Repair - Polyurethane Foam Duct

(Figure 802)

### A. General

(1) This procedure gives instructions for making a structural repair to a polyurethane foam air conditioning duct. A structural repair replaces the polyurethane foam in the surface of the duct if the damage or deterioration to the polyurethane foam is greater than 1/4 inch deep and 1 inch long but the inner lining is not damaged.



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**B. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| A00040 | Resin - Self-Extinguishing Laminating - Epocast 50-A1 with Epocast 9816 | BMS8-201 Type III (Long work life) |
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| B01027 | Solvent - Butyl Carbitol (Dow Chemical - E-Series Glycol Ethers) | |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00077 | Foam - Flame Retardant Rigid Urethane | BMS8-133 |
| G02137 | Resin - Polyester - Hetron 92 | |
| G50305 | Sheeting - Plastic, Polyethylene | |
| G50399 | Resin - Fiberglass Layup, Long Worklife, Non-Brominated | BMS8-201 Type III (Supersedes BMS8-201 Type I) |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |

**D. Prepare for the Repair**

**SUBTASK 21-20-02-840-046**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-047**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-210-004**

(3) Examine the inner surface of the duct.

**SUBTASK 21-20-02-210-005**

(4) If the duct lining is damaged, then do the Duct Section Replacement - Polyurethane Foam Duct procedure below.

**SUBTASK 21-20-02-210-006**

(5) Examine the damage to the duct. If the damage is more than half the thickness of the foam duct material, then do the Duct Section Replacement - Polyurethane Foam Duct procedure below.

**SUBTASK 21-20-02-840-048**

(6) Do these steps to prepare the air conditioning duct.



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(a) Remove the damaged portion of the outer lining and the damaged foam material.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Use the solvent, B00148 and a cotton wiper, G00034 to clean the damaged area.

(c) Sand the duct outer surface a minimum of 2 inches from the edges of the damaged area to remove any unwanted contamination.

(d) Use the solvent, B00148 and a cotton wiper, G00034 to clean any dust from the damaged area.

**SUBTASK 21-20-02-840-049**

(7) Cut a piece of the polyurethane foam foam, G00077 to fit the area where the damaged foam was removed.

(a) Put the foam in the opening to make sure it is the correct size and shape.

**SUBTASK 21-20-02-840-050**

(8) Prepare glass fabric, G00031 to cover the damaged area:

(a) Cut two pieces of the glass fabric, G00031 two inches larger on all sides than the damaged area.

(b) Round the corners of the two pieces of the glass fabric, G00031.

**SUBTASK 21-20-02-840-051**

(9) Prepare the applicable resin, G50400, or resin, G50399, or resin, A00040 or Hetron 92 resin, G02137.

## E. Repair the Duct

**SUBTASK 21-20-02-340-042**

(1) Use the resin mixture to bond the piece of foam, G00077 (plug) to the damaged area on the duct:

(a) Make sure you fill all gaps and voids with the resin mixture.

**SUBTASK 21-20-02-340-043**

(2) Put the glass fabric, G00031 onto a piece of plastic sheeting, G50305.

**SUBTASK 21-20-02-340-044**

(3) Pour the resin mixture onto the glass fabric, G00031.

**SUBTASK 21-20-02-300-001**

(4) Put a second piece of plastic sheeting, G50305 over the glass fabric, G00031.

**SUBTASK 21-20-02-300-002**

(5) Use a plastic squeegee or your hand to remove unwanted resin, bubbles and wrinkles from the fiberglass fabric as follows:

(a) Smooth from the center of the fiberglass fabric to the edges of the fiberglass fabric.

**SUBTASK 21-20-02-300-003**

(6) Remove the top piece of the plastic sheeting from the fiberglass fabric.



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SUBTASK 21-20-02-300-004

(7) Put the glass fabric coated with the resin over the foam plug so that it extends beyond the damaged area a minimum of two inches on all sides.

SUBTASK 21-20-02-300-005

(8) Rub the glass fabric over the foam plug with a squeegee until the surface is smooth and unwanted resin is removed.

SUBTASK 21-20-02-340-045

(9) Follow the same steps above to apply a second piece of the glass fabric, G00031 over the damaged area.

SUBTASK 21-20-02-340-046

(10) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-20-02-300-006

**WARNING**

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. PUT ON A RESPIRATOR, PROTECTIVE SPLASH GOGGLES, AND GLOVES WHEN YOU USE SOLVENTS. KEEP THE SOLVENTS AWAY FROM SPARKS, FLAME, AND HEAT. SOLVENTS ARE POISONOUS AND FLAMMABLE. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(11) Remove unwanted resin from the edges of the repaired area with a cotton wiper, G00034 soaked with Butyl Carbitol solvent, B01027, solvent, B00184 or solvent, B00062.

### F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-052

(1) Replace the panels or other airplane structure removed to gain access to the duct joint.

——— END OF TASK ———

**TASK 21-20-02-330-808**

## 9. Inner Lining Repair - Polyurethane Foam Duct

### A. General

(1) This procedure gives instructions for the repair of the inner lining on a polyurethane foam air conditioning duct. Use this procedure if the inner lining has peeled away from the duct but the polyurethane foam is not damaged.

(2) If the polyurethane foam is damaged, do the procedure to replace a section of polyurethane foam air conditioning duct.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

## D. Prepare for the Repair

SUBTASK 21-20-02-840-053

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-054

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-840-055

(3) Do these steps to prepare the air conditioning duct.

(a) Cut away the inner lining that has peeled away from the foam. Do not damage the polyurethane foam.

(b) Examine the polyurethane foam. If the foam is damaged, do the Duct Section Replacement - Polyurethane Foam Duct procedure below.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to clean the damaged area.

(d) Sand the duct joint area to remove any unwanted contamination on the duct.

(e) Use the solvent, B00148 and a cotton wiper, G00034 to remove any dust from the damaged area.

SUBTASK 21-20-02-840-056

(4) Cut two pieces of the Fiberglass glass fabric, G00031 1/2 inch larger on all sides than the damaged area. Round the corners of the Fiberglass fabric pieces.

SUBTASK 21-20-02-840-057

(5) Prepare the applicable resin.

## E. Repair the Inner Lining

SUBTASK 21-20-02-340-047

(1) Apply a thin, smooth layer of the applicable resin to the damaged area of the duct. Make sure the area of the resin is a minimum of the size and shape of the Fiberglass fabric.

SUBTASK 21-20-02-340-048

(2) Place a piece of the Fiberglass fabric on the resin so that it extends beyond the damaged area a minimum of 1/2 inch on all sides.

SUBTASK 21-20-02-340-049

(3) Soak the Fiberglass fabric with the applicable resin.



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SUBTASK 21-20-02-340-050

(4) Put a piece of the plastic sheet on the Fiberglass fabric and press lightly with a squeegee or with your hand. Smooth from the center to the edges of the Fiberglass fabric to remove any bubbles or any wrinkles.

SUBTASK 21-20-02-340-051

(5) Remove the plastic sheet from the patch and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-052

(6) Follow the same procedure to apply the second piece of Fiberglass fabric.

SUBTASK 21-20-02-340-053

(7) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-20-02-340-054

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Remove unwanted resin from the edges of the repaired area with a cotton wiper, G00034 soaked with solvent, B00148.

### F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-058

(1) Use the applicable procedure to return the duct to its usual condition.

SUBTASK 21-20-02-840-059

(2) Replace the panels or other airplane structure removed to gain access to the duct.

**END OF TASK**

**TASK 21-20-02-330-809**

## 10. Duct Section Replacement - Polyurethane Foam Duct

(Figure 802)

### A. General

(1) This procedure gives instructions to replace a section of polyurethane foam air conditioning duct.

(2) If time or materials are not available to do this procedure, use the procedure to repair a taped duct joint to make a temporary repair. If a temporary repair is made, do this procedure as soon as possible to make a permanent repair.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

## D. Prepare for the Repair

SUBTASK 21-20-02-840-060

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-061

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-840-062

(3) Cut and remove the damaged section of polyurethane foam air conditioning duct. Cut the duct so the edges are straight and perpendicular to the circumference of the duct.

SUBTASK 21-20-02-840-063

(4) Do these steps to prepare the air conditioning duct.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct ends.

(b) Sand the duct ends to remove any contamination from the duct ends.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to remove any dust from the duct ends.

SUBTASK 21-20-02-840-064

(5) Prepare a piece of the polyurethane foam duct that matches the damaged duct and is the correct length to replace the damaged section of the duct.

NOTE: Cut the replacement section with clearance for the material that will be added by the duct end repair procedure.

SUBTASK 21-20-02-840-065

(6) Do the Duct End Repair - Polyurethane Foam Duct procedure above for each end of the replacement duct section and for each end of the damaged duct.

SUBTASK 21-20-02-840-066

(7) Cut two pieces of the Fiberglass glass fabric, G00031 3 inches wide and long enough to go around the duct a minimum of four times.

SUBTASK 21-20-02-840-067

(8) Prepare the applicable resin.



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**E. Repair the Taped Joint**

SUBTASK 21-20-02-340-055

(1) Apply the applicable resin to the duct ends. Allow the resin to partially dry until it is sticky. Press the duct ends together by aligning the installation checkmarks.

SUBTASK 21-20-02-340-056

(2) Apply the applicable resin to each joint area a minimum of 2 inches on both sides of the joint.

SUBTASK 21-20-02-340-057

(3) Apply the applicable resin to one side of the two pieces of the Fiberglass fabric.

SUBTASK 21-20-02-340-058

(4) Wrap one piece of the Fiberglass fabric around each duct joint a minimum of four times. Make sure the resin on the Fiberglass fabric is in contact with the duct.

SUBTASK 21-20-02-340-059

(5) Put a piece of plastic sheet on the joint and press on it to smooth the Fiberglass fabric to remove any bubbles or any wrinkles.

SUBTASK 21-20-02-340-060

(6) Allow the resin to cure for 24 hours at room temperature.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(7) Clean any unwanted resin from the joint areas with a cotton wiper, G00034 and solvent, B00148.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-20-02-840-068

(1) Replace the panels or other airplane structure removed to gain access to the duct joint.

**END OF TASK**

**TASK 21-20-02-330-810**

**11. Tape Replacement - Foam Wrapped Insulated Duct**

(Figure 803)

**A. General**

(1) This procedure has instructions to repair those air conditioning ducts insulated with Melamine or Polyimide Foam. The Foam Insulation is wrapped around the duct and held in place with an adhesive tape.

(2) CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

(a) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.



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(b) Melamine foam insulation, G50449, BMS8-385, is the preferred foam insulation material that meets the flame propagation requirement. Melamine BMS8-385 Type 4 is the preferred foam insulation material that meets the flame propagation requirement. Melamine BMS 8-385 Type 6 and polyimide BMS 8-300 Type VIII insulation are optional to BMS8-385 Type 4.

(c) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(d) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(e) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327, tape, G51202 or tape, G50789 to meet the flammability/flame propagation requirement. Wrap the tape, G50327, tape, G51202 or tape, G50789 across 100% of the brown hypalon insulation surface of the polyimide foam insulation, G02470.

## B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

## C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

## D. Prepare for the Repair

**SUBTASK 21-20-02-840-069**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-070**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-071**

(3) If necessary, remove the air conditioning duct.

**SUBTASK 21-20-02-840-072**

(4) Do these steps to remove loose tape and unwanted adhesive from the repair area:

(a) Carefully remove loose tape from the repair area.

(b) Use the solvent, B00184 or alcohol, B00130 and a wiping fabric to clean the repair area.



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### E. Replace the Tape

SUBTASK 21-20-02-420-001

(1) Install the tape, G50327, tape, G51202 or tape, G50789 to the repair area (Figure 803).

(a) Make sure the tape, G50327, tape, G51202 or tape, G50789 has an overlap of all the edges and seams of the insulation by a minimum of 1.00 inch (25.4 mm).

### F. Rework Ducts Insulated with Polyimide Foam Insulation

SUBTASK 21-20-02-420-002

(1) Install tape, G50327, tape, G51202 or tape, G50789 to completely cover all exposed surfaces of foam insulation as shown in (Figure 803).

(a) The tape, G50327, tape, G51202 or tape, G50789 must cover 100% of the brown colored hypalon insulation surface.

(b) Cut the tape, G50327, tape, G51202 or tape, G50789 as required to fit around air outlets, branches and insulation vent holes.

(c) The tape, G50327, tape, G51202 or tape, G50789 may be installed spiral wrapped or lengthwise down the duct depending on installers preference.

(d) The tape, G50327, tape, G51202 or tape, G50789 may be installed in any configuration as long as 100% complete coverage of the foam insulation, G02470 insulation is obtained.

(e) Maintain a minimum of 1/8 inch overlap of tape, G50327, tape, G51202 or tape, G50789.

(f) Avoid compression of the foam insulation, G02470 insulation.

(g) Wrinkles in the tape, G50327, tape, G51202 or tape, G50789 are acceptable if pinched together and contain no voids.

(h) The tape, G50327, tape, G51202 or tape, G50789 may be installed to the foam insulation, G02470 insulation prior to installation on the duct if desired by the installer.

(i) For foam insulation, G02470 insulation installed on duct joints, tape, G50327, tape, G51202 or tape, G50789 may be applied to the foam insulation, G02470 insulation before or after the foam insulation, G02470 insulation is installed over the duct joint.

(j) The tape, G50327, tape, G51202 or tape, G50789 orientation is optional.

SUBTASK 21-20-02-420-003

(2) If necessary, install the air conditioning duct.

### G. Put the Airplane Back to Its Usual Condition

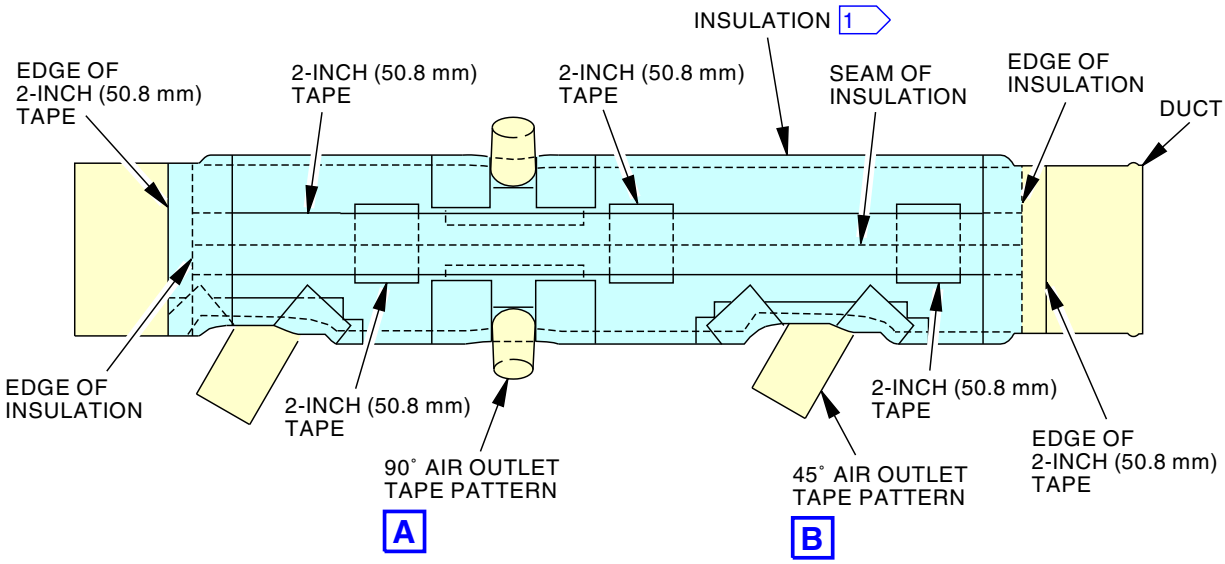
SUBTASK 21-20-02-840-073

(1) Replace the panels or other airplane structure removed to gain access to the duct.

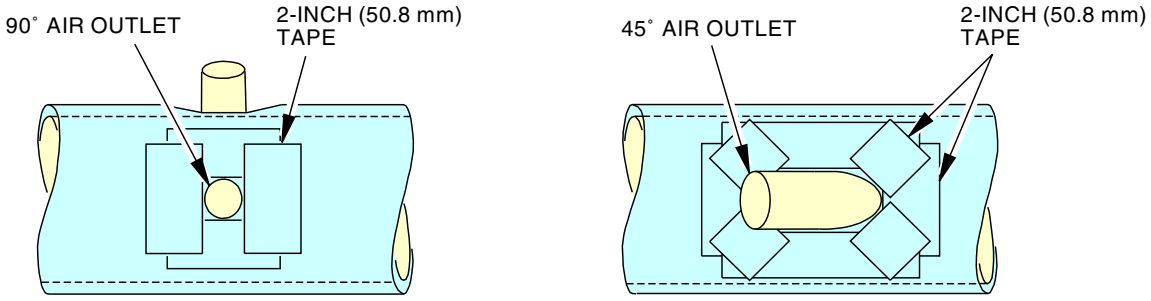
**——— END OF TASK ———**



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**FOAM WRAPPED INSULATED DUCT (EXAMPLE)**




**90˚ AIR OUTLET TAPE PATTERN**

**A**

**45˚ AIR OUTLET TAPE PATTERN**

**B**

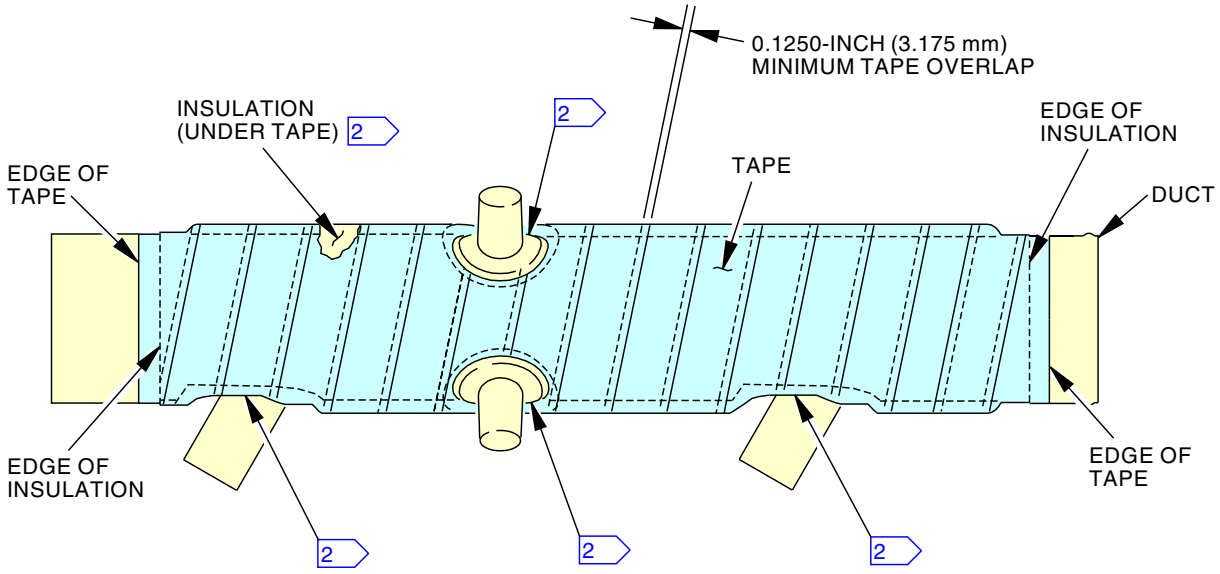
1 FOR INSULATION DAMAGE APPLY A MINIMUM 2-INCH (50.8 mm) PATCH OF PRESSURE SENSITIVE ADHESIVE TAPE TO THE DAMAGED AREA. MAKE SURE YOU HAVE FULL COVERAGE OF THE DAMAGED OR TORN AREA WITH NO LESS THAN 0.5-INCH (12.7 mm) OVERLAP.

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**Air Conditioning System Insulated Duct Repair (Foam Wrapped)**
**Figure 803/21-20-02-990-803 (Sheet 1 of 2)**



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**REWORK POLYIMIDE FOAM INSULATED DUCT (EXAMPLE)**

**NOTE:**

- 2-INCH (50.8 mm) WIDE, 3-INCH (76.2 mm) WIDE OR 12-INCH (304.8 mm)WIDE TAPE (BMS 5-157 TYPE I, CLASS 1, GRADE B) MUST COVER 100% OF THE BROWN HYPALON INSULATION SURFACE.
- TAPE MAY BE INSTALLED SPIRAL WRAPPED AS SHOWN OR LENGTHWISE DOWN THE DUCT DEPENDING ON THE INSTALLERS PREFERENCE.
- SHOWN PATTERN IS FOR REFERENCE ONLY. TAPE MAY BE APPLIED IN ANY CONFIGURATION AS LONG AS COMPLETE BMS 8-300 COVERAGE IS OBTAINED.
- WIDER TAPE MAY BE CUT INTO NARROWER STRIPS OR ANY UNIQUE SHAPE IF DESIRED TO ASSIST IN OBTAINING COMPLETE BMS 8-300 COVERAGE.
- MAINTAIN MINIMUN 0.1250-INCH (3.175 mm) OVERLAP OF TAPE.
- AVOID COMPRESSION OF BMS 8-300 INSULATION.
- WRINKLES IN TAPE ARE ACCEPTABLE IF PINCHED TOGETHER AND CONTAIN NO VOIDS.
- COVERING OF EXISTING BMS 5-157 TAPE IS NOT REQUIRED.
- TAPE MAY BE APPLIED TO THE BLANKET PRIOR TO THE BLANKET INSTALLATION ON THE DUCT IF DESIRED BY THE INSTALLER.
- FOR BLANKETS INSTALLED ON DUCT JOINTS, TAPE MAY BE APPLIED TO THE BLANKET BEFORE OR AFTER THE BLANKET IS INSTALLED OVER THE DUCT JOINT. TAPE ORIENTATION IS OPTIONAL.

2 COVER ALL EXPOSED INSULATION (BMS 8-300 TYPE II, GRADE 5) WITH TAPE (BMS 5-157 TYPE I, CLASS 1, GRADE B). CUT TAPE AS REQUIRED TO FIT AROUND AIR OUTLETS, BRANCHES AND INSULATION VENT HOLES.

2411261 S00061527418_V1

**Air Conditioning System Insulated Duct Repair (Foam Wrapped)**
**Figure 803/21-20-02-990-803 (Sheet 2 of 2)**



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**TASK 21-20-02-330-811**

## 12. Insulation Repair - Foam Wrapped Insulated Duct

(Figure 803)

### A. General

(1) This procedure has instructions to repair those air conditioning ducts insulated with Melamine or Polyimide Foam. The Foam Insulation is wrapped around the duct and held in place with an adhesive tape.

(2) CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

(a) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

(b) Melamine foam insulation, G50449, BMS8-385, Type 4 is the preferred foam insulation material that meets the flame propagation requirement. Melamine foam insulation, G51169, BMS 8-385, Type 6 and polyimide foam insulation, G51170, BMS 8-300, Type VIII insulation are new, qualified materials optional to BMS 8-385, Type 4.

(c) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(d) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(e) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327 or tape, G51202 to meet the flammability/flame propagation requirement. Wrap the tape, G50327 or tape, G51202 across 100% of the brown hypalon insulation surface of the polyimide foam insulation, G02470. The tape, G50789 is optional to the tape, G50327.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

**D. Prepare for the Repair**

SUBTASK 21-20-02-840-074

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-840-075

(2) Gain access to the damaged air conditioning duct.

SUBTASK 21-20-02-840-076

(3) If necessary, remove the air conditioning duct.

SUBTASK 21-20-02-840-077

(4) Do these steps to remove loose tape and unwanted adhesive from the repair area:

(a) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the repair area.

**E. Repair the Insulation**

SUBTASK 21-20-02-420-004

(1) Install a minimum 2.0 inch (50.8 mm) wide patch of the tape, G50327, tape, G51202 or tape, G50789 to completely cover the damaged area of the insulation (Figure 803).

(a) Make sure the tape, G50327, tape, G51202 or tape, G50789 has an overlap of all the edges of the damaged area by a minimum of 0.50 inch (12.7 mm).

**F. Rework Ducts Insulated with Polymide Foam Insulation**

SUBTASK 21-20-02-420-005

(1) Install tape, G50327, tape, G51202 to completely cover all exposed surfaces of foam insulation as shown in (Figure 803).

(a) The tape, G50327, tape, G51202 or tape, G50789 must cover 100% of the brown colored hypalon insulation surface.

(b) Cut the tape, G50327, tape, G51202 or tape, G50789 as required to fit around air outlets, branches and insulation vent holes.

(c) The tape, G50327, tape, G51202 or tape, G50789 may be installed spiral wrapped or lengthwise down the duct depending on installers preference.

(d) The tape, G50327, tape, G51202 or tape, G50789 may be installed in any configuration as long as 100% complete coverage of the foam insulation, G02470 insulation is obtained.

(e) Maintain a minimum of 1/8 inch overlap of tape, G50327, tape, G51202 or tape, G50789.

(f) Avoid compression of the foam insulation, G02470 insulation.

(g) Wrinkles in tape, G50327, tape, G51202 or tape, G50789 are acceptable if pinched together and contain no voids.

(h) The tape, G50327, tape, G51202 or tape, G50789 may be installed to the foam insulation, G02470 insulation prior to installation on the duct if desired by the installer.



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(i) For foam insulation, G02470 insulation installed on duct joints, tape, G50327, tape, G51202 or tape, G50789 may be applied to the foam insulation, G02470 insulation before or after the foam insulation, G02470 insulation is installed over the duct joint.

(j) The tape, G50327, tape, G51202 or tape, G50789 orientation is optional.

SUBTASK 21-20-02-420-006

(2) If necessary, install the air conditioning duct.

### G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-840-078

(1) Replace the panels or other airplane structure removed to gain access to the duct.

——— END OF TASK ———

TASK 21-20-02-330-812

## 13. Insulation Replacement - Foam Wrapped Insulated Duct

(Figure 803)

### A. General

(1) This procedure has instructions to repair those air conditioning ducts insulated with Melamine or Polyimide Foam. The Foam Insulation is wrapped around the duct and held in place with an adhesive tape.

(2) CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

(a) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

(b) Melamine foam insulation, G50449, BMS8-385, Type 4 is the preferred foam insulation material that meets the flame propagation requirement. BMS 8-385 Type 6 flexible melamine foam and BMS 8-300 Type VIII flexible polyimide foam insulation are optional to BMS8-385 Type 4.

(c) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(d) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(e) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327, tape, G51202 or tape, G50789 to meet the flammability/flame propagation requirement. Wrap the tape, G50327, tape, G51202 or tape, G50789 across 100% of the brown hypalon insulation surface of the polyimide foam insulation, G02470.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

**D. Prepare for the Repair**

**SUBTASK 21-20-02-840-079**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-080**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-081**

(3) Remove the damaged air conditioning duct to permit removal of the foam insulation.

**SUBTASK 21-20-02-840-082**

(4) Do these steps to remove the tape and the foam insulation from the duct:

(a) Remove the tape from the duct.

(b) Remove the insulation from the repair duct.

(c) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the repair area.

**E. Replace the Insulation**

**SUBTASK 21-20-02-420-007**

(1) Do these steps to install one of these foam insulations: foam insulation, G50449, foam insulation, G51169, foam insulation, G51170 or foam insulation, G02470 on the duct:

(a) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the outer surface of the foam insulation.

(b) Wrap the foam insulation around the duct.

(c) Install strips of 2 inch wide (50.8 mm) tape, G50327, tape, G51202 or tape, G50789 to the edges and seams of the foam insulation (Figure 803)

(d) Make sure the tape has an overlap of all the edges and seams of the foam insulation by a minimum of 1.00 inch (25.4 mm).

(e) Install the tape, G50327, tape, G51202 or tape, G50789 as shown in (Figure 803)

**F. Rework Ducts insulated with Polyimide Foam Insulation**

**SUBTASK 21-20-02-420-008**

(1) Install tape, G50327, tape, G51202 or tape, G50789 to completely cover all exposed surfaces of foam insulation as shown in (Figure 803).



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(a) The tape, G50327, tape, G51202 or tape, G50789 must cover 100% of the brown colored hypalon insulation surface.

(b) Cut the tape, G50327, tape, G51202 or tape, G50789 as required to fit around air outlets, branches and insulation vent holes.

(c) The tape, G50327, tape, G51202 or tape, G50789 may be installed spiral wrapped or lengthwise down the duct depending on installers preference.

(d) The tape, G50327, tape, G51202 or tape, G50789 may be installed in any configuration as long as 100% complete coverage of the foam insulation, G02470 insulation is obtained.

(e) Maintain a minimum of 1/8 inch overlap of tape, G50327, tape, G51202 or tape, G50789.

(f) Avoid compression of the foam insulation, G02470 insulation.

(g) Wrinkles in the tape, G50327, tape, G51202 or tape, G50789 are acceptable if pinched together and contain no voids.

(h) The tape, G50327, tape, G51202 or tape, G50789 may be installed to the foam insulation, G02470 insulation prior to installation on the duct if desired by the installer.

(i) For foam insulation, G02470 insulation installed on duct joints, tape, G50327, tape, G51202 or tape, G50789 may be applied to the foam insulation, G02470 insulation before or after the foam insulation, G02470 insulation is installed over the duct joint.

(j) The tape orientation is optional.

**SUBTASK 21-20-02-420-009**

(2) Install the air conditioning duct you removed for the repair.

### G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-20-02-840-083**

(1) Replace the panels or other airplane structure removed to gain access to the duct.

**——— END OF TASK ———**

**TASK 21-20-02-330-813**

## 14. Tape Replacement - Fiberglass Insulated Duct

(Figure 803, Figure 804)

### A. General

(1) This procedure has instructions to repair those air conditioning ducts insulated with Fiberglass Insulation (BMS 8-48) and a flame-resistant covering (BMS 8-142) which have been overwrapped with cargo liner joint sealing tape (BMS 5-146).

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

**D. Prepare for the Repair**

**SUBTASK 21-20-02-840-084**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-085**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-086**

(3) If necessary, remove the air conditioning duct.

**SUBTASK 21-20-02-840-087**

(4) Do these steps to remove loose tape and unwanted adhesive from the repair area:

(a) Carefully remove loose tape from the repair area.

(b) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the repair area.

**SUBTASK 21-20-02-840-088**

(5) Install the tape, G50327, tape, G51202 or tape, G50789 to the repair area (Figure 803, Figure 804).

(a) Use a continuous strip of tape to wrap around the insulation/covering and the duct.

(b) Make sure the tape has an overlap of the edges of the adjacent tape by a minimum of 0.12 inch (3.17 mm).

(c) Make sure the new tape has an overlap onto the ends of the duct by a minimum of 1.00 inch (25.4 mm).

**SUBTASK 21-20-02-840-089**

(6) If necessary, install the air conditioning duct.

**E. Put the Airplane Back to Its Usual Condition**

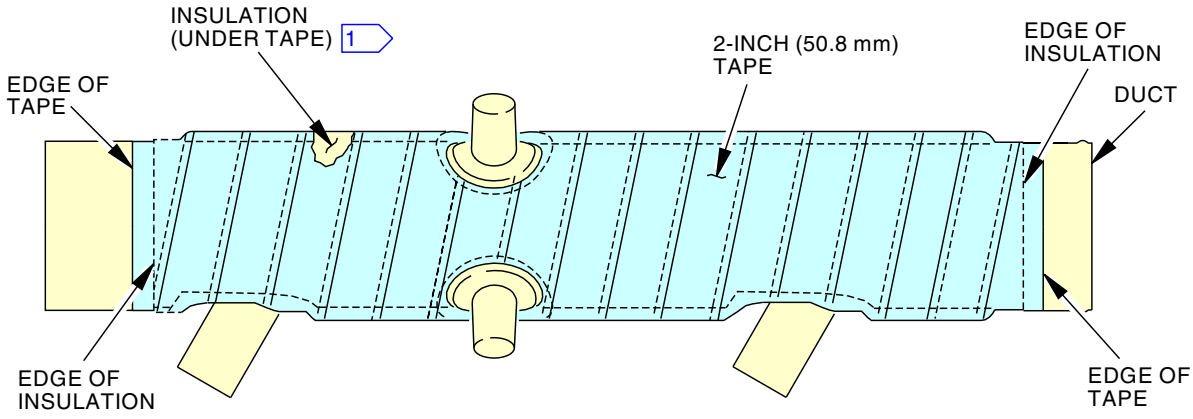
**SUBTASK 21-20-02-840-090**

(1) Replace the panels or other airplane structure removed to gain access to the duct.

**END OF TASK**



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**FIBERGLASS INSULATED DUCT
(EXAMPLE)**

1 COVER ALL EXPOSED INSULATION WITH CARGO LINER JOINT SEALER TAPE. CUT TAPE AS REQUIRED TO FIT AROUND AIR OUTLETS.

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**Air Conditioning System Insulated Duct Repair (Fiberglass)
Figure 804/21-20-02-990-804**



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**TASK 21-20-02-330-814**

## 15. Insulation and Covering Repair - Fiberglass Insulated Duct

(Figure 804)

### A. General

(1) This procedure has instructions to repair those air conditioning ducts insulated with Fiberglass Insulation (BMS 8-48) and a flame-resistant covering (BMS 8-142) which have been overwrapped with cargo liner joint sealing tape (BMS 5-146).

(2) This procedure has these repair instructions:

(a) Replacement of loose or old tape (Repair Method 1)

(b) Repair of cuts or tears in the flame-resistant covering and Fiberglass insulation (Repair Method 2)

(c) Replacement of the Fiberglass insulation (Repair Method 3).

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

### D. Tape Replacement (Repair Method 1)

**SUBTASK 21-20-02-840-091**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-092**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-093**

(3) If necessary, remove the air conditioning duct.

**SUBTASK 21-20-02-840-094**

(4) Remove all loose or old cargo liner joint sealing tape from the insulation/covering.

**SUBTASK 21-20-02-110-001**

(5) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the repair area.

**SUBTASK 21-20-02-420-010**

(6) Install new tape, G50327, tape, G51202 or tape, G50789 to completely cover all surfaces of insulation and existing tape as shown in (Figure 803):



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(a) Use a continuous strip of tape to wrap around the insulation/covering and the duct.

1) Make sure the new tape overlaps the edges of the adjacent tape by a minimum of 1/8-inch.

2) Make sure the new tape overlaps onto the ends of the duct by a minimum of 1-inch.

SUBTASK 21-20-02-840-095

(7) If removed, install the air conditioning duct.

**E. Cuts or Tears in Fiberglass Insulation/Covering (Repair Method 2)**

SUBTASK 21-20-02-020-001

(1) Remove the duct if needed for better access.

SUBTASK 21-20-02-110-002

(2) Use the solvent, B00184 or alcohol, B00130 and a wiping cloth to clean the repair area.

SUBTASK 21-20-02-340-061

(3) Apply a minimum 2-inch wide patch of tape, G50327, tape, G51202 or tape, G50789 to completely cover the damaged area on the insulation/covering.

(a) Make sure to apply a large enough patch to assure full coverage of the damaged area with a minimum 2-inch overlap.

SUBTASK 21-20-02-420-011

(4) If removed, install the air conditioning duct.

**F. Fiberglass Insulation Replacement (Repair Method 3)**

SUBTASK 21-20-02-020-002

(1) Remove the fiberglass insulation from the duct.

SUBTASK 21-20-02-420-012

(2) Install new melamine foam insulation. To install the insulation, do this task: Insulation Replacement - Foam Wrapped Insulated Duct, TASK 21-20-02-330-812.

**G. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-20-02-840-096

(1) Replace the panels or other airplane structure removed to gain access to the duct.

**——— END OF TASK ———**

**TASK 21-20-02-330-815**

## 16. Insulation and Covering Replacement - Fiberglass Insulated Duct

(Figure 803)

**A. General**

(1) This procedure has instructions to repair those air conditioning ducts insulated with Fiberglass Insulation (BMS 8-48) and a flame-resistant covering (BMS 8-142) which have been overwrapped with cargo liner joint sealing tape (BMS 5-146).

(2) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327, tape, G51202 or tape, G50789 to meet new flammability/flame propagation requirements. Wrap the tape, G50327, tape, G51202 or tape, G50789 across 100% of the brown hypalon insulation surface on the polyimide foam insulation, G02470.

**B. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |



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**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

**D. Prepare for the Repair**

**SUBTASK 21-20-02-840-097**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-840-098**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-840-099**

(3) Remove the damaged air conditioning duct.

**SUBTASK 21-20-02-840-100**

(4) Install a new air conditioning duct with polyimide foam insulation, G02470 (Tape Replacement - Foam Wrapped Insulated Duct, TASK 21-20-02-330-810).

(5) Rework the duct insulated with polyimide (Tape Replacement - Foam Wrapped Insulated Duct, TASK 21-20-02-330-810).

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-20-02-840-101**

(1) Replace the panels or other airplane structure removed to gain access to the duct.

**——— END OF TASK ———**

**TASK 21-20-02-330-816**

## 17. External Patch - Reinforced Thermoplastic Laminate Duct

(Figure 805)

**A. General**

(1) This procedure gives instructions for the repair of a puncture, crack or cut in a Reinforced Thermoplastic Laminate air conditioning duct with an external patch.

(2) An external patch is applicable when the cut or the crack is less than 0.25 inches (6.35 mm) wide and is less than 3.0 inches (76.2 mm) long.

(3) An external patch is applicable when the puncture is less than 0.25 inches (6.35 mm) diamter.

**B. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |



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**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00316 | Fabric - Woven Glass Reinforcements For Laminating Plastics | BMS9-3 |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |

**D. Prepare for the Repair**

SUBTASK 21-20-02-860-001

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-010-001

(2) Gain access to the damaged air conditioning duct joint.

SUBTASK 21-20-02-010-002

(3) If insulation is installed on the duct, then remove the insulation.

SUBTASK 21-20-02-120-001

(4) Do these steps to prepare the damaged area of the duct.

(a) Use sandpaper on the damaged area to remove the gloss from the finish of the duct.

(b) Use the solvent, B00062 and a cotton wiper, G00034 to clean the duct joint area.

(c) Make sure fibers from the damaged area of the duct do not extend more than 0.125 inches (3.175 mm) into the inside of the duct.

SUBTASK 21-20-02-340-062

(5) Do these steps to prepare the materials for the duct repair:

(a) Cut sufficient pieces of the Fiberglass fabric, G00316 to equal the number of plies of the damaged duct. Cut the Fiberglass fabric, G00316 pieces 0.50 inches (12.7 mm) larger on all sides than the damage. Round the corners of the pieces of the Fiberglass fabric.

(b) Prepare the Fiberglass duct repair resin, G50400.

**E. Repair the Air Conditioning Duct**

SUBTASK 21-20-02-340-063

(1) Apply a thin, smooth layer of the resin, G50400 to the duct where the Fiberglass fabric will be applied. Make sure the area of the resin is a minimum of the size and shape of the Fiberglass fabric pieces.

SUBTASK 21-20-02-340-064

(2) Place a piece of the Fiberglass fabric on the resin so that it extends beyond the area of damage a minimum of 1/2 inch on all sides.

SUBTASK 21-20-02-340-065

(3) Soak the Fiberglass fabric with the applicable resin.



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SUBTASK 21-20-02-340-066

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly to remove any bubbles or any wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-067

(5) Remove the plastic sheet from the Fiberglass fabric piece and remove any unwanted resin with a wiping cloth.

SUBTASK 21-20-02-340-068

(6) Place another piece of the Fiberglass fabric on the first piece, soak it with resin, and smooth it. Continue using the same procedure for each new ply of the fabric.

SUBTASK 21-20-02-340-069

(7) Allow the resin to cure for 24 hours at room temperature.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-410-001

(1) If insulation was removed from the duct joint, install new insulation.

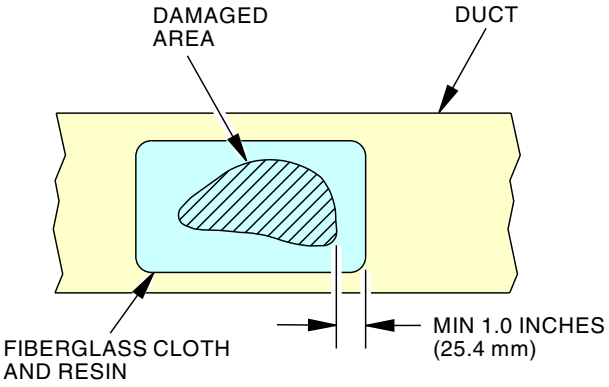
SUBTASK 21-20-02-410-002

(2) Replace the panels or other airplane structure removed to gain access to the duct joint.

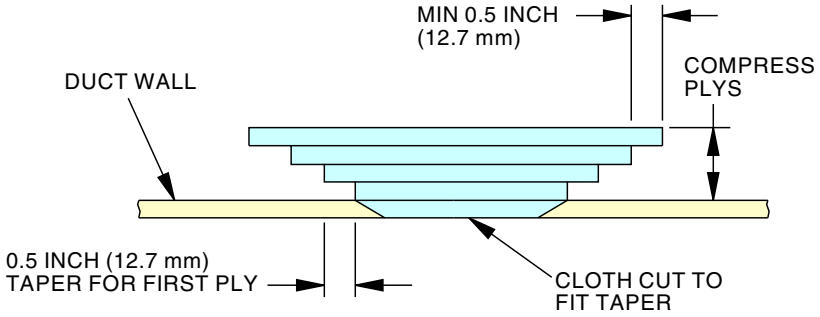
——— END OF TASK ———



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**STRUCTURAL REPAIR - REINFORCED THERMOPLASTIC LAMINATE - OVERHEAD VIEW**




**STRUCTURAL REPAIR - REINFORCED THERMOPLASTIC LAMINATE - CROSS-SECTION VIEW**

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**Strutural Repair - Reinforced Thermoplastic Laminate Duct**
**Figure 805/21-20-02-990-805**



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**TASK 21-20-02-330-817**

## 18. Structural Repair - Reinforced Thermoplastic Laminate Duct

(Figure 805)

### A. General

(1) This procedure gives instructions for making a structural repair to a Reinforced Thermoplastic Laminate air conditioning duct.

(2) A structural repair is applicable when the damage to the air conditioning duct is a cut or a hole that is more than 0.25 inches (6.35 mm) wide and more than 3.0 inches (76.2 mm) long but less than 5 percent of the total surface area of the duct. If the damage is more than 5 percent of the total surface area of the duct, then replace the duct section.

(3) A structural repair is applicable when the damage to the air conditioning duct is a puncture that is more than 0.25 inches (6.35 mm) in diameter.

(4) It is not permitted to overlap structural repairs to the air conditioning duct.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00316 | Fabric - Woven Glass Reinforcements For Laminating Plastics | BMS9-3 |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |

### D. Prepare for the Repair

**SUBTASK 21-20-02-010-003**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

**SUBTASK 21-20-02-010-004**

(2) Gain access to the damaged air conditioning duct.

**SUBTASK 21-20-02-010-005**

(3) If insulation is installed on the duct, then remove the insulation.

**SUBTASK 21-20-02-120-002**

(4) Do these steps to prepare the damaged area of the duct.

(a) Cut away the damaged area to make a rounded opening with a smooth shape.

(b) Use sandpaper to prepare the surface of the duct around the opening a distance of 0.50 inches (12.7 mm) for each ply in the duct. For example, if there are 6 plies, sand 3 inches from the opening on all sides (0.50 x 6.0 = 3.0 inches)(12.7 x 152.4 = 76.2 mm).



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(c) Use sandpaper to prepare the surface of the duct an additional 0.50 inches (12.7 mm) from the repair area.

(d) Make sure fibers from the damaged area of the duct do not extend more than 0.125 inches (3.175 mm) into the inside of the duct.

(e) Use the solvent, B00062 and a cotton wiper, G00034 to clean the duct joint area.

SUBTASK 21-20-02-350-001

(5) Cut a piece of plastic sheet 2.0 to 3.0 inches (50.8 to 76.2 mm) larger on all sides than the opening. Cut a piece of cardboard or aluminum 2.0 to 3.0 inches (50.8 to 76.2 mm) larger than the opening on all sides.

SUBTASK 21-20-02-350-002

(6) Attach the plastic sheet to the inside of the opening with adhesive tape so that it covers the opening. Attach the cardboard or aluminum to the inside of the opening with adhesive tape so that it covers the opening and provides support for the plastic sheet.

SUBTASK 21-20-02-340-070

(7) Do these steps to prepare the materials for the duct repair:

(a) Cut sufficient pieces of the Fiberglass fabric, G00316 to equal the number of plies of damaged the duct. Cut an additional piece of fabric, G00316

(b) Cut the first piece of the Fiberglass fabric, G00316 pieces 0.50 inches (12.7 mm) larger on all sides than the damage. Round the corners of the pieces of the Fiberglass fabric.

(c) Cut each piece of the Fiberglass fabric, G00316 0.50 inches (12.7 mm) larger on all sides than the piece before.

(d) Prepare the Fiberglass duct repair resin, G50400.

## E. Repair the Air Conditioning Duct

SUBTASK 21-20-02-340-071

(1) Apply a thin, smooth layer of resin, G50400 to the plastic sheet in the opening in the duct.

SUBTASK 21-20-02-340-072

(2) Place a piece of the Fiberglass fabric in the opening over the plastic sheet so that it covers the opening completely.

SUBTASK 21-20-02-340-073

(3) Soak the Fiberglass fabric with the applicable resin.

SUBTASK 21-20-02-340-074

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly with a squeegee or with your hand. Smooth from the center to the edges of the Fiberglass fabric to remove bubbles or wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-075

(5) Remove the plastic sheet from the patch and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-076

(6) Place the next piece of the Fiberglass fabric on the first piece so that it covers the opening. Trim the Fiberglass fabric if necessary. Soak the Fiberglass fabric with resin and smooth it. Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

SUBTASK 21-20-02-340-077

(7) Round the corners of the last piece of the Fiberglass fabric. Smooth the Fiberglass fabric to remove bubbles or winkles.



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SUBTASK 21-20-02-340-078

(8) Wipe the duct around the patch with a cotton wiper, G00034 and solvent, B00148 to remove unwanted resin.

SUBTASK 21-20-02-340-079

(9) Allow the resin to cure for 24 hours at room temperature.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-20-02-410-003

(1) If insulation was removed from the duct joint, install new insulation.

SUBTASK 21-20-02-410-004

(2) Replace the panels or other airplane structure removed to gain access to the duct joint.

**——— END OF TASK ———**

**TASK 21-20-02-330-818**

**19. Duct End Repair - Reinforced Thermoplastic Laminate Duct**

(Figure 805)

**A. General**

(1) This procedure gives instructions for making a repair to the end of a Reinforced Thermoplastic Laminate air conditioning duct.

(2) A duct end repair replaces a full section of a damaged duct. A repair section to a duct end can not extend more than 4.0 inches (101.6 mm) from the end of the duct.

**B. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00316 | Fabric - Woven Glass Reinforcements For Laminating Plastics | BMS9-3 |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |

**D. Prepare for the Repair**

SUBTASK 21-20-02-040-001

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-20-02-010-006

(2) Gain access to the damaged air conditioning duct.



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SUBTASK 21-20-02-010-007

(3) If insulation is installed on the duct, then remove the insulation.

SUBTASK 21-20-02-120-003

(4) Do these steps to prepare the damaged area of the duct.

(a) Remove the damaged area of the duct end.

(b) Cut the duct end straight and perpendicular to the circumference of the duct.

(c) Use sandpaper to taper the surface of the duct around the opening a distance of 0.50 inches (12.7 mm).

(d) Use sandpaper to prepare the surface of the duct a distance of 0.50 inches (12.7 mm) for each ply in the duct. For example, if there are 6 plies, sand 3 inches from the duct end on all sides (0.50 x 6.0 = 3.0 inches)(12.7 x 152.4 = 76.2 mm).

(e) Use sandpaper to remove the gloss of the duct finish an additional of 0.50 inches (12.7 mm) from the repair area.

(f) Make sure that fibers from the cut end of the duct do not extend more than 0.125 inches (3.175 mm) into the inner surface of the duct.

(g) Use the solvent, B00062 and a cotton wiper, G00034 to clean the duct joint area.

SUBTASK 21-20-02-350-003

(5) Do these steps to prepare a parting surface to hold the new duct section:

(a) Get a cardboard tube of an equal diameter to the damaged duct. Make sure that the cardboard tube is of a sufficient length to give support to the new duct suction.

(b) Cut a piece of a plastic sheet of a sufficient size to cover the cardboard tube.

(c) Attach the plastic sheet to the outer surface of the cardboard tube with adhesive tape.

SUBTASK 21-20-02-340-080

(6) Do these steps to prepare the materials for the duct repair:

(a) Do the steps that follow to cut the pieces of the Fiberglass fabric, G00316 to the correct size:

1) Cut the same number pieces of the Fiberglass fabric, G00316 as the number of plies of the damaged duct. Cut an additional piece of fabric, G00316

2) Cut the pieces of the Fiberglass fabric, G00316 to a length sufficient to go around the circumference of the duct, plus 0.50 inches (12.7 mm) to make an overlap.

3) Cut each piece of the Fiberglass fabric, G003160.50 inches (12.7 mm) wider than the piece before.

4) Round the corners of the last piece of the Fiberglass fabric.

(b) Prepare the Fiberglass duct repair resin, G50400.

## E. Repair the Air Conditioning Duct

SUBTASK 21-20-02-340-081

(1) Apply a thin, smooth layer of resin, G50400 to the plastic sheet in the opening in the duct.

SUBTASK 21-20-02-340-082

(2) Place a piece of the Fiberglass fabric in the opening over the plastic sheet so that it covers the opening completely.

SUBTASK 21-20-02-340-083

(3) Soak the Fiberglass fabric with the applicable resin.



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SUBTASK 21-20-02-340-084

(4) Put a piece of plastic sheet on the Fiberglass fabric and press lightly with a squeegee or with your hand. Smooth from the center to the edges of the Fiberglass fabric to remove bubbles or wrinkles and to remove unwanted resin.

SUBTASK 21-20-02-340-085

(5) Remove the plastic sheet from the patch and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-20-02-340-086

(6) Place the next piece of the Fiberglass fabric on the first piece so that it covers the opening. Trim the Fiberglass fabric if necessary. Soak the Fiberglass fabric with resin and smooth it. Continue using the same procedure to apply each new ply of fabric.

SUBTASK 21-20-02-340-087

(7) Place the last piece of the Fiberglass fabric on top of the patch so it extends beyond the damage a minimum of 2.0 inches (50.8 mm) on all sides. Smooth the Fiberglass fabric to remove bubbles or winkles.

SUBTASK 21-20-02-340-088

(8) Wipe the duct around the patch with a cotton wiper, G00034 and solvent, B00148 to remove unwanted resin.

SUBTASK 21-20-02-340-089

(9) Allow the resin to cure for 24 hours at room temperature.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-20-02-010-008

(1) If insulation was removed from the duct joint, install new insulation.

SUBTASK 21-20-02-010-009

(2) Replace the panels or other airplane structure removed to gain access to the duct joint.

——— END OF TASK ———



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## GROUND CONDITIONED AIR CONNECTION DUCT AND CHECK VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the ground conditioned air connection duct.

(2) An installation of the ground conditioned air connection duct.

(3) A removal of the ground conditioned air check valve.

(4) An installation of the ground conditioned air check valve.

(5) A removal of the cooling exchange check valve.

(6) An installation of the cooling exchange check valve.

B. The ground conditioned air connection duct is installed below the mix bay. The function of the duct is to provide a connection for a supply of external conditioned air. To gain access to the duct, do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

C. The check valve is installed in the mix bay just forward of the air conditioning bays. The function of the check valve is to let conditioned air from an external source to be put into the distribution system and also to seal the distribution system when external conditioned air is not being used.

D. The check valve is a component of the lower mix manifold. It is necessary to remove the mix manifold to get access to the check valve.

**TASK 21-21-01-000-801**

### 2. Ground Conditioned Air Connection Duct Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |
| 821 | Forward Cargo Door |

**D. Prepare for the Removal**

**SUBTASK 21-21-01-860-002**

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.



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SUBTASK 21-21-01-010-001

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 21-21-01-010-002

(3) Remove the center aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

## E. Ground Conditioned Air Connection Duct Removal

SUBTASK 21-21-01-010-003

(1) Remove the 15 bolts [4] and washers [5] that attach the ground conditioned air connection duct [1] to the airplane skin.

SUBTASK 21-21-01-010-004

(2) Remove the bolts [7] and washers [5] that attach the clamps [6] to the ground conditioned air connection duct [1].

(a) Make a record of the locations for the bolts [7], washers [5] and clamps [6] to make sure they are installed in the same positions.

SUBTASK 21-21-01-010-005

(3) To get access to the ground conditioned air connection duct [1], do this step:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

SUBTASK 21-21-01-970-001

(4) Make a record of the correct position that the ground conditioned air connection duct [1] is installed so that it can be reinstalled the same way.

SUBTASK 21-21-01-020-001

(5) Remove the ground conditioned air connection duct [1].

SUBTASK 21-21-01-410-001

(6) To prevent the entry of unwanted materials into the check valve duct, do this step:

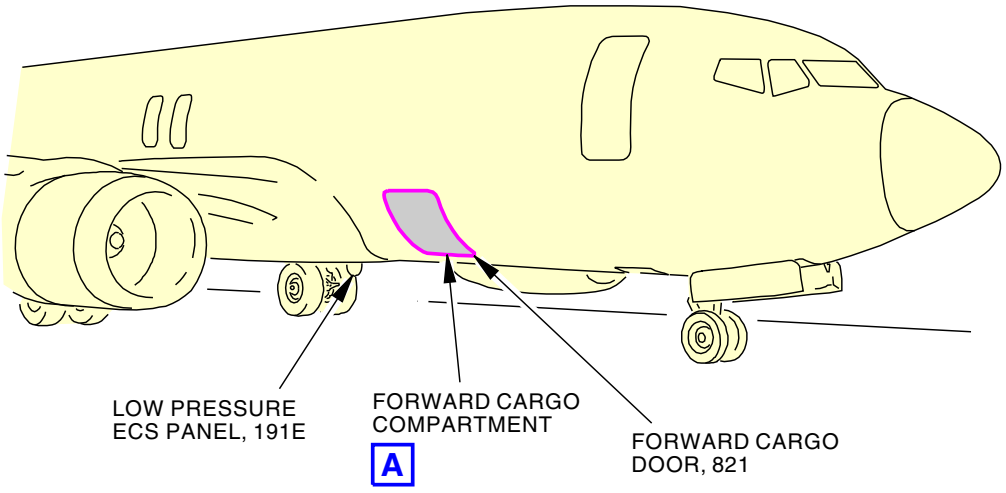
(a) Close this access panel:

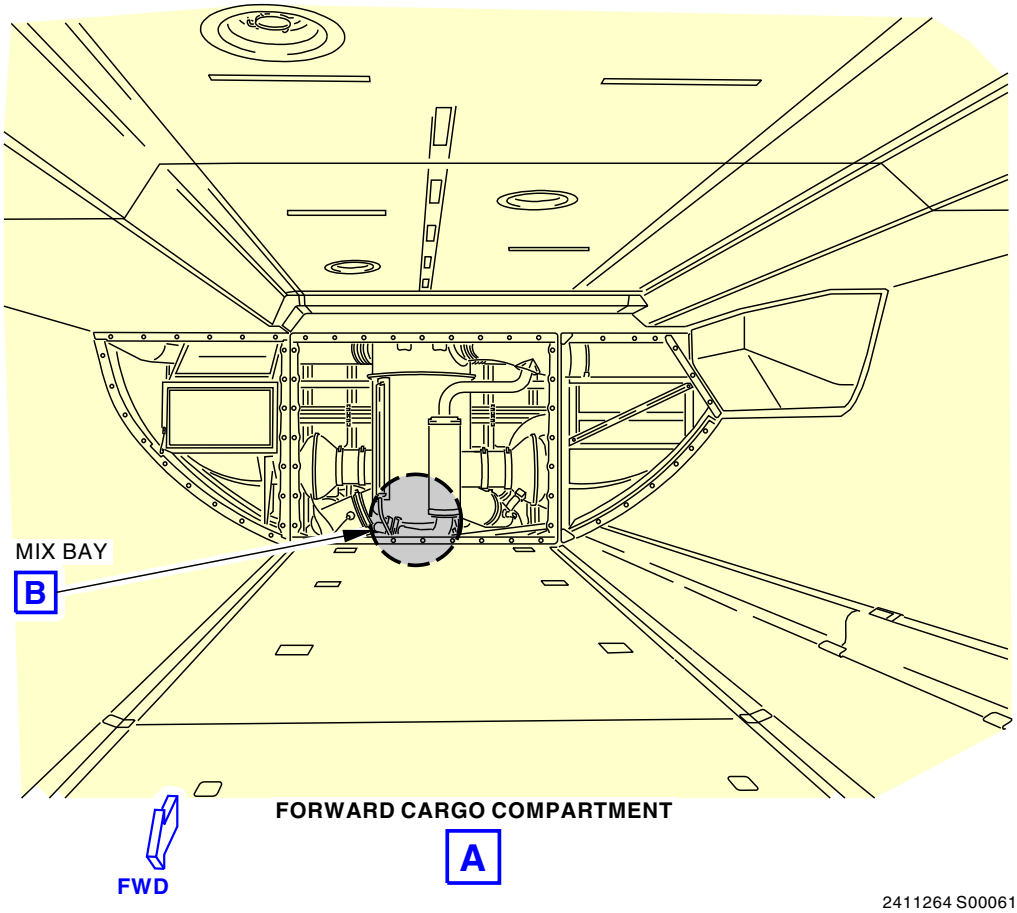
| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

**——— END OF TASK ———**



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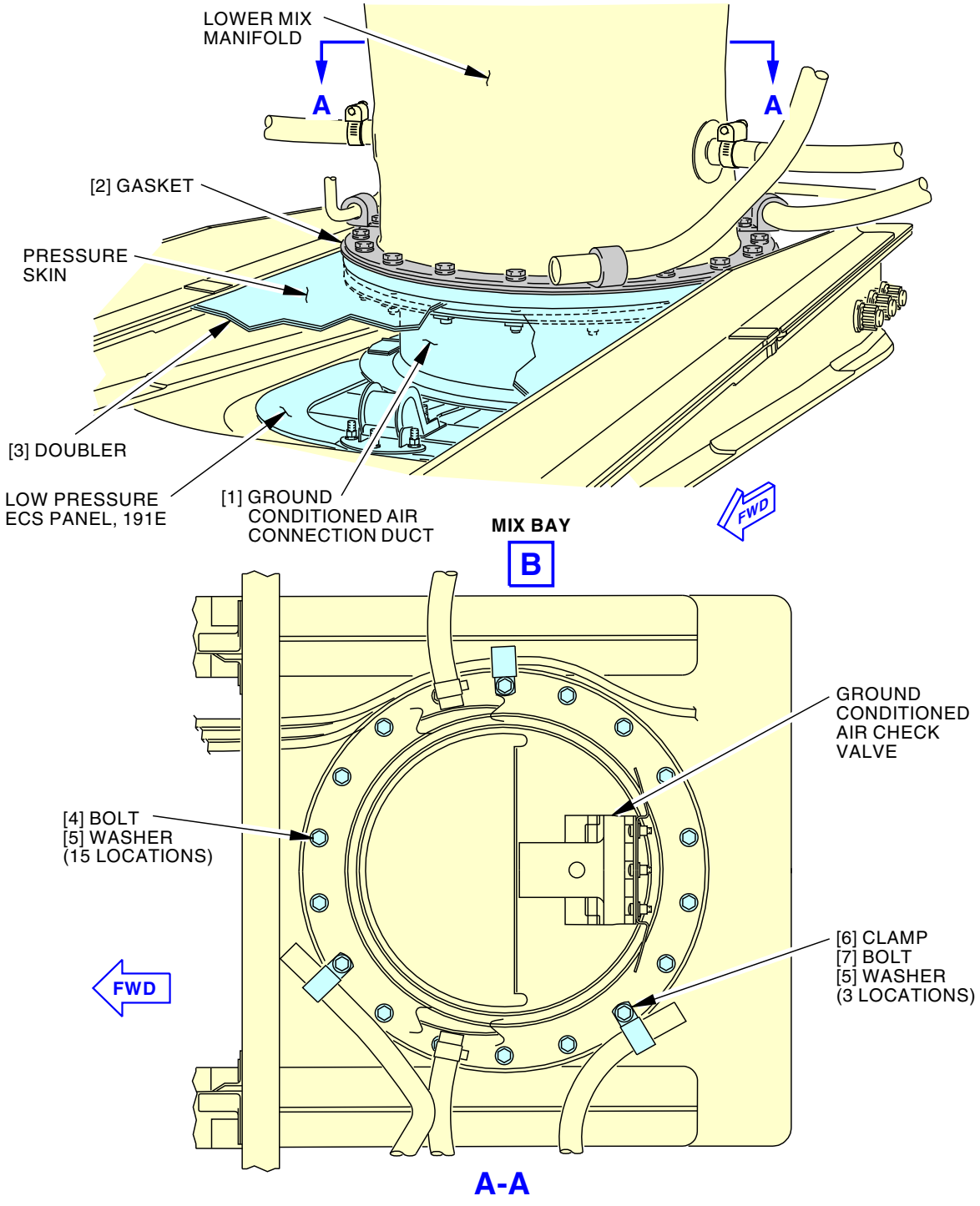



**Ground Conditioned Air Connection Duct Installation**
**Figure 401/21-21-01-990-801 (Sheet 1 of 2)**



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**Ground Conditioned Air Connection Duct Installation**
**Figure 401/21-21-01-990-801 (Sheet 2 of 2)**



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**TASK 21-21-01-400-801**

## 3. Ground Conditioned Air Connection Duct Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |
| 51-22-00-160-801 | Prepare For Sealing (P/B 201) |
| 51-22-00-390-801 | Non-Removable Faying (Mated) Surface Seal Application (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A00247 | Sealant - Pressure And Environmental - Chromate Type | BMS5-95 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Air connection duct | 21-21-01-01-560 | SIA 001-003 |
| | | 21-21-01-02-470 | SIA 004-999 |

### D. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |
| 821 | Forward Cargo Door |

### F. Prepare for the Installation

**SUBTASK 21-21-01-010-006**

(1) Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

**SUBTASK 21-21-01-140-001**

(2) Prepare the surfaces for the application of sealant (TASK 51-22-00-160-801).

**SUBTASK 21-21-01-390-001**

(3) Apply a layer of the sealant, A00247, to the faying surface between the doubler [3] on the airplane skin and the ground conditioned air connection duct [1] (TASK 51-22-00-390-801).

### G. Ground Conditioned Air Connection Duct Installation

**SUBTASK 21-21-01-420-001**

(1) Install the ground conditioned air connection duct [1] in its position:

(a) Make sure the ground conditioned air connection duct [1] is installed in the same position as when it was removed.



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SUBTASK 21-21-01-420-002

(2) Install the bolts [7] and washers [5] for the clamps [6].

(a) Make sure they are installed in the positions they were before the removal.

SUBTASK 21-21-01-420-003

(3) Install the 15 bolts [4] and washers [5].

### H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-21-01-410-002

(1) Install the center aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).

SUBTASK 21-21-01-010-007

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 21-21-01-410-003

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

END OF TASK

## TASK 21-21-01-000-802

## 4. Ground Conditioned Air Check Valve Removal

(Figure 402)

### A. General

(1) The check valve is a component of the lower mix manifold. It is necessary to remove the mix manifold to get access to the check valve.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### D. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |



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**E. Access Panels**

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**F. Prepare for the Removal**

SUBTASK 21-21-01-860-005

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

SUBTASK 21-21-01-860-006

(2) Put these switches on the P5-10 Air Conditioning Panel to the OFF position and attach DO NOT OPERATE tags, STD-858:

(a) L and R RECIRC FAN.

(b) L and R PACK.

(c) BLEED 1, 2 and APU.

SUBTASK 21-21-01-010-008

(3) Open this access door:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 21-21-01-010-009

(4) Remove the center aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

**G. Mix Manifold Removal**

SUBTASK 21-21-01-010-010

(1) To remove the check valves for the two recirculation fans, do these steps:

(a) Hold the check valve while you remove the couplings [37] and the sleeves [38].

(b) Remove the check valves [39].

SUBTASK 21-21-01-010-011

(2) To remove the forward muffler [41] in the mix bay, do these steps:

(a) Remove the clamp [46] that is installed at the rear bulkhead of the mix bay.

(b) Remove the nut [47], washer [48], and spacer [49] that are below the bracket.

(c) Remove the screw [51], washer [50] and washer [48] from the clamp [52].

(d) Remove the coupling [35] and sleeve [36] from the upper duct of the forward muffler.

(e) Carefully remove the forward muffler [41].

SUBTASK 21-21-01-010-012

(3) To remove the upper mix manifold [31], do these steps:

(a) Disconnect the electrical connectors [32] from the mix manifold temperature sensors.

(b) Remove the three clamps [33] and sleeves [34].

(c) Remove the 18 screws [56] and washers [55].

(d) Carefully remove the upper mix manifold [31].

SUBTASK 21-21-01-010-013

(4) Remove the collector ring [54] and the two gaskets [53].

SUBTASK 21-21-01-010-014

(5) Remove the two couplings [40] from the lower ducts of the lower mix manifold [43].



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SUBTASK 21-21-01-020-002

(6) To disconnect the drain tubes from the lower mix manifold [43]:

(a) Remove the four clamps [42].

(b) Pull the four drain tubes off the lower mix manifold [43].

(c) Make a record of the locations of the drain tubes and the clamps [42] to make sure they are installed in the same positions.

SUBTASK 21-21-01-020-003

(7) To remove the lower mix manifold [43] from the mix bay, do these steps:

(a) Remove the two screws [44] and washers [45] that attach the support brackets of the lower mix manifold [43] to the airplane structure.

(b) Remove the bolts [61] and the washers [62] that attach the clamps [60] to the lower mix manifold [43].

1) Make a record of the locations of the bolts [61], washers [62] and clamps [60] to make sure they are installed in the same positions.

(c) Remove the 15 bolts [65] and washers [62] that attach the lower mix manifold [43] to the spacer on the airplane skin.

(d) Carefully remove the lower mix manifold [43] from the mix bay.

(e) Remove the gasket [58] that was below the rear duct of the lower mix manifold [43].

## H. Ground Conditioned Air Check Valve Removal

SUBTASK 21-21-01-020-004

(1) To remove the ground conditioned air check valve [59] from the lower mix manifold, do these steps:

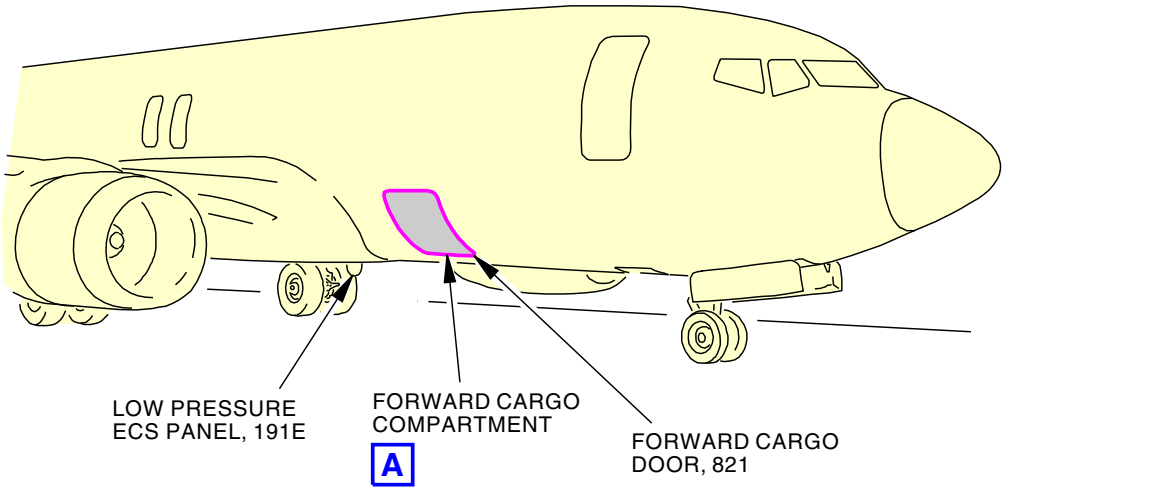
(a) Remove the bolts [63] and the washers [64].

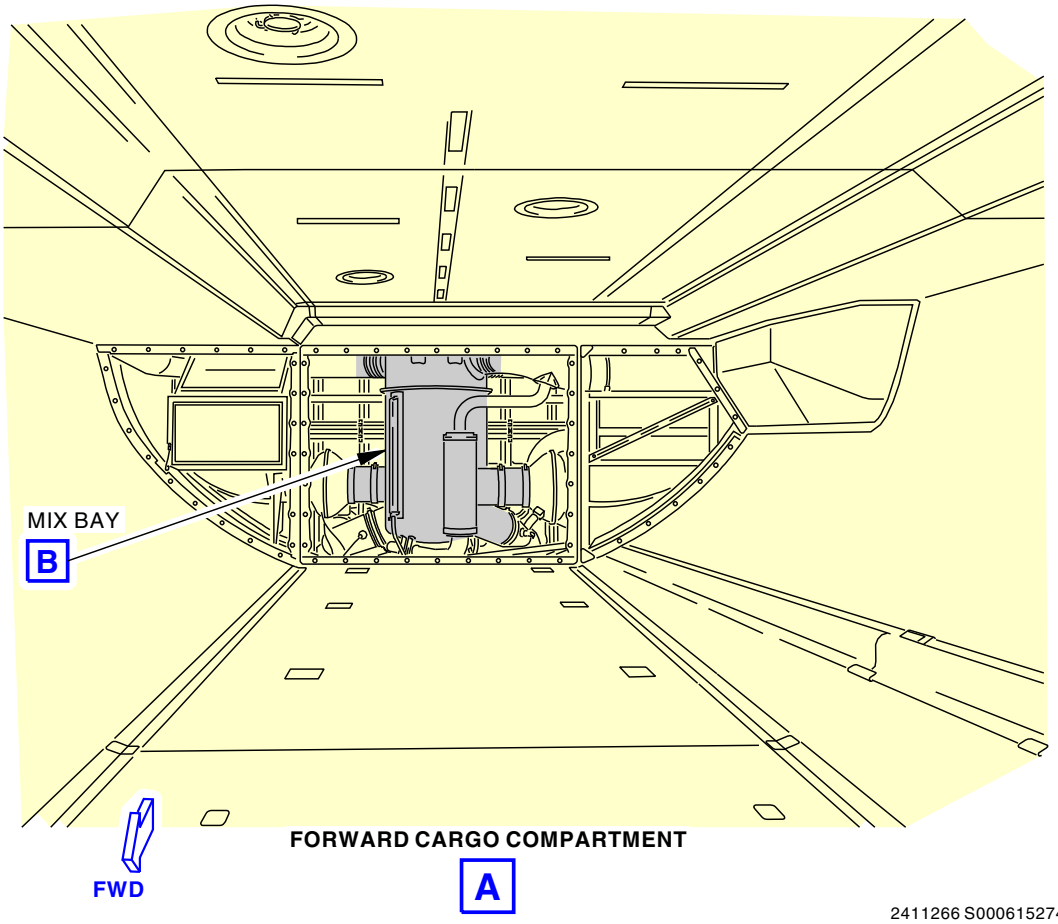
(b) Remove the ground conditioned air check valve [59] from its position in the lower mix manifold [43].

**END OF TASK**



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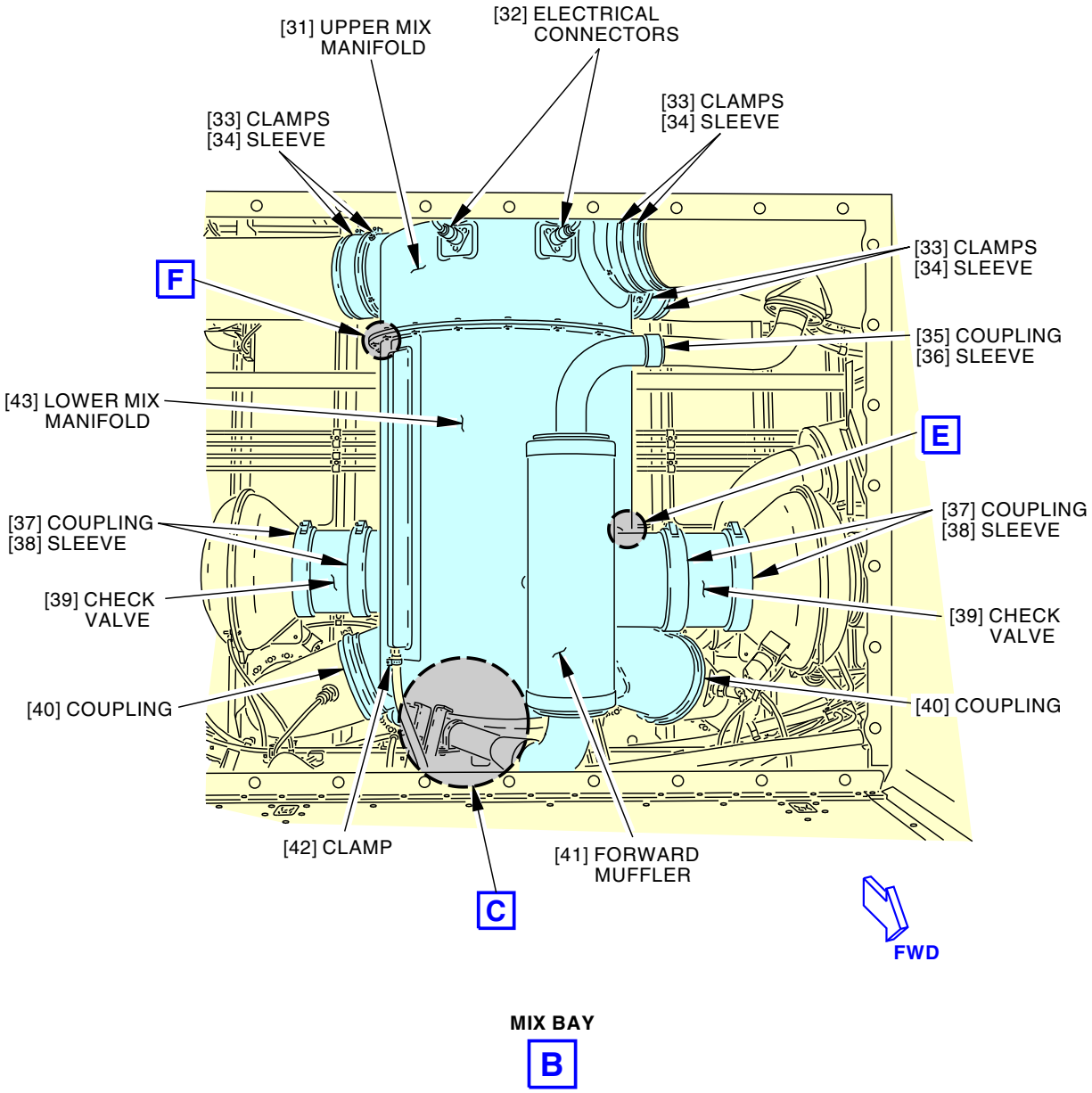



**Ground Conditioned Air Check Valve Installation**
**Figure 402/21-21-01-990-802 (Sheet 1 of 5)**



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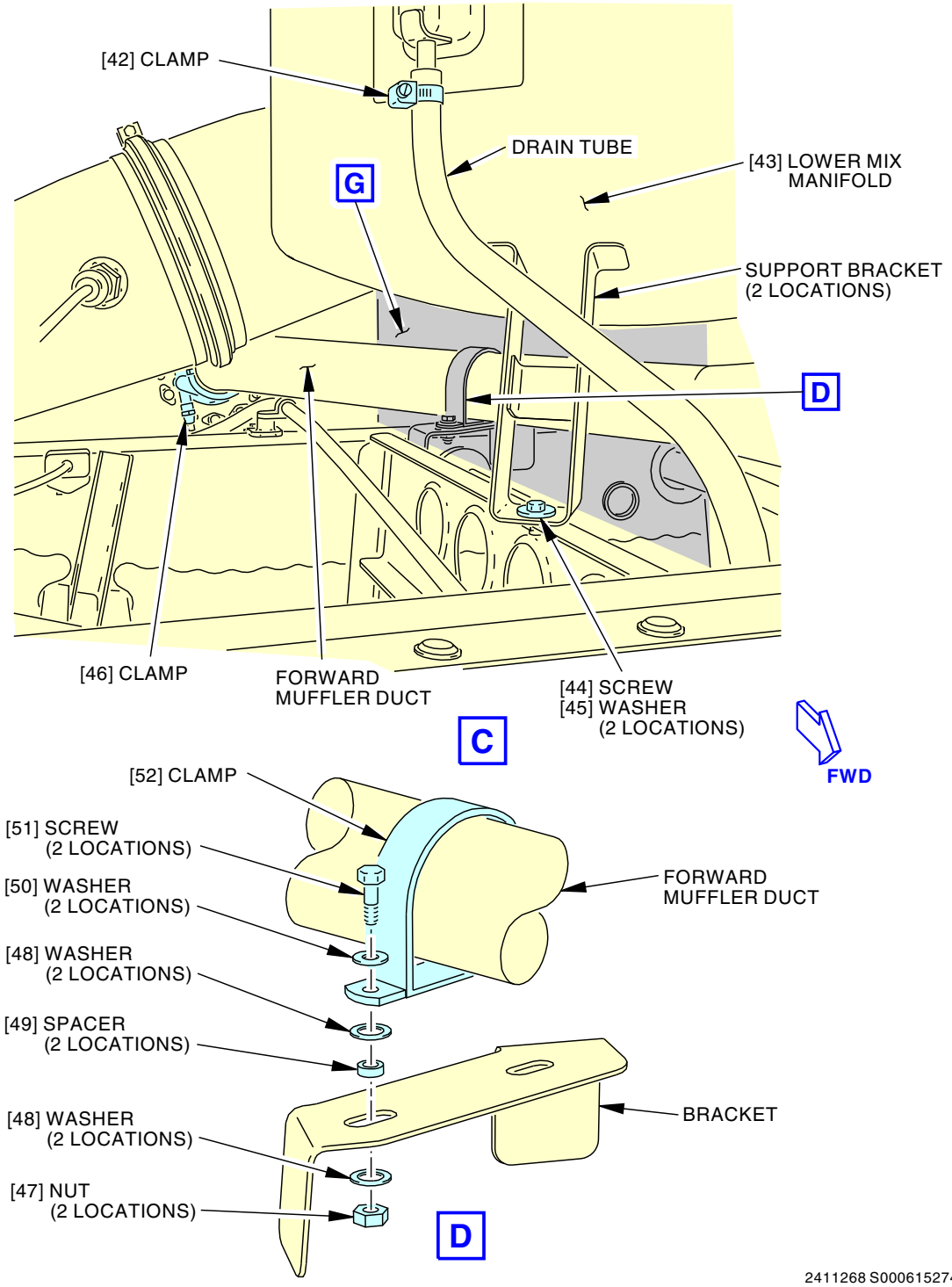



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**Ground Conditioned Air Check Valve Installation**
**Figure 402/21-21-01-990-802 (Sheet 2 of 5)**



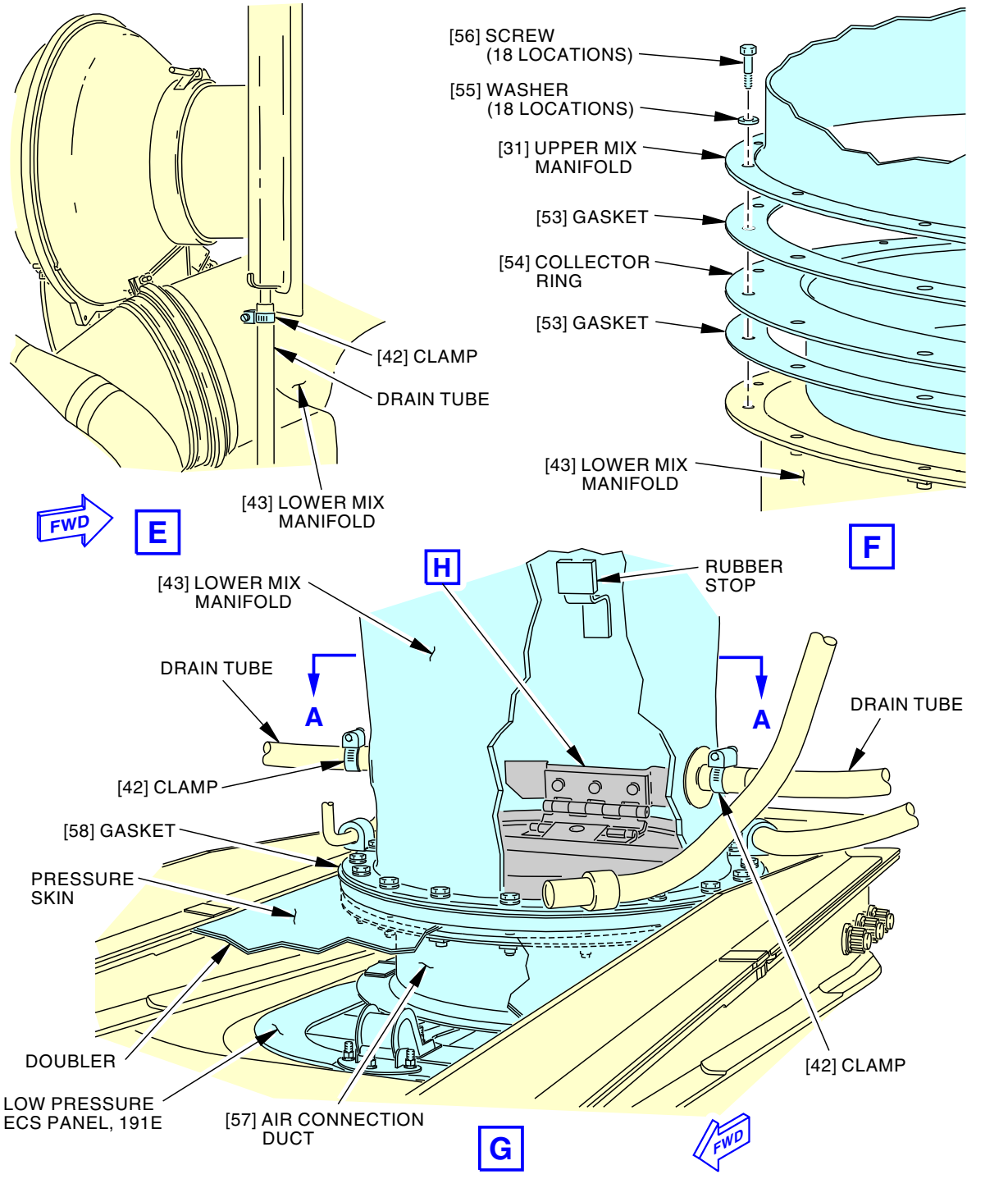
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**Ground Conditioned Air Check Valve Installation**
**Figure 402/21-21-01-990-802 (Sheet 3 of 5)**



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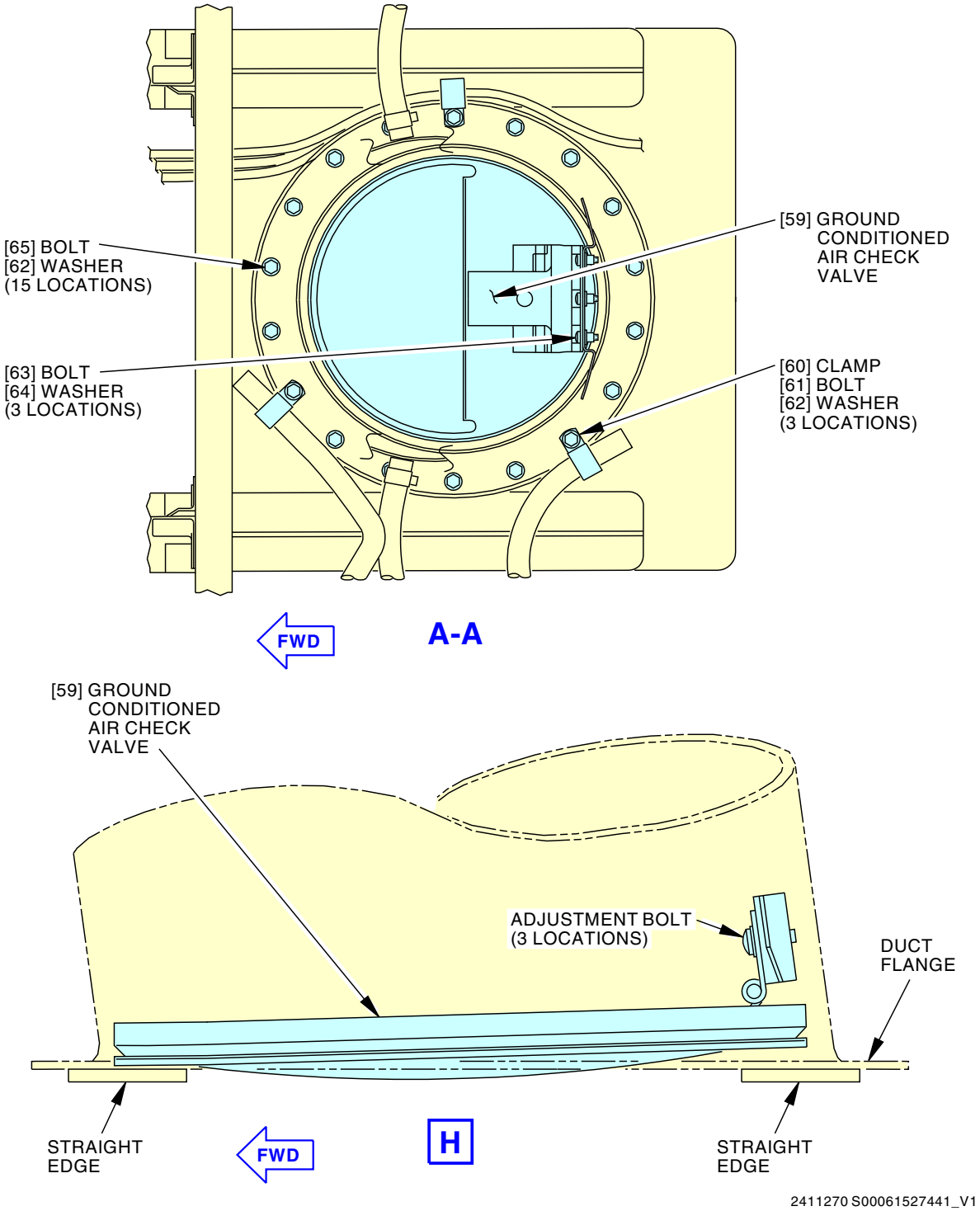



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**Ground Conditioned Air Check Valve Installation**
**Figure 402/21-21-01-990-802 (Sheet 4 of 5)**



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**Ground Conditioned Air Check Valve Installation**
**Figure 402/21-21-01-990-802 (Sheet 5 of 5)**



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**TASK 21-21-01-400-802**

## 5. Ground Conditioned Air Check Valve Installation

(Figure 402)

### A. General

(1) The hinge on the check valve has a spring which holds the check valve almost open when the air conditioning system is off. When the air conditioning system is on, the pressure in the mix manifold causes the swing check valve to close. Before you install the lower mix manifold, you must do a check of the check valve and adjust the hinge if it is necessary. The check valve must open and close correctly.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 53 | Gasket | 21-21-01-01-380 | SIA 001-003 |
| | | 21-21-01-02-530 | SIA 004-999 |
| 58 | Gasket | 21-21-01-01-550 | SIA 001-003 |
| | | 21-21-01-02-545 | SIA 004-999 |
| 59 | Ground conditioned air check valve | 21-21-01-01-430 | SIA 001-003 |
| | | 21-21-05-01-145 | SIA 004-999 |

### D. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |
| 821 | Forward Cargo Door |

### F. Ground Conditioned Air Check Valve Installation

**SUBTASK 21-21-01-420-004**

(1) Do these steps to install the ground conditioned air check valve [59] in the lower mix manifold [43]:

(a) Put the ground conditioned air check valve [59] in its position in the lower mix manifold [43].

(b) Loosely install the bolts [63] and the washers [64].



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(c) Adjust the ground conditioned air check valve [59] so that the bolts [63] are in the center of the adjustment slots.

(d) Fully tighten the bolts [63] and the washers [64].

## G. Ground Conditioned Air Check Valve Adjustment

SUBTASK 21-21-01-710-001

(1) Do this check of the ground conditioned air check valve [59]:

(a) Put a straight edge on the flange of the rear duct of the lower mix manifold [43].

(b) Move the straight edge to the end of the ground conditioned air check valve [59] opposite the hinge.

(c) Make sure the end of the ground conditioned air check valve [59] touches the straight edge.

(d) Move the straight edge to the end of the ground conditioned air check valve [59] below the hinge.

(e) Make sure there is a small clearance between the edge of the ground conditioned air check valve [59] and the straight edge.

(f) If there is no clearance, adjust the hinge:

1) Loosen the hinge adjustment bolts [63].

2) Move the hinge up as necessary.

3) Tighten the hinge adjustment bolts [63].

(g) Push down on the ground conditioned air check valve [59] at the hinge.

(h) Make sure that the clearance in the above step closes without too much downward force.

(i) Release the pressure on the ground conditioned air check valve [59].

(j) Make sure that there is clearance again between the edge of ground conditioned air check valve [59] and the straight edge.

(k) If too much force is necessary to remove the clearance when you push down on the ground conditioned air check valve [59], adjust the hinge:

1) Loosen the hinge adjustment bolts [63].

2) Move the hinge down as necessary.

3) Tighten the hinge adjustment bolts [63].

(l) Do this check again to make sure the ground conditioned air check valve [59] operates correctly.

## H. Mix Manifold Installation

SUBTASK 21-21-01-420-005

(1) To install the gasket [58] that was below the rear duct of the lower mix manifold [43], do these steps:

(a) Make sure the gasket [58] is not damaged.

1) Replace the gasket [58] if it is damaged.

(b) When you install the gasket [58], align the slot in the gasket [58] with the slot on the spacer on the airplane skin.

SUBTASK 21-21-01-420-006

(2) Install the lower mix manifold [43] in the mix bay:

(a) Carefully move the mix manifold to its position.



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(b) Make sure the ducts on the mix manifold are aligned with the other ducts in the mix bay.

(c) Install the bolts [61] and washers [62] for the clamps [60].

1) Make sure the bolts [61] and washers [62] are installed in the positions they were before the removal.

(d) Install the bolts [65] and the washers [62] that attach the lower mix manifold [43] to the spacer on the airplane skin.

(e) Install the two screws [44] and washers [45] that attach support brackets of the lower mix manifold [43] to the airplane structure.

**SUBTASK 21-21-01-010-015**

(3) Install the two couplings [40] for the lower ducts of the lower mix manifold [43].

(a) Tighten the nut on the couplings [40] to 20 in-lb (2.3 N·m) to 25 in-lb (2.8 N·m).

**SUBTASK 21-21-01-010-016**

(4) Install the collector ring [54] and the gaskets [53]:

(a) Make sure the gaskets [53] are not damaged.

1) Replace the gaskets [53] if they are damaged.

(b) Put one of the gaskets [53] on the lower mix manifold [43].

(c) Put the collector ring [54] on the lower mix manifold [43].

(d) Put the other gasket [53] on the collector ring [54].

1) Make sure the holes in the gaskets [53], collector ring [54], and the lower mix manifold [43] are aligned.

**SUBTASK 21-21-01-010-017**

(5) To install the upper mix manifold [31], do these steps:

(a) Put the upper mix manifold [31] on the lower mix manifold [43].

1) Make sure the holes in the manifolds, gaskets, and collector ring are aligned.

(b) Install the 18 screws [56] and washers [55].

(c) Install the electrical connectors [32] on the mix manifold temperature sensors.

(d) Install the three clamps [33] and sleeves [34].

**SUBTASK 21-21-01-020-005**

(6) To connect the drain tubes to the lower mix manifold [43]:

(a) Push the four drain tubes on lower mix manifold [43].

1) Make sure the drain tubes and the clamps [42] are installed in the positions they were before the removal.

(b) Install the clamps [42] on the drain tubes.

**SUBTASK 21-21-01-010-018**

(7) To install the forward muffler [41] in the mix bay, do these steps:

(a) Carefully move the forward muffler [41] to its location in the mix bay.

(b) Install the clamp [46] at the rear bulkhead of the mix bay.

1) Tighten the nut on the clamp 55 in-lb (6.2 N·m) to 60 in-lb (6.8 N·m).

(c) Move the clamp [52] to its position on the bracket.

(d) Put the two washers [48] under the clamp [52] at two locations.

(e) Install the screw [51] and the washer [48].



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(f) Install the spacer [49], washer [48] and nut [47] below the bracket.

1) Make sure the spacer [49] is in the slot on the bracket.

(g) Install the coupling [35] and the sleeve [36] for the top duct of the forward muffler [41].

SUBTASK 21-21-01-010-019

(8) To install the check valve [39] for the recirculation fans, do these steps for each of the two check valves [39]:

(a) Hold the check valve [39] in its position.

1) Make sure the flow arrow on the check valve [39] points inboard.

(b) Install the couplings [37] and the sleeves [38].

## I. Check Valve Duct Installation Test

SUBTASK 21-21-01-860-007

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-21-01-860-008

(2) Supply conditioned air to the air conditioning system (TASK 21-00-00-800-803).

SUBTASK 21-21-01-790-001

(3) Make sure that there are no leaks at any of the ducts or hoses you disconnected for this installation.

SUBTASK 21-21-01-010-020

(4) Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

SUBTASK 21-21-01-710-002

(5) Make sure air flows out the drain hole.

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-21-01-860-009

(1) Remove the conditioned air from the air conditioning system (TASK 21-00-00-800-802)

SUBTASK 21-21-01-710-003

(2) Make sure the swing check valve is not completely closed.

SUBTASK 21-21-01-410-004

(3) Install the center liner in the aft bulkhead in the forward cargo compartment (TASK 50-11-02-400-801)

SUBTASK 21-21-01-410-005

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

SUBTASK 21-21-01-410-006

(5) Close this access door:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**END OF TASK**



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**TASK 21-21-01-000-803**

## 6. Cooling Exchange Check Valve Removal

(Figure 403)

### A. General

(1) This task includes the steps to remove the Cooling Exchange Check Valve.

(2) You must remove electrical power from the airplane before you remove the cooling exchange check valve. This will make sure the electrical/electronic equipment does not receive electrical power when the equipment cooling system is not in operation.

### B. References

| Reference | Title |
|---|---|
| 12-15-21-600-804 | Crew Oxygen Cylinder Replacement (P/B 301) |

### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### E. Prepare for the Removal

**SUBTASK 21-21-01-010-021**

(1) To get access to the cooling exchange check valve, do this step:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-21-01-010-022**

(2) Remove the access panel on the top of the raised platform just aft and right of the aircraft center line:

(a) Remove the 9 screws that attach the access panel to the top of the raised platform.

(b) Remove the raised platform.

**SUBTASK 21-21-01-010-023**

(3) Remove the crew oxygen system cylinder (TASK 12-15-21-600-804).

### F. Cooling Exchange Check Valve Removal

**SUBTASK 21-21-01-020-006**

(1) Remove the strap [4].

**SUBTASK 21-21-01-020-007**

(2) Remove the sleeve [3].

**SUBTASK 21-21-01-020-008**

(3) Loosen the coupling [2].

**SUBTASK 21-21-01-020-009**

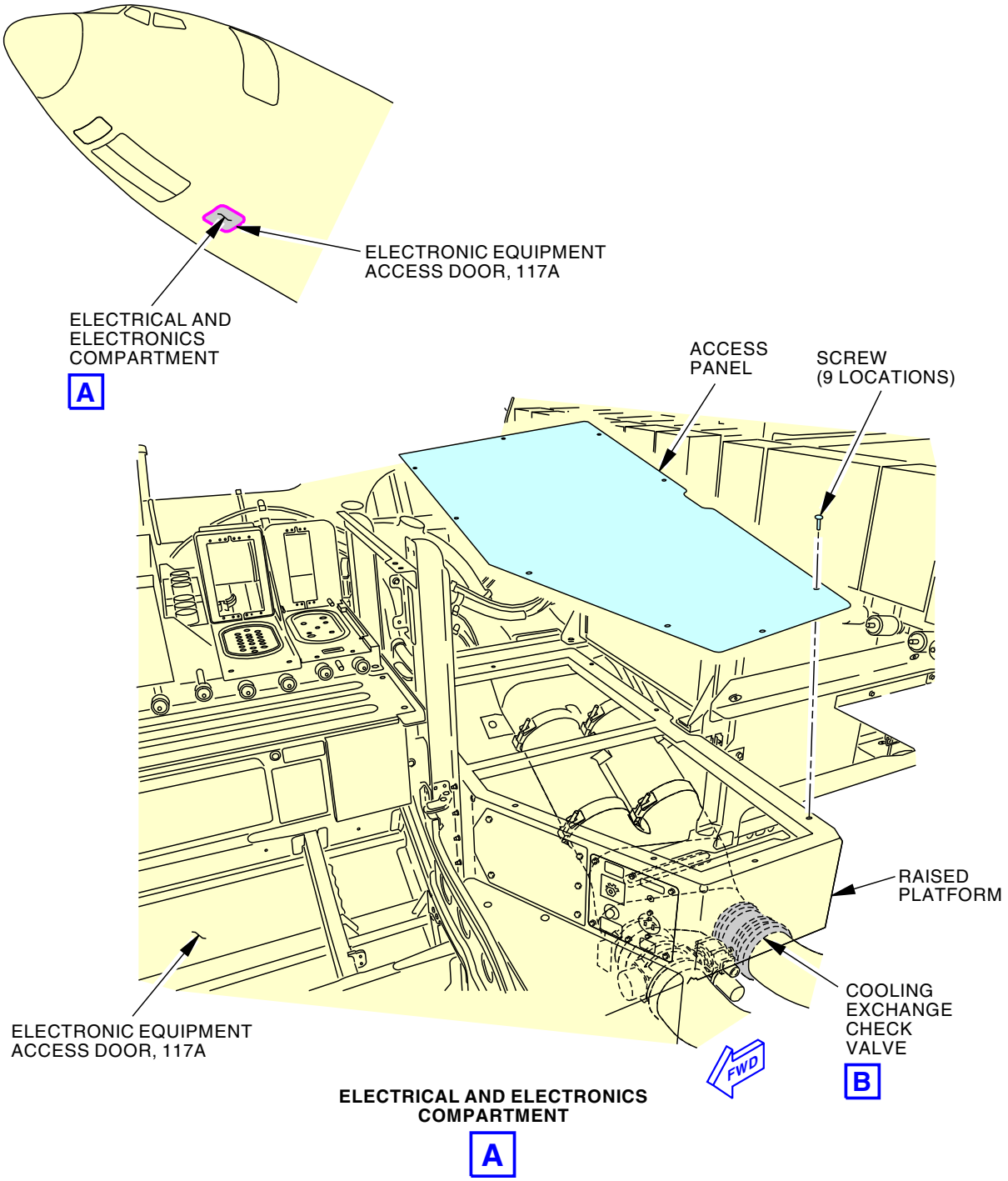
(4) Remove the cooling exchange check valve [1]:

(a) Put covers on the duct openings to prevent the entry of unwanted material.

**END OF TASK**



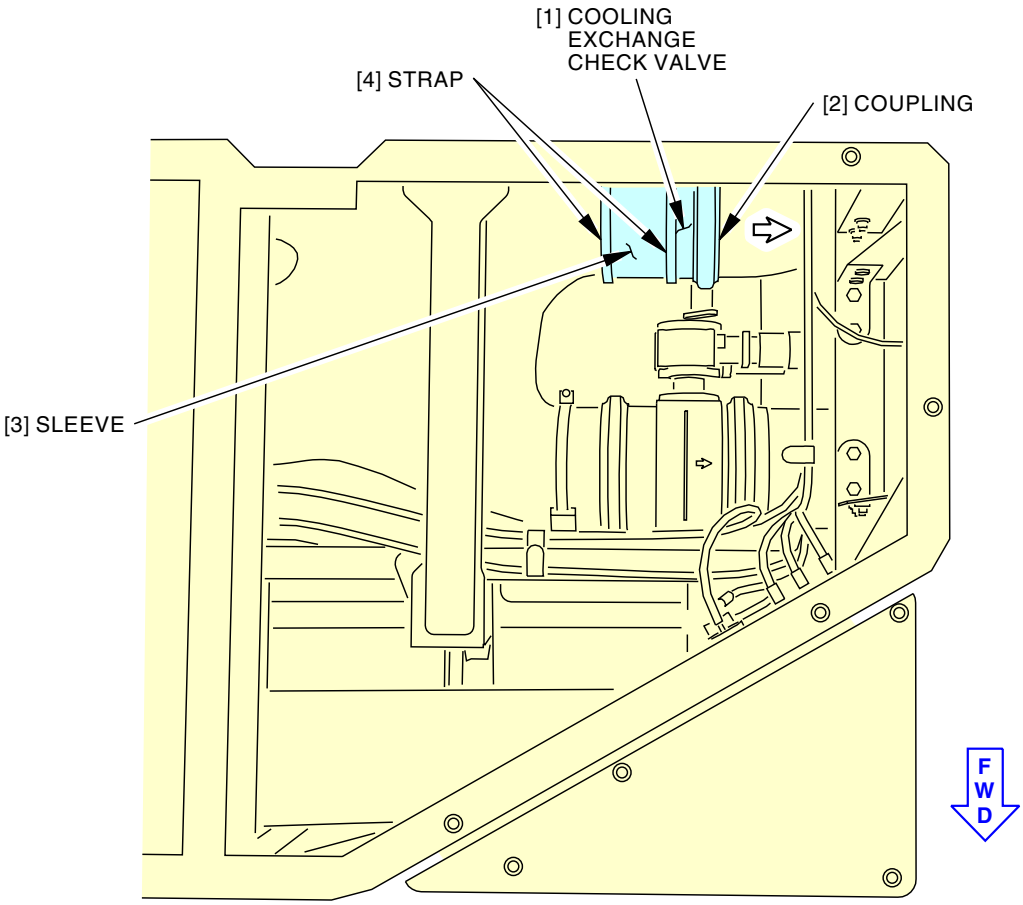
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cooling Exchange Check Valve Installation**
**Figure 403/21-21-01-990-803 (Sheet 1 of 2)**



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**COOLING EXCHANGE CHECK VALVE**
**(OXYGEN BOTTLE INSTALLATION IS NOT SHOWN)**

**B**

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**Cooling Exchange Check Valve Installation**
**Figure 403/21-21-01-990-803 (Sheet 2 of 2)**



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**TASK 21-21-01-400-803**

## 7. Cooling Exchange Check Valve Installation

(Figure 403)

### A. General

(1) This task includes the steps to install the Cooling Exchange Check Valve.

### B. References

| Reference | Title |
|---|---|
| 50-10-04-000-801 | Cargo Compartment Floor Panel Removal (P/B 401) |
| 50-10-04-400-801 | Cargo Compartment Floor Panel Installation (P/B 401) |
| 52-31-00-580-802 | Close the Cargo Door (P/B 201) |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-3923 | Tool - Installation, Tie Strap<br>Part #: GS2B-E Supplier: 06383<br>Part #: GS4H-E Supplier: 06383<br>Part #: GTS-E Supplier: 06383<br>Part #: PPTS Supplier: 06383<br>Opt Part #: GS2B Supplier: 06383<br>Opt Part #: GS2BL Supplier: 06383<br>Opt Part #: GS4H Supplier: 06383<br>Opt Part #: GTS Supplier: 06383 |

### D. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

### E. Cooling Exchange Check Valve Installation

**SUBTASK 21-21-01-420-007**

(1) Install the Cooling Exchange Check Valve:

(a) Remove the duct covers.

(b) Put the cooling exchange check valve [1] in its position.

1) Install the cooling exchange check valve [1] so the direction of the flow is from the E/E compartment to the forward cargo compartment.

(c) Install the coupling [2].

(d) Tighten the coupling [2].

(e) Move the sleeve [3] on to the cooling exchange check valve [1] and the duct flanges.

(f) Put the strap [4] around the sleeve [3].

(g) Tighten the strap [4].

1) To apply the correct tension, set the selector knob to heavy and the tension indicator to 8.

a) Use the panduit tie strap installation tool, COM-3923 (with blue handle).



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### F. Cooling Exchange Check Valve Installation Test

**SUBTASK 21-21-01-860-011**

(1) Make sure these switches, on the P5 Overhead Panel, are in the NORMAL position:

(a) EQUIP COOLING, EXHAUST

(b) EQUIP COOLING, SUPPLY

**SUBTASK 21-21-01-710-004**

(2) Make sure there is no air leakage at the coupling [2] and strap [4].

**SUBTASK 21-21-01-010-024**

(3) Remove the forward cargo compartment forward floor panel (TASK 50-10-04-000-801).

**SUBTASK 21-21-01-710-005**

(4) Make sure there is air flow out of the forward cargo heat duct port.

### G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-21-01-410-007**

(1) Install the forward cargo compartment forward cargo floor panel (TASK 50-10-04-400-801).

**SUBTASK 21-21-01-860-012**

(2) Put these switches in the AUTO position:

(a) L PACK

(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

**SUBTASK 21-21-01-410-008**

(3) Close the forward cargo door (TASK 52-31-00-580-802).

**——— END OF TASK ———**



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## WINDSHIELD AND FOOT AIR OUTLET VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the windshield and foot air outlet valve.

(2) An installation of the windshield and foot air outlet valve.

B. There is one windshield and foot air outlet valve for the captain and one for the first officer. The valves control the flow of air to the foot air outlets and the windshield defoggers. The valves are installed behind the display units on the captains instrument panel, P1, and the first officers instrument panel, P3.

**TASK 21-22-01-000-801**

### 2. Windshield and Foot Air Outlet Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 31-65-11-000-801 | MAX Display Unit Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**C. Prepare for the Removal**

**SUBTASK 21-22-01-860-001**

(1) Make sure that the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, are set to the OFF position.

**SUBTASK 21-22-01-860-002**

(2) Make sure that the L and R PACK switches, on the P5-10 air conditioning panel, are set to the OFF position.

**SUBTASK 21-22-01-010-001**

(3) To get access to the captain's windshield and foot air outlet valve [4], do this step:

(a) Remove the display units on the captain's instrument panel (P1) (TASK 31-65-11-000-801).

**SUBTASK 21-22-01-010-002**

(4) To get access to the first officer's windshield and foot air outlet valve [4], do this step:

(a) Remove the display units on the first officer's instrument panel (P3) (TASK 31-65-11-000-801).

**D. Windshield and Foot Air Outlet Valve Removal**

**SUBTASK 21-22-01-020-001**

(1) Disconnect the cable assemblies [9] from the windshield and foot air outlet valve [4] as follows:

(a) Remove the cotter pins [2], the washers [3], and the pins [1].

**SUBTASK 21-22-01-010-003**

(2) Remove the strap [8] that holds the inlet flex duct to the valve [4].

**SUBTASK 21-22-01-010-004**

(3) Remove the strap [5] that holds the flex duct to the windshield and foot air outlet valve [4].



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SUBTASK 21-22-01-010-005

(4) Slide the inlet duct and the two outlets ducts away from the windshield and foot air outlet valve [4].

SUBTASK 21-22-01-010-006

(5) Remove the windshield and foot air outlet valve [4] from the wire tray bracket, as follows:

(a) Remove the screws [6] and the washers [7].

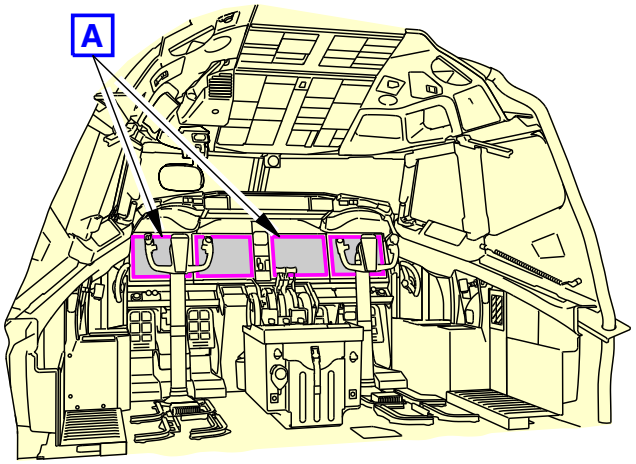
SUBTASK 21-22-01-020-002

(6) Remove the windshield and foot air outlet valve [4].

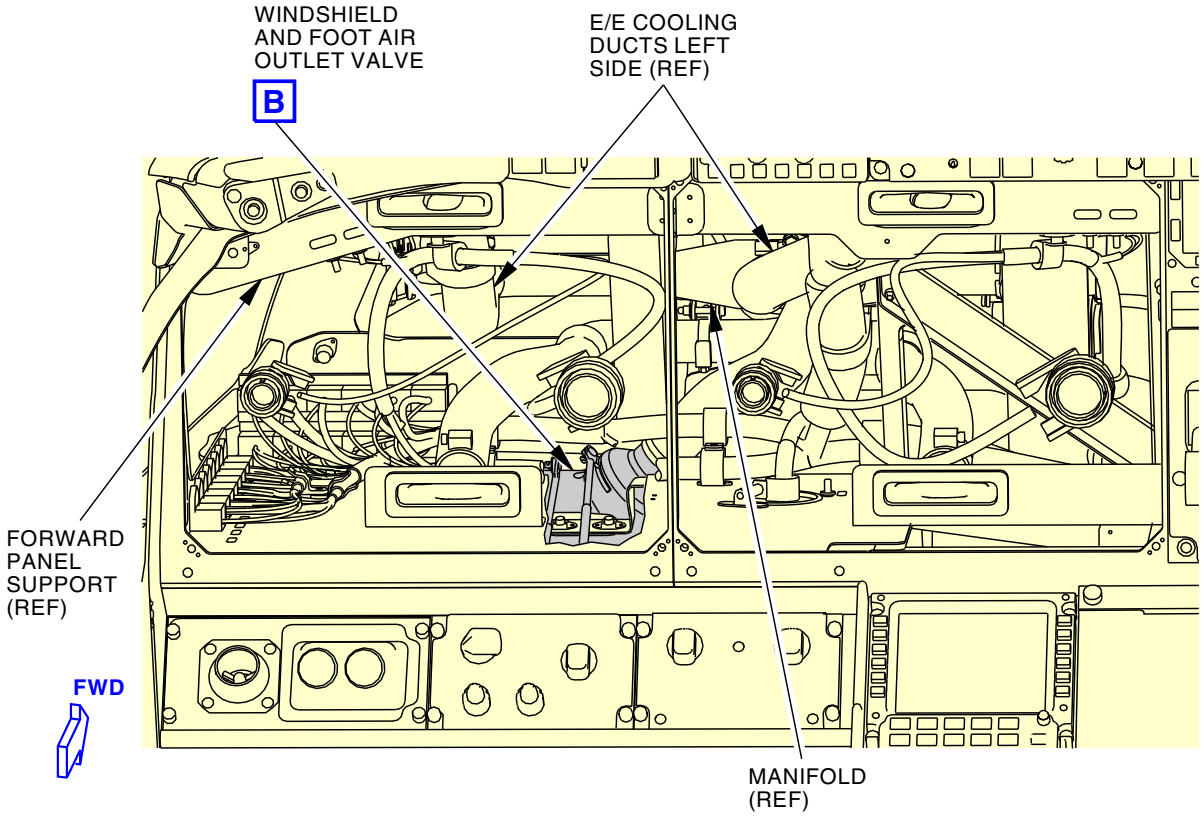
——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

**NOTE:**

MAX DISPLAY UNITS REMOVED

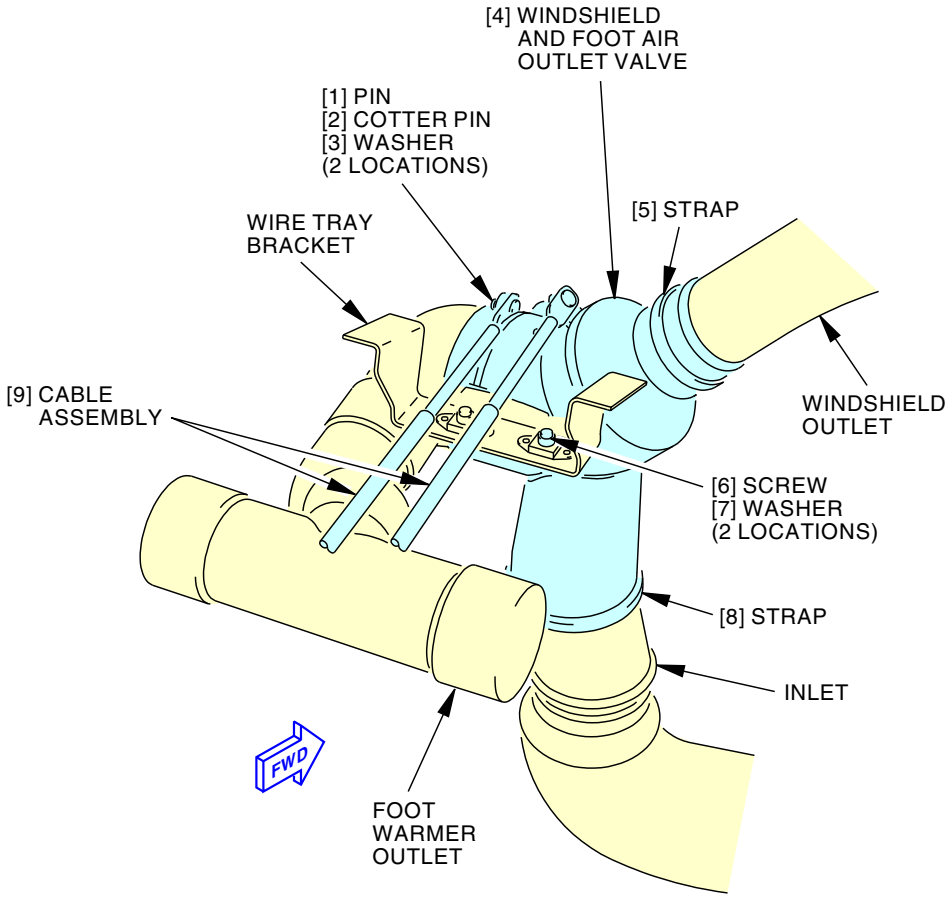
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**Windshield and Foot Air Outlet Valve Installation**
**Figure 401/21-22-01-990-801 (Sheet 1 of 2)**



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**WINDSHIELD AND FOOT AIR OUTLET VALVE**

**B**

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**Windshield and Foot Air Outlet Valve Installation**
**Figure 401/21-22-01-990-801 (Sheet 2 of 2)**



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**TASK 21-22-01-400-801**

## 3. Windshield and Foot Air Outlet Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-22-02-820-801 | Air Outlet Valve Control Cables Adjustment and Test (P/B 501) |
| 31-65-11-400-801 | MAX Display Unit Installation (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### C. Windshield and Foot Air Outlet Valve Installation

**SUBTASK 21-22-01-210-001**

(1) Make sure that there is no unwanted material or contamination in the inlet duct to the windshield and foot air outlet valve [4] or the outlet ducts from the windshield and foot air outlet valve [4].

**SUBTASK 21-22-01-420-001**

(2) Install the windshield and foot air outlet valve [4] on the wire tray bracket as follows (Figure 401):

(a) Position the windshield and foot air outlet valve [4] in its correct location.

(b) Install the washers [7] and the screws [6].

**SUBTASK 21-22-01-410-001**

(3) Install the inlet duct and the two outlet ducts on the windshield and foot air outlet valve [4] as follows:

(a) Slide the ends of the inlet duct and the outlet ducts onto the windshield and foot air outlet valve [4].

(b) Install the strap [5], and the strap [8] to hold the ducts onto the valve [4].

**SUBTASK 21-22-01-420-002**

(4) Attach the cable assemblies [9] to the windshield and foot air outlet valve [4] as follows:

(a) Put the control cable for the windshield air on the applicable valve body of the windshield and foot air outlet valve [4].

(b) Put the control cable for the foot air on the applicable valve body of the windshield and foot air outlet valve [4].

(c) Install the pins [1], the washers [3], and the cotter pins [2].

### D. Air Outlet Valve Installation Test

**SUBTASK 21-22-01-710-001**

(1) Do a check of the windshield and foot air outlet valve [4] as follows:

(a) Do this task: Supply Conditioned Air to the Airplane, TASK 21-00-00-800-801.

(b) Operate the FOOT AIR or WINDSHIELD AIR knob, as applicable, to close the valve [4].

(c) Make sure that no air flow is detected at the windshield defogger outlet or at the foot air outlet, as applicable.



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(d) If air flow is detected, adjust the applicable cable assembly (TASK 21-22-02-820-801).

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-22-01-410-002**

(1) Install the display units for the captains instrument panel (P1) or the first officers instrument panel (P3), as applicable (TASK 31-65-11-400-801).

**SUBTASK 21-22-01-860-003**

(2) Make sure that the L and R RECIRC FAN switches on the P5-10 air conditioning panel are set to the AUTO position.

**SUBTASK 21-22-01-410-003**

(3) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**——— END OF TASK ———**



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## AIR OUTLET VALVE CONTROL CABLES - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Air outlet valve control cables removal.

(2) Air outlet valve control cables installation.

B. There are two control cables that go to each windshield and foot air outlet valve. One of the cables controls the flow of air to the foot air outlet. The other cable controls the flow of air to the windshield defogger.

**TASK 21-22-02-000-801**

### 2. Air Outlet Valve Control Cables Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 31-65-11-000-801 | MAX Display Unit Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### C. Prepare for the Removal

**SUBTASK 21-22-02-010-001**

(1) To get access the control cables for the outlet valve, do this step:

(a) Remove the display units on the captain's instrument panel (P1) or the first officer's instrument panel (P3), as applicable (TASK 31-65-11-000-801).

#### D. Air Outlet Valve Control Cables Removal

**SUBTASK 21-22-02-020-002**

(1) Remove the nut [9] from the end of the cable assembly [1] or the cable assembly [2].

**SUBTASK 21-22-02-020-003**

(2) Remove the cotter pin [6], the washer [7], and the pin [5] that attach the end of cable assembly [1] or cable assembly [2] to the tab on the applicable windshield and foot air outlet valve.

**SUBTASK 21-22-02-020-004**

(3) Loosen the nut [3] or the nut [8] to release the cable assembly [1] or the cable assembly [2] from the bracket.

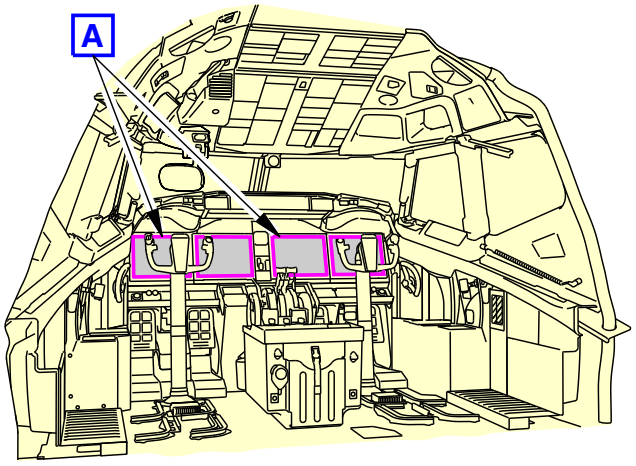
**SUBTASK 21-22-02-020-005**

(4) Remove the cable assembly [1] or the cable assembly [2].

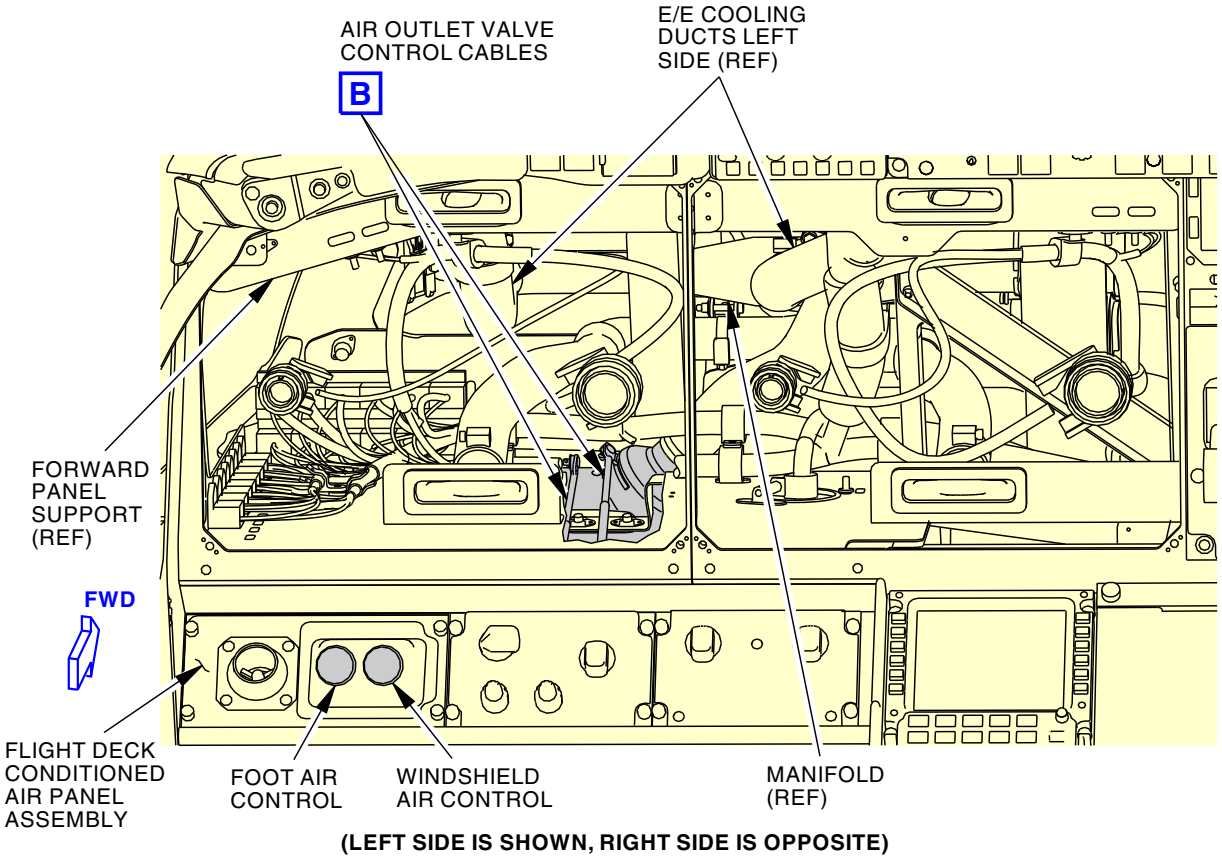
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




**(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)**

A

**NOTE:**

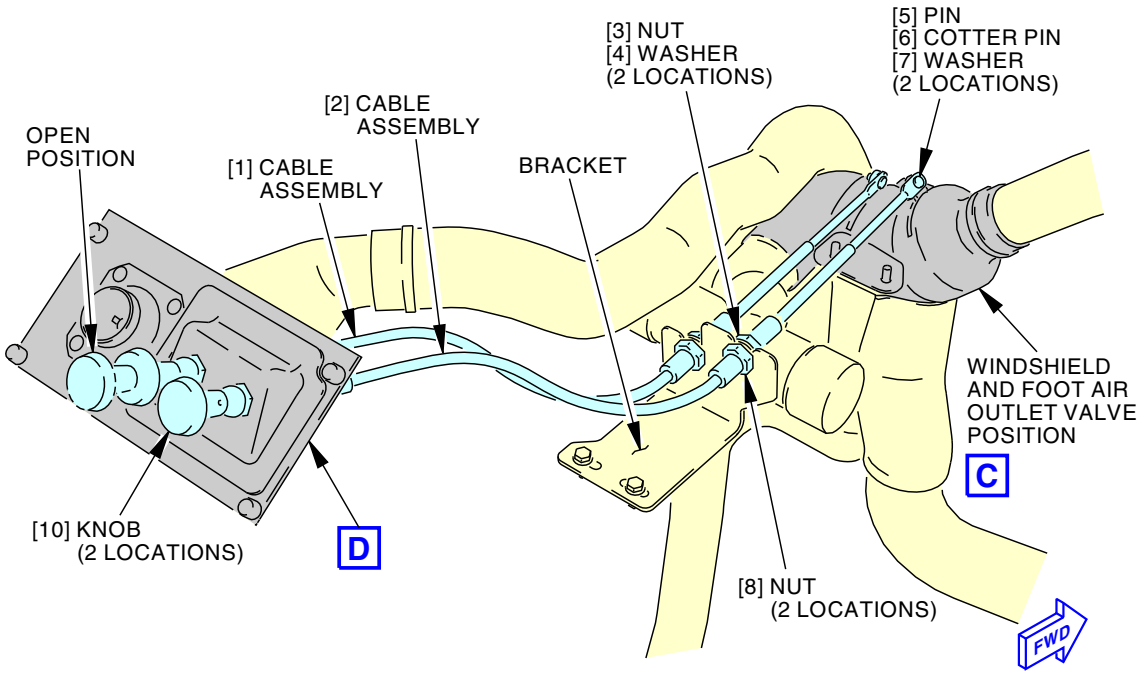
MAX DISPLAY UNITS REMOVED

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**Air Outlet Valve Control Cables Installation**
**Figure 401/21-22-02-990-801 (Sheet 1 of 2)**

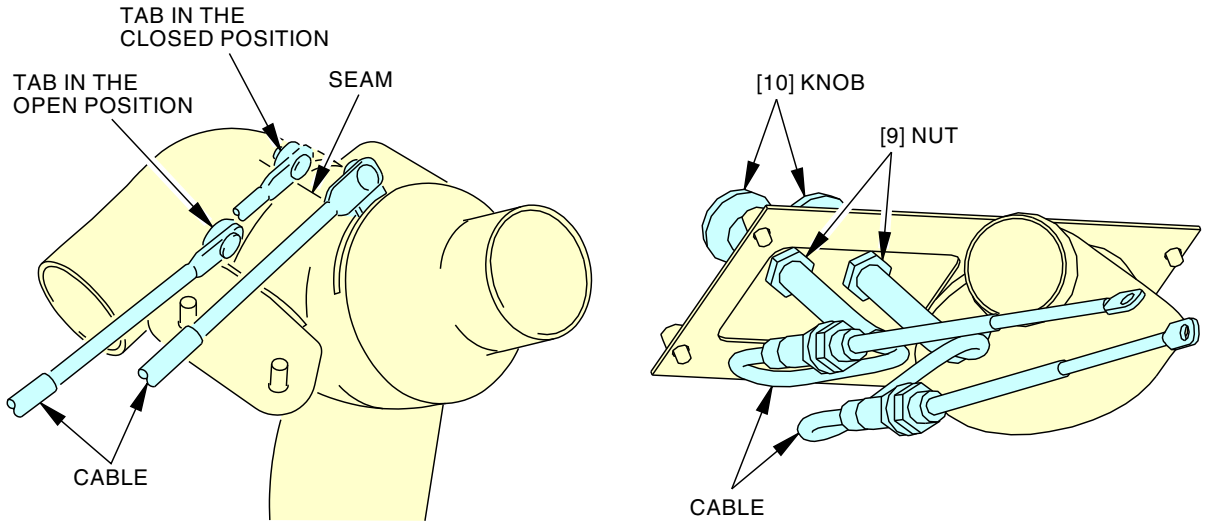


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**AIR OUTLET VALVE CONTROL CABLES**

B




**WINDSHIELD AND FOOT AIR OUTLET VALVE POSITION**

C

D

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**Air Outlet Valve Control Cables Installation**
**Figure 401/21-22-02-990-801 (Sheet 2 of 2)**



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**TASK 21-22-02-400-801**

## 3. Air Outlet Valve Control Cables Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-22-02-820-801 | Air Outlet Valve Control Cables Adjustment and Test (P/B 501) |
| 31-65-11-400-801 | MAX Display Unit Installation (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### C. Air Outlet Valve Control Cables Installation

**SUBTASK 21-22-02-210-001**

(1) Position cable assembly [1] or cable assembly [2] in its correct position (Figure 401).

**SUBTASK 21-22-02-420-001**

(2) Install the nut [9] from the end of cable assembly [1] or cable assembly [2] and tighten firmly to the plate.

**SUBTASK 21-22-02-410-001**

(3) Tighten the nut [3] or the nut [8] to firmly hold cable assembly [1] or cable assembly [2] in the bracket.

**SUBTASK 21-22-02-860-001**

(4) Make sure that the windshield and foot air outlet valve ports are fully closed.

NOTE: The tabs on the valve will be centered on the seam on the valve between the two halves of the valve when the outlet ports are fully closed.

**SUBTASK 21-22-02-860-002**

(5) Push the knob [10] fully forward to put the cable assembly [1] or the cable assembly [2] in the closed position.

**SUBTASK 21-22-02-820-001**

(6) Adjust the nut [3] or the nut [8] until the hole in the end of cable assembly [1] or cable assembly [2] aligns with the hole in the tab on the windshield and foot air outlet valve.

**SUBTASK 21-22-02-420-003**

(7) Install the pin [5], the washer [7], and a new cotter pin [6].

**SUBTASK 21-22-02-700-001**

(8) Perform the air outlet valve control cables test (TASK 21-22-02-820-801).

### D. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-22-02-410-005**

(1) Install the display units for the captain's instrument panel (P1) or the first officer's instrument panel (P3), as applicable (TASK 31-65-11-400-801).

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## AIR OUTLET VALVE CONTROL CABLES - ADJUSTMENT/TEST

### 1. General

A. This procedure has this task:

(1) An adjustment of the control cables for the outlet valve for the windshield and foot air.

B. There are two control cables for each outlet valve for the windshield and foot air. The adjustment nuts on the control cables are installed behind the display units on the P1 captain's instrument panel or the P3 first officer's instrument panel.

**TASK 21-22-02-820-801**

### 2. Air Outlet Valve Control Cables Adjustment and Test

(Figure 501)

#### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 31-65-11-000-801 | MAX Display Unit Removal (P/B 401) |
| 31-65-11-400-801 | MAX Display Unit Installation (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### C. Prepare for the Adjustment

**SUBTASK 21-22-02-010-004**

(1) To get access to the control cables for the captain's foot outlet and windshield outlet, do this step:

(a) Remove the display units on the P1 captain's instrument panel (TASK 31-65-11-000-801).

**SUBTASK 21-22-02-010-005**

(2) To get access to the control cables for the first officer's foot outlet and windshield outlet, do this step:

(a) Remove the display units on the P3 first officer's instrument panel (TASK 31-65-11-000-801).

#### D. Air Outlet Valve Control Cables Adjustment

**SUBTASK 21-22-02-020-006**

(1) Disconnect the cable assembly [1] or cable assembly [2] from the outlet valve [8] as follows:

(a) Remove the cotter pin [6], washer [7], and pin [5].

**SUBTASK 21-22-02-860-004**

(2) Make sure that the outlet port on the outlet valve [8] that the cable controls is fully closed.

NOTE: The port on the valve is fully closed when the tab on the valve for the control cable is centered on the seam of the valve (View C, Figure 501).

**SUBTASK 21-22-02-860-005**

(3) Push the knob [10] on the cable assembly [1] or cable assembly [2] fully forward.

NOTE: When the knob is pushed fully forward, the valve is in the fully closed position.



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SUBTASK 21-22-02-820-002

(4) Adjust the nut [3] and nut [9] until the hole in the end of the cable assembly [1] or cable assembly [2] aligns with the hole in the tab on the outlet valve [8].

SUBTASK 21-22-02-420-006

(5) Install the pin [5], washer [7], and cotter pin [6].

## E. Air Outlet Valve Control Cables Test

SUBTASK 21-22-02-710-001

(1) Do this task: Supply Conditioned Air to the Airplane, TASK 21-00-00-800-801.

SUBTASK 21-22-02-860-006

(2) Pull out the knob [10] for the cable assembly that was adjusted.

SUBTASK 21-22-02-710-002

(3) Make sure that air comes out of the foot air outlet or at the base of the windshield, as applicable.

SUBTASK 21-22-02-710-003

(4) Push the knob [10] fully in for the cable that was adjusted.

SUBTASK 21-22-02-710-004

(5) Make sure that the flow of air stops.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-22-02-860-007

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

SUBTASK 21-22-02-010-006

(2) Install the display units on the P1 captains's instrument panel if applicable (TASK 31-65-11-400-801).

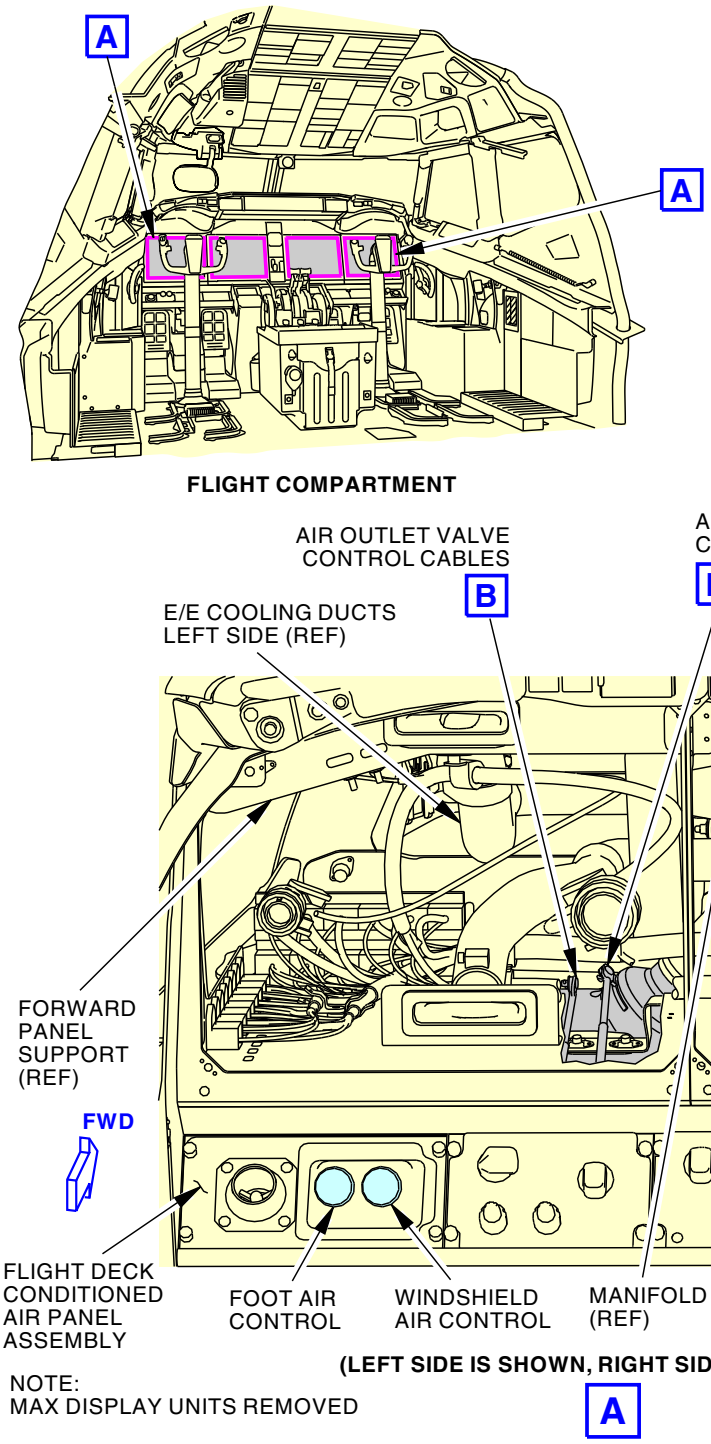
SUBTASK 21-22-02-010-007

(3) Install the display units on the P3 first officer's instrument panel if applicable (TASK 31-65-11-400-801).

**——— END OF TASK ———**



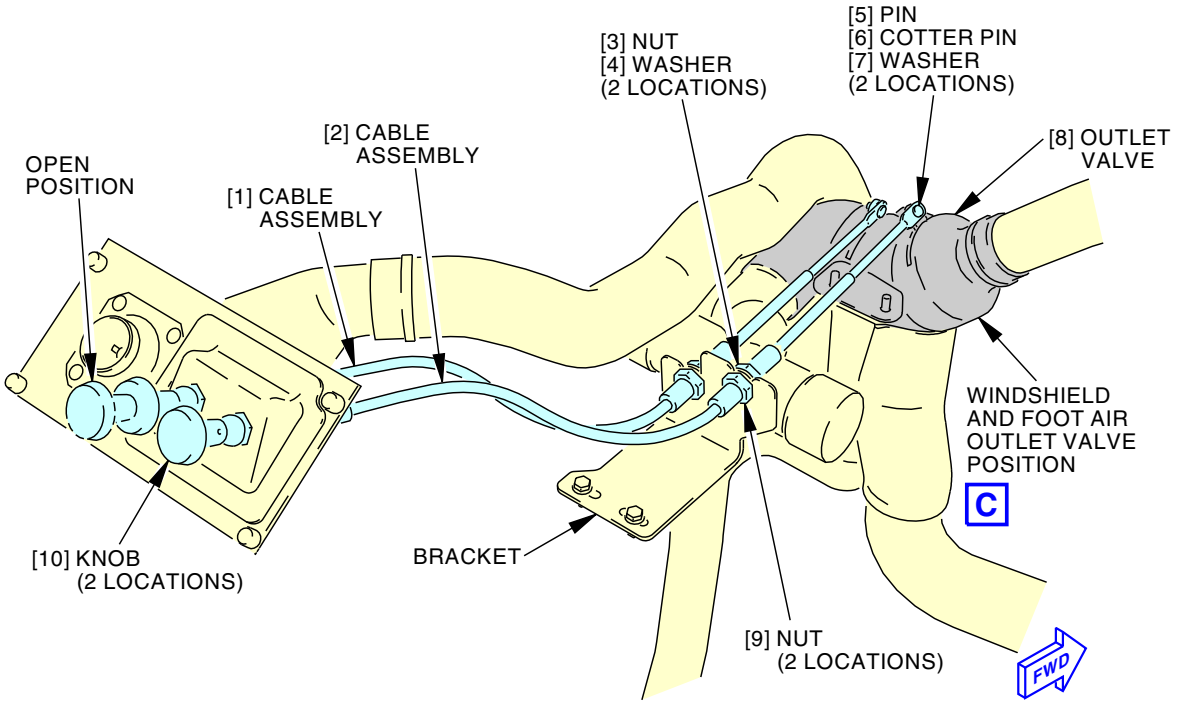
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**Air Outlet Valve Control Cables Adjustment**
**Figure 501/21-22-02-990-802 (Sheet 1 of 2)**

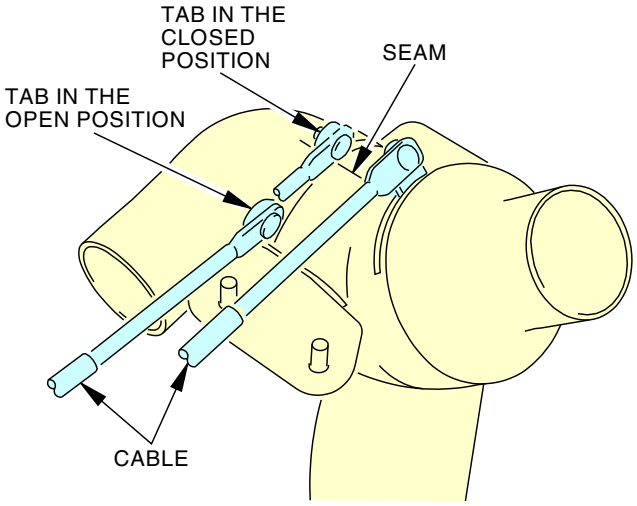


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**AIR OUTLET VALVE CONTROL CABLES**

**B**




**WINDSHIELD AND FOOT AIR OUTLET VALVE POSITION**

**C**

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**Air Outlet Valve Control Cables Adjustment**
**Figure 501/21-22-02-990-802 (Sheet 2 of 2)**



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## FLIGHT DECK AIR DISTRIBUTION SYSTEM MUFFLER/DUCT ASSEMBLY - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the flight deck air distribution system muffler/duct assembly.

(2) An installation of the flight deck air distribution system muffler/duct assembly.

B. The flight deck air distribution system muffler/duct assembly is located in the left portion of the air distribution mix bay.

C. The muffler is bonded to two elbow ducts to form the muffler/duct assembly.

**TASK 21-22-05-000-801**

### 2. Flight Deck Air Distribution System Muffler/Duct Assembly Removal

#### A. References

| Reference | Title |
|---|---|
| 21-25-02-000-801 | Recirculation Fan Removal (P/B 401) |
| 50-10-03-000-801 | Cargo Compartment Ceiling Liner Removal (P/B 401) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

#### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G50140 | Gloves - Protective, Latex or Nitrile | |

#### D. Location Zones

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 125 | Air Conditioning Distribution Bay - Left |
| 212 | Flight Compartment - Right |

#### E. Prepare for the Removal

**SUBTASK 21-22-05-860-001**

(1) Make sure the L and R PACK switches on the P5-10 air conditioning panel are set to OFF and install the DO NOT OPERATE tag, STD-858.

**SUBTASK 21-22-05-860-002**

(2) Make sure that the L and R RECIRC FAN switches are set to OFF and install the DO NOT OPERATE tag, STD-858.

**SUBTASK 21-22-05-010-001**

(3) Open the forward cargo compartment door.



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SUBTASK 21-22-05-010-002

(4) Remove the center and left aft bulkhead liners from the forward cargo compartment (TASK 50-11-02-000-801).

SUBTASK 21-22-05-010-003

(5) Remove the left, aft ceiling liner from the forward cargo compartment (TASK 50-10-03-000-801).

SUBTASK 21-22-05-940-001

**WARNING** PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(6) Before you touch the muffler/duct assembly, put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140

## F. Flight Deck Air Distribution System Muffler/Duct Assembly Removal

(Figure 401)

SUBTASK 21-22-05-020-001

(1) Remove the muffler/duct assembly [9]:

(a) Remove the left recirculation fan (TASK 21-25-02-000-801).

(b) Remove the fasteners that attach the duct support [7] to the filter housing.

(c) Remove the fasteners that attach the bracket assembly [2] and bracket assembly [8] to the filter housing.

(d) Remove the strap [13] that connects the muffler/duct assembly [9] to the filter housing.

(e) Remove the straps [11], strap [12], and straps [15] that connect the muffler/duct assembly [9] to the ducts that are forward and aft of the muffler/duct assembly [9].

(f) Remove the screw [5] and the washer [6].

(g) Remove the screws [3] and the washers [4].

(h) Remove the filter housing from the mix bay.

(i) Move the sleeve [10] and sleeve [16] away from the ends of the elbow ducts.

(j) Remove the muffler/duct assembly [9] from the mix bay.

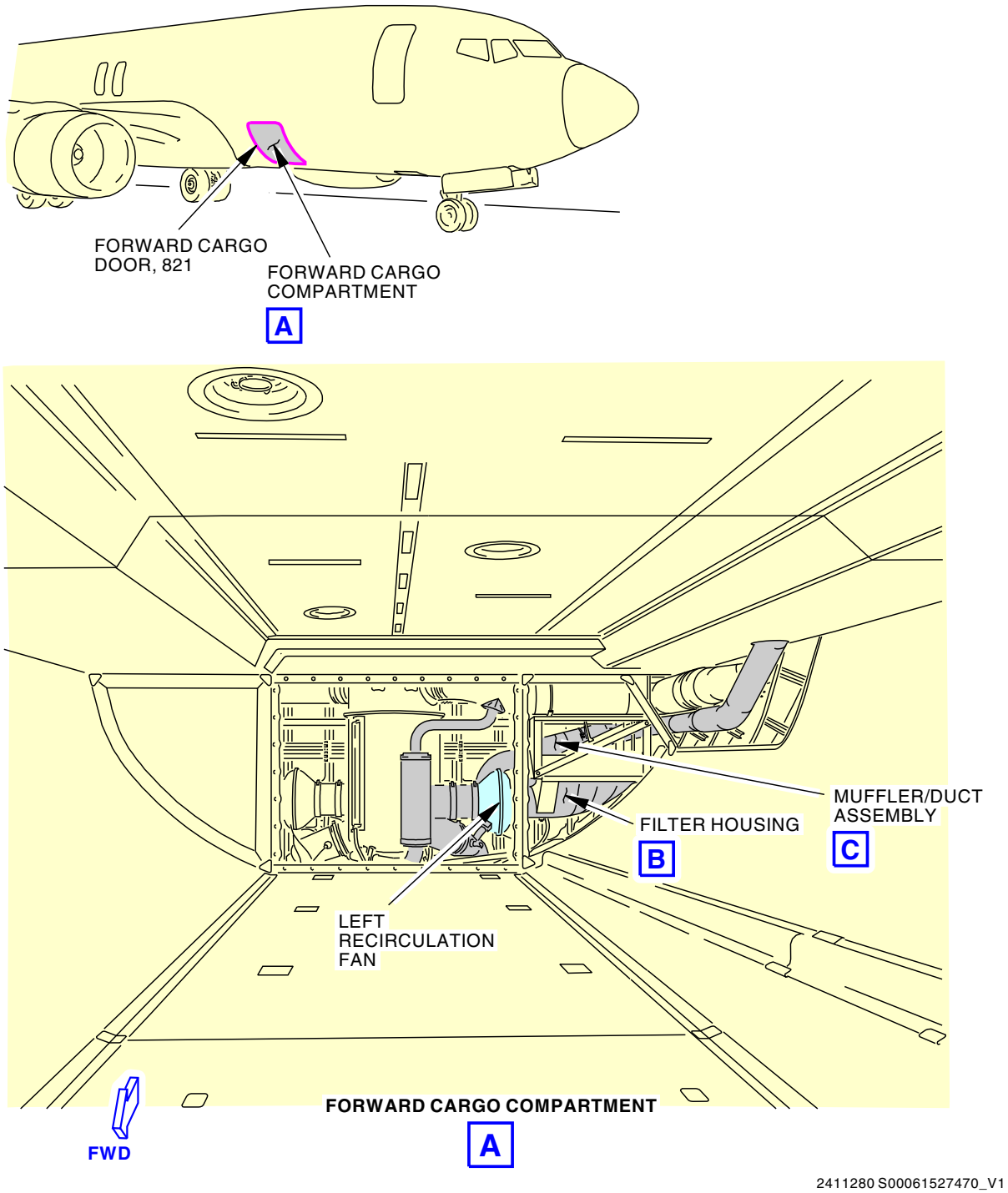
SUBTASK 21-22-05-400-001

(2) Put covers over the open ducts to prevent the entry of unwanted materials.

**END OF TASK**



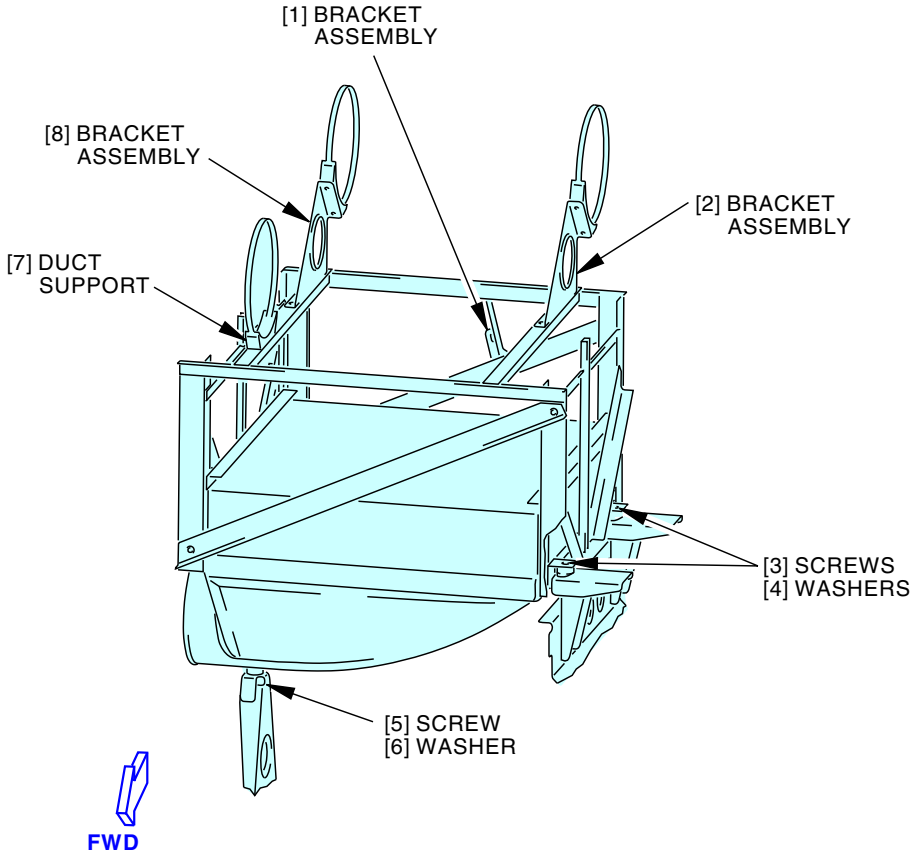
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Deck Air Distribution System Muffler/Duct Assembly Installation**
**Figure 401/21-22-05-990-801 (Sheet 1 of 3)**



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**FILTER HOUSING**
**(DUCTS NOT SHOWN)**

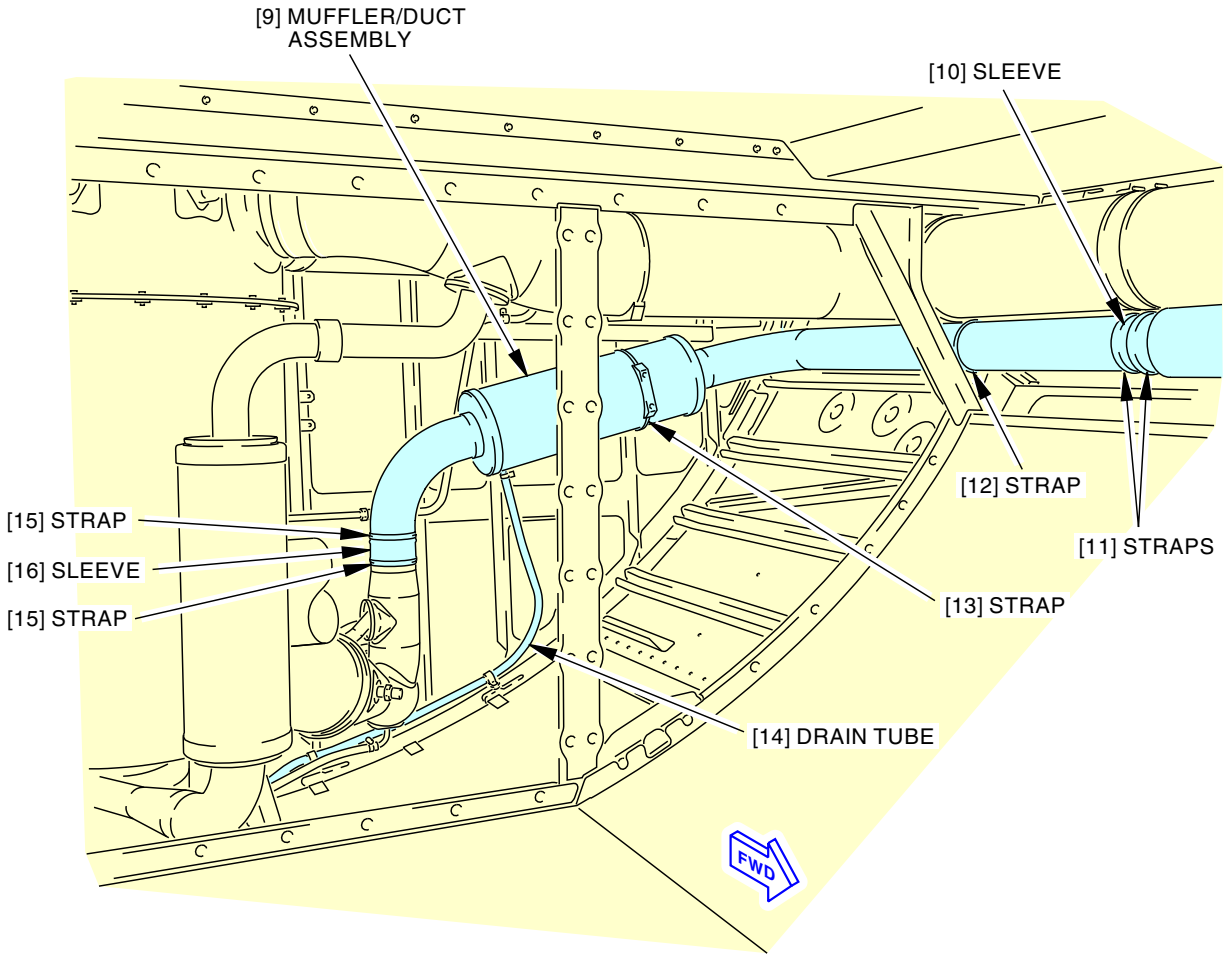
**B**

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**Flight Deck Air Distribution System Muffler/Duct Assembly Installation**
**Figure 401/21-22-05-990-801 (Sheet 2 of 3)**



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**MUFFLER/DUCT ASSEMBLY**

C

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**Flight Deck Air Distribution System Muffler/Duct Assembly Installation**
**Figure 401/21-22-05-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-22-05-400-801**

## 3. Flight Deck Air Distribution System Muffler/Duct Assembly Installation

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 21-25-02-400-801 | Recirculation Fan Installation (P/B 401) |
| 50-10-03-400-801 | Cargo Compartment Ceiling Liner Installation (P/B 401) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-3923 | Tool - Installation, Tie Strap<br>Part #: GS2B-E Supplier: 06383<br>Part #: GS4H-E Supplier: 06383<br>Part #: GTS-E Supplier: 06383<br>Part #: PPTS Supplier: 06383<br>Opt Part #: GS2B Supplier: 06383<br>Opt Part #: GS2BL Supplier: 06383<br>Opt Part #: GS4H Supplier: 06383<br>Opt Part #: GTS Supplier: 06383 |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00624 | Bag - Plastic, General Purpose | |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 9 | Muffler/duct assembly | 21-22-05-01-140 | SIA 001-003 |
| | | 21-22-05-03-080 | SIA 004-999 |
| 11 | Strap | 21-22-05-01-035 | SIA 001-003 |
| | | 21-22-05-03-015 | SIA 004-999 |
| 12 | Strap | 21-22-05-01-035 | SIA 001-003 |
| | | 21-22-05-03-015 | SIA 004-999 |
| 15 | Strap | 21-21-01-01-050 | SIA 001-003 |
| | | 21-21-01-02-050 | SIA 004-999 |
| | | 21-21-01-02-270 | SIA 004-999 |

### E. Location Zones

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 125 | Air Conditioning Distribution Bay - Left |



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## F. Flight Deck Air Distribution System Muffler/Duct Assembly Installation

(Figure 401)

SUBTASK 21-22-05-000-001

(1) Remove the duct covers from the connecting ducts.

SUBTASK 21-22-05-080-001

(2) Install the muffler/duct assembly [9]:

NOTE: The muffler/duct assembly [9] comes with two elbow ducts bonded to the muffler.

(a) Put the muffler/duct assembly [9] in its position in the left side of the mix bay.

(b) Connect the sleeve [10] and sleeve [16] to the muffler/duct assembly [9].

(c) Install the straps [11] and straps [15] that attach the sleeve [10] and sleeve [16] with a tie strap installation tool, COM-3923.

(d) Install the strap [12] and attach it with the tie strap installation tool, COM-3923.

(e) Install the filter housing:

1) Put the filter housing into the left side of the mix bay.

2) Install the washer [6] and screw [5].

3) Install the washers [4] and screws [3].

4) Attach the duct support [7] to the filter housing.

5) Attach the bracket assembly [8] and bracket assembly [2] to the filter housing.

6) Install the strap [13] and secure it with the tie strap installation tool, COM-3923 to the filter housing.

7) Install the left recirculation fan (TASK 21-25-02-400-801).

(f) Connect the drain tube [14] to the muffler/duct assembly [9].

SUBTASK 21-22-05-420-001

(3) Supply conditioned air to the flight deck (TASK 21-00-00-800-803).

SUBTASK 21-22-05-790-001

(4) Make sure that there are no leaks at the interfaces at the ends of the muffler/duct assembly.

(a) Repair all leaks that you find.

SUBTASK 21-22-05-420-002

(5) Operate the flight deck air conditioning outlets to make sure that an adequate supply of conditioned air is available to the flight deck.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-22-05-020-002

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(1) Remove all personal protective equipment and put them in a plastic bag, G00624. Seal the bag closed with tape.



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**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(a) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.

**SUBTASK 21-22-05-110-001**

**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(2) Clean your hands with soap and running hot water.

**SUBTASK 21-22-05-860-003**

(3) Remove the conditioned air to the flight deck (TASK 21-00-00-800-804).

**SUBTASK 21-22-05-860-004**

(4) Install the center and left aft bulkhead panels in the forward cargo compartment (TASK 50-11-02-400-801).

**SUBTASK 21-22-05-410-001**

(5) Install the forward cargo compartment ceiling liner that was removed (TASK 50-10-03-400-801).

**SUBTASK 21-22-05-860-005**

(6) Close the forward cargo compartment door.

**SUBTASK 21-22-05-860-006**

(7) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the AUTO position and remove the DO-NOT-OPERATE tag.

**SUBTASK 21-22-05-860-007**

(8) Put the L and R RECIRC FAN switches, on the P5–10 panel, to the AUTO position and remove the DO-NOT-OPERATE tag.

**——— END OF TASK ———**



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## FLIGHT DECK DUCT ASSEMBLY SCREEN - CLEANING/PAINTING

### 1. General

A. This procedure has these tasks:

(1) Flight Deck Duct Assembly Removal

(2) Flight Deck Duct Assembly Screen Cleaning

(3) Flight Deck Duct Assembly Installation.

B. The duct assembly is located along the lower left side of the flight deck compartment to the left of the nose landing gear wheel well.

C. The duct assembly with the wire mesh screen must be removed from the ducts that are connected to it and then the screen can be cleaned.

**TASK 21-22-07-020-801**

### 2. Flight Deck Duct Assembly Removal

(Figure 701)

#### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G50140 | Gloves - Protective, Latex or Nitrile | |

#### C. Location Zones

| Zone | Area |
|---|---|
| 113 | Area Above and Outboard of Nose Landing Gear Wheel Well - Left |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-22-07-864-001**

(1) Make sure that the L and R PACK switches on the P5-10 air conditioning panel are set to OFF.

**SUBTASK 21-22-07-864-002**

(2) Make sure the L and R RECIRC FAN switches on the P5-10 air conditioning panel are set to OFF.

**SUBTASK 21-22-07-010-001**

(3) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



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SUBTASK 21-22-07-940-001

**WARNING** WEAR APPLICABLE PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN YOU DO THIS TASK. BEFORE YOU USE PPE, READ, UNDERSTAND AND OBEY ALL INSTRUCTIONS FOR ITS USE. YOU CAN BE INJURED IF YOU DO NOT USE PPE AND USE IT CORRECTLY.

(4) Before you touch the duct assembly, put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140

## F. Flight Deck Duct Assembly Removal

SUBTASK 21-22-07-010-002

(1) Get access to the duct assembly [1] with the wire mesh cone assembly in the compartment to the left of the nose landing gear wheel well.

SUBTASK 21-22-07-020-001

(2) Remove the duct assembly [1] as follows:

(a) Remove the plastic tie straps [15] at the location where the duct assembly [1] connects to the duct assembly [3].

(b) Remove the plastic tie straps [15] at two locations where the duct assembly [1] connects to the duct assembly [5] and duct assembly [6].

(c) Do these steps to remove the clamp [4]:

1) Remove the nut [12], washer [13] and screw [14] that attach the clamp [4] to the structure.

2) Remove the clamp [4].

(d) Try to remove duct assembly [1].

(e) If you find that there is not enough clearance in the installation of the duct assemblies to permit removal of the duct assembly [1], then continue with the steps that follow:

NOTE: The ends of the duct assemblies overlap and clearance must be obtained so that duct assembly [1] can be removed.

1) Remove the plastic tie straps [15] that keep the flex sleeve hose [10] between the duct assembly [5] and duct assembly [8].

2) If it is necessary, remove the plastic tie strap [15] that attaches the duct assembly [8] and duct support [7].

3) Remove the plastic tie straps [15] that keep the flex sleeve hose [10] between the duct assembly [6] and duct assembly [11].

4) Loosen the screws [16] on the clamp [9] that keeps the duct assembly [8].

5) Slide the duct assembly [5] and duct assembly [6] as far aft as possible so that the duct assembly [1] can be removed.

(f) Remove duct assembly [1].

(g) Examine the duct assembly [1].

1) If the duct assembly [1] or the wire mesh screen is damaged, get a serviceable duct assembly [1].



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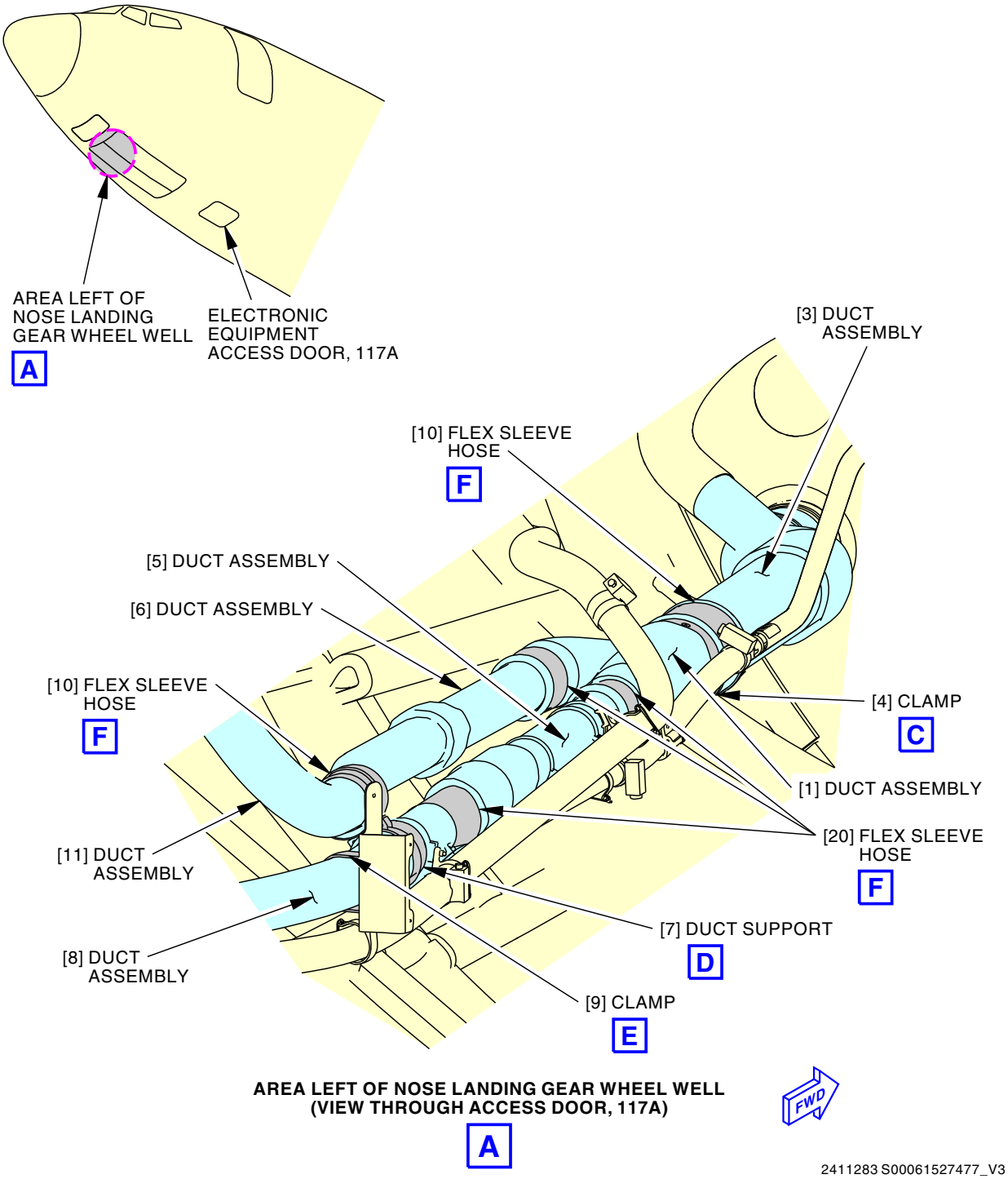
SUBTASK 21-22-07-913-001

(3) Put protective covers on the open ends of the duct assembly [5], duct assembly [6] and duct assembly [3].

——— END OF TASK ———



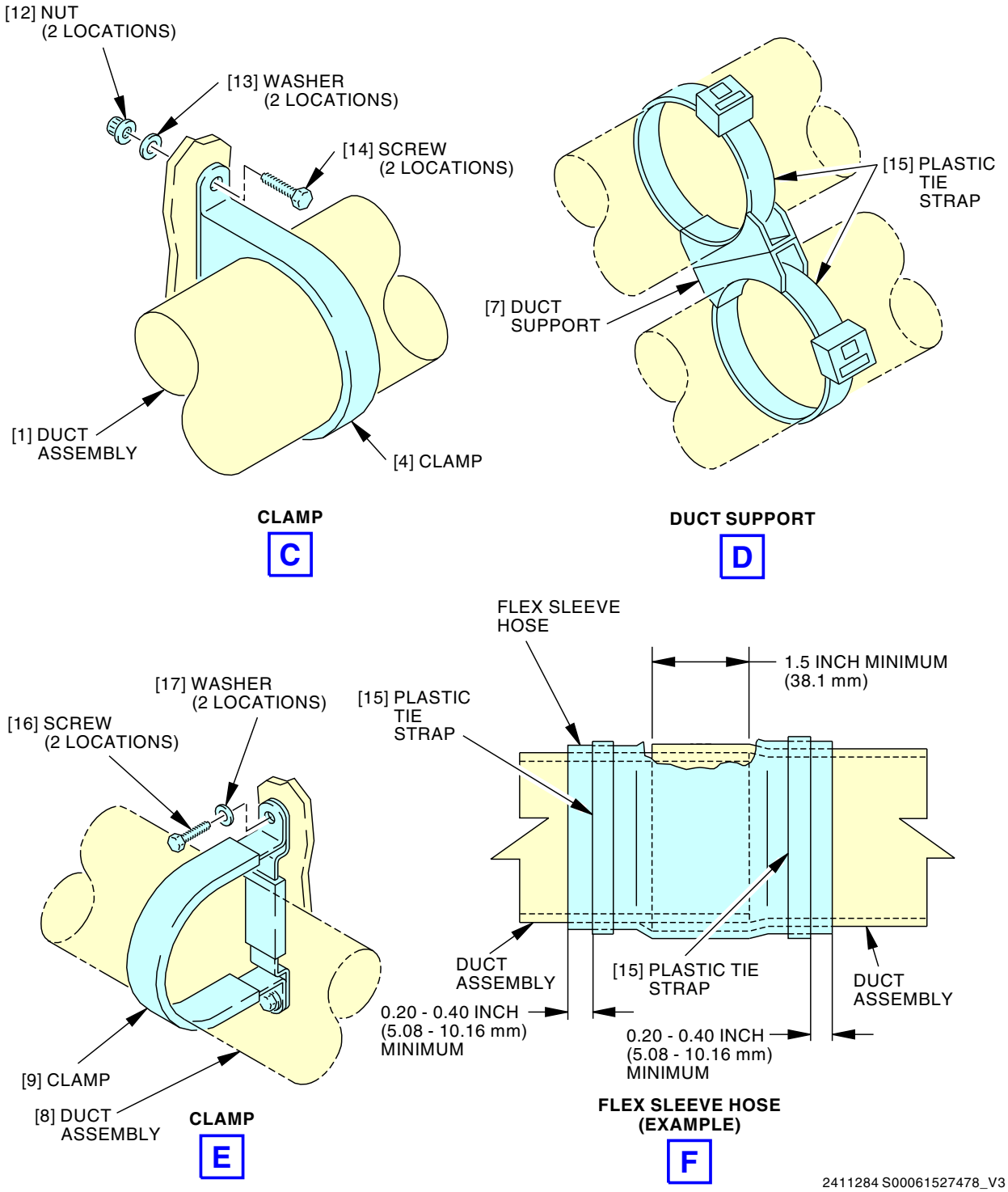
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Deck Duct Assembly Screen Cleaning**
**Figure 701/21-22-07-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Deck Duct Assembly Screen Cleaning**
**Figure 701/21-22-07-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-22-07-100-801**

## 3. Flight Deck Duct Assembly Screen Cleaning

(Figure 701)

### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-1068 | Vacuum - High Capacity |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### C. Location Zones

| Zone | Area |
|---|---|
| 113 | Area Above and Outboard of Nose Landing Gear Wheel Well - Left |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### D. Flight Deck Duct Assembly Screen Cleaning

**SUBTASK 21-22-07-020-002**

(1) If it is not already done, remove the duct assembly [1] with the wire mesh cone assembly (TASK 21-22-07-020-801).

**SUBTASK 21-22-07-560-001**

(2) Move the duct assembly [1] to a location where there is a source of high capacity vacuum, STD-1068.

**SUBTASK 21-22-07-160-001**

(3) Remove all debris that is accumulated on the wire mesh screen inside the duct assembly [1] with the high capacity vacuum, STD-1068.

**SUBTASK 21-22-07-210-001**

(4) Visually inspect and make sure that all debris has been removed from the wire mesh cone assembly.

**SUBTASK 21-22-07-670-001**

**WARNING** ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE. USE PROTECTION EQUIPMENT. MAKE SURE THAT YOU USE ISOPROPYL ALCOHOL IN AN AREA WITH AIRFLOW. IF YOU DO NOT OBEY, INJURY TO PERSONNEL CAN OCCUR.

(5) Disinfect the wire mesh screen with a solution of 70% alcohol, B00130.

(a) Use pre-moistened cotton wiper, G00034.

NOTE: Follow the manufacture's instruction and refer to the local health authority guidance for required contact/dwell time.

**SUBTASK 21-22-07-420-001**

(6) Install the duct assembly [1] with the screen (TASK 21-22-07-420-801).

**END OF TASK**



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**TASK 21-22-07-420-801**

## 4. Flight Deck Duct Assembly Installation

(Figure 701)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-3923 | Tool - Installation, Tie Strap<br>Part #: GS2B-E Supplier: 06383<br>Part #: GS4H-E Supplier: 06383<br>Part #: GTS-E Supplier: 06383<br>Part #: PPTS Supplier: 06383<br>Opt Part #: GS2B Supplier: 06383<br>Opt Part #: GS2BL Supplier: 06383<br>Opt Part #: GS4H Supplier: 06383<br>Opt Part #: GTS Supplier: 06383 |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00624 | Bag - Plastic, General Purpose | |
| G50218 | Strap - Plastic, Adjustable, Self-locking, 27.50 Inches (698.50MM) Long | BACS38K6 |
| G51390 | Strap - Plastic, Adjustable, Self-locking, 11.40 Inches (289.56MM) Long | BACS38K7 |

### D. Location Zones

| Zone | Area |
|---|---|
| 113 | Area Above and Outboard of Nose Landing Gear Wheel Well - Left |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Flight Deck Duct Assembly Installation

**SUBTASK 21-22-07-420-002**

(1) Install the duct assembly [1] as follows:

(a) Install the flex sleeve hose [10] and make sure to position a minimum of 1.5 in. (38.1 mm) of overlap between duct walls of duct assembly [1] and duct assembly [3] (Figure 701, View F).

(b) Install the flex sleeve hose [20] and make sure to position a minimum of 1.5 in. (38.1 mm) of overlap between duct walls of (Figure 701, View F):

1) duct assembly [1] and duct assembly [5]

2) duct assembly [1] and duct assembly [6].



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(c) If it is necessary, install the flex sleeve hose [20] and make sure to position a minimum of 1.5 in. (38.1 mm) of overlap between duct walls of duct assembly [5] and duct assembly [8] (Figure 701, View F):

(d) If it is necessary, install the flex sleeve hose [10] and make sure to position a minimum of 1.5 in. (38.1 mm) of overlap between duct walls of duct assembly [6] and duct assembly [11] (Figure 701, View F):

(e) Install the plastic tie straps [15] to the flex sleeve hose with the tie strap installation tool, COM-3923:

1) Use the adjustable plastic straps, G50218, between the duct assembly [1] and duct assembly [3].

2) Use the adjustable plastic straps, G51390, at these locations:

a) duct assembly [1] connects to duct assembly [5] and duct assembly [6]

b) between duct assembly [5] and duct assembly [8]

c) between duct assembly [6] and duct assembly [11].

3) Put the plastic tie straps [15] in position 0.20 in. (5.08 mm) - 0.40 in. (10.16 mm) from the ends of the flex sleeve hose.

(f) Install the clamp [4] with the screws [14], washers [13] and nuts [12].

(g) If it is necessary, install the plastic tie straps [15] (adjustable plastic strap, G51390) that attaches the duct assembly [8] and duct support [7] with the tie strap installation tool, COM-3923.

(h) Tighten the screws [16] for the clamp [9] that holds the duct assembly [8].

**SUBTASK 21-22-07-863-001**

(2) Supply conditioned air to the flight compartment (TASK 21-00-00-800-801).

**SUBTASK 21-22-07-710-001**

(3) Make sure that the conditioned air outflow from the flight compartment outlets is satisfactory.

**SUBTASK 21-22-07-790-001**

(4) Make sure that there are no leaks at the joints of the duct assemblies that were disturbed.

(a) If there are leaks, repair the duct assembly joint to stop the leak.

**SUBTASK 21-22-07-020-003**

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(5) Remove all personal protective equipment and put them in a plastic bag, G00624.

(6) Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(7) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.



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SUBTASK 21-22-07-110-001

**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(8) Clean your hands with soap and running hot water.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-22-07-410-001

(1) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-22-07-864-003

(2) Remove conditioned air from the airplane (TASK 21-00-00-800-802).

——— END OF TASK ———



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## FLIGHT COMPARTMENT GASPER AIR OUTLETS - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the gasper air outlets installed in the control cabin.

(2) An installation of the gasper air outlets installed in the control cabin.

B. The gasper air outlets are referred to as captain/first officer's gasper air outlet and overhead gasper air outlet in this procedure.

**TASK 21-22-09-000-801**

### 2. Gasper Air Outlet Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 25-11-21 P/B 201 | FLIGHT COMPARTMENT PANELS - MAINTENANCE PRACTICES |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G51390 | Strap - Plastic, Adjustable, Self-locking, 11.40 Inches (289.56MM) Long | BACS38K7 |
| G51414 | Strap - Plastic, Adjustable, Self-locking, 7.30 Inches (185.42 mm) Long | BACS38K1 |

#### C. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Prepare for the Removal

**SUBTASK 21-22-09-010-001**

(1) Remove the flight compartment panel for the applicable gasper air oulet [1] (PAGEBLOCK 25-11-21/201).

#### E. Gasper Air Outlet Removal

**SUBTASK 21-22-09-030-001**

(1) For the captain/first officers gasper air oulet [1] removal, do these steps:

(a) Remove the strap [2] (adjustable plastic strap, G51414) that holds the hose [3] to the gasper air oulet [1].

(b) Remove the hose [3] from the gasper air oulet [1].

(c) Discard the strap [2] (adjustable plastic strap, G51414).

(d) Remove the screws [4] that attach the gasper air oulet [1] to the panel.

(e) Remove the gasper air oulet [1].

**SUBTASK 21-22-09-020-002**

(2) For the overhead gasper air oulet [1] removal, do these steps:

(a) Remove the strap [6] (adjustable plastic strap, G51390) that holds the hose [7] to the gasper air oulet [5].



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(b) Remove the hose [7] from the gasper air oulet [5].

(c) Discard the strap [6] (adjustable plastic strap, G51390).

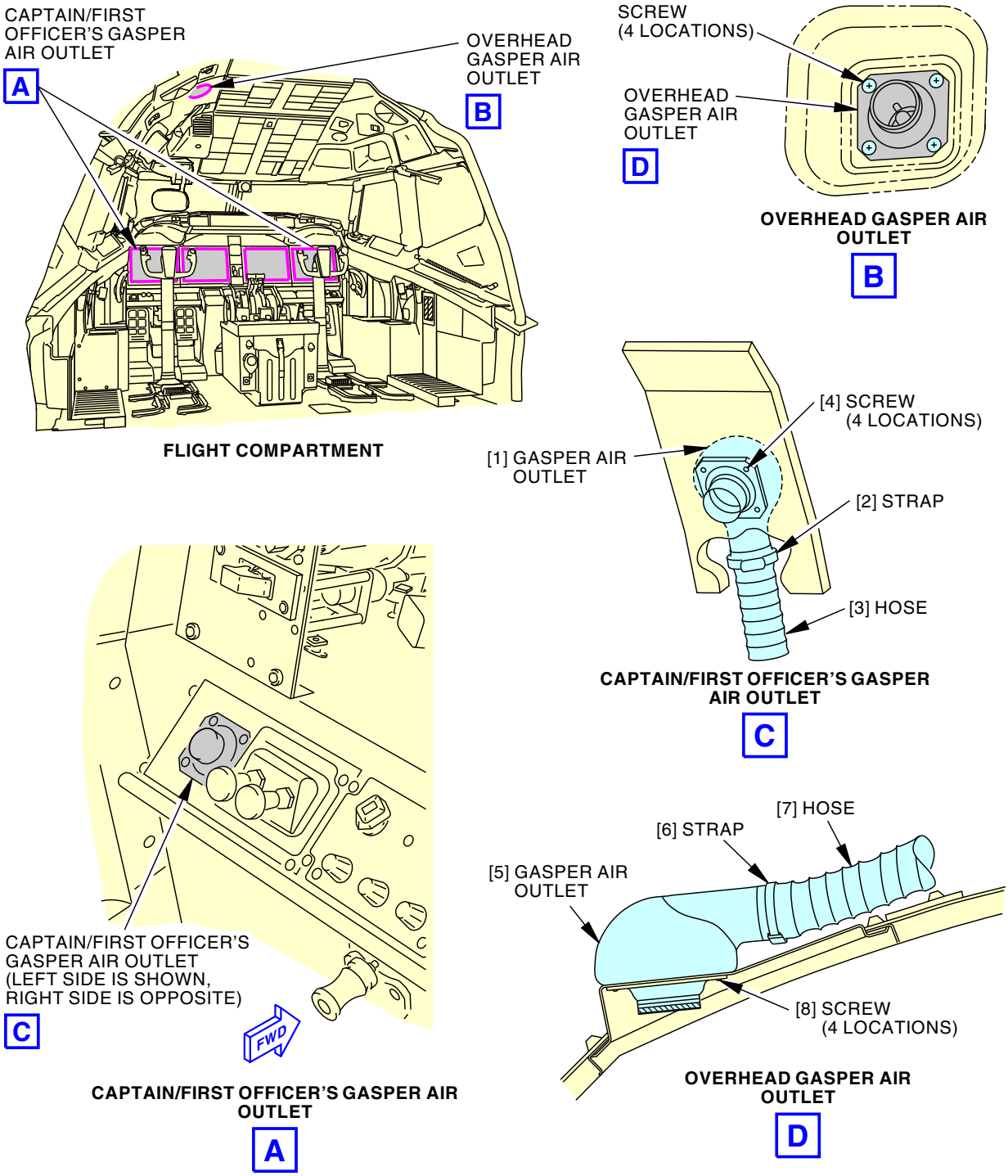
(d) Remove the screws [8] that attach the gasper air oulet [5] to the panel.

(e) Remove the gasper air oulet [5].

**——— END OF TASK ———**



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**Gasper Air Outlet Installation**
**Figure 401/21-22-09-990-801**



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**TASK 21-22-09-400-801**

**3. Gasper Air Outlet Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 25-11-21 P/B 201 | FLIGHT COMPARTMENT PANELS - MAINTENANCE PRACTICES |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-3923 | Tool - Installation, Tie Strap<br>Part #: GS2B-E Supplier: 06383<br>Part #: GS4H-E Supplier: 06383<br>Part #: GTS-E Supplier: 06383<br>Part #: PPTS Supplier: 06383<br>Opt Part #: GS2B Supplier: 06383<br>Opt Part #: GS2BL Supplier: 06383<br>Opt Part #: GS4H Supplier: 06383<br>Opt Part #: GTS Supplier: 06383 |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G51390 | Strap - Plastic, Adjustable, Self-locking, 11.40 Inches (289.56MM) Long | BACS38K7 |
| G51414 | Strap - Plastic, Adjustable, Self-locking, 7.30 Inches (185.42 mm) Long | BACS38K1 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**E. Gasper Air Outlet Installation**

**SUBTASK 21-22-09-400-001**

(1) For the captain/first officers gasper air oulet [1]gasper air outlet installation, do these steps:

(a) Put the gasper air oulet [1] in the panel.

(b) Install the screws [4] that attach the gasper air oulet [1] to the panel.

(c) Install the hose [3] on the gasper air oulet [1]:

1) Loosely put a strap [2] (adjustable plastic strap, G51414) around the hose [3].

2) Install the hose [3] onto the gasper air oulet [1].

3) Put the head of the strap [2] (adjustable plastic strap, G51414) towards the panel assembly to prevent head contact with wiring or wire bundles.

4) Tighten the strap [2] (adjustable plastic strap, G51414) with a tie strap installation tool, COM-3923.



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SUBTASK 21-22-09-420-003

(2) For the overhead gasper air outlet installation, do these steps:

(a) Put the gasper air oulet [5] in the panel.

(b) Install the screws [8] that attach the gasper air oulet [5] to the panel.

(c) Install the hose [7] on the gasper air oulet [5]:

1) Loosely put a strap [6] (adjustable plastic strap, G51390) around the hose [7].

2) Install the hose [7] onto the gasper air oulet [5].

3) Put the head of the strap [6] (adjustable plastic strap, G51390) towards the panel assembly to prevent head contact with wiring or wire bundles.

4) Tighten the strap [6] (adjustable plastic strap, G51390) with a tie strap installation tool, COM-3923.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-22-09-410-001

(1) Install the flight compartment panel for the applicable gasper (PAGEBLOCK 25-11-21/201).

——— END OF TASK ———



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## OVERHEAD DISTRIBUTION DUCT - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) A removal of a section of the overhead distribution duct.

(2) An installation of a section of the overhead distribution duct.

(3) A repair of the insulation for the overhead distribution duct.

(4) A cleaning of the passenger overhead distribution duct.

B. Some of the ducts in the air distribution system are wrapped with insulation material. CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

C. Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

D. BMS8-385 Type 4 is the preferred foam insulation material that meets the flame propagation requirement. BMS 8-385 Type 6 and BMS 8-300 Type VIII insulation are new, qualified materials optional to BMS 8-385 Type 4.

E. If BMS8-300, Type 1 foam insulation material is used, it must be completely covered with tape that meets the flame propagation requirement.

F. Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

G. When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(1) Tape specifications BMS 5-157 MPVF and BMS 5-157 MPEEK are qualified tapes used to secure insulation to ducts.

**TASK 21-23-01-000-801**

### 2. Overhead Distribution Duct Removal

(Figure 201)

#### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G50344 | Tape - Nitto P-212HD WHT (Formerly Permacel) Glass Cloth | |
| G50625 | Strap - Plastic, Adjustable, Self-locking, 14.40 Inches (365.76 mm) Long | BACS38K3 |

#### B. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

#### C. Prepare for the Removal

**SUBTASK 21-23-01-860-001**

(1) Make sure these switches, on the P5-10 air conditioning panel, are set to the OFF position:

(a) L PACK



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(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

SUBTASK 21-23-01-010-001

(2) Remove the ceiling panels as required to get access to the duct.

SUBTASK 21-23-01-010-002

(3) As required, remove the interior furnishings.

**D. Overhead Distribution Duct Removal**

SUBTASK 21-23-01-030-001

(1) Remove the adjustable plastic straps, G50625 [14] that are on the tape [3] at the joints between the diffuser/hose assembly [2] and the spuds on the distribution duct [1].

SUBTASK 21-23-01-020-002

(2) Remove the Nitto P-212HD WHT tape, G50344 [3] that connects the diffuser/hose assembly [2] to the distribution duct [1].

SUBTASK 21-23-01-020-003

(3) Remove the strap [4] that hold the distribution duct [1] to the bracket assemblies.

SUBTASK 21-23-01-020-004

(4) Loosen the clamp [5] at each end of the distribution duct [1] that secure the flex sleeves [6] to the duct.

SUBTASK 21-23-01-020-005

(5) Remove the Nitto P-212HD WHT tape, G50344 [3] that connects the flex sleeve [6] to the duct.

SUBTASK 21-23-01-020-006

(6) Support the distribution duct [1] and slide the flex sleeves [6] away from the ends of the distribution duct [1].

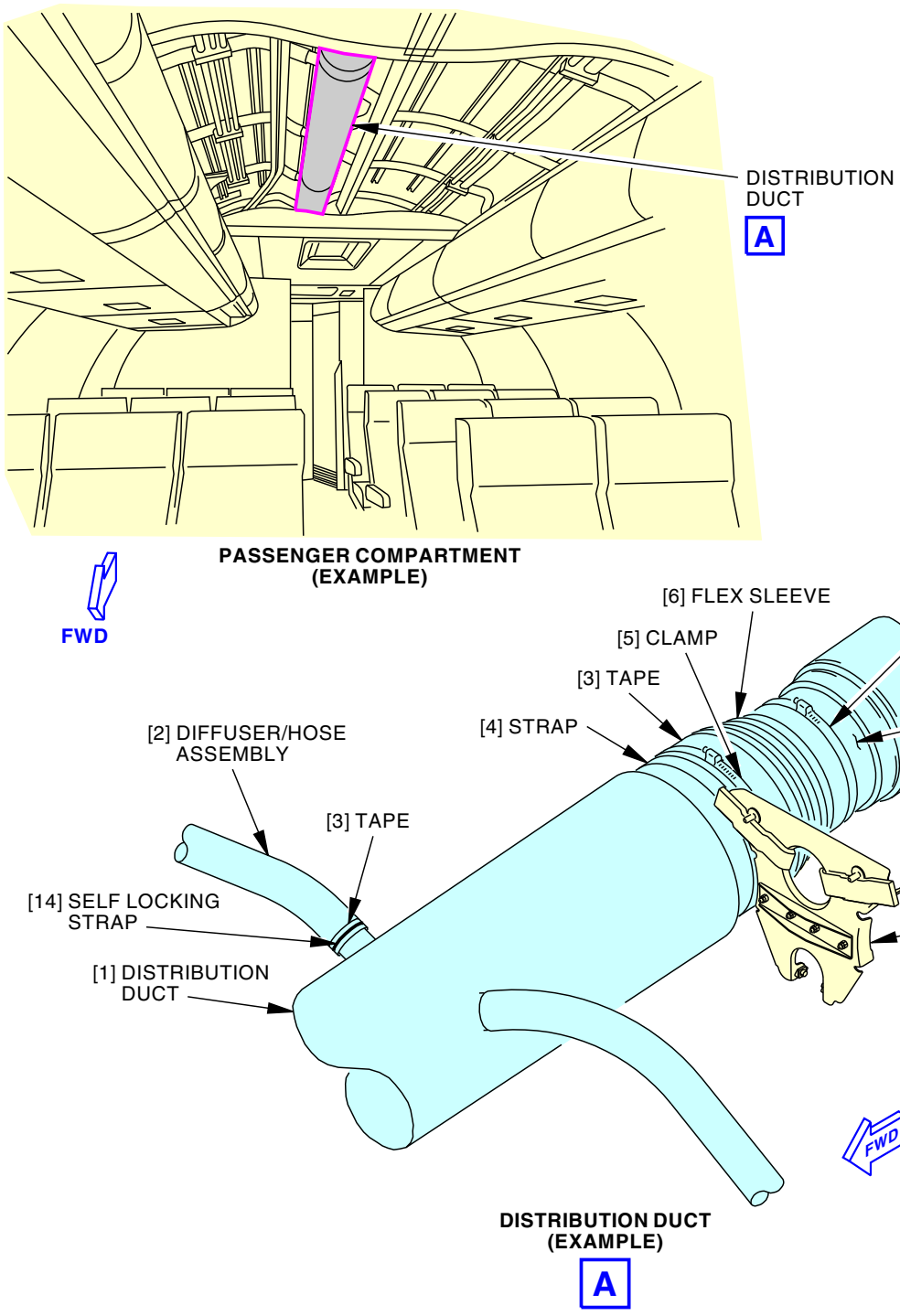
SUBTASK 21-23-01-020-007

(7) Remove the distribution duct [1].

**——— END OF TASK ———**



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**Passenger Cabin Overhead Air Distribution Duct Installation**
**Figure 201/21-23-01-990-801**



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**TASK 21-23-01-400-801**

## 3. Overhead Distribution Duct Installation

(Figure 201)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-805 | Supply Conditioned Air with a Ground Air Source (P/B 201) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00068 | Alcohol - Denatured, Ethyl (Ethanol) | AMS 3002, MIL-E-51454 Type II |
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| E50001 | Solvent - Acetone | ASTM D 329 (Supersedes O-A-51) |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G50344 | Tape - Nitto P-212HD WHT (Formerly Permacel) Glass Cloth | |
| G50625 | Strap - Plastic, Adjustable, Self-locking, 14.40 Inches (365.76 mm) Long | BACS38K3 |

### C. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

### D. Overhead Distribution Duct Installation

**SUBTASK 21-23-01-980-001**

(1) Put the distribution duct [1] in its position above the ceiling panels.

**SUBTASK 21-23-01-420-001**

(2) Slide the flex sleeves [6] onto the ends of the distribution duct [1] as follows:

(a) Make sure that each flex sleeve [6] overlaps the duct end by 1.63 ±0.13 in. (41.40 ±3.30 mm).

(b) Install 2-inch wide Nitto P-212HD WHT tape, G50344 [3] over the end of the distribution duct [1] and the flex sleeves [6].



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**WARNING**

OBEY THE INSTRUCTIONS FROM THE INDUSTRIAL HYGIENE, FIRE, AND SAFETY ORGANIZATIONS FOR THE NECESSARY PROCEDURES AND EQUIPMENT WHEN YOU USE SOLVENTS. DO NOT GET THE SOLVENTS IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. USE A PROTECTIVE SPLASH GOGGLE, GLOVES, AND A RESPIRATOR (IN CONFINED AREAS) WHEN YOU USE THE SOLVENTS. KEEP THE SOLVENTS AWAY FROM ALL SOURCES OF IGNITION (HEAT, FLAME, AND SPARKS). IF YOU DO NOT USE THE CORRECT PROCEDURES AND EQUIPMENT, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

1) Clean the area on the duct where you will apply the tape with solvent, B00148, solvent, E50001 or alcohol, B00130.
2) Dry the duct joint with a clean cotton wiper, G00034 before the solvent dries fully.
3) Apply two laps of the Nitto P-212HD WHT tape, G50344 to the center of the joint.

NOTE: Make sure the tape is pulled tight and is smooth.

(c) Loosely position the duct clamp [5] from the ends of the flex sleeves [6].

**SUBTASK 21-23-01-020-009**

(3) Connect the diffuser/hose assembly [2] to the distribution duct [1] as follows:

(a) Install the diffuser/hose assembly [2] over the outlets on the distribution duct.

1) Make sure that there is at least 1/2-inch of overlap between each diffuser/hose assembly and the outlet on the distribution duct.
2) Use alcohol, B00068 to clean the area on the outlet on the distribution duct and the area on the diffuser/hose assembly where you will apply the tape [3].

(b) Install two to four laps of 2-inch wide Nitto P-212HD WHT tape, G50344 to the center of the joint over the ends of the diffuser/hose assembly [2] and the outlets on the distribution duct as follows:

1) Keep the tape taut and smooth as you apply the two to four laps.

(c) Install an adjustable plastic strap, G50625, around the center portion of the tape to hold the diffuser/hose assembly tightly to the outlet on the distribution duct.

**SUBTASK 21-23-01-420-003**

(4) Install the strap [4] to secure the distribution duct to the bracket assemblies [9].

**SUBTASK 21-23-01-420-004**

(5) Tighten the clamp [5] that hold the flex sleeves [6] to the ends of the distribution duct.

## E. Overhead Distribution Duct Test

**SUBTASK 21-23-01-790-001**

(1) Do this check of the overhead distribution duct:

(a) If the packs are operational, do the steps that follow for the test of the overhead distribution test:

1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.
2) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the AUTO position



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3) Make sure that there is not excessive leakage of air at the connections on the distribution duct that was replaced.

4) Repair any connection in the overhead distribution ducts where airflow can be felt on a hand a minimum of 2 inches away from the surface of a joint.

(b) If the packs are not operational and a test of the overhead distribution ducts is desired, do these steps:

1) Supply ground conditioned air to the distribution system. Do this task: Supply Conditioned Air with a Ground Air Source, TASK 21-00-00-800-805.

2) Make sure that there is not excessive leakage of air at the connections on the distribution duct that was replaced.

a) Excessive leakage is airflow that can be felt on a hand a minimum of 2 inches away from the surface of a joint.

3) Repair any connection in the overhead distribution ducts where airflow can be felt on a hand a minimum of 2 inches away from the surface of a joint.

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-23-01-410-001**

(1) Install any interior furnishings that were removed for access.

**SUBTASK 21-23-01-410-002**

(2) Install all ceiling panels that were removed for access.

**——— END OF TASK ———**

**TASK 21-23-01-300-801**

**4. Overhead Distribution Duct Insulation Repair**

(Figure 201)

**A. General**

(1) The repair of the duct insulation consists of replacement of the tape that holds the insulation to the duct.

(2) CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

(3) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

(4) Melamine foam insulation, G50449 is the preferred foam insulation material that meets the flame propagation requirement. Melamine foam insulation, G51169, BMS 8-385, Type 6 and foam insulation, G51170, BMS 8-300, Type VIII insulation is optional to BMS8-385 Type 4.

(5) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327, tape, G51202 or tape, G50789 to meet the flammability/flame propagation requirements. Wrap tape, G50327, tape, G51202 or tape, G50789 across 100% of the brown hypalon insulation surface on the polyimide foam insulation, G02470.

(6) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(7) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.



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**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51169 | Foam - Flexible Melamine, | BMS8-385 Type 6 |
| G51170 | Foam - Flexible Polyimide | BMS8-300 Type VIII |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

**C. Location Zones**

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

**D. Insulation Repair for Overhead Distribution Duct**

**SUBTASK 21-23-01-010-003**

(1) Remove ceiling panels as required to get access to the distribution duct.

**SUBTASK 21-23-01-010-004**

(2) As required, remove the interior furnishings for access.

**SUBTASK 21-23-01-020-010**

(3) Remove all loose tape from the ends or seams of the insulation blanket on the distribution duct.

**SUBTASK 21-23-01-420-005**

(4) Apply tape to the seams or ends of the insulation blanket as follows:

(a) Put the edges of the insulation together and apply two-inch wide tape, G50327, tape, G51202 or tape, G50789 to the seam of the insulation blanket so that no insulation foam edge can be seen.

(b) Apply a circumferential wrap of two-inch wide tape, G50327, tape, G51202 or tape, G50789 on the insulation at the ends of the duct so that the tape extends one inch beyond the end of the insulation blanket.

(c) Apply circumferential wraps of one-inch wide tape, G50327, tape, G51202 or tape, G50789 along the length of the duct to secure the insulation blanket to the duct.

**SUBTASK 21-23-01-410-003**

(5) Install all ceiling panels that were removed for access.

**SUBTASK 21-23-01-410-004**

(6) Install any interior furnishings removed for access.

**END OF TASK**



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**TASK 21-23-01-300-802**

## 5. Insulation Replacement/Repair - Overhead Distribution Duct Sidewall Risers Interface Segment

Figure 202

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00184 | Solvent - Presealing, Cleaning Solvent | BMS11-7 |
| G00834 | Cloth - Lint-free Cotton | |
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |

### C. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### D. General

**SUBTASK 21-23-01-350-001**

(1) This procedure provides instructions for either the replacement or repair of the insulation on the duct segments of the overhead distributgfhe vbyenion system that connect to the sidewall risers. Some airplanes did not have insulation installed on the production line in the area of the spuds that connect to the sidewall risers. For those airplanes, refer to SB 737-21A1139 for instructions to install this insulation.

### E. Preparation for the Replacement/Repair of the Insulation

**SUBTASK 21-23-01-864-001**

(1) Make sure that the L and R PACK switches on the P5-10 air conditioning panel are set to OFF.

**SUBTASK 21-23-01-864-002**

(2) Remove the pressure from the pneumatic system. To remove the pressure, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-23-01-010-005**

(3) Remove the ceiling panels as required to get access to the duct segment of the overhead distribution system that connects to the sidewall risers.



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SUBTASK 21-23-01-020-011

(4) If necessary, remove the overhead distribution system duct segment that connects to the sidewall risers ducts. To remove the duct segment, do this task: Overhead Distribution Duct Removal, TASK 21-23-01-000-801.

SUBTASK 21-23-01-020-012

(5) If applicable, remove all tape and insulation from the area around the riser spuds on the duct segment to be repaired.

SUBTASK 21-23-01-110-001

(6) Clean the area around the riser spuds without the insulation as follows:

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Wet a lint-free cloth, G00834 with solvent, B00062 or solvent, B00184.

(b) Wipe the area around the riser spuds on the duct segment until all traces of dirt, debris, or tape is removed.

(c) Use a lint-free cloth, G00834 and remove all traces of the solvent.

SUBTASK 21-23-01-350-002

(7) Cut the foam insulation, G02470 insulation into four sections to the approximate size necessary to cover the bare surfaces around the riser spuds.

(a) Refer to Figure 202that illustrates the four sections of foam insulation.

SUBTASK 21-23-01-350-003

(8) Position each section in its place and mark the location on the section where the riser spuds will intersect the section.

SUBTASK 21-23-01-350-004

(9) Make small cuts in the areas of the insulation where the riser spuds will fit so that the insulation will fit around the spuds.

(a) Cut from the center of the semicircle that you marked to the circumference of the marked semicircle.

(b) Make the cuts on each of the four sections of insulation.

SUBTASK 21-23-01-420-006

(10) Position the four sections of foam insulation around the riser spuds on the duct segment.

SUBTASK 21-23-01-420-007

(11) Install tape, G50327, tape, G51202 or tape, G50789 on the foam insulation as shown on Figure 202and in accordance with these guidelines:

(a) One-inch wide or 2-inch wide advanced insulation blanket tape, G50327, tape, G51202 or tape, G50789 must cover 100% of the brown colored “Hypalon” insulation surface.

(b) Cut the tape, G50327, tape, G51202 or tape, G50789 as required to fit around the spuds.

(c) Tape may be installed spiral wrapped or lengthwise depending on the installers' preference.

(d) Tape may be installed in any configuration as long as 100% coverage of the foam insulation is obtained.



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(e) The tape must overlap all edges and seams of the insulation by a minimum of 1.00 inch (25.4mm).

(f) Wider tape may be cut into narrower strips or any unique shape if desired to assist in complete foam insulation coverage.

(g) Maintain a minimum of 1/8-inch overlap of the tape.

(h) Avoid compression of the foam insulation.

(i) Wrinkles in the tape are acceptable if the wrinkles are pinched together to remove all voids.

(j) Covering of existing insulation tape is not required.

(k) Tape may be installed to the foam insulation prior to installation of the duct if desired by the installer.

(l) Tape orientation is optional.

**SUBTASK 21-23-01-420-008**

(12) Install the repaired overhead distribution system duct segment. To install the duct segment, do this task: Overhead Distribution Duct Installation, TASK 21-23-01-400-801.

**SUBTASK 21-23-01-780-001**

(13) Do this test of the overhead distribution system:

(a) Supply conditioned air to the overhead distribution system. To supply conditioned air, do this task: Supply Conditioned Air to the Airplane, TASK 21-00-00-800-801.

(b) Make sure that there are no leaks at the joints of the repaired duct segment of the overhead distribution assembly.

(c) Repair any leak that you can feel with your hand when it is 2 in. (51 mm) from the duct.

## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-23-01-864-003**

(1) Remove the conditioned air from the airplane if it is not necessary. To remove conditioned air, do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

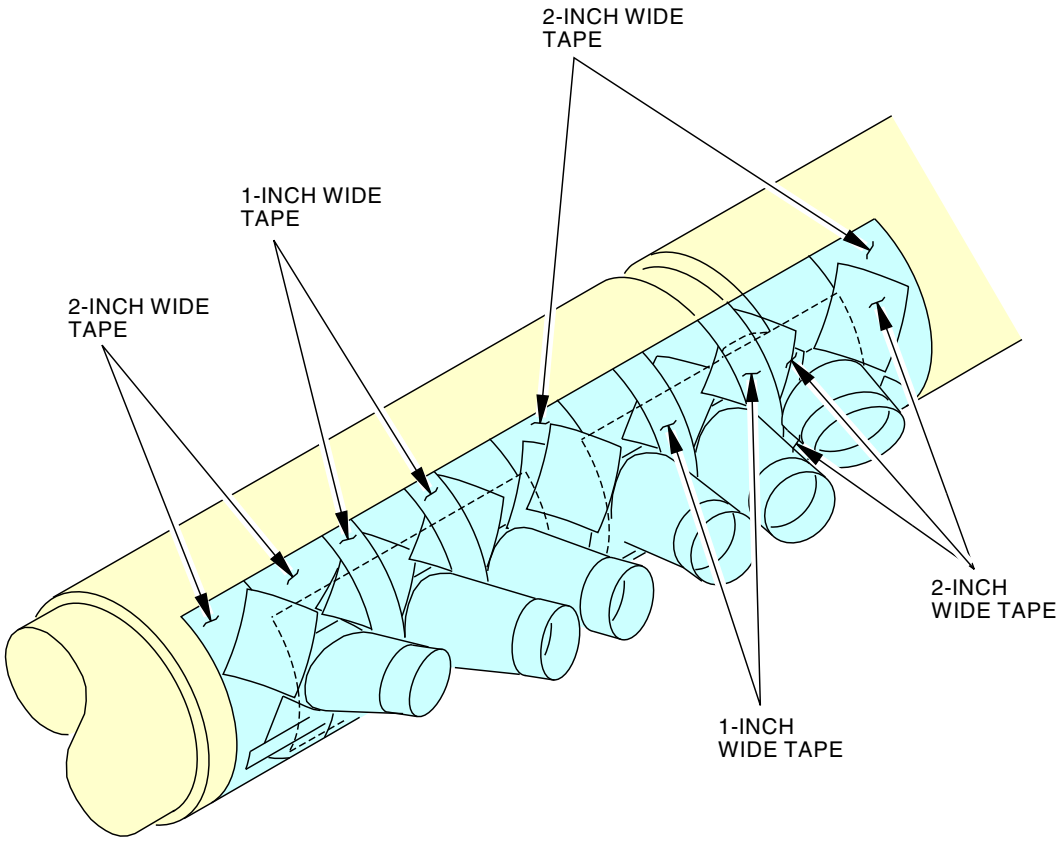
**SUBTASK 21-23-01-410-005**

(2) Install all ceiling panels that were removed for access to the overhead distribution system duct segment.

**——— END OF TASK ———**



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**TAPE INSTALLATION**
**(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE) (TYPICAL)**

C

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**Insulation Repair/Replacement - Overhead Distribution Sidewall Risers Connecting Section**
**Figure 202/21-23-01-990-802**



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**TASK 21-23-01-100-801**

## 6. Overhead Distribution Duct Cleaning

### A. General

(1) This task has these procedures:

(a) Light check cleaning.

(b) Heavy check cleaning.

NOTE: Heavy check cleaning should be done during the crown corrosion inspection.

### B. References

| Reference | Title |
|---|---|
| 21-22-09 P/B 401 | FLIGHT COMPARTMENT GASPER AIR OUTLETS - REMOVAL/INSTALLATION |
| 21-24-04 P/B 401 | PASSENGER CABIN GASPER AIR OUTLETS - REMOVAL/INSTALLATION |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-133 | Brush - Stiff Bristle, Non-metallic |

### D. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

### E. Prepare for the Cleaning

NOTE: The Overhead Distribution Duct consist of 13 duct segments. Duct segments are connected in the two separated lines. Firtst line has 3 duct segments which supply air to the forward passenger zone, and second line has 10 duct segments which supply air to the aft passenger zone. The Overhead Distribution Duct start at body station 403 and end at body station 962.

**SUBTASK 21-23-01-860-003**

(1) Put the L and R RECIRC FAN switches, on the P5-10 Air Conditioning Panel, to the OFF position.

**SUBTASK 21-23-01-860-004**

(2) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

**SUBTASK 21-23-01-860-005**

(3) Close all gasper valves in cockpit (PAGEBLOCK 21-22-09/401).

**SUBTASK 21-23-01-860-017**

(4) Close all gasper valves in galley and cabin (PAGEBLOCK 21-24-04/401).

### F. Light Check Cleaning

**SUBTASK 21-23-01-020-014**

(1) Remove the FWD galley air supply hose from the round manifold duct at STA 360 and connect to a hose routed overboard.

**SUBTASK 21-23-01-860-006**

(2) Put the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, to the ON position.



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SUBTASK 21-23-01-860-007

(3) Put the L and R PACK swithces, on the P5-10 air conditioning panel, to the ON position.

(a) Wait for 5 minutes until no debris come out from the hose.

NOTE: The airflow will dislodge the debris through the hose routed overboard.

SUBTASK 21-23-01-860-008

(4) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

SUBTASK 21-23-01-860-009

(5) Put the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, to the OFF position.

SUBTASK 21-23-01-020-015

(6) Disconnect the hose that is routed overboard and install the FWD galley air supply hose that you removed from the round manifold duct.

SUBTASK 21-23-01-420-009

(7) Remove the AFT galley air supply hose from the round manifold duct at STA 967 and connect to a hose routed overboard.

SUBTASK 21-23-01-860-010

(8) Put the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, to the ON position.

SUBTASK 21-23-01-860-011

(9) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the ON position.

(a) Wait for 5 minutes until no debris come out from the hose.

NOTE: The airflow will dislodge the debris through the hose routed overboard.

SUBTASK 21-23-01-860-012

(10) Put the L and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

SUBTASK 21-23-01-860-013

(11) Put the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, to the OFF position.

SUBTASK 21-23-01-420-010

(12) Disconnect the hose that is routed overboard and install the AFT galley air supply hose that you removed from the round manifold duct.

SUBTASK 21-23-01-211-001

(13) Inspect the duct distribution system to see if the airflow distribution is equally distributed throughout the cabin and cargo compartment.

## G. Heavy Check Cleaning

SUBTASK 21-23-01-860-014

(1) Do this task: Overhead Distribution Duct Removal, TASK 21-23-01-000-801.

SUBTASK 21-23-01-170-001

(2) Clean the overhead distribution duct [1] as follow:

(a) Fill the overhead distribution duct [1] with water and rinse it.

1) Do not use the soap water.

(b) Use long stick stiff bristle brush, STD-133 to scrub the duct.

(c) Repeat the cleaning until no dirty water shows from the overhead distribution duct [1].



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SUBTASK 21-23-01-160-001

(3) Let the ducts dry before reinstalling.

SUBTASK 21-23-01-860-015

(4) Do this task: Overhead Distribution Duct Installation, TASK 21-23-01-400-801.

SUBTASK 21-23-01-210-001

(5) Inspect the duct distribution system to see if the airflow distribution is equally distributed throughout the cabin and cargo compartment.

SUBTASK 21-23-01-860-016

(6) Put the airplane back to its usual condition.

——— END OF TASK ———



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## SIDEWALL RISER DUCTS/TRANSITION DUCT - MAINTENANCE PRACTICES

### 1. General

A. This procedure consists of these tasks:

(1) Inspection of the sidewall risers/transition duct installation

(2) Repair of the sidewall risers/transition duct installation

B. There are two configurations of the installation where the sidewall riser ducts connect to the spuds on the transition duct. One configuration consists of the sidewall riser ducts directly connected to the spuds on the transition duct with a clamp to secure each riser duct and spud together. The other configuration uses a flex sleeve between each riser duct and spud with two clamps to secure the connection.

**TASK 21-23-02-212-801**

### 2. Sidewall Riser Ducts/Transition Duct Inspection

(Figure 201)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**C. Sidewall Riser Ducts/Transition Duct Inspection**

**SUBTASK 21-23-02-010-001**

(1) If it is not already done, remove the applicable cabin sidewall panels that are adjacent to the forward wing-to-body fairing.

**SUBTASK 21-23-02-780-001**

(2) Supply conditioned air to the passenger cabin (TASK 21-00-00-800-801).

**SUBTASK 21-23-02-212-001**

(3) Make sure the sidewall riser ducts [3]are securely connected to the spuds [6] on the transition duct [7].

**SUBTASK 21-23-02-790-001**

(4) Make sure that there is no excessive conditioned air leakage from the sidewall riser ducts/transition duct connections.

NOTE: Excessive leakage is leakage that can be felt with the hand 2 in. (51 mm) away from the joint.

**SUBTASK 21-23-02-840-001**

(5) Remove the conditioned air from the airplane (TASK 21-00-00-800-802).

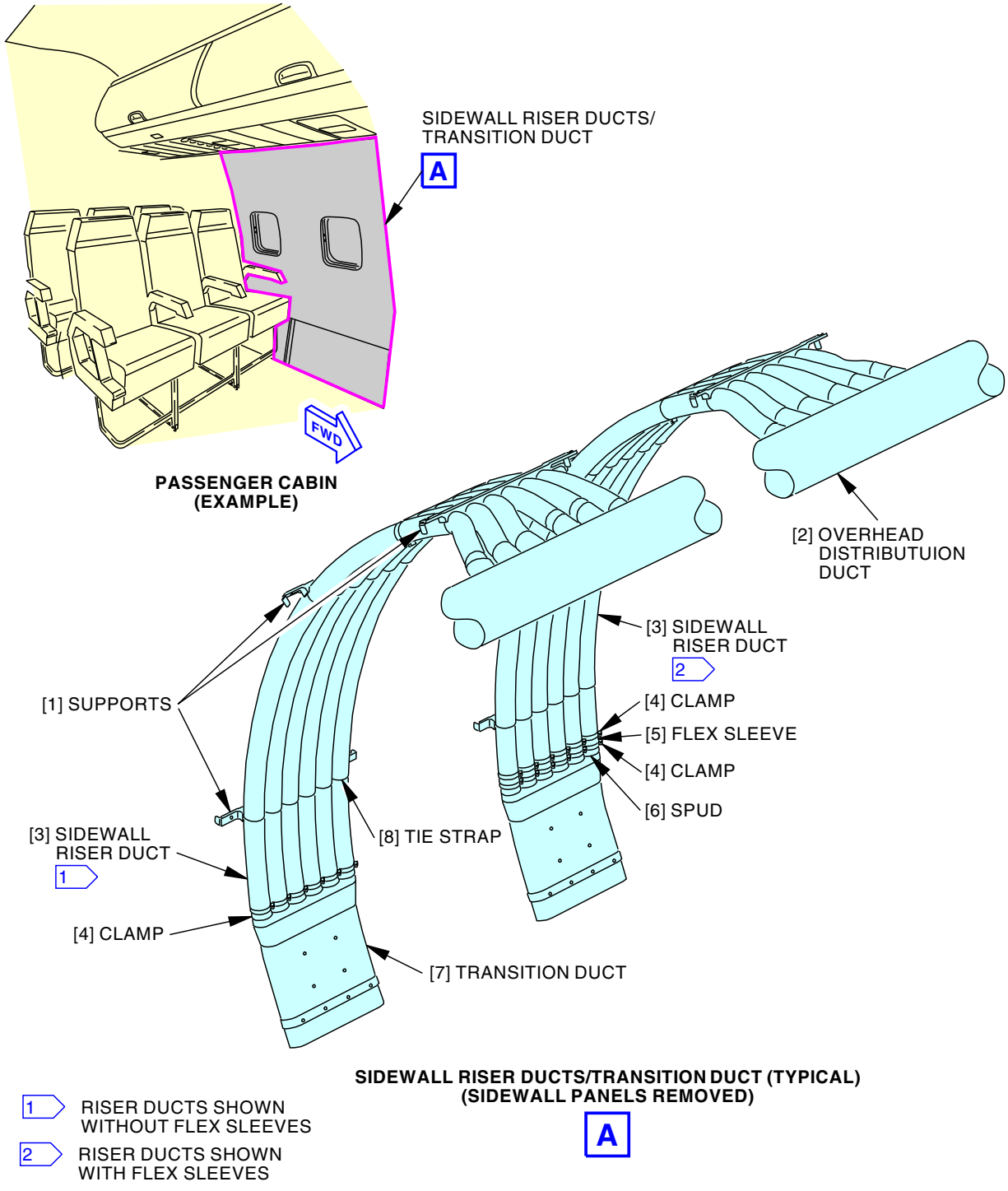
**SUBTASK 21-23-02-360-001**

(6) If the sidewall riser ducts [3] have separated from the transition duct [7] or there is excessive leakage, do this task : Sidewall Riser Ducts/Transition Duct Repair, TASK 21-23-02-360-801.

**END OF TASK**



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**Sidewall Riser Ducts/Transition Duct Installation**
**Figure 201/21-23-02-990-801**



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**TASK 21-23-02-360-801**

## 3. Sidewall Riser Ducts/Transition Duct Repair

(Figure 201)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G00093 | Tape - Fiberglass, Silicone Pressure Sensitive Adhesive - G565 | |
| G50218 | Strap - Plastic, Adjustable, Self-locking, 27.50 Inches (698.50MM) Long | BACS38K6 |
| G50262 | Wiper - Cleaning | BMS15-5 |

### C. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### D. Sidewall Riser Ducts/Transition Duct Repair

**SUBTASK 21-23-02-210-001**

(1) Make sure that the bottom of the transition duct [7] is approximately 8 in. (203 mm) above the passenger compartment floor.

**SUBTASK 21-23-02-211-001**

(2) If it is necessary, reposition the transition duct [7] so that the bottom of the transition duct [7] is correctly positioned 8 in. (203 mm) above the passenger compartment floor.

**SUBTASK 21-23-02-430-001**

(3) If the sidewall riser ducts [3] need to be moved down to be installed on the spuds [6], do these steps:

(a) Cut the plastic tie straps [8] from the three supports [1] that hold the sidewall riser ducts [3].

(b) Put the sidewall riser ducts [3] in position so that they can be installed on the spuds [6]].

**SUBTASK 21-23-02-360-002**

(4) If the sidewall riser ducts [3] are installed without a flex sleeve, then do these steps for the repair:

(a) Make sure there is no contamination in the sidewall riser ducts [3] or the spuds [6].

(b) Remove all tape from the spuds [6]on the transition duct [7].

(c) Remove all remaining parts of tape from the sidewall riser ducts [3] and the spuds [6] with a wiper, G50262, that is wet with alcohol, B00130, or solvent, B00083.

(d) Use a dry wiper, G50262, to remove the remaining alcohol, B00130, or solvent, B00083, from the sidewall riser ducts [3] and the spuds [6].

1) Do not allow the alcohol, B00130 or solvent, B00083 to dry on the sidewall riser ducts [3] and the spuds [6].



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(e) Wrap the ends of the spuds [6] on the transition duct [7] with G565 tape, G00093, to build-up the diameter of the spud [6] to match the diameter of the sidewall riser duct [3] so that there is a tight fit between the two.

(f) Slide the sidewall riser duct [3] over the spud [6] so that there is a 1 in. (25 mm) overlap between the spud [6] and the sidewall riser duct [3].

1) Shape the round sidewall riser duct [3] as necessary to fit over the oblong spud [6].

(g) Install the clamps [4] that hold the sidewall riser ducts [3] and spuds [6] together:

1) Put the clamps [4] in position equally between the end of the sidewall riser duct [3] and the transition duct [7] bead (0.25 in. (6.35 mm) to 0.45 in. (11.43 mm) from the end of the sidewall riser duct [3]).

2) Put the clamps [4] in position so that the screw head is 45 degrees forward or aft from the station line.

NOTE: The screw head can interfere with the side panel if it is put on the station line.

3) Tighten the clamp [4] to 15 ±2 in-lb (2 ±1 N·m).

**SUBTASK 21-23-02-360-003**

(5) If the sidewall riser ducts [3] are installed with a flex sleeve [5], then do these steps for the repair:

(a) Make sure there is no contamination in the sidewall riser ducts [3], flex sleeves [5], or spuds [6].

(b) If it is necessary, clean the sidewall riser ducts [3], flex sleeves [5], and spuds [6] with a wiper, G50262, that is wet with alcohol, B00130, or solvent, B00083.

(c) If it is necessary, use a dry wiper, G50262, to remove the remaining alcohol, B00130, or solvent, B00083, from the sidewall riser ducts [3], flex sleeves [5], and spuds [6].

1) Do not let the alcohol, B00130, or solvent, B00083, dry on the sidewall riser ducts [3], flex sleeves [5], and spuds [6].

(d) Slide the flex sleeve [5] over the sidewall riser duct [3] or spud [6] so that there is a 1 in. (25 mm) overlap between the sidewall riser duct [3] or spud [6] and flex sleeve [5].

1) Shape the round flex sleeve [5] as necessary to fit over the oblong spud [6].

(e) Install the clamps [4] that hold the sidewall riser ducts [3], flex sleeves [5], and spuds [6] together:

1) Put the clamps [4] in position equally between the end of the flex sleeve [5] and the sidewall riser duct [3] bead (0.25 in. (6.35 mm) to 0.45 in. (11.43 mm) from the end of the flex sleeve [5]).

2) Put the clamps [4] in position so that the screw head is 45 degrees forward or aft from the station line.

NOTE: The screw head can interfere with the side panel if it is positioned on the station line.

3) Tighten the clamp [4] to 15 ±2 in-lb (2 ±1 N·m).

**SUBTASK 21-23-02-430-002**

(6) If the sidewall riser ducts [3] were moved down and the plastic tie straps [8] removed, install a new adjustable plastic strap, G50218, to hold each sidewall riser duct [3] to the supports [1], if it is necessary.



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**E. Post-Repair Check of the Sidewall Riser Ducts/Transition Duct**

**SUBTASK 21-23-02-710-001**

(1) Supply conditioned air to the passenger cabin (TASK 21-00-00-800-801).

**SUBTASK 21-23-02-790-002**

(2) Do a check for leaks in the sidewall riser ducts/transition duct installation.

(a) Repair all leaks with the installation of tape on the spud [6].

**SUBTASK 21-23-02-840-002**

(3) Remove the conditioned air from the airplane (TASK 21-00-00-800-802).

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-23-02-410-001**

(1) Install the applicable cabin sidewall panels that were removed for this repair.

**——— END OF TASK ———**



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## RETURN AIR GRILLES (DECOMPRESSION VENTS) - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Return air grille removal.

(2) Return air grille installation.

(3) Return air grille baffle removal.

(4) Return air grille baffle installation.

(5) Return air grille and baffle cleaning.

(6) Return air grille baffle inspection.

B. The return air grilles, which are also called decompression vents. They are near the floor, in the passenger compartment sidewall. The return air grilles let the air in the passenger cabin to flow into the lower fuselage areas. This will prevent damage to the airplane if a decompression condition occurs. The return air grille will be called the grille throughout this procedure.

**TASK 21-23-03-000-801**

### 2. Return Air Grille Removal

(Figure 201)

**A. References**

| Reference | Title |
|---|---|
| 25-22-00-000-801 | Passenger Seat Removal (P/B 401) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-549 | Knife - Putty, Broad Blade |
| STD-726 | Punch - Awl |

**C. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**SIA 001-014**

**D. Prepare for the Procedure**

**SUBTASK 21-23-03-000-001**

(1) If necessary to gain access to the panels, do this task to remove the passenger seats: TASK 25-22-00-000-801.

**SIA ALL**

**E. Procedure**

**SUBTASK 21-23-03-020-001**

(1) Do the steps that follow to remove the return air grille [1] with latch assembly:

(a) Insert awl punch, STD-726 in the release notch of the latch head.

1) Push the handle of awl punch, STD-726 up to release the latch on the right of the applicable panel.

2) Push the handle of awl punch, STD-726 up to release the latches on the two adjacent panels to the right.

(b) Make sure that the latches move freely.



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(c) Carefully slide the two adjacent panels to the left.

(d) Disengage the spring clip on the right hand edge of the applicable panel.

1) Insert a broad blade putty knife, STD-549, or an equivalent tool, behind the right edge of the panel.

2) Turn the broad blade putty knife, STD-549 inboard to separate the panel edges.

3) Carefully slide the adjacent panel to the right until the vertical edge is clear.

4) Remove the broad blade putty knife, STD-549.

(e) Insert awl punch, STD-726 in the release notch in the top edge of the latch head.

1) Push the handle of awl punch, STD-726 up to release the latch on the left of the applicable panel.

2) Push the handle of awl punch, STD-726 up to release the right latch of the adjacent panel to the left.

(f) Disengage the spring clip on the left hand edge of the applicable panel.

1) Insert a broad blade putty knife, STD-549, or an equivalent tool, behind the right edge of the left adjacent panel.

2) Turn the broad blade putty knife, STD-549 inboard to separate the panel edges.

3) Carefully slide the panel being removed to the right until the vertical edge is clear.

4) Remove the broad blade putty knife, STD-549.

(g) Pull the lower edge of the return air grille [1] down until clear of the window panel.

(h) Remove the return air grille [1].

**SUBTASK 21-23-03-020-002**

(2) Do the steps that follow to remove the return air grille [2] with sidewall clip assembly:

(a) Move the return air grille [2] up until the sidewall clip disengages from the crease beam.

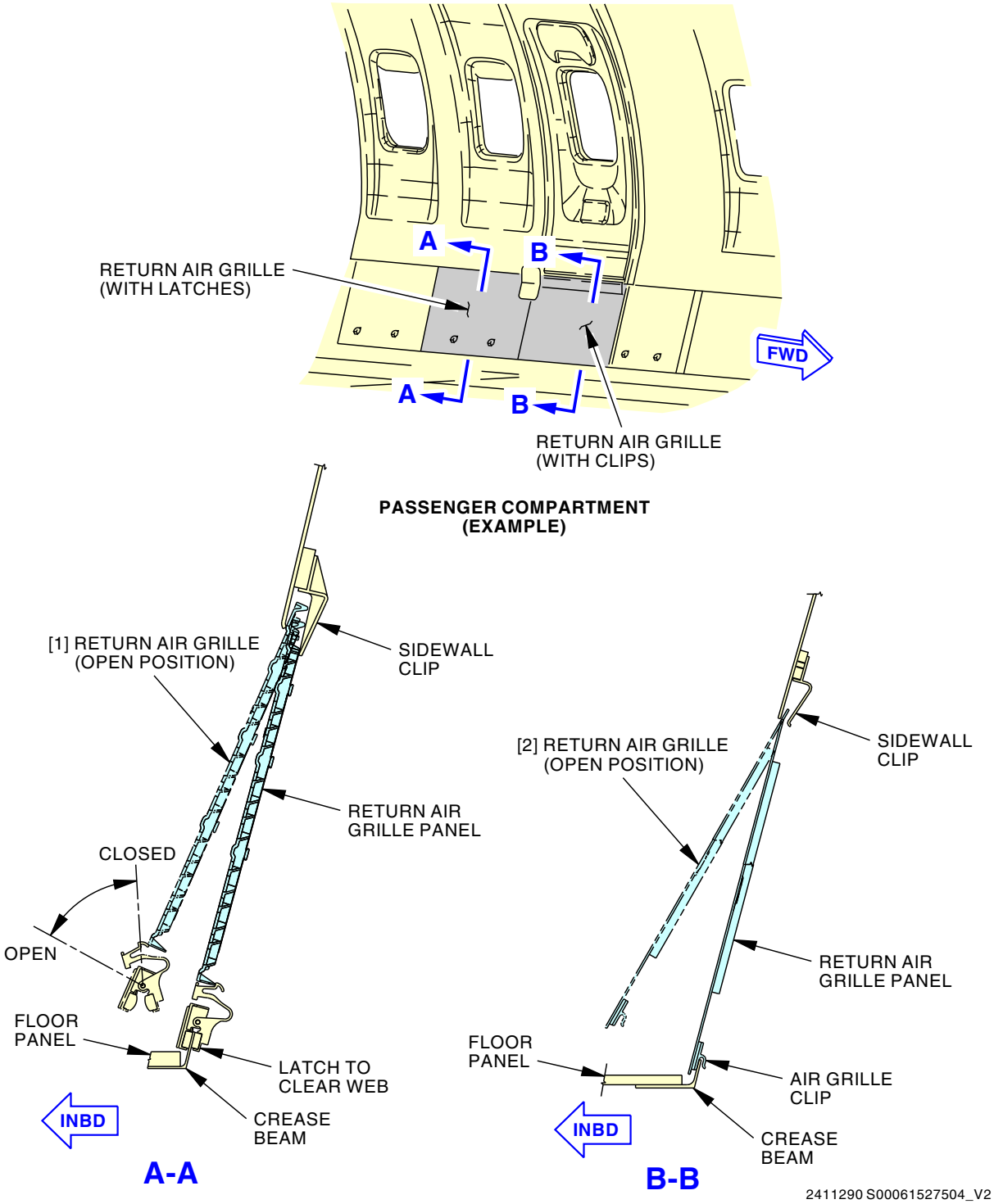
(b) Move inboard until the return air grille [2] clears the crease beam then lower to clear the window panel.

(c) Remove the return air grille [2].

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Return Air Grille Installation**
**Figure 201/21-23-03-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-23-03-000-802**

**3. Return Air Grille Baffle Removal**

Figure 202

**A. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**B. Procedure**

**SUBTASK 21-23-03-020-003**

(1) Do the steps that follow to remove the baffle [3] from the return air grille [1]:

(a) Remove the return air grill and baffle assembly, (TASK 21-23-03-000-801).

(b) Remove the retainer clips [4], at 5 locations, which attach the top of the baffle [3] to the return air grille [1].

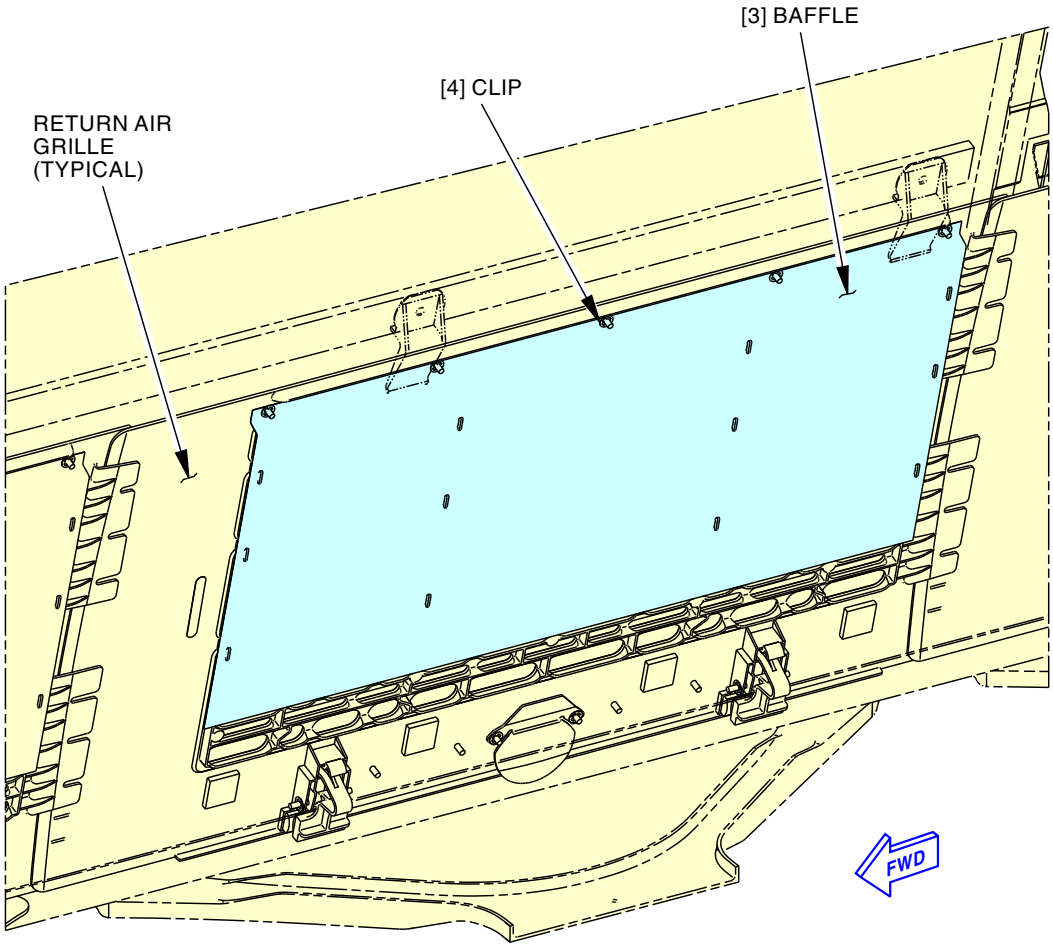
(c) Slide the baffle [3] over the tabs on the return air grille [1].

(d) Remove the baffle [3].

**——— END OF TASK ———**



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**Return Air Grille Baffle Installation**
**Figure 202/21-23-03-990-802**



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**TASK 21-23-03-100-801**

## 4. Return Air Grille and Baffle Cleaning

### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-1068 | Vacuum - High Capacity |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### C. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

### D. Procedure

**SUBTASK 21-23-03-160-001**

(1) Do the steps that follow to clean the return air grille and baffle assembly:

(a) Do this task to remove the return air grille and baffle assembly: TASK 21-23-03-000-801.

(b) Use the high capacity vacuum, STD-1068 to remove the dust, lint, or unwanted material from the return air grille and baffle assembly.

(c) Use the high capacity vacuum, STD-1068 to remove the dust, lint, or unwanted material from the airplane structure behind the return air grill and baffle assembly.

(d) Wipe the return air grille and baffle assembly with a cotton wiper, G00034 that is moist with water.

(e) Do this task to install the return air grille and baffle assembly: TASK 21-23-03-400-802.

**——— END OF TASK ———**

**TASK 21-23-03-400-801**

## 5. Return Air Grille Baffle Installation

Figure 202

### A. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

### B. Procedure

**SUBTASK 21-23-03-420-001**

(1) Do the steps that follow to attach the baffle [3] to the return air grille [1]:

(a) Slide the baffle [3] over the tabs on the return air grille [1].

1) Make sure that all the edges of the baffle [3] are in their correct positions to the tabs.

(b) Install the retainer clips [4], at 5 locations, which attach the top of the baffle [3] to the return air grille [1]

(c) Install the return air grille and baffle assembly (TASK 21-23-03-400-802).

**——— END OF TASK ———**



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**TASK 21-23-03-400-802**

## 6. Return Air Grille Installation

(Figure 201)

### A. References

| Reference | Title |
|---|---|
| 25-22-00 P/B 401 | PASSENGER SEATS - REMOVAL/INSTALLATION |

### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-549 | Knife - Putty, Broad Blade |

### C. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

### D. Procedure

**SUBTASK 21-23-03-420-002**

(1) Do the steps that follow to install the return air grille [1] with latch assembly:

(a) Make sure that the latches are in the full open position on the return air grille [1].

(b) Move the top edge of the return air grille [1] into the sidewall clip.

(c) Move the return air grille [1] outboard until the lower edge rests against the inner chord of the crease beam.

(d) Make sure that the right hand latch is in the open position.

(e) Make sure that the left hand latch is in the closed position on the adjacent grille [1] to the left.

(f) Engage the spring clip into the adjacent panel.

1) Insert a broad blade putty knife, STD-549, or an equivalent tool, behind the adjacent panel to the left with the bottom edge of the tool level with the bottom edge of the panel.

2) Turn the broad blade putty knife, STD-549 to separate the spring clip from the adjacent panel.

3) Carefully slide the panel, to be installed, to the left on the outboard side of the broad blade putty knife, STD-549.

4) Make sure there is a 0.5 in. (1.3 cm) overlap between the vertical edges of the two panels.

5) Remove the broad blade putty knife, STD-549.

(g) Push the latches to the closed position.

**SUBTASK 21-23-03-420-003**

(2) Do the steps that follow to install the return air grille [2] with clip assembly:

(a) Move the top of the return air grille [2] into the window panel clip as high as possible.

(b) Move the return air grille [2] outboard until it is above the crease beam.

(c) Move the return air grille [2] down until the clip engages the crease beam.



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**SIA 001-014**

**E. Put the Airplane Back to its Usual Condition**

**SUBTASK 21-23-03-410-001**

(1) If necessary, install the applicable passenger seats (PAGEBLOCK 25-22-00/401).

**SIA ALL**

**——— END OF TASK ———**

**TASK 21-23-03-200-801**

## 7. Return Air Grille Baffle Inspection

**A. General**

(1) This task has instructions to inspect, remove, and install the baffles on the backside of the return air grilles.

(2) In the event of a rapid decompression of the airplane fuselage, the baffles are designed to detach from the backside of the return air grilles to permit airflow movement from the main cabin to the lower lobe compartments. After a decompression event, it is necessary to inspect the baffles and reinstall them to the backside of the return air grilles.

**B. References**

| Reference | Title |
|---|---|
| 25-22-00-000-801 | Passenger Seat Removal (P/B 401) |
| 25-22-00-400-801 | Passenger Seat Installation (P/B 401) |

**C. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**D. Prepare for Inspection**

**SIA 001-014**

**SUBTASK 21-23-03-020-006**

(1) Do this task to remove the passenger seats as needed to get access to the return air grille [1]: TASK 25-22-00-000-801.

**SIA ALL**

**SUBTASK 21-23-03-020-004**

(2) Do this task to remove the return air grille [1]: TASK 21-23-03-000-801.

**E. Baffle Inspection**

**SUBTASK 21-23-03-212-001**

(1) If the baffle [3] is missing or has damage (tears, punctures, rips, cuts), install a new baffle [3].

**SUBTASK 21-23-03-212-002**

(2) If the baffle [3] has become partially or fully detached from the backside of the return air grille [1], reinstall the baffle [3] with the attachment hardware.

**SUBTASK 21-23-03-212-003**

(3) If the baffle [3] has missing or damaged attachment hardware, install new attachment hardware.

**SUBTASK 21-23-03-212-004**

(4) Inspect the lower sidewall areas for unwanted materials or missing baffle [3] hardware, and clean the areas as applicable before you reinstall the return air grille [1].



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**F. Baffle Removal**

SUBTASK 21-23-03-020-005

(1) Do this task to remove the baffle on the return air grille [1]: TASK 21-23-03-000-802.

**G. Baffle Installation**

SUBTASK 21-23-03-420-004

(1) Do this task to install the baffle on the return air grille [1]: TASK 21-23-03-400-801.

**H. Put the airplane back to its usual condition**

SUBTASK 21-23-03-420-005

(1) Do this task to install the return air grille [1]: TASK 21-23-03-400-802.

**SIA 001-014**

SUBTASK 21-23-03-420-006

(2) Do this task to install the passenger seats if you removed them for access: TASK 25-22-00-400-801.

**——— END OF TASK ———**



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## SIDEWALL RISER DUCTS - REMOVAL/INSTALLATION

### 1. General

A. This task removes the sidewall riser ducts between the transition duct in the mix bay and the main deck overhead distribution duct.

**TASK 21-23-04-000-801**

### 2. Sidewall Riser Ducts Removal

(Figure 401)

#### A. General

(1) This task removes the sidewall riser ducts between the distribution bay and the overhead distribution ducts.

(a) The sidewall riser duct installation consists of these components:

1) Six ducts
2) Three support assemblies
3) Clamps and plastic ties
4) Six flexible hoses
5) Six flexible sleeves
6) A transition duct assembly.

(2) There are three sets of riser ducts, two on the left side of the passenger cabin and one set on the right side.

(3) Access to the sidewall riser ducts is through the sidewall panels directly above the distribution bay in the main passenger cabin.

(4) There are two configurations of the installation where the sidewall riser ducts connect to the spuds on the transition duct. One configuration consists of the sidewall riser ducts directly connected to the spuds on the transition duct with a clamp to attach each riser duct and spud together. The other configuration uses a flex sleeve between each riser duct and transition duct spud with two clamps to attach the connections.

#### B. References

| Reference | Title |
|---|---|
| 25-22-00-000-801 | Passenger Seat Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 231 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Left |

#### D. Preparation for the Removal

**SUBTASK 21-23-04-860-001**

(1) Remove pressure from the pneumatic system (TASK 36-00-00-860-806).

**SUBTASK 21-23-04-860-002**

(2) Make sure that the L PACK and R PACK switches on the P5-10 air conditioning panel are set to OFF.



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**SIA 001-014**

**SUBTASK 21-23-04-020-001**

(3) If it is necessary, remove passenger seats in the area of the sidewall riser ducts (TASK 25-22-00-000-801).

**SIA ALL**

**SUBTASK 21-23-04-020-002**

(4) Remove the cabin sidewall panels that are directly above main distribution outlets in the main distribution manifold to the sidewall riser ducts.

**SUBTASK 21-23-04-020-003**

(5) If it is necessary, remove the ceiling panels in the passenger cabin above the sidewall panels that you removed.

## E. Sidewall Riser Ducts Removal

**SUBTASK 21-23-04-020-004**

(1) Do all of the applicable steps that follow to disconnect the six flex hoses [1] or six flex hoses [15] from the overhead distribution duct [3]:

(a) Remove the tie straps [2] and the tapes [16] at six locations that connect the flex hoses [1] and the spuds [7] on the overhead distribution duct [3].

**SUBTASK 21-23-04-020-005**

(2) Do one of the steps that follow to loosen the sidewall riser ducts [4] at the three support [14]locations:

(a) Cut the plastic tie straps [11] from the three supports [14] that hold the sidewall riser ducts [4].

1) Discard the plastic tie straps [11].

(b) Disconnect the supports [14] from structure.

**SUBTASK 21-23-04-020-006**

(3) Do one of these steps that follows to loosen the sidewall riser ducts [4] at the transition duct [12]:

(a) Loosen the twelve clamps [5] or six clamps [13] that attach the flex sleeves [6] and the spuds [7] to the sidewall riser ducts [4].

**SUBTASK 21-23-04-020-007**

(4) Do these steps to remove the transition duct [12] from the elbow duct [10] from the mix bay:

NOTE: This step is not necessary if the intent of maintenance is to replace just the round ducts as an assembly or an individual duct.

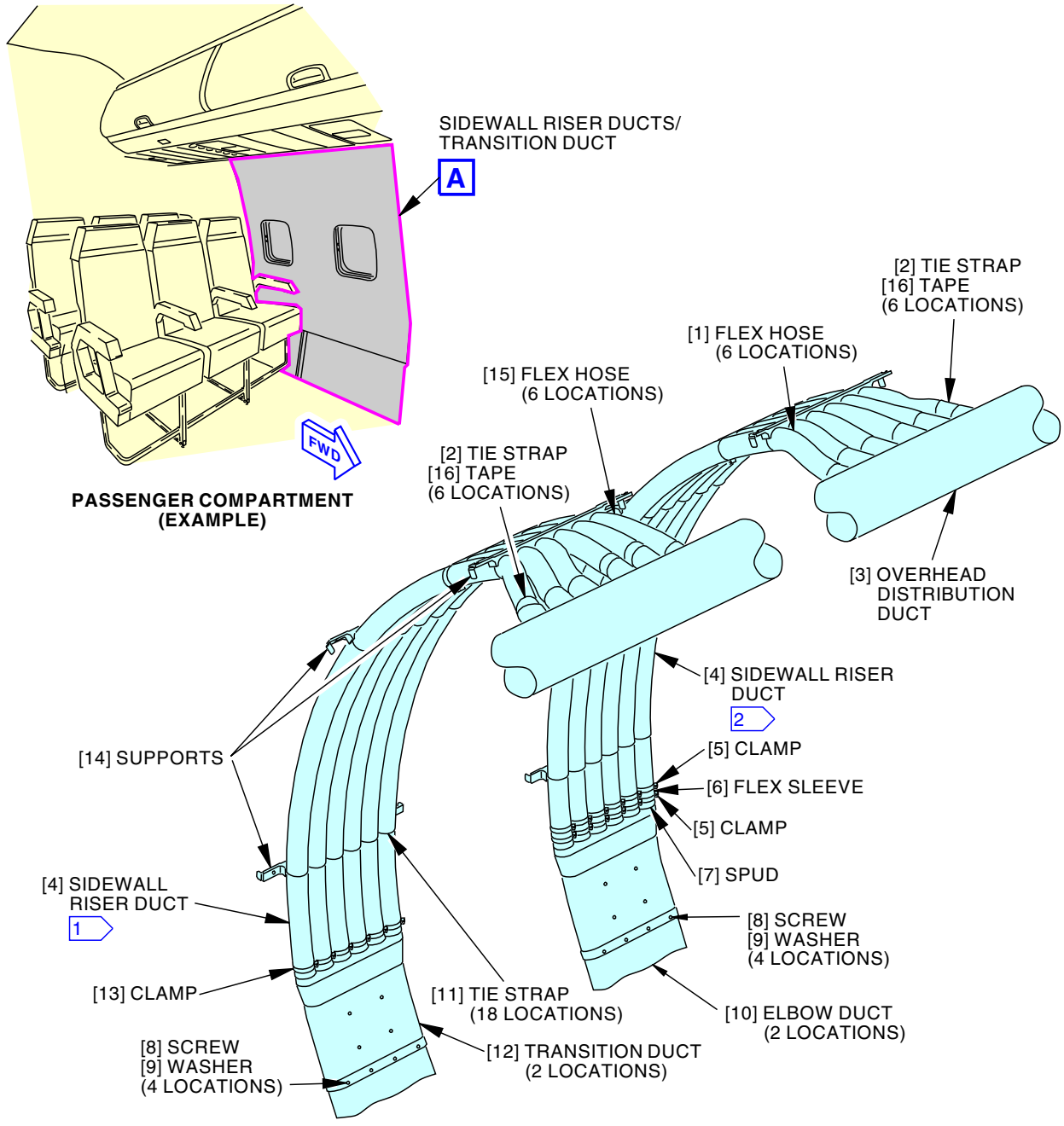
(a) Remove the screws [8] and washers [9].

(b) Remove the transition duct [12] from the elbow duct [10].

**——— END OF TASK ———**



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**Sidewall Riser Ducts Installation**
**Figure 401/21-23-04-990-801**



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**TASK 21-23-04-400-801**

## 3. Sidewall Riser Ducts Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 25-22-00-400-801 | Passenger Seat Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A00027 | Adhesive - Silicone Rubber, 1 Part, RTV | BAC5010 Type 60 |
| A50126 | Primer - Adhesive Bonding (Formerly Dow Corning 1204 Clear) | |
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |
| B00102 | Abrasive - Aluminum Oxide Coated Cloth | |
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| C00580 | Primer - Adhesive Bonding, RTV - PR-1200 (Formerly DC 1200) | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G50140 | Gloves - Protective, Latex or Nitrile | |
| G50262 | Wiper - Cleaning | BMS15-5 |
| G50344 | Tape - Nitto P-212HD WHT (Formerly Permacel) Glass Cloth | |
| G50625 | Strap - Plastic, Adjustable, Self-locking, 14.40 Inches (365.76 mm) Long | BACS38K3 |

### C. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### D. Sidewall Riser Ducts Installation

**SUBTASK 21-23-04-160-001**

(1) If you removed the transition duct [12] with the sidewall riser ducts [4], then remove all the sealant between the faying surfaces of the transition duct [12] and the elbow duct [10]:

(a) Lightly abrade the surfaces with old adhesive with 320 grit or finer abrasive cloth, B00102, until the old adhesive is removed.

(b) Wet a cotton wiper, G00034, with solvent, B00083, or alcohol, B00130, and wipe all faying surfaces until all traces of the old adhesive are gone.

1) Wet the cotton wiper, G00034, by pouring the solvent onto the wiper, not by dipping the wiper into the solvent source.

(c) Remove excess solvent with a clean cotton wiper, G00034.

(d) Do a final cleaning of the surfaces with a cotton wiper, G00034, wet with alcohol, B00130.



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(e) Immediately wipe all cleaned surfaces with a new cotton wiper, G00034, until all alcohol, B00130, is removed from the surfaces.

(f) Put on clean protective gloves, G50140, and avoid contact with the cleaned surfaces.

**SUBTASK 21-23-04-390-001**

(2) Apply the sealant to the faying surfaces on the elbow duct [10] and the transition duct [12]:

(a) Prime the surfaces:

1) Do not thin the primer or use primer that is cloudy or milky.

2) Brush or spray the surfaces with a thin coat of red or clear PR-1200 primer, C00580, or PR 1204 primer, A50126.

3) Let the primer dry at 65°F (18°C) - 100°F (38°C) for a minimum of 30 minutes and 4 hours maximum.

(b) Apply a continuous layer of adhesive, A00027, over both surfaces to be bonded.

NOTE: The inside bottom surface of the transition duct [12] and the outside top surface of the elbow duct [10] are the bonding surfaces.

(c) Install the transition duct [12] over the elbow duct [10] as soon as possible after the application of the adhesive.

(d) Install the four washers [9] and screws [8].

(e) Let the adhesive cure for a minimum of 24 hours at 65°F (18°C) - 100°F (38°C).

**SUBTASK 21-23-04-210-001**

(3) Make sure that the bottom of the transition duct [12] is approximately 8 in. (203 mm) above the passenger compartment floor.

**SUBTASK 21-23-04-210-002**

(4) If it is necessary, reposition the transition duct [12] so that the bottom of the transition duct [12] is approximately 8 in. (203 mm) above the passenger compartment floor.

**SUBTASK 21-23-04-420-001**

(5) Put the sidewall riser ducts [4] in their installed position.

**SUBTASK 21-23-04-420-002**

(6) Do these steps for the sidewall riser duct [4] installations without the flex sleeves [6]:

(a) Make sure that there is no contamination in the sidewall riser ducts [4] or the spuds [7].

(b) Remove all tape from the spuds [7] on the transition duct [12].

(c) If it is necessary, remove all remaining pieces of tape from the sidewall riser ducts [4] and the spuds [7] with a wiper, G50262, that is wet with alcohol, B00130, or solvent, B00083.

(d) Use a dry wiper, G50262, to remove the remaining alcohol, B00130, or solvent, B00083.

(e) Do not let the alcohol, B00130, or solvent, B00083, dry on the sidewall riser ducts [4] and the spuds [7].

(f) Wrap the ends of the spuds [7] on the with 2 in. (51 mm) Nitto P-212HD WHT tape, G50344, to build-up the diameter of the spuds [7] to match the diameter of the sidewall riser ducts [4] so that there is a tight fit between the two.

(g) Put the sidewall riser ducts [4] over the spuds [7] on the transition duct [12] until there is a 1 in. (25 mm) overlap between the ends of the sidewall riser ducts [4] and the spuds [7] on the transition duct [12].

1) Shape the round sidewall riser ducts [4] as necessary to fit over the oblong spuds [7].



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(h) Install the clamps [13] that hold the sidewall riser ducts [4] and spuds [7] together:

1) Put the clamps [13] in position equally between the end of the sidewall riser duct [4] and the transition duct [12] bead (0.25 in. (6.35 mm) to 0.45 in. (11.43 mm) from the end of the sidewall riser duct [4]).

2) Put the clamps [13] in position so that the screw head is 45 degrees forward or aft from the station line.

NOTE: The screw head can interfere with the sidewall panel if it is positioned on the station line.

3) Tighten the clamps [13] to 15 ±2 in-lb (2 ±1 N·m).

**SUBTASK 21-23-04-420-003**

(7) Do these steps for the sidewall riser duct [4] installations with the flex sleeves [6]:

(a) Make sure that there is no contamination in the sidewall riser ducts [4], flex sleeves [6], or the spuds [7].

(b) If it is necessary, clean the sidewall riser ducts [4], flex sleeves [6], and the spuds [7] with a wiper, G50262, that is wet with alcohol, B00130, or solvent,solvent, B00083.

(c) If it is necessary, use a dry wiper, G50262, to remove the remaining alcohol, B00130, or solvent, B00083, from the sidewall riser ducts [4], flex sleeves [6], and the spuds [7].

1) Do not let the alcohol, B00130 or solvent, B00083, dry on the sidewall riser ducts [4], flex sleeves [6], and the spuds [7].

(d) Slide the flex sleeves [6] over the sidewall riser ducts [4] or spuds [7] so that there is a 1 in. (25 mm) overlap between the sidewall riser duct [4], or spud [7] and the flex sleeve [6].

1) Shape the round flex sleeves [6] as necessary to fit over the oblong spuds [7].

(e) Install the clamps [5] that hold the sidewall riser ducts [4], flex sleeves [6], and the spuds [7] together:

1) Put the clamps [5] in position equally between the end of the flex sleeve [6] and the sidewall riser duct [4] bead (0.25 in. (6.35 mm) to 0.45 in. (11.43 mm) from the end of the flex sleeve [6]).

2) Put the clamps [5] in position so that the screw head is 45 degrees forward or aft from the station line.

NOTE: The screw head can interfere with the sidewall panel if it is positioned on the station line.

3) Tighten the clamps [5] to 15 ±2 in-lb (2 ±1 N·m).

**SUBTASK 21-23-04-420-004**

(8) If they are removed, install the supports [14].

**SUBTASK 21-23-04-410-001**

(9) Put the sidewall riser ducts [4] in position so that they are in the supports [14].

**SUBTASK 21-23-04-420-005**

(10) Install the adjustable plastic strap, G50625, and tie straps [11] to hold the sidewall riser ducts [4] in position in the supports [14].

**SUBTASK 21-23-04-420-006**

(11) To attach the flex hose [1] and flex hoses [15] to the overhead distribution duct [3], do these steps:



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(a) Make sure that there is no contamination in the flex hoses [15] or the overhead distribution duct [3].

(b) Remove all remaining pieces of tape from the flex hoses [15] and the overhead distribution duct spuds with a wiper, G50262, that is wet with alcohol, B00130, or solvent, B00083.

(c) If it is necessary, use a dry wiper, G50262, to remove the remaining alcohol, B00130, or solvent, B00083, from the flex hoses [1] and flex hoses [15] and the overhead distribution duct spuds.

(d) Install the Nitto P-212HD WHT tape, G50344:

1) Install the flex hoses [1] and flex hoses [15] on the spuds on the overhead distribution duct [3] with a minimum 0.5 in. (12.7 mm) of overlap.

2) Apply 2-4 laps of the tapes [16] to the center of the joint with these considerations:

a) Keep the tapes [16] taut as you wrap the joint.

b) Smooth out any wrinkles in the tapes [16] as you wrap the joint.

(e) Install six adjustable plastic straps, G50625 and tie straps [2] around the tapes [16] on the flex hoses [1]s.

(f) Make sure that the joints are tight and do not slip.

## E. Sidewall Riser Ducts Installation Test

**SUBTASK 21-23-04-860-003**

(1) Supply conditioned air to the passenger cabin (TASK 21-00-00-800-801).

**SUBTASK 21-23-04-790-001**

(2) Make sure that there are no leaks in the sidewall riser ducts [4]:

(a) Do a check for leaks at all the joints in the sidewall riser ducts [4].

NOTE: A leak exists if airflow can be felt on a hand a minimum of 2 in. (51 mm) away from a joint or surface.

(b) Make sure that there is no whistling, vibration or other excessive air noise from the sidewall riser ducts [4].

(c) Repair all leaks that are found.

**SUBTASK 21-23-04-860-004**

(3) Remove the conditioned air from the airplane (TASK 21-00-00-800-802).

## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-23-04-410-002**

(1) Install the sidewall panels that were removed for access.

**SUBTASK 21-23-04-410-003**

(2) Install all ceiling panels that were removed.

**SIA 001-014**

**SUBTASK 21-23-04-410-004**

(3) If it is necessary, install passenger seats in the area of the sidewall riser ducts (TASK 25-22-00-400-801).

**END OF TASK**



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## PASSENGER CABIN GASPER AIR OUTLETS - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the gasper air outlets installed in the Passenger Service Units (PSU).

(2) An installation of the gasper air outlets installed in the Passenger Service Units (PSU).

(3) A removal of the gasper air outlets installed in the Lavatory Service Units (LSU).

(4) An installation of the gasper air outlets installed in the Lavatory Service Units (LSU).

B. The gasper air outlet is referred to as the gasper in this procedure.

**TASK 21-24-04-000-801**

### 2. Gasper Air Outlet (PSU) Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**B. Gasper Air Outlet Removal**

**SUBTASK 21-24-04-860-001**

(1) Get a different gasper and turn the finger grips clockwise to fully retract the air guide.

**SUBTASK 21-24-04-860-002**

(2) Put the four tabs of the retracted gasper in the four holes of the air outlet gasper [1] being removed.

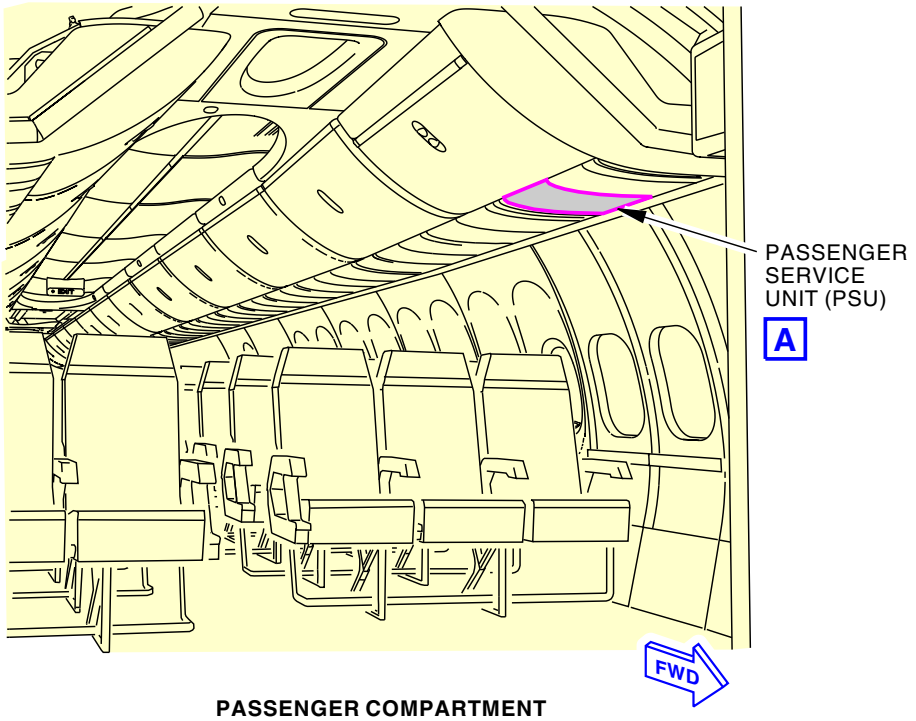
**SUBTASK 21-24-04-020-001**

(3) Turn the retracted gasper counterclockwise to remove the air outlet gasper [1].

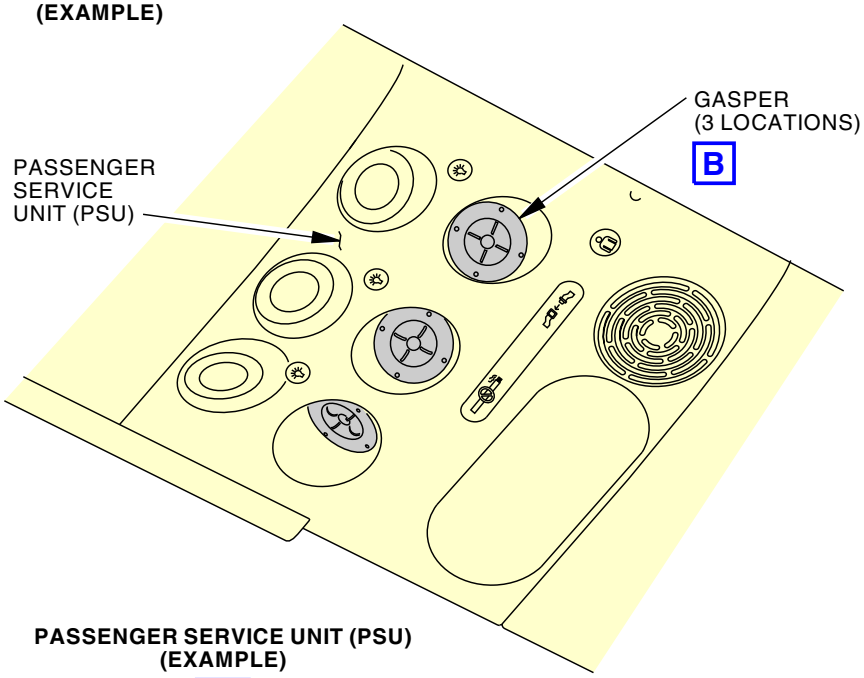
**——— END OF TASK ———**



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**PASSENGER COMPARTMENT
(EXAMPLE)**




**PASSENGER SERVICE UNIT (PSU)
(EXAMPLE)**

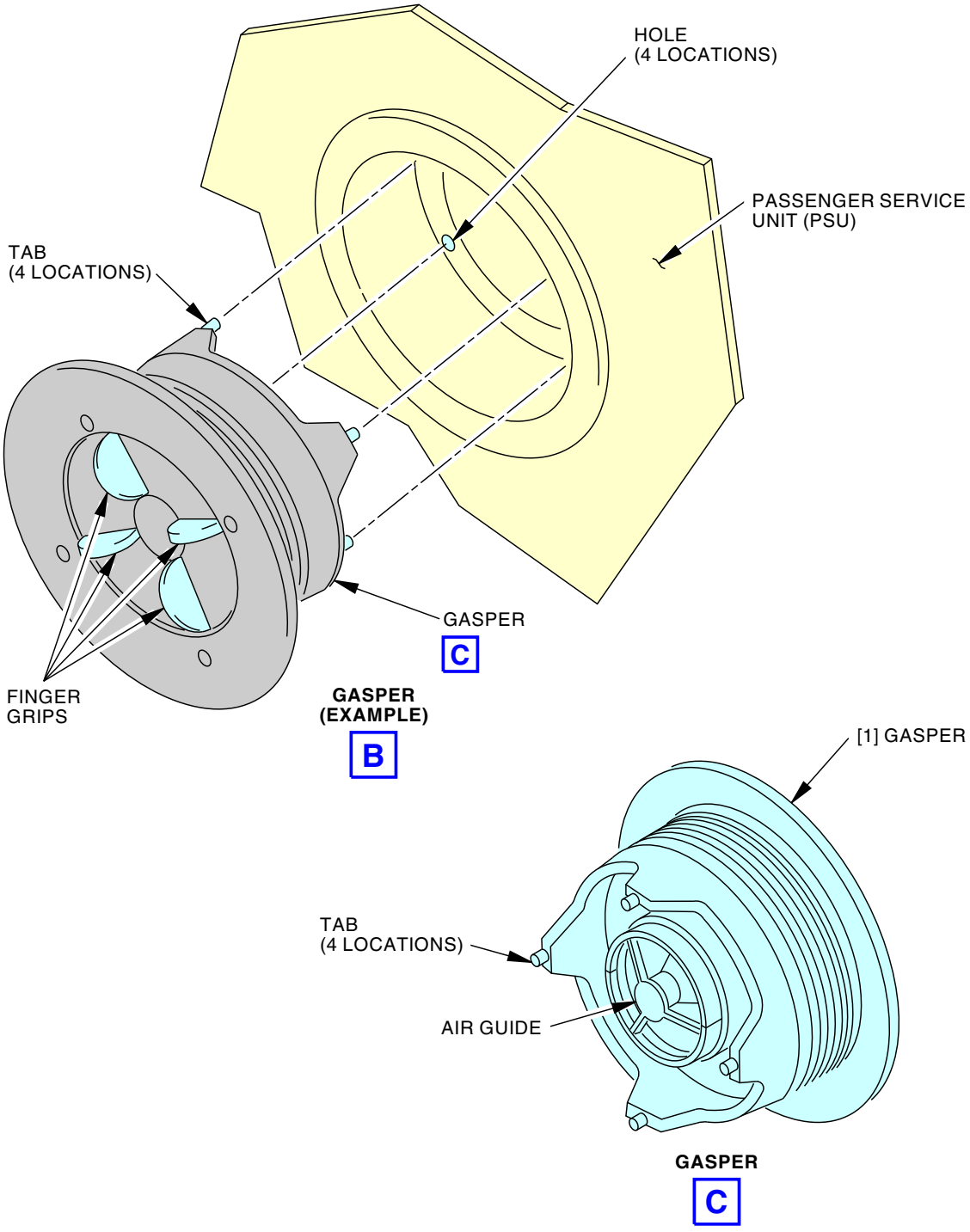
**A**

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**Gasper Air Outlets (PSU) Installation
Figure 401/21-24-04-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Gasper Air Outlets (PSU) Installation**
**Figure 401/21-24-04-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-24-04-400-801**

**3. Gasper Air Outlet (PSU) Installation**

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**B. Gasper Air Outlet Installation**

**SUBTASK 21-24-04-420-001**

(1) Loosely install the air outlet gasper [1] into the PSU gasper panel.

**SUBTASK 21-24-04-860-003**

(2) Get a different gasper and turn the finger grips in the clockwise direction to fully retract the air guide.

**SUBTASK 21-24-04-860-004**

(3) Put the four tabs of the retracted gasper in the four holes of the new air outlet gasper [1].

**SUBTASK 21-24-04-420-002**

(4) Use your hand to turn the air outlet gasper [1] in the clockwise direction and tighten.

**——— END OF TASK ———**

**TASK 21-24-04-000-802**

**4. Gasper Air Outlet (LSU) Removal**

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-23-13-000-801 | Attendant/Lavatory Service Unit Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**C. Prepare for the Removal**

**SUBTASK 21-24-04-010-001**

(1) Lower the applicable (LSU) gasper panel from the lavatory ceiling (TASK 25-23-13-000-801).

**D. Gasper Air Outlet Removal**

**SUBTASK 21-24-04-020-002**

(1) Do these steps to remove the air outlet gasper [2] from the strip:

(a) Loosen the strap that holds the A/C tubing to the air outlet gasper [2].

(b) Remove the A/C tubing from the air outlet gasper [2].

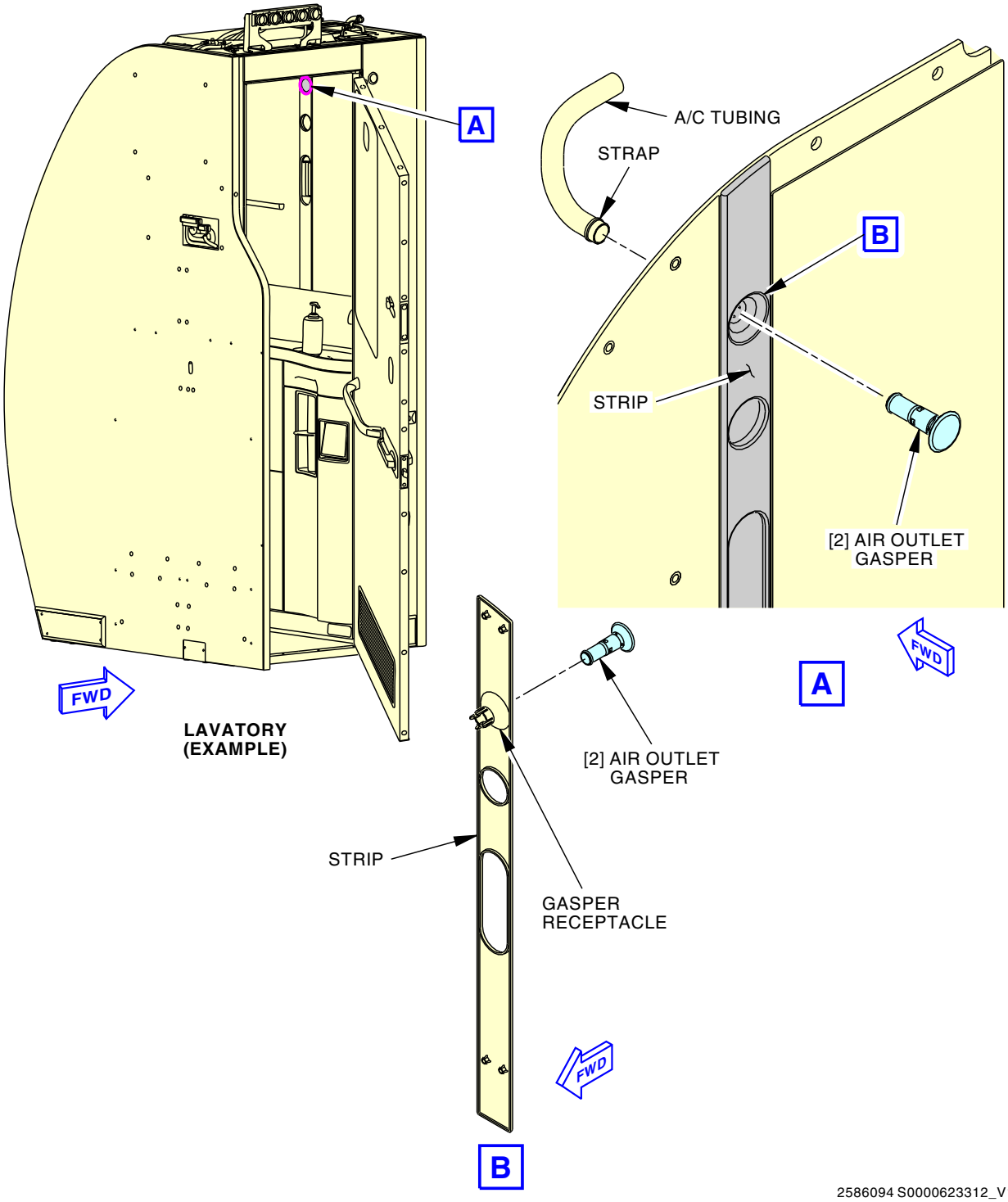
(c) Disengage the air outlet gasper [2] from the gasper receptacle clips on the strip.

(d) Remove the air outlet gasper [2] from the strip.

**——— END OF TASK ———**



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**Gasper Air Outlet Installation**
**Figure 402/21-24-04-990-802**



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**TASK 21-24-04-400-802**

**5. Gasper Air Outlet (LSU) Installation**

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-23-13-400-801 | Attendant/Lavatory Service Unit Installation (P/B 401) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Air outlet gasper | 25-40-11-18D-195 | SIA 001-014 |
| | | 25-40-11-28F-135 | SIA 015-999 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**D. Gasper Air Outlet Installation**

**SUBTASK 21-24-04-420-003**

(1) Install the air outlet gasper [2] to the strip as follows (Figure 402):

(a) Put the air outlet gasper [2] into the gasper receptacle on the strip.

(b) Engage the air outlet gasper [2] with the gasper receptacle clips.

(c) Position the strip on the A/C tubing.

(d) Connect the A/C tubing to the air outlet gasper [2].

(e) Tighten the A/C tubing strap.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-24-04-410-001**

(1) Install the applicable (LSU) gasper panel (TASK 25-23-13-400-801).

**——— END OF TASK ———**



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## RECIRCULATION SYSTEM - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Recirculation System - Deactivation

(2) Recirculation System - Activation

**TASK 21-25-00-800-801**

### 2. Recirculation System - Deactivation

(Figure 201)

#### A. General

(1) This task will deactivate this component in the recirculation system:

(a) Recirculation Fan.

#### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

#### E. Procedure

**SUBTASK 21-25-00-010-001**

(1) Open this door:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**SUBTASK 21-25-00-010-002**

(2) Remove the aft center bulkhead liner in the forward cargo compartment. To remove the liner, do this task: (Forward Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-11-02-000-801).

**SUBTASK 21-25-00-860-001**

(3) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |



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**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**F. Tryout**

NOTE: This tryout is to make sure the recirculation system is in a zero energy state.

**SUBTASK 21-25-00-860-003**

(1) Make sure that the GALLEY switch on the P5-13 electrical meters, battery and galley power panel is set at ON.

**SUBTASK 21-25-00-860-004**

(2) Set these switches, on the P5-10 Air Conditioning Panel, to the OFF position:

(a) L PACK

(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

**SUBTASK 21-25-00-860-005**

(3) Do this task: (Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801).

**SUBTASK 21-25-00-860-006**

(4) Make sure the BLEED 1 switch on the P5-10 air conditioning panel is set to ON.

**SUBTASK 21-25-00-860-007**

(5) Set the L and R RECIRC FAN switches to the AUTO position.

**SUBTASK 21-25-00-860-008**

(6) Set the L PACK switch and the R PACK switch to the positions shown below and make sure the recirculation fans are off:

NOTE: Put your hand on the fan to feel for vibration. If you do not feel vibration, the fan is off.

**Table 201/21-25-00-993-801**

| L PACK Switch Position | R PACK Switch Position | L Fan Condition | R Fan Condition |
|---|---|---|---|
| OFF | OFF | OFF | OFF |
| OFF | AUTO | OFF | OFF |
| OFF | HIGH | OFF | OFF |
| AUTO | OFF | OFF | OFF |
| AUTO | AUTO | OFF | OFF |
| AUTO | HIGH | OFF | OFF |
| HIGH | OFF | OFF | OFF |
| HIGH | AUTO | OFF | OFF |
| HIGH | HIGH | OFF | OFF |

**SUBTASK 21-25-00-860-009**

(7) Set the L and R PACK switches to the OFF position.

**SUBTASK 21-25-00-860-010**

(8) Make sure the L RECIRC FAN and R RECIRC FAN switches are in the AUTO position.



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SUBTASK 21-25-00-860-011

(9) Make sure the BLEED 1 switch on the P5-10 air conditioning panel is set to OFF.

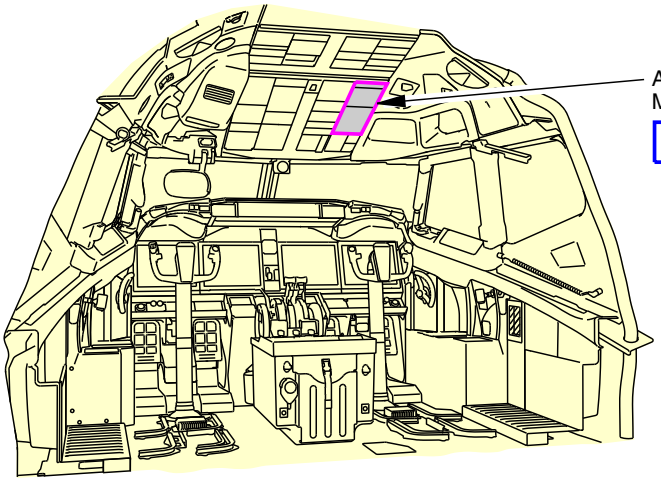
SUBTASK 21-25-00-860-012

(10) Do this task: (Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806).

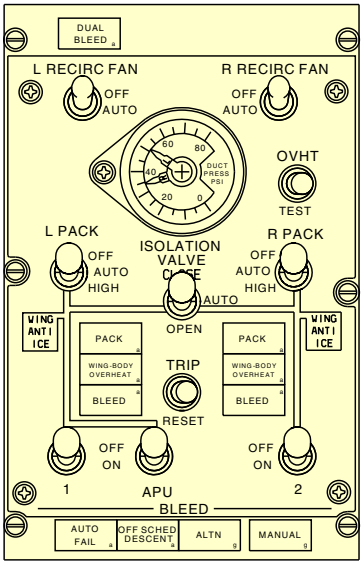
——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**FLIGHT COMPARTMENT**




**AIR CONDITIONING MODULE**

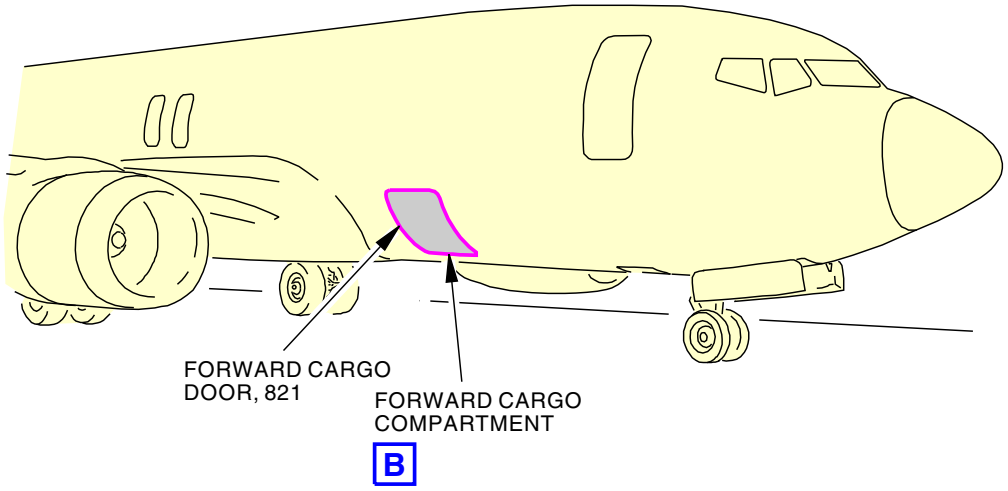
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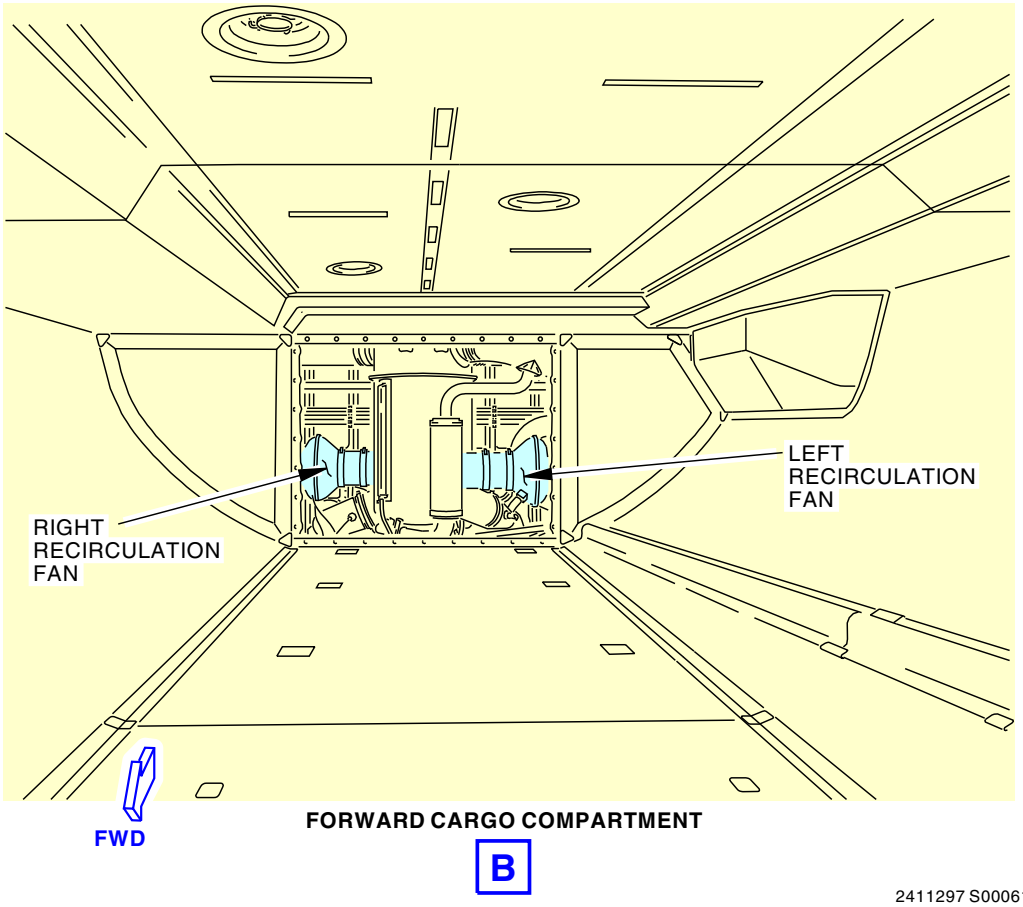
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**Recirculation System**
**Figure 201/21-25-00-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2411297 S00061527531_V2

**Recirculation System**
**Figure 201/21-25-00-990-801 (Sheet 2 of 2)**



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**TASK 21-25-00-800-802**

## 3. Recirculation System - Activation

(Figure 201)

### A. General

(1) This task will activate this component in the recirculation system:

(a) Recirculation Fan.

### B. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

### E. Procedure

**SUBTASK 21-25-00-860-014**

(1) Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**SUBTASK 21-25-00-410-001**

(2) Install the aft center bulkhead liner in the forward cargo compartment. To install the liner, do this task: (Forward Cargo Compartment Aft Bulkhead Liner Installation, TASK 50-11-02-400-801).

**SUBTASK 21-25-00-410-002**

(3) Close this door:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**END OF TASK**



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## RECIRCULATION SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure does an operational test of the recirculation system.

**TASK 21-25-00-710-801**

### 2. Recirculation System - Operational Test

(Figure 501)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

#### C. Prepare for the Operational Test

**SUBTASK 21-25-00-860-016**

(1) Make sure that the GALLEY switch on the P5-13 electrical meters, battery and galley power panel is set at ON.

**SUBTASK 21-25-00-860-017**

(2) Make sure that these circuit breakers are closed:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**SUBTASK 21-25-00-010-003**

(3) Open the forward cargo door.

**SUBTASK 21-25-00-010-004**

(4) Remove the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

#### D. Recirculation System Operational Test

**SUBTASK 21-25-00-860-018**

(1) Set these switches, on the P5-10 air conditioning panel, to the OFF position:



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(a) L PACK

(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

SUBTASK 21-25-00-210-001

(2) Put your hand on the fan to feel for vibration.

(a) Make sure the recirculation fans are off.

NOTE: If you do not feel vibration, the fan is off.

SUBTASK 21-25-00-910-001

(3) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-25-00-860-019

(4) Make sure the BLEED 1 switch on the P5-10 air conditioning panel is set to ON.

SUBTASK 21-25-00-210-002

(5) Set the L and R RECIRC FAN switches to the AUTO position.

(a) Set the L PACK switch and the R PACK switch to the positions shown in Table 501 and make sure the applicable fan condition occurs.

1) Put your hand on the fan to feel for vibration.

a) Make sure the recirculation fans are off.

NOTE: If you do not feel vibration, the fan is off.

**Table 501/21-25-00-993-803**

| L PACK Switch Position | R PACK Switch Position | L Fan Condition | R Fan Condition |
|---|---|---|---|
| OFF | OFF | ON | ON |
| OFF | AUTO | ON | ON |
| OFF | HIGH | ON | ON |
| AUTO | OFF | ON | ON |
| AUTO | AUTO | ON | ON |
| AUTO | HIGH | ON | ON |
| HIGH | OFF | ON | ON |
| HIGH | AUTO | ON | ON |
| HIGH | HIGH | OFF | ON |

## E. Put the Airplane Back to Its Usual Condition

SUBTASK 21-25-00-860-020

(1) Set the L and R PACK switches to the OFF position.

SUBTASK 21-25-00-860-021

(2) Set the L and R RECIRC FAN switches to the AUTO position.

SUBTASK 21-25-00-410-003

(3) Install the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).



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SUBTASK 21-25-00-410-004

(4) Close the forward cargo door.

SUBTASK 21-25-00-860-022

(5) Make sure the BLEED 1 switch on the P5-10 air conditioning panel is set to OFF.

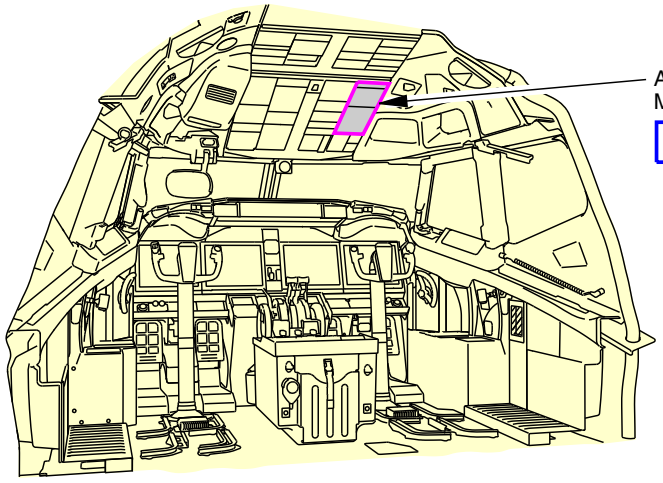
SUBTASK 21-25-00-910-002

(6) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

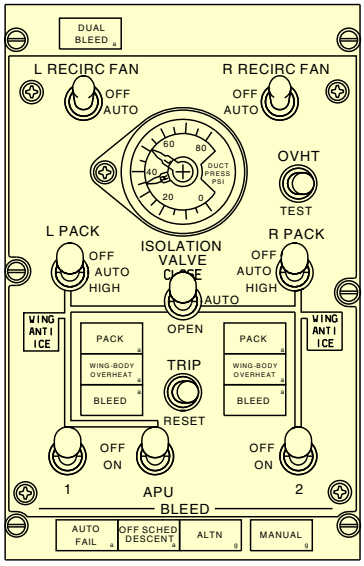
——— END OF TASK ———



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**FLIGHT COMPARTMENT**




**AIR CONDITIONING MODULE**

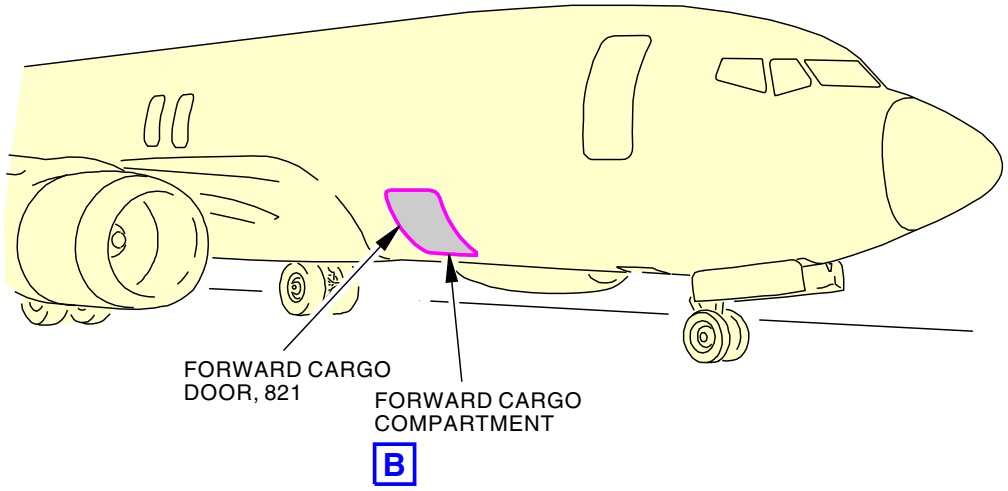
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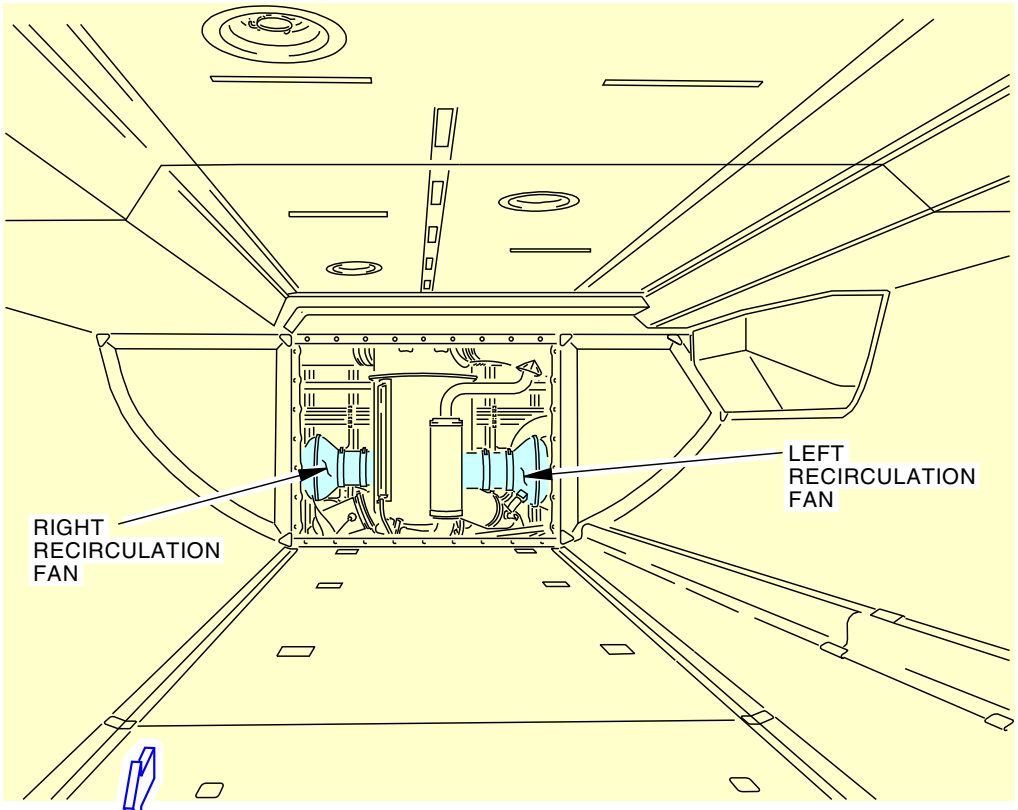
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**Recirculation System Test**
**Figure 501/21-25-00-990-802 (Sheet 1 of 2)**



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2411297 S00061527531_V2

**Recirculation System Test**
**Figure 501/21-25-00-990-802 (Sheet 2 of 2)**



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## RECIRCULATION AIR FILTER - REMOVAL/INSTALLATION

### 1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has these tasks:

(1) A removal of the recirculation air filter

(2) An installation of the recirculation air filter.

C. There are two recirculation air filters installed behind the end wall lining at the aft end of the forward cargo compartment. The air filters are in filter housings on the left and the right side of the mix manifold bay.

**TASK 21-25-01-000-801**

### 2. Recirculation Air Filter - Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B50280 | Cleaner - Disinfectant - Zip-Chem Products Calla 1452 | |
| B50364 | Cleaner - Disinfectant - Matrix #3 | |
| G00624 | Bag - Plastic, General Purpose | |
| G50140 | Gloves - Protective, Latex or Nitrile | |

**D. Location Zones**

| Zone | Area |
|---|---|
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

**E. Prepare for the Removal**

**SUBTASK 21-25-01-860-001**

(1) Put the L RECIRC FAN and the R RECIRC FAN switches, on the P5-10 panel, to the OFF position and attach a DO NOT OPERATE tag, STD-858.



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SUBTASK 21-25-01-865-001

(2) To prevent accidental recirculation fan operation during the removal of the recirculation air filters, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

SUBTASK 21-25-01-010-001

(3) Remove the left and right aft bulkhead liners in the forward cargo compartment (TASK 50-11-02-000-801).

SUBTASK 21-25-01-941-001

**WARNING** PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(4) Before you touch the recirculation air filter [3], put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140.

SUBTASK 21-25-01-500-001

(5) The plastic bag, G00624, must be larger than the filter dimensions of 20 in. (51 cm) in length, 20 in. (51 cm) in width, 5.5 in. (14 cm) in height and tape suitable for sealing the bag closed.

## F. Recirculation Air Filter Removal

SUBTASK 21-25-01-020-001

(1) Remove the left recirculation air filter [3].

(a) Remove the two screws [6] from the retainer [7] on the filter housing [8].

(b) Remove the retainer [7] from the filter housing [8].

**WARNING** DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.



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**(WARNING PRECEDES)**

**CAUTION**

DO NOT LET THE RECIRCULATION FILTER TOUCH THE WIRE BUNDLE THAT IS IMMEDIATELY FORWARD OF THE FILTER. THE FORWARD AND AFT LOWER OUTBOARD CORNERS OF THE FILTER HAVE SHARP EDGES. THE SHARP EDGES CAN CUT THE INSULATION ON THE WIRE BUNDLE.

(c) If possible, slide the plastic bag, G00624, over the filter when removing the recirculation air filter [3] from the filter housing [8] to minimize contamination.

(d) Seal the bag closed with tape.

**WARNING**

OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(e) Discard the bag with the filter. Refer to the airline, local health, safety and regulatory procedures for the disposal of material.

**SUBTASK 21-25-01-020-002**

(2) Remove the right recirculation air filter [3].

(a) Release the quarter-turn fastener [1] which attach the access panel [2] to the filter housing [4].

(b) Remove the access panel [2].

**WARNING**

DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(c) If possible, slide the plastic bag, G00624, over the filter when removing the recirculation air filter [3] from the filter housing [4] to minimize contamination.

(d) Seal the bag closed with tape.

**WARNING**

OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(e) Discard the bag with the filter. Refer to the airline, local health, safety and regulatory procedures for disposal of material.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## G. Post-Filter Removal Cleanup

SUBTASK 21-25-01-670-003

**WARNING** ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE. USE PROTECTION EQUIPMENT. MAKE SURE THAT YOU USE ISOPROPYL ALCOHOL IN AN AREA WITH AIRFLOW. IF YOU DO NOT OBEY, INJURY TO PERSONNEL CAN OCCUR.

(1) Disinfect hard non-porous surfaces near the filter with a solution of 70% alcohol, B00130, Calla 1452 cleaner, B50280, or Matrix #3 cleaner, B50364.

NOTE: Follow the disinfectant manufacturer's instruction and refer to the EPA List N for applicable contact/dwell time.

NOTE: Refer to the EPA List N or local health authority guidance for required contact/dwell time for Isopropyl Alcohol to be used as a disinfectant.

SUBTASK 21-25-01-670-002

(2) Disinfect all tools used for filter replacement. Refer to the airline procedures and polices for the disinfecting of tools.

SUBTASK 21-25-01-020-003

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) Remove the personal protective equipment and put them in a plastic bag, G00624.

(a) Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(b) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.

SUBTASK 21-25-01-110-001

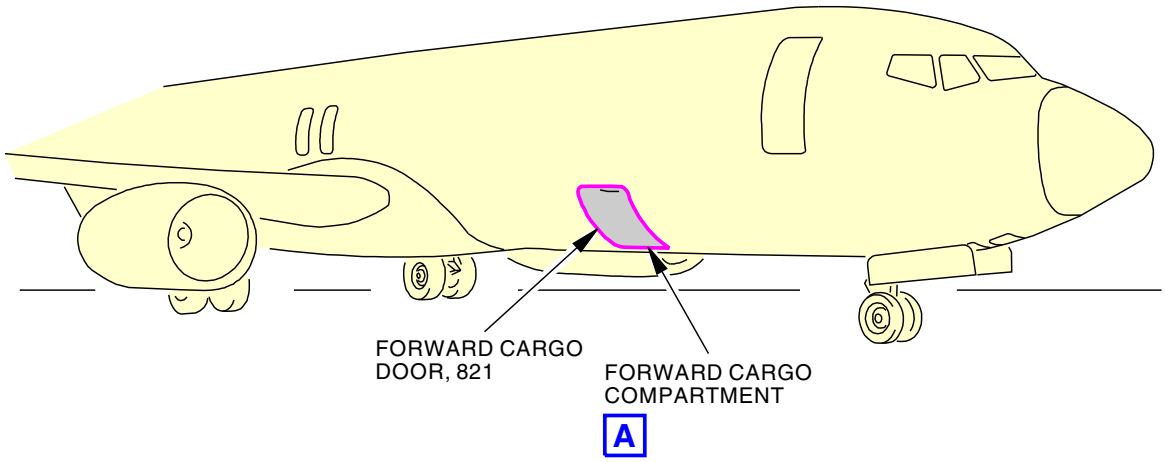
**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

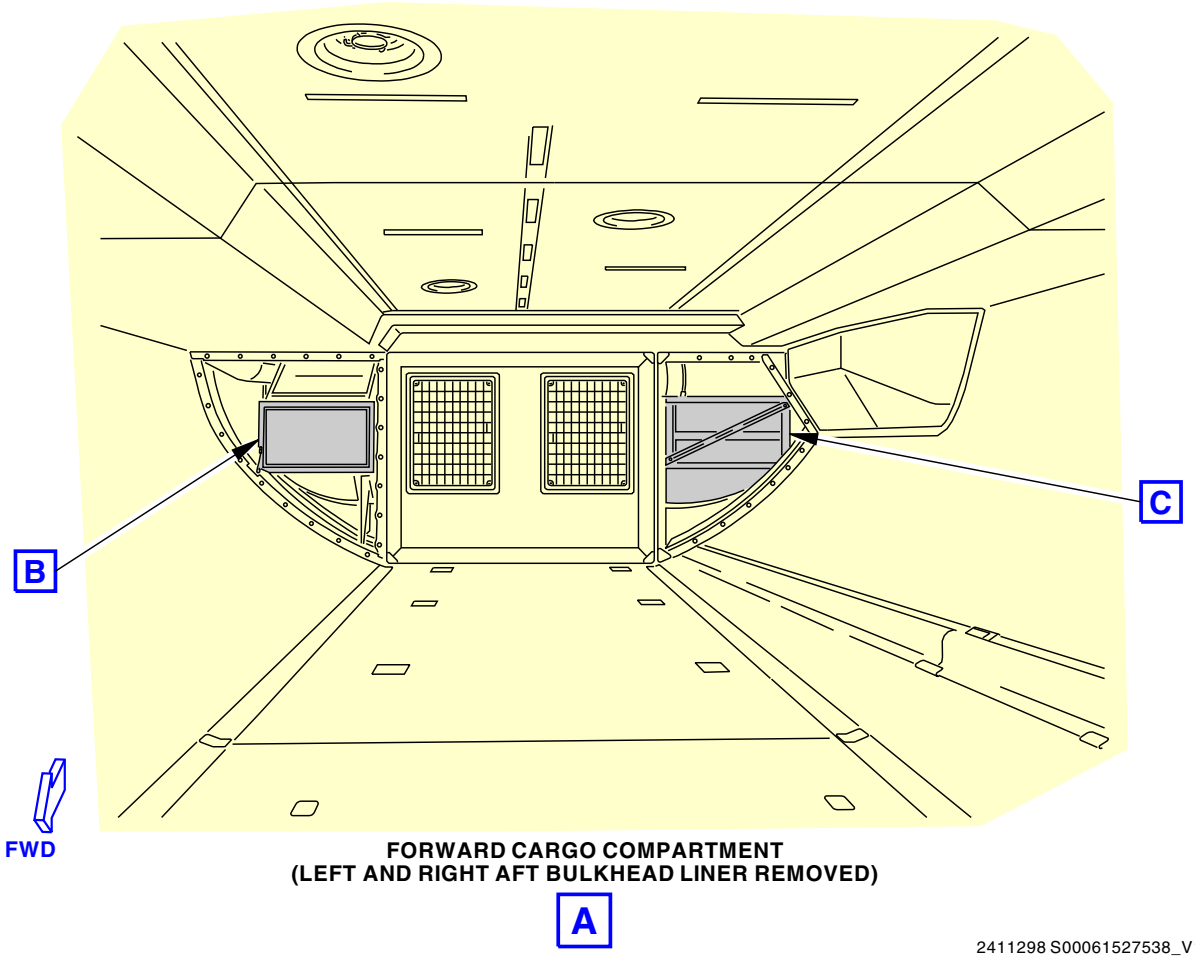
(4) Clean your hands with soap and running hot water.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



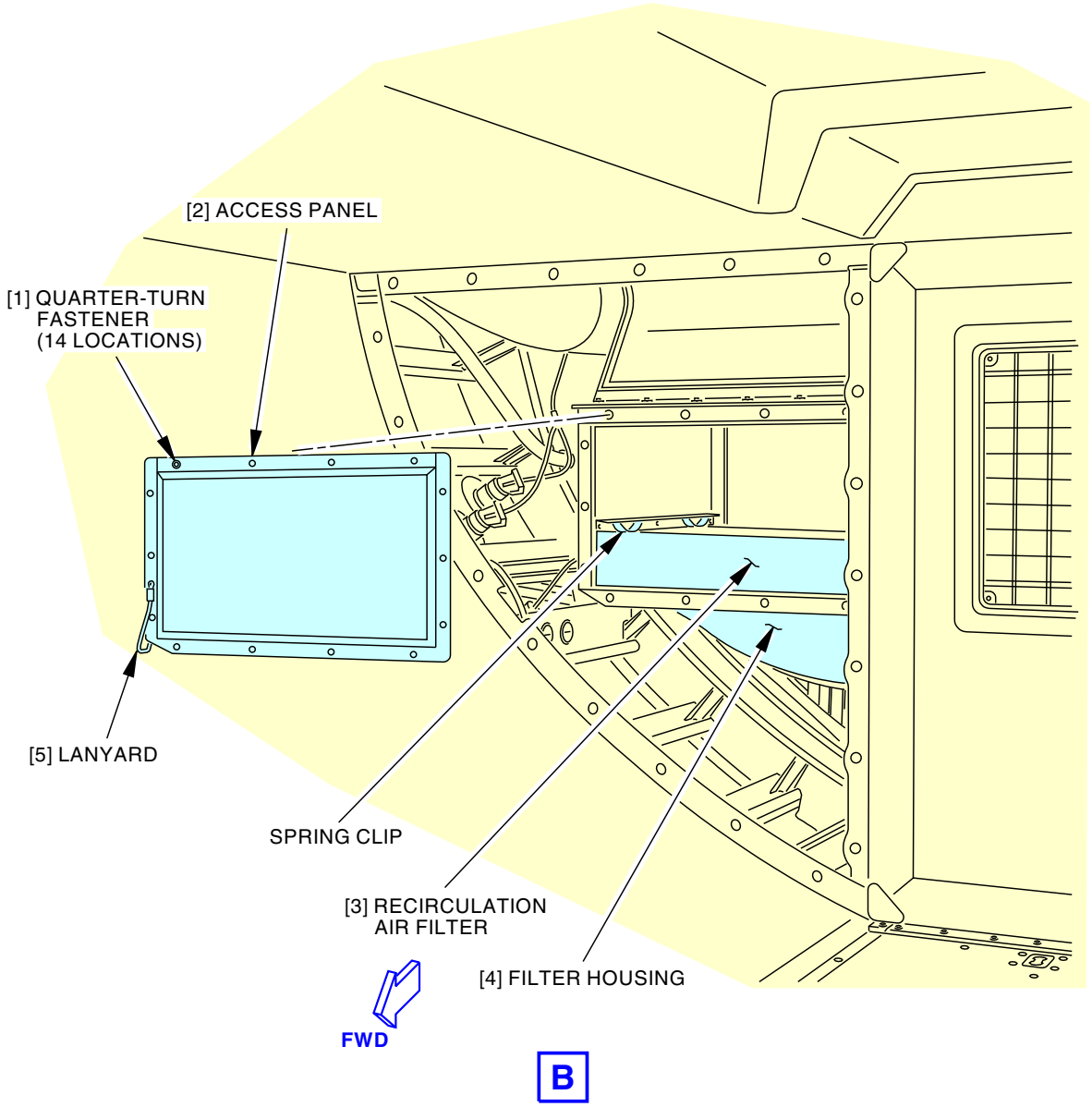




2411298 S00061527538_V1

**Recirculation Air Filter Installation**
**Figure 401/21-25-01-990-801 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

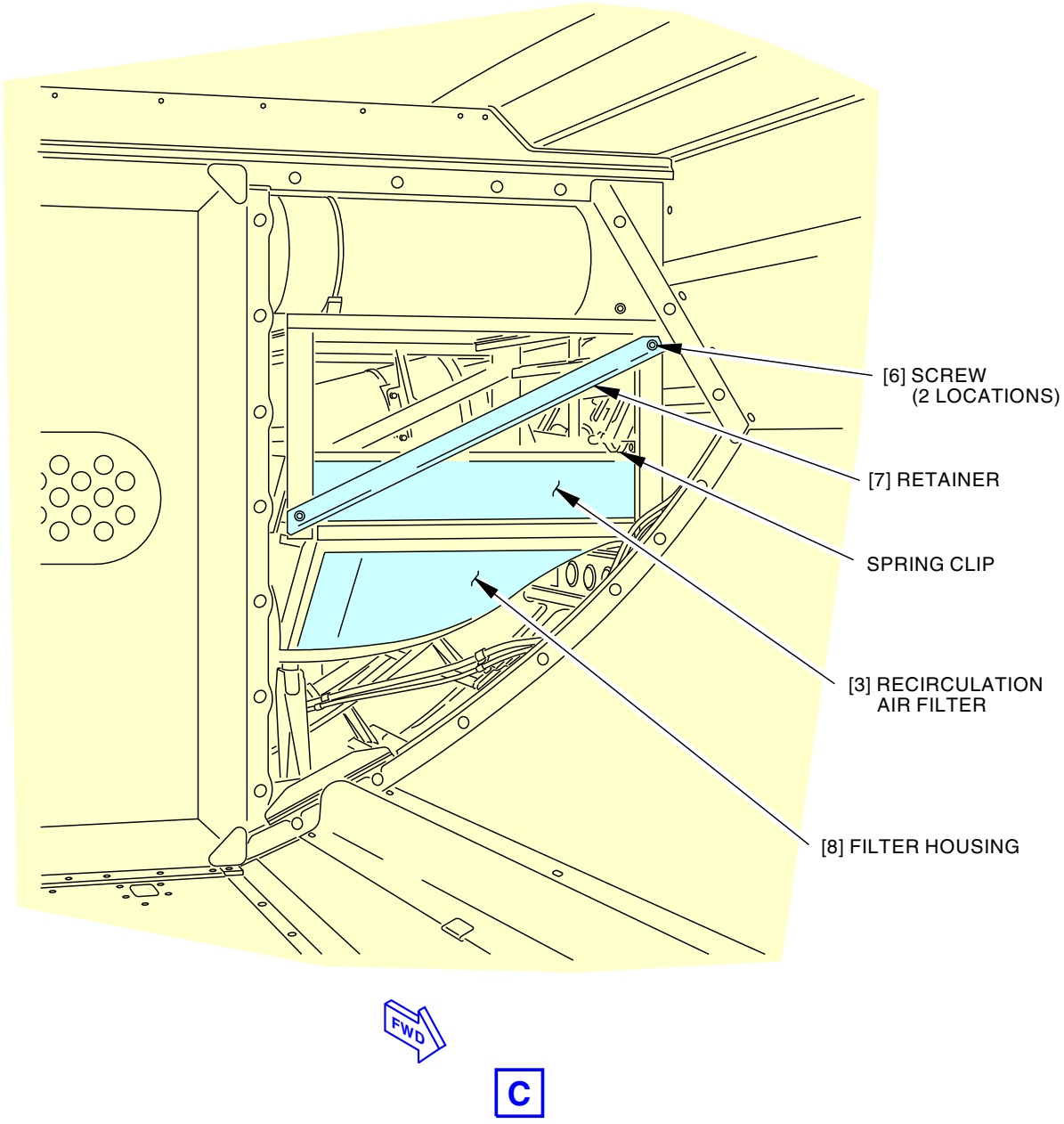



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**Recirculation Air Filter Installation**
**Figure 401/21-25-01-990-801 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Recirculation Air Filter Installation**
**Figure 401/21-25-01-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-25-01-400-801**

## 3. Recirculation Air Filter - Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

### A. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 3 | Recirculation air filter | 21-25-01-01-465 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

### D. Recirculation Air Filter Installation

**SUBTASK 21-25-01-420-001**

(1) Install the left recirculation air filter [3].

(a) Make sure that there is no unwanted material or contamination in the filter housing [8] which could cause damage to the recirculation fan.

**CAUTION**

DO NOT LET THE RECIRCULATION FILTER TOUCH THE WIRE BUNDLE THAT IS IMMEDIATELY FORWARD OF THE FILTER. THE FORWARD AND AFT LOWER OUTBOARD CORNERS OF THE FILTER HAVE SHARP EDGES. THE SHARP EDGES CAN CUT THE INSULATION ON THE WIRE BUNDLE.

(b) Put the new recirculation air filter [3] in the filter housing [8].

(c) Check the spring clips.

1) Make sure that the spring clips apply pressure to keep the recirculation air filter [3] in position.

2) Make sure that all spring clips are installed and not damaged.

(d) Hold the retainer [7] in its position on the filter housing [8].

(e) Install the two screws [6] for the retainer [7] on the filter housing [8].

**SUBTASK 21-25-01-420-002**

(2) Install the right recirculation air filter [3].

(a) Make sure that there is no unwanted material in the filter housing [4] which could cause damage to the recirculation air filter [3].

(b) Put the new recirculation air filter [3] in the filter housing [4].

(c) Check the spring clips.

1) Make sure that the spring clips apply pressure to keep the recirculation air filter [3] in position.

2) Make sure that all spring clips are installed and not damaged.



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(d) Put the access panel [2] in its position and turn the quarter-turn fasteners [1] to attach the access panel [2] to the filter housing [4].

## E. Put the Airplane Back to Its Usual Condition

SUBTASK 21-25-01-010-002

(1) Install the left and right aft bulkhead liners in the forward cargo compartment (TASK 50-11-02-400-801).

SUBTASK 21-25-01-865-002

(2) To restore recirculation fan operation after installation of the recirculation filter, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

SUBTASK 21-25-01-860-002

(3) Put the L RECIRC FAN and R RECIRC FAN switches, on the P5–10 panel, to the AUTO position and remove the DO-NOT-OPERATE tag.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

# RECIRCULATION FAN - REMOVAL/INSTALLATION

## 1. General

A. This procedure has these tasks:

(1) A removal of the recirculation fan.

(2) An installation of the recirculation fan.

B. There are two recirculation fans installed behind the liner at the aft end of the forward cargo compartment.

**TASK 21-25-02-000-801**

## 2. Recirculation Fan Removal

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

### C. Prepare for the Removal

**SUBTASK 21-25-02-860-001**

(1) To remove the left recirculation fan [1], do this step:

(a) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

**SUBTASK 21-25-02-860-002**

(2) To remove the right recirculation fan [1], do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**SUBTASK 21-25-02-010-001**

(3) Remove the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

### D. Recirculation Fan Removal

**SUBTASK 21-25-02-020-001**

(1) Disconnect the electrical connector [4] from the recirculation fan [1].



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SUBTASK 21-25-02-020-002

(2) Remove the nut [10], washer [9], and washer [8].

SUBTASK 21-25-02-020-003

(3) Remove the bonding jumper [5] from the recirculation fan [1].

SUBTASK 21-25-02-020-004

(4) Remove the coupling [2] and sleeve [3].

SUBTASK 21-25-02-020-005

(5) Remove the coupling [6] and sleeve [7].

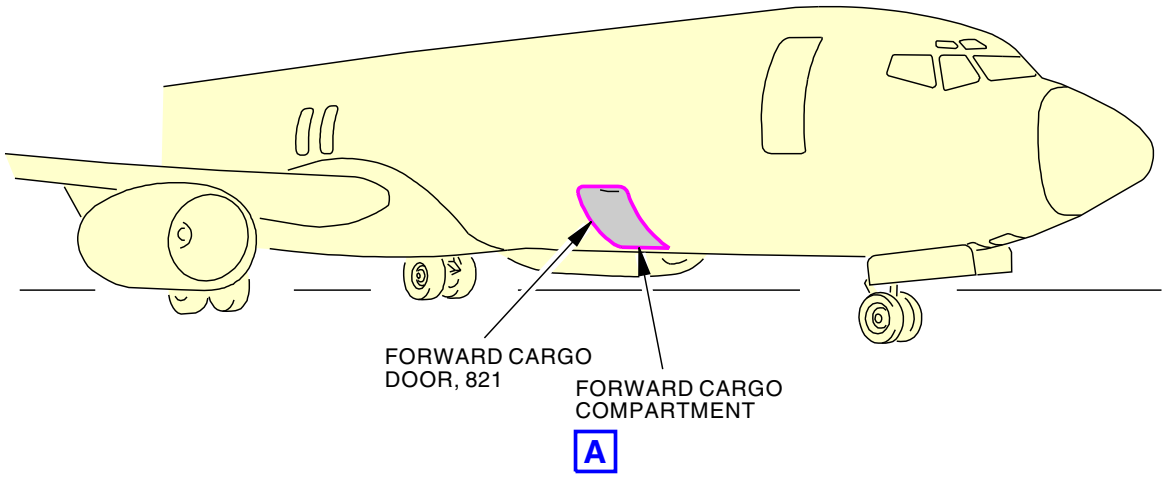
SUBTASK 21-25-02-020-006

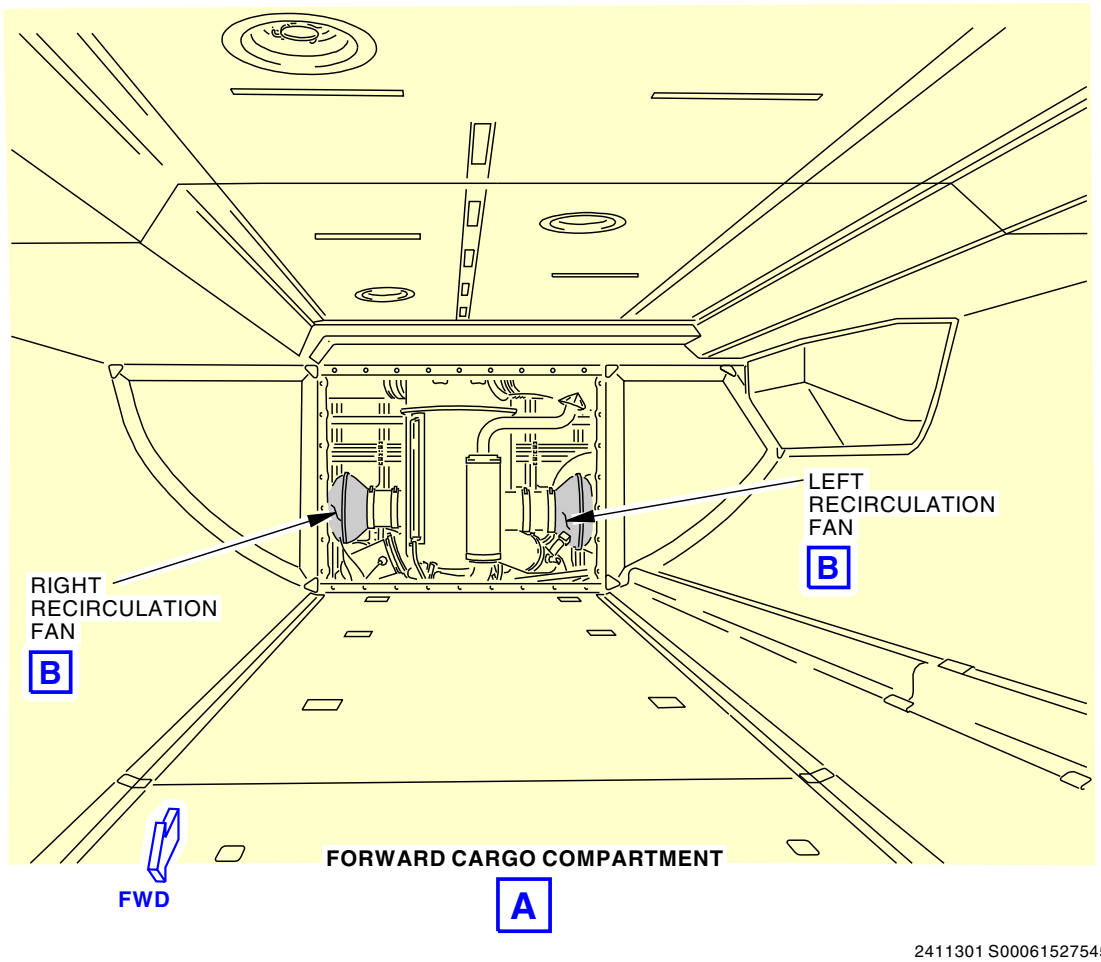
(6) Remove the recirculation fan [1].

——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details



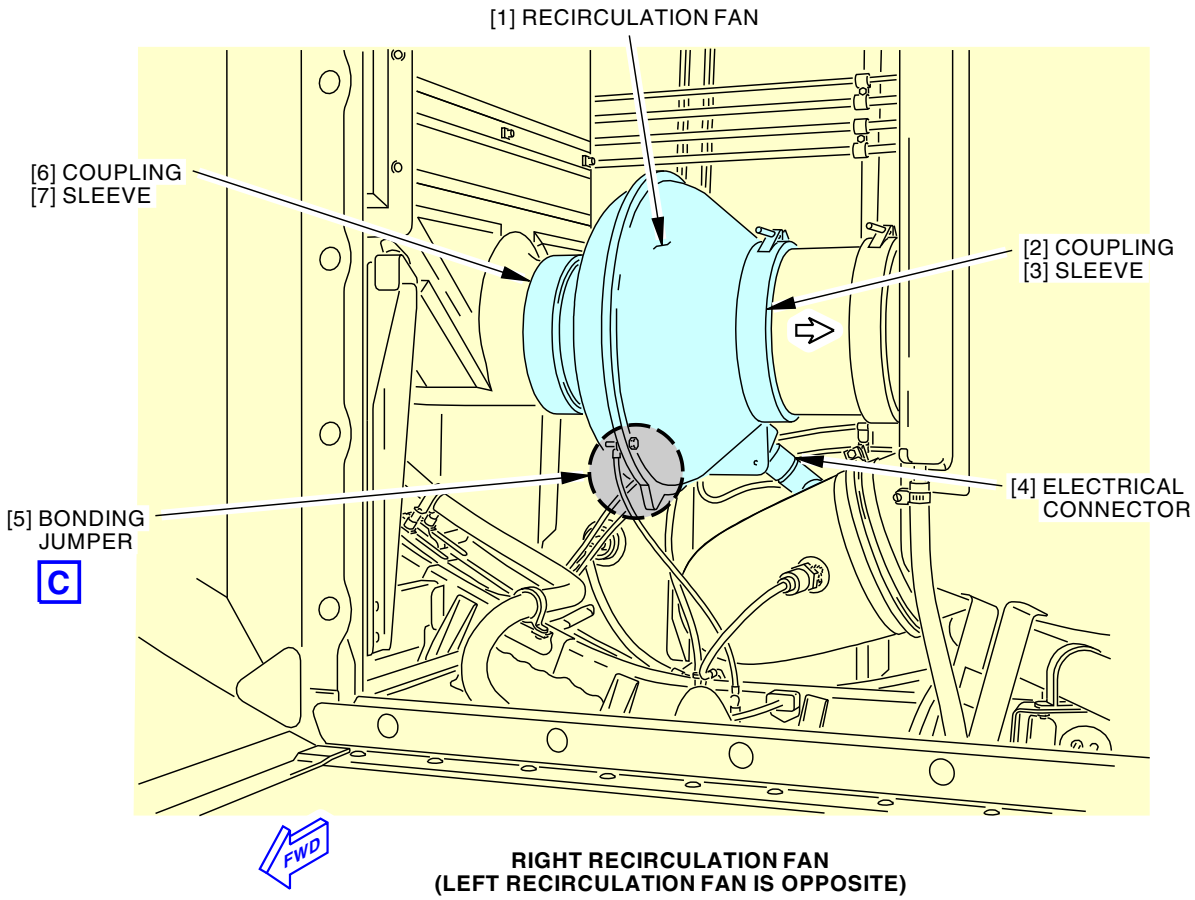




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**Recirculation Fan Installation**
**Figure 401/21-25-02-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Recirculation Fan Installation**
**Figure 401/21-25-02-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-25-02-400-801**

**3. Recirculation Fan Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-614 | Bonding Meters - Non-Intrinsically Safe (For use in outside Class I, Divisions I & II non-hazardous locations. For hazardous locations, use COM-1550).<br>Part #: 247000 Supplier: 00426<br>Part #: 620LK Supplier: 1CRL2<br>Part #: BLR-0003-XX Supplier: KC432<br>Part #: BT51 Supplier: 00426<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659<br>Opt Part #: 247001 Supplier: 00426 |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Recirculation fan | 21-25-02-08-100 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

**E. Recirculation Fan Installation**

**SUBTASK 21-25-02-980-001**

(1) Put the recirculation fan [1] in its position:

(a) Put the recirculation fan [1] in position so the flow arrow points inboard.

(b) Turn the recirculation fan [1] so you can install the electrical connector [4] and bonding jumper [5].

**SUBTASK 21-25-02-420-001**

(2) Install the sleeve [7] and coupling [6].

(a) Tighten the nut on the coupling [6] to 45 in-lb (5 N·m) - 55 in-lb (6 N·m).

**SUBTASK 21-25-02-420-002**

(3) Install the sleeve [3] and coupling [2].

(a) Tighten the nut on the coupling [2] to 45 in-lb (5 N·m) - 55 in-lb (6 N·m).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-25-02-420-003

(4) Do these steps to install the bonding jumper [5] on the recirculation fan [1]:

(a) Use the solvent cleaning method to clean these parts:

1) The bonding post
2) The terminal of the bonding jumper [5]
3) The washer [8]
4) The washer [9]
5) The nut [10].

(b) Put washer [8] and bonding jumper [5] in its position on the bonding post of the recirculation fan [1].

(c) Install the washer [9] and nut [10].

SUBTASK 21-25-02-760-001

(5) Measure the electrical bonding resistance between the bonding jumper [5] and recirculation fan [1] (SWPM 20-20-00).

(a) Use a non-intrinsically safe bonding meter, COM-614.

(b) Make sure that the electrical bonding resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 21-25-02-420-004

(6) Install the electrical connector [4] on the recirculation fan [1].

## F. Recirculation Fan Installation Test

SUBTASK 21-25-02-860-003

(1) If it is necessary, do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-25-02-860-004

(2) Make sure that the GALLEY switch, on the P5-13 electrical meters, battery and galley power panel, is set at the ON position.

SUBTASK 21-25-02-860-005

(3) If the left recirculation fan [1] was replaced, do this step:

(a) Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |
| E | 9 | C01156 | A/C RECIRC FAN LEFT CONT |

SUBTASK 21-25-02-860-006

(4) If the right recirculation fan [1] was replaced, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 2 | C01023 | A/C RECIRC FAN RIGHT CONT. |
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

SUBTASK 21-25-02-860-007

(5) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are in the OFF position.



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SUBTASK 21-25-02-860-008

(6) Put the applicable RECIRC FAN switch, on the P5-10 air conditioning panel, to the AUTO position.

SUBTASK 21-25-02-710-001

(7) Make sure that the recirculation fan [1] operates.

(a) Put your hand on the fan to feel for vibration.

NOTE: If you feel vibration, the fan is on.

SUBTASK 21-25-02-790-001

(8) Make sure there are no leaks around the fan connections.

(a) If you find a leak, repair it.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-25-02-410-001

(1) Install the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## RECIRCULATION FAN CHECK VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the recirculation fan check valve.

(2) An installation of the recirculation fan check valve.

B. There are two recirculation fan check valves installed behind the liner at the aft end of the forward cargo compartment.

**TASK 21-25-03-000-801**

### 2. Recirculation Fan Check Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

**C. Prepare for the Removal**

**SUBTASK 21-25-03-860-001**

(1) Put the L RECIRC FAN and the R RECIRC FAN switches, on the P5-10 air conditioning panel, to the OFF position.

**SUBTASK 21-25-03-860-002**

(2) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**SUBTASK 21-25-03-860-003**

(3) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

**SUBTASK 21-25-03-010-001**

(4) Open the forward cargo door.

**SUBTASK 21-25-03-010-002**

(5) Remove the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## D. Recirculation Fan Check Valve Removal

**SUBTASK 21-25-03-020-001**

(1) Remove the coupling [2] and sleeve [3] at two locations.

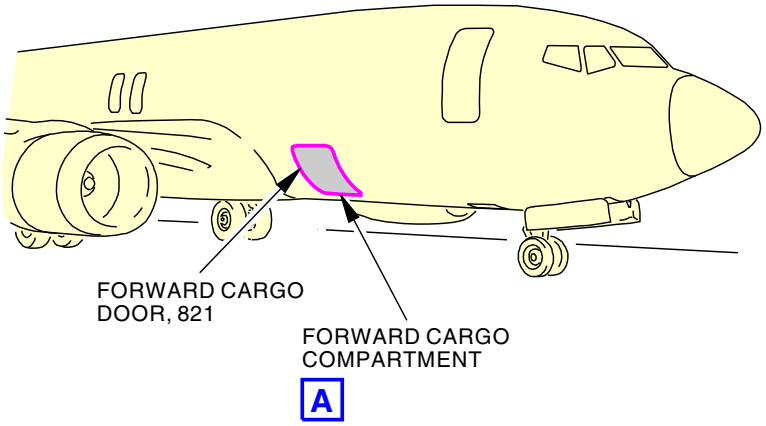
**SUBTASK 21-25-03-020-002**

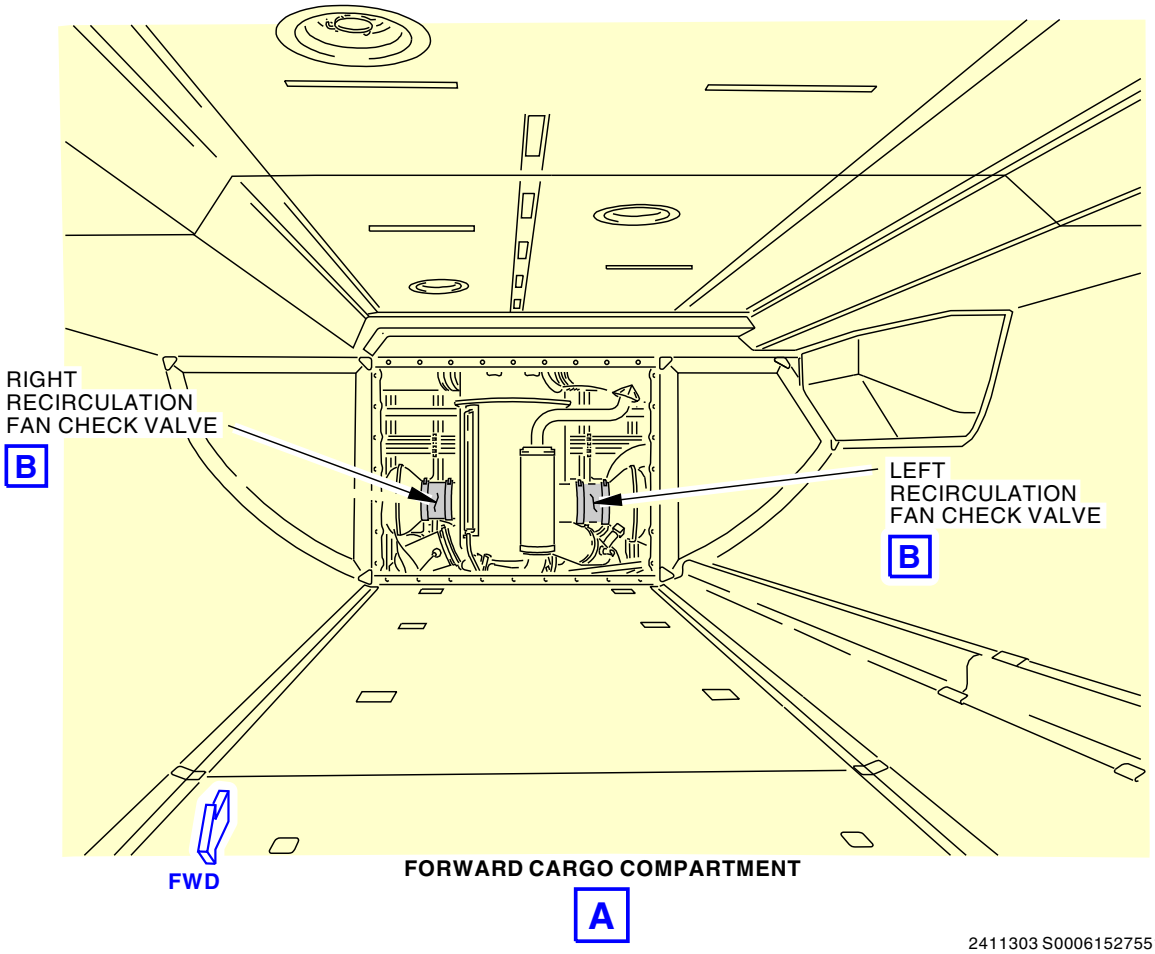
(2) Remove the recirculation fan check valve [1].

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



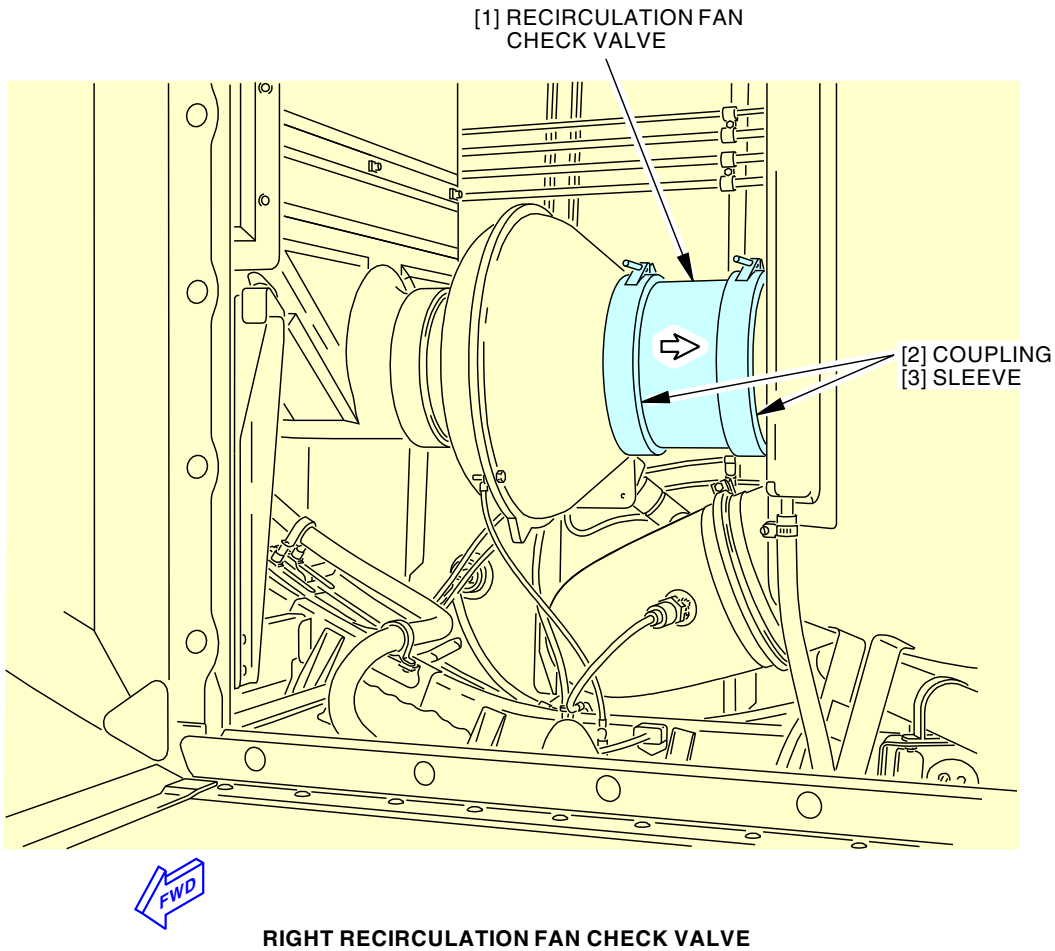




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**Recirculation Fan Check Valve Installation**
**Figure 401/21-25-03-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RIGHT RECIRCULATION FAN CHECK VALVE**
**(LEFT RECIRCULATION FAN CHECK VALVE IS OPPOSITE)**

B

2411304 S00061527552_V1

**Recirculation Fan Check Valve Installation**
**Figure 401/21-25-03-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-25-03-400-801**

## 3. Recirculation Fan Check Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

### C. Recirculation Fan Check Valve Installation

**SUBTASK 21-25-03-420-001**

(1) Put the recirculation fan check valve [1] in its position.

(a) Make sure that the flapper valve shaft is in the vertical position.

NOTE: Installation with the flapper valve shaft in horizontal position reduces the ease of operation of the check valve.

(b) Make sure that the flow arrow points inboard.

**SUBTASK 21-25-03-420-002**

(2) Install the coupling [2] and sleeve [3] at two locations.

(a) Tighten the nut on the coupling [2] to 45 in-lb (5 N·m) - 55 in-lb (6 N·m).

### D. Recirculation Fan Check Valve Leakage Test

**SUBTASK 21-25-03-860-005**

(1) Make sure that the CAB/UTIL switch, on the P5-13 electrical meters, battery and galley power panel, is set at the ON position.

**SUBTASK 21-25-03-860-006**

(2) Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 7 | C00911 | A/C RECIRC FAN LEFT CABIN AIR |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 4 | C00884 | AC RECIRC RIGHT FAN CABIN AIR |

**SUBTASK 21-25-03-860-007**

(3) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

**SUBTASK 21-25-03-860-008**

(4) Put the applicable L or R RECIRC FAN switch, on the P5-10 air conditioning panel, to the AUTO position.

**SUBTASK 21-25-03-790-001**

(5) Make sure there are no leaks around the check valve connections.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) If you find a leak, repair it.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-25-03-410-001**

(1) Install the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).

**SUBTASK 21-25-03-010-003**

(2) Close the forward cargo door.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## RECIRCULATION FAN CHECK VALVE - INSPECTION/CHECK

### 1. General

A. This procedure has this task:

(1) An inspection of the recirculation fan check valve.

**TASK 21-25-03-200-801**

### 2. Recirculation Fan Check Valve Inspection

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

**A. General**

(1) This task has the steps to inspect the recirculation fan check valve.

**B. References**

| Reference | Title |
|---|---|
| 21-25-03-000-801 | Recirculation Fan Check Valve Removal (P/B 401) |
| 21-25-03-400-801 | Recirculation Fan Check Valve Installation (P/B 401) |

**C. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-625 | Pen |

**D. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |

**E. Prepare for the Inspection**

**SUBTASK 21-25-03-020-003**

(1) Do this task: Recirculation Fan Check Valve Removal, TASK 21-25-03-000-801.

**F. Recirculation Fan Check Valve Inspection**

**SUBTASK 21-25-03-210-001**

(1) Examine the recirculation fan check valve:

(a) Use your finger or a pen, STD-625, to push on each flapper to open them.

(b) Make sure that each flapper opens freely and moves smoothly to the stop tube.

(c) Make sure that each flapper closes smoothly and touches fully on the face of the check valve body.

(d) Make sure that there is no damage to the flappers:

1) Measure the thickness of the area on the flappers where the flappers contact the stop tube.

2) Make sure that the stop tube contact area on the flappers is a minimum of 0.020 in. (0.508 mm) thick.

3) Repair or replace check valves that do not meet the minimum thickness.

(e) Make sure that there is no corrosion or lint on the flappers or the hinge pin.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**G. Put the Airplane Back to Its Usual Condition**

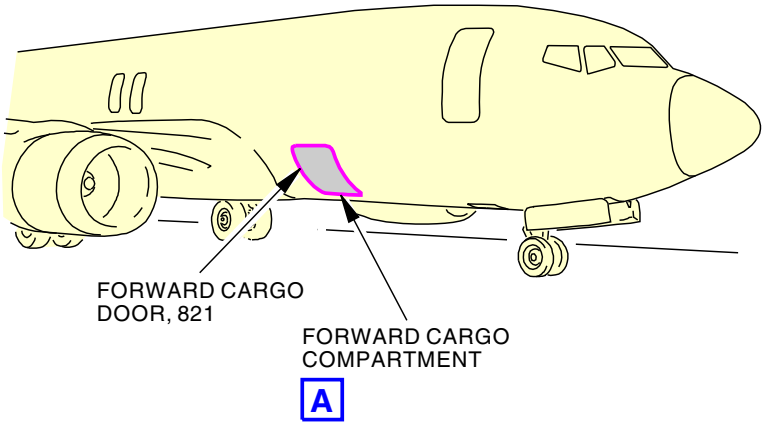
**SUBTASK 21-25-03-420-003**

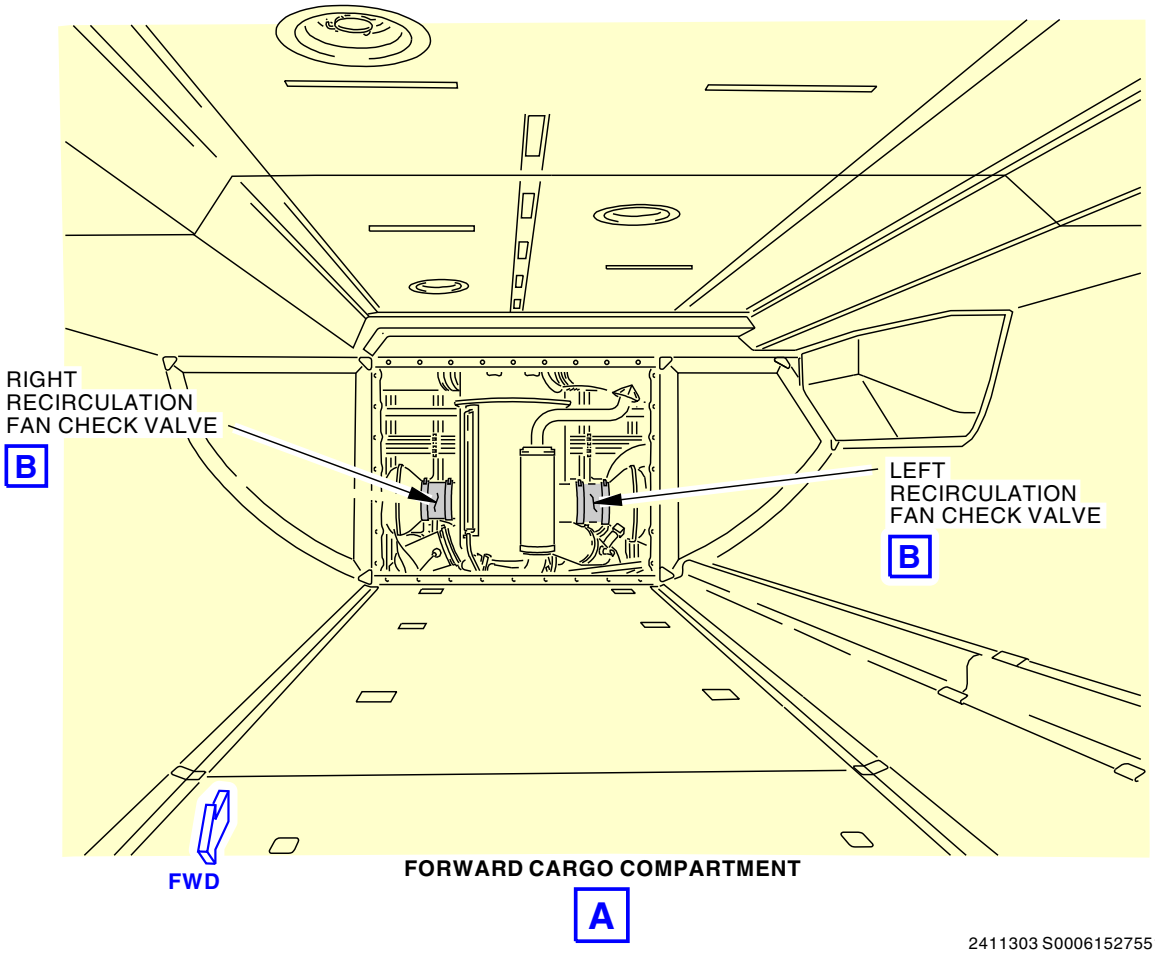
(1) Do this task: Recirculation Fan Check Valve Installation, TASK 21-25-03-400-801.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



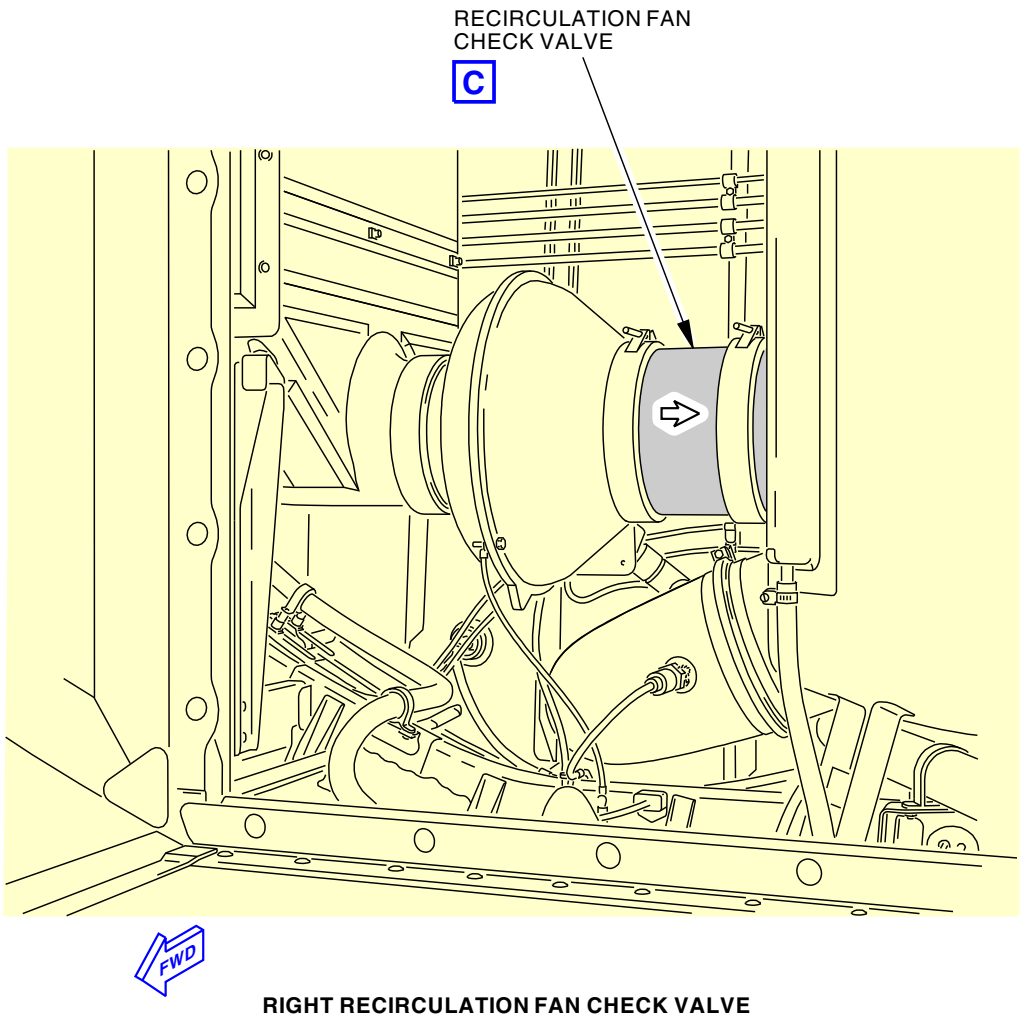




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**Recirculation Fan Check Valve Inspection**
**Figure 601/21-25-03-990-802 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RIGHT RECIRCULATION FAN CHECK VALVE**
**(LEFT RECIRCULATION FAN CHECK VALVE IS OPPOSITE)**

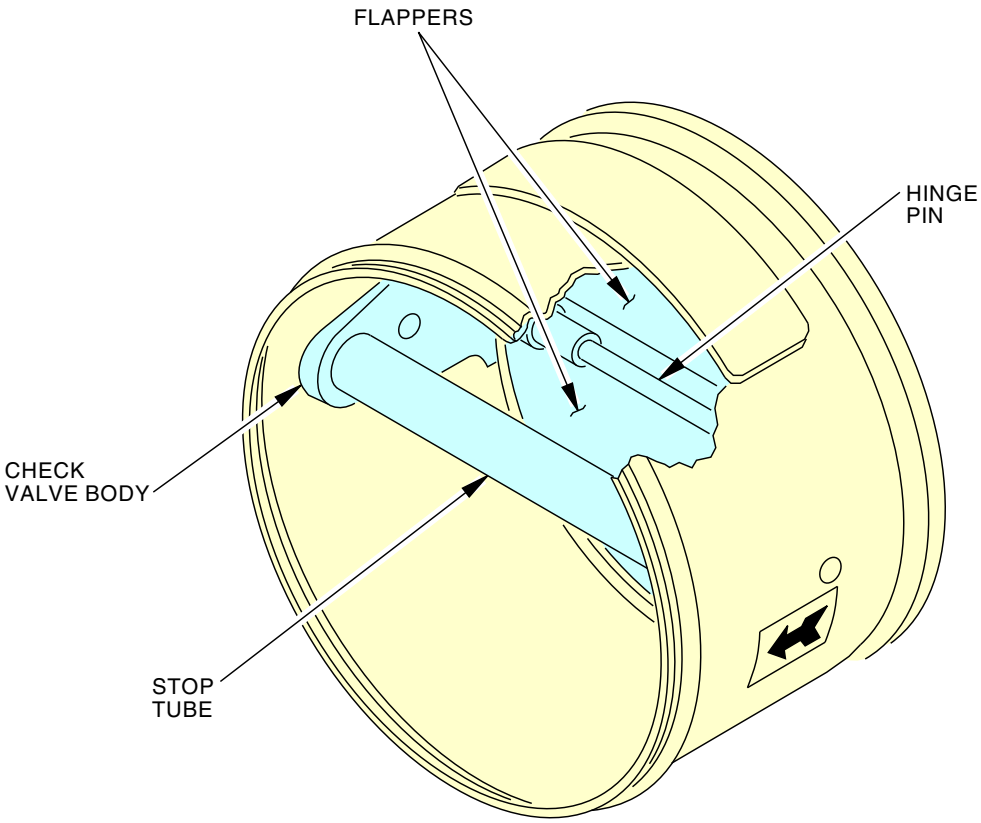
**B**

2536798 S0000602222_V2

**Recirculation Fan Check Valve Inspection**
**Figure 601/21-25-03-990-802 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RECIRCULATION FAN CHECK VALVE**

C

2411305 S00061527556_V1

**Recirculation Fan Check Valve Inspection**
**Figure 601/21-25-03-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## GALLEY VENTILATION MUFFLER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the forward and aft galley ventilation mufflers.

(2) An installation of the forward and aft galley ventilation mufflers.

B. There is a galley ventilation muffler installed above the lowered ceiling panels in the forward and aft entry ways.

**TASK 21-26-01-000-801**

### 2. Galley Ventilation Muffler Removal

(Figure 401, Figure 402)

#### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G50140 | Gloves - Protective, Latex or Nitrile | |

#### C. Location Zones

| Zone | Area |
|---|---|
| 220 | Subzone - Passenger Compartment - Body Station 259.50 to 360.00 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

#### D. Prepare for the Removal

**SUBTASK 21-26-01-940-001**

**WARNING** PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(1) Before you touch the muffler/duct assembly, put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140

**SUBTASK 21-26-01-010-001**

(2) Lower the forward or aft entry light assembly to get access to the forward or aft galley ventilation muffler, as applicable.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## E. Galley Ventilation Muffler Removal

**SUBTASK 21-26-01-010-002**

(1) Do these steps to remove the forward galley ventilation muffler [1] from above the forward lowered ceiling:

(a) Loosen the clamp [3].

(b) Remove the strap [6].

(c) Move the flex hose [2] and flex hose [5] away from the ends of the forward galley ventilation muffler [1].

(d) Remove the clamps [4].

(e) Remove the forward galley ventilation muffler [1].

**SUBTASK 21-26-01-020-001**

(2) Do these steps to remove the aft galley ventilation muffler [23] from above the aft lowered ceiling:

(a) Remove the strap [22] that attaches the flex hose [21] to the aft galley ventilation muffler [23].

(b) Remove the strap [25] that attaches the flex sleeve [24] to the aft galley ventilation muffler [23].

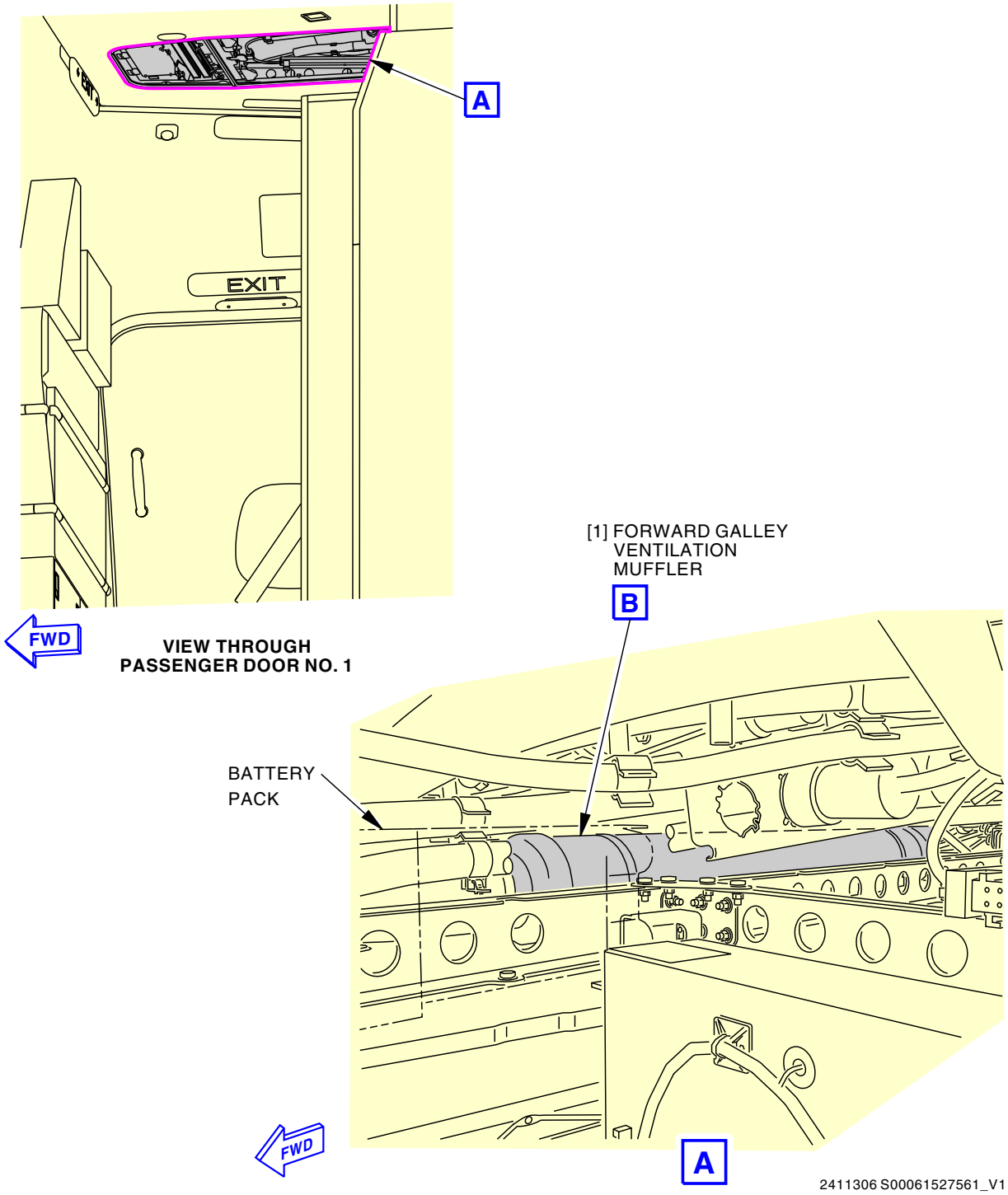
(c) Remove the straps [22] that attach the aft galley ventilation muffler [23] to the support structure.

(d) Remove the aft galley ventilation muffler [23].

**——— END OF TASK ———**



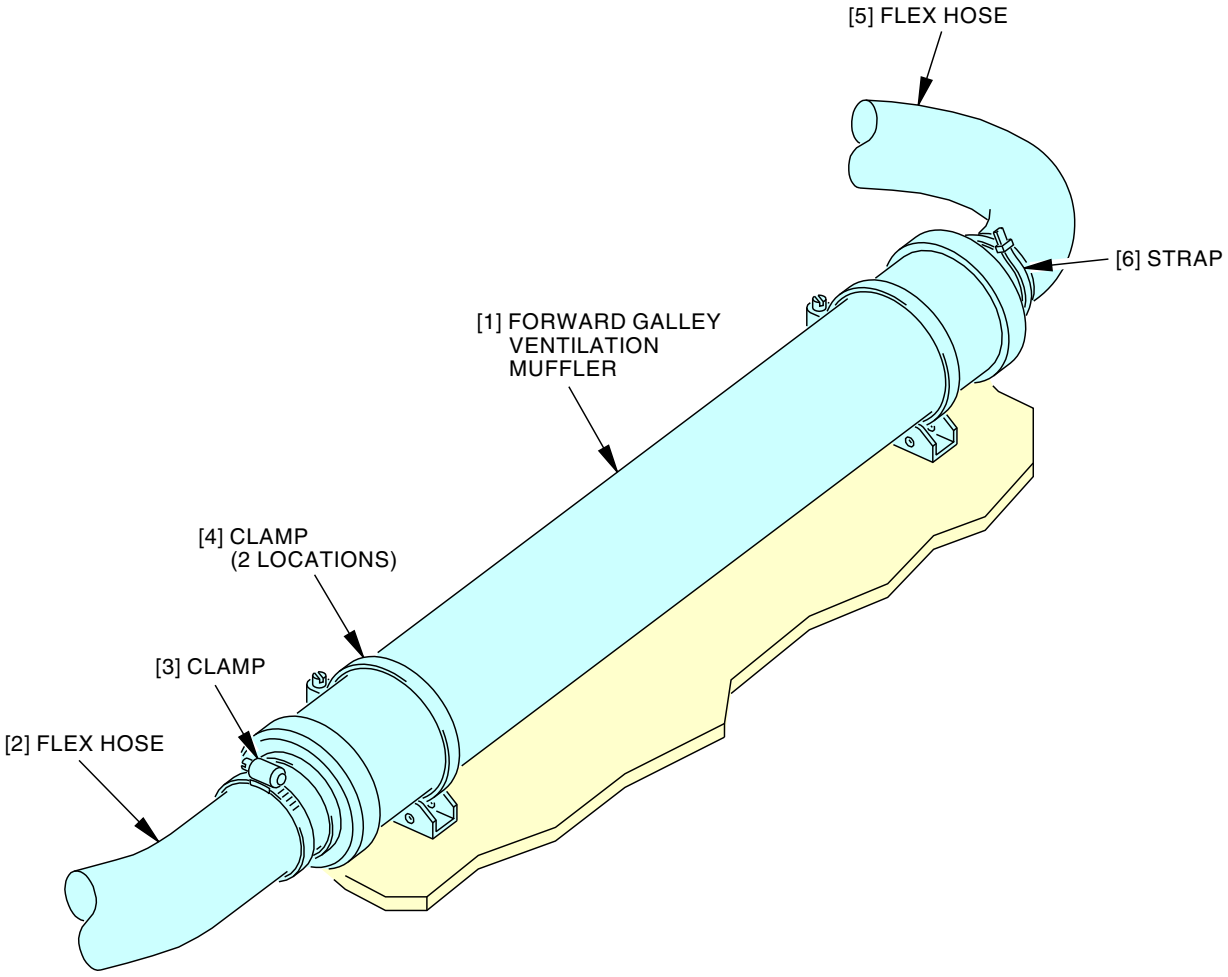
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Forward Galley Ventilation Muffler Installation**
**Figure 401/21-26-01-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**FORWARD GALLEY VENTILATION MUFFLER**

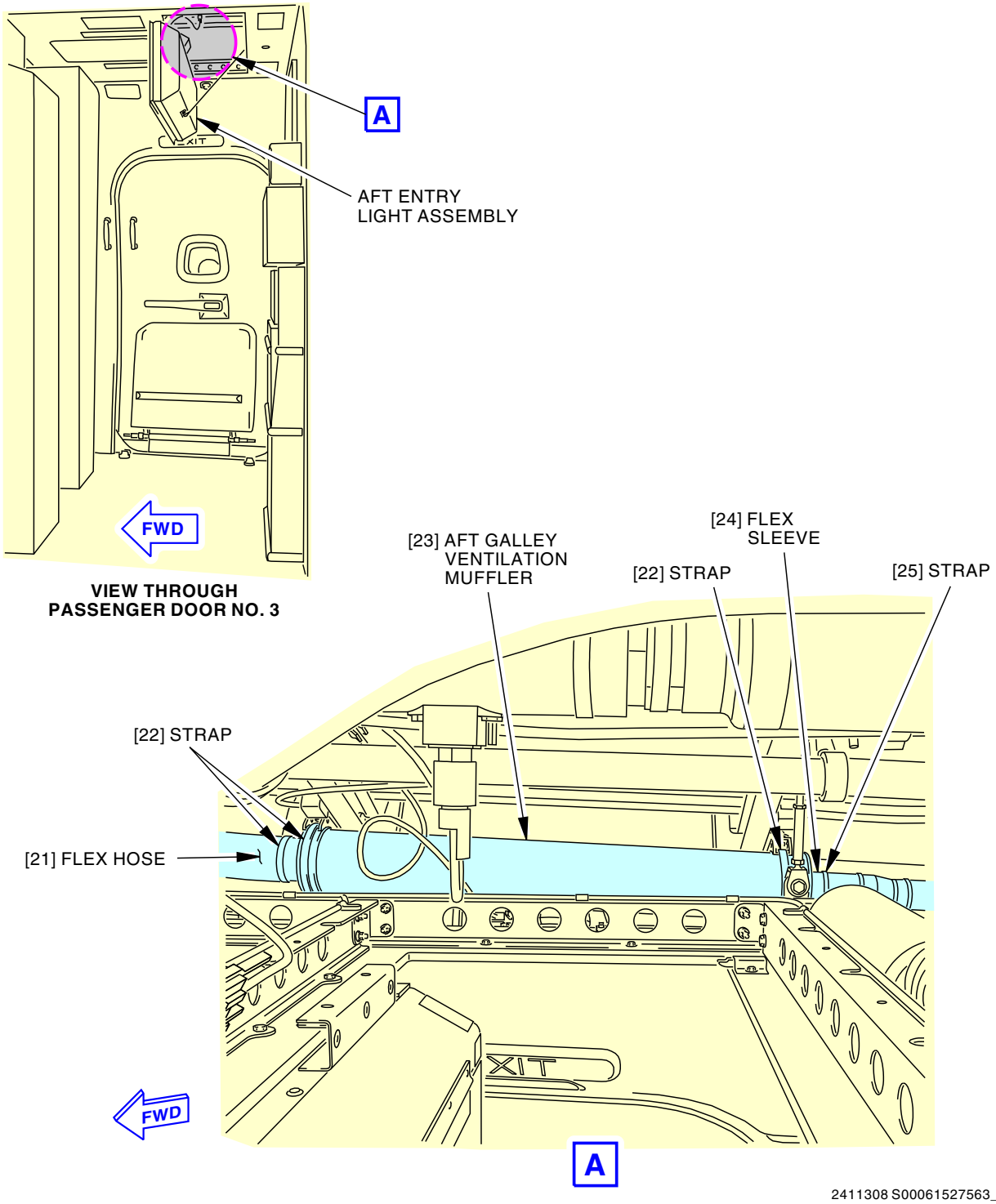
**B**

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**Forward Galley Ventilation Muffler Installation**
**Figure 401/21-26-01-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Aft Galley Ventilation Muffler Installation**
**Figure 402/21-26-01-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-26-01-400-801**

**3. Galley Ventilation Muffler Installation**

(Figure 401, Figure 402)

**A. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Forward galley ventilation muffler | 21-26-01-10-010 | SIA ALL |
| 6 | Strap | 21-26-51-03-035 | SIA 006-999 |
| | | 21-26-51-09-055 | SIA 001-005 |
| 22 | Strap | 21-26-51-03-035 | SIA 006-999 |
| | | 21-26-51-09-055 | SIA 001-005 |
| | | 21-26-51-09-062 | SIA 001-005 |
| 23 | Aft galley ventilation muffler | 21-26-51-03-145 | SIA 006-999 |
| | | 21-26-51-09-090 | SIA 001-005 |
| 25 | Strap | 21-26-51-03-030 | SIA 006-999 |
| | | 21-26-51-09-060 | SIA 001-005 |

**B. Location Zones**

| Zone | Area |
|---|---|
| 220 | Subzone - Passenger Compartment - Body Station 259.50 to 360.00 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

**C. Galley Ventilation Muffler Installation**

**SUBTASK 21-26-01-420-001**

(1) Do these steps to install the forward galley ventilation muffler [1]:

(a) Put the forward galley ventilation muffler [1] in position on the lowered ceiling.

(b) Install the clamps [4].

(c) Move the flex hose [2] and flex hose [5] onto the ends of the forward galley ventilation muffler [1].

(d) Install the strap [6].

(e) Position the clamp [3] and tighten.

**SUBTASK 21-26-01-420-002**

(2) Do these steps to install the aft galley ventilation muffler [23]:

(a) Put the aft galley ventilation muffler [23] into its position on the support structure.

(b) Install the straps [22] to attach the aft galley ventilation muffler [23] to the support structure.

(c) Move the flex hose [21] and the flex sleeve [24] onto the ends of the aft galley ventilation muffler [23].

(d) Install the strap [25] to attach the flex sleeve [24] to the aft galley ventilation muffler [23].

(e) Install the strap [22] to attach the flex hose [21] to the aft galley ventilation muffler [23].

**SUBTASK 21-26-01-410-001**

(3) Close the forward or aft entry light assembly, as applicable.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-26-01-020-002

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(4) Remove all personal protective equipment and put them in a plastic bag, G00624. Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(a) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.

SUBTASK 21-26-01-110-001

**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(5) Clean your hands with soap and running hot water.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## GALLEY CEILING VENTILATION GRILL - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) A removal of the galley ceiling ventilation grill [1].

(2) A cleaning of the galley ceiling ventilation grill [1].

(3) An installation of the galley ceiling ventilation grill [1].

**TASK 21-26-03-000-801**

### 2. Galley Ceiling Ventilation Grill Removal

(Figure 201)

#### A. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

#### B. Prepare for the Removal

**SUBTASK 21-26-03-210-001**

(1) Locate the galley ventilation grill [1] in the ceiling of either the forward-passenger door entry-way or the aft-passenger door entry-way.

#### C. Galley Ceiling Ventilation Grill Removal

**SUBTASK 21-26-03-030-001**

(1) Remove the two screws [2] that retain the ventilation grill [1] to the plenum above the ceiling.

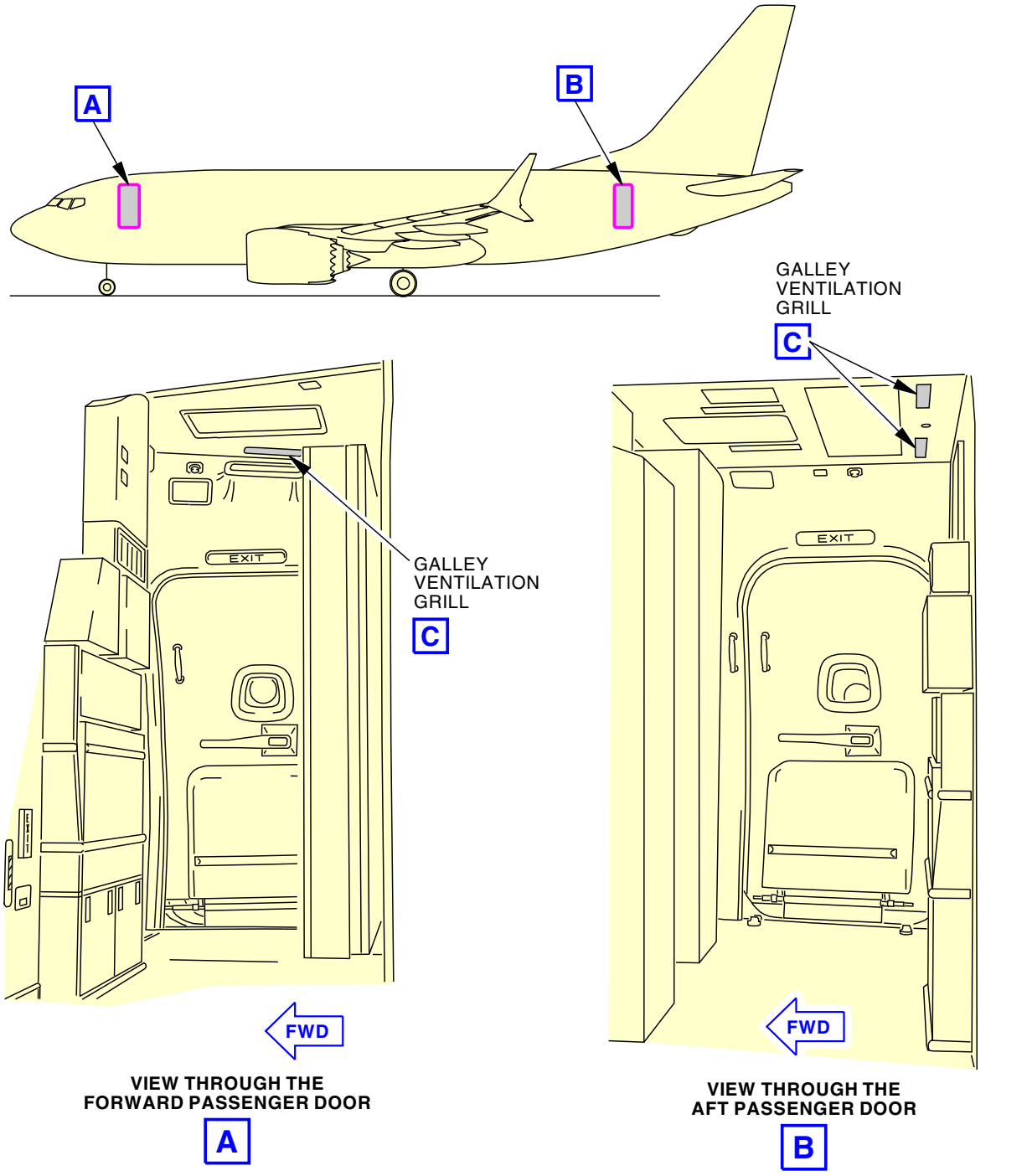
**SUBTASK 21-26-03-020-001**

(2) Remove the ventilation grill [1] from the ceiling.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

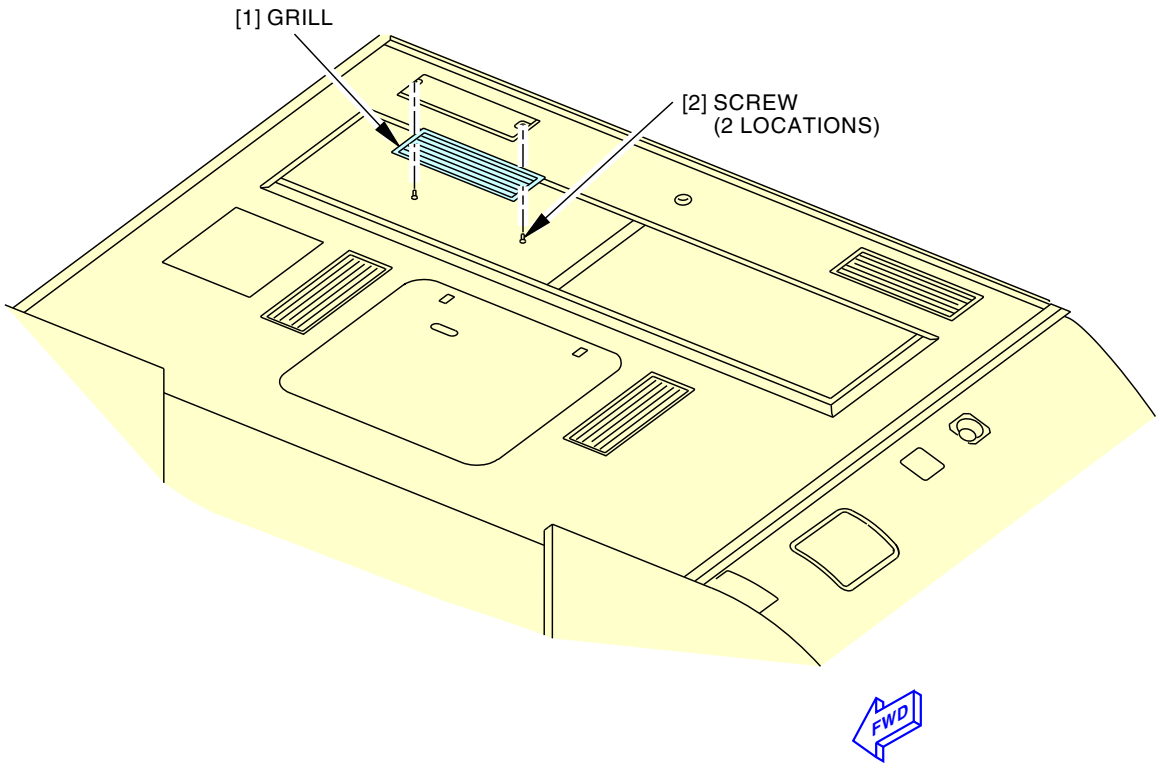



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**Galley Ceiling Ventilation Grill Removal**
**Figure 201/21-26-03-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**GALLEY VENTILATION GRILL**
**(EXAMPLE)**

C

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**Galley Ceiling Ventilation Grill Removal**
**Figure 201/21-26-03-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-26-03-100-801**

## 3. Galley Ceiling Ventilation Grill Cleaning

(Figure 201)

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00541 | Cleaner - General Purpose Household Detergent | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### B. Location Zones

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

### C. Prepare for the Cleaning

**SUBTASK 21-26-03-000-001**

(1) Remove the ventilation grill [1] to be cleaned from the ceiling of the forward-passenger entry-way or the aft-passenger entry-way (TASK 21-26-03-000-801).

### D. Galley Ceiling Ventilation Grill Cleaning

**SUBTASK 21-26-03-100-001**

(1) Do these steps to clean the ventilation grill [1]:

(a) Prepare a cleaning solution of a general purpose household detergent cleaner, B00541, diluted with water in accordance with the instructions on the detergent container.

(b) Clean the grill [1] with a cotton wiper, G00034, that is moist with the cleaning solution.

(c) If the cotton wiper, G00034, with the cleaning solution, did not remove all dirt deposits or contamination from the grill [1], clean the grill [1] with a cotton wiper, G00034, that is moist with alcohol, B00130.

(d) Flush the grill [1] with clean water until all traces of the detergent solution or alcohol are removed.

(e) Dry the grill [1] with a dry, clean cotton wiper, G00034.

### E. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-26-03-420-001**

(1) Install the ventilation grill [1] in the entry-way ceiling (TASK 21-26-03-400-801).

**——— END OF TASK ———**

**TASK 21-26-03-400-801**

## 4. Galley Ceiling Ventilation Grill Installation

(Figure 201)

### A. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Grill | 21-26-03-01-015 | SIA ALL |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**B. Location Zones**

| Zone | Area |
|---|---|
| 200 | Upper Half of Fuselage |

**C. Galley Ceiling Ventilation Grill Installation**

**SUBTASK 21-26-03-420-002**

(1) Put the ventilation grill [1] in its position in the ceiling in either the forward or aft passenger entry-way.

**SUBTASK 21-26-03-420-003**

(2) Install the two screws [2] to retain the ventilation grill [1] to the plenum above the ceiling.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## EQUIPMENT COOLING SYSTEM - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Equipment Cooling System - Deactivation

(2) Equipment Cooling System - Activation

**TASK 21-27-00-800-801**

### 2. Equipment Cooling System - Deactivation

(Figure 201)

#### A. General

(1) This task will deactivate these components in the equipment cooling system.

- Equipment Cooling Supply Fan
- Equipment Cooling Exhaust Fan
- Equipment Cooling Overboard Exhaust Valve

#### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Equipment Cooling System - Deactivation

**SUBTASK 21-27-00-860-177**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**SUBTASK 21-27-00-010-001**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-00-860-001

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open these circuit breakers and install safety tags:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00935 | EQPT CLG SPLY FAN PWR-ALTN |
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |
| D | 12 | C00837 | EQPT CLG EXH FAN PWR-ALTN |

SUBTASK 21-27-00-410-015

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

## F. Tryout

NOTE: This tryout is to make sure these components in the equipment cooling system are in a zero energy state.

- Equipment Cooling Supply Fan
- Equipment Cooling Exhaust Fan
- Equipment Cooling Overboard Exhaust Valve

NOTE: Wait a minimum of 60 seconds after deactivation before you do the tryout steps.

SUBTASK 21-27-00-860-002

(1) For the equipment cooling supply and exhaust fans, do these steps:

(a) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORM position.

(b) Make sure that the EQUIP COOLING EXHAUST switch on the Equipment Cooling Panel is in the NORM position.

(c) Make sure that the EQUIP COOLING SUPPLY OFF light is on.

(d) Make sure that the EQUIP COOLING EXHAUST OFF light is on.

(e) Put the EQUIP COOLING SUPPLY switch in the ALTN position.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(f) Put the EQUIP COOLING EXHAUST switch in the ALTN position.

(g) Wait a minimum of 60 seconds.

(h) Make sure that the EQUIP COOLING SUPPLY OFF light is on.

(i) Make sure that the EQUIP COOLING EXHAUST OFF light is on.

SUBTASK 21-27-00-860-003

(2) For the equipment cooling overboard exhaust valve, do these steps:

(a) Do this task: (Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803).

(b) Make sure that these switches, on the P5-10 Air Conditioning Panel, are in the AUTO position:

1) L RECIRC FAN

2) R RECIRC FAN

(c) Make sure that these switches, on the Equipment Cooling Panel, are in the NORM position:

1) EQUIP COOLING, EXHAUST

2) EQUIP COOLING, SUPPLY

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Do this task: (Put the Airplane in the Air Mode, TASK 32-09-00-860-801).

(e) Put these switches, on the air conditioning module, to the HIGH position:

1) L PACK

2) R PACK

(f) Put the L RECIRC FAN switch to the OFF position.

(g) Put the R RECIRC FAN switch to the OFF position.

(h) Make sure that the equipment cooling overboard exhaust valve is in the NORMAL position.

NOTE: Look at the indicator on the valve actuator to see the position of the valve.

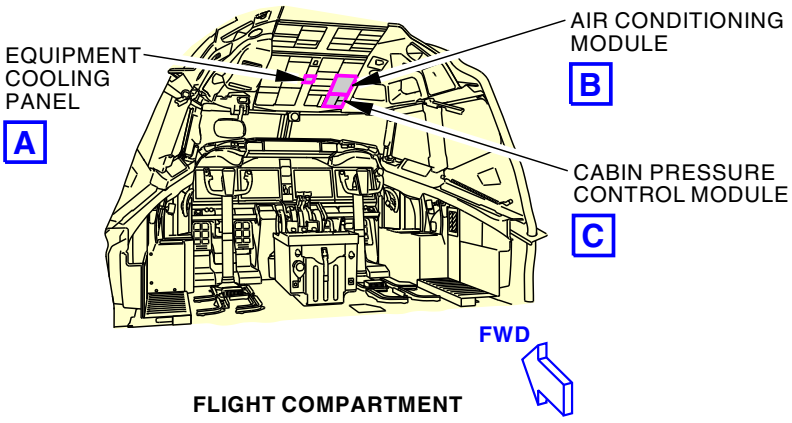
(i) Make sure that the equipment cooling overboard exhaust valve is NOT in the SMOKE position.

NOTE: Look at the indicator on the valve actuator to see the position of the valve.

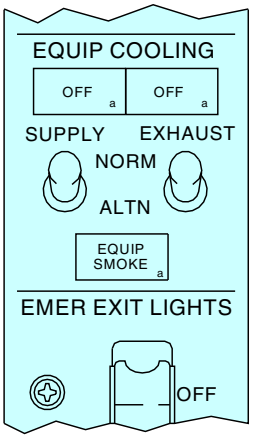
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

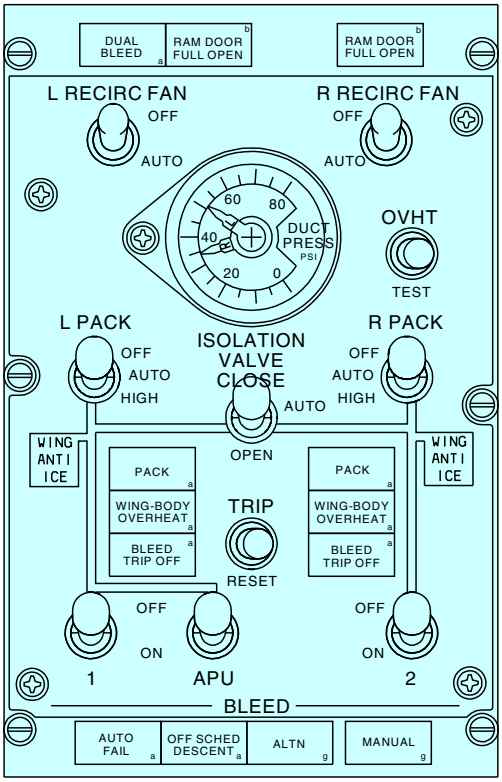



FLIGHT COMPARTMENT



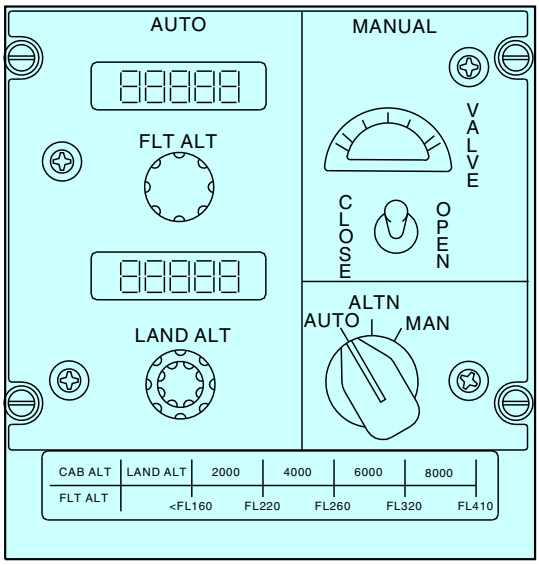

EQUIPMENT COOLING PANEL

A




AIR CONDITIONING MODULE

B




CABIN PRESSURE CONTROL MODULE

C

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**Equipment Cooling System**
**Figure 201/21-27-00-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-00-800-802**

## 3. Equipment Cooling System - Activation

(Figure 201)

### A. General

(1) This task will activate these components in the equipment cooling system.

- Equipment Cooling Supply Fan
- Equipment Cooling Exhaust Fan
- Equipment Cooling Overboard Exhaust Valve

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Equipment Cooling System - Activation

**SUBTASK 21-27-00-860-178**

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

**SUBTASK 21-27-00-010-011**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-27-00-860-004**

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**(WARNING PRECEDES)**

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Remove the safety tags and close these circuit breakers:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00935 | EQPT CLG SPLY FAN PWR-ALTN |
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |
| D | 12 | C00837 | EQPT CLG EXH FAN PWR-ALTN |

**SUBTASK 21-27-00-410-001**

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



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## EQUIPMENT COOLING SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tasks:

(1) Equipment Cooling Operational Tests

NOTE: You need to do these tasks to do a complete system test of the equipment cooling system.

(a) Equipment Cooling Low Flow Sensors Operational Test

(b) Equipment Cooling Fans Operational Test

(c) Equipment Cooling Overboard Exhaust Valve Operational Test.

(d) Flight Compartment Display Unit Air Flow Test

(2) Equipment Cooling Scheduled Maintenance Tests for Task Cards

NOTE: You do not need to do the scheduled maintenance tests for task cards to do a complete system test of the equipment cooling system.

(a) Alternate Equipment Cooling Supply Fan Operational Test

(b) Alternate Equipment Cooling Exhaust Fan Operational Test

(c) Equipment Cooling Overboard Exhaust Valve Smoke Clearance Mode Operational Test.

**TASK 21-27-00-700-801**

### 2. Equipment Cooling Low Flow Sensors - Operational Test

(Figure 501)

#### A. General

(1) This task does a test of the equipment cooling supply and exhaust low flow sensors.

#### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### D. Equipment Cooling Low Flow Sensors - Operational Test

**SUBTASK 21-27-00-860-133**

(1) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORM position.

**SUBTASK 21-27-00-860-134**

(2) Make sure that the EQUIP COOLING EXHAUST switch on the Equipment Cooling Panel is in the NORM position.

**SUBTASK 21-27-00-860-006**

(3) Make sure that the EQUIP COOLING SUPPLY and EXHAUST OFF lights on the Equipment Cooling Panel are not on.



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SUBTASK 21-27-00-710-001

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Do these steps to do a check of the equipment cooling supply low flow sensor:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(b) Open this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(c) Make sure that the EQUIP COOLING SUPPLY OFF light comes on after 20 to 60 seconds.

(d) Close this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(e) Make sure that the EQUIP COOLING SUPPLY OFF light goes out within 20 seconds.

SUBTASK 21-27-00-710-002

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Do these steps to do a check of the equipment cooling exhaust low flow sensor:


ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Open this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

(b) Make sure that the EQUIP COOLING EXHAUST OFF light comes on after 20 to 60 seconds.

(c) Close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

(d) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

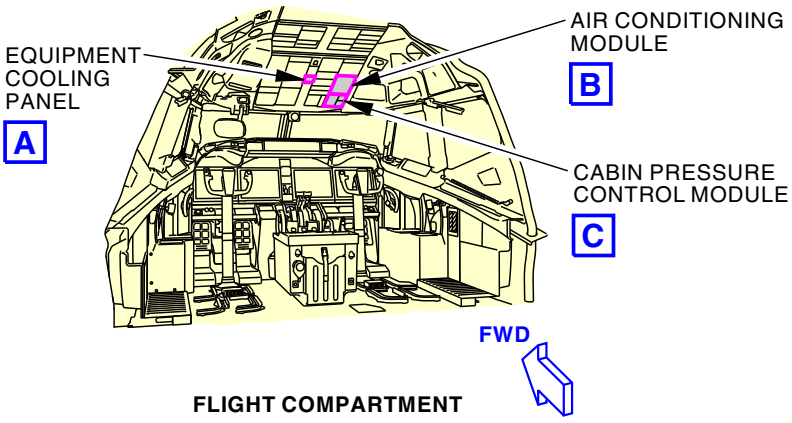
(e) Make sure that the EQUIP COOLING EXHAUST OFF light goes out within 20 seconds.

(f) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

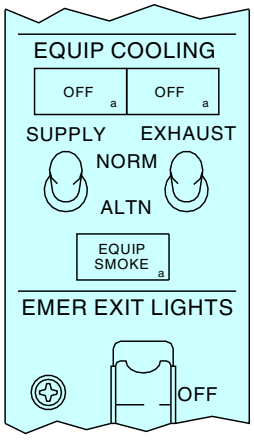
**——— END OF TASK ———**



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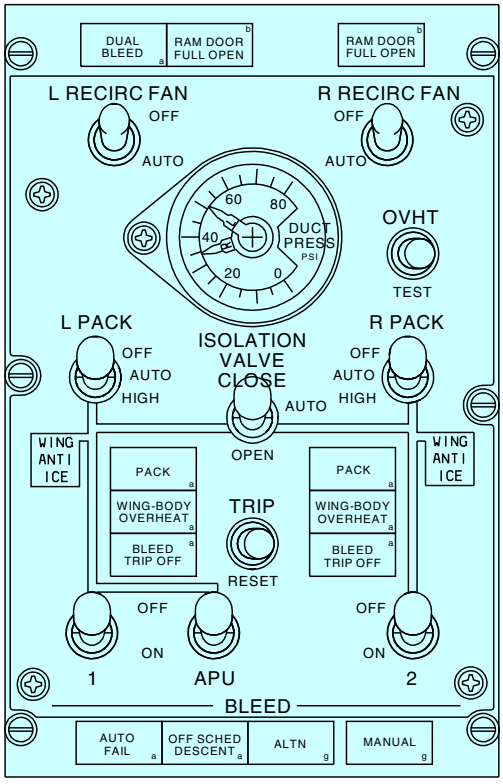



FLIGHT COMPARTMENT



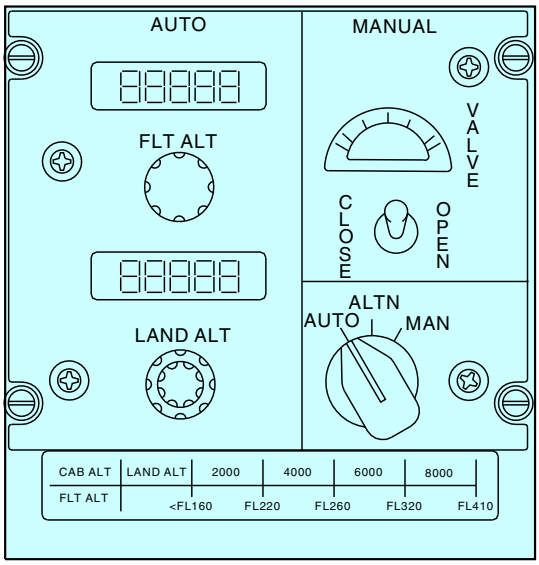

EQUIPMENT COOLING PANEL

A




AIR CONDITIONING MODULE

B




CABIN PRESSURE CONTROL MODULE

C

2411311 S00061527576_V1

**Equipment Cooling System - Adjustment/Test**
**Figure 501/21-27-00-990-802**



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**TASK 21-27-00-700-802**

## 3. Equipment Cooling Fans - Operational Test

(Figure 501)

### A. General

(1) This task does a test of these fans:

(a) Equipment cooling normal supply fan

(b) Equipment cooling alternate supply fan

(c) Equipment cooling normal exhaust fan

(d) Equipment cooling alternate exhaust fan

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Equipment Cooling Fans - Operational Test

**SUBTASK 21-27-00-860-010**

(1) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORM position.

**SUBTASK 21-27-00-860-011**

(2) Make sure that the EQUIP COOLING EXHAUST switch on the Equipment Cooling Panel is in the NORM position.

**SUBTASK 21-27-00-860-135**

(3) Make sure that the EQUIP COOLING SUPPLY and EXHAUST OFF lights on the Equipment Cooling Panel are not on.

**SUBTASK 21-27-00-010-008**

(4) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-27-00-860-012**

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**(WARNING PRECEDES)**

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Open this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

**SUBTASK 21-27-00-710-003**

(6) Make sure that the EQUIP COOLING SUPPLY OFF light comes on after 20 to 60 seconds.

**SUBTASK 21-27-00-860-013**

(7) Put the EQUIP COOLING SUPPLY switch in the ALTN position.

**SUBTASK 21-27-00-710-004**

(8) Make sure that the EQUIP COOLING SUPPLY OFF light goes out within 20 seconds.

**SUBTASK 21-27-00-860-014**

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(9) Close this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

**SUBTASK 21-27-00-860-015**

(10) Put the EQUIP COOLING SUPPLY switch in the NORM position.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-00-860-016

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(11) Open this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

SUBTASK 21-27-00-710-005

(12) Make sure that the EQUIP COOLING EXHAUST OFF light comes on after 20 to 60 seconds.

SUBTASK 21-27-00-860-017

(13) Put the EQUIP COOLING EXHAUST switch in the ALTN position.

SUBTASK 21-27-00-710-006

(14) Make sure that the EQUIP COOLING EXHAUST OFF light goes out within 20 seconds.

SUBTASK 21-27-00-860-018

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(15) Close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |



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SUBTASK 21-27-00-410-012

(16) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-27-00-860-019

(17) Put the EQUIP COOLING EXHAUST switch in the NORM position.

SUBTASK 21-27-00-860-020

(18) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

——— END OF TASK ———

**TASK 21-27-00-700-803**

## 4. Equipment Cooling Overboard Exhaust Valve - Functional Test

(Figure 501)

### A. General

(1) This task does a functional test of the equipment cooling overboard exhaust valve. The interfaces of the exhaust fans, supply fans and recirculation fans with the overboard exhaust valve system are also tested.

### B. References

| Reference | Title |
|---|---|
| 12-15-21-600-804 | Crew Oxygen Cylinder Replacement (P/B 301) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 821 | Forward Cargo Door |

### E. Prepare for the Functional Test

SUBTASK 21-27-00-010-002

(1) Get access to the equipment cooling overboard exhaust valve, the equipment cooling supply fans and the equipment cooling exhaust fans:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(b) Remove the access panel on the top of the raised platform that is just aft and outboard of the electronic equipment access door.



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(c) Remove the crew oxygen system cylinder (TASK 12-15-21-600-804).

SUBTASK 21-27-00-010-003

(2) Get access to the recirculation fan in the mix bay at the aft end of the forward cargo compartment:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

(b) Remove the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

## F. Equipment Cooling Overboard Exhaust Valve Functional Test

SUBTASK 21-27-00-860-136

(1) Make sure that the CAB/UTIL switch on the P5-13 Electrical meter, Battery and Galley Power Module is set to the ON position.

SUBTASK 21-27-00-860-023

(2) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

SUBTASK 21-27-00-860-024

(3) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-27-00-860-025

(4) Set the EQUIP COOLING SUPPLY and EXHAUST switches on the Equipment Cooling Panel to the NORM positions.

SUBTASK 21-27-00-860-026

(5) Set these switches on the P5-10 Air Conditioning Panel to the AUTO position:

(a) L PACK

(b) R PACK

(c) R RECIRC FAN.

SUBTASK 21-27-00-720-001

(6) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

SUBTASK 21-27-00-860-027



**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-27-00-860-028

(8) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the OFF position.

SUBTASK 21-27-00-720-002

(9) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.



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SUBTASK 21-27-00-860-029

(10) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the AUTO position.

SUBTASK 21-27-00-860-030

(11) Set the L PACK switch on the P5-10 Air Conditioning Panel to the HIGH position.

SUBTASK 21-27-00-720-003

(12) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-860-031

(13) Set the L PACK switch on the P5-10 Air Conditioning Panel to the AUTO position.

SUBTASK 21-27-00-860-032

(14) Set the R PACK switch on the P5-10 Air Conditioning Panel to the HIGH position.

SUBTASK 21-27-00-720-004

(15) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-860-033

(16) Set the L PACK switch on the P5-10 Air Conditioning Panel to the HIGH position.

SUBTASK 21-27-00-720-005

(17) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-006

(18) Make sure that equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-007

(19) Make sure that equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-860-034

(20) Put the EQUIP COOLING SUPPLY and EXHAUST fan switches to the ALTN positions.

SUBTASK 21-27-00-720-008

(21) Make sure that equipment cooling alternate exhaust fan, M99, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-009

(22) Make sure that the equipment cooling alternate supply fan, M1323, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-010

(23) Do these steps to send an OEV close enable signal to the overboard exhaust valve:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |

(b) Unlatch and lower the P5 forward overhead panel to get access to the back of the P5-6 Cabin Pressurization Control Panel.



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(c) Disconnect the electrical connector, D10726, from the P5-6 Cabin Pressurization Control Panel.

(d) Connect a jumper between pins 26 and 27 of electrical connector, D10726, on wire bundle, W2510.

SUBTASK 21-27-00-720-011

(24) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

SUBTASK 21-27-00-720-012

(25) Do these steps to send an OEV open enable signal (OEV position indicator at the SMOKE position) to the overboard exhaust valve:

(a) Make a record of the time immediately after you do the next step.

(b) Remove the jumper between pins 26 and 27 of electrical connector, D10726, on wire bundle, W2510.

(c) Reconnect the electrical connector, D10726, to the P5-6 Cabin Pressurization Control Panel.

(d) Raise and latch the P5 forward overhead panel.

(e) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |

(f) Make sure that after 4-1/2 to 5-1/2 minutes that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

NOTE: This does a check of the 5 minute delay on relay R649.

SUBTASK 21-27-00-860-035

(26) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the OFF position.

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-720-013

(27) Make sure the equipment cooling alternate supply fan, M1323, is not operating.

SUBTASK 21-27-00-720-014

(28) Make sure the equipment cooling alternate exhaust fan, M99, is operating.

SUBTASK 21-27-00-720-015

(29) Make sure that the EQUIP COOLING SUPPLY OFF light is not on after 30 seconds since the R RECIRC FAN switch was set to OFF.

SUBTASK 21-27-00-720-016

(30) Make sure that the equipment cooling alternate supply fan, M1323, is operating within 4-1/2 to 5-1/2 minutes of when the R RECIRC FAN switch was set to OFF.

SUBTASK 21-27-00-720-017

(31) Make sure that the equipment cooling alternate exhaust fan, M99, is operating.

SUBTASK 21-27-00-720-069

(32) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-018

(33) Make sure that the EQUIP COOLING SUPPLY and EXHAUST OFF lights are not on.



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SUBTASK 21-27-00-860-036

(34) Make sure that these circuit breakers are closed:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |
| C | 18 | C01525 | CARGO FIRE AFT DET B |
| C | 19 | C01524 | CARGO FIRE AFT DET A |

SUBTASK 21-27-00-720-019

(35) Push and hold the TEST switch, on the P8 Cargo Fire Control Panel, until the FWD and AFT red cargo fire lights come on.

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-860-037

(36) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the AUTO position.

SUBTASK 21-27-00-860-038

(37) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the OFF position.

SUBTASK 21-27-00-720-021

(38) Make sure the equipment cooling alternate supply fan, M1323, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-022

(39) Make sure the equipment cooling alternate exhaust fan, M99, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-860-039

(40) Put the EQUIP COOLING EXHAUST switch to the NORM position.

SUBTASK 21-27-00-720-023

(41) Make sure the equipment cooling normal exhaust fan, M98, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-070

(42) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-024

(43) Make sure that the EQUIP COOLING SUPPLY OFF light is not on after 30 seconds since the recirculation fan switch was set to OFF.

SUBTASK 21-27-00-720-071

(44) Make sure that the EQUIP COOLING EXHAUST OFF light is not on after 30 seconds since the R RECIRC FAN was set to OFF.

SUBTASK 21-27-00-720-026

(45) Make sure that after 4-1/2 to 5-1/2 minutes that the equipment cooling alternate supply fan, M1323, is operating.

(a) Put your hand on the fan case to feel that it is operating.



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SUBTASK 21-27-00-860-040

(46) Open this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-860-041

(47) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-720-027

(48) Make sure that the equipment cooling alternate supply fan, M1323, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-028

(49) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-072

(50) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-029

(51) Make sure that 30 seconds from when circuit breaker, C01444, was closed that the EQUIP COOLING SUPPLY OFF light is not on.

SUBTASK 21-27-00-720-030

(52) Make sure that 4-1/2 to 5-1/2 minutes from when circuit breaker, C01444, was closed that the equipment cooling alternate supply fan, M1323, is operating.

SUBTASK 21-27-00-860-042

(53) Set the EQUIP COOLING SUPPLY switch to the NORMAL position.

SUBTASK 21-27-00-720-031

(54) Make sure the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-860-043

(55) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

SUBTASK 21-27-00-860-044

(56) Push and hold the TEST switch on the P8 Cargo Fire Control Panel until the AFT cargo compartment smoke detector light comes on.

SUBTASK 21-27-00-720-032

(57) Make sure that the equipment cooling normal supply fan, M1322, is operating.



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(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-033

(58) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-034

(59) Make sure that the overboard exhaust valve position indicator is in the NORMAL position.

SUBTASK 21-27-00-860-045

(60) Open this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-860-046

(61) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-720-035

(62) Make sure that the equipment cooling normal supply fan, M1322, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-036

(63) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-037

(64) Make sure that the overboard exhaust valve position indicator is in the SMOKE position

SUBTASK 21-27-00-720-038

(65) Make sure that after 30 seconds the EQUIP COOLING SUPPLY OFF light is not on.

SUBTASK 21-27-00-720-039

(66) Make sure that after 4-1/2 to 5-1/2 minutes that the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that the fan is operating.

SUBTASK 21-27-00-720-040

(67) Do these checks of the recirculation fan:

(a) Make sure the right recirculation fan is not operating.

(b) Set the R RECIRC FAN switch to the AUTO position.

(c) Make sure that the right recirculation fan is operating.

1) Put your hand on the fan case to feel that it is operating.

(d) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |



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(e) Set the R RECIRC FAN switch to the OFF position.

1) Make a record of the time when you do this step.

(f) Make sure that the right recirculation fan, M1441, is operating.

1) Put your hand on the fan case to feel that it is operating.

(g) Make sure that the equipment cooling normal supply fan, M1322, is not operating.

1) Put your hand on the fan case to feel that it is not operating.

(h) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

1) Put your hand on the fan case to feel that it is operating.

(i) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

(j) Make sure that after 30 seconds the EQUIP COOLING SUPPLY OFF light is not on.

(k) Make sure that after 4-1/2 to 5-1/2 minutes the normal equipment cooling supply fan, M1322, is operating.

1) Put your hand on the fan case to feel that it is operating.

**SUBTASK 21-27-00-860-047**

(68) Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

**SUBTASK 21-27-00-720-041**

(69) Push and hold the TEST switch on the P8 Cargo Fire Control Panel until the FWD and AFT cargo compartment smoke detector lights come on.

**SUBTASK 21-27-00-720-042**

(70) Make sure that the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

**SUBTASK 21-27-00-720-043**

(71) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

**SUBTASK 21-27-00-720-044**

(72) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

**SUBTASK 21-27-00-720-073**

(73) Make sure that the right recirculation fan, M1441, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

**SUBTASK 21-27-00-860-048**

(74) Open this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |



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SUBTASK 21-27-00-860-049

(75) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-720-047

(76) Make sure that the equipment cooling normal supply fan, M1322, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-048

(77) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-049

(78) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-050

(79) Make sure that the right recirculation fan, M1441, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-051

(80) Make sure that 30 seconds from when circuit breaker, C01444, was closed that the EQUIP COOLING SUPPLY OFF light is not on.

SUBTASK 21-27-00-720-052

(81) Make sure that 4-1/2 to 5-1/2 minutes after circuit breaker, C01444, was closed that the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-860-050

(82) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

SUBTASK 21-27-00-720-053

(83) Push and hold the TEST switch on the P8 Cargo Fire Control Panel until the AFT cargo compartment smoke detector light comes on.

SUBTASK 21-27-00-720-054

(84) Make sure that the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-055

(85) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.



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SUBTASK 21-27-00-720-056

(86) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

SUBTASK 21-27-00-720-057

(87) Make sure that the right recirculation fan, M1441, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-860-051

(88) Open this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-860-052

(89) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

(a) Make a record of the time when you do this step.

SUBTASK 21-27-00-720-058

(90) Make sure that the equipment cooling normal supply fan, M1322, is not operating.

(a) Put your hand on the fan case to feel that it is not operating.

SUBTASK 21-27-00-720-059

(91) Make sure that the equipment cooling normal exhaust fan, M98, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-060

(92) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.

SUBTASK 21-27-00-720-061

(93) Make sure that the right recirculation fan, M1441, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-062

(94) Make sure that 30 seconds after circuit breaker, C01444, was closed that the EQUIP COOLING SUPPLY OFF light is not on.

SUBTASK 21-27-00-720-063

(95) Make sure that 4-1/2 to 5-1/2 minutes after circuit breaker, C01444, was closed that the equipment cooling normal supply fan, M1322, is operating.

(a) Put your hand on the fan case to feel that it is operating.

SUBTASK 21-27-00-720-064

(96) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-27-00-720-065

(97) Make sure that the position indicator on the overboard exhaust valve actuator is in the SMOKE position.



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SUBTASK 21-27-00-860-053

(98) Set the R RECIRC FAN switch to the AUTO position.

SUBTASK 21-27-00-720-066

(99) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

SUBTASK 21-27-00-860-144

(100) Set the R RECIRC FAN switch to the OFF position.

SUBTASK 21-27-00-720-077

(101) Make sure that the position indicator on the overboard exhaust valve actuator is in the NORMAL position.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-27-00-860-054

(1) Put these switches on the P5-10 Air Conditioning Module to the AUTO position:

(a) L PACK

(b) R PACK

(c) R RECIRC FAN.

SUBTASK 21-27-00-860-055

(2) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

SUBTASK 21-27-00-410-003

(3) Install the crew oxygen system cylinder (TASK 12-15-21-600-804).

SUBTASK 21-27-00-860-162

(4) Make sure that these circuit breakers are closed:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |
| C | 18 | C01525 | CARGO FIRE AFT DET B |
| C | 19 | C01524 | CARGO FIRE AFT DET A |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-27-00-410-008

(5) Install the access panel in the electronics equipment bay on the top of the raised platform that you removed.

SUBTASK 21-27-00-410-004

(6) Install the forward cargo compartment aft bulkhead liner (TASK 50-11-02-400-801).



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SUBTASK 21-27-00-410-005

(7) Close these access doors:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 821 | Forward Cargo Door |

——— END OF TASK ———

TASK 21-27-00-700-804

## 5. Flight Compartment Display Unit Air Flow Test

### A. General

(1) This task makes sure that these display units (DU) have sufficient cooling air flow:

(a) Captain's Inboard DU

(b) Captain's Outboard DU

(c) First Officer's Inboard DU

(d) First Officer's Outboard DU

### B. References

| Reference | Title |
|---|---|
| 31-65-11-000-801 | MAX Display Unit Removal (P/B 401) |
| 31-65-11-400-801 | MAX Display Unit Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### D. Flight Compartment Display Unit Air Flow Test

SUBTASK 21-27-00-860-059

(1) Make sure the EQUIP COOLING SUPPLY and EXHAUST OFF lights on the Equipment Cooling Panel are not on.

SUBTASK 21-27-00-860-060

(2) Make sure the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORMAL position.

SUBTASK 21-27-00-860-061

(3) Make sure the EQUIP COOLING EXHAUST switch on the Equipment Cooling Panel is in the NORM position.

SUBTASK 21-27-00-750-001

(4) Do these steps to make sure the display units are receiving sufficient cooling airflow:

(a) Remove the four display units in the flight compartment (TASK 31-65-11-000-801).

(b) Make sure that you can feel airflow going into the air inlet at the first officer's inboard DU in the P3 panel.

NOTE: There is sufficient cooling airflow if you can feel air movement with your hand 3.0 in. (7.6 cm) from the air inlet or outlet.

(c) Make sure that you can feel airflow going into the air inlet at the first officer's outboard DU in the P3 panel.



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(d) Make sure that you can feel airflow going into the air inlet at the captain's control display unit (CDU) in the P9 panel.

(e) Make sure that you can feel airflow going into the air inlet at the first officer's CDU in the P9 panel.

(f) Make sure that you can feel airflow going out of the lower air outlet at the captain's inboard DU in the P1 panel.

(g) Make sure that you can feel airflow going out of the lower air outlet at the captain's outboard DU in the P1 panel.

(h) Make sure that the passive exhaust duct connected to the captain's display units is not capped or bagged.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-27-00-420-001**

(1) Install the display units (TASK 31-65-11-400-801).

**——— END OF TASK ———**

**TASK 21-27-00-890-801**

**6. Alternate Equipment Cooling Supply Fan - Operational Test**

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

**A. General**

(1) This task does a test of the equipment cooling alternate supply fan.

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Alternate Equipment Cooling Supply Fan - Operational Test**

**SUBTASK 21-27-00-860-064**

(1) Make sure that the EQUIP COOLING SUPPLY OFF light on the Equipment Cooling Panel is not on.

**SUBTASK 21-27-00-860-065**

(2) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORM position.

**SUBTASK 21-27-00-010-009**

(3) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



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SUBTASK 21-27-00-860-066

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Open this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

SUBTASK 21-27-00-710-007

(5) Make sure that the EQUIP COOLING SUPPLY OFF light comes on after 20 to 60 seconds.

SUBTASK 21-27-00-860-067

(6) Put the EQUIP COOLING SUPPLY switch in the ALTN position.

SUBTASK 21-27-00-710-008

(7) Make sure that the EQUIP COOLING SUPPLY OFF light goes out within 20 seconds.

SUBTASK 21-27-00-860-068

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(8) Close this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |



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SUBTASK 21-27-00-410-013

(9) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-27-00-860-069

(10) Put the EQUIP COOLING SUPPLY switch in the NORM position.

SUBTASK 21-27-00-860-070

(11) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

——— END OF TASK ———

**TASK 21-27-00-700-805**

**7. Alternate Equipment Cooling Exhaust Fan - Operational Test**

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

**A. General**

(1) This task does a test of the equipment cooling alternate exhaust fan.

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Alternate Equipment Cooling Exhaust Fan - Operational Test**

SUBTASK 21-27-00-860-073

(1) Make sure that the EQUIP COOLING EXHAUST OFF light on the Equipment Cooling Panel is not on.

SUBTASK 21-27-00-860-074

(2) Make sure that the EQUIP COOLING EXHAUST switch on the Equipment Cooling Panel is in the NORM position.

SUBTASK 21-27-00-010-010

(3) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



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SUBTASK 21-27-00-860-075

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Open this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

SUBTASK 21-27-00-710-009

(5) Make sure that the EQUIP COOLING EXHAUST OFF light comes on after 20 to 60 seconds.

SUBTASK 21-27-00-860-076

(6) Put the EQUIP COOLING EXHAUST switch in the ALTN position.

SUBTASK 21-27-00-710-010

(7) Make sure that the EQUIP COOLING EXHAUST OFF light goes out within 20 seconds.

SUBTASK 21-27-00-860-077

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(8) Close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |



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SUBTASK 21-27-00-410-014

(9) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-27-00-860-078

(10) Put the EQUIP COOLING EXHAUST switch in the NORM position.

SUBTASK 21-27-00-860-079

(11) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

——— END OF TASK ———

**TASK 21-27-00-700-806**

## 8. Equipment Cooling Overboard Exhaust Valve Smoke Clearance Mode - Operational Test

(Figure 501)

### A. General

(1) This task does a test of the equipment cooling overboard exhaust valve in the smoke removal mode.

(2) When persons are in the airplane during this test, they must be in good physical condition. When a person feels pain during a pressure change, you must make the pressure stable immediately or it must be lowered. Do this until the person can make the pressure equal in their ears, or be removed from the airplane.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### D. Procedure

SUBTASK 21-27-00-860-082

(1) Extend the trailing edge flaps to position 1. To extend the flaps, do this task: Extend the Trailing Edge Flaps, TASK 27-51-00-860-803.

SUBTASK 21-27-00-860-083

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.



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SUBTASK 21-27-00-860-084

**WARNING** MAKE SURE YOU OBEY THE PROPER PROCEDURES FOR COMPRESSION AND DECOMPRESSION WHEN YOU USE PERSONS IN A PRESSURIZED AREA. PRESSURE CHANGES THAT CAUSE PAIN MUST NOT BE DONE. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURY TO PERSONS CAN OCCUR.

(3) Do these steps to pressurize the airplane cabin to 2.00 psi (13.79 kPa) differential pressure:

(a) Close all exterior doors.

(b) Make sure the flight compartment sliding windows are closed.

(c) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

(d) Set the R RECIRC FAN switch on the P5-10 Air Conditioning Panel to the AUTO position.

(e) Put the cabin pressurization switch on the P5–6 Cabin Pressure Control Panel to the MAN position.

(f) Begin to close the cabin pressurization outflow valve with the cabin pressurization valve MANUAL OPEN-CLOSE toggle switch on the P5–6 Cabin Pressure Control Panel:

1) Look at the VALVE position indicator to see the position of the valve.

**WARNING** DO NOT ALLOW THE INDICATION ON THE CABIN CLIMB GAUGE TO SHOW MORE THAN 1000 FEET PER MINUTE. WHEN YOU ALLOW A RATE OF CABIN CLIMB OF MORE THAN 1000 FEET PER MINUTE, DAMAGE TO THE AIRPLANE STRUCTURE OR INJURY TO PERSONNEL CAN OCCUR.

(g) Slowly increase the cabin pressure with the MANUAL OPEN-CLOSE toggle switch on the P5-6 panel so that the indication on the CABIN CLIMB gauge on the P5–16 panel shows a rate of approximately 300 feet per minute.

1) Do not change the cabin pressure at a rate of more than 1000 feet per minute.

(h) Increase the cabin pressure until the cabin DIFF PRESS indicator on the P5–16 Cabin Altitude and Rate of Climb Panel shows a differential pressure of 2.00 psi (13.79 kPa).

SUBTASK 21-27-00-860-085

(4) Make sure that the L PACK and R PACK switches on the P5-10 Air Conditioning Panel are in the AUTO position.

SUBTASK 21-27-00-860-086

(5) Make sure the R RECIRC FAN switch, on the P5-10 Air Conditioning Panel, is in the AUTO position.

SUBTASK 21-27-00-710-011

(6) Make sure that there is no air flow out of the equipment cooling overboard exhaust valve port:

(a) Put your hand at the valve exhaust port on the bottom of the airplane to feel for airflow.

NOTE: The exhaust port is just aft of the E/E bay access door.



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SUBTASK 21-27-00-860-087

**WARNING** DO NOT ALLOW THE INDICATION ON THE CABIN CLIMB GAUGE TO SHOW MORE THAN 1000 FEET PER MINUTE. WHEN YOU ALLOW A RATE OF CABIN CLIMB OF MORE THAN 1000 FEET PER MINUTE, DAMAGE TO THE AIRPLANE STRUCTURE OR INJURY TO PERSONNEL CAN OCCUR.

(7) Put the L PACK switch to HIGH.

NOTE: The cabin pressure can increase at more than 1000 feet per minute when the pack is in the high flow mode. Manually opening the outflow valve will reduce the rate of cabin pressurization.

(a) If necessary, operate the MANUAL OPEN-CLOSE toggle switch on the P5-6 Pressurization Control Panel so that the CABIN CLIMB indication on the P5-16 Cabin Altitude and Rate of Climb Panel does not exceed 1000 feet per minute.

SUBTASK 21-27-00-860-088

(8) Put the R PACK switch to OFF.

SUBTASK 21-27-00-860-089

(9) Put the R RECIRC FAN switch to the OFF position.

SUBTASK 21-27-00-710-012

(10) Make sure that there is air flow out of the equipment cooling overboard exhaust valve port.

NOTE: The CABIN CLIMB indication on the P5-16 Cabin Altitude and Rate of Climb Panel will indicate that the cabin pressure is climbing.

SUBTASK 21-27-00-860-090

**WARNING** DO NOT ALLOW THE INDICATION ON THE CABIN CLIMB GAUGE TO SHOW MORE THAN 1000 FEET PER MINUTE. WHEN YOU ALLOW A RATE OF CABIN CLIMB OF MORE THAN 1000 FEET PER MINUTE, DAMAGE TO THE AIRPLANE STRUCTURE OR INJURY TO PERSONNEL CAN OCCUR.

(11) Put the R PACK switch to HIGH.

NOTE: The cabin pressure can increase at more than 1000 feet per minute when the pack is in the high flow mode. Manually opening the outflow valve will reduce the rate of cabin pressurization.

(a) If necessary, operate the MANUAL OPEN-CLOSE switch on the P5-6 Pressurization Control Panel so that the CABIN CLIMB indication on the P5-16 Cabin Altitude and Rate of Climb Panel does not exceed 1000 feet per minute.

SUBTASK 21-27-00-860-091

(12) Put the L PACK switch to OFF.

SUBTASK 21-27-00-710-013

(13) Make sure that there is airflow out of the equipment cooling overboard exhaust valve port.

NOTE: The CABIN CLIMB indication on the P5-16 Cabin Altitude and Rate of Climb Panel will indicate that the cabin pressure is climbing.

## E. Put the Airplane Back to its Usual Condition

SUBTASK 21-27-00-860-092

(1) Put these switches to the AUTO position:

(a) L PACK

(b) R PACK



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(c) R RECIRC FAN

SUBTASK 21-27-00-860-093

(2) Slowly open the outflow valve to decrease the cabin pressure until the cabin DIFF PRESS indicator shows a differential pressure of 0 psi (0 kPa).

SUBTASK 21-27-00-860-094

(3) Put the Cabin Pressurization Switch to the AUTO position.

SUBTASK 21-27-00-866-001

(4) Retract the trailing edge flaps to the full up position. To retract the flaps, do this task: Retract the Trailing Edge Flaps, TASK 27-51-00-860-804.

SUBTASK 21-27-00-860-095

(5) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-27-00-860-096

(6) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

——— END OF TASK ———

21-CMR-01

**TASK 21-27-00-700-807**

**9. Smoke Clearance Mode - Operational Test**

NOTE: This procedure is a scheduled maintenance task.

**A. General**

(1) This task does an operational test of the equipment cooling overboard exhaust valve system components that follow:

- The interfaces of the exhaust fans
- Supply fans
- Recirculation fans
- Smoke detection system.

(2) The equipment cooling overboard exhaust valve will be referred to by the acronym OEV in this test.

(3) In the event of a forward cargo fire, the cargo smoke detectors will detect smoke and annunciate to the flight crew of the forward cargo fire. The flight crew will then take the appropriate action for smoke clearance from the flight deck which results in the following:

(a) Power to the E/E cooling supply normal and alternate fans is removed for 5 minutes

(b) The E/E cooling supply low flow sensor warning is inhibited for 5 minutes

(c) The OEV opens to the SMOKE position for the duration of the flight

(d) Power to the E/E cooling exhaust normal and alternate fans is removed for the duration of the flight

(e) The E/E cooling exhaust low flow sensor warning is inhibited for the duration of the flight.

**B. References**

| Reference | Title |
|---|---|
| 32-09-00-840-801 | Prepare to Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 125 | Air Conditioning Distribution Bay - Left |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 191E | Low Pressure ECS Panel - Forward |

**E. Prepare for the Operational Test**

SUBTASK 21-27-00-010-004

(1) Get access to the Cabin Pressure Controller (CPC) No. 2 on the E1-1 shelf in the E/E compartment:

NOTE: The CPC No. 2 will be used to determine if the OEV is in the NORMAL or SMOKE position.

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-27-00-860-099

(2) Make sure that the CAB/UTIL switch, on the P5-13 electrical meters, battery and galley power panel, is set at ON.

SUBTASK 21-27-00-210-001

(3) Make sure that the needle on the VALVE position indicator, on the P5-6 pressurization control panel, shows that the aft outflow valve is fully open.

(a) If it is necessary, do these steps:

1) Put the pressurization control switch to MAN position.

2) Put and hold the VALVE switch to OPEN position until the VALVE indicator is fully open.

SUBTASK 21-27-00-860-100

(4) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

SUBTASK 21-27-00-860-158

(5) Open these circuit breakers:

**CAPT Electrical System Panel, P18-1**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 5 | C01009 | ADIRU LEFT DC |
| E | 7 | C01007 | ADIRU LEFT AC |

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 5 | C01204 | SMYD-1 CMPTR DC |
| E | 6 | C01205 | SMYD-1 SNSR EXC AC |



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**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 18 | C01434 | EQPT COOLING LOW FLOW DETECT EXHAUST |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01207 | SMYD-2 SNSR EXC AC |
| B | 5 | C01206 | SMYD-2 CMPTR DC |
| C | 14 | C01008 | ADIRU RIGHT AC |
| C | 17 | C01010 | ADIRU RIGHT DC |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 14 | C01435 | EQPT COOLING EXHAUST FAN CONT NORMAL |
| C | 15 | C01436 | EQPT COOLING EXHAUST FAN CONT ALTN |

SUBTASK 21-27-00-860-160

(6) Open these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-27-00-860-181

(7) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-27-00-860-104

(8) Set the EQUIP COOLING SUPPLY and EXHAUST switches, on the equipment cooling panel in the middle of the P5 forward overhead panel, to the NORM positions.

SUBTASK 21-27-00-210-002

(9) Make sure that pneumatic power is off.

(a) Make sure that the L and R needle indicators on the DUCT PRESS gauge, on the P5-10 air conditioning panel, show 0 psi.

SUBTASK 21-27-00-860-105

(10) Set these switches, on the P5-10 air conditioning panel, to the AUTO position:

- L PACK
- R PACK
- L RECIRC FAN.

SUBTASK 21-27-00-860-168

(11) Set the R RECIRC FAN switch, on the P5-10 air conditioning panel, to the OFF position.



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SUBTASK 21-27-00-860-166

**WARNING** MAKE SURE THAT YOU DO THE STEPS TO PREPARE THE SYSTEMS FOR THE AIR MODE CORRECTLY. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(12) Do this task: Prepare to Put the Airplane in the Air Mode, TASK 32-09-00-840-801.

NOTE: This is not to put the airplane in the air mode but to prepare the airplane for the air mode.

SUBTASK 21-27-00-860-167

(13) Open these circuit breakers:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 15 | C01355 | LANDING GEAR AIR/GND SYS 2 |
| C | 16 | C01356 | LANDING GEAR AIR/GND SYS 1 |

## F. Smoke Clearance Mode Operational Test

SUBTASK 21-27-00-710-014

(1) Do this check that the left recirculation fan, M1440, is operating:

(a) If air is flowing out of the gaspers just outboard of the captain's and first officer's windshield and foot air controls, the left recirculation fan is operating.

(b) If the airflow out of the gaspers is not sufficient to positively determine left recirculation fan operation, do the steps that follow:

1) Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

2) Push up on the swing check valve.

3) If air flows out through the swing check valve, the left recirculation fan is operating.

SUBTASK 21-27-00-860-107

(2) Set the L RECIRC FAN switch, on the P5-10 air conditioning panel, to the OFF position.

SUBTASK 21-27-00-710-015

(3) Do this check that the recirculation fans are not operating:

(a) If air is not flowing out of the gaspers just outboard of the windshield and foot air controls, the recirculation fans are not operating.

SUBTASK 21-27-00-860-108

(4) Set the R RECIRC FAN switch, on the P5-10 air conditioning panel, to the AUTO position.

SUBTASK 21-27-00-710-016

(5) Do this check that the right recirculation fan, M1441, is operating:

(a) If air is flowing out of the gaspers just outboard of the captain's and first officer's windshield and foot air controls, the right recirculation fan is operating.

(b) If the airflow out of the gaspers is not sufficient to positively determine right recirculation fan operation, do the steps that follow:



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1) Open this access panel:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

2) Push up on the swing check valve.

3) If air flows out through the swing check valve, the right recirculation fan is operating.

SUBTASK 21-27-00-860-109

(6) Prepare the cabin pressure controller to display the OEV position indication:

(a) Set the pressurization mode selector switch, on the P5-6 pressurization control panel, to the AUTO position.

NOTE: The AUTO FAIL light may momentarily flash when AUTO is selected.

(b) Push the ON/OFF button on the front of the cabin pressure controller No.2 (M1654) on the E1-1 shelf in the E/E compartment.

(c) Push the MENU button.

(d) Continue to push the ↓ button until the display shows SYSTEM STATUS.

(e) Push the YES button.

(f) Push the ↓ button until the display shows SYSTEM CONFIG.

(g) Push the YES button.

(h) Push the ↓ button until the display shows CARGO HT VLV LOW.

NOTE: This display indicates that the OEV is in the NORMAL position.

SUBTASK 21-27-00-710-017

(7) Make sure that the CPC display shows CARGO HT VLV LOW.

SUBTASK 21-27-00-860-110

(8) Set the R PACK switch to the HIGH position.

SUBTASK 21-27-00-710-018

(9) Make sure that the CPC display shows CARGO HT VLV HIGH.

SUBTASK 21-27-00-860-111

(10) Set the R PACK switch to the AUTO position.

SUBTASK 21-27-00-710-019

(11) Make sure that the CPC display shows CARGO HT VLV LOW.

SUBTASK 21-27-00-860-112

(12) Set the L PACK switch to the HIGH position.

SUBTASK 21-27-00-710-020

(13) Make sure that the CPC display shows CARGO HT VLV HIGH.

SUBTASK 21-27-00-710-021

(14) Do an audible check that the equipment cooling normal supply fan, M1322, is operating.

SUBTASK 21-27-00-860-113

(15) Set the R RECIRC FAN switch, on the P5-10 air conditioning panel, to the OFF position:

(a) Make a note of the time when the switch is placed in the OFF position.

SUBTASK 21-27-00-710-022

(16) Make sure that the CPC display shows CARGO HT VLV HIGH.

NOTE: This display indicates that the OEV is in the SMOKE position.



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SUBTASK 21-27-00-710-023

(17) Do an audible check that the equipment cooling normal supply fan, M1322, is not operating.

SUBTASK 21-27-00-860-114

(18) Set the EQUIP COOLING SUPPLY and EXHAUST switches, on the equipment cooling panel in the middle of the P5 forward overhead panel, to the ALTN positions.

SUBTASK 21-27-00-710-024

(19) Do an audible check that the equipment cooling alternate supply fan, M1323, is not operating.

SUBTASK 21-27-00-710-025

(20) Do an audible check that the equipment cooling alternate supply fan, M1323, is operating within 4 1/2 to 5 1/2 minutes of when the R RECIRC FAN switch was set to OFF.

SUBTASK 21-27-00-860-115

(21) Open these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |

SUBTASK 21-27-00-860-116

(22) Open and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-710-026

(23) Do an audible check that the equipment cooling alternate supply fan, M1323, is not operating.

SUBTASK 21-27-00-710-027

(24) Do this check to make sure that the right recirculation fan, M1441, is operating:

(a) If air is flowing out of the gaspers just outboard of the captain's and first officer's windshield and foot air controls, the right recirculation fan is operating.

(b) If the air flow out of the gaspers is not sufficient to positively determine recirculation fan operation, do the steps that follow:

1) Make sure that this access panel is open:

| Number | Name/Location |
|---|---|
| 191E | Low Pressure ECS Panel - Forward |

2) Push up on the swing check valve.

3) If air is flowing out through the swing check valve, the right recirculation fan is operating.



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SUBTASK 21-27-00-860-151

(25) Close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

SUBTASK 21-27-00-860-117

(26) Push and hold the TEST switch, on the P8 cargo fire control panel, until the FWD and AFT red cargo fire lights come on.

SUBTASK 21-27-00-860-118

(27) If it is necessary, push the BELL CUTOUT switch, on the engine and Auxiliary Power Unit (APU) fire control panel, to silence the flight compartment fire bell.

SUBTASK 21-27-00-710-028

(28) Make sure that the right recirculation fan, M1441, is not operating:

(a) If air is not flowing out of the gaspers just outboard of the captain's and first officer's windshield and foot air controls, the right recirculation fan is not operating.

SUBTASK 21-27-00-860-119

**CAUTION**

MAKE SURE THAT YOU CLOSE THE FAN CIRCUIT BREAKER IN LESS THAN 5 MINUTES AFTER YOU OPEN IT. IF YOU KEEP THE CIRCUIT BREAKER OPEN MORE THAN 5 MINUTES, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(29) Open these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 17 | C01433 | EQPT COOLING LOW FLOW DETECT SUPPLY |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 12 | C01116 | EQPT COOLING SUPPLY FAN CONT-NORMAL |
| C | 13 | C01117 | EQPT COOLING SUPPLY FAN CONTROL-ALTN |

SUBTASK 21-27-00-860-120

(30) Close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 18 | C01434 | EQPT COOLING LOW FLOW DETECT EXHAUST |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 14 | C01435 | EQPT COOLING EXHAUST FAN CONT NORMAL |
| C | 15 | C01436 | EQPT COOLING EXHAUST FAN CONT ALTN |
| D | 2 | C01445 | A/C OVERBOARD EXH VALVE RECONFIG CONT |



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SUBTASK 21-27-00-860-169

(31) Open and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-710-029

(32) Do an audible check that the equipment cooling alternate exhaust fan, M99, is operating.

SUBTASK 21-27-00-860-121

(33) Set the EQUIP COOLING SUPPLY and EXHAUST switches, on the equipment cooling panel in the middle of the P5 forward overhead panel, to the NORM positions.

SUBTASK 21-27-00-710-030

(34) Do an audible check that the equipment cooling normal exhaust fan, M98, is operating.

SUBTASK 21-27-00-860-122

(35) Push and hold the TEST switch, on the P8 cargo fire control panel, until the FWD and AFT red cargo fire lights come on.

SUBTASK 21-27-00-860-179

(36) If it is necessary, push the BELL CUTOUT switch, on the engine and APU fire control panel, to silence the flight compartment fire bell.

SUBTASK 21-27-00-710-031

(37) Do an audible check that the equipment cooling normal exhaust fan, M98, is not operating.

SUBTASK 21-27-00-860-123

(38) Set the EQUIP COOLING SUPPLY and EXHAUST switches, on the equipment cooling panel in the middle of the P5 forward overhead panel, to the ALTN positions.

SUBTASK 21-27-00-710-032

(39) Do an audible check that the equipment cooling alternate exhaust fan, M99, is not operating.

SUBTASK 21-27-00-710-033

(40) Make sure that the CPC display shows CARGO HT VLV HIGH.

NOTE: This display shows that the OEV is in the SMOKE position.

SUBTASK 21-27-00-860-125

(41) Open and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

NOTE: The FWD and AFT cargo fire alarm relays R945 and R946 are not latched.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-27-00-860-175

(1) Close these circuit breakers:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 15 | C01355 | LANDING GEAR AIR/GND SYS 2 |
| C | 16 | C01356 | LANDING GEAR AIR/GND SYS 1 |



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SUBTASK 21-27-00-860-161

(2) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-27-00-860-127

(3) Put these switches to the AUTO position:

- R RECIRC FAN
- L RECIRC FAN

SUBTASK 21-27-00-860-128

(4) Put these switches to the OFF position:

- L PACK
- R PACK

SUBTASK 21-27-00-860-130

(5) Put these switches, on the center panel of the P5 forward overhead panel, to the NORM position:

- EQUIP COOLING SUPPLY
- EQUIP COOLING EXHAUST.

SUBTASK 21-27-00-860-131

(6) Close these circuit breakers:

**CAPT Electrical System Panel, P18-1**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 5 | C01009 | ADIRU LEFT DC |
| E | 7 | C01007 | ADIRU LEFT AC |

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 5 | C01204 | SMYD-1 CMPTR DC |
| E | 6 | C01205 | SMYD-1 SNSR EXC AC |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01207 | SMYD-2 SNSR EXC AC |
| B | 5 | C01206 | SMYD-2 CMPTR DC |
| C | 14 | C01008 | ADIRU RIGHT AC |
| C | 17 | C01010 | ADIRU RIGHT DC |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 12 | C01116 | EQPT COOLING SUPPLY FAN CONT-NORMAL |
| C | 13 | C01117 | EQPT COOLING SUPPLY FAN CONTROL-ALTN |

SUBTASK 21-27-00-860-176

(7) Remove the safety tag and close this circuit breaker:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 17 | C01433 | EQPT COOLING LOW FLOW DETECT SUPPLY |


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SUBTASK 21-27-00-410-007

(8) Close these access panels:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 191E | Low Pressure ECS Panel - Forward |

——— END OF TASK ———

TASK 21-27-00-700-808

## 10. Aft Equipment Cooling Fan - Functional Test

(Figure 502)

### A. General

(1) This task gives the instructions to test the aft equipment, E6 rack cooling exhaust fan.

### B. References

| Reference | Title |
|---|---|
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| 50-12-02-000-801 | Aft Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-12-02-400-801 | Aft Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-11325 | Manometer - Digital (-5 to 5 PSI, Accuracy +/- 0.5%) |

### D. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

### F. Prepare for Functional Test

SUBTASK 21-27-00-010-005

(1) Open this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

SUBTASK 21-27-00-010-006

(2) Do this task: Aft Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-12-02-000-801.

### G. Procedure

SUBTASK 21-27-00-720-078

(1) Make sure that all required avionics boxes are installed in electrical equipment E6-1 shelf and E6-3 shelf.

(2) Make sure that the visible metering tray holes are plugged with red or black plugs.

(3) Make sure that the pressure equalization holes underneath the rack E6-3 are plugged.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-00-720-079

(4) Set the IFE/PASS SEAT switch on the P5-13 panel to ON.

SUBTASK 21-27-00-720-080

(5) Measure rack E6-1 shelf pressure at the test port on the front of the rack using digital manometer, STD-11325. (Refer to Figure 502 for location of test port).

(a) Make sure that pressure is at or above (more negative than) the acceptable minimum -2.0 inches of water.

NOTE: For example, a pressure reading of -2.2 inches of water is acceptable and a reading of -1.8 inches of water is a failure.

SUBTASK 21-27-00-720-081

(6) Measure rack E6-3 shelf pressure at the test port on the front of the rack using digital manometer, STD-11325. (Refer to Figure 502 for location of test port).

(a) Make sure that pressure is at or above (more negative than) the acceptable minimum -2.0 inches of water.

NOTE: For example, a pressure reading of -2.2 inches of water is acceptable and a reading of -1.8 inches of water is a failure.

SUBTASK 21-27-00-860-156

**WARNING**

MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF CONTROL SURFACES AND LANDING GEAR DOOR AREAS BEFORE YOU SIMULATE THE AIRPLANE TO THE AIR MODE. THE SIMULATED AIR MODE CAN CAUSE MOVEMENT TO CONTROL SURFACES, LANDING GEAR, AND LANDING GEAR DOORS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-27-00-860-163

(8) Put these switches on the P5-10 panel to the HIGH position:

(a) L PACK

(b) R PACK.

SUBTASK 21-27-00-860-164

(9) Put these switches on the P5-10 panel to the OFF position:

(a) L RECIRC FAN

(b) R RECIRC FAN.

SUBTASK 21-27-00-720-082

(10) Press and hold the P8-75 Cargo Fire Control Module Test switch.

(a) Make sure that the P8-75 Cargo Fire Control Module FWD light illuminates and fire bell alarms.

(11) Release the P8-75 Cargo Fire Control Module Test switch.

(a) Make sure that the P8-75 Cargo Fire Control Module FWD light turns off and the fire bell turns off.

(b) Make sure that the E6 rack cooling fan is not running.



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SUBTASK 21-27-00-020-001

(12) Open these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

SUBTASK 21-27-00-720-085

(13) Press and hold the P8-75 Cargo Fire Control Module Test switch.

(a) Make sure that the P8-75 Cargo Fire Control Module AFT light illuminates and fire bell alarms.

SUBTASK 21-27-00-720-086

(14) Release the P8-75 Cargo Fire Control Module Test switch.

(a) Make sure that the P8-75 Cargo Fire Control Module AFT light turns off and the fire bell turns off.

(b) Make sure that the E6 rack cooling fan is not running.

SUBTASK 21-27-00-410-010

(15) Close these circuit breakers:

**CAPT Electrical System Panel, P18-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 16 | C01523 | CARGO FIRE FWD DET B |
| C | 17 | C01522 | CARGO FIRE FWD DET A |

SUBTASK 21-27-00-860-157

(16) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-27-00-720-084

(17) Set the IFE/PASS SEAT switch on the P5-13 panel to OFF.

(a) Make sure that the E6 rack cooling fan is not running.

SUBTASK 21-27-00-860-174

(18) Open and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 1 | C01444 | A/C OVERBOARD EXHAUST VALVE CONT |

SUBTASK 21-27-00-720-087

(19) Set the IFE/PASS SEAT switch on the P5-13 panel to ON.

(a) Make sure that the E6 rack cooling fan is running.

SUBTASK 21-27-00-720-088

(20) Set the IFE/PASS SEAT switch on the P5-13 panel to OFF.

## H. Put the Airplane Back to its Usual Condition

SUBTASK 21-27-00-860-165

(1) Put these switches to the AUTO position:

(a) L PACK

(b) R PACK

(c) L RECIRC FAN



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(d) R RECIRC FAN.

**SUBTASK 21-27-00-410-009**

(2) Do this task: Aft Cargo Compartment Aft Bulkhead Liner Installation, TASK 50-12-02-400-801.

**SUBTASK 21-27-00-420-002**

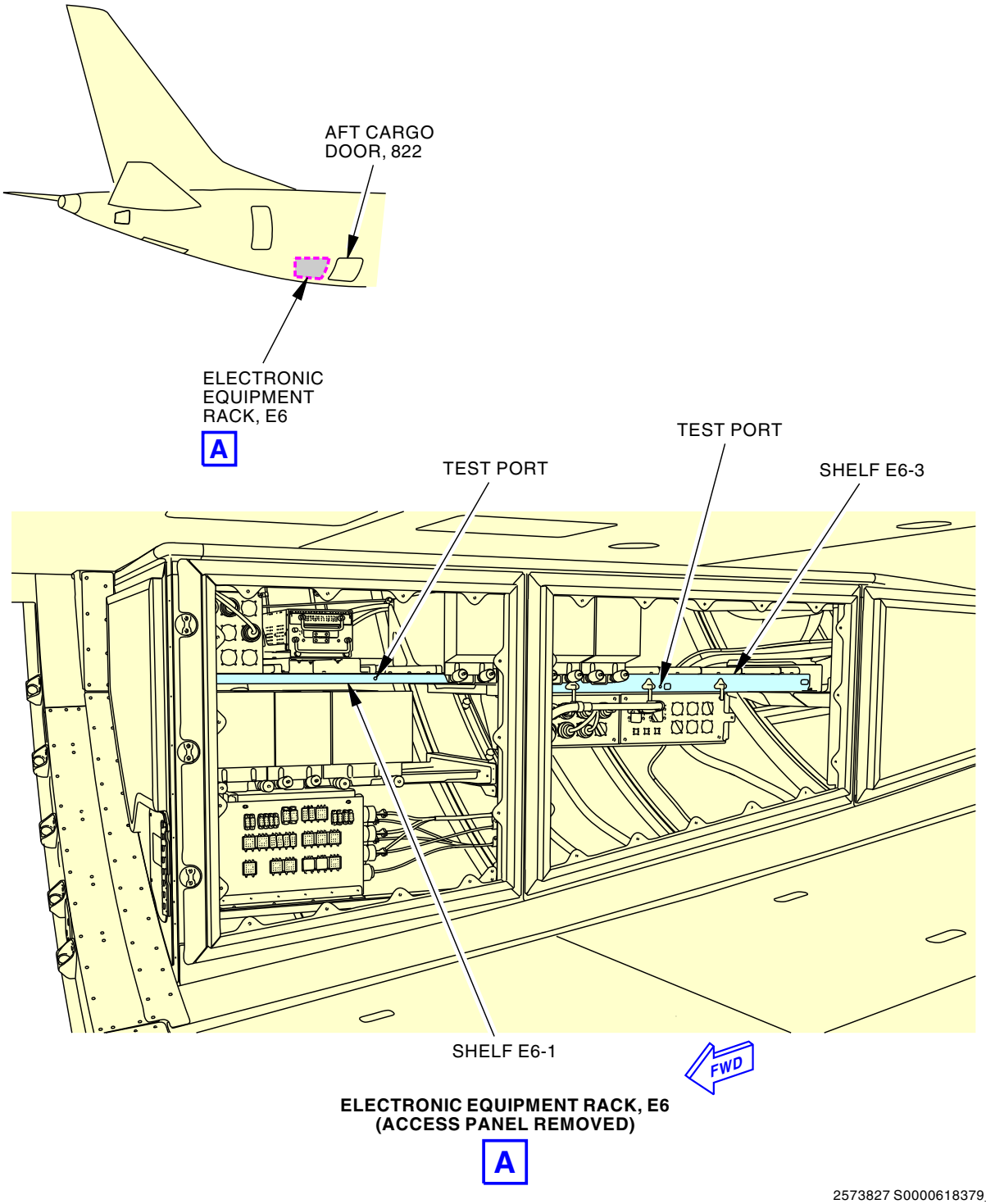
(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**ELECTRONIC EQUIPMENT RACK, E6**
**(ACCESS PANEL REMOVED)**

A

2573827 S0000618379_V1

**Aft Equipment Rack Cooling Fan - Functional Test**
**Figure 502/21-27-00-990-803**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## EQUIPMENT COOLING AIR FILTER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling air filter

(2) An installation of the equipment cooling air filter.

**TASK 21-27-01-000-801**

### 2. Equipment Cooling Air Filter Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. General**

(1) You must remove electrical power from the airplane before you remove an equipment cooling air filter. This will make sure that the electrical/electronic equipment does not receive electrical power when the equipment cooling system is not in operation.

**B. References**

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 50-11-01-000-801 | Forward Cargo Compartment Forward Bulkhead Liner Removal (P/B 401) |
| 52-31-00-580-801 | Open the Cargo Door (P/B 201) |
| 52-31-00-580-802 | Close the Cargo Door (P/B 201) |

**C. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

**D. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B50280 | Cleaner - Disinfectant - Zip-Chem Products Calla 1452 | |
| B50364 | Cleaner - Disinfectant - Matrix #3 | |
| G00624 | Bag - Plastic, General Purpose | |
| G50140 | Gloves - Protective, Latex or Nitrile | |

**E. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## F. Prepare for the Removal

SUBTASK 21-27-01-860-001

**CAUTION**

MAKE SURE THAT YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

SUBTASK 21-27-01-010-001

(2) Open the forward-cargo compartment door (TASK 52-31-00-580-801).

SUBTASK 21-27-01-010-002

(3) Remove the forward right bulkhead liner in the forward cargo compartment (TASK 50-11-01-000-801).

SUBTASK 21-27-01-980-001

**WARNING**

PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(4) Before you touch the equipment cooling air filter [2] put on the following personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140.

SUBTASK 21-27-01-500-001

(5) Select a plastic bag, G00624 larger than the filter and tape suitable for sealing the bag closed.

## G. Equipment Cooling Air Filter Removal

SUBTASK 21-27-01-010-003

(1) Close the forward-cargo compartment door (TASK 52-31-00-580-802).

NOTE: The cargo door must be lowered to permit the removal of the air filter.

SUBTASK 21-27-01-020-001

(2) Release the latch assemblies [3] that are on the top and the bottom of the filter housing assembly [1].



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-01-020-002

**WARNING** DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) If possible, slide the plastic bag, G00624 over the filter when removing the equipment cooling air filter [2] from the filter housing assembly [1] to minimize contamination. Seal the bag closed with tape.

SUBTASK 21-27-01-980-002

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(4) Discard the bag with the filter. Refer to the airline, local, health, safety and regulatory procedures for disposal of material.

SUBTASK 21-27-01-010-004

(5) If necessary, open the forward-cargo compartment door (TASK 52-31-00-580-801).

## H. Post-Filter Removal Cleanup

SUBTASK 21-27-01-670-002

**WARNING** ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE. USE PROTECTION EQUIPMENT. MAKE SURE THAT YOU USE ISOPROPYL ALCOHOL IN AN AREA WITH AIRFLOW. IF YOU DO NOT OBEY, INJURY TO PERSONNEL CAN OCCUR.

(1) Disinfect hard non-porous surfaces near the filter with a solution of 70% alcohol, B00130, Calla 1452 cleaner, B50280, or Matrix #3 cleaner, B50364.

NOTE: Follow the disinfectant manufacturer's instruction and refer to the Environmental Protection Agency (EPA) List N for applicable contact/dwell time.

NOTE: Refer to the EPA List N or local health authority guidance for required contact/dwell time for Isopropyl Alcohol to be used as a disinfectant.

SUBTASK 21-27-01-670-001

(2) Disinfect all tools used for filter replacement. Refer to the airline procedure and policies for the disinfecting of tools.

SUBTASK 21-27-01-020-005

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) Remove the personal protective equipment and put them in a plastic bag, G00624. Seal the bag closed with tape.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(a) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.

**SUBTASK 21-27-01-110-001**

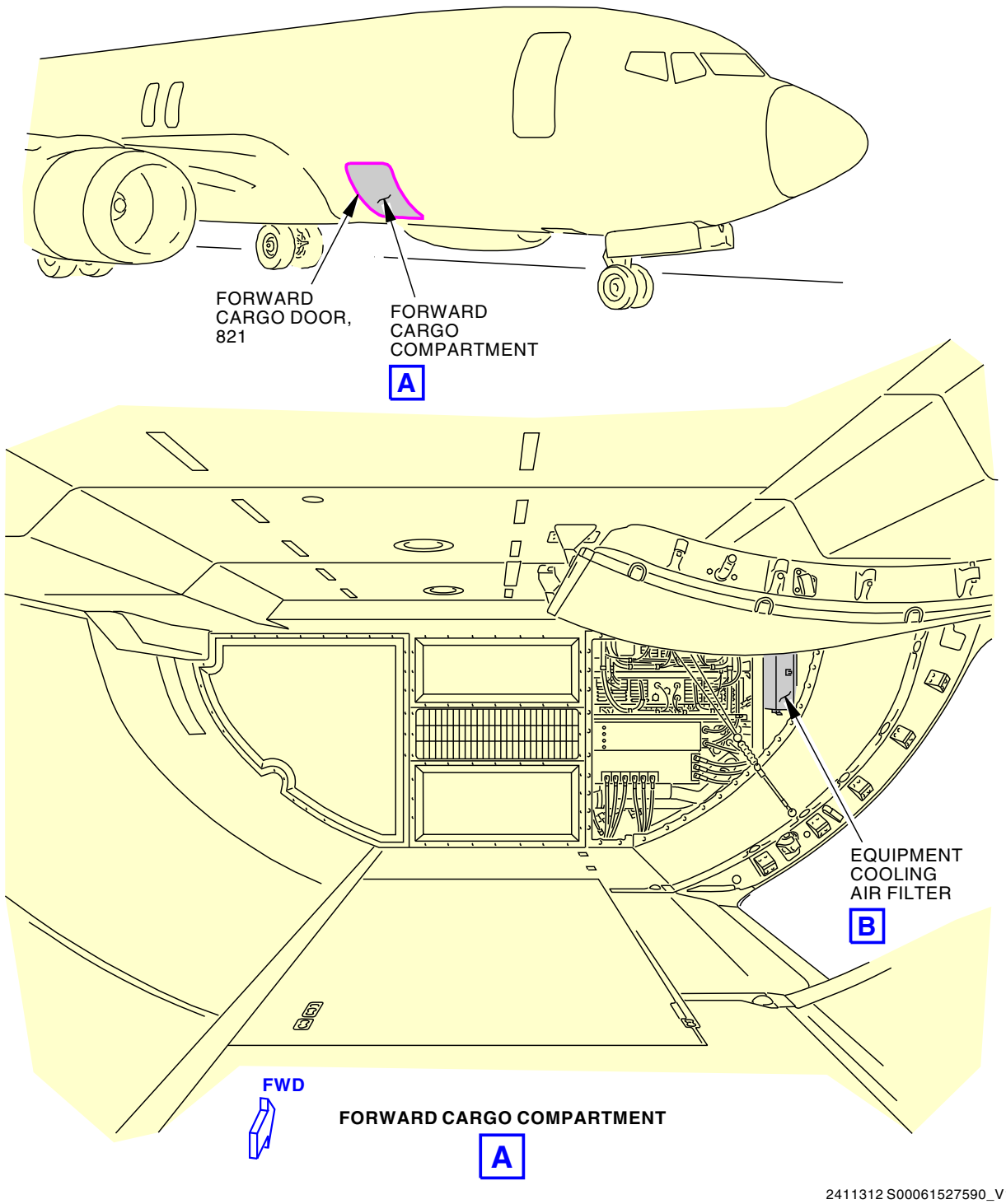
**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(4) Clean your hands with soap and running hot water.

**END OF TASK**



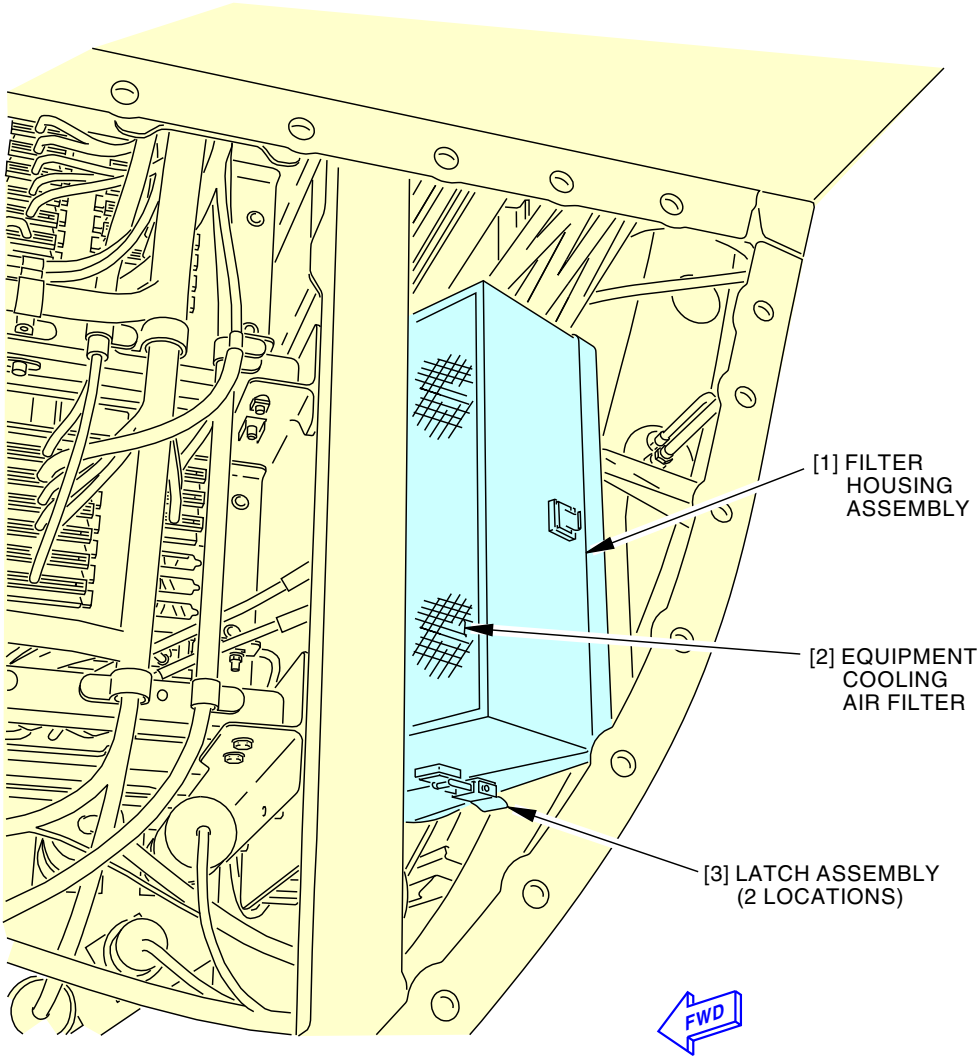
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Equipment Cooling Air Filter Installation**
**Figure 401/21-27-01-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**EQUIPMENT COOLING AIR FILTER**

**B**

2411313 S00061527591_V1

**Equipment Cooling Air Filter Installation**
**Figure 401/21-27-01-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-01-400-801**

**3. Equipment Cooling Air Filter Installation**

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 50-11-01-400-801 | Forward Cargo Compartment Forward Bulkhead Liner Installation (P/B 401) |
| 52-31-00-580-801 | Open the Cargo Door (P/B 201) |
| 52-31-00-580-802 | Close the Cargo Door (P/B 201) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Equipment cooling air filter | 21-27-01-02-010 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 122 | Forward Cargo Compartment - Right |

**D. Prepare for the Installation**

**SUBTASK 21-27-01-010-005**

(1) Open the forward-cargo compartment door (TASK 52-31-00-580-801).

**E. Equipment Cooling Air Filter Installation**

**SUBTASK 21-27-01-400-001**

(1) Get access to the filter housing assembly [1] at the forward right bulkhead in the cargo compartment.

**SUBTASK 21-27-01-400-002**

(2) Close the forward-cargo compartment door to allow access for the installation of the air filter (TASK 52-31-00-580-802).

**SUBTASK 21-27-01-020-003**

(3) Put the equipment cooling air filter [2] in its position on the filter housing assembly [1].

**SUBTASK 21-27-01-020-004**

(4) Close the latch assemblies [3] that are on the top and the bottom of the filter housing assembly [1].

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-27-01-410-001**

(1) Install the forward right bulkhead liner in the forward cargo compartment (TASK 50-11-01-400-801).

**SUBTASK 21-27-01-010-006**

(2) Open the forward-cargo compartment door to allow technician to exit.

**SUBTASK 21-27-01-410-002**

(3) If it is necessary, close the forward-cargo compartment door.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## EQUIPMENT COOLING SUPPLY FAN - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling supply fans

(2) An installation of the equipment cooling supply fans.

B. There are two identical forward equipment cooling supply fans:

(1) The normal fan is installed in the top position

(2) The alternate fan is installed in the bottom position.

**TASK 21-27-02-000-801**

### 2. Forward Equipment Cooling Supply Fan Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-27-02-860-004**

**CAUTION**

MAKE SURE THAT YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**SUBTASK 21-27-02-010-001**

(2) To get access to the equipment cooling supply fans [1], do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Equipment Cooling Supply Fan Removal**

**SUBTASK 21-27-02-020-001**

(1) Disconnect the electrical connector [6] from the equipment cooling supply equipment cooling supply fan [1].

(a) Make a record of the orientation of the electrical connector [6] so that you can install the equipment cooling supply fan [1] with the electrical connector [6] in the same position.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-02-020-002

(2) Disconnect the bonding jumper [4] as follows:

(a) Remove the nut [5], washers [3], and the screw [2].

(b) Disconnect and stow the bonding jumper [4].

1) If you are removing the normal equipment cooling supply fan [1], also disconnect the bonding jumper [4] that connects the normal and the alternate equipment cooling supply fans [1] together.

SUBTASK 21-27-02-020-003

(3) Loosen the clamp [7].

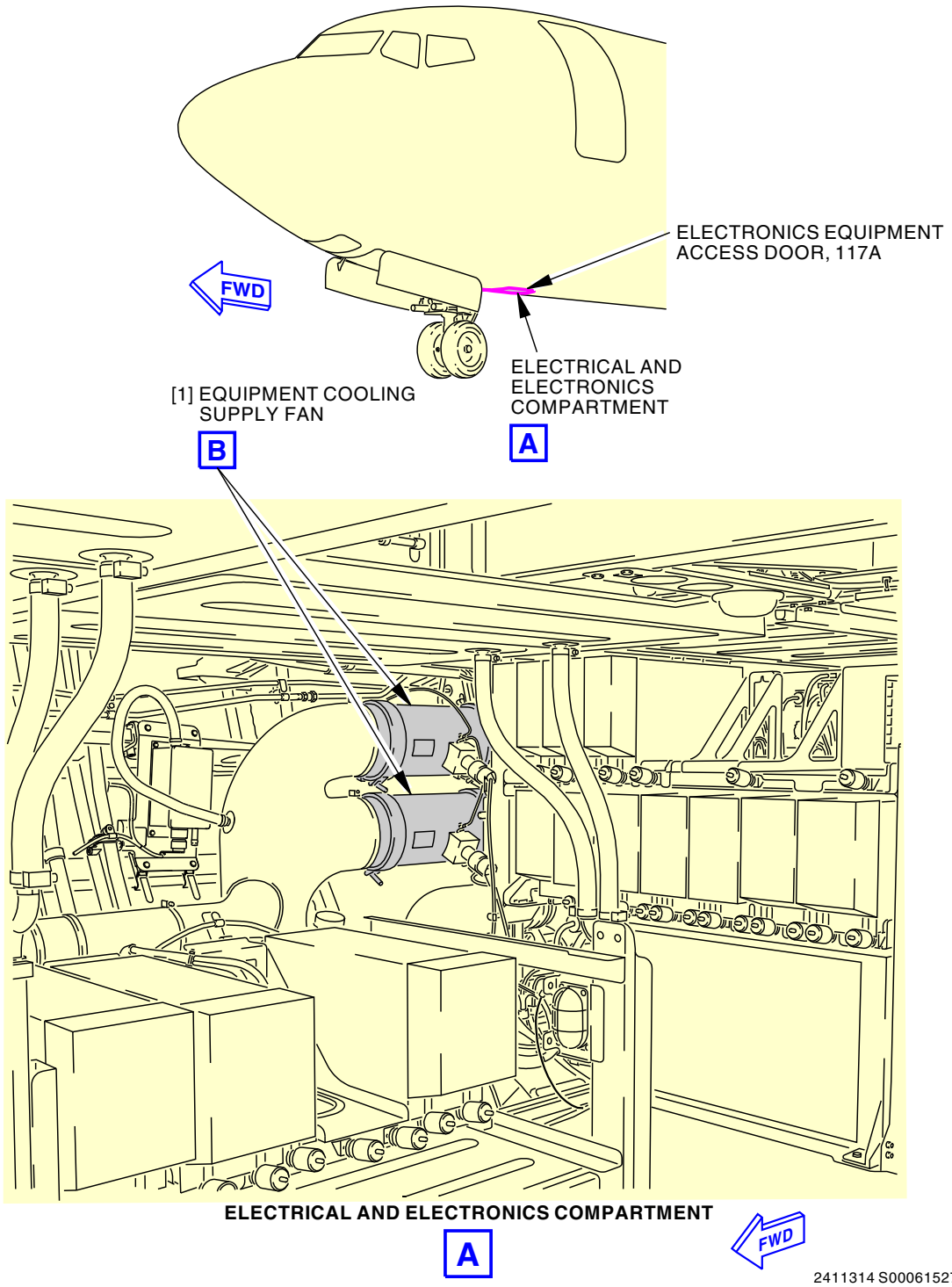
SUBTASK 21-27-02-020-004

(4) Remove the equipment cooling supply fan [1] and the sleeve [8].

**——— END OF TASK ———**



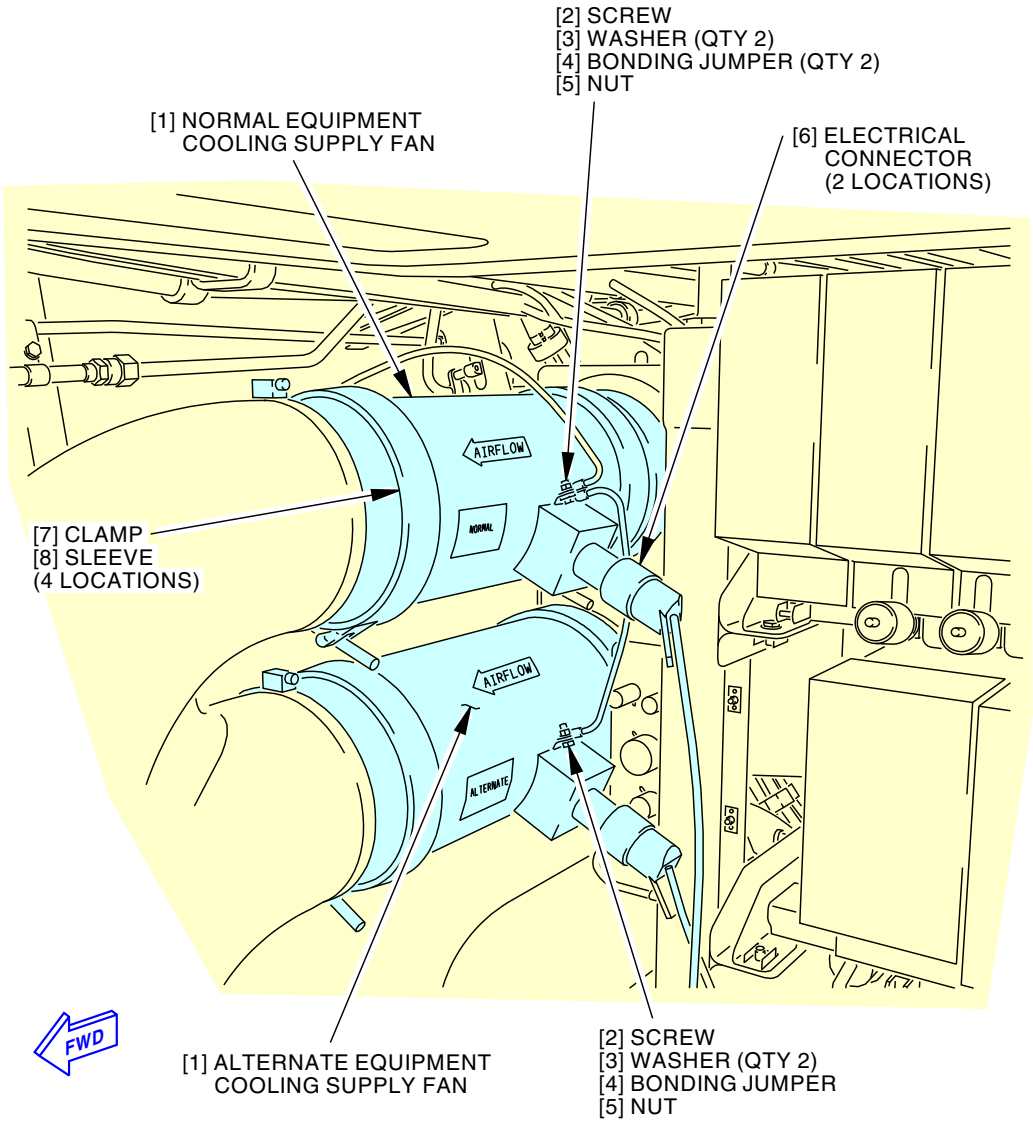
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Equipment Cooling Supply Fan Installation**
**Figure 401/21-27-02-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**EQUIPMENT COOLING SUPPLY FAN**

**B**

2411315 S00061527597_V1

**Equipment Cooling Supply Fan Installation**
**Figure 401/21-27-02-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-02-400-801**

## 3. Forward Equipment Cooling Supply Fan Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Equipment Cooling Supply Fan Installation

**SUBTASK 21-27-02-420-001**

(1) Put the equipment cooling supply fan [1] and the sleeve [8] in their position.

(a) Make sure that the fan impeller is aft of the fan check valve flappers until the flow of air is in the correct direction.

(b) Make sure that the orientation for the electrical connector [6] is the same as it was on the removed equipment cooling supply fan [1].

**SUBTASK 21-27-02-420-002**

(2) Install the clamp [7] and tighten to 20 in-lb (2.3 N·m) – 25 in-lb (2.8 N·m).

**SUBTASK 21-27-02-420-003**

(3) Install the bonding jumper [4] as follows:

(a) Make sure that the bonding jumper [4], the two washers [3], the nut [5], and the screw [2] are clean.

(b) Put the bonding jumper [4] in its position.

1) If you are installing the normal equipment cooling supply fan [1], also install the bonding jumper [4] that connects the normal and the alternate equipment cooling supply fans [1] together.

(c) Install the nut [5], washers [3], and the screw [2].

**SUBTASK 21-27-02-420-004**

(4) Connect the electrical connector [6] to the equipment cooling supply fan [1].

### E. Equipment Cooling Supply Fan Installation Test

**SUBTASK 21-27-02-860-002**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-27-02-710-001**

(2) Do these steps if you installed the normal equipment cooling supply fan [1]:

(a) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the NORMAL position.

(b) Make sure that the normal equipment cooling supply fan [1] operates.

NOTE: Put your hand on the equipment cooling supply fan [1] to feel that it operates.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Examine the normal equipment cooling supply fan [1] connections for leaks.

1) If a leak is found, repair the normal equipment cooling supply fan [1] connections.

**SUBTASK 21-27-02-710-002**

(3) Do these steps if you installed the alternate equipment cooling supply fan [1]:

(a) Make sure that the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel is in the ALTERNATE position.

(b) Make sure that the alternate equipment cooling supply fan [1] operates.

NOTE: Put your hand on the equipment cooling supply fan [1] to feel that it operates.

(c) Examine the alternate equipment cooling supply fan [1] connections for leaks.

1) If a leak is found, repair the alternate equipment cooling supply fan [1] connections.

(d) Put the EQUIP COOLING SUPPLY switch on the Equipment Cooling Panel to the NORMAL position.

## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-27-02-410-001**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## EQUIPMENT COOLING LOW FLOW SENSORS - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling supply or exhaust low flow sensor.

(2) An installation of the equipment cooling supply or exhaust low flow sensor.

(3) A cleaning of the equipment cooling supply or exhaust low flow sensor.

B. The equipment cooling low flow sensors are installed in the forward EE bay.

**TASK 21-27-03-000-801**

### 2. Equipment Cooling Low Flow Sensors Removal

(Figure 201)

#### A. General

(1) You must remove electrical power from the airplane before you remove one of the equipment cooling low flow sensors. This will make sure that the electrical/electronic equipment does not receive electrical power when the equipment cooling system is not in operation.

#### B. References

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

#### D. Location Zones

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |

#### E. Access Panels

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

#### F. Prepare for the Removal

**SUBTASK 21-27-03-860-001**

(1) To get access to the equipment cooling supply or exhaust low flow sensor [4], do this step:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

**SUBTASK 21-27-03-860-002**

**CAUTION**

MAKE SURE YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(2) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## G. Equipment Cooling Low Flow Sensors Removal

**SUBTASK 21-27-03-020-001**

(1) Disconnect the electrical connector [3].

**SUBTASK 21-27-03-020-002**

(2) Remove the lockwire [2] (MS20995C32 lockwire, G01048).

**SUBTASK 21-27-03-020-003**

**CAUTION**

USE TWO WRENCHES WHEN YOU REMOVE THE SENSOR, ONE ON THE BOSS OF THE DUCT AND ONE ON THE SENSOR. IF YOU DO NOT USE TWO WRENCHES WHEN YOU REMOVE THE SENSOR, DAMAGE TO THE DUCT CAN OCCUR.

(3) Remove the equipment cooling low flow sensor [4].

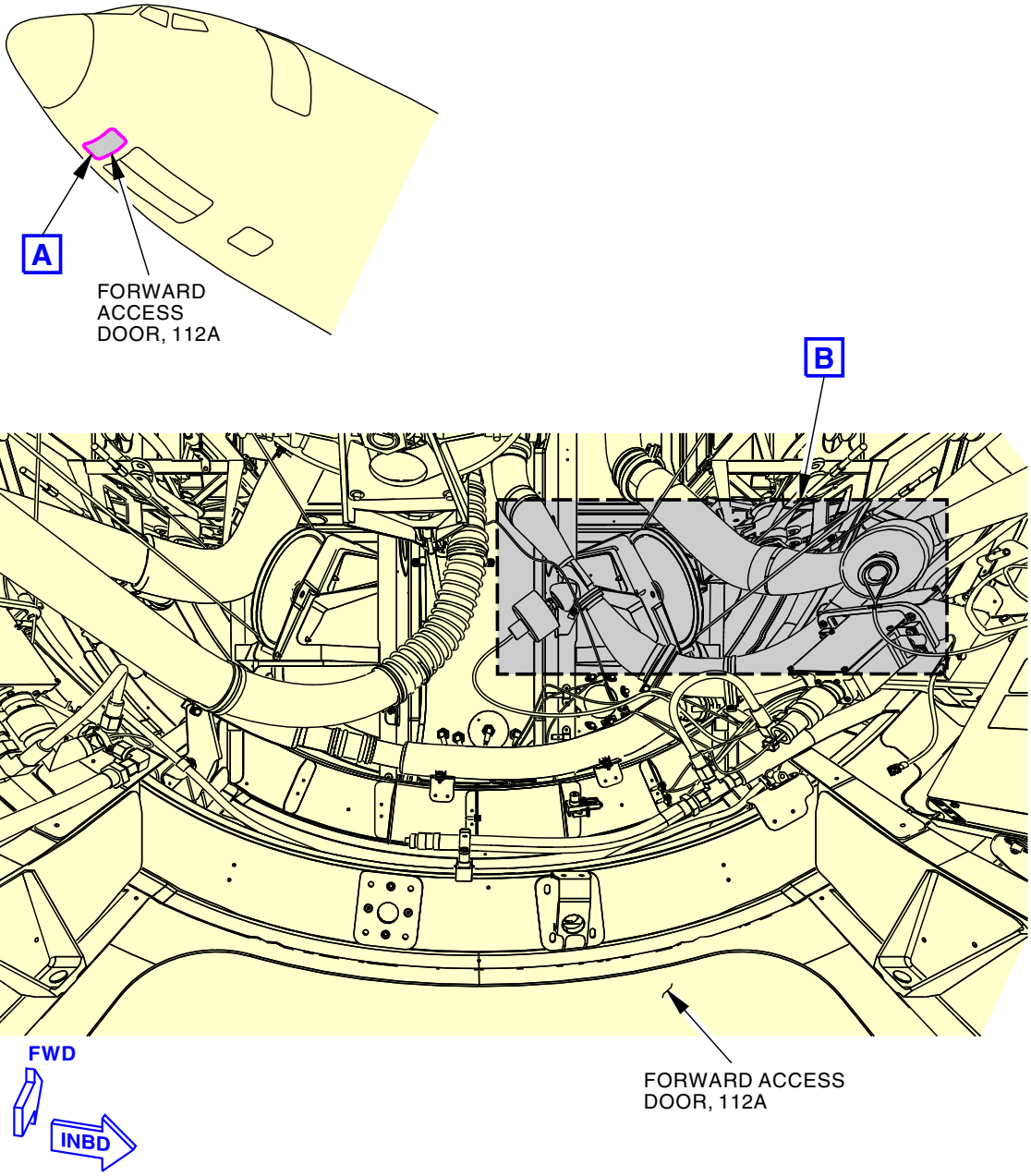
**SUBTASK 21-27-03-020-004**

(4) Remove the packing [1] and discard.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**VIEW WHEN YOU ARE LOOKING UP THROUGH THE FORWARD ACCESS DOOR, 112A**

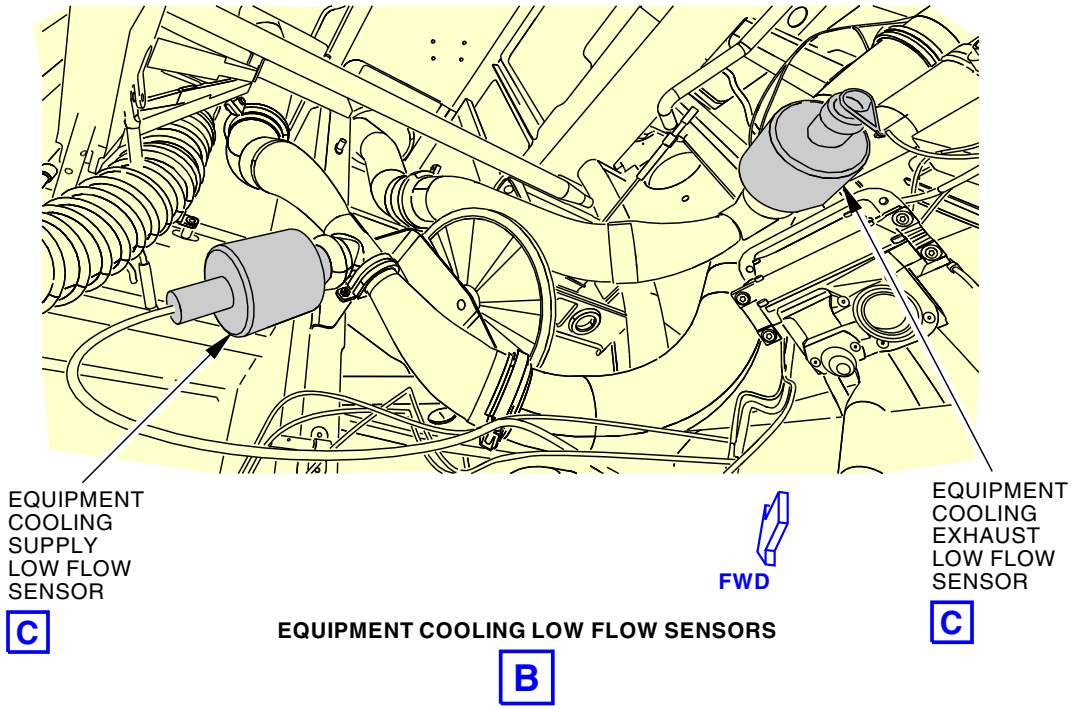
**A**

2411316 S00061527602_V1

**Equipment Cooling Low Flow Sensors Installation**
**Figure 201/21-27-03-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Equipment Cooling Low Flow Sensors Installation**
**Figure 201/21-27-03-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-03-400-801**

## 3. Equipment Cooling Low Flow Sensors Installation

(Figure 201)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D50004 | Compound - Antiseize | BMS3-28 |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Packing | 21-27-03-01-010 | SIA ALL |
| | | 21-27-03-02-020 | SIA ALL |
| 4 | Low flow sensor | 21-27-03-01-015 | SIA ALL |
| | | 21-27-03-02-025 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |
| 117A | Electronic Equipment Access Door |

### F. Equipment Cooling Low Flow Sensors Installation

**SUBTASK 21-27-03-640-001**

(1) Apply compound, D50004, to the threads of the equipment cooling low flow sensor [4].

**SUBTASK 21-27-03-420-001**

(2) Put a new packing [1] on the equipment cooling low flow sensor [4].

**SUBTASK 21-27-03-420-002**

**CAUTION**

USE TWO WRENCHES WHEN YOU TIGHTEN THE SENSOR, ONE ON THE BOSS OF THE DUCT AND ONE ON THE SENSOR. IF YOU DO NOT USE TWO WRENCHES WHEN YOU TIGHTEN THE SENSOR, DAMAGE TO THE DUCT CAN OCCUR.

(3) Install the equipment cooling low flow sensor [4] until the packing [1] makes contact with the duct, then tighten a maximum of 3/4 turn.

**SUBTASK 21-27-03-420-003**

(4) Install the lockwire [2] (MS20995C32 lockwire, G01048).

**SUBTASK 21-27-03-420-004**

(5) Connect the electrical connector [3].



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## G. Equipment Cooling Low Flow Sensors Installation Test

SUBTASK 21-27-03-860-006

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-27-03-860-004

(2) Make sure that the equipment cooling supply and exhaust OFF lights on the equipment cooling Panel are not on.

SUBTASK 21-27-03-710-001

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

**CAUTION**

MAKE SURE THAT YOU CLOSE THE FAN CIRCUIT BREAKER IN LESS THAN 5 MINUTES AFTER YOU OPEN IT. IF YOU KEEP THE CIRCUIT BREAKER OPEN MORE THAN 5 MINUTES, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(3) Do these steps to do a check of the equipment cooling supply low flow sensor [4]:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(b) Open this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(c) Make sure that the equipment cooling supply OFF light comes on after approximately 20 to 60 seconds.

(d) Close this circuit breaker:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C00934 | EQPT CLG SPLY FAN PWR-NORM |

(e) Make sure that the equipment cooling supply OFF light goes out within 20 seconds.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-03-710-002

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

**CAUTION**

MAKE SURE THAT YOU CLOSE THE FAN CIRCUIT BREAKER IN LESS THAN 5 MINUTES AFTER YOU OPEN IT. IF YOU KEEP THE CIRCUIT BREAKER OPEN MORE THAN 5 MINUTES, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(4) Do these steps to do a check of the equipment cooling exhaust low flow sensor [4]:

(a) Open this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

(b) Make sure that the equipment cooling exhaust OFF light comes on after approximately 20 to 60 seconds.

(c) Close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 1 | C00836 | EQPT CLG EXH FAN PWR-NORM |

(d) Make sure that the equipment cooling exhaust OFF light goes out within 20 seconds.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-27-03-410-001

(1) Close these access panels:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |
| 117A | Electronic Equipment Access Door |

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-03-400-802**

## 4. Equipment Cooling Low Flow Sensors Cleaning

(Figure 201)

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### B. Location Zones

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |

### C. Equipment Cooling Low Flow Sensors Cleaning

**SUBTASK 21-27-03-640-002**

(1) Remove the equipment cooling low flow sensor [4]. To remove the equipment cooling low flow sensor [4], do this task: Equipment Cooling Low Flow Sensors Removal, TASK 21-27-03-000-801.

**SUBTASK 21-27-03-420-005**

(2) Clean the probe of the sensor with a cotton wiper, G00034 that is moist with alcohol, B00130.

**SUBTASK 21-27-03-420-006**

(3) Install the equipment cooling low flow sensor. To install the equipment cooling low flow sensor, do this task: Equipment Cooling Low Flow Sensors Installation, TASK 21-27-03-400-801.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## EQUIPMENT COOLING EXHAUST FAN - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling exhaust fans.

(2) An installation of the equipment cooling exhaust fans.

(3) A removal of the Aft Equipment Cooling Exhaust Fan.

(4) An installation of the Aft Equipment Cooling Exhaust Fan.

B. There are two identical equipment cooling exhaust fans installed in the electronic equipment center:

(1) The normal exhaust fan is installed in the forward position.

(2) The alternate exhaust fan is installed in the aft position.

**TASK 21-27-04-000-801**

### 2. Equipment Cooling Exhaust Fan Removal

(Figure 401)

#### A. General

(1) This task provides the instructions how to remove the normal and alternate equipment cooling exhaust fans from the electronic equipment center.

#### B. References

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-27-04-860-001**

**CAUTION**

MAKE SURE THAT YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**SUBTASK 21-27-04-010-001**

(2) To get access to the equipment cooling exhaust fans, do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-27-04-010-002

(3) Remove the access panel [11] on the top of the raised platform just aft and right of the aircraft center line as follows:

(a) Remove the screws [10] that attach the access panel [11] to the top of the raised platform.

1) Remove the access panel [11].

## F. Equipment Cooling Exhaust Fan Removal

SUBTASK 21-27-04-020-001

(1) Disconnect the electrical connector [6] from the normal exhaust fan [1] or alternate exhaust fan [9].

SUBTASK 21-27-04-020-002

(2) Disconnect the bonding jumper [4] as follows:

(a) Remove the nut [5], washers [3], and screw [2].

(b) Disconnect and stow the bonding jumper [4].

NOTE: If you are removing the normal exhaust fan [1], also disconnect thebonding jumper [4] that connects the normal and the alternate exhaust fan [9] together.

SUBTASK 21-27-04-020-003

(3) Loosen the clamps [7].

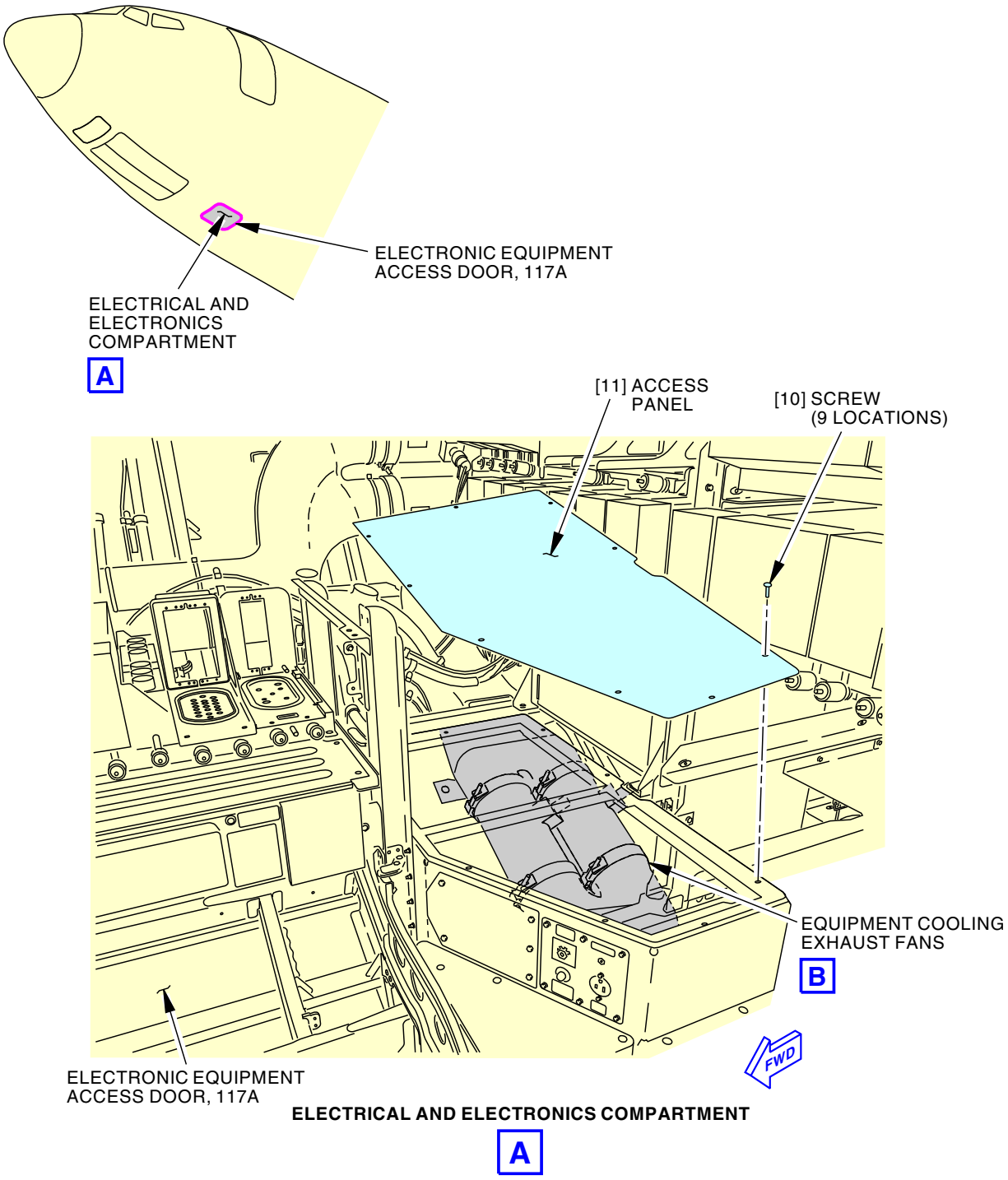
SUBTASK 21-27-04-020-004

(4) Remove the normal exhaust fan [1] or alternate exhaust fan [9] and the sleeves [8].

——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details

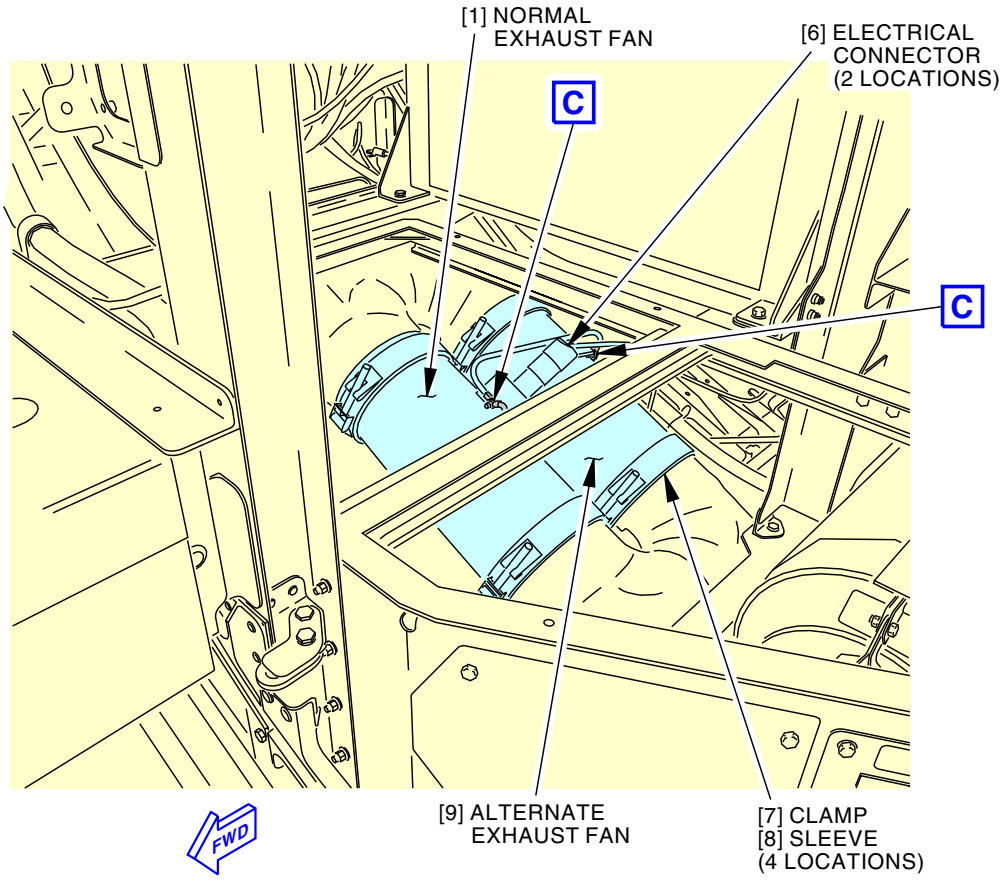



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**Equipment Cooling Exhaust Fan Installation**
**Figure 401/21-27-04-990-801 (Sheet 1 of 2)**

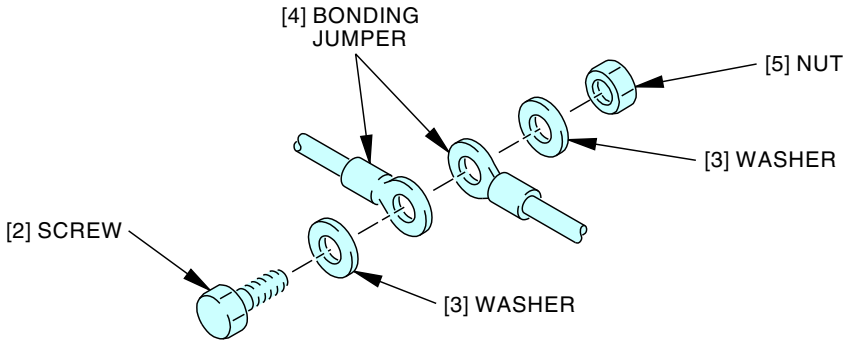


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**EQUIPMENT COOLING EXHAUST FANS**

B




**NOTE:**

EQUIPMENT COOLING EXHAUST SMOKE DETECTOR REMOVED FOR CLARITY

**(EXAMPLE)**

C

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**Equipment Cooling Exhaust Fan Installation**
**Figure 401/21-27-04-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-04-400-801**

## 3. Equipment Cooling Exhaust Fan Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

### B. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Equipment Cooling Exhaust Fan Installation

**SUBTASK 21-27-04-420-001**

(1) Put the normal exhaust fan [1] or alternate exhaust fan [9] and the sleeves [8] in their position.

**SUBTASK 21-27-04-420-002**

(2) Install the clamps [7] and tighten to 20 in-lb (2.3 N·m) to 25 in-lb (2.8 N·m).

**SUBTASK 21-27-04-420-003**

(3) Do the steps that follow to installl the bonding jumper [4]:

(a) Make sure that the bonding jumper [4], the two washers [3], the nut [5], and the screw [2] are clean.

(b) Put the bonding jumper [4] in its position.

(c) If you are installing the normal exhaust fan [1], also install the bonding jumper [4] that connects the normal and the alternate fans together.

(d) Install the nut [5], washers [3], and screw [2].

**SUBTASK 21-27-04-420-004**

(4) Connect the electrical connector [6] to the normal exhaust fan [1] or alternate exhaust fan [9].

### E. Equipment Cooling Exhaust Fan Installation Test

**SUBTASK 21-27-04-860-002**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-27-04-710-001**

(2) Do these steps if you installed the normal exhaust fan [1]:

(a) Make sure that the EQUIP COOLING exhaust switch on the Equipment Cooling Panel is in the NORM position.

(b) Make sure that the normal exhaust fan [1] operates.

(c) Put your hand on the normal exhaust fan [1] to feel that it operates.

(d) Examine the fan connections for leaks.

1) If a leak is found, repair the normal exhaust fan [1] connections.

**SUBTASK 21-27-04-710-002**

(3) Do these steps if you installed the alternate exhaust fan [9]:



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(a) on the P5 panel, make sure that the EQUIP COOLING exhaust switch on the Equipment Cooling Panel is in the ALTN position.

(b) Make sure that the alternate exhaust fan [9] fan operates.

(c) Put your hand on the fan to feel that it operates.

(d) Examine the fan connections for leaks.

1) If a leak is found, repair the alternate exhaust fan [9] connections.

(e) Put the EQUIP COOLING exhaust switch on the Equipment Cooling Panel to the NORM position.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-27-04-410-001

(1) Install the access panel [11] that you removed on the top of the raised platform as follows:

(a) Install the access panel [11].

1) Install the screws [10] that attach the access panel [11] to the top of the raised platform.

SUBTASK 21-27-04-410-002

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**

**TASK 21-27-04-000-802**

## 4. Aft Equipment Cooling Exhaust Fan Removal

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 50-12-02-000-801 | Aft Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 12 | Aft equipment cooling exhaust fan | 21-27-04-02-120 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |



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## E. Prepare for the Removal

SUBTASK 21-27-04-040-001

(1) Open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01537 | VOICE RCDR RELAY |
| D | 6 | C01948 | VOICE RCDR/RIPS |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C00857 | COMMUNICATIONS HF 2 |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 19 | C01344 | APU FIRE SW POWER |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 14 | C00033 | AUX POWER UNIT CONT |

**F/O Electrical System Panel, P6-5**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C04069 | EQUIPMENT COOLING E6 RACK FAN POWER |
| D | 10 | C04070 | EQUIPMENT COOLING E6 RACK FAN CONTROL |

This circuit breaker is inoperative and should remain open:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C00107 | VOICE RCDR (INOP) |

SUBTASK 21-27-04-010-003

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

SUBTASK 21-27-04-010-004

(3) Do this task: Aft Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-12-02-000-801

## F. Aft Equipment Cooling Supply Fan Removal

SUBTASK 21-27-04-020-007

(1) Disconnect the electrical connector [13] from the aft equipment cooling exhaust fan [12].

SUBTASK 21-27-04-020-008

(2) Loosen clamps [14].

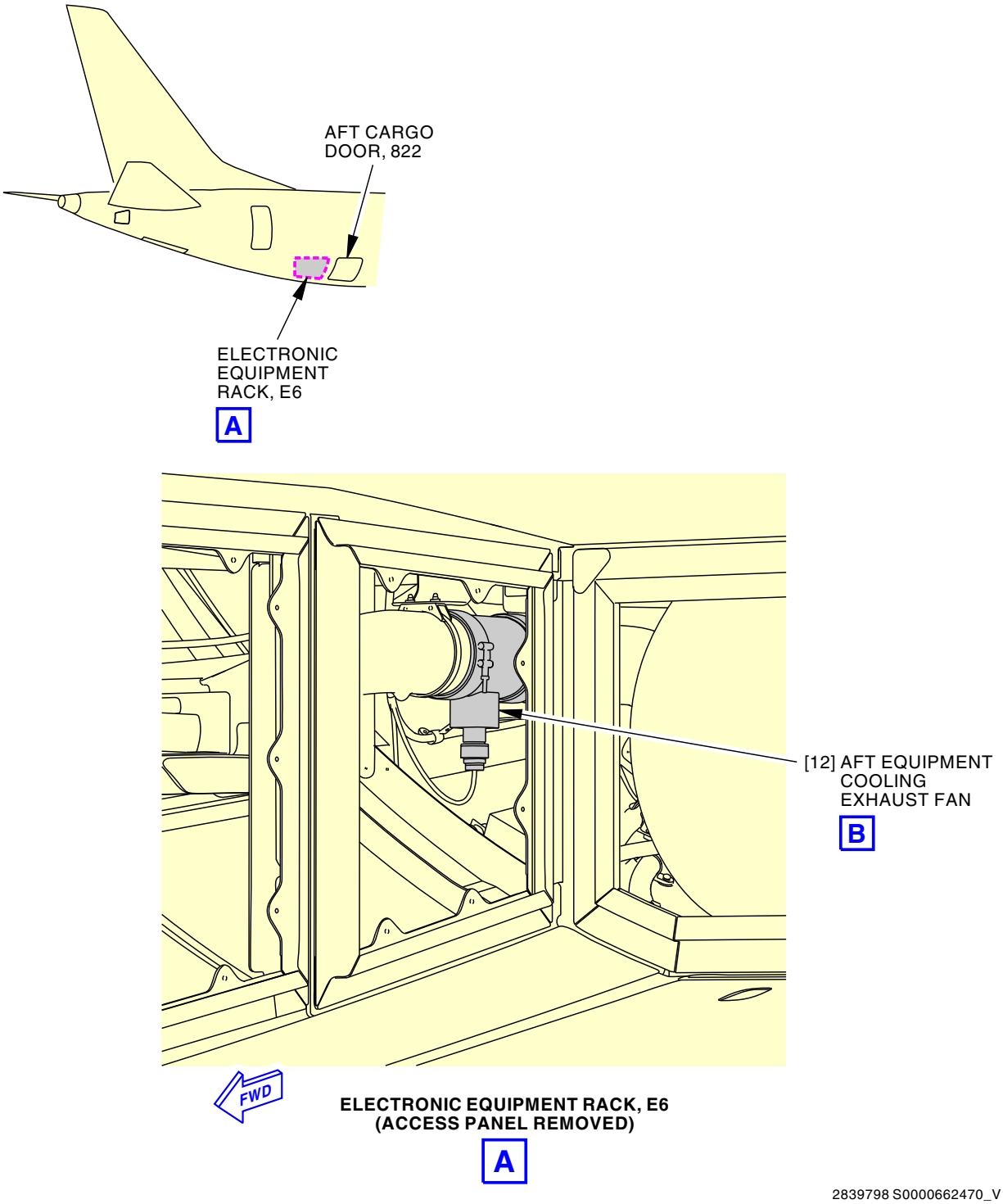
SUBTASK 21-27-04-020-009

(3) Remove the aft equipment cooling exhaust fan [12] and the sleeves [15].

**END OF TASK**



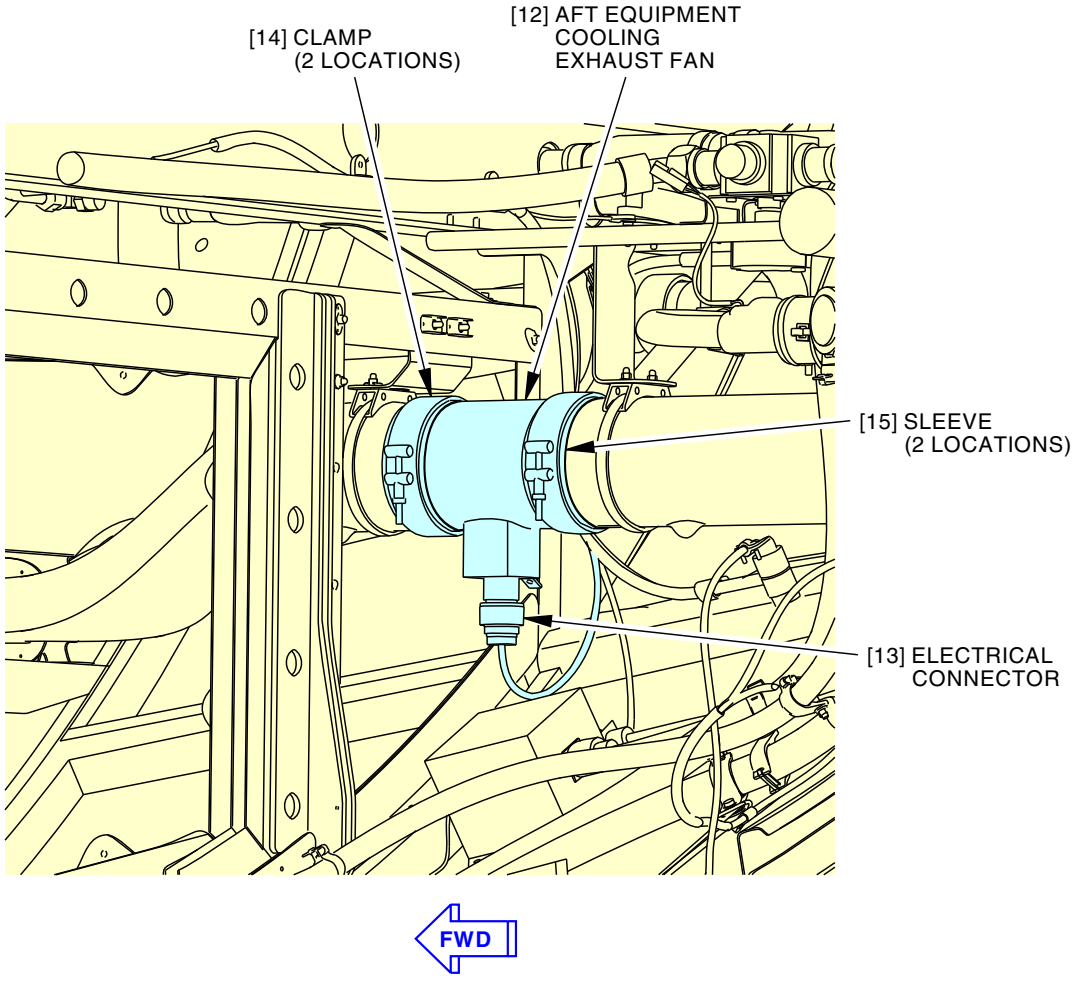
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**Aft Equipment Cooling Exhaust Fan Installation**
**Figure 402/21-27-04-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**AFT EQUIPMENT COOLING EXHAUST FAN**

**B**

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**Aft Equipment Cooling Exhaust Fan Installation**
**Figure 402/21-27-04-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-27-04-400-802**

## 5. Aft Equipment Cooling Exhaust Fan Installation

(Figure 402)

### A. References

| Reference | Title |
|---|---|
| 21-27-00-700-808 | Aft Equipment Cooling Fan - Functional Test (P/B 501) |
| 50-12-02-400-801 | Aft Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 12 | Aft equipment cooling exhaust fan | 21-27-04-02-120 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

### E. Aft Equipment Cooling Supply Fan Installation

**SUBTASK 21-27-04-420-009**

(1) Put the aft equipment cooling exhaust fan [12] and the sleeves [15] in their position.

(a) Align electrical connector [13] with the protrusion of the aft duct.

**SUBTASK 21-27-04-420-010**

(2) Install the clamps [14] and tighten to 20 in-lb (2 N·m)-25 in-lb (3 N·m).

**SUBTASK 21-27-04-420-011**

(3) Connect the electrical connector [13] to the aft equipment cooling exhaust fan [12].

**SUBTASK 21-27-04-440-001**

(4) Remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01537 | VOICE RCDR RELAY |
| D | 6 | C01948 | VOICE RCDR/RIPS |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 2 | C00857 | COMMUNICATIONS HF 2 |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 19 | C01344 | APU FIRE SW POWER |



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**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 14 | C00033 | AUX POWER UNIT CONT |

**F/O Electrical System Panel, P6-5**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C04069 | EQUIPMENT COOLING E6 RACK FAN POWER |
| D | 10 | C04070 | EQUIPMENT COOLING E6 RACK FAN CONTROL |

This circuit breaker is inoperative and should remain open:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C00107 | VOICE RCDR (INOP) |

## F. Aft Equipment Cooling Supply Fan Installation Test

**SUBTASK 21-27-04-710-003**

(1) Do this task: Aft Equipment Cooling Fan - Functional Test, TASK 21-27-00-700-808.

## G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-27-04-410-003**

(1) Do this task: Aft Cargo Compartment Aft Bulkhead Liner Installation, TASK 50-12-02-400-801.

**SUBTASK 21-27-04-410-004**

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

**——— END OF TASK ———**



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## EQUIPMENT COOLING EXHAUST FAN - CLEANING/PAINTING

### 1. General

A. This procedure has a task to clean the equipment cooling exhaust fans.

B. There are two identical equipment cooling exhaust fans installed in the electronic equipment center.

(1) The normal exhaust fan is installed in the forward position.

(2) The alternate exhaust fan is installed in the aft position.

**TASK 21-27-04-110-801**

### 2. Equipment Cooling Exhaust Fan Cleaning

#### A. General

(1) The equipment cooling exhaust fans may not operate correctly if they are dirty.

(2) This procedure cleans only the impellers of the equipment cooling exhaust fans and the air passages.

(3) You must do an overhaul of the equipment cooling exhaust fans if it is necessary to disassemble them for a more thorough cleaning.

(4) This procedure is applicable for all of the fans in the equipment cooling system.

#### B. References

| Reference | Title |
|---|---|
| 21-27-04-000-801 | Equipment Cooling Exhaust Fan Removal (P/B 401) |
| 21-27-04-400-801 | Equipment Cooling Exhaust Fan Installation (P/B 401) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-123 | Brush - Soft Bristle |

#### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00039 | Cleaner - Brulin Formula 815MX | |
| B00074 | Solvent - Degreasing | MIL-PRF-680 (Supersedes P-D-680) |
| G50138 | Cloth - Soft Cotton | |

#### E. Prepare for the Cleaning

**SUBTASK 21-27-04-020-005**

(1) Remove the equipment cooling exhaust fan(TASK 21-27-04-000-801).

**SUBTASK 21-27-04-930-001**

(2) Make marks on the impellers so you can install them in the same position they were in when you removed them.

**SUBTASK 21-27-04-030-001**

(3) Remove the nut and washer at each impeller.

(a) Discard the nuts.

**SUBTASK 21-27-04-020-006**

(4) Move the impeller from side to side to remove it from the rotor shaft.

NOTE: You can lightly hit the rotor shaft with a rubber mallet while you pull on the impeller to make it easy to remove.



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## F. Equipment Cooling Exhaust Fan Cleaning

SUBTASK 21-27-04-160-001

(1) Soak the impellers in Brulin Formula 815MX cleaner, B00039, or solvent, B00074, until contamination loosens.

NOTE: Use the solvent, B00074, if the Brulin Formula 815MX cleaner, B00039, does not fully clean the impellers.

SUBTASK 21-27-04-160-002

(2) Remove the contamination with a soft bristle brush, STD-123.

SUBTASK 21-27-04-160-003

**CAUTION**

MAKE SURE TO DRY THE MOTOR FULLY WITH WARM AIR OR IN AN OVEN IF WATER GETS IN IT. IF THE MOTOR IS NOT FULLY DRIED BEFORE IT OPERATES, DAMAGE CAN OCCUR.

(3) Flush the impellers fully with clean water if you used Brulin Formula 815MX cleaner, B00039.

SUBTASK 21-27-04-160-004

(4) Dry the impellers with a soft cotton cloth, G50138, or with dry, compressed air.

SUBTASK 21-27-04-420-005

(5) Install the keys and the impellers on the motor shaft.

NOTE: Use the marks on the impellers to install them.

SUBTASK 21-27-04-420-006

(6) Make sure the key is correctly engaged in each impeller.

SUBTASK 21-27-04-420-007

**CAUTION**

USE A NEW NUT TO INSTALL THE IMPELLER. IF YOU DO NOT USE A NEW NUT, THE IMPELLER CAN BECOME LOOSE DURING OPERATION, AND CAUSE DAMAGE TO EQUIPMENT.

(7) Install the washers and the new self-locking nuts.

SUBTASK 21-27-04-430-001

(8) Tighten the nuts to 80 in-lb (9.0 N·m) to 100 in-lb (11.3 N·m) above the run-on torque.

NOTE: The minimum back-off torque is 60 in-lb (6.8 N·m).

SUBTASK 21-27-04-420-008

(9) Install the equipment cooling exhaust fan (TASK 21-27-04-400-801).

**END OF TASK**



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## EQUIPMENT COOLING MUFFLER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling muffler.

(2) An installation of the equipment cooling muffler.

B. There is an equipment cooling muffler installed behind galley No. 1. The muffler quiets the air being drawn from the P5 and P6 panels.

**TASK 21-27-07-000-801**

### 2. Equipment Cooling Muffler Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 25-31-11-000-801 | Galley No. 1 - Removal (P/B 401) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G50140 | Gloves - Protective, Latex or Nitrile | |

**D. Location Zones**

| Zone | Area |
|---|---|
| 220 | Subzone - Passenger Compartment - Body Station 259.50 to 360.00 |

**E. Prepare for the Removal**

**SUBTASK 21-27-07-860-001**

**CAUTION**

MAKE SURE THAT YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE ELECTRICAL/ELECTRONIC EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**SUBTASK 21-27-07-010-001**

(2) Remove the No. 1 galley (TASK 25-31-11-000-801).



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SUBTASK 21-27-07-940-001

**WARNING**

PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(3) Before you touch the muffler/duct assembly, put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140

## F. Equipment Cooling Muffler Removal

SUBTASK 21-27-07-010-002

(1) Do the steps that follow to remove the equipment cooling muffler [1]:

(a) Loosen the clamp [3].

(b) Slide the flex hose [2] away from the end of the muffler [1].

(c) Remove the clamp [4].

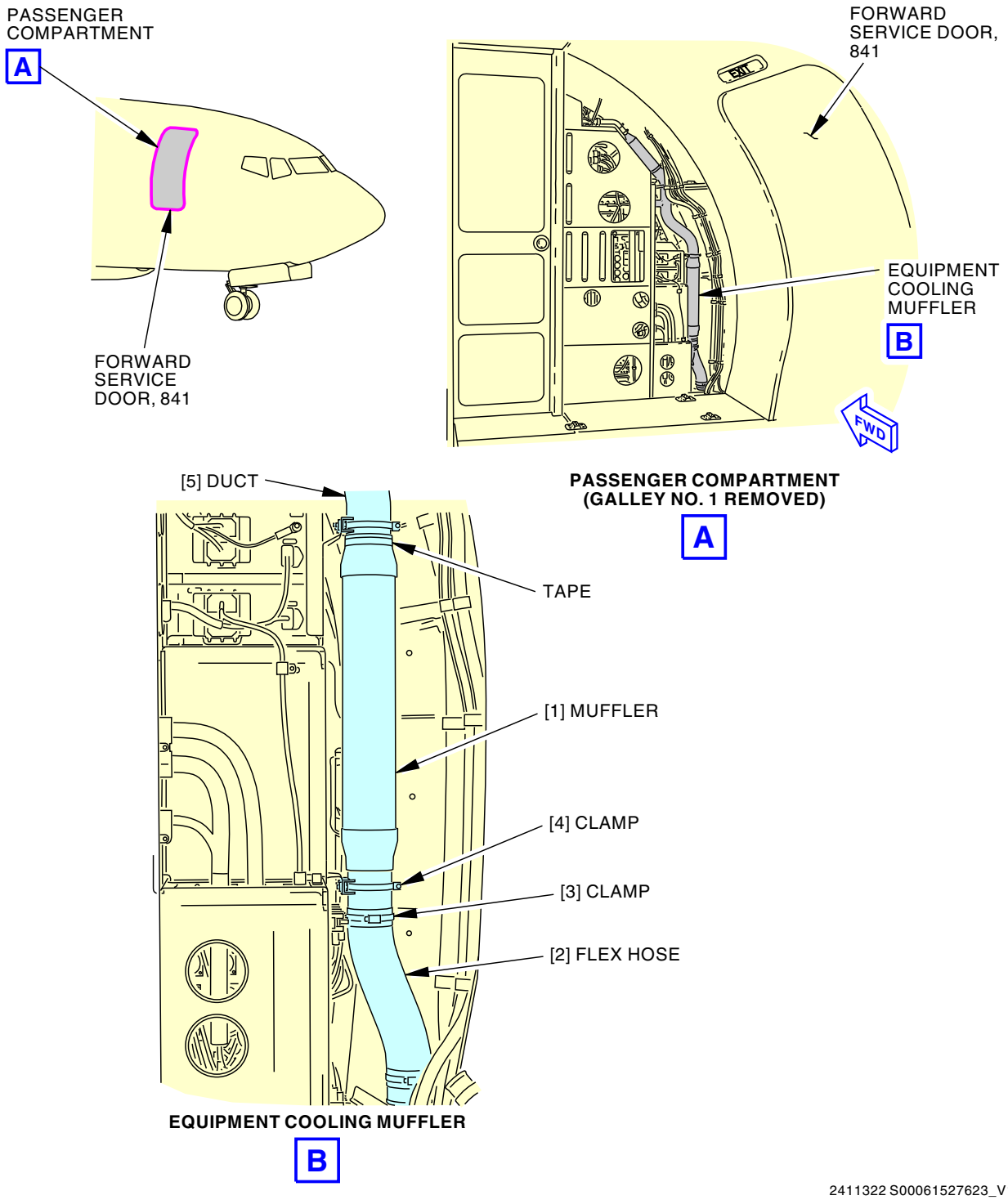
(d) Remove the tape between the muffler [1] and the duct [5].

(e) Move the muffler [1] down to remove it from the duct [5].

——— END OF TASK ———



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**Equipment Cooling Muffler Installation**
**Figure 401/21-27-07-990-801**



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**TASK 21-27-07-400-801**

## 3. Equipment Cooling Muffler Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 25-31-11-400-801 | Galley No. 1 - Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A50464 | Tape - Vinyl, Adhesive Coated | BMS5-179 |
| B00090 | Solvent - Inhibited Trichloroethane 1,1,1 | MIL-T-81533 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Muffler | 21-27-07-01-085 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 220 | Subzone - Passenger Compartment - Body Station 259.50 to 360.00 |

### E. Equipment Cooling Muffler Installation

**SUBTASK 21-27-07-860-002**

(1) Make sure that power has been removed from the airplane (Remove Electrical Power, TASK 24-22-00-860-802).

**SUBTASK 21-27-07-110-001**

(2) Clean the surfaces at the joint between the muffler [1] and the duct [5] with solvent, B00090.

**SUBTASK 21-27-07-420-001**

(3) Install the equipment cooling muffler [1] as follows:

(a) Slide the upper end of the muffler [1] over the end of the duct [5].

(b) Put the clamp [4] in its position and tighten to 3.00 in-lb (0.34 N·m) - 5.00 in-lb (0.56 N·m).

(c) Slide the flex hose [2] onto the lower end of the muffler [1].

(d) Put the clamp [3] in its position and tighten to 3.00 in-lb (0.34 N·m) - 5.00 in-lb (0.56 N·m).

1) Do a visual inspection of the muffler [1], make sure that it is not damaged.

(e) Install two layers of 2-inch wide tape, A50464 - Vinyl, Adhesive Coated BMS5-179, over the joint between the muffler [1] and the duct [5].

**SUBTASK 21-27-07-860-003**

(4) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-27-07-200-001**

(5) Make sure that the equipment cooling fan operates.

**SUBTASK 21-27-07-200-002**

(6) Check for air leaks with your hand at all duct joints.

(a) Repair any leaks.

**SUBTASK 21-27-07-410-001**

(7) Install the No. 1 galley (TASK 25-31-11-400-801).



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SUBTASK 21-27-07-020-001

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(8) Remove all personal protective equipment and put them in a plastic bag, G00624. Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(a) Discard the bag with the personal protective equipment. Refer to the airline, local health, safety and regulatory procedures for disposal of material.

SUBTASK 21-27-07-110-002

**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(9) Clean your hands with soap and running hot water.

**END OF TASK**



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## EQUIPMENT COOLING EXHAUST DUCT - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the equipment cooling exhaust duct

(2) An installation of the equipment cooling overboard exhaust duct.

**TASK 21-27-10-000-801**

### 2. Equipment Cooling Exhaust Duct - Removal

(Figure 401)

#### A. General

(1) You must remove electrical power from the airplane before you remove an equipment cooling exhaust duct. This will make sure the electrical/electronic equipment does not receive electrical power when the equipment cooling system is not in operation.

#### B. References

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-27-10-860-001**

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**SUBTASK 21-27-10-010-001**

(2) To get access to the equipment cooling exhaust duct, do this step:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(3) Remove the access panel [1] and access panel [3] on the top of the raised platform.

(a) Remove the screws [2] that attach the access panel [1] and access panel [3] to the top of the raised platform.

#### F. Equipment Cooling Exhaust Duct Removal

**SUBTASK 21-27-10-020-001**

(1) Loosen the coupling [4].

**SUBTASK 21-27-10-020-002**

(2) Remove the bolts [6].

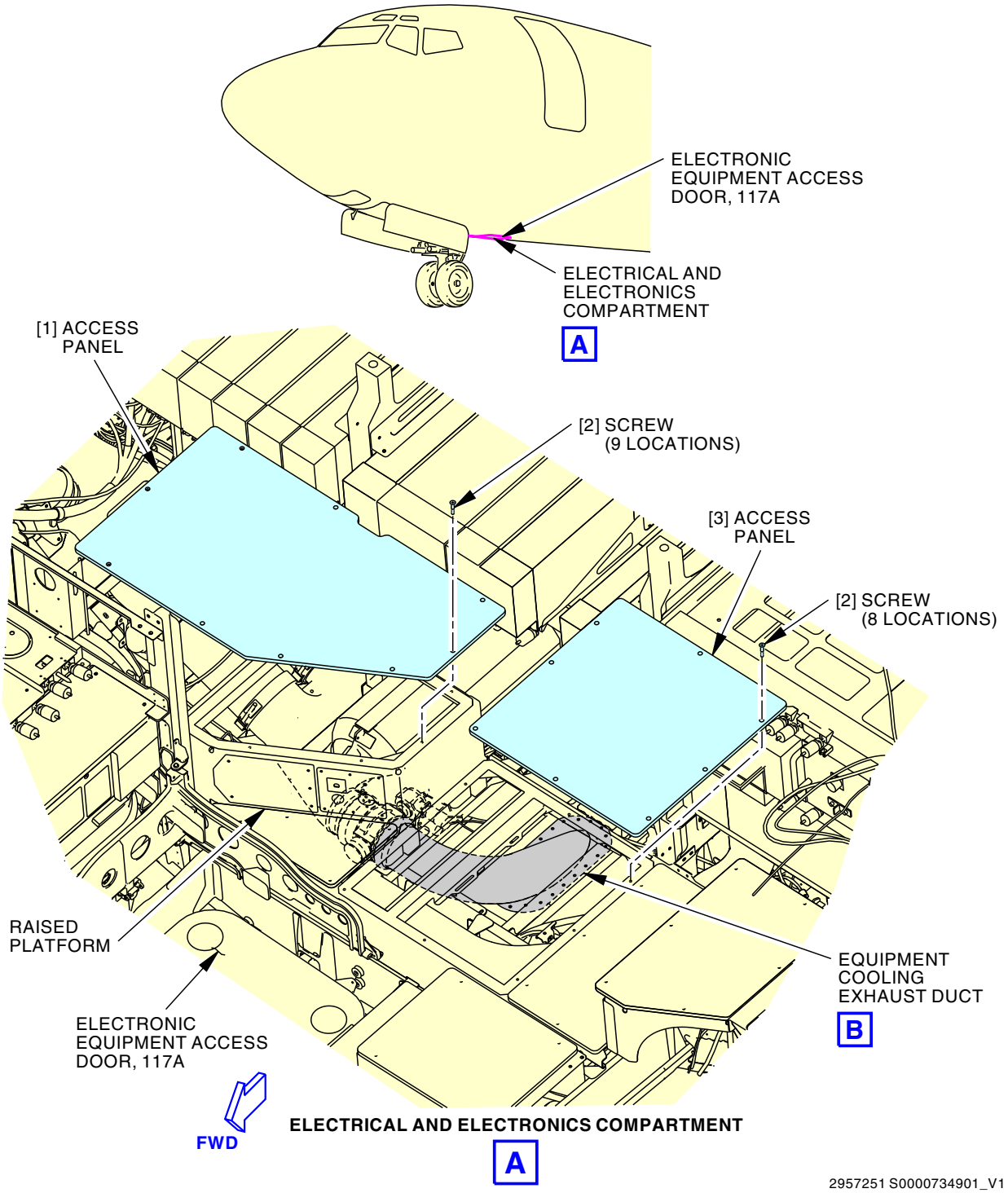
**SUBTASK 21-27-10-020-003**

(3) Remove the equipment cooling exhaust duct [5].

**END OF TASK**



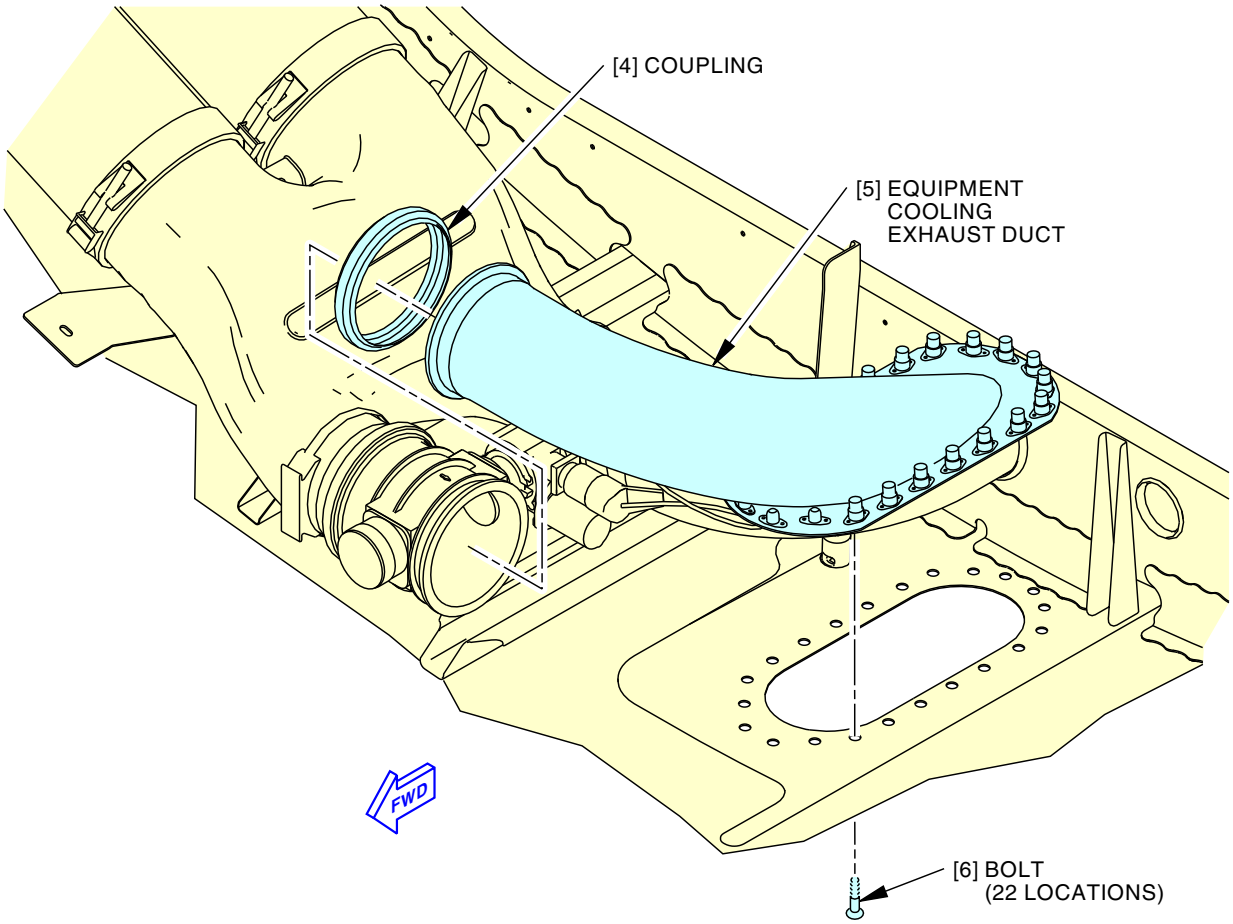
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Equipment Cooling Exhaust Duct Installation**
**Figure 401/21-27-10-990-801 (Sheet 1 of 2)**



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**EQUIPMENT COOLING EXHAUST DUCT**
**(RAISED PLATFORM AND INSULATION ARE NOT SHOWN)**

**B**

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**Equipment Cooling Exhaust Duct Installation**
**Figure 401/21-27-10-990-801 (Sheet 2 of 2)**



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**TASK 21-27-10-400-801**

**3. Equipment Cooling Exhaust Duct - Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| A50525 | Sealant - P/S 870 Class C-80 Corrosion Inhibitive | BMS5-95 Class C-80 |
| C00528 | Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film) | MIL-C-11796 Class III |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Equipment Cooling Exhaust Duct Installation**

**SUBTASK 21-27-10-420-001**

(1) Put the equipment cooling exhaust duct [5] in its position.

(a) Apply P/S 870 Class C-80 sealant, A50525, between surfaces of the skin and the equipment cooling exhaust duct [5].

**SUBTASK 21-27-10-420-002**

(2) Install the bolts [6] as follows:

(a) Apply compound, C00528, to the all surface of the hole.

(b) Immediately install the bolts [6] after you apply the compound, C00528.

**SUBTASK 21-27-10-420-003**

(3) Tighten the coupling [4].

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-27-10-410-001**

(1) Install the access panel [1] and access panel [3] on the top of the raised platform.

(a) Install the screws [2].

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-27-10-860-002**

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**——— END OF TASK ———**



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## PRESSURIZATION CONTROL SYSTEM - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Pressurization Control System - Deactivation

(2) Pressurization Control System - Activation

(3) Digital Cabin Pressure Controller NVM Download Procedure - Maintenance Practices.

**TASK 21-31-00-800-801**

### 2. Pressurization Control System - Deactivation

(Figure 201)

#### A. General

(1) This task will deactivate these components in the pressurization control system.

- Cabin Pressure Controller (CPC)
- Cabin Pressure Control Module
- Aft Outflow Valve

#### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 146 | Aft Cargo Compartment Equipment Bay - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Procedure

**SUBTASK 21-31-00-010-001**

(1) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-31-00-860-001**

(2) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |



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**F. Tryout**

NOTE: This tryout is to make sure that the pressurization control system is in a zero energy state.

**SUBTASK 21-31-00-860-002**

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Set the mode selector switch on the P5-6 cabin pressure control module to the AUTO position.

**SUBTASK 21-31-00-210-001**

(2) Make sure that the P5-10 air conditioning panel amber AUTO FAIL LIGHT (L8) is illuminated.

**SUBTASK 21-31-00-740-001**

(3) Do these steps on the BITE module on the pressure controller No. 1:

(a) Push the ON/OFF button on the BITE module on the pressure controller No. 1.

(b) Push the MENU button.

(c) Push the down arrow button.

(d) Make sure that the display does not show “GROUND TEST”.

**SUBTASK 21-31-00-740-002**

(4) Do these steps on the BITE module on the pressure controller No. 2:

(a) Push the ON/OFF button on the BITE module on the pressure controller No. 2.

(b) Push the MENU button.

(c) Push the down arrow button.

(d) Make sure that the display does not show “GROUND TEST”.

**SUBTASK 21-31-00-860-003**

(5) Set the mode selector switch on the P5-6 cabin pressure control module to the MAN position.

**SUBTASK 21-31-00-210-002**

(6) Make sure that the P5-10 air conditioning panel green MANUAL LIGHT (L7) is illuminated.

(a) Position an assistant to monitor the cabin pressurization outflow valve for movement.

**SUBTASK 21-31-00-860-004**

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Push and hold the MANUAL MODE CLOSE/OPEN toggle switch (S2) on the P5-6 cabin pressure control module to the CLOSE position.

(a) Make sure that the cabin pressurization outflow valve gates do not move.

**SUBTASK 21-31-00-860-005**

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Push and hold the MANUAL MODE CLOSE/OPEN toggle switch (S2) on the P5-6 cabin pressure control module to the OPEN position.



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(a) Make sure that the cabin pressurization outflow valve gates do not move.

**SUBTASK 21-31-00-860-006**

(9) Install DO NOT OPERATE tag, STD-858 on the following P5-6 cabin pressure control module switches:

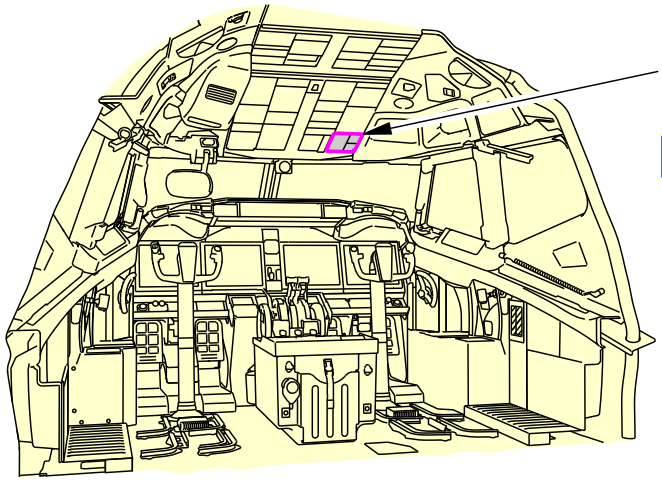
(a) AUTO/ALTN/MAN select switch (S1).

(b) MANUAL MODE CLOSE/OPEN toggle switch (S2).

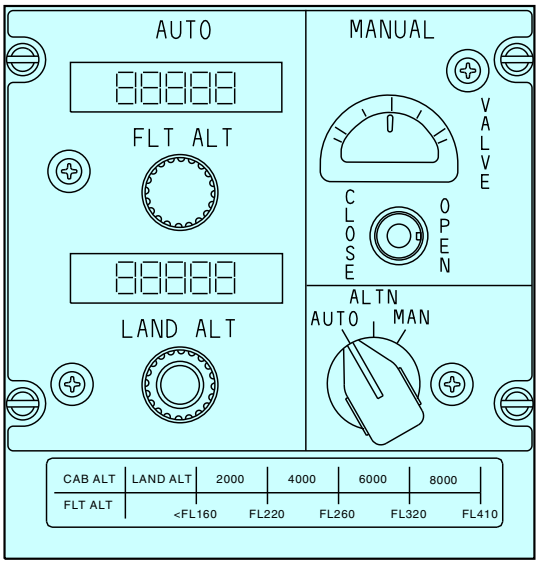
**——— END OF TASK ———**



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**FLIGHT COMPARTMENT**




**CABIN PRESSURE CONTROL MODULE**

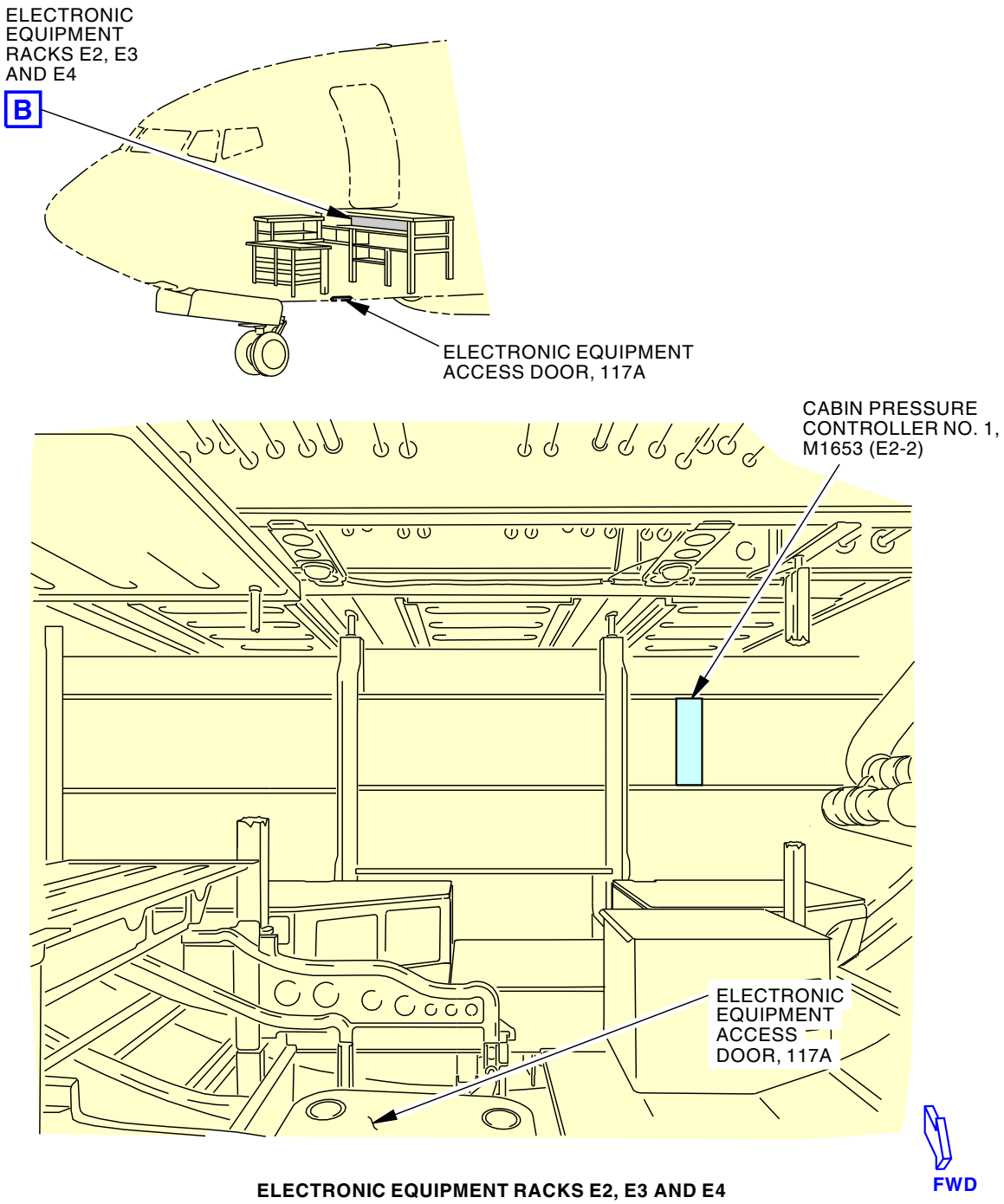
**A**

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**Pressurization Control System**
**Figure 201/21-31-00-990-801 (Sheet 1 of 4)**



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**ELECTRONIC EQUIPMENT RACKS E2, E3 AND E4**

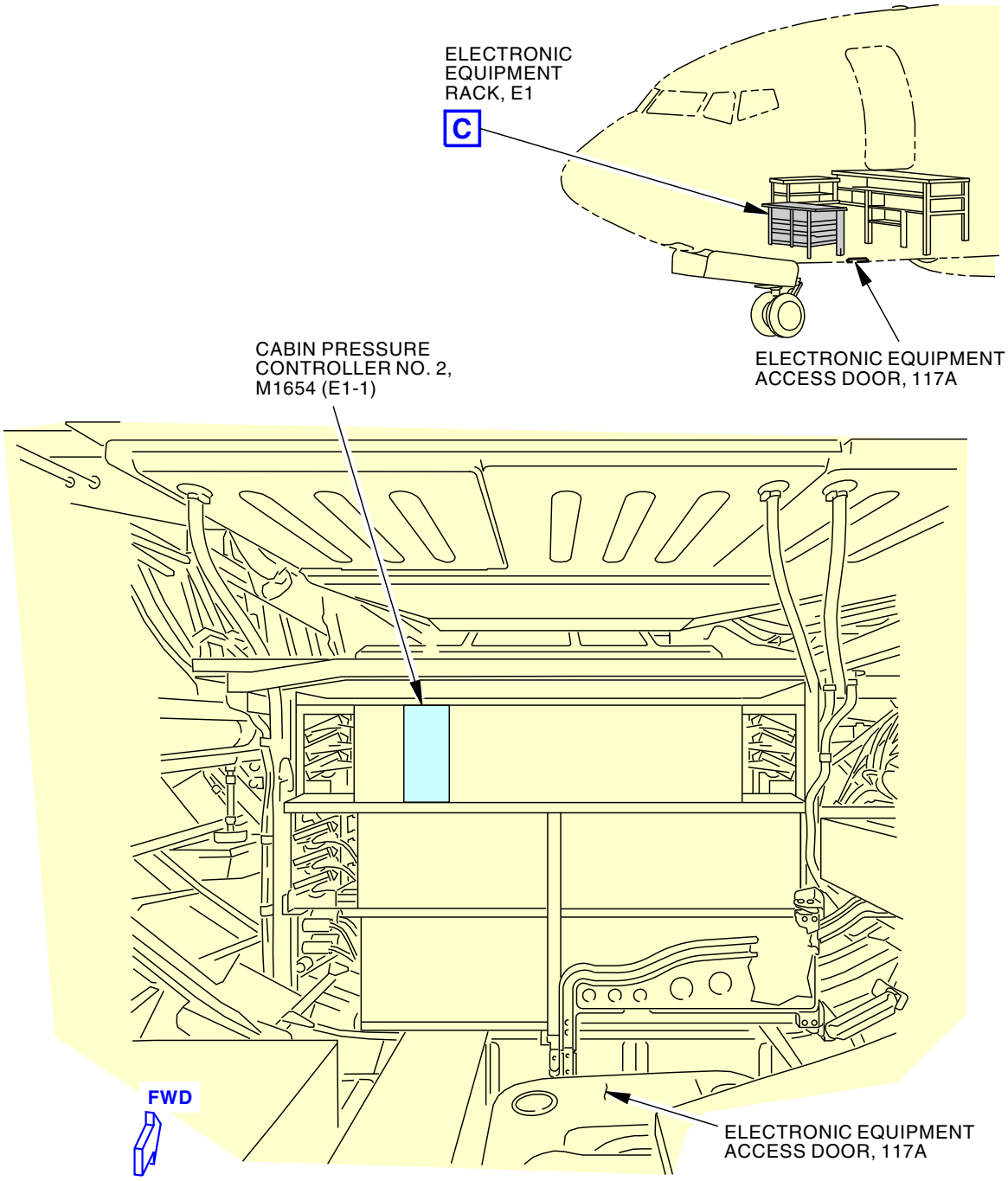
**B**

2411324 S00061527630_V1

**Pressurization Control System**
**Figure 201/21-31-00-990-801 (Sheet 2 of 4)**



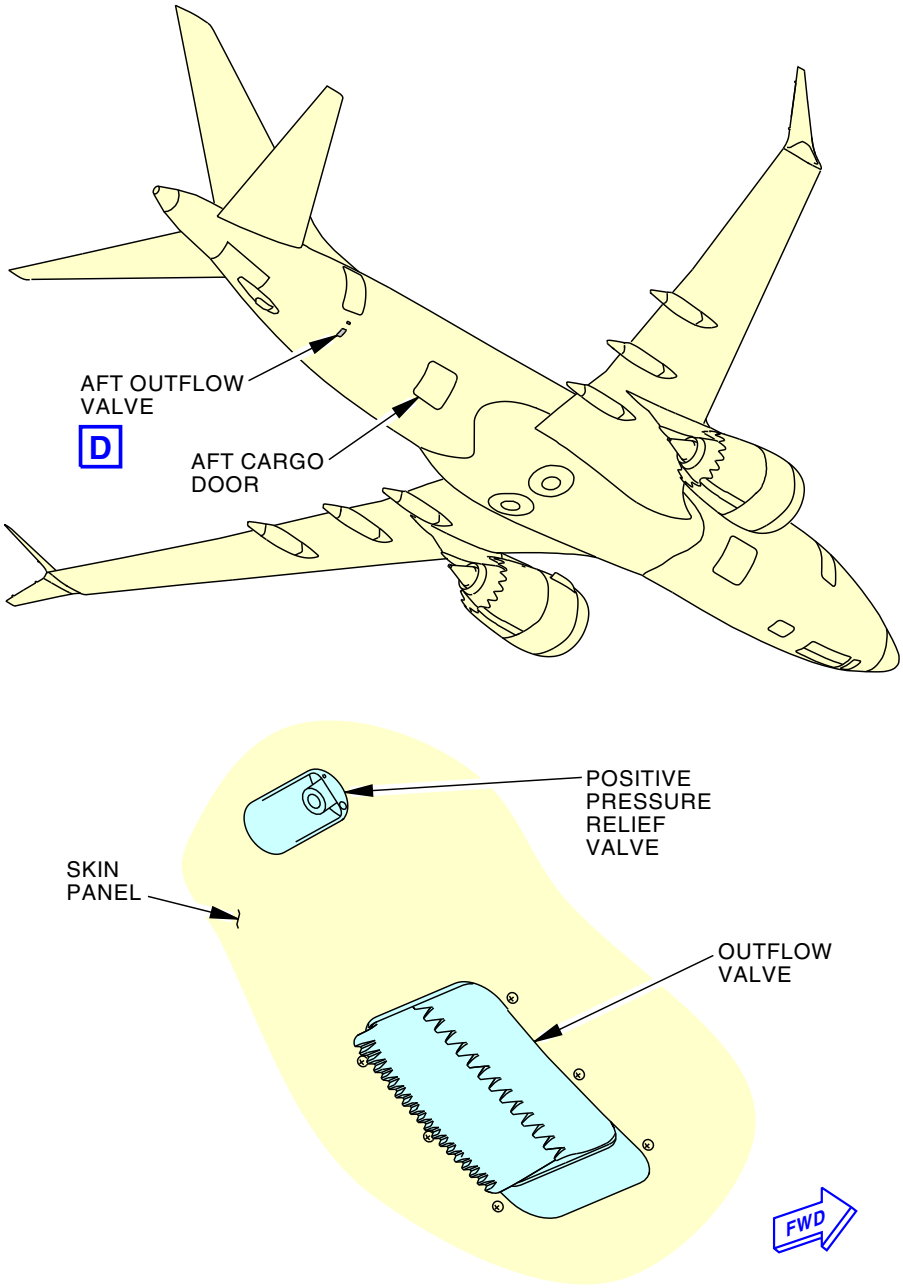
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Pressurization Control System**
**Figure 201/21-31-00-990-801 (Sheet 3 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**OUTFLOW VALVE (EXTERIOR VIEW)**

D

2411326 S00061527632_V1

**Pressurization Control System**
**Figure 201/21-31-00-990-801 (Sheet 4 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-00-800-802**

## 3. Pressurization Control System - Activation

(Figure 201)

### A. General

(1) This task will activate these components in the pressurization control system.

- Cabin Pressure Controller (CPC)
- Cabin Pressure Control Module
- Aft Outflow Valve

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 146 | Aft Cargo Compartment Equipment Bay - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Procedure

**SUBTASK 21-31-00-860-007**

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

**SUBTASK 21-31-00-410-001**

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**



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**TASK 21-31-00-970-801**

## 4. Digital Cabin Pressure Controller NVM Download Procedure

(Figure 202)

### A. General

(1) This procedure has instructions to download NVM data from pressure controllers M1653 and M1654.

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-12762 | Analyzer - Data Bus, ARINC 429-USB<br>Part #: 800-0630 Supplier: 1JSZ6<br>Part #: UA1410 Supplier: 0H231<br>Opt Part #: 650-0330 Supplier: 1JSZ6<br>Opt Part #: 702125-01 Supplier: CG603 |

### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### E. Prepare for the NVM Download Procedure

**SUBTASK 21-31-00-860-008**

(1) If it is necessary, make sure that the laptop computer has the correct software to download the NVM data.

NOTE: Contact a Boeing Service Representative for the correct software.

**SUBTASK 21-31-00-860-009**

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**SUBTASK 21-31-00-010-002**

(3) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. NVM Download Procedure

**SUBTASK 21-31-00-860-010**

(1) Make sure that cabin pressure controllers No.1 (M1653) and No.2 (M1654) are powered:

(a) Push the ON/OFF button.

(b) Push the MENU button.



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(c) If the MENU shows, the controller is powered.

SUBTASK 21-31-00-010-003

(2) Remove the two thumbscrews that attach the BITE INSTRUCTIONS plate to the face of the controller.

SUBTASK 21-31-00-480-001

(3) Connect the six wire modular phone cable to the connector on the face of the cabin pressure controller.

SUBTASK 21-31-00-480-003

(4) Connect the other end of the phone cable to the ARINC 429 to USB interface Analyzer, COM-12762.

SUBTASK 21-31-00-480-002

(5) Connect the USB cable to the ARINC 429 to USB interface Analyzer, COM-12762.

SUBTASK 21-31-00-480-004

(6) Connect the other end of the USB cable to the computer.

SUBTASK 21-31-00-750-001

(7) Do the instructions given in the NVM Download software help files to download the NVM data.

SUBTASK 21-31-00-080-001

(8) Disconnect the six wire modular phone cable from the controller.

SUBTASK 21-31-00-750-002

(9) Do the NVM download procedure on the other cabin pressure controller.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-31-00-420-001

(1) Install the BITE instructions plate on the front of the controller.

SUBTASK 21-31-00-410-002

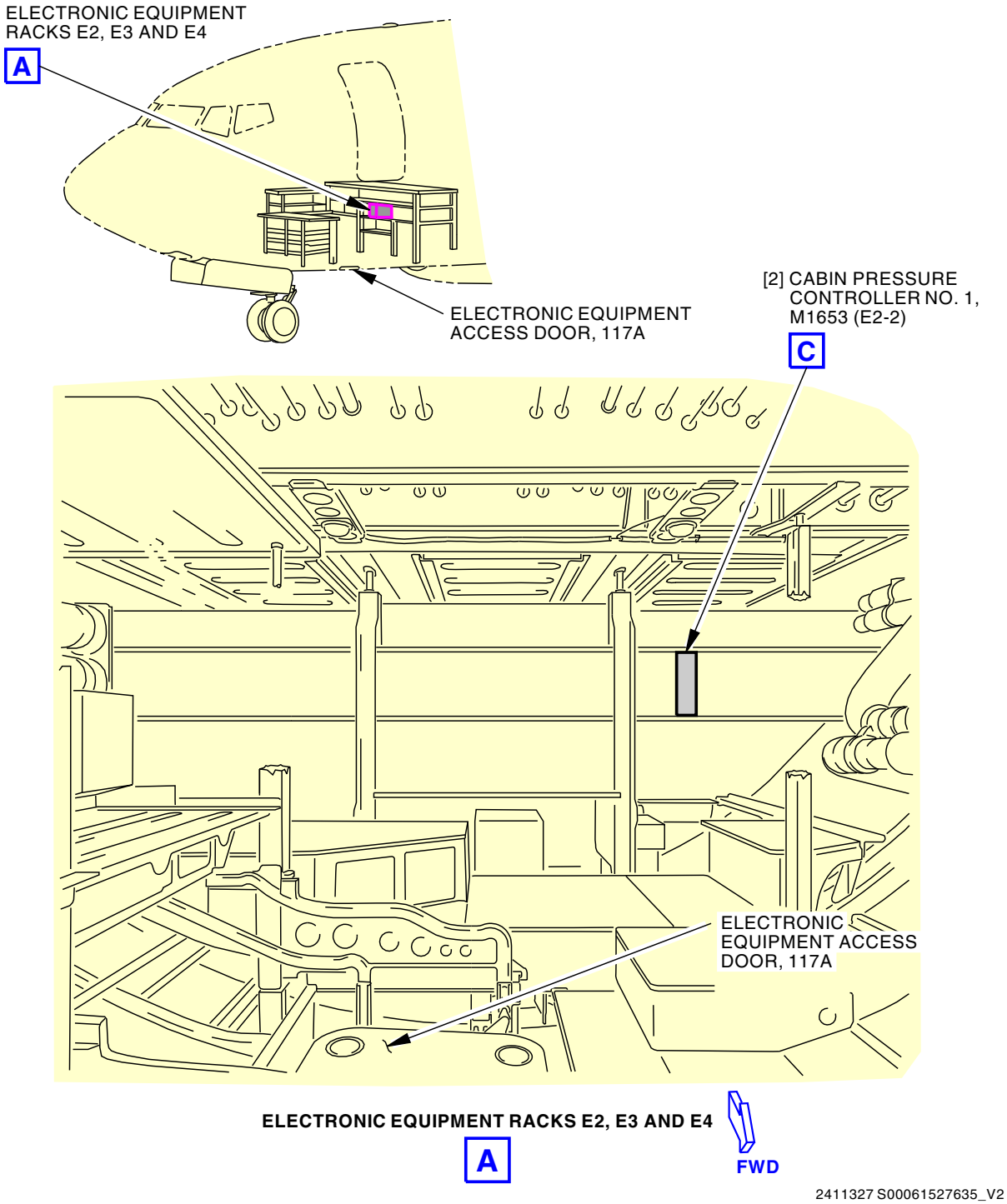
(2) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

——— END OF TASK ———



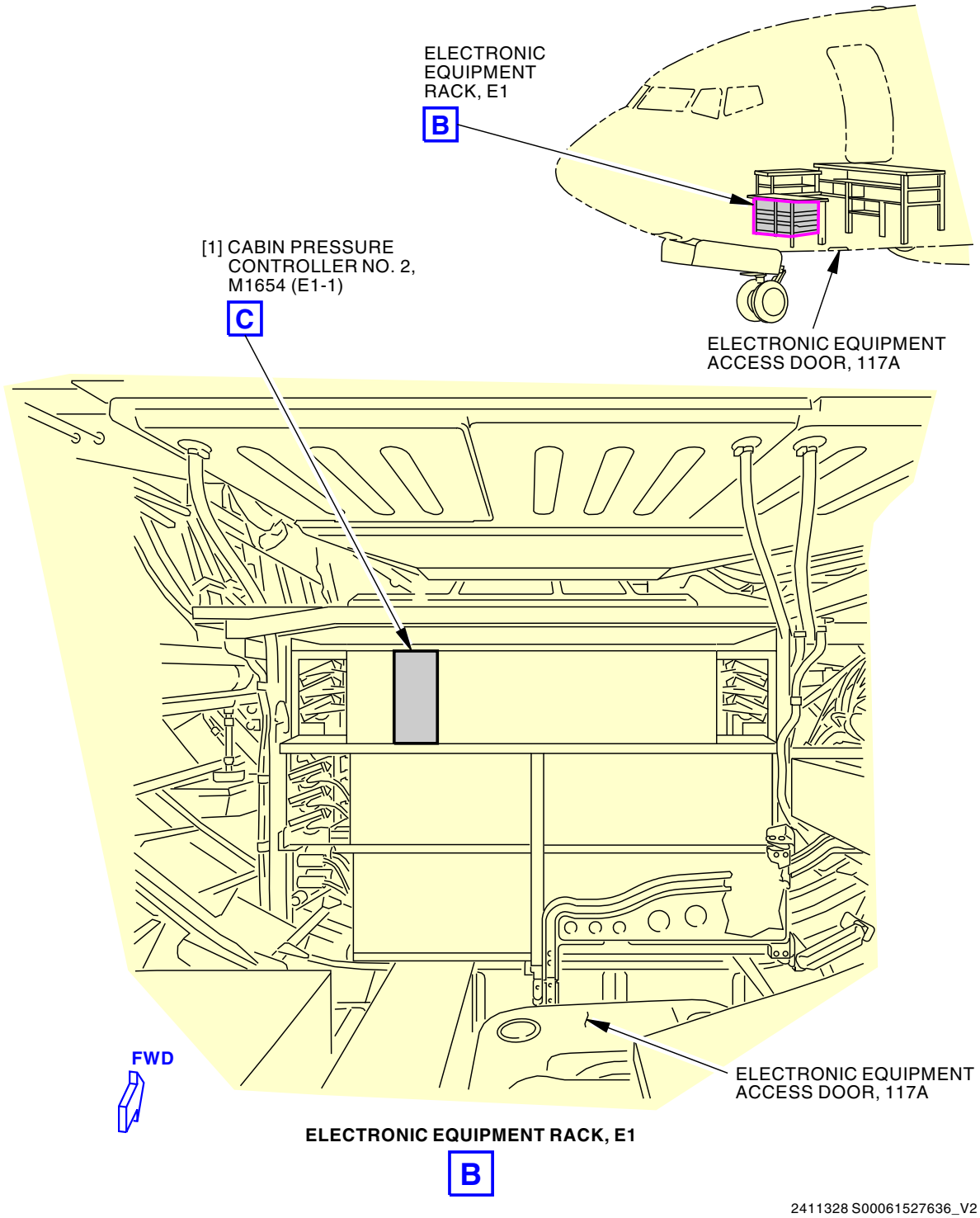
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Pressure Controller Installation**
**Figure 202/21-31-00-990-802 (Sheet 1 of 3)**



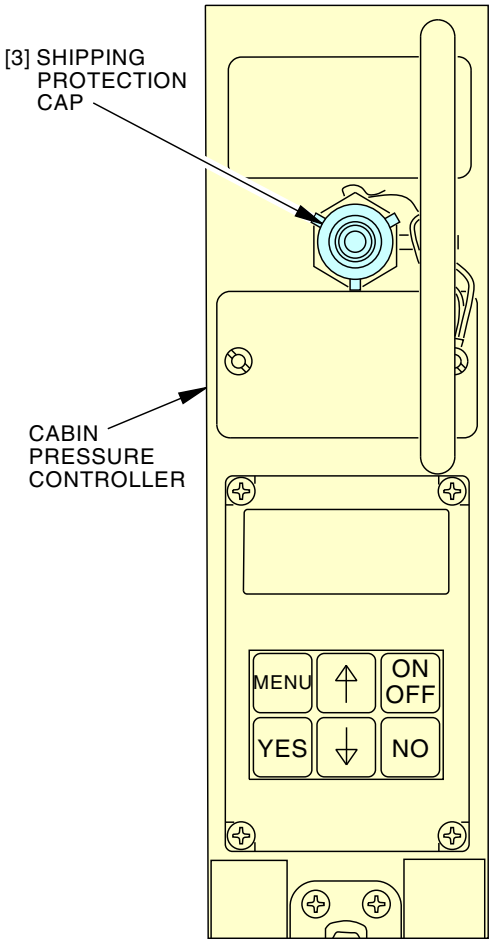
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Pressure Controller Installation**
**Figure 202/21-31-00-990-802 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN PRESSURE CONTROLLER (EXAMPLE)**

C

2479871 S0000582552_V1

**Cabin Pressure Controller Installation**
**Figure 202/21-31-00-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## PRESSURE EQUALIZATION VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Pressure equalization valve removal.

(2) Pressure equalization valve installation.

**TASK 21-31-00-000-801**

### 2. Pressure Equalization Valve Removal

(Figure 401, Figure 402)

#### A. General

(1) This task includes the steps to remove the pressure equalization valve from the forward and aft cargo compartment.

(a) The forward cargo compartment has a pressure equalization valve on the aft bulkhead.

(b) The aft cargo compartment has a pressure equalization valve on the forward portion of the waste tank bulkhead.

#### B. References

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-12-03-000-801 | Waste Tank Enclosure Panel Removal (P/B 401) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 124 | Forward Cargo Compartment - Right |
| 142 | Aft Cargo Compartment - Right |

#### D. Prepare for the Removal

**SUBTASK 21-31-00-020-002**

(1) For the forward cargo compartment:

(a) Remove the forward cargo compartment access panel [5], do this task: Forward Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-11-02-000-801.

**SUBTASK 21-31-00-020-003**

(2) For the aft cargo compartment:

(a) Remove the waste tank access panel [5], do this task: Waste Tank Enclosure Panel Removal, TASK 50-12-03-000-801.

#### E. Cargo Compartment Pressure Equalization Valve Removal

**SUBTASK 21-31-00-020-004**

(1) Remove the bolts [4] and nuts [3] from the pressure equalization valve [1].

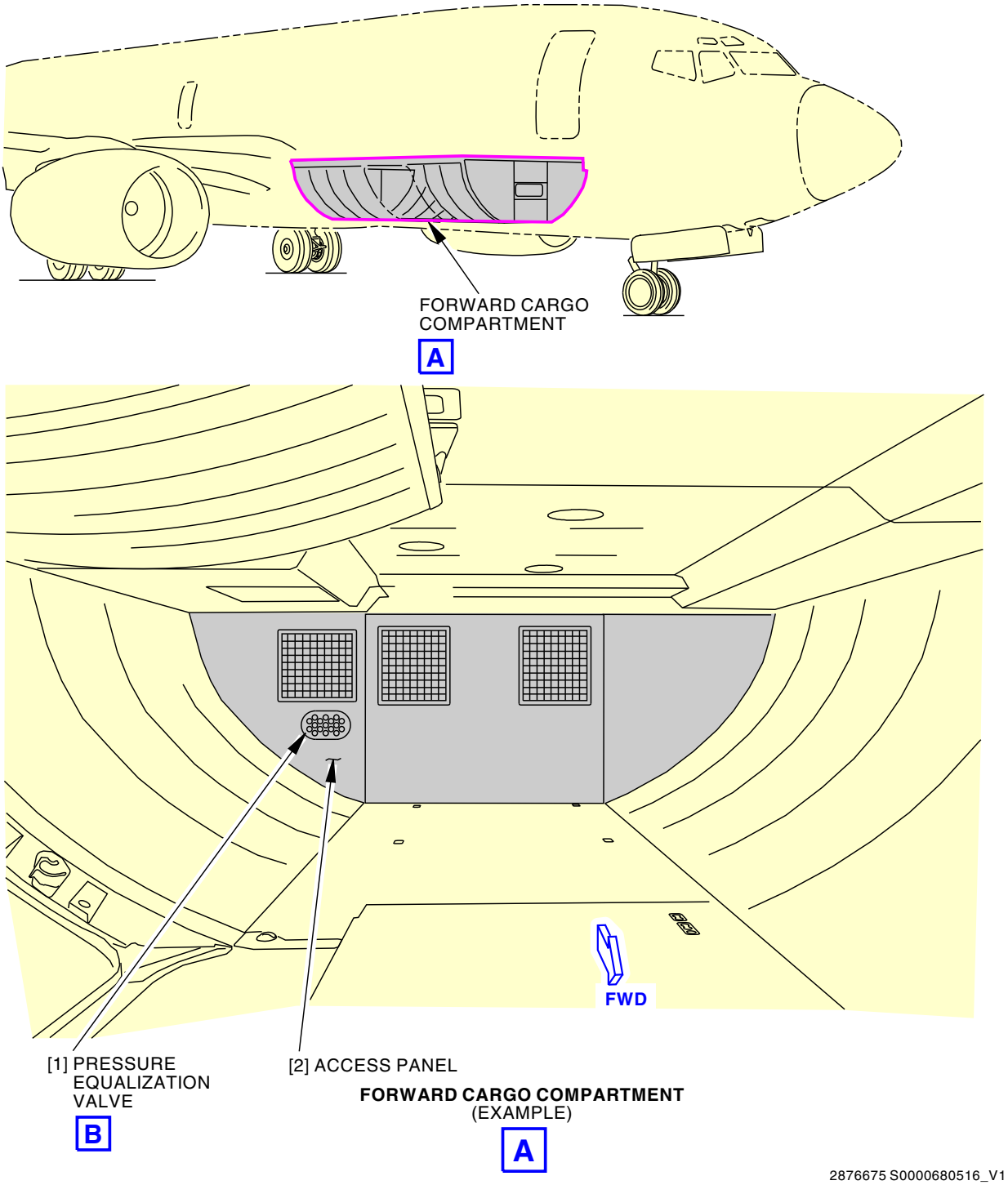
(a) Detach the pressure equalization valve [1] from the adapter [2].

NOTE: It is not required to remove the adapter [2] from the access panel [5] to replace the pressure equalization valve [1].

**END OF TASK**



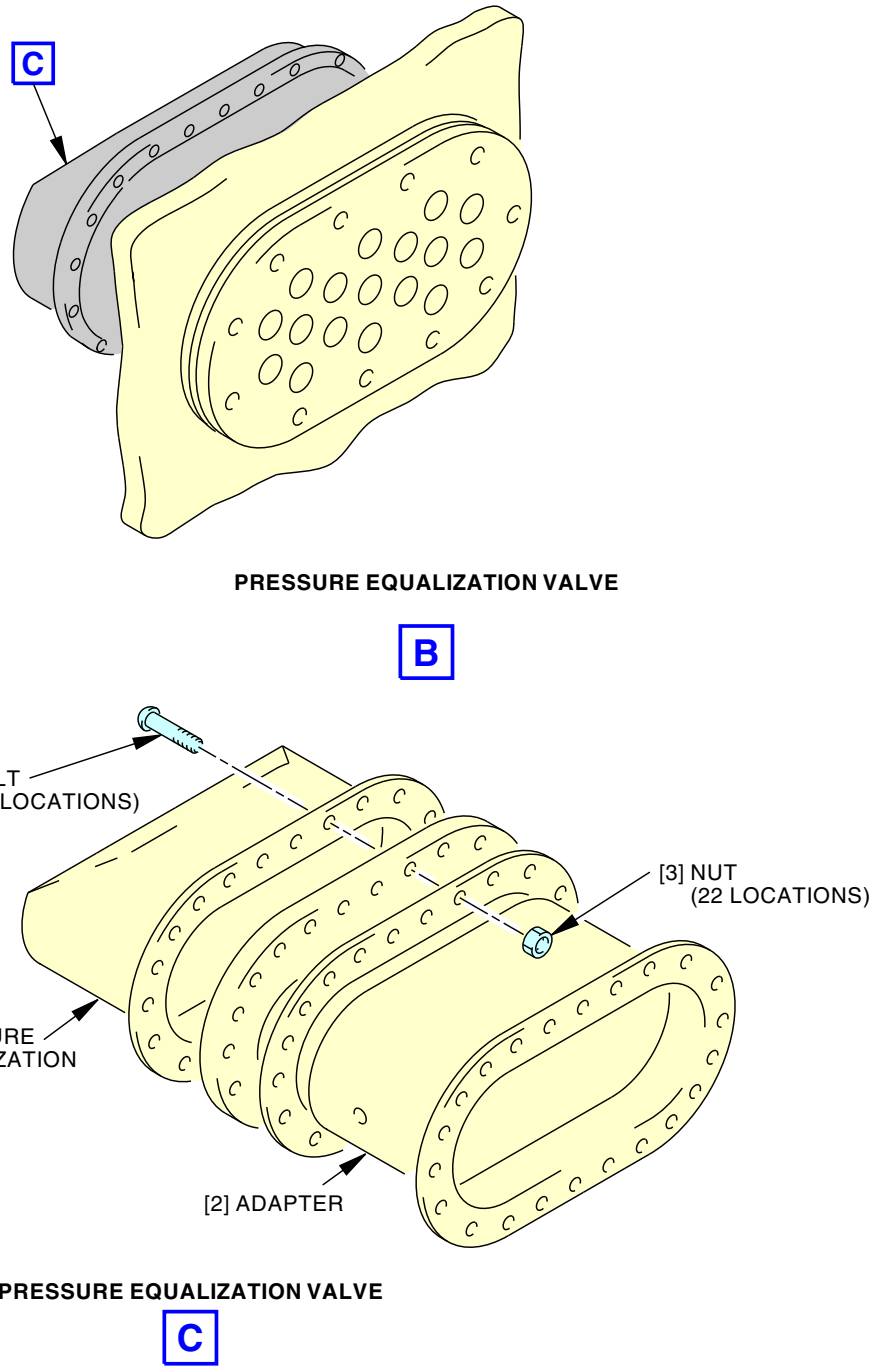
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Forward Cargo Compartment Pressure Equalization Valve**
**Figure 401/21-31-00-990-807 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

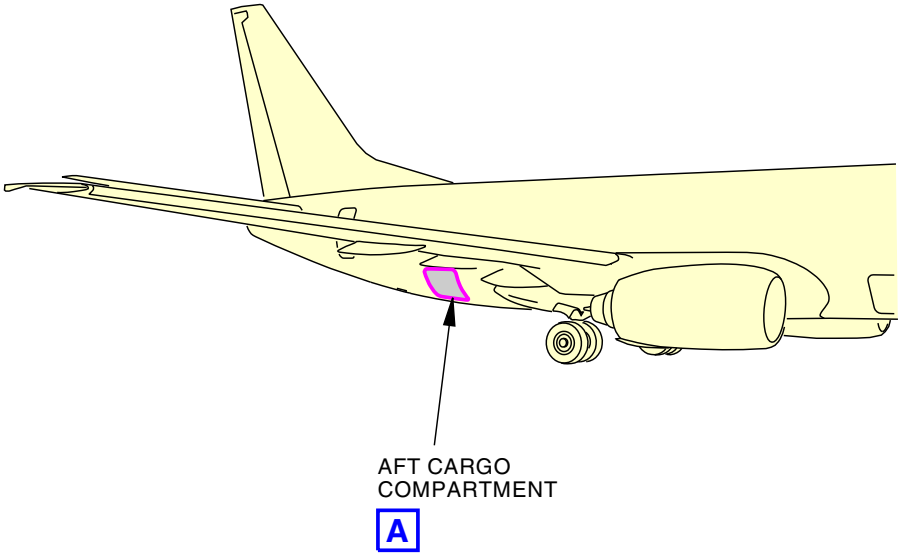


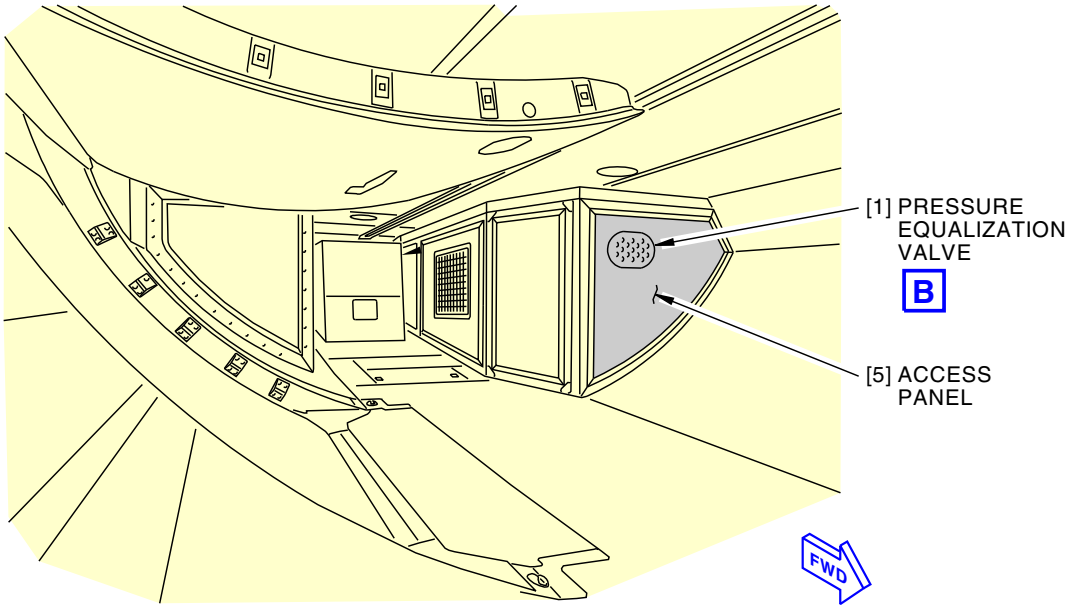

2876678 S0000680518_V1

**Forward Cargo Compartment Pressure Equalization Valve**
**Figure 401/21-31-00-990-807 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**AFT CARGO COMPARTMENT**

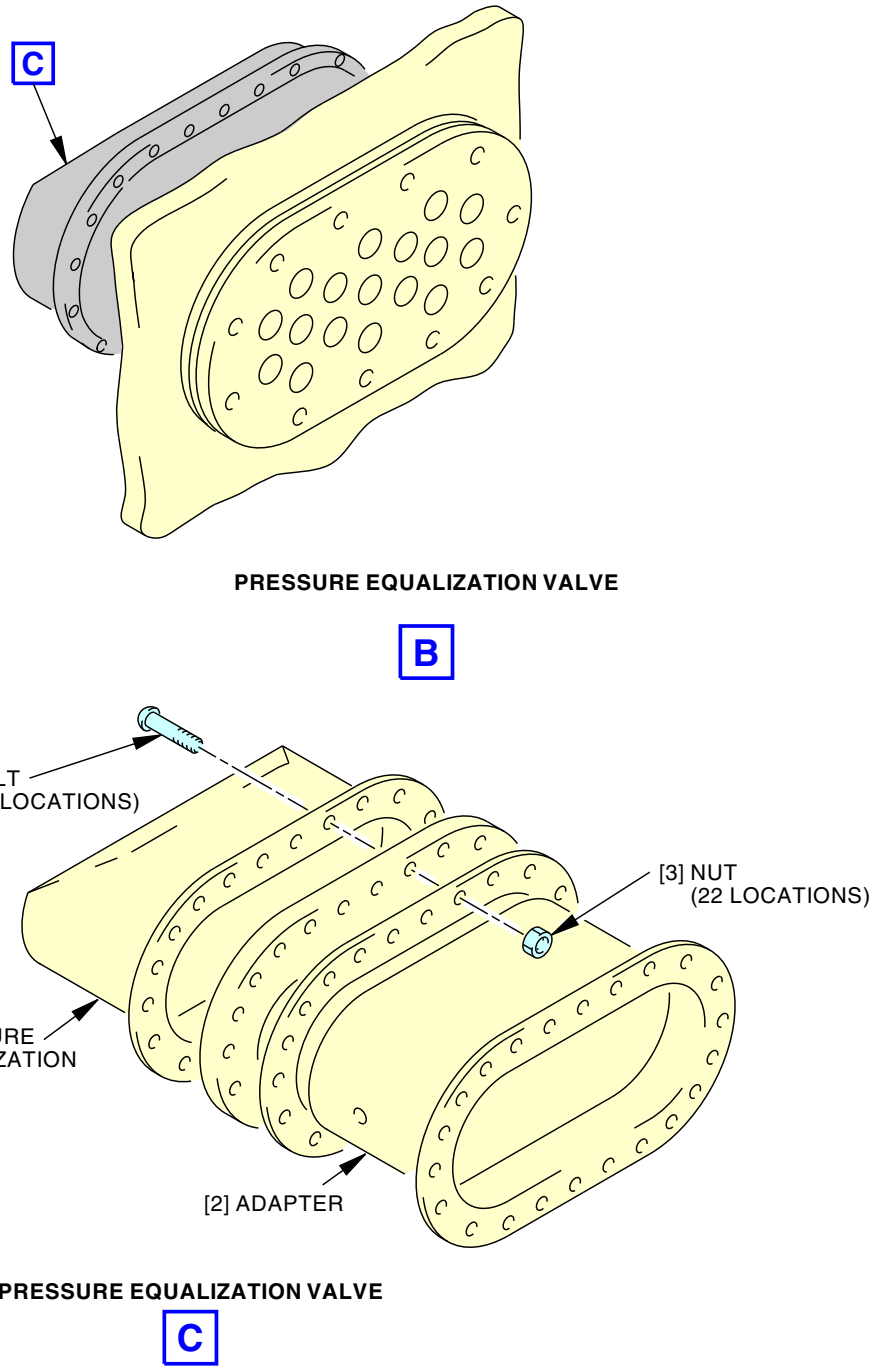
**A**

2876679 S0000680519_V1

**Aft Cargo Compartment Pressure Equalization Valve**
**Figure 402/21-31-00-990-809 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2876678 S0000680518_V1

**Aft Cargo Compartment Pressure Equalization Valve**
**Figure 402/21-31-00-990-809 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-00-400-801**

## 3. Pressure Equalization Valve Installation

(Figure 401, Figure 402)

### A. General

(1) This task includes the steps to install the pressure equalization valve to the forward and aft cargo compartment.

(a) The forward cargo compartment has a pressure equalization valve on the aft bulkhead.

(b) The aft cargo compartment has a pressure equalization valve on the forward portion of the waste tank bulkhead.

### B. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |
| 50-12-03-400-801 | Waste Tank Enclosure Panel Installation (P/B 401) |

### C. Location Zones

| Zone | Area |
|---|---|
| 124 | Forward Cargo Compartment - Right |
| 142 | Aft Cargo Compartment - Right |

### D. Cargo Compartment Pressure Equalization Valve Installation

**SUBTASK 21-31-00-420-002**

(1) Align the pressure equalization valve [1] with the adapter [2].

(2) Install the bolts [4] and nuts [3] that attach the pressure equalization valve [1] and the adapter [2].

### E. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-31-00-420-004**

(1) For the forward cargo compartment:

(a) Install the forward cargo compartment access panel [5], do this task: Forward Cargo Compartment Aft Bulkhead Liner Installation, TASK 50-11-02-400-801.

**SUBTASK 21-31-00-420-005**

(2) For the aft cargo compartment:

(a) Install the aft cargo compartment access panel [5], do this task: Waste Tank Enclosure Panel Installation, TASK 50-12-03-400-801.

**——— END OF TASK ———**



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## PRESSURIZATION CONTROL SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tasks:

(1) Pressurization system manual mode test

(2) 750 feet per minute descent with cargo fire mode test

(3) Master caution test

(4) Pressurization system ground test

(5) Cabin Pressure Controller (CPC) Built-In-Test Equipment (BITE) procedure.

**TASK 21-31-00-710-801**

### 2. Pressurization System Manual Mode Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

#### A. General

(1) This task does an operational test of these components:

(a) The outflow valve manual mode motor

(b) The outflow valve selector panel

(c) The outflow valve position indicator

(d) The outflow valve feedback module for the outflow valve position indicator.

#### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### C. Prepare for the Test

**SUBTASK 21-31-00-860-012**

(1) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

#### D. Pressurization System Manual Mode Test

**SUBTASK 21-31-00-860-013**

**CAUTION** MAKE SURE THAT ONE OF THE EXTERNAL DOORS OR WINDOWS IS OPEN BEFORE YOU CONTINUE WITH THE TEST. UNCONTROLLED PRESSURIZATION OF THE CABIN CAN OCCUR WHEN THE OUTFLOW VALVE IS CLOSED. THIS CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Make sure that at least one exterior door or window is OPEN or that the L and R PACK switches, on the P5 forward overhead panel, are in the OFF position.



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SUBTASK 21-31-00-860-014

(2) Set the mode selector switch, on the P5-6 cabin pressure control module, to the MAN position.

SUBTASK 21-31-00-710-001

(3) Make sure that the MANUAL light, on the P5-10 air conditioning module, comes ON.

SUBTASK 21-31-00-860-015

(4) Set the LIGHTS switch, on the P2 center instrument panel, to the DIM position.

SUBTASK 21-31-00-710-002

(5) Make sure that the MANUAL light becomes dim.

SUBTASK 21-31-00-860-016

(6) Set the LIGHTS switch, on the P2 center instrument panel, to the BRT position.

SUBTASK 21-31-00-710-003

(7) Make sure that the MANUAL light becomes bright.

SUBTASK 21-31-00-710-004

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 cabin pressure control module, to the CLOSE position until the outflow valve is fully closed.

SUBTASK 21-31-00-710-005

(9) Make sure that the outflow valve is fully closed.

SUBTASK 21-31-00-710-006

(10) Make sure that the needle on the position indicator gage for the outflow valve is within approximately two needle widths of the fully closed mark.

SUBTASK 21-31-00-710-007

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 cabin pressure control module, to the OPEN position until the outflow valve is fully open.

SUBTASK 21-31-00-710-008

(12) Make sure that the outflow valve is fully open.

SUBTASK 21-31-00-710-009

(13) Make sure that the needle on the position indicator gage for the outflow valve is within approximately two needle widths of the fully open mark.

## E. Put the Airplane Back to Its Usual Condition

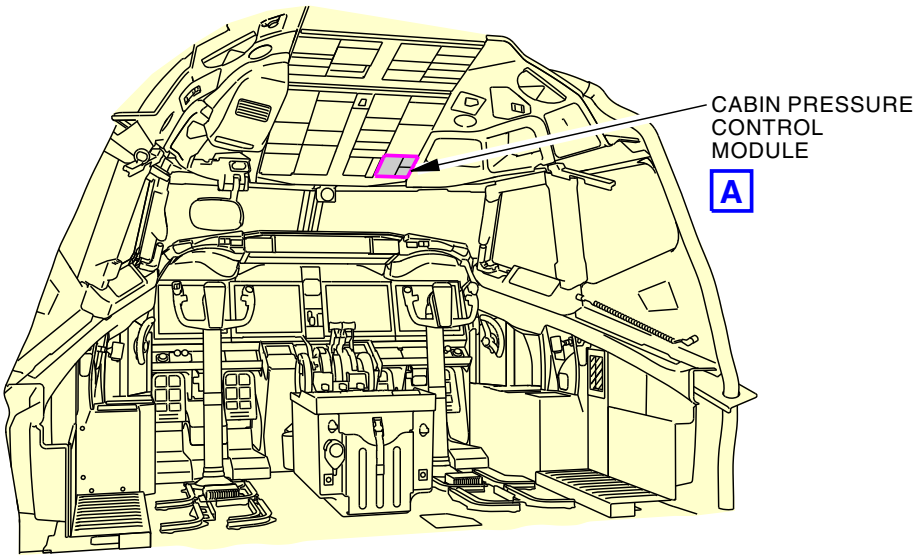
SUBTASK 21-31-00-860-017

(1) Make sure that the mode selector switch, on the P5-6 cabin pressure control module, is returned to the AUTO position.

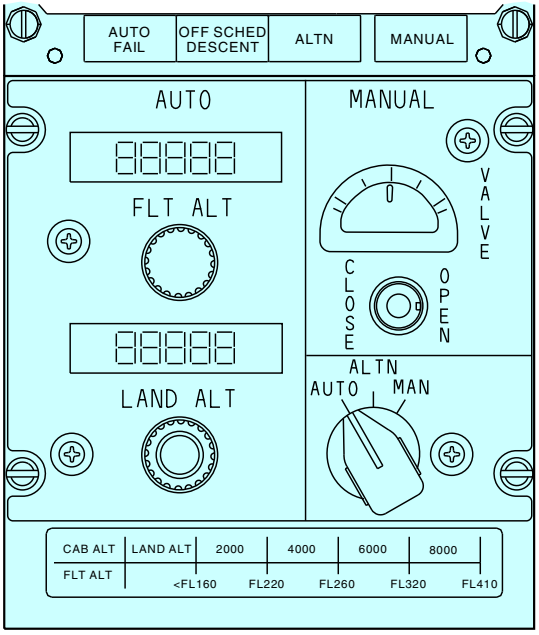
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**FLIGHT COMPARTMENT**




**CABIN PRESSURE CONTROL MODULE**

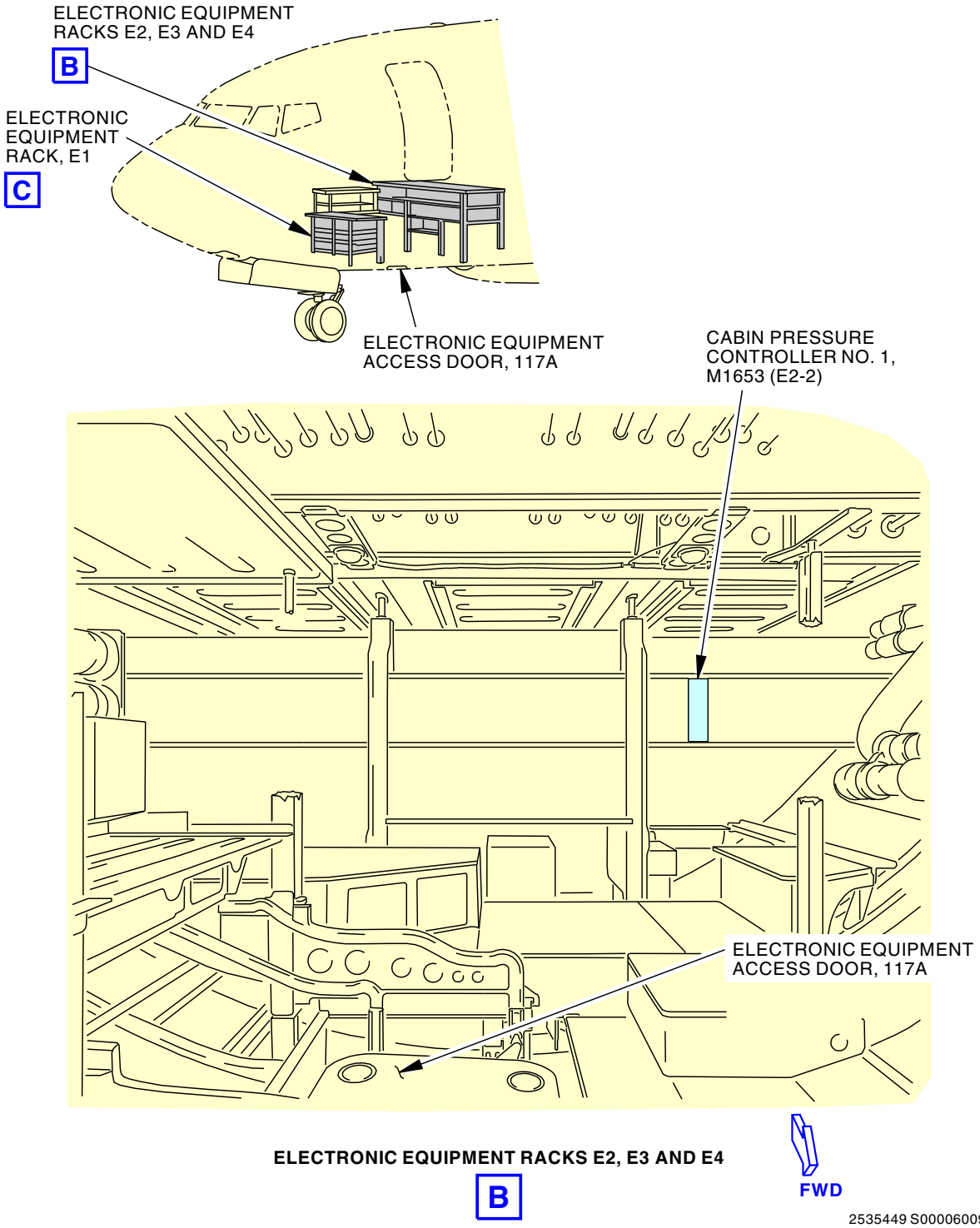
**A**

2535269 S0000600966_V1

**Cabin Pressure Control System Test**
**Figure 501/21-31-00-990-806 (Sheet 1 of 4)**



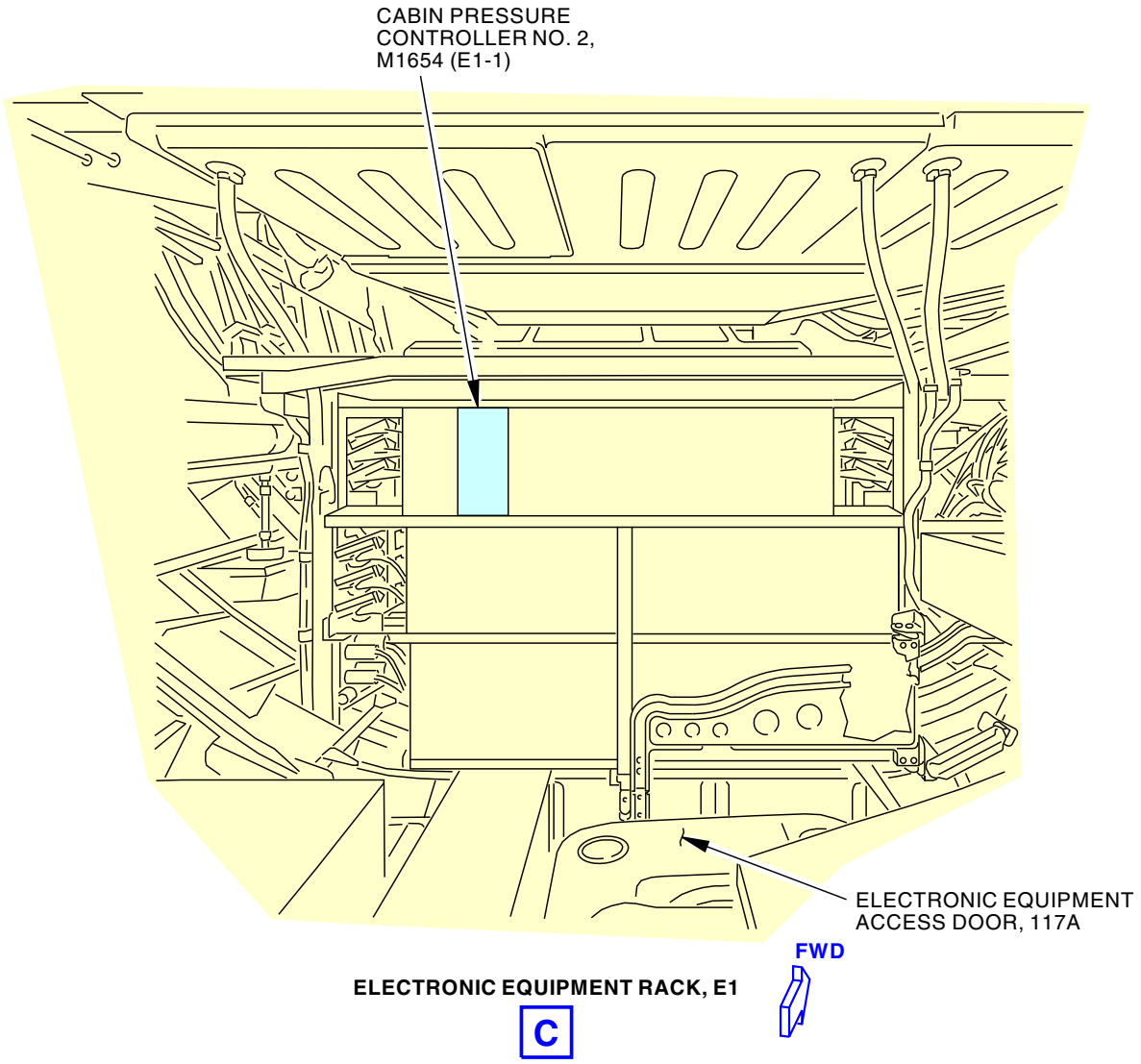
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Pressure Control System Test**
**Figure 501/21-31-00-990-806 (Sheet 2 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

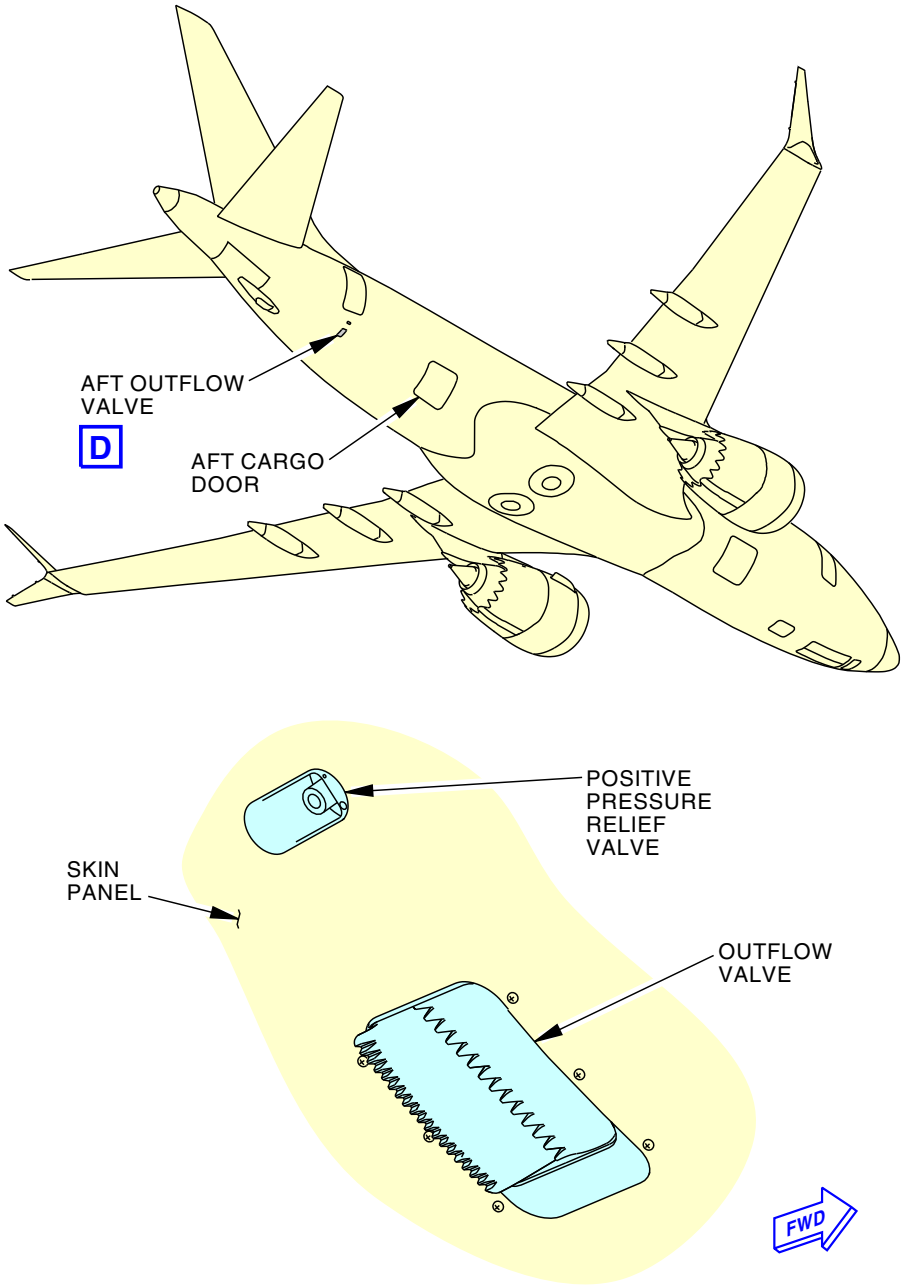



3009740 S0000783413_V1

**Cabin Pressure Control System Test**
**Figure 501/21-31-00-990-806 (Sheet 3 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**OUTFLOW VALVE (EXTERIOR VIEW)**

D

2411326 S00061527632_V1

**Cabin Pressure Control System Test**
**Figure 501/21-31-00-990-806 (Sheet 4 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-00-710-802**

**3. 750 Feet Per Minute Descent With Cargo Fire Mode Test**

(Figure 501)

**A. General**

(1) This task does an operational test of the 750 feet per minute descent rate with cargo fire mode.

**B. References**

| Reference | Title |
|---|---|
| 21-31-01-000-801 | Cabin Pressure Controller (CPC) Removal (P/B 401) |
| 21-31-01-400-801 | Cabin Pressure Controller (CPC) Installation (P/B 401) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**C. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**E. Prepare for the Test**

**SUBTASK 21-31-00-860-018**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

## F. 750 Feet Per Minute Descent With Cargo Fire Mode Test

SUBTASK 21-31-00-860-019

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-31-00-020-001

(2) Remove Cabin Pressure Controller 1 and Cabin Pressure Controller 2. To remove the controllers, do this task: Cabin Pressure Controller (CPC) Removal, TASK 21-31-01-000-801.

SUBTASK 21-31-00-860-020

(3) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

SUBTASK 21-31-00-710-010

(4) Push and hold the TEST switch on the P8 Cargo Fire Control Panel.

SUBTASK 21-31-00-710-011

(5) Connect a digital/analog multimeter, COM-1793 between the E2-2 shelf connector D10738B electrical contact D7 and airplane ground.

NOTE: Pressure controller No. 1 is installed on the E2-2 shelf.

(a) Make sure that there is less than 4.0 ohms between electrical contact D7 and airplane ground.

SUBTASK 21-31-00-710-012

(6) Disconnect the multimeter from electrical contact D7 of E2-2 shelf connector D10738B.

SUBTASK 21-31-00-710-013

(7) Connect the multimeter between the E1-1shelf connector D10740B electrical contact D7 and airplane ground.

NOTE: Pressure controller No. 2 is installed on the E1-1 shelf.

(a) Make sure that there is less than 4.0 ohms between electrical contact D7 and airplane ground.

SUBTASK 21-31-00-710-014

(8) Release the TEST switch on the P8 Cargo Fire Control Panel.



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SUBTASK 21-31-00-860-021

(9) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**G. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-31-00-860-022

(1) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-31-00-410-003

(2) Install Cabin Pressure Controller 1 and Cabin Pressure Controller 2. To install the controllers, do this task: Cabin Pressure Controller (CPC) Installation, TASK 21-31-01-400-801.

**——— END OF TASK ———**

**TASK 21-31-00-700-801**

**4. Master Caution Test**

(Figure 501)

**A. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**B. Prepare for the Test**

SUBTASK 21-31-00-860-023

(1) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 13 | C01277 | MASTER CAUTION ANNUNCIATOR CONT 3 |
| D | 11 | C00133 | INDICATOR MASTER DIM DIM/TST CONT |
| D | 12 | C00310 | INDICATOR MASTER DIM BAT |
| D | 13 | C00311 | INDICATOR MASTER DIM BUS 1 |
| D | 14 | C00312 | INDICATOR MASTER DIM BUS 2 |
| E | 11 | C00313 | INDICATOR MASTER DIM SECT 1 |
| E | 12 | C00314 | INDICATOR MASTER DIM SECT 2 |
| E | 13 | C00315 | INDICATOR MASTER DIM SECT 3 |
| E | 14 | C00316 | INDICATOR MASTER DIM SECT 4 |
| F | 11 | C00317 | INDICATOR MASTER DIM SECT 5 |
| F | 12 | C00318 | INDICATOR MASTER DIM SECT 6 |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |



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## C. Master Caution Test

SUBTASK 21-31-00-860-024

(1) Put the mode selector switch on the P5-6 pressure control module to the AUTO position.

SUBTASK 21-31-00-860-025

(2) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |

SUBTASK 21-31-00-710-015

(3) Make sure that the AUTO FAIL and ALTN lights on the P5-10 air conditioning module come ON in less than 5 seconds.

SUBTASK 21-31-00-860-026

(4) Set the mode selector switch on the P5-6 pressure control module to the ALTN position.

SUBTASK 21-31-00-710-016

(5) Make sure the AUTO FAIL light on the P5-10 air conditioning module goes OFF and the ALTN light stays ON.

SUBTASK 21-31-00-860-027

(6) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

SUBTASK 21-31-00-710-017

(7) Make sure that the AUTO FAIL light comes ON and the ALTN light goes OFF in less than 5 seconds.

SUBTASK 21-31-00-860-028

(8) Disconnect electrical connector D10724 from the P5-6 pressure control module:

(a) Get access to the back of the P5-6 pressure control panel as follows:

1) Loosen the 1/4-turn fasteners and lower the forward end of the P5 forward overhead panel.

SUBTASK 21-31-00-860-029

(9) Make sure the AUTO FAIL light is ON.

SUBTASK 21-31-00-860-030

(10) Connect electrical connector D10724 to the P5-6 pressure control module.

(a) Push the P5 forward overhead panel back into its installed position and tighten the 1/4-turn fasteners to hold the panel.

SUBTASK 21-31-00-860-031

(11) Set the mode selector switch on the pressure control module to the MAN position.

SUBTASK 21-31-00-860-032

(12) Make sure the AUTO FAIL light goes OFF and the MANUAL light comes ON.

SUBTASK 21-31-00-860-033

(13) Set the mode selector switch on the pressure control module to the AUTO position.



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SUBTASK 21-31-00-860-034

(14) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

SUBTASK 21-31-00-860-035

(15) Make sure the AUTO FAIL, ALTN, and the MANUAL lights are OFF.

**——— END OF TASK ———**

**TASK 21-31-00-700-802**

## 5. Pressurization System Ground Test

(Figure 501, Figure 502, Figure 503)

### A. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### B. Pressurization System Ground Test (No. 1 Pressure Controller)

SUBTASK 21-31-00-860-036

(1) Put the mode selector switch on the P5-6 pressure control module to AUTO.

SUBTASK 21-31-00-710-018

**CAUTION** MAKE SURE THAT ONE OF THE EXTERNAL DOORS OR WINDOWS IS OPEN BEFORE YOU CONTINUE WITH THE TEST. UNCONTROLLED PRESSURIZATION OF THE CABIN CAN OCCUR WHEN THE OUTFLOW VALVE IS CLOSED. THIS CAN CAUSE DAMAGE TO EQUIPMENT.

(2) Make sure at least one external door or window is open or that the L and R PACK switches on the P5 forward overhead panel are off.

SUBTASK 21-31-00-740-003

(3) Do these steps on the BITE module on the pressure controller No. 1:

(a) Push the ON/OFF button on the BITE module on the pressure controller No. 1.

(b) Push the MENU button.

(c) Continue to push the button with the down arrow label until the display shows this message:

**Table 501/21-31-00-993-801**

| |
|---|
| GROUND TEST |

(d) Push the YES button.

(e) Make sure this message is shown on the display:



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**Table 502/21-31-00-993-802**

| |
|---|
| DISPLAY TEST |

(f) Continue to push the button with the down arrow label until the display shows this message:

**Table 503/21-31-00-993-803**

| |
|---|
| SYSTEM TEST |

(g) Push the YES button to start the system test.

(h) Make sure this message is shown on the display:

**Table 504/21-31-00-993-804**

| |
|---|
| DOORS OPEN? |

(i) Make sure that at least one external airplane door is open and then push the YES button.

(j) Make sure this message is shown on the display:

**Table 505/21-31-00-993-805**

| |
|---|
| DADC ON? |

NOTE: The DADC is referring to the Air Data Inertial Reference Units (ADIRU) that provides the air data to the pressure controller.

(k) Make sure that both ADIRU L and R are ON.

1) Make sure that these circuit breakers are closed:

**CAPT Electrical System Panel, P18-1**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 5 | C01009 | ADIRU LEFT DC |
| E | 7 | C01007 | ADIRU LEFT AC |

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 8 | C00425 | ADIRU LEFT EXC |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 14 | C01008 | ADIRU RIGHT AC |
| C | 15 | C00426 | ADIRU RIGHT EXC |
| C | 17 | C01010 | ADIRU RIGHT DC |

(l) Push the YES button.

(m) Make sure this message is shown on the display:



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**Table 506/21-31-00-993-806**

| |
|---|
| SMC ON? |

NOTE: SMC is the Stall Management Yaw Damper (SMYD) computer that provides data to the pressure controller.

(n) Make sure that both SMYD-1 and SMYD -2 are ON.

(o) Push the YES button on the pressure controller No. 1.

(p) Make sure this message is shown on the display:

**Table 507/21-31-00-993-807**

| |
|---|
| OFV CLEAR? |

(q) Do these steps in less than one minute or the test will fail:

NOTE: You will try to do a system test on pressure controller No. 2 while the test for pressure controller No. 1 is in progress. The system test cannot be done on the two controllers at the same time. This step makes sure that if you try to do the system test on pressure controller No. 2 when the test is in progress on pressure controller No. 1 that the test on pressure controller No. 2 will be aborted.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

1) Push the YES button on the BCM on pressure controller No. 1 after you make sure the outflow valve is not blocked.

2) Make sure this message is shown on the display:

NOTE: Five or eight digits will come on below the word "TESTING" at intervals of approximately 12 seconds. Older controllers will show eight digits. Newer controllers will show 5 digits.

**Table 508/21-31-00-993-808**

| |
|---|
| TESTING |

3) Do these steps on the BITE module on pressure controller No. 2:

a) Push the ON/OFF button on the front of the pressure controller No. 2.

b) Push the MENU button.

c) Continue to push the button with the down arrow label until the display shows this message:

**Table 509/21-31-00-993-809**

| |
|---|
| GROUND TEST |

d) Push the YES button.

e) Make sure this message is shown on the display:



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**Table 510/21-31-00-993-810**

| |
|---|
| DISPLAY TEST |

f) Continue to push the button with the down arrow label until the display shows this message:

**Table 511/21-31-00-993-811**

| |
|---|
| SYSTEM TEST |

g) Push the YES button to start the system test.

h) Make sure the display on the BITE module of pressure controller No. 2 shows these messages:

NOTE: The messages will show one after the other with a two second delay between the first and the second message. This shows that the test on pressure controller No. 2 is aborted.

**Table 512/21-31-00-993-812**

| |
|---|
| BOTH SYS |
| IN IBIT |
| |
| IBIT |
| ABORTED |

i) Push the ON/OFF button on the BITE module of pressure controller No. 2 (M1654).

(r) Make sure that five or eight digits are on for pressure controller No. 1.

NOTE: Five or eight digits will come on below the word "TESTING" at intervals of approximately 12 seconds. Older controllers will show eight digits. Newer controllers will show 5 digits.

(s) Make sure the display on the BITE module of pressure controller No. 1 shows these messages:

NOTE: The messages will show one after the other with a two second delay between the first and the second message.

**Table 513/21-31-00-993-813**

| |
|---|
| SYSTEM |
| OK |
| |
| SYSTEM TEST |
| & CLEAR |

(t) Push the YES button on the BITE module on pressure controller No. 1 (M1653).



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(u) Push the ON/OFF button on the BITE module on pressure controller No. 1 (M1653).

## C. Pressurization System Ground Test (No. 2 Pressure Controller)

SUBTASK 21-31-00-860-037

(1) Put the mode selector switch on the P5-6 pressure control module to AUTO.

SUBTASK 21-31-00-710-019

**CAUTION** MAKE SURE THAT ONE OF THE EXTERNAL DOORS OR WINDOWS IS OPEN BEFORE YOU CONTINUE WITH THE TEST. UNCONTROLLED PRESSURIZATION OF THE CABIN CAN OCCUR WHEN THE OUTFLOW VALVE IS CLOSED. THIS CAN CAUSE DAMAGE TO EQUIPMENT.

(2) Make sure at least one external door or window is open or that the L and R PACK switches on the P5 forward overhead panel are off.

SUBTASK 21-31-00-740-004

(3) Do these steps on the BITE module on the pressure controller No. 2:

(a) Push the ON/OFF button on the BITE module on the pressure controller No. 2.

(b) Push the MENU button.

(c) Continue to push the button with the down arrow label until the display shows this message:

**Table 514/21-31-00-993-814**

| |
|---|
| GROUND TEST |

(d) Push the YES button.

(e) Make sure this message is shown on the display:

**Table 515/21-31-00-993-815**

| |
|---|
| DISPLAY TEST |

(f) Continue to push the button with the down arrow label until the display shows this message:

**Table 516/21-31-00-993-816**

| |
|---|
| SYSTEM TEST |

(g) Push the YES button to start the system test.

(h) Make sure this message is shown on the display:

**Table 517/21-31-00-993-817**

| |
|---|
| DOORS OPEN? |

(i) Make sure that at least one external airplane door is open and then push the YES button.

(j) Make sure this message is shown on the display:



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**Table 518/21-31-00-993-818**

| |
|---|
| DADC ON? |

NOTE: The DADC is referring to the Air Data Inertial Reference Units (ADIRU) that provides the air data to the pressure controller.

(k) Make sure that both ADIRU L and R are ON.

(l) Push the YES button.

(m) Make sure this message is shown on the display:

**Table 519/21-31-00-993-819**

| |
|---|
| SMC ON? |

NOTE: SMC is the Stall Management Yaw Damper (SMYD) computer that provides data to the pressure controller.

(n) Make sure that both SMYD-1 and SMYD -2 are ON.

(o) Push the YES button on the pressure controller No. 2.

(p) Make sure this message is shown on the display:

**Table 520/21-31-00-993-820**

| |
|---|
| OFV CLEAR? |

(q) Do these steps in less than one minute or the test will fail:

NOTE: You will try to do a system test on pressure control No. 1 while the test for pressure controller No. 2 is in progress. The system test cannot be done on the two pressure controllers at the same time. This test makes sure that if you try to do the system test on pressure controller No. 1 when the test is in progress on pressure controller No. 2 that the test on pressure controller No. 1 will be aborted.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

1) Push the YES button on pressure controller No. 2 after you make sure the outflow valve is not blocked.

2) Make sure this message is shown on the display:

NOTE: Five or eight digits will come on below the word "TESTING" at intervals of approximately 12 seconds. Older controllers will show eight digits. Newer controllers will show 5 digits.

**Table 521/21-31-00-993-821**

| |
|---|
| TESTING |

3) Do these steps on the BITE module on pressure controller No. 1:



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a) Push the ON/OFF button on the front of pressure controller No. 1 (M1653).

b) Push the MENU button.

c) Continue to push the button with the down arrow label until the display shows this message:

**Table 522/21-31-00-993-822**

| |
|---|
| GROUND TEST |

d) Push the YES button.

e) Make sure this message is shown on the display:

**Table 523/21-31-00-993-823**

| |
|---|
| DISPLAY TEST |

f) Continue to push the button with the down arrow label until the display shows this message:

**Table 524/21-31-00-993-824**

| |
|---|
| SYSTEM TEST |

g) Push the YES button to start the system test.

h) Make sure the display on the BITE module of pressure controller No. 1 shows these messages:

NOTE: The messages will show one after the other with a two second delay between the first and the second message. This shows that the test on pressure controller No. 1 is aborted.

**Table 525/21-31-00-993-825**

| |
|---|
| BOTH SYS |
| IN IBIT |
| |
| IBIT |
| ABORTED |

i) Push the ON/OFF button on the BITE module of pressure controller No. 1 (M1653).

(r) Make sure that five or eight digits on pressure controller No. 2 are on.

NOTE: Five or eight digits will come on below the word "TESTING" at intervals of approximately 12 seconds. Older controllers will show eight digits. Newer controllers will show 5 digits.



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(s) Make sure the display on the BITE module of pressure controller No. 2 shows these messages:

NOTE: The messages will show one after the other with a two second delay between the first and the second message.

**Table 526/21-31-00-993-826**

| |
|---|
| SYSTEM |
| OK |
| |
| SYSTEM TEST |
| & CLEAR |

(t) Push the YES button on the BITE module on pressure controller No. 2 (M1654).

(u) Push the ON/OFF button on the BITE module on pressure controller No. 2 (M1654).

**——— END OF TASK ———**

**TASK 21-31-00-740-801**

## 6. Cabin Pressure Controller (CPC) BITE Procedure

### A. General

(1) The Cabin Pressure Controller (CPC) is a part of the Cabin Pressure Control System. It automatically controls with related aircraft systems, the cabin pressure and the rate of pressure change.

(2) There are two the same CPC.

(a) CPC No. 1 is on the E2-2 shelf in the electronic equipment bay.

(b) CPC No. 2 is on the E1-1 shelf in the electronic equipment bay.

(3) The steps that follow give a summary of the CPC button functions.

(a) ON/OFF button activates or de-activates the BITE functions in the CPC.

(b) MENU button is used to show the BITE menus or move up one level in the BITE menus.

(c) YES button is used to respond to questions.

(d) NO button is used to respond to questions.

(e) Up arrow button is used to scroll up through the menu or the results of a BITE test.

(f) Down arrow button is used to scroll down through the menu or the results of a BITE test.

### B. References

| Reference | Title |
|---|---|
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |


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(Continued)

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**D. Prepare for the BITE Procedure**

**SUBTASK 21-31-00-040-001**

(1) Do the steps below to prepare for the applicable Built-In-Test Equipment (BITE) procedures:

(a) Push the ON/OFF button on the CPC front panel.

(b) Put the airplane in the ground mode (TASK 32-09-00-860-802).

**E. BITE Procedure for EXISTING FAULTS**

**SUBTASK 21-31-00-740-005**

(1) Do these steps on the CPC:

(a) Make sure that the CPC front panel display shows EXISTING FAULTS.

(b) Push the YES button on the CPC front panel.

(c) The CPC front panel display shows the first fault (maintenance message) in the existing fault list.

NOTE: When the cabin pressure controller shows a maintenance message that requires maintenance action, there is an equivalent maintenance message that shows on the Onboard Maintenance Function (OMF).

(d) Find and record the existing faults:

1) Make a record of the existing fault (maintenance message).

2) Push the YES button, on the CPC front panel, to see the fault details (fault numbers) for the maintenance message.

3) Make a record of the fault detail (fault number) for the maintenance message.

4) Push the down arrow button, on the CPC front panel, to look for the next fault detail (fault number).

5) Make a record of this fault detail (fault number) also.

6) Do the above two steps again until the CPC front panel display shows BOTTOM OF LIST for two seconds, then shows the maintenance message again.

7) Push the MENU button, on the CPC front panel, to go back to see the maintenance message in the existing fault list.

8) Push the down arrow button, on the CPC front panel, to see the next maintenance message in the EXISTING FAULTS list.

NOTE: If there are no more faults, the display will show "BOTTOM OF LIST" for two seconds, then the previous maintenance message will show.

9) Do the eight steps above until the CPC front panel display shows BOTTOM OF LIST for two seconds so that all maintenance messages and associated fault numbers have been recorded.

(e) Push the MENU button on the CPC front panel.

(f) Go to the IFIM and do the applicable procedure(s) for each maintenance message.

(g) If the CPC front panel display is not at a main menu selection, push the MENU button until you are in the main menu.



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## F. BITE Procedure for FAULT HISTORY

**SUBTASK 21-31-00-740-006**

(1) Do these steps on the CPC:

(a) Make sure that the CPC front panel display shows FAULT HISTORY.

(b) Push the YES button on the CPC front panel.

(c) The CPC front panel display shows FLIGHT LEG XX.

NOTE: XX is the last flight leg that faults were recorded in history.

(d) If there are no FLIGHT LEGS shown on the CPC front panel display, go to the IFIM and do the applicable procedure(s) for each maintenance message.

NOTE: This shows that there are no faults recorded in FAULT HISTORY.

(e) Push the YES button on the CPC front panel.

(f) The CPC front panel display shows the first fault (maintenance message) in the flight leg fault list.

(g) Find and record the faults in the flight leg fault list as follows:

1) Make a record of the fault (maintenance message).

2) Push the YES button, on the CPC front panel, to see the fault details (fault numbers) for the maintenance message.

NOTE: When the CPC shows a maintenance message that requires maintenance action, there is an equivalent maintenance message that shows on the OMF.

3) Make a record of the fault detail (fault number) for the maintenance message.

4) Push the down arrow button, on the CPC front panel, to look for the next fault detail (fault number) for the maintenance message.

5) Make a record of this fault detail (fault number) also.

6) Do the above two steps again until the CPC front panel display shows BOTTOM OF LIST for two seconds, then returns to the maintenance message in the fight leg fault list.

7) Push the down arrow button, on the CPC front panel, to look for the next fault (maintenance message) for the flight leg.

8) Do the seven steps above until all fault entries in the flight leg fault list have been examined and recorded for the flight leg.

(h) Push the MENU button, on the CPC front panel, until the display shows FLIGHT LEG XX.

(i) Push the down arrow button, on the CPC front panel, to look for the next flight leg that recorded faults in FAULT HISTORY.

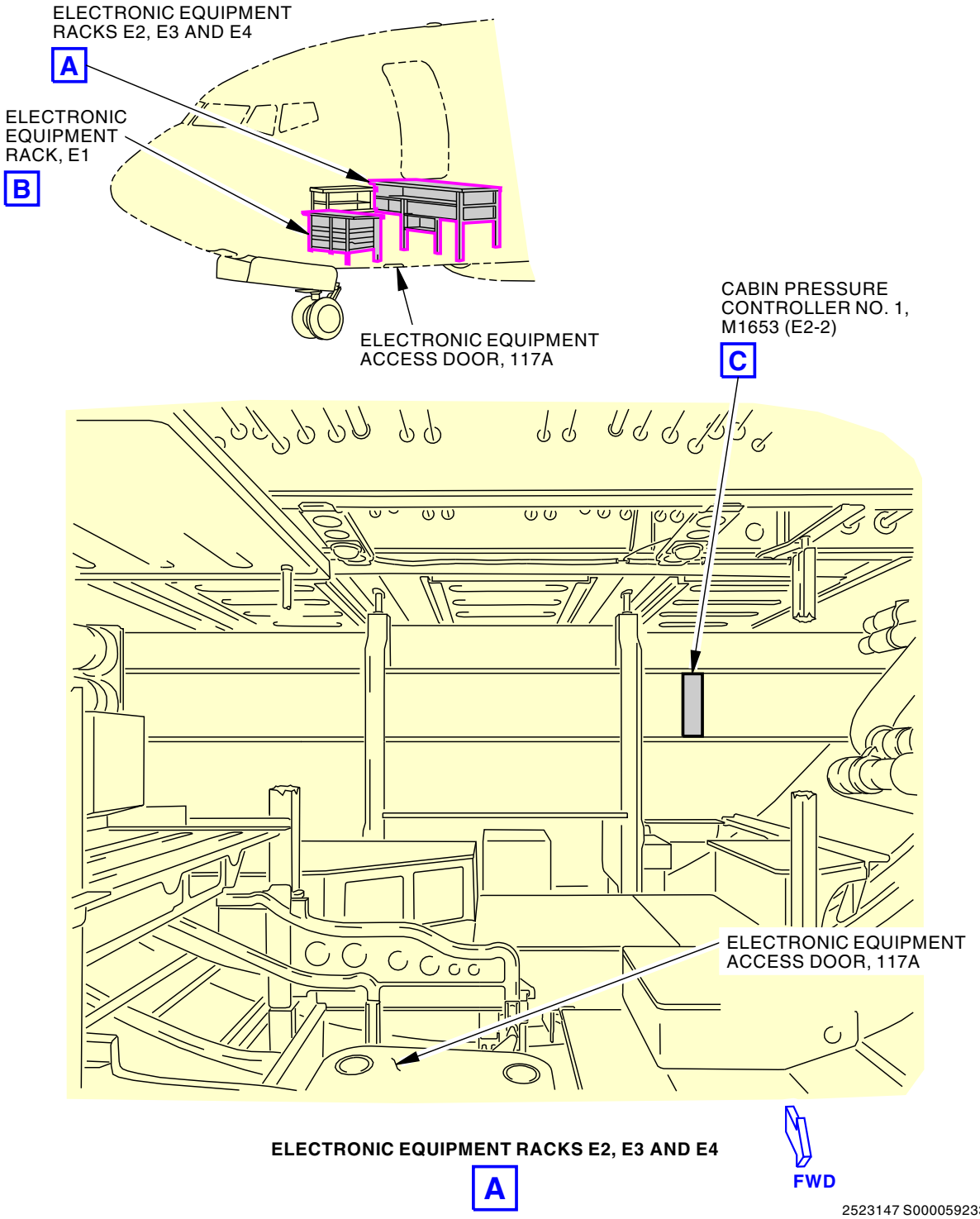
(j) Repeat this procedure until all flight legs with faults in FAULT HISTORY have been examined and recorded.

(k) If the CPC front panel display is not at a main menu selection, push the MENU button until you are in the main menu.

**——— END OF TASK ———**



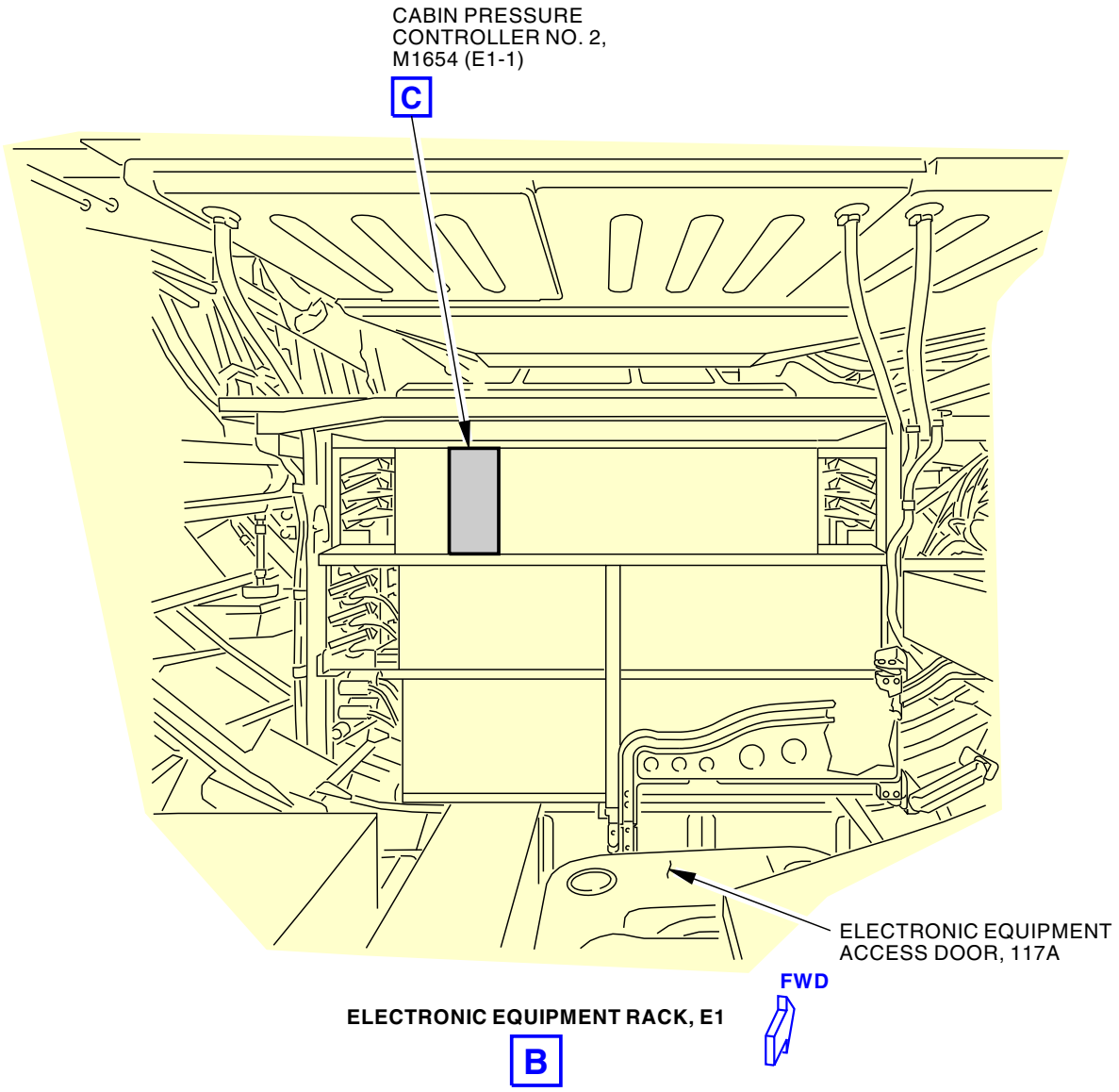
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**Cabin Pressure Control System**
**Figure 502/21-31-00-990-804 (Sheet 1 of 3)**



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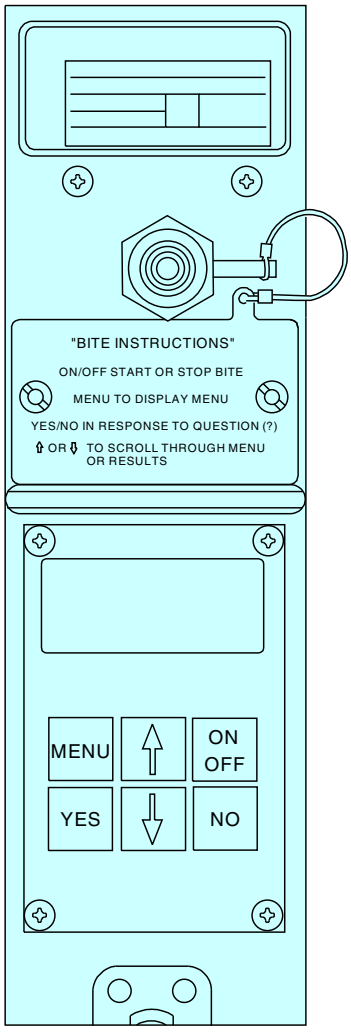



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**Cabin Pressure Control System**
**Figure 502/21-31-00-990-804 (Sheet 2 of 3)**



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**CABIN PRESSURE CONTROLLER (EXAMPLE)**

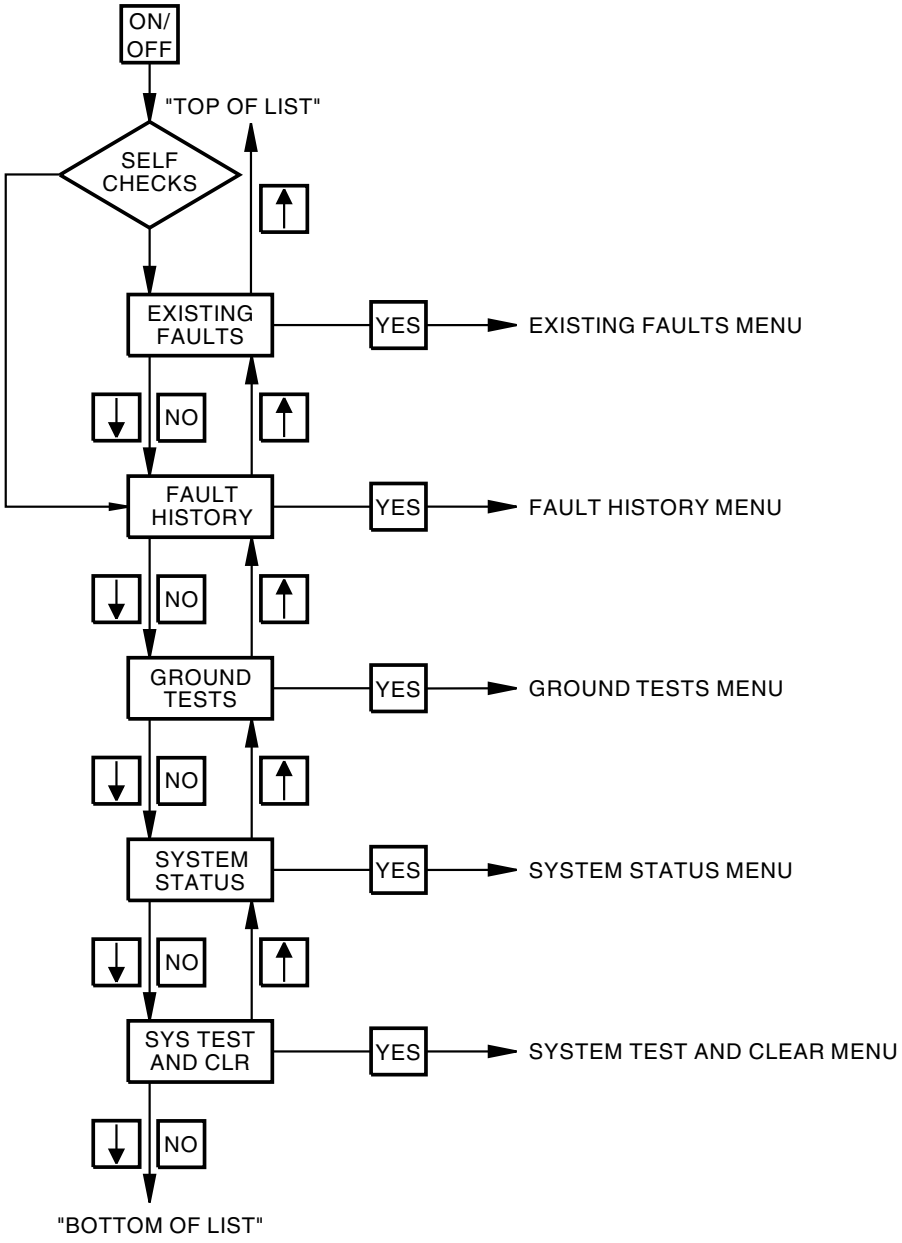
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2523159 S0000592335_V2

**Cabin Pressure Control System**
**Figure 502/21-31-00-990-804 (Sheet 3 of 3)**



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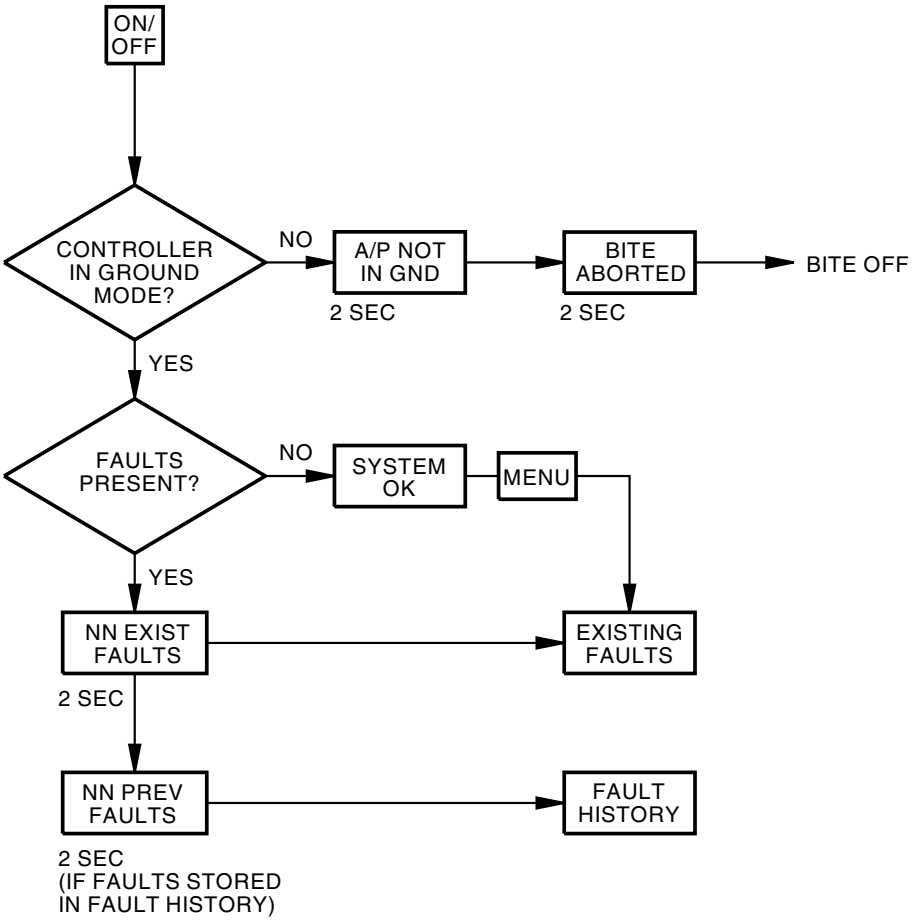

**CPC BITE MAIN MENUS**

2523161 S0000592344_V1

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 1 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



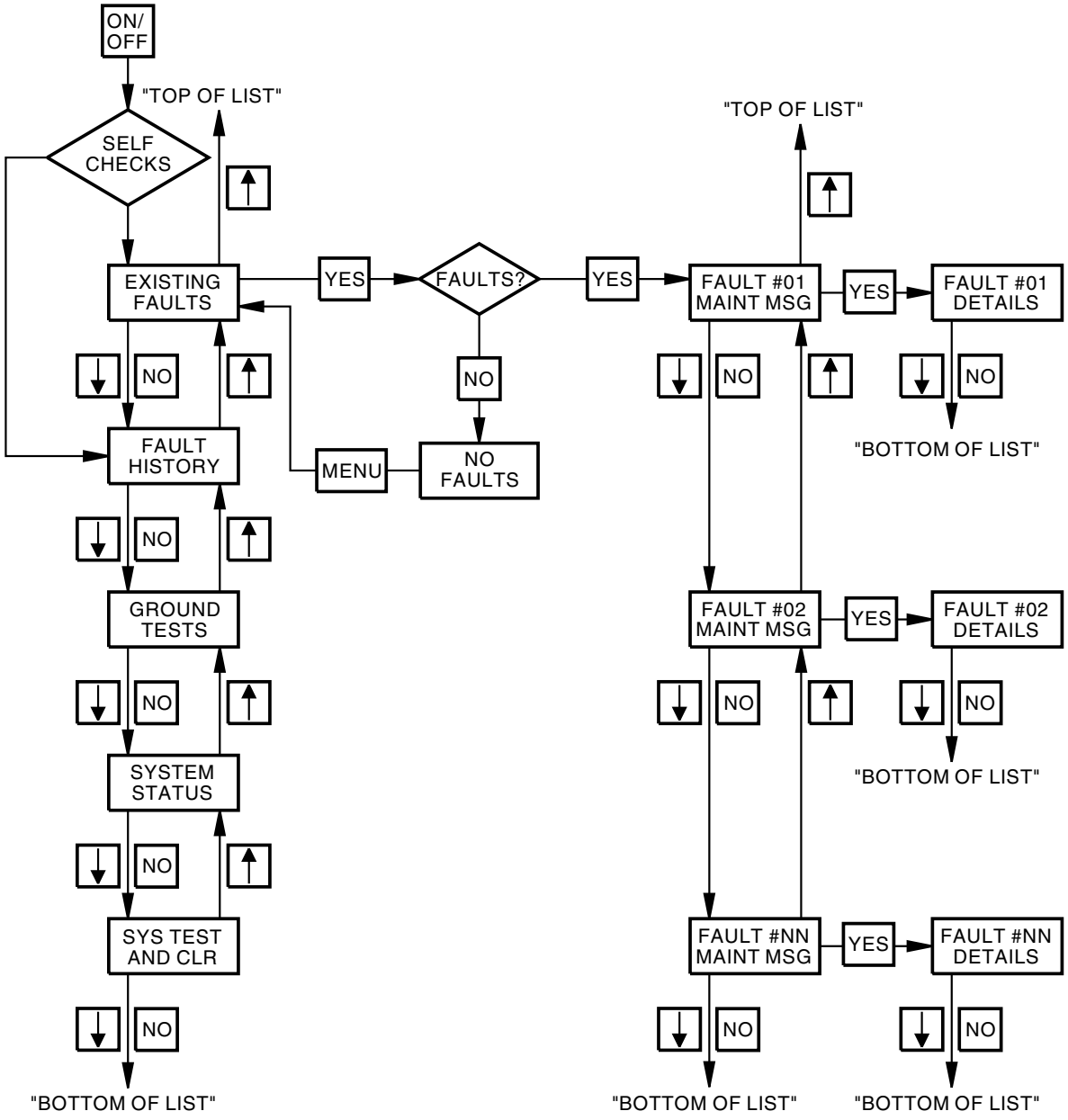

**BITE ACCESS**

2523188 S0000592347_V1

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 2 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



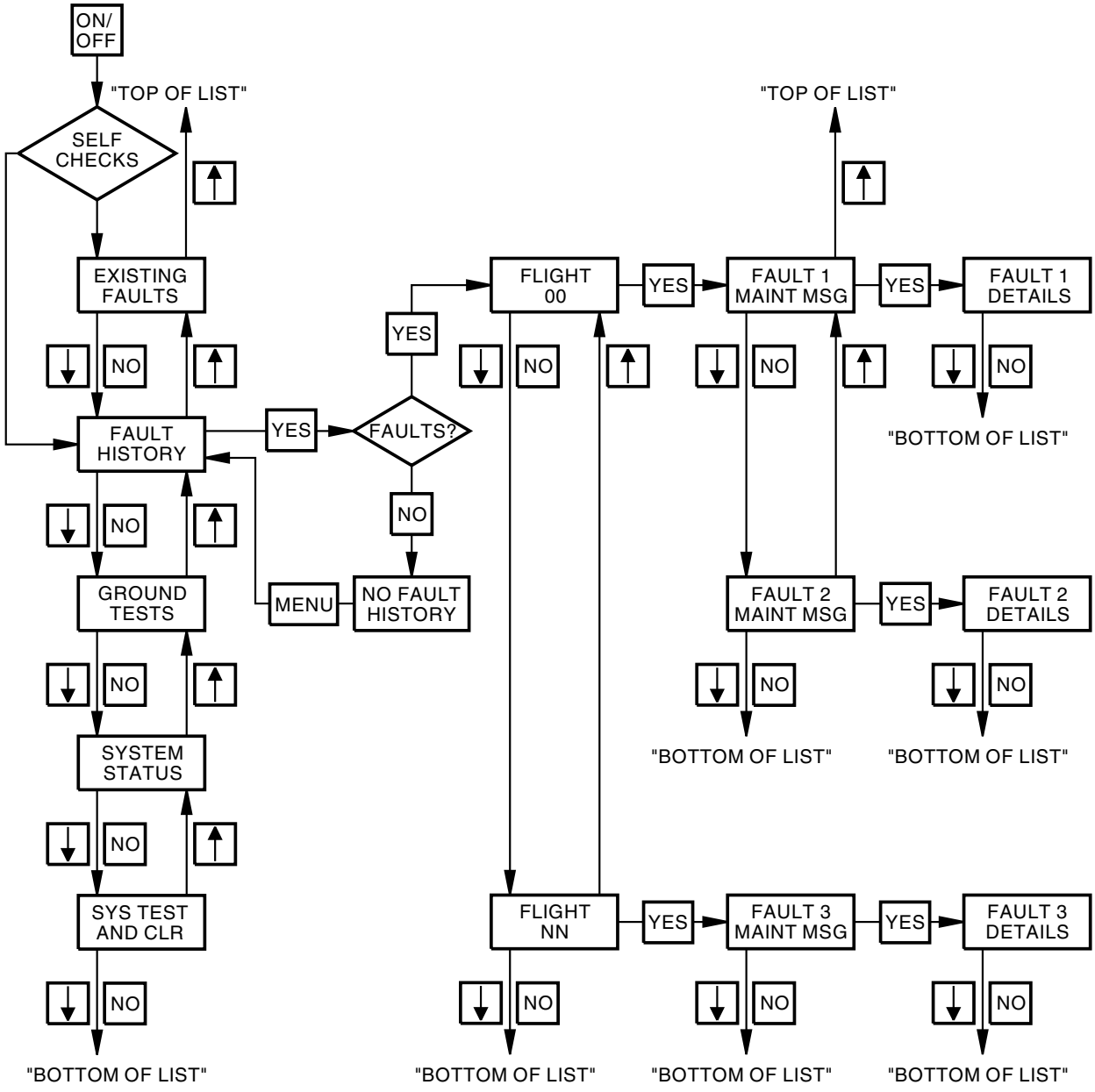

**EXISTING FAULTS MENU**

2523214 S0000592348_V1

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 3 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



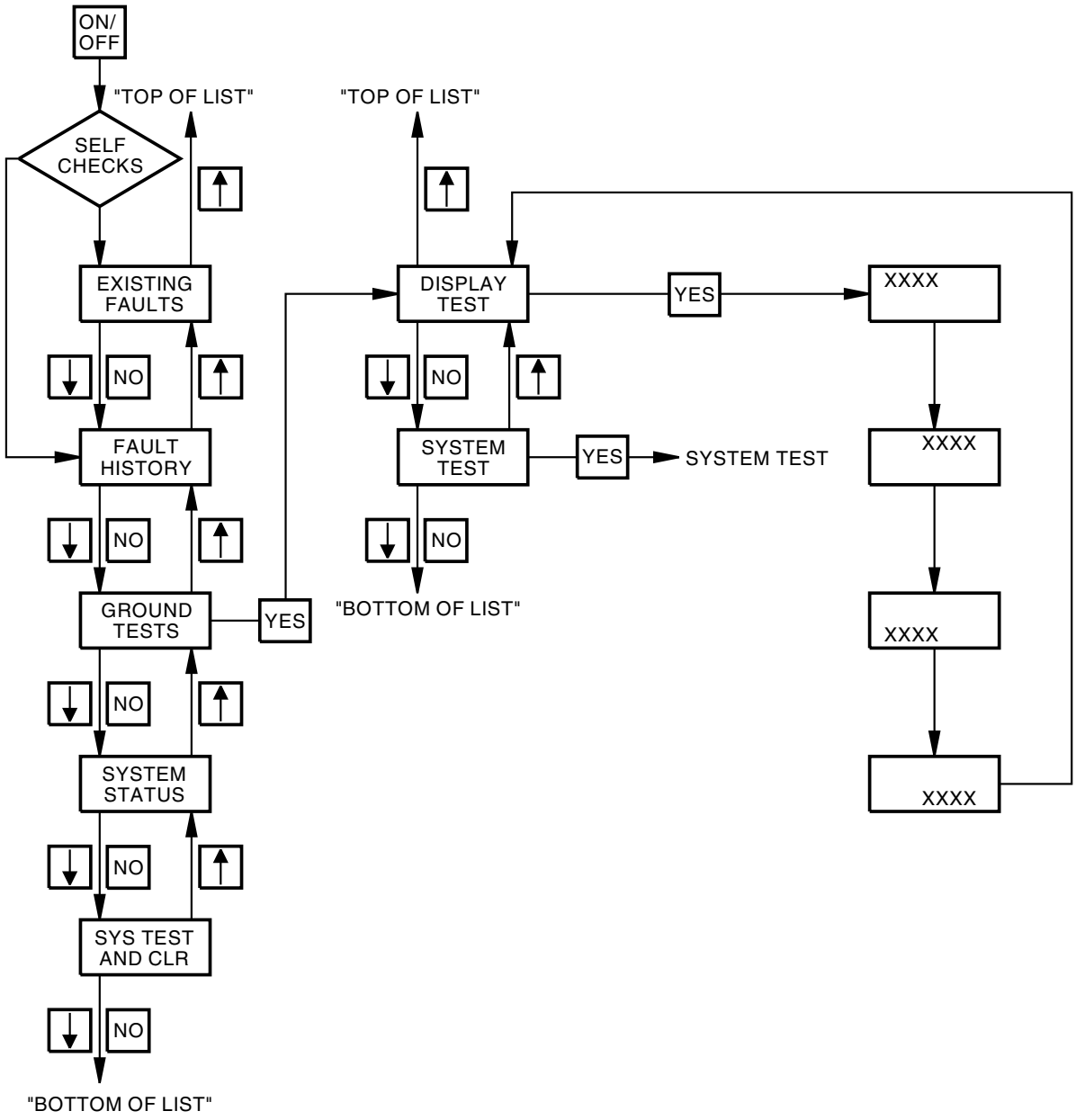

**FAULT HISTORY MENU**

2523222 S0000592349_V1

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 4 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



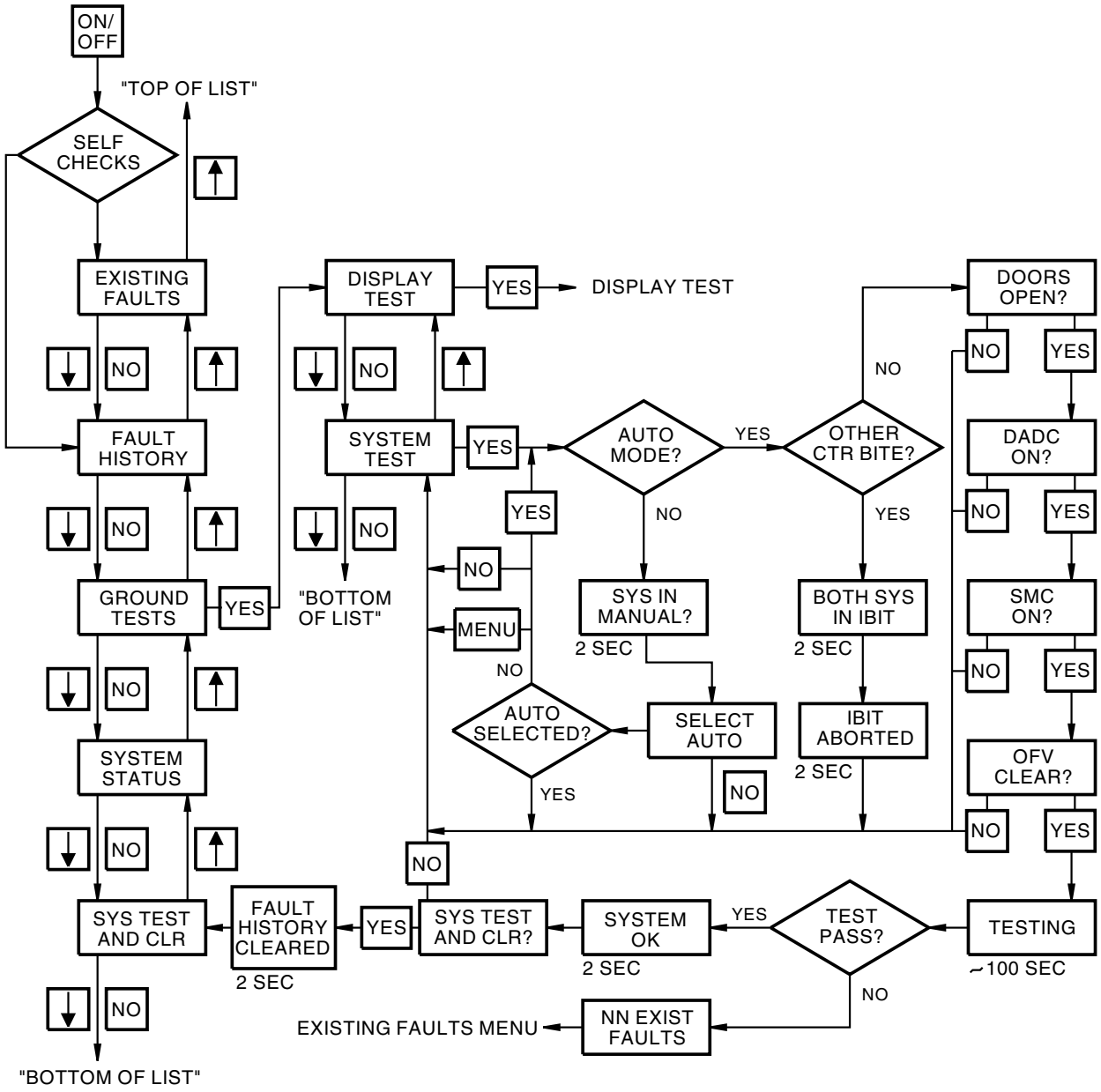

**GROUND TESTS MENUS - DISPLAYS**

2523227 S0000592351_V1

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 5 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**GROUND TESTS MENUS - SYSTEMS TEST**

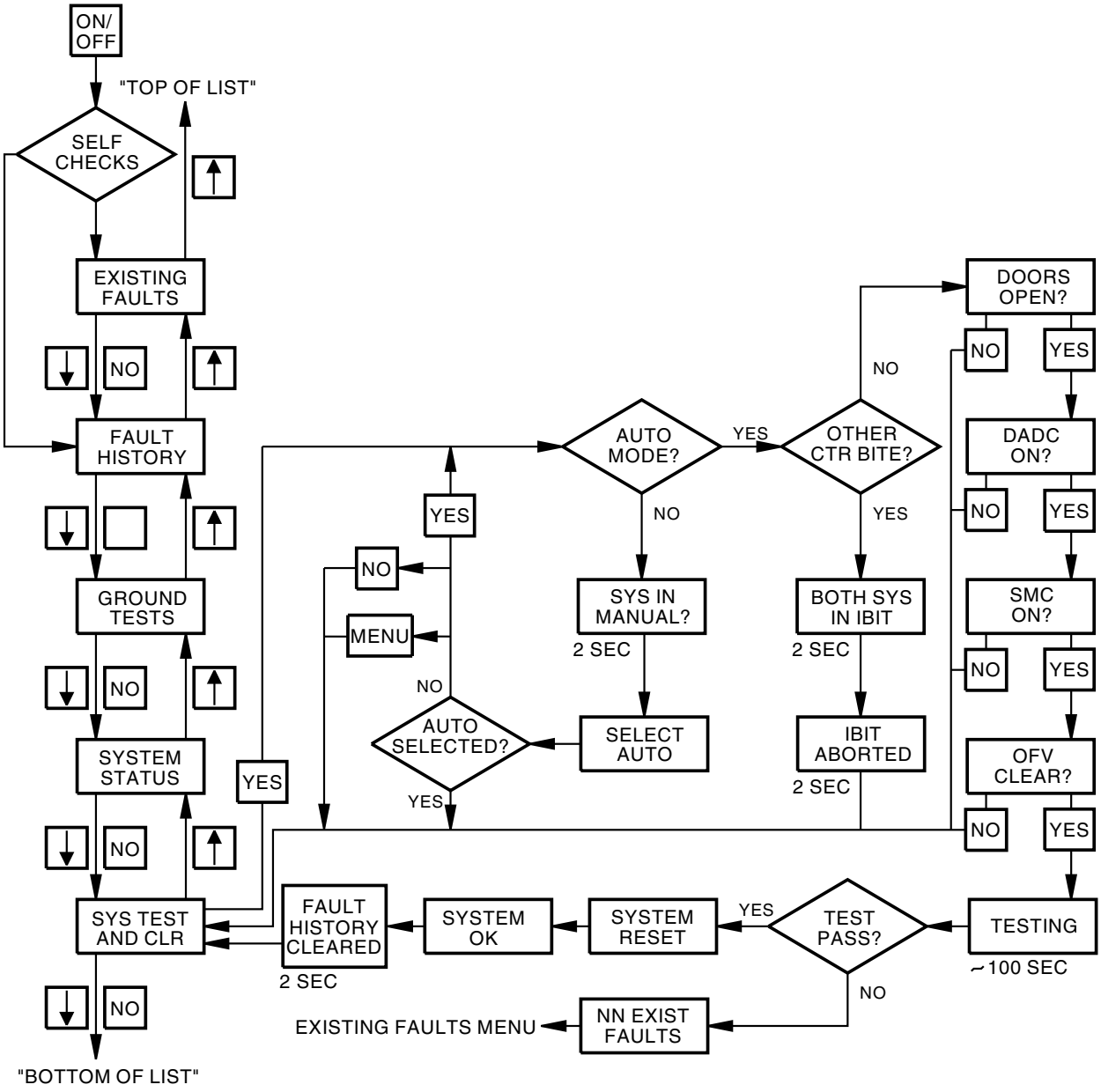
NOTE: DADC REFERS TO THE AIR DATA INERTIAL REFERENCE UNIT (ADIRU).
SMC REFERS TO THE STALL MANAGEMENT YAW DAMPENER (SMYD) COMPUTER.

2523655 S0000592352_V2

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 6 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**SYSTEM TEST & CLEAR MENUS**

NOTE: DADC REFERS TO THE AIR DATA INERTIAL REFERENCE UNIT (ADIRU).
SMC REFERS TO THE STALL MANAGEMENT YAW DAMPENER (SMYD) COMPUTER.

2523665 S0000592354_V2

**Cabin Pressure Controller BITE Procedure**
**Figure 503/21-31-00-990-805 (Sheet 7 of 7)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## CABIN PRESSURE CONTROLLER (CPC) - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the cabin pressure controller (CPC).

(2) An installation of the cabin pressure controller (CPC).

**TASK 21-31-01-000-801**

### 2. Cabin Pressure Controller (CPC) Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 20-10-07-000-801 | E/E Box Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### D. Procedure

**SUBTASK 21-31-01-860-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**SUBTASK 21-31-01-010-001**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-31-01-020-001**

**CAUTION**

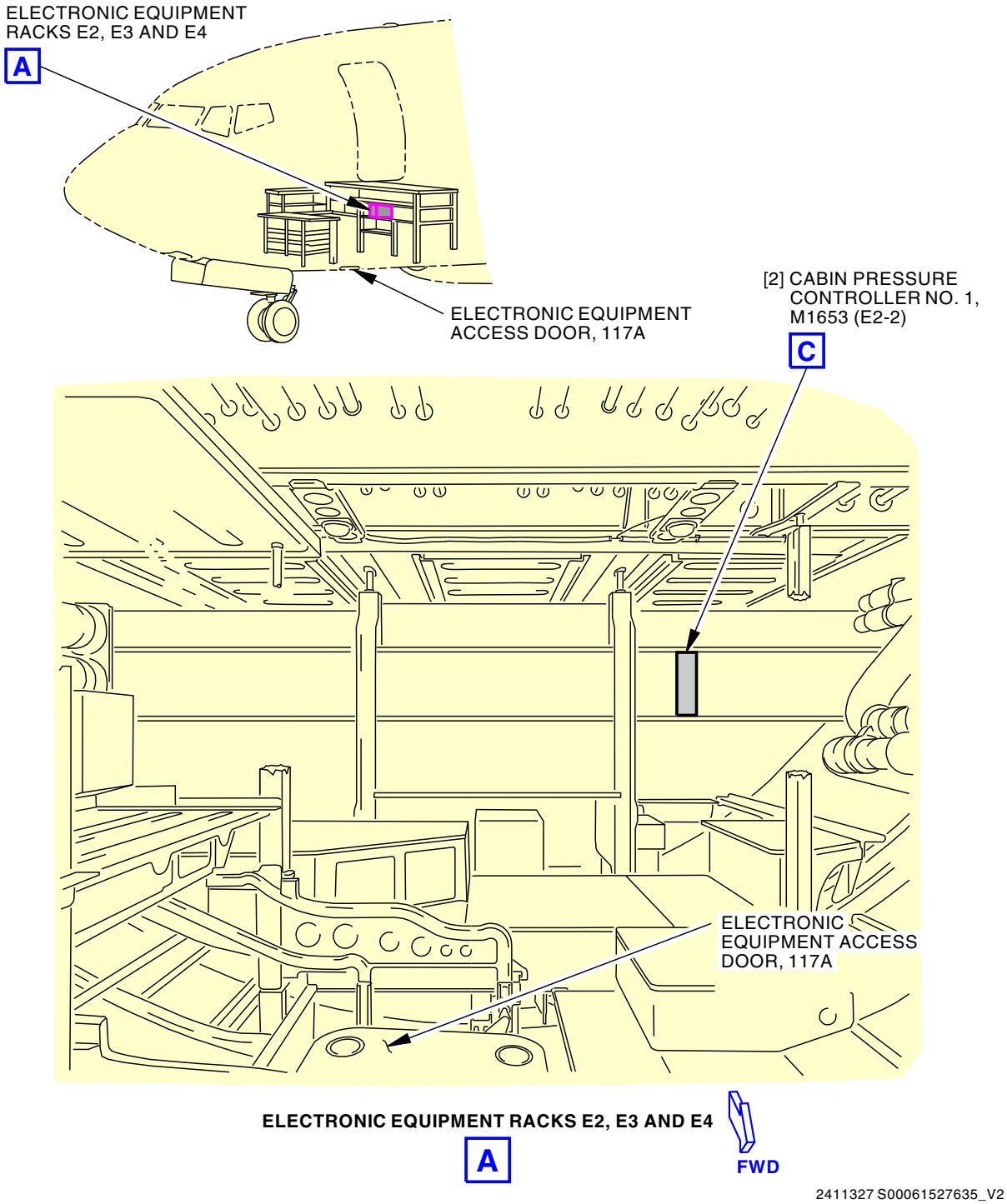
REMOVE AND INSTALL THE PRESSURE CONTROLLER CAREFULLY TO PREVENT DAMAGE TO THE COPPER TAPE ON THE FRONT OF THE PRESSURE CONTROLLER. THE COPPER TAPE PREVENTS ELECTROMAGNETIC INTERFERENCE. IF YOU ARE NOT CAREFUL, DAMAGE TO THE COPPER TAPE WILL OCCUR.

(3) Remove the cabin pressure controller No. 2 [1] or the cabin pressure controller No. 1 [2]. To remove the controller, do this task: E/E Box Removal, TASK 20-10-07-000-801.

**END OF TASK**



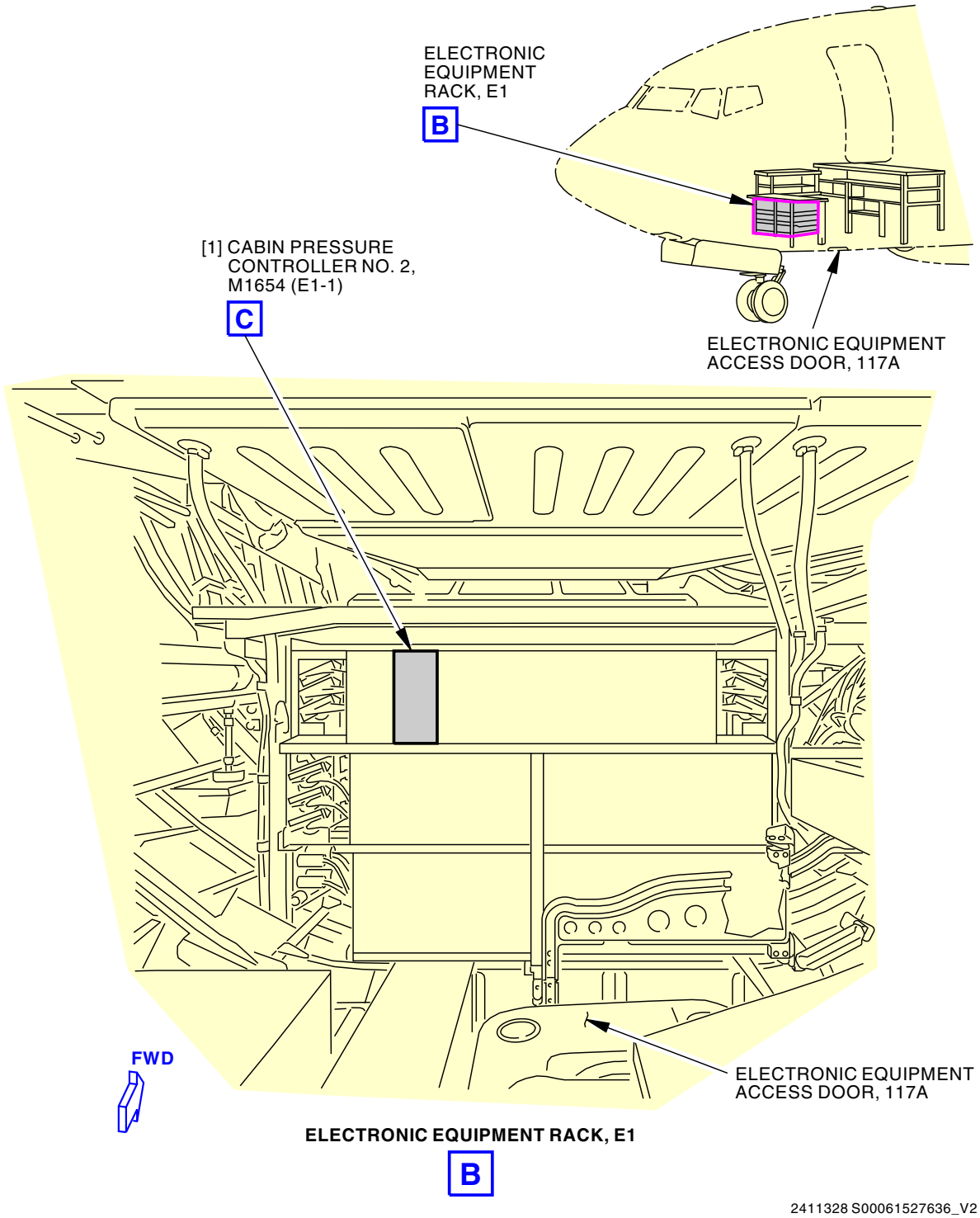
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Pressure Controller Installation**
**Figure 401/21-31-01-990-802 (Sheet 1 of 3)**



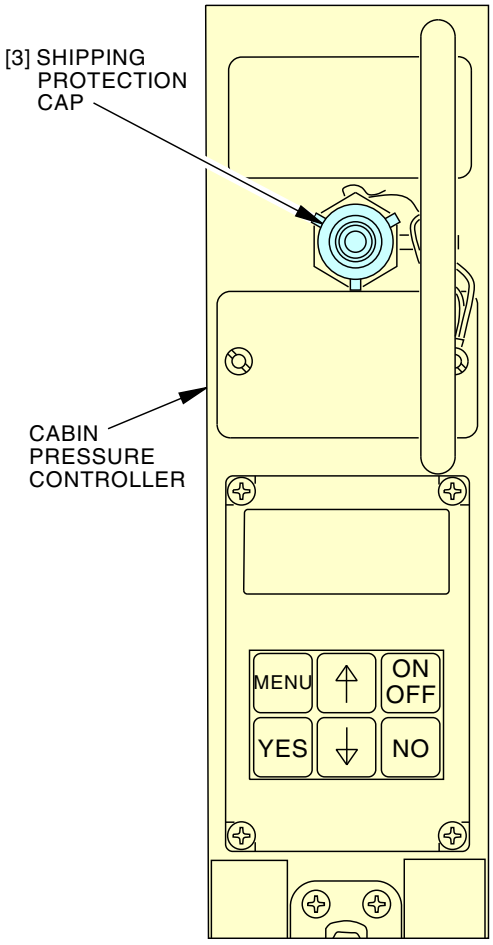
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Pressure Controller Installation**
**Figure 401/21-31-01-990-802 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN PRESSURE CONTROLLER (EXAMPLE)**

C

2479871 S0000582552_V1

**Cabin Pressure Controller Installation**
**Figure 401/21-31-01-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-01-400-801**

**3. Cabin Pressure Controller (CPC) Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-07-400-801 | E/E Box Installation (P/B 401) |
| 21-31-00-700-802 | Pressurization System Ground Test (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Pressure controller No. 2 | 21-31-01-03-010 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Cabin Pressure Controller (CPC) Installation**

**SUBTASK 21-31-01-420-001**

(1) Make sure the shipping protection cap [3] is removed from the cabin pressure port on the faceplate of the controller.

**SUBTASK 21-31-01-420-002**

(2) Install the cabin pressure controller No. 2 [1] or the cabin pressure controller No. 1 [2]. To install the controller, do this task: E/E Box Installation, TASK 20-10-07-400-801.

**SUBTASK 21-31-01-860-002**

(3) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |

**F. Cabin Pressure Controller (CPC) Installation Test**

**SUBTASK 21-31-01-860-003**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-31-01-740-001**

(2) Do a pressurization system ground test on the controller. To do the ground test, do this task: Pressurization System Ground Test, TASK 21-31-00-700-802.



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## G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-31-01-410-001**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## CABIN PRESSURE CONTROL MODULE - REMOVAL/INSTALLATION

### 1. General

A. The pressure control module is installed on the lower right corner of the P5 forward overhead panel in the flight deck.

B. This procedure has these tasks:

(1) A removal of the cabin pressure control module.

(2) An installation of the cabin pressure control module.

**TASK 21-31-02-000-801**

### 2. Cabin Pressure Control Module Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**B. Cabin Pressure Control Module Removal**

**SUBTASK 21-31-02-860-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

**SUBTASK 21-31-02-010-001**

(2) Get access to the electrical connectors on the back of the P5-6 cabin pressure control module in the P5 forward overhead panel.

(a) Loosen the 1/4-turn fasteners that hold the P5 forward overhead panel in position and let the panel move downward.

**SUBTASK 21-31-02-020-001**

(3) Remove the P5-6 cabin pressure controlmodule [1] from the P5 forward overhead panel as follows:

(a) Disconnect the electrical connectors at the back of the module.

**WARNING** HOLD THE PRESSURE CONTROL MODULE WHEN YOU LOOSEN THE 1/4-TURN FASTENERS. IF THE MODULE FALLS, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

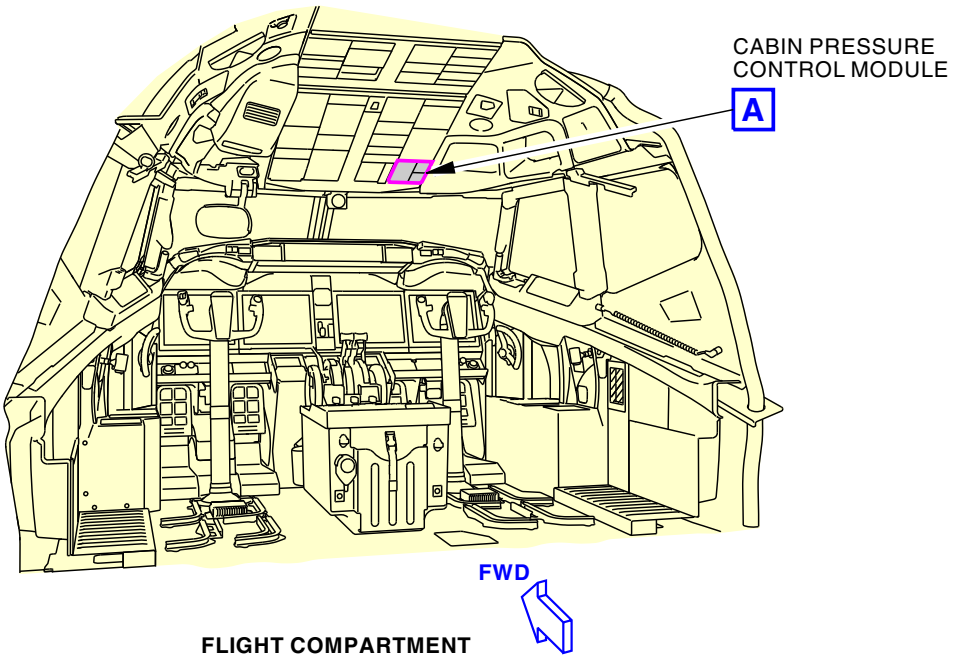
(b) Hold the cabin pressure control module [1] while you loosen the 1/4-turn fasteners that attach the cabin pressure control module [1] to the P5 forward overhead panel.

(c) Remove the cabin pressure control module [1].

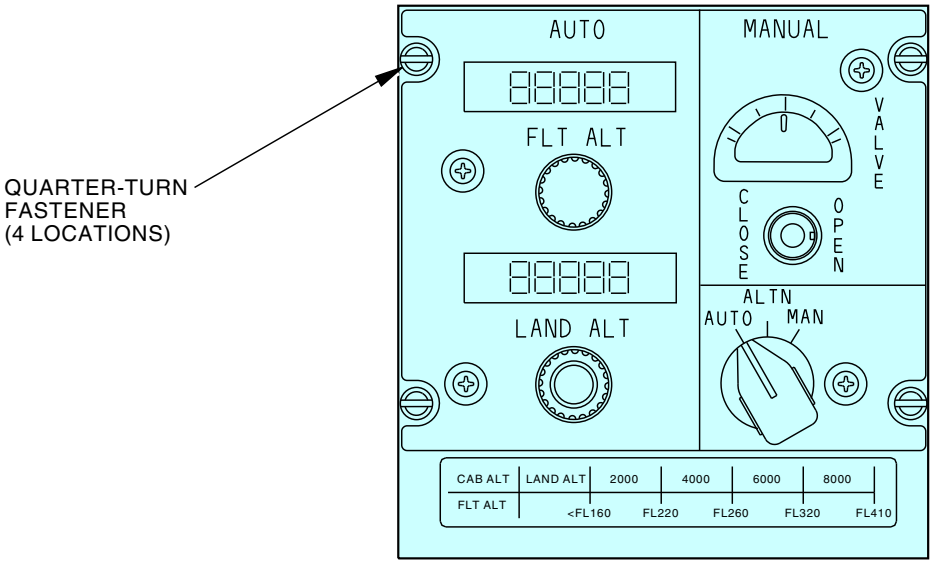
**END OF TASK**



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**FLIGHT COMPARTMENT**




**[1] CABIN PRESSURE CONTROL MODULE**

**A**

2411332 S00061527652_V1

**Cabin Pressure Control Module Installation**
**Figure 401/21-31-02-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-02-400-801**

## 3. Cabin Pressure Control Module Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-31-00-700-802 | Pressurization System Ground Test (P/B 501) |
| 21-31-00-710-801 | Pressurization System Manual Mode Test (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

### B. Location Zones

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

### C. Cabin Pressure Control Module Installation

**SUBTASK 21-31-02-860-002**

(1) Make sure that these circuit breakers are open and have safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

**SUBTASK 21-31-02-010-002**

(2) If it has not already been done, lower the P5 forward overhead panel.

**SUBTASK 21-31-02-420-001**

(3) Install the P5-6 cabin pressure control module [1] into the P5 forward overhead panel as follows:

(a) Put the module [1] into the P5 forward overhead panel and hold it in position.

(b) Turn the 1/4-turn fasteners on the cabin pressure control module [1] to hold the module to the P5 forward overhead panel.

(c) Connect the two electrical connectors to the module.

**SUBTASK 21-31-02-010-003**

(4) Lift the P5 forward overhead panel to the closed position and turn the 1/4-turn fasteners.

**SUBTASK 21-31-02-860-003**

(5) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 7 | C01272 | PRESSURIZATION CONTROL IND |

### D. Cabin Pressure Control Module Installation Test

**SUBTASK 21-31-02-860-004**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.



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SUBTASK 21-31-02-860-005

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-31-02-710-001

(3) Do a cabin pressurization system ground test. To do the ground test, do this task: Pressurization System Ground Test, TASK 21-31-00-700-802.

SUBTASK 21-31-02-710-002

(4) Do a Pressurization System Manual Mode Test. To do the manual mode test, do this task: Pressurization System Manual Mode Test, TASK 21-31-00-710-801.

## E. Put the Airplane Back to Its Usual Condition

SUBTASK 21-31-02-410-001

(1) Remove electrical power if it is not necessary. To remove electrical power, do this task: Remove Electrical Power, TASK 24-22-00-860-802.

——— END OF TASK ———



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## AFT OUTFLOW VALVE ASSEMBLY - REMOVAL/INSTALLATION

### 1. General

A. This procedure gives instructions for the removal and installation of the aft outflow valve assembly.

B. The aft outflow valve assembly is found on the bottom of the airplane near the aft entry door.

**TASK 21-31-03-000-801**

### 2. Aft Outflow Valve Assembly Removal

(Figure 401 and Figure 402)

#### A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-14208 | Extension Cable - Outflow Valve Installation, Aft Fuselage<br>Part #: C21008-1 Supplier: 81205 |

#### B. Location Zones

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

#### D. Prepare for the Removal

**SUBTASK 21-31-03-860-001**

**WARNING**

DO NOT OPERATE THE OUTFLOW VALVE. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

**CAUTION**

MAKE SURE THAT THE VALVE GATES STAY FULLY CLOSED DURING TRANSPORTATION, REPAIR OR OVERHAUL. DAMAGE CAN OCCUR TO THE SEALS AND MOVABLE PARTS IF NOT PREPARED CORRECTLY.

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

**SUBTASK 21-31-03-860-009**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |


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SUBTASK 21-31-03-000-002

(3) Remove the potable water line cap as follows:

(a) Release the quarter-turn fasteners that are around the edges of the potable water line cap.

(b) Remove the potable water line cap.

## E. Aft Outflow Valve Assembly Removal

SUBTASK 21-31-03-020-001

**CAUTION** BE CAREFUL WHEN YOU REACH THROUGH THE OPENING OF THE OUTFLOW VALVE. DAMAGE CAN OCCUR TO THE ANTISKATING FOIL ON THE FORWARD AND AFT GATES OF THE OUTFLOW VALVE.

(1) Reach through the opening of the outflow valve [1] to disconnect electrical connectors or other components (Figure 402).

NOTE: The function of the antiskating foil is to reduce noise made by the air going through the outflow valve.

SUBTASK 21-31-03-020-002

(2) Disconnect these electrical connectors from the outflow valve [1]:

NOTE: You can get access to the electrical connectors through the valve door opening.

(a) ELACT 1 electrical connector [3]

(b) ELACT 2 electrical connector [2]

(c) feedback module connector 1 [5]

(d) feedback module connector 2 [6].

SUBTASK 21-31-03-020-003

(3) Remove the nut [7] and washer [8] that attach the bonding jumper [9] to the outflow valve [1].

SUBTASK 21-31-03-020-004

(4) Disconnect the bonding jumper [9] from the outflow valve [1].

SUBTASK 21-31-03-020-005

(5) Turn the three aft lugs [11] until they point inboard-to-outboard.

SUBTASK 21-31-03-860-002

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN THE VALVE IS IN OPERATION. IF YOU PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN IT OPERATES YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(6) Do these steps to move the outflow valve [1] gates until the outflow valve [1] can be moved through the fuselage opening:

(a) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(b) Put the mode select switch, on the P5-6 cabin pressure control module on the overhead P5 panel, to the MAN position.

(c) Set the outflow valve [1] in position:



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1) Use the service interphone to make sure that the technician at the outflow valve [1] location can hear and speak with the technician in the flight compartment.

2) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 pressure control module, to the CLOSE position until the technician at the outflow valve [1] tells you that the outflow valve [1] is approximately in the specified position (View B-B, Figure 401).

SUBTASK 21-31-03-860-003

(7) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-31-03-020-006

(8) Do these steps to remove the outflow valve [1]:

(a) Turn the six screws [12] in the counterclockwise direction until they stop.

(b) Slowly push up and aft against the aft end of the outflow valve [1].

(c) Turn the outflow valve [1] until you can get to the manual motor electrical connector [4].

(d) Disconnect the manual motor electrical connector [4].

(e) Lift and turn the outflow valve [1] until it is diagonal to the skin opening of the airplane and until the valve motors are up.

(f) Carefully remove the outflow valve [1] through the skin opening of the airplane.

NOTE: Remove the outflow valve so that the valve motors come out last.

(g) Remove the gasket [10].

SUBTASK 21-31-03-210-001

(9) Visually examine the condition of the antiskating foil on the forward and aft gates of the outflow valve [1] (Figure 402):

(a) If the antiskating foil is missing, do one of these actions:

1) Remove all adhesive or dirt that remains on the valve gates and do not replace the foil as the outflow valve [1] is functionally serviceable with the antiskating foil missing.

2) Repair the antiskating foil per the vendor component maintenance manual at the next convenient maintenance opportunity.

(b) If the antiskating foil is damaged or peeled away from the gate surface, trim the damaged or loose portion of the foil from the gate.

## F. Prepare for the Transportation of the Outflow Valve Assembly

SUBTASK 21-31-03-210-002

(1) The outflow valve [1] must be in the fully closed position for transportation.

SUBTASK 21-31-03-860-006

(2) If you do not have outflow valve installation extension cable, SPL-14208 available, do these steps to close the outflow valve gates for transportation:

(a) Lift the outflow valve [1] sufficiently so that you can connect the manual motor electrical connector [4] on the outflow valve [1].

(b) Connect the manual motor electrical connector [4] on the outflow valve [1].



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Put the outflow valve [1] on a suitable support so that the valve doors will be free to move.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN THE VALVE IS IN OPERATION. IF YOU PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN IT OPERATES YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(d) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(e) Put the mode select switch, on the P5-6 cabin pressure control module on the overhead P5 panel, to the MAN position.

(f) Position the outflow valve [1] as follows:

1) Use the service interphone system to make sure that there is communication between the technician at the aft outflow valve location and technician in the flight deck.

2) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 pressure control module, to the CLOSE position until the aft outflow valve is fully closed.

(g) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(h) Disconnect the manual motor electrical connector [4] from the outflow valve [1].

SUBTASK 21-31-03-210-003

(3) The outflow valve [1] must be in the fully closed position for transportation.

SUBTASK 21-31-03-860-005

(4) If the outflow valve installation extension cable, SPL-14208, is available, do these steps to close the outflow valve gates for transportation:

(a) Position the outflow valve [1] so that the valve gates are free to move and are not obstructed.

(b) Connect J1 connector of the outflow valve installation extension cable, SPL-14208, to connector D10730 on the ship's wiring inside the outflow valve opening in the fuselage.

(c) Connect P1 of the outflow valve installation extension cable, SPL-14208, to the manual motor electrical connector [4] (J5) on the aft outflow valve DC motor.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |



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(e) Put the mode select switch, on the P5-6 cabin pressure control module, to the MAN position.

(f) Position the outflow valve [1] as follows:

1) Use the service interphone system to make sure there is communication between the technician at the aft outflow valve location and the technician in the flight deck.

2) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 pressure control module, to the CLOSE position until the outflow valve [1] is fully closed.

(g) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

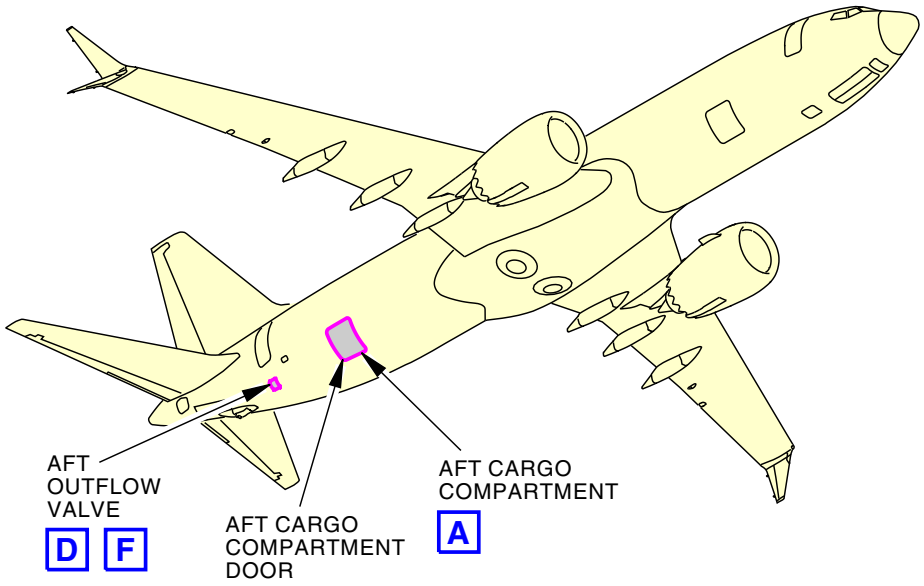
| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

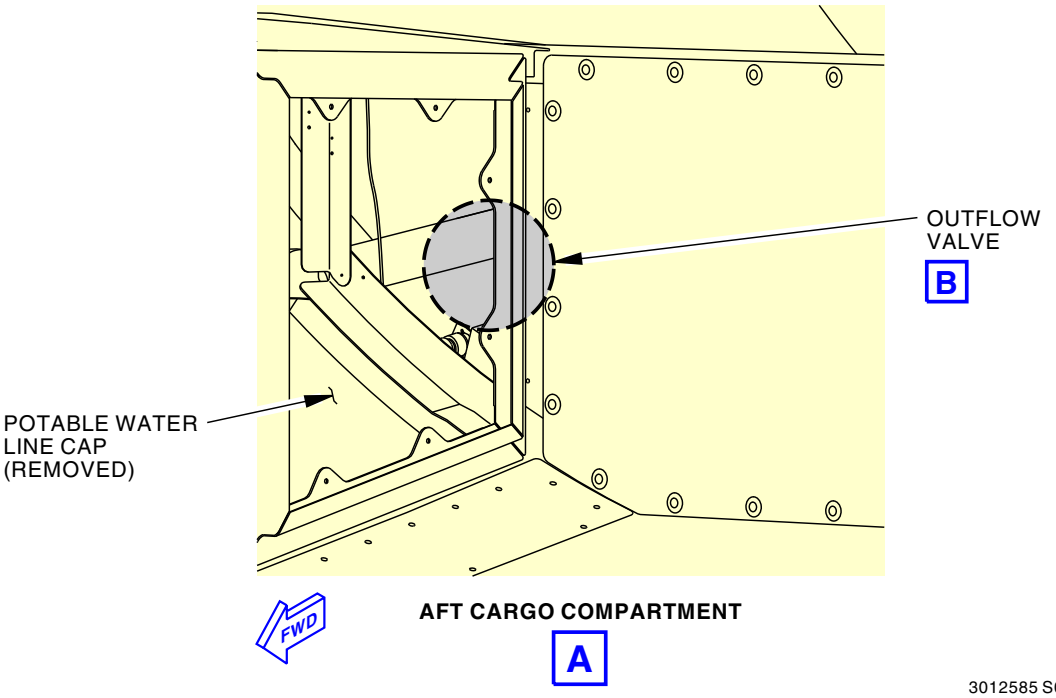
(h) Disconnect the outflow valve installation extension cable, SPL-14208, from the aft outflow valve connector J5 and connector D10730 on the ship's wiring.

**——— END OF TASK ———**



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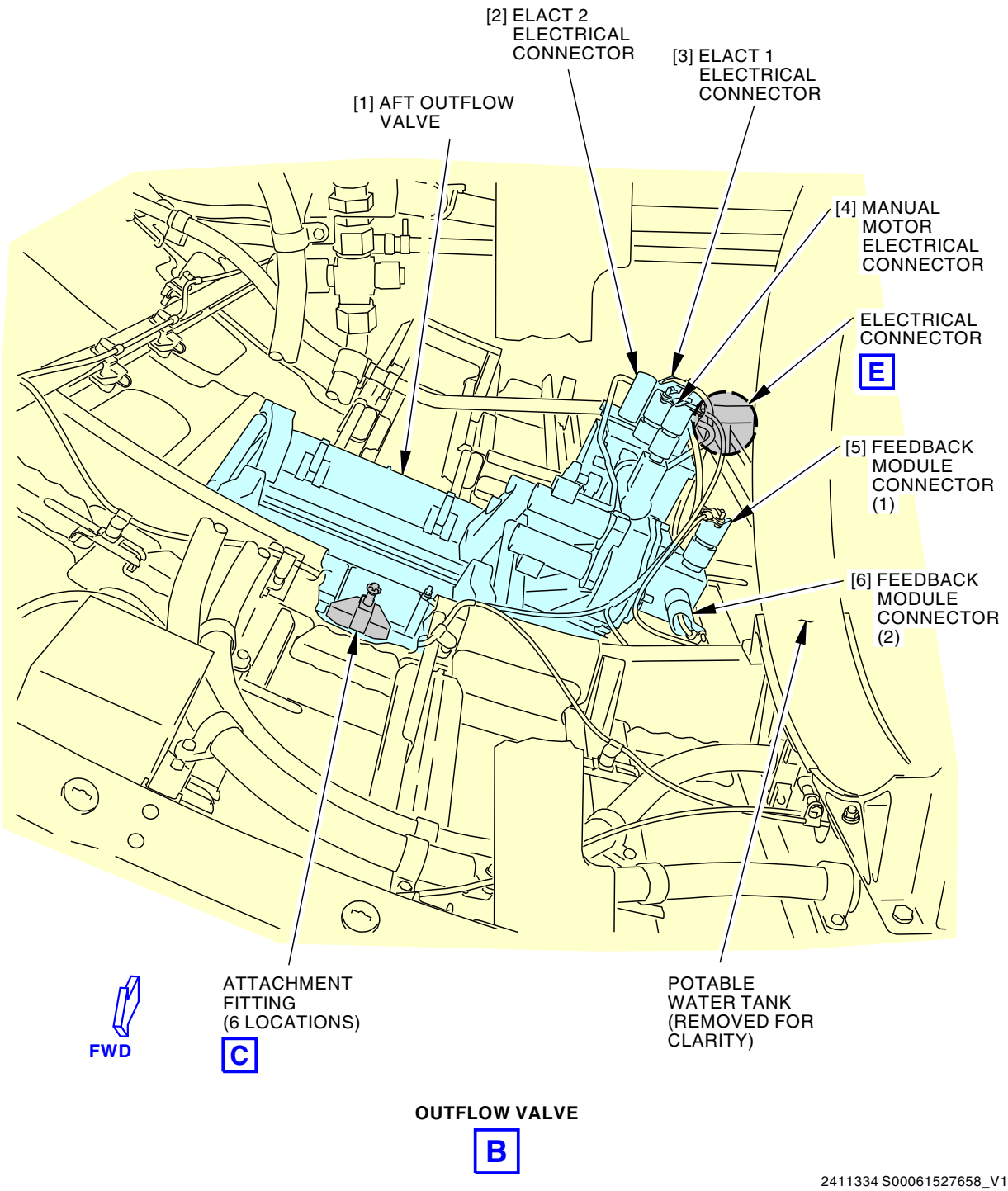



**Aft Outflow Valve Installation**
**Figure 401/21-31-03-990-801 (Sheet 1 of 4)**



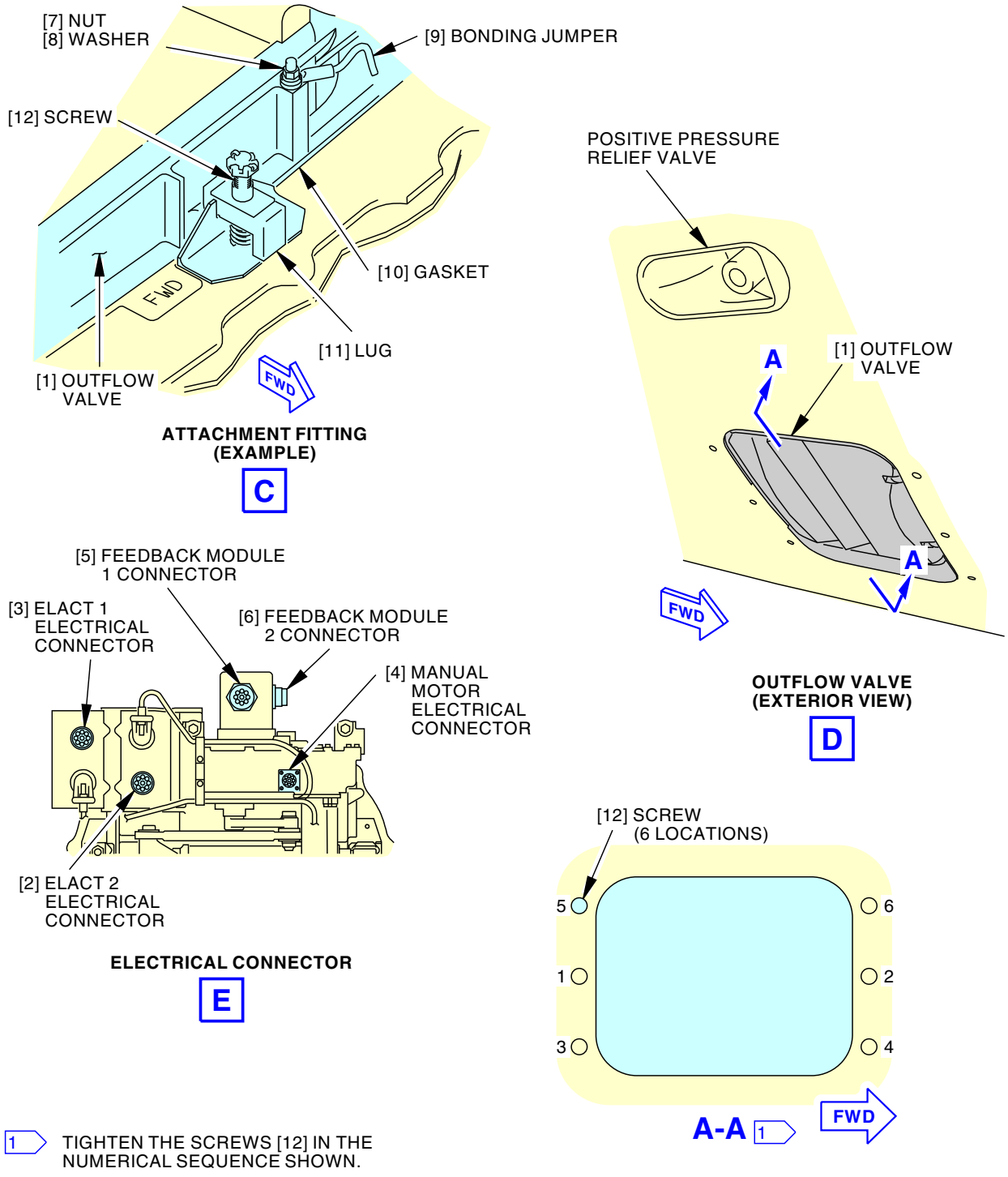
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**Aft Outflow Valve Installation**
**Figure 401/21-31-03-990-801 (Sheet 2 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

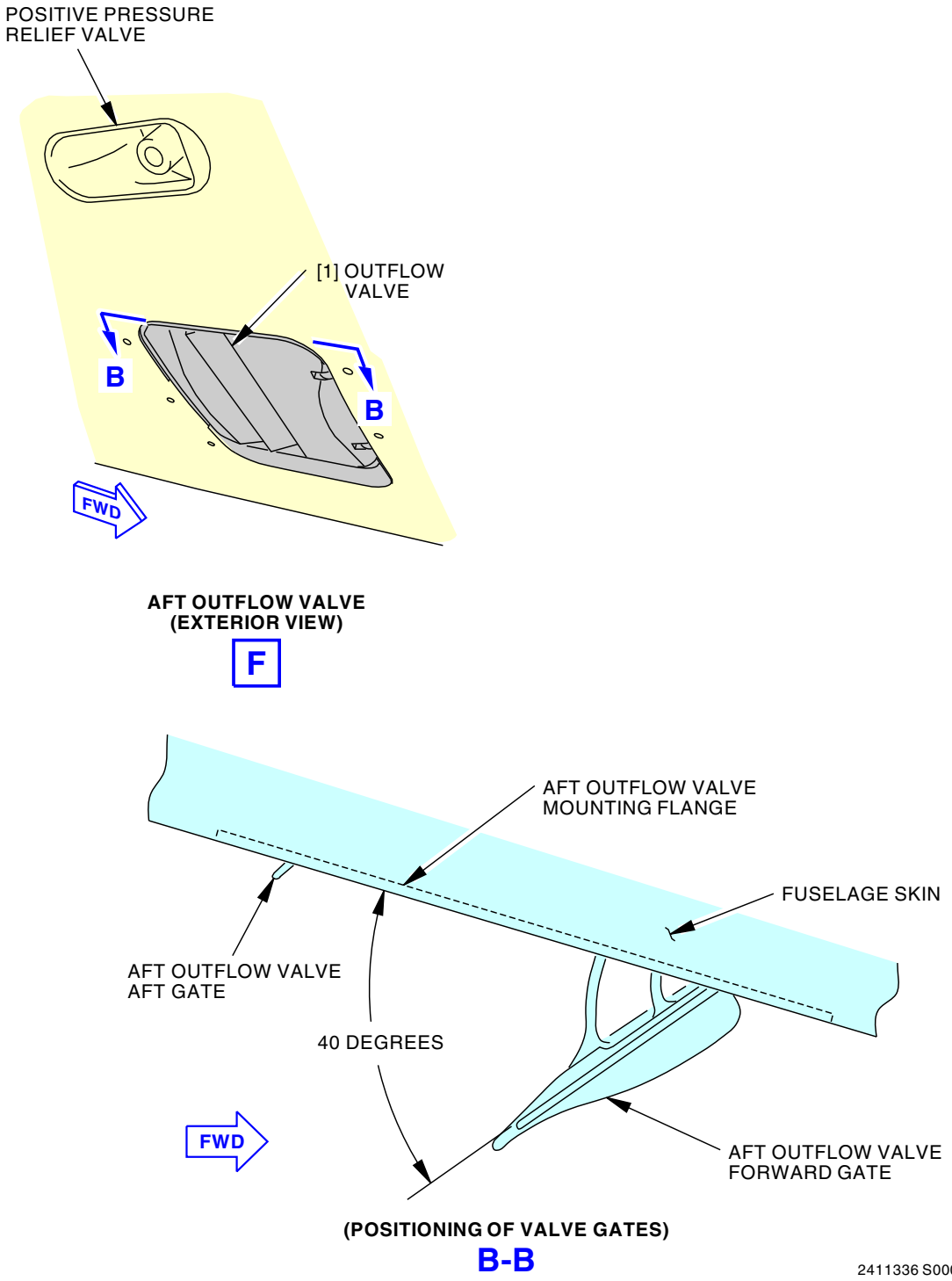



2411335 S00061527659_V1

**Aft Outflow Valve Installation**
**Figure 401/21-31-03-990-801 (Sheet 3 of 4)**



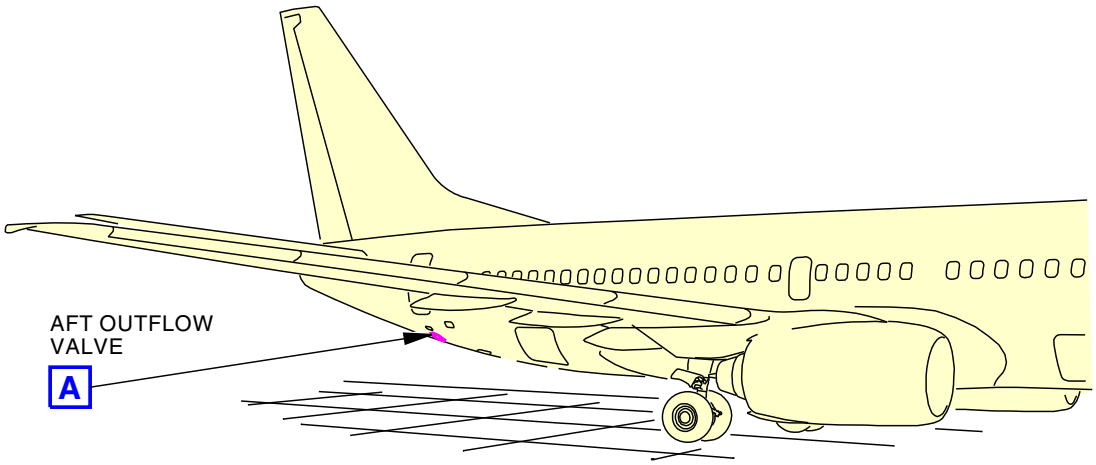
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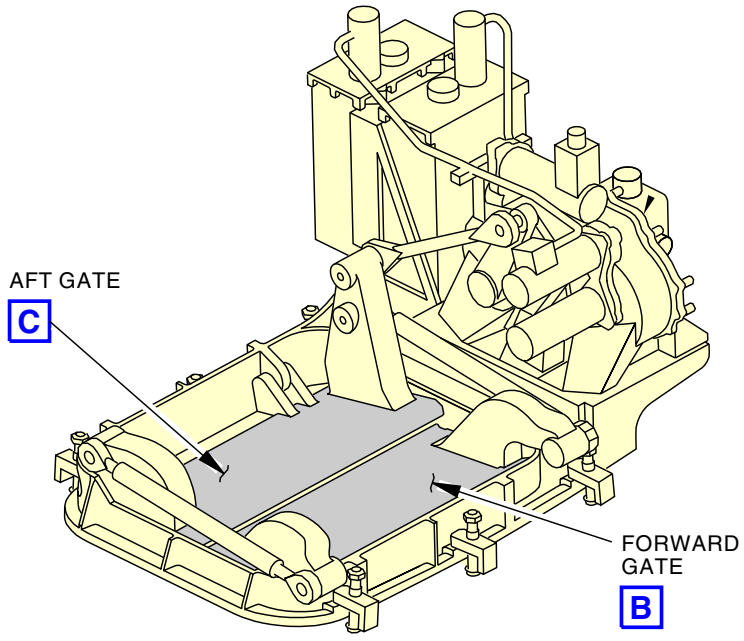



**Aft Outflow Valve Installation**
**Figure 401/21-31-03-990-801 (Sheet 4 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



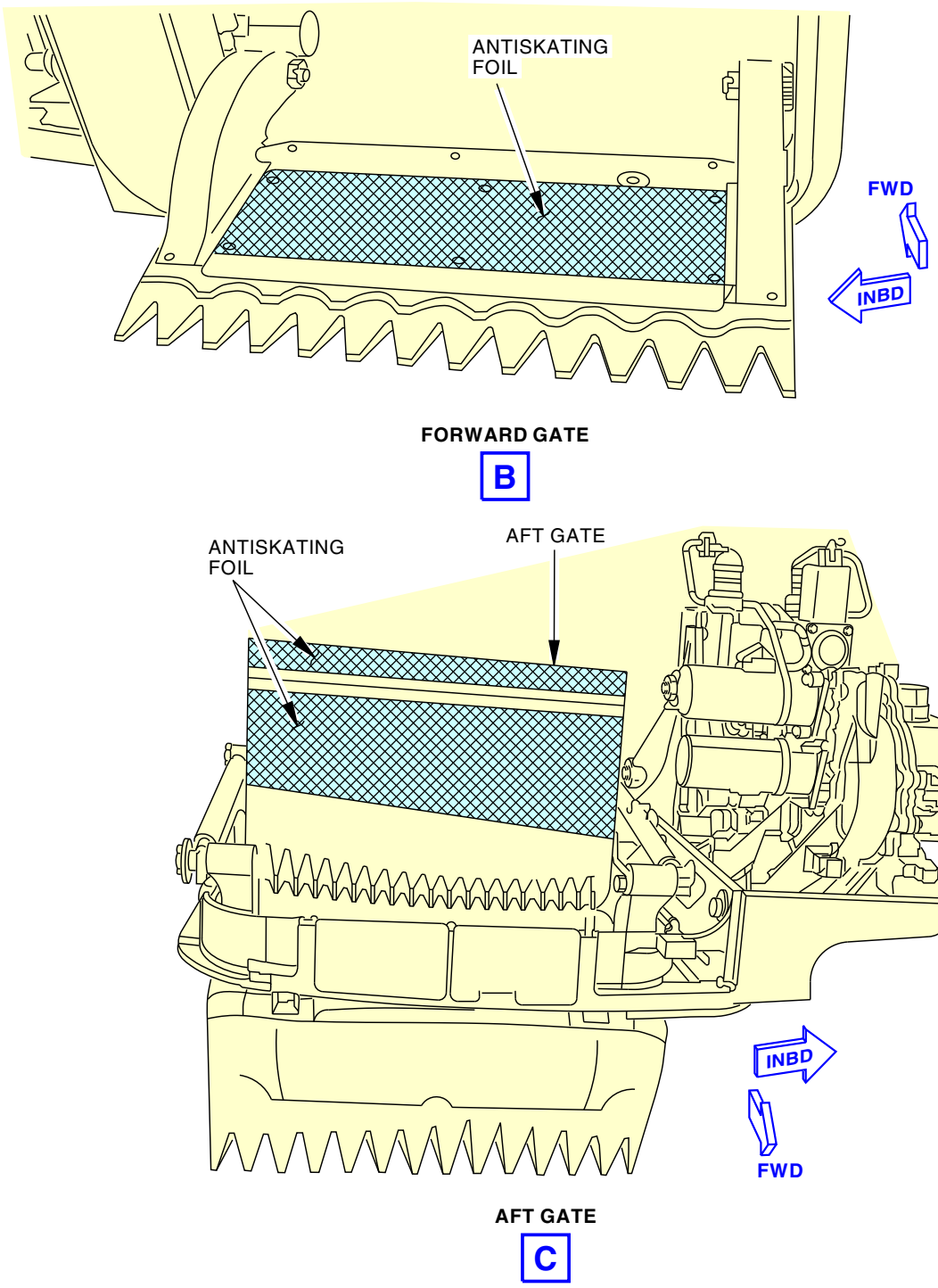

**AFT OUTFLOW VALVE**
**A**

2411337 S00061527661_V1

**Location of Antiskating Foil on Forward and Aft Gates**
**Figure 402/21-31-03-990-802 (Sheet 1 of 2)**



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2411338 S00061527662_V1

**Location of Antiskating Foil on Forward and Aft Gates**
**Figure 402/21-31-03-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-31-03-400-801**

**3. Aft Outflow Valve Assembly Installation**

(Figure 401 and Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 21-31-00-700-802 | Pressurization System Ground Test (P/B 501) |
| 21-31-00-710-801 | Pressurization System Manual Mode Test (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |
| COM-10996 | Bit - Screwdriver, Torq-set<br>Part #: 212-5/16A Supplier: 03705<br>Part #: TS212-5/16B Supplier: 67179 |
| SPL-14208 | Extension Cable - Outflow Valve Installation, Aft Fuselage<br>Part #: C21008-1 Supplier: 81205 |
| STD-10994 | Screwdriver - Torque, (0-100 in-lbs, 1/4 in. drive) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D50004 | Compound - Antiseize | BMS3-28 |
| G50360 | Seal - Closed Cell Silicone Foam Rubber, Hydraulic Fluid Resistant (with Adhesive) | BMS1-68 Grade A Form III |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Outflow valve | 21-31-03-01-197 | SIA ALL |
| 10 | Gasket | 21-31-03-01-080 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |



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## G. Aft Outflow Valve Assembly Installation

SUBTASK 21-31-03-860-007

(1) Make sure that these circuit breakers are open and have safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-31-03-860-008

(2) Make sure that the electrical power is on (TASK 24-22-00-860-801).

SUBTASK 21-31-03-860-010

(3) Make sure that the BAT switch, on the P5-13 electrical meters, battery, and galley power module, is in the ON position.

SUBTASK 21-31-03-420-001

(4) Make sure that all shipping plugs are removed from the vent ports of the two electronic actuators.

NOTE: The vent ports are below the electronic actuators.

SUBTASK 21-31-03-640-001

(5) If a screw [12] is replaced for any reason or if a screw [12] was difficult to loosen, apply a light and even application of compound, D50004, to the threads and shank of the screw [12].

SUBTASK 21-31-03-420-002

**CAUTION**

BE CAREFUL WHEN YOU REACH THROUGH THE OPENING OF THE OUTFLOW VALVE. DAMAGE CAN OCCUR TO THE ANTISKATING FOIL ON THE FORWARD AND AFT GATES OF THE OUTFLOW VALVE.

(6) Reach through the opening of the outflow valve [1] to connect electrical connectors or other components (Figure 402).

(a) If you install the same outflow valve [1] that you removed and the foil is damaged or peeled away from the gate, the foil can be removed or cut away until all loose foil has been removed.

SUBTASK 21-31-03-980-001

(7) If the outflow valve [1] to be installed is in the fully open position or closed position and you do not have outflow valve installation extension cable, SPL-14208, available, do these steps to put the outflow valve gates in position so that the outflow valve [1] can be moved through the fuselage opening:

NOTE: If you are re-installing the same outflow valve that you removed, then you do not need to change the position of the valve gates.

(a) Lift the outflow valve [1] sufficiently so that you can connect the manual motor electrical connector [4] on the outflow valve [1].

(b) Connect the manual motor electrical connector [4] (J5) on the outflow valve [1].

(c) Put the outflow valve [1] on a suitable support so that the outflow valve [1] doors will be free to move.



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**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN THE VALVE IS IN OPERATION. IF YOU PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN IT OPERATES YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(d) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(e) Put the mode select switch, on the P5-6 cabin pressure control module on the overhead P5 panel, to the MAN position.

(f) Set the outflow valve [1] in its position:

1) Use the service interphone system to make sure that the technician at the outflow valve [1] location can hear and speak with the technician in the flight compartment.

2) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 pressure control module, to the OPEN position until the technician at the outflow valve [1] location tells you that the outflow valve [1] is approximately in the specified position (View B-B, Figure 401).

(g) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(h) Disconnect the manual motor electrical connector [4] from the outflow valve [1].

**SUBTASK 21-31-03-480-001**

(8) If the outflow valve [1] to be installed is in the fully open position or closed position and outflow valve installation extension cable, SPL-14208, is available, do these steps to position the outflow valve gates so that the outflow valve [1] can be moved through the fuselage opening:

NOTE: If you are re-installing the same outflow valve that you removed, then you do not need to change the position of the valve gates.

(a) Set the outflow valve [1] so that the valve gates are free to move and are not blocked.

(b) Connect the J1 connector of the outflow valve installation extension cable, SPL-14208, to connector D10730 on the ship's wiring inside the outflow valve [1] opening in the fuselage.

(c) Connect P1 of the outflow valve installation extension cable, SPL-14208, to the manual motor electrical connector [4] (J5) on the outflow valve [1] DC motor.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTLET OF THE OUTFLOW VALVE. THE VALVE IS MOTOR-OPERATED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |



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(e) Put the mode select switch, on the P5-6 cabin pressure control module to the MAN position.

(f) Set the outflow valve [1] in position:

1) Use the service interphone system to make sure the technician at the outflow valve location can hear and speak with the technician in the flight deck.

2) Push and hold the CLOSE/OPEN toggle switch, on the P5-6 pressure control module, to the OPEN position until the technician at the outflow valve [1] location tells you that the valve is approximately in the specified position (View B-B, Figure 401).

(g) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(h) Disconnect the outflow valve installation extension cable, SPL-14208, from the outflow valve [1] connector J5 and connector D10730 on the ship's wiring.

**SUBTASK 21-31-03-420-003**

(9) Do these steps to install the outflow valve [1]:

(a) Make sure that the aft three lugs [11] are turned until they point inboard-to-outboard.

NOTE: The lugs will be 1/4 turn away from the installed position.

(b) Put the outflow valve [1] through the skin opening on the airplane so that the motors go in first with the outflow valve [1] diagonal to the skin opening.

NOTE: The motors will be on the inboard side of the skin opening.

(c) Set the outflow valve [1] down on the inside of the airplane so that you can connect the manual motor electrical connector [4].

(d) Connect the manual motor electrical connector [4] to the outflow valve [1].

(e) Install the gasket [10] in its position on the airplane skin opening with the thinner rubber side against the airplane (down).

(f) Do these steps to put the outflow valve [1] in its position:

1) Put the outflow valve [1] above the skin opening with the motors facing inboard.

2) Tilt the outflow valve [1] to put the forward end of the outflow valve [1] below the three forward lugs [11], then lower the aft end of the outflow valve [1].

3) Turn the three aft lugs [11] 90 degrees in the counterclockwise direction so that they face aft to forward.

(g) Do these steps to tighten the screws [12] to 60 ±5 in-lb (6.78 ±0.57 N·m):

1) Tighten the screws [12] no more than one turn at a time in sequence (1 through 6) as shown (View D, Figure 401).

2) Continue to tighten the screws [12] until all of the latches touch the valve.

3) Use a torque screwdriver, STD-10994, set at 60 ±5 in-lb (6.78 ±0.57 N·m) with a bit, COM-10996, to tighten the screws no more than 1/2 turn at a time in the sequence shown in (View D, Figure 401).

4) Continue to tighten the screws [12] in sequence until all latch screws [12] are tightened to 60 ±5 in-lb (6.78 ±0.57 N·m).



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5) If a screw [12] does not turn when the final application of torque is applied, back that screw [12] off one turn and tighten it to the final torque value.

**WARNING** DO NOT PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN THE VALVE IS IN OPERATION. IF YOU PUT YOUR HANDS OR TOOLS IN THE OUTFLOW VALVE WHEN IT OPERATES YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(h) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

(i) Put the mode select switch, on the P5-6 cabin pressure control module on the overhead P5 panel, to the MAN position.

(j) Use the service interphone system so that the technician at the outflow valve [1] location can communicate the position of the outflow valve [1] to the technician in the flight compartment.

(k) Push and hold the manual control switch to the OPEN position until the outflow valve [1] is in the full open position.

(l) Open this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

**SUBTASK 21-31-03-420-004**

(10) Connect these electrical connectors to the outflow valve [1]:

NOTE: You can get access the electrical connectors through the valve door opening.

(a) ELACT 1 electrical connector [3]

(b) ELACT 2 electrical connector [2]

(c) feedback module connector 1 [5]

(d) feedback module connector 2 [6].

**SUBTASK 21-31-03-020-007**

(11) Do these steps to install the bonding jumper [9] on the outflow valve [1].

(a) Use the solvent cleaning method to clean these parts:

1) The surfaces of the outflow valve [1] where the bonding jumper [9] will touch

2) The stud

3) The terminal of the bonding jumper [9]

4) The washer [8]

5) The nut [7].

(b) Put the bonding jumper [9] in its position on the stud of the outflow valve [1] and install the washer [8] and nut [7].

(c) Measure the bonding resistance between the bonding jumper [9] and outflow valve [1] (SWPM 20-20-00).

1) Use an intrinsically safe approved bonding meter, COM-1550



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2) Make sure that the bonding resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 21-31-03-860-004

(12) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 3 | C01270 | PRESSURIZATION CONTROL AUTO 1 |
| F | 5 | C01271 | PRESSURIZATION CONTROL AUTO 2 |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

## H. Aft Outflow Valve Assembly Installation Test

SUBTASK 21-31-03-710-001

(1) Do a test of the manual mode (TASK 21-31-00-710-801).

SUBTASK 21-31-03-710-002

(2) Do a cabin pressure control system ground test (TASK 21-31-00-700-802).

## I. Put the Airplane Back to Its Usual Condition

SUBTASK 21-31-03-210-004

(1) Examine seal, G50360, on the potable water line cap frame.

(a) Replace seal, G50360, if it missed or damaged.

SUBTASK 21-31-03-400-002

(2) Install the potable water line cap as follows:

(a) Install the potable water line cap.

(b) Lock the quarter-turn fasteners around the edges of the potable water line cap.

SUBTASK 21-31-03-860-011

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 822 | Aft Cargo Door |

——— END OF TASK ———



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## POSITIVE PRESSURE RELIEF VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Positive pressure relief valve removal.

(2) Positive pressure relief valve installation.

B. Two positive pressure relief valves are installed in the area aft of the aft cargo compartment behind the aft bulkhead liner.

**TASK 21-32-01-000-801**

### 2. Positive Pressure Relief Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-31-03-000-801 | Aft Outflow Valve Assembly Removal (P/B 401) |
| 38-11-01-000-801 | Water Tank Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

**C. Prepare for the Removal**

**SUBTASK 21-32-01-010-001**

(1) Do one of the tasks that follow to get access to the positive pressure relief valves [1]:

(a) Remove the potable water tank (TASK 38-11-01-000-801).

(b) Remove the aft outflow valve (TASK 21-31-03-000-801).

**D. Positive Pressure Relief Valve Removal**

**SUBTASK 21-32-01-020-001**

(1) Loosen the clamp [3] at the bottom of the positive pressure relief valve [1].

(a) Slide the clamp [3] down over the pedestal [4].

**SUBTASK 21-32-01-020-002**

(2) Remove the positive pressure relief valve [1].

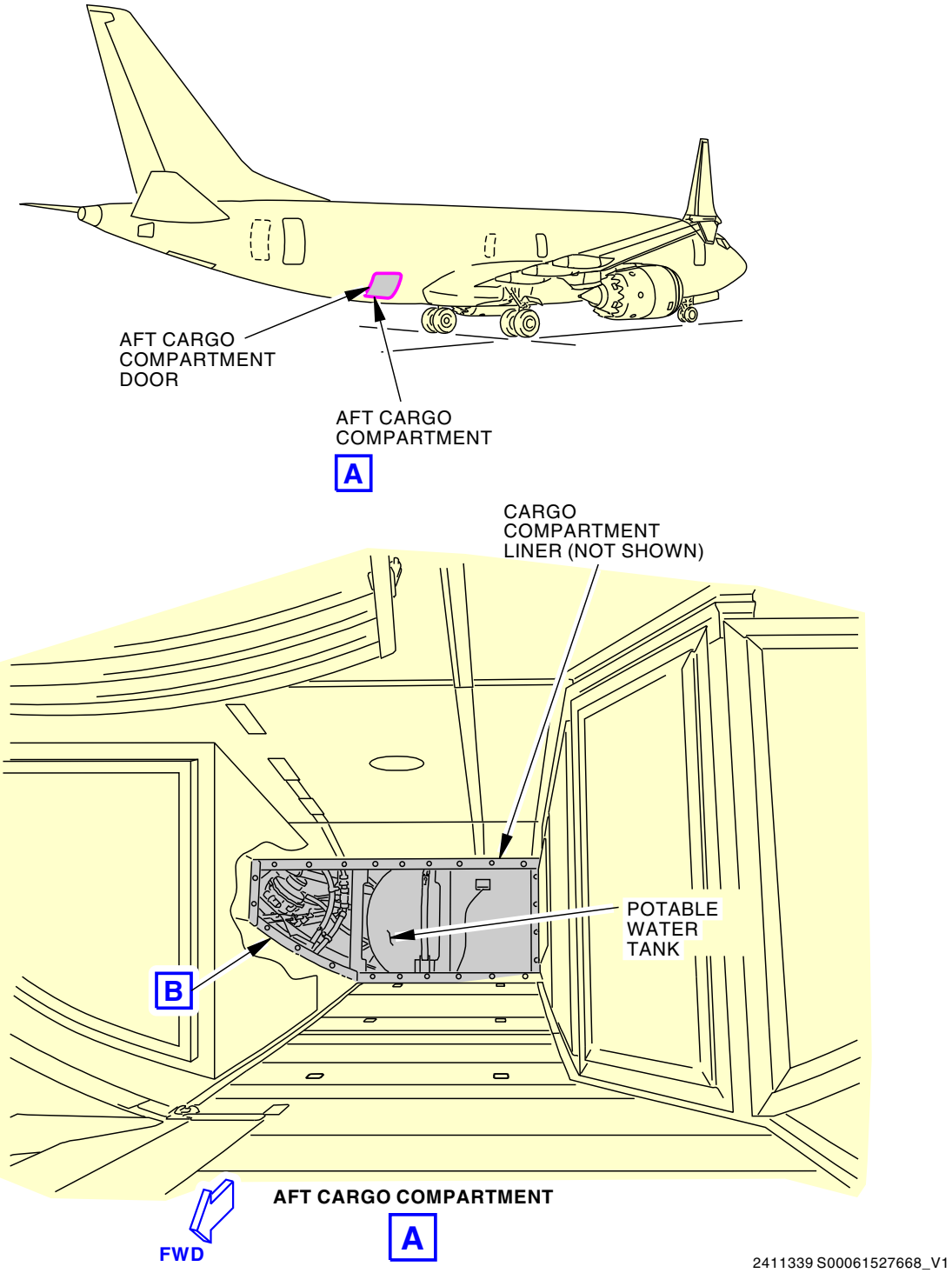
**SUBTASK 21-32-01-020-003**

(3) Remove and discard the gasket [2].

**——— END OF TASK ———**



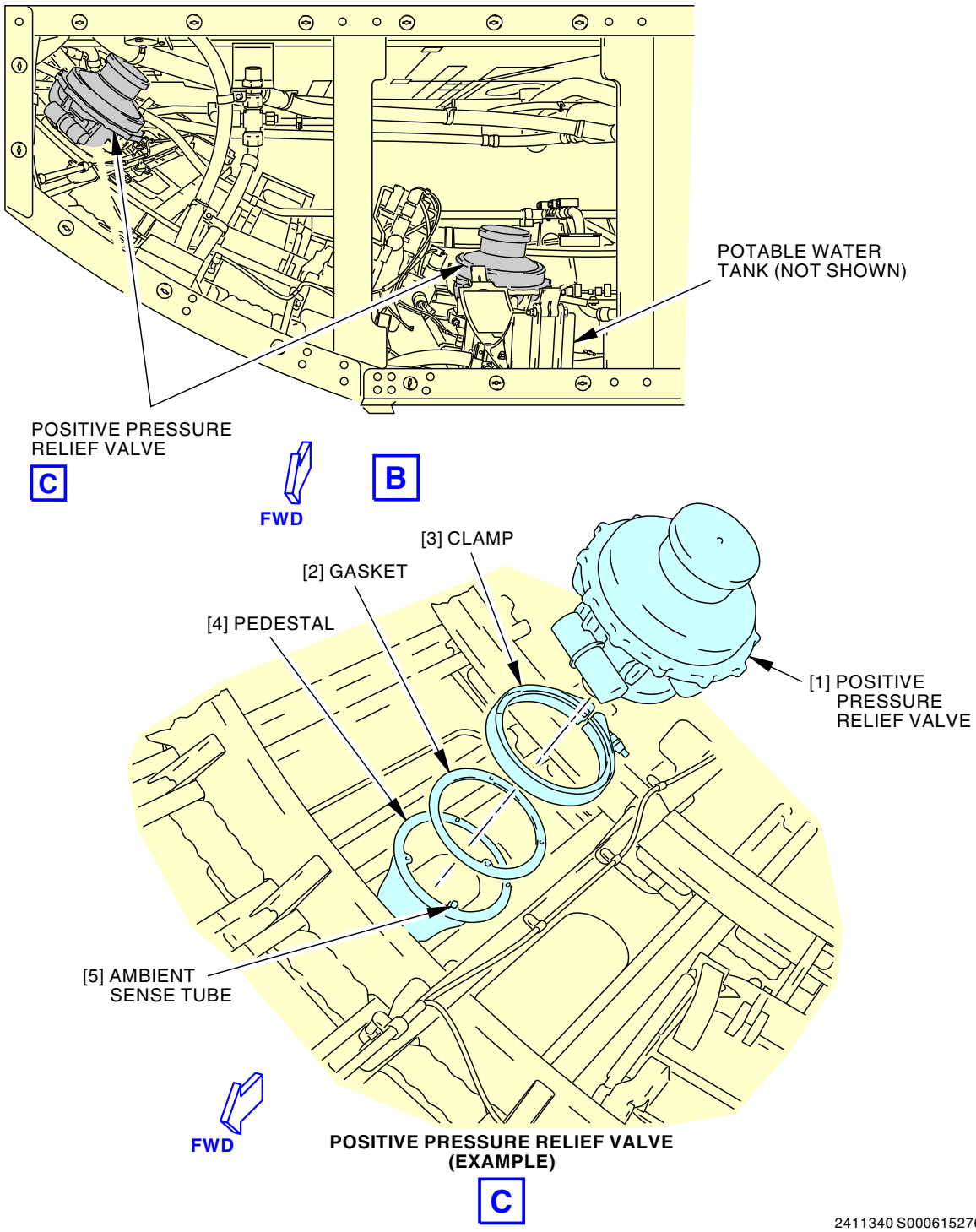
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**Positive Pressure Relief Valve Installation**
**Figure 401/21-32-01-990-801 (Sheet 1 of 2)**



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**Positive Pressure Relief Valve Installation**
**Figure 401/21-32-01-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-32-01-400-801**

## 3. Positive Pressure Relief Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-31-03-400-801 | Aft Outflow Valve Assembly Installation (P/B 401) |
| 21-32-01-700-801 | Positive Pressure Relief Valve - System Test with the Use of Hamilton Sundstrand Test Equipment (P/B 501) |
| 21-32-01-700-802 | Positive Pressure Relief Valve - System Test with the Use of Boeing Test Equipment (P/B 501) |
| 38-11-01-400-801 | Water Tank Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G50063 | Lubricant - PTFE Release Agent - Miller-Stephenson MS-122XD (Replaces MS-122DF) | |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Positive pressure relief valve | 21-32-01-01-010 | SIA ALL |
| 2 | Gasket | 21-32-01-01-030 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

### E. Positive Pressure Relief Valve Installation

**SUBTASK 21-32-01-640-001**

(1) Apply MS-122XD release agent, G50063 to the two sides of the gasket [2].

**SUBTASK 21-32-01-420-001**

**CAUTION**

MAKE SURE THAT YOU DO NOT GET UNWANTED MATERIALS IN THE AMBIENT SENSE TUBE WHEN YOU INSTALL THE GASKET. IF YOU GET UNWANTED MATERIALS IN THE AMBIENT SENSE TUBE, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(2) Install the gasket [2] on the pedestal [4].

**SUBTASK 21-32-01-420-002**

**CAUTION**

BE CAREFUL WHEN YOU INSTALL THE POSITIVE PRESSURE RELIEF VALVE ON THE PEDESTAL. DAMAGE COULD OCCUR TO THE AMBIENT SENSE TUBE.

(3) Put the positive pressure relief valve [1] in its position on the pedestal [4].

**SUBTASK 21-32-01-420-003**

(4) Put the clamp [3] in its position around the top of the pedestal [4] and the bottom of the positive pressure relief valve [1].

(a) Tighten the clamp [3] to 65 +5 / -0 in-lb (7 +1 / -0 N·m).



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SUBTASK 21-32-01-710-001

(5) To do the required post-installation test of the positive pressure relief valve [1] , do one of these tasks:

(a) Positive Pressure Relief Valve - System Test with the Use of Boeing Test Equipment, TASK 21-32-01-700-802

(b) Positive Pressure Relief Valve - System Test with the Use of Hamilton Sundstrand Test Equipment, TASK 21-32-01-700-801.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-32-01-410-001

(1) If removed, install the potable water tank (TASK 38-11-01-400-801).

SUBTASK 21-32-01-410-002

(2) If removed, install the aft outflow valve (TASK 21-31-03-400-801).

**——— END OF TASK ———**



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## POSITIVE PRESSURE RELIEF VALVE - ADJUSTMENT/TEST

### 1. General

A. This procedure has two tasks. Each task does a test to find the differential pressure when the positive pressure relief valve opens. The first task uses a Hamilton Sundstrand valve test fixture. The second task uses Boeing test equipment.

B. The two positive pressure relief valves are installed on the lower exterior part of the airplane near the aft entry door. One of the valves is above the aft outflow valve and one is below the aft outflow valve.

C. Each task is accomplished with the positive pressure relief valves installed on the aircraft. The task will make sure that the positive pressure relief valves can operate correctly at specific differential pressures if the pressure inside the airplane becomes too high as compared to the pressure outside the airplane. To accomplish this task, the differential pressure at which the valve is designed to relieve is simulated with ground test equipment.

**TASK 21-32-01-700-801**

### 2. Positive Pressure Relief Valve - System Test with the Use of Hamilton Sundstrand Test Equipment

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

#### A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-6692 | Vacuum Tank - Pressure Relief Valve Tester<br>Part #: A21010-203 Supplier: 81205<br>Part #: GS15047-1 Supplier: 99167<br>Opt Part #: A21010-187 Supplier: 81205<br>Opt Part #: A21010-188 Supplier: 81205<br>Opt Part #: A21010-189 Supplier: 81205<br>Opt Part #: A21010-190 Supplier: 81205 |
| STD-1114 | Air Source - Regulated, Dry, Filtered 0-150 PSIG with Pressure Gauge Range 0-100 PSIG, 1 PSIG Increment, and +/-1 PSI Minimum Accuracy |

#### B. Location Zones

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

#### C. Prepare for the Test

**SUBTASK 21-32-01-840-001**

(1) Make sure that there is no blockage or unwanted materials at these locations:

(a) The fuselage skin in the area of the relief valves.

(b) The overboard vent tube opening in the center of each relief valve.

(c) The ambient sense tube in the fuselage pedestal mount.

**SUBTASK 21-32-01-840-002**

(2) Close the pressure regulator on the pressure relief valve tester, SPL-6692.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-32-01-840-003

(3) Connect the Regulated Dry Filtered Air Source, STD-1114, to the pressure regulator of the pressure relief valve tester, SPL-6692.

## D. Positive Pressure Relief Valve System Test

NOTE: This test can only be done on one relief valve at a time. Do the test on the outboard relief valve, then do the test again on the inboard relief valve.

SUBTASK 21-32-01-730-001

(1) Do these steps to do a test of the positive pressure relief valve:

(a) Put the pressure relief valve tester, SPL-6692, on the relief valve on the fuselage.

(b) Put the locating crossbar on the pressure relief valve tester, SPL-6692, forward of the deflector tube on the relief valve and hold the fixture in position.

NOTE: The fixture is installed to make sure that the test fixture gasket is not on the opening in the valve.

(c) Open the air pressure regulator on the pressure relief valve tester, SPL-6692, to start the flow of air.

(d) Adjust the air pressure regulator so that the indication on the vacuum gage increases 2.21 psi/minute (15.24 kPa/minute) until the vacuum gage shows 7.76 psig (53.50 kPa).

**WARNING** MANUALLY HOLD THE TEST FIXTURE AGAINST THE FUSELAGE. WHEN THE VALVE OPENS, IT CAN CAUSE THE TEST FIXTURE TO FALL. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(e) When the vacuum gage shows 7.76 psig (53.50 kPa), manually hold the test fixture against the airplane fuselage.

(f) When the vacuum gage shows 7.76 psig (53.50 kPa), adjust the air pressure regulator to increase the vacuum in 0.05 psi (0.34 kPa) increments.

(g) Stop the increase of vacuum for 10 seconds between each increase of 0.05 psi (0.34 kPa).

(h) Continue the intermittent vacuum increases of 0.05 psi (0.34 kPa) until the valve opens as noted by these indications:

1) The cracking point pressure of the valve occurs when the vacuum gauge needle stops increasing, then suddenly decreases slightly, then increases slightly again and then stabilizes.

(i) Monitor the indication on the vacuum gage when the valve opens.

(j) Make sure that the valve opens to 8.69 psig (59.92 kPa) - 9.09 psig (62.67 kPa) (17.7 - 18.5 inches Hg).

(k) If the pressure relief valve cracks open at a vacuum gauge indication greater than 9.09 psig (62.67 kPa) (18.5 inches of Hg), make sure that there are no leaks anywhere on the valve test fixture.

(l) Adjust the vacuum regulator valve to decrease the differential pressure to approximately 7.5 psid (51.7 kPa) - 7.0 psid (48.3 kPa) (15.04 - 14.02 inches Hg) at a rate not more than 2.00 psig/minute (13.79 kPa/minute) (4.07 inches Hg/minute).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the relief valve closes.

NOTE: The indication that the relief valve has closed is seen on the differential pressure gauge when the gauge stops, and then starts to increase and then becomes stable.

(m) Adjust the air pressure regulator to reduce the indication on the vacuum gage to 0 psig (0 kPa) (0 inches Hg) at a rate of 4.0 psig/minute (27.58 kPa/minute) (8.14 inches Hg/minute) or slower.

(n) Close the pressure regulator on the pressure relief valve tester, SPL-6692.

(o) Remove the pressure relief valve tester, SPL-6692, from the airplane.

(p) Disconnect the Regulated Dry Filtered Air Source, STD-1114, from the pressure regulator.

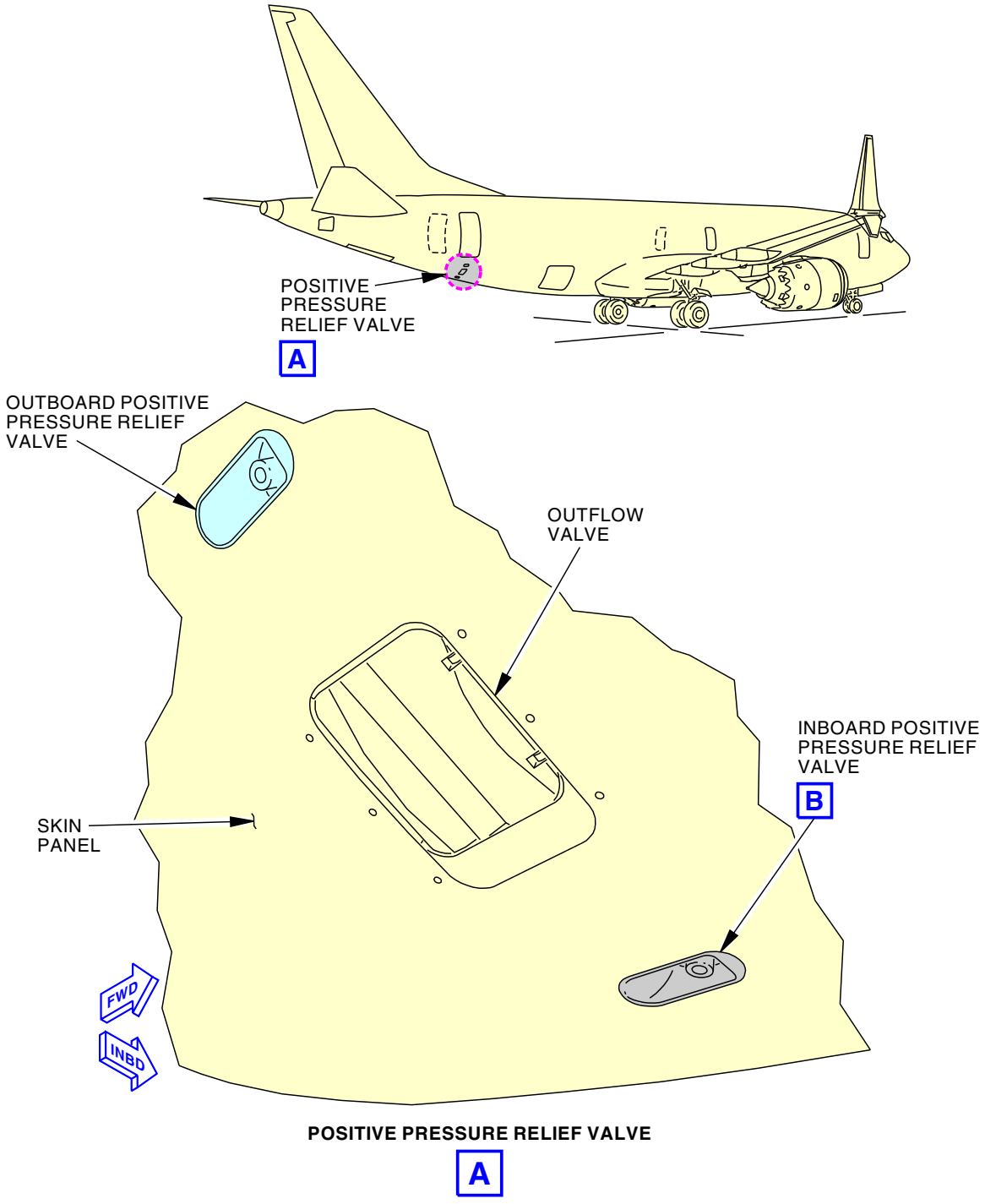
**SUBTASK 21-32-01-730-002**

(2) Do the test for the other relief valve.

**——— END OF TASK ———**



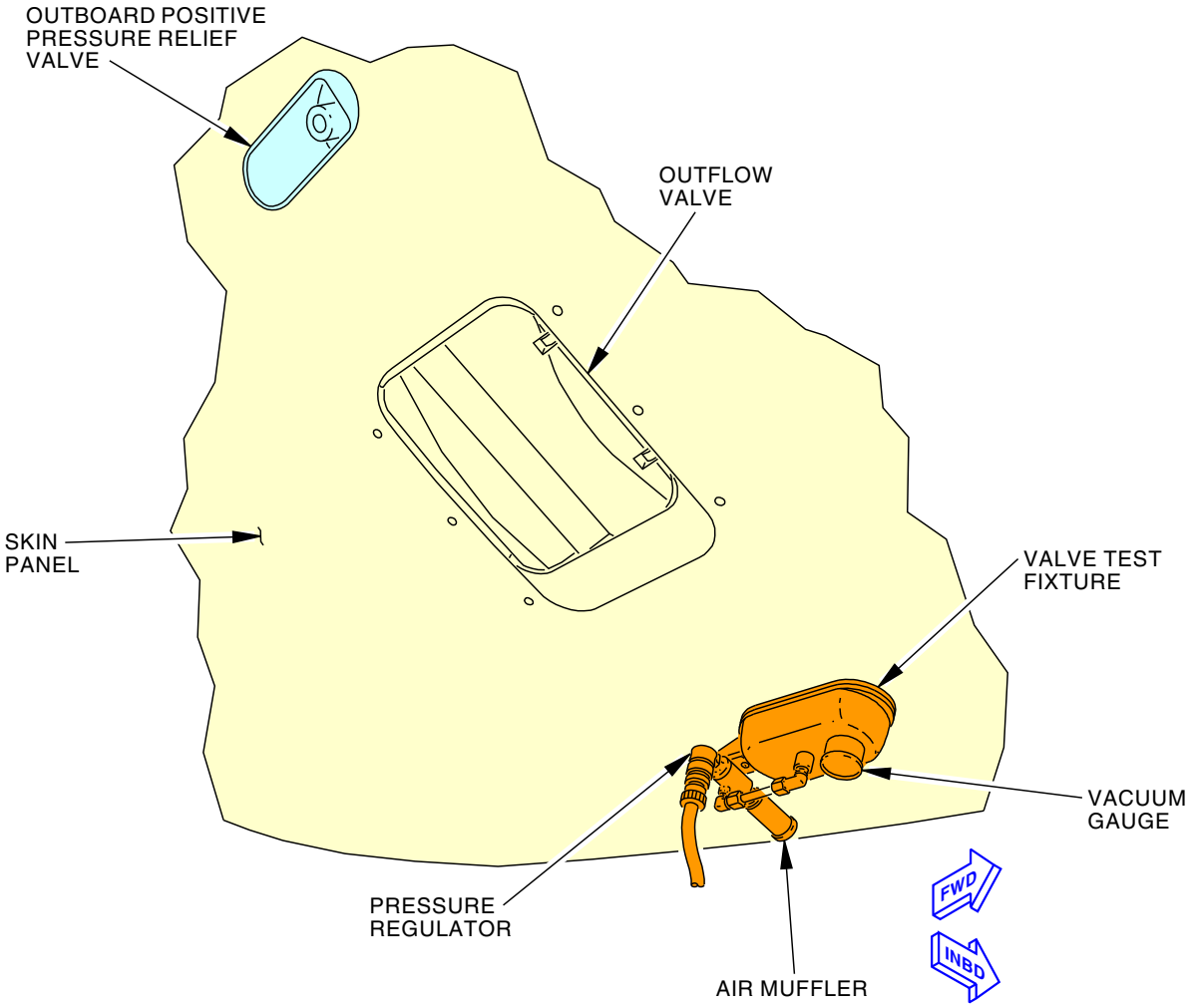
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Positive Pressure Relief Valve Test Setup**
**Figure 501/21-32-01-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**GS15047-1 POSITIVE RELIEF VALVE TEST FIXTURE**

B

2411342 S00061527674_V1

**Positive Pressure Relief Valve Test Setup**
**Figure 501/21-32-01-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-32-01-700-802**

## 3. Positive Pressure Relief Valve - System Test with the Use of Boeing Test Equipment

(Figure 502)

NOTE: This procedure is a scheduled maintenance task.

### A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-6692 | Vacuum Tank - Pressure Relief Valve Tester<br>Part #: A21010-203 Supplier: 81205<br>Part #: GS15047-1 Supplier: 99167<br>Opt Part #: A21010-187 Supplier: 81205<br>Opt Part #: A21010-188 Supplier: 81205<br>Opt Part #: A21010-189 Supplier: 81205<br>Opt Part #: A21010-190 Supplier: 81205 |
| STD-1114 | Air Source - Regulated, Dry, Filtered 0-150 PSIG with Pressure Gauge Range 0-100 PSIG, 1 PSIG Increment, and +/-1 PSI Minimum Accuracy |

### B. Location Zones

| Zone | Area |
|---|---|
| 146 | Aft Cargo Compartment Equipment Bay - Right |

### C. Prepare for the Test

**SUBTASK 21-32-01-210-001**

(1) Make sure that there is no blockage or unwanted materials at these locations:

(a) The fuselage skin in the area of the relief valve.

(b) The overboard vent tube opening in the center of each relief valve.

(c) The ambient sense tube in the fuselage pedestal mount.

### D. Positive Pressure Relief Valve System Test

NOTE: This test can only be done on one relief valve at a time. Do the test on the outboard relief valve, then do the test again on the inboard relief valve.

**SUBTASK 21-32-01-480-001**

(1) Do these steps to connect the pressure relief valve tester, SPL-6692, to the relief valve:

(a) Make sure that all the valves on the pressure relief valve tester, SPL-6692, are closed.

(b) Connect the Regulated Dry Filtered Air Source, STD-1114, to the quick-disconnect connection on the pressure relief valve tester, SPL-6692.

(c) Adjust the air control valve on the pressure relief valve tester, SPL-6692, until the indication on the pressure gage is 60 psi (414 kPa) - 80 psi (552 kPa).

(d) Adjust the vacuum regulator valve until the differential pressure is approximately 2.0 psi (13.8 kPa) (4.07 in/Hg).

NOTE: Turn the vacuum regulator valve counter-clockwise to increase the vacuum (differential pressure). The arrow on the vacuum regulator valve indicates an increase of pressure not vacuum.



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(e) Put and hold the vacuum head assembly over the relief valve, and open the vacuum head assembly valve.

1) Make sure that the vacuum head assembly is sealed to the airplane skin.

SUBTASK 21-32-01-730-003

(2) Do these steps to find the differential pressure when the relief valve opens:

(a) Adjust the vacuum regulator valve so the indication on the vacuum rate gage does not exceed 2.4 psi/minute (16.5 kPa/minute).

**WARNING** YOU MUST HOLD THE VACUUM HEAD ASSEMBLY MANUALLY AGAINST THE AIRPLANE FUSELAGE WHEN THE DIFFERENTIAL PRESSURE GAGE INDICATION IS 8.25 PSID (56.88 KPA). WHEN THE VALVE OPENS, THE VACUUM HEAD ASSEMBLY CAN FALL FROM THE FUSELAGE SURFACE. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN OCCUR.

(b) When the differential pressure gage shows 8.25 psid (56.88 kPa), manually hold the vacuum head assembly against the fuselage.

(c) When the differential pressure gage shows 8.25 psid (56.88 kPa), adjust the vacuum regulator valve to increase the differential pressure in 0.05 psi (0.34 kPa) increments.

(d) Stop the increase of vacuum for 10 seconds between each increase of 0.05 psid (0.34 kPa).

(e) Continue the intermittent vacuum increases of 0.05 psid (0.34 kPa) until the relief valve opens.

(f) Monitor the indication on the differential pressure gage when the relief valve opens.

NOTE: The indication that the relief valve has opened is seen on the differential pressure gage when the pressure starts to decrease.

(g) Make sure that the valve opens at a differential pressure of 8.69 psid (59.92 kPa) - 9.09 psid (62.67 kPa) (17.7 in/Hg - 18.5 in/Hg).

NOTE: When the valve opens the differential pressure will decrease to near 0 psid.

(h) If the relief valve opens at a differential pressure more than 9.09 psid (62.67 kPa) (18.5 in/Hg), make sure that there are no leaks at any of the tubing connections on the vacuum tank assembly.

(i) Adjust the vacuum regulator valve to decrease the differential pressure to approximately 7.5 psig (51.7 kPa) - 7.0 psig (48.3 kPa) (15.04 in/Hg - 14.02 in/Hg) at a rate not more than 2.00 psig/minute (13.79 kPa/minute) (4.07 inches Hg/minute).

1) Make sure that the relief valve closes.

NOTE: The indication that the relief valve has closed is seen on the differential pressure gage when the gage stops, and then starts to increase and then becomes stable.

SUBTASK 21-32-01-080-001

(3) Adjust the vacuum regulator valve fully clockwise and reduce the differential pressure to 0 psig (0 kPa) (0 in/Hg), at a rate of 4.0 psig/minute (27.58 kPa/minute) (8.14 inches Hg/minute) or slower.

SUBTASK 21-32-01-080-002

(4) Close the vacuum head assembly valve and remove the vacuum head assembly.



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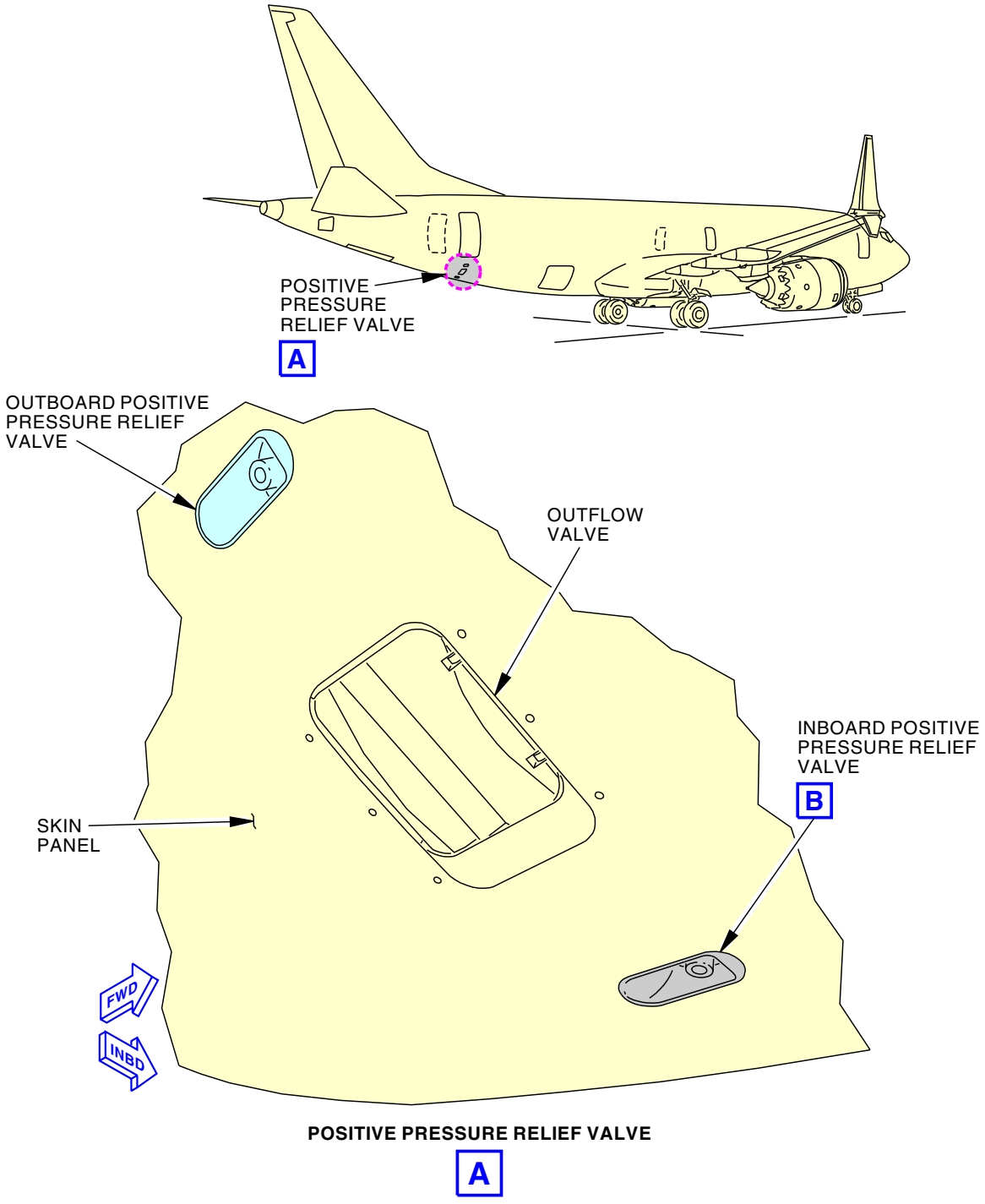
SUBTASK 21-32-01-730-004

(5) Do the test for the other relief valve.

END OF TASK



ECCN 9E991 BOEING PROPRIETARY - See title page for details

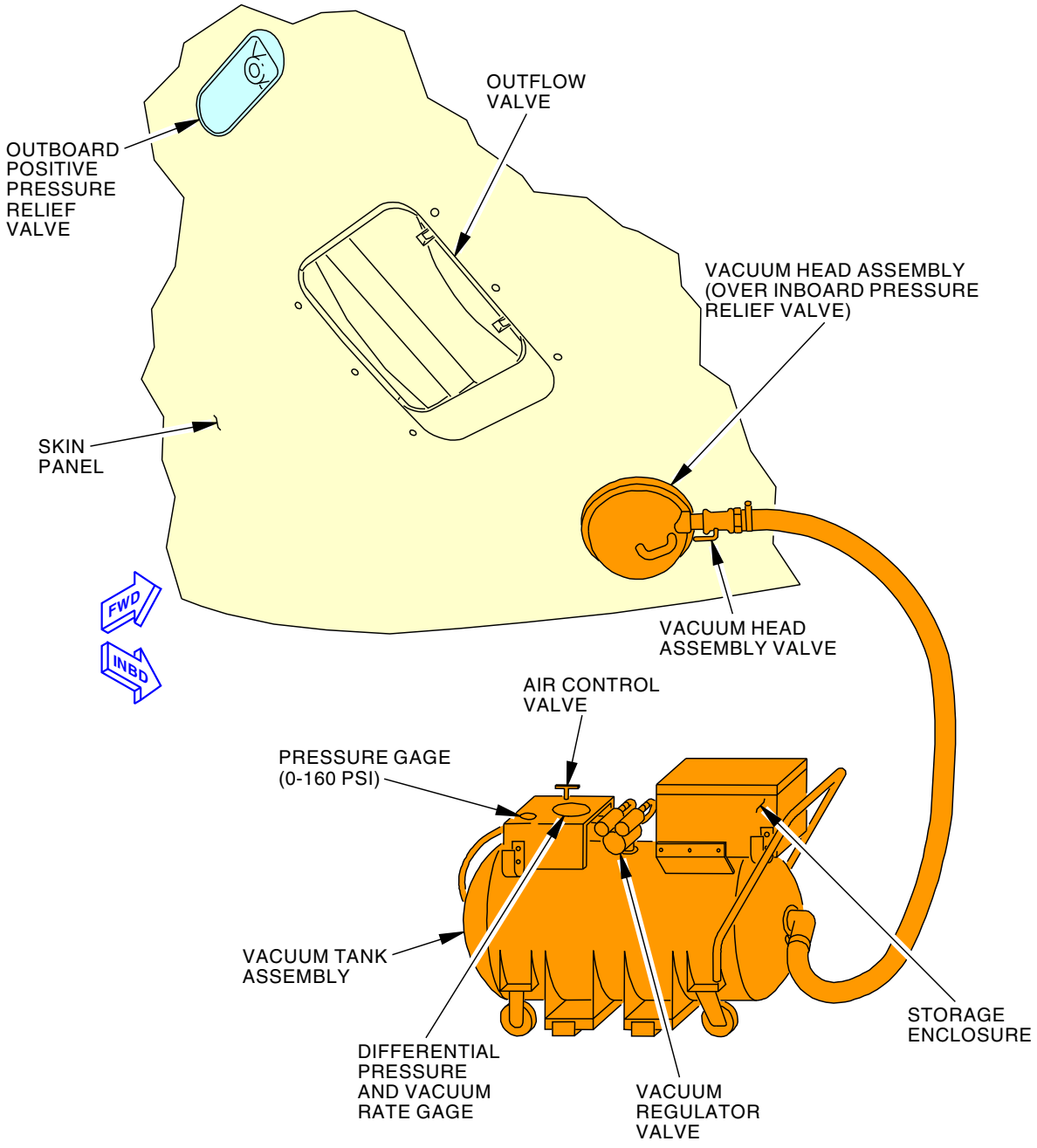



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**Positive Pressure Relief Valve Test Setup**
**Figure 502/21-32-01-990-803 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**A21010 VACUUM TANK - RELIEF VALVE TEST**

B

2411343 S00061527676_V1

**Positive Pressure Relief Valve Test Setup**
**Figure 502/21-32-01-990-803 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## POSITIVE PRESSURE RELIEF VALVE FILTER - REMOVAL/INSTALLATION

### 1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has these tasks:

(1) Positive pressure relief valve filter removal.

(2) Positive pressure relief valve filter installation.

C. Two positive pressure relief valves are installed in the aft cargo compartment behind just inboard and outboard of the aft outflow valve. One filter is installed on the top side of each positive pressure relief valve.

**TASK 21-32-02-000-801**

### 2. Positive Pressure Relief Valve Filter Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

#### A. References

| Reference | Title |
|---|---|
| 21-31-03-000-801 | Aft Outflow Valve Assembly Removal (P/B 401) |
| 38-11-01-000-801 | Water Tank Removal (P/B 401) |
| 50-12-02-000-801 | Aft Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 53-21-00-000-801 | Passenger Cabin Floor Panel Removal (P/B 401) |

#### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B50073 | Alcohol - Isopropyl | ASTM D 770 |
| G00624 | Bag - Plastic, General Purpose | |
| G50140 | Gloves - Protective, Latex or Nitrile | |

#### D. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |

#### E. Prepare for the Removal

**SUBTASK 21-32-02-010-001**

(1) Remove the cargo compartment liner on the aft bulkhead of the aft cargo compartment to get access to the positive pressure relief valves [1] (TASK 50-12-02-000-801).

**SUBTASK 21-32-02-010-002**

(2) Do one of these steps to get access to the positive pressure relief valve [1]:

(a) Remove the potable water tank (TASK 38-11-01-000-801).

(b) Remove the aft outflow valve (TASK 21-31-03-000-801).



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(c) Remove the applicable floor panels above the positive pressure relief valve [1] (TASK 53-21-00-000-801).

SUBTASK 21-32-02-940-001

**WARNING** PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(3) Before you touch the positive pressure relief valve filter [3], put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140.

SUBTASK 21-32-02-500-001

(4) Select a plastic bag, G00624, larger than the filters and tape suitable for sealing the bag closed.

## F. Positive Pressure Relief Valve Filter Removal

SUBTASK 21-32-02-020-001

(1) Remove the cover [4] from the top of the positive pressure relief valve [1].

SUBTASK 21-32-02-020-002

(2) Remove the filter [3] and packing [2] from the positive pressure relief valve [1].

SUBTASK 21-32-02-020-003

**WARNING** DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) If it is possible, slide plastic bag, G00624, over the filter [3] with the packing [2] when removing filter from the positive pressure relief valve [1] to minimize contamination.

(a) Seal the bag closed with a tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(b) Discard the bag with the filter.

NOTE: Refer to the airline, local health, safety and regulatory procedures for the disposal of material.



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## G. Post-Filter Removal Cleanup

SUBTASK 21-32-02-670-002

**WARNING** ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE. USE PROTECTION EQUIPMENT. MAKE SURE THAT YOU USE ISOPROPYL ALCOHOL IN AN AREA WITH AIRFLOW. IF YOU DO NOT OBEY, INJURY TO PERSONNEL CAN OCCUR.

(1) Disinfect the filter cover, filter housing and exterior surfaces of the valve with alcohol, B50073.

NOTE: Refer to the Environmental Protection Agency (EPA) List N or local health authority guidance for required contact/dwell time for Isopropyl Alcohol to be used as a disinfectant.

SUBTASK 21-32-02-670-001

(2) Disinfect all tools used for filter replacement. Refer to the airline procedure and policies for the disinfecting of tools.

SUBTASK 21-32-02-020-004

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) Remove the personal protective equipment and put them in plastic bag, G00624.

(a) Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(b) Discard the bag with the personal protective equipment.

NOTE: Refer to the airline, local health, safety and regulatory procedures for disposal of material.

SUBTASK 21-32-02-110-001

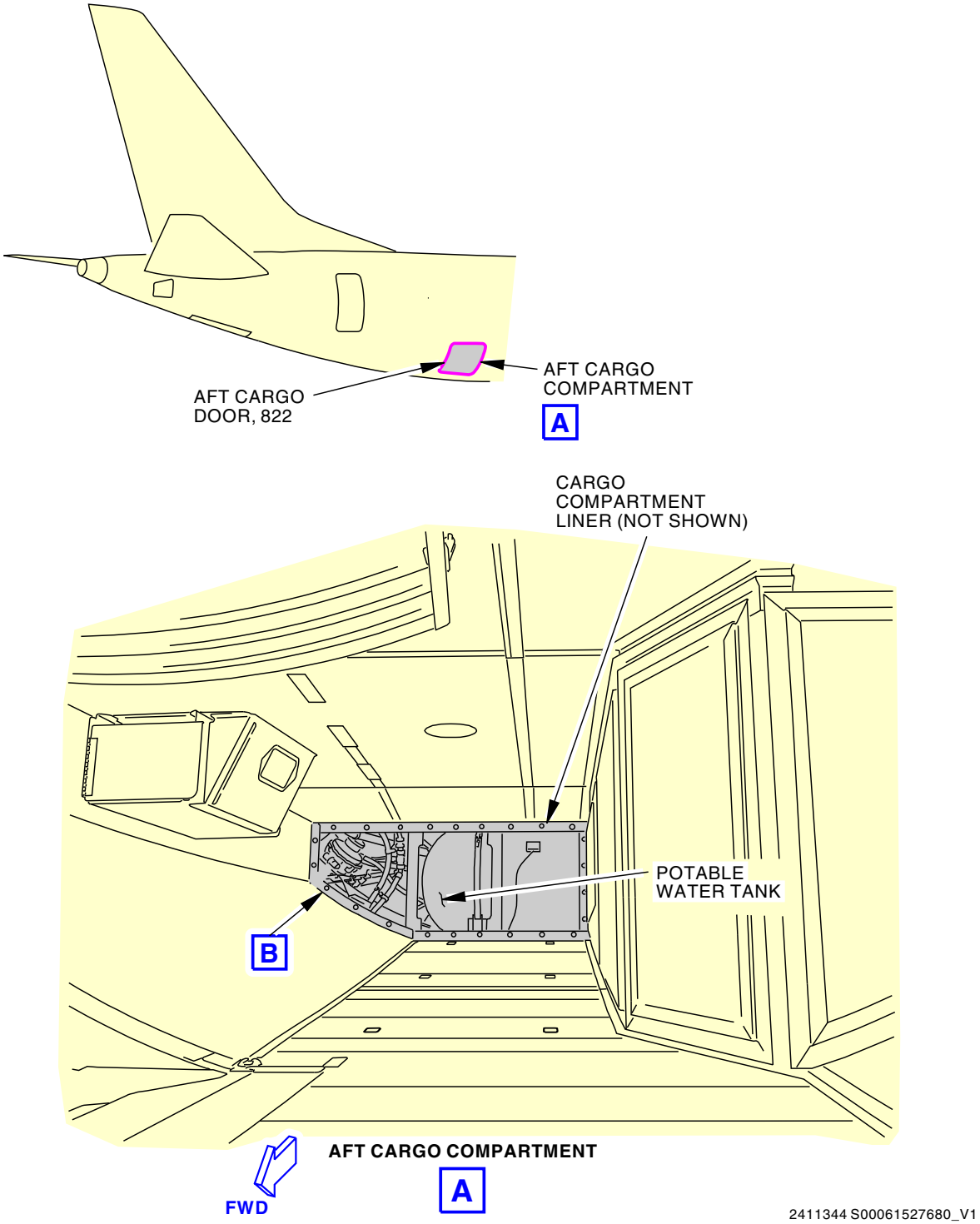
**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(4) Clean your hands with soap and running hot water.

**END OF TASK**



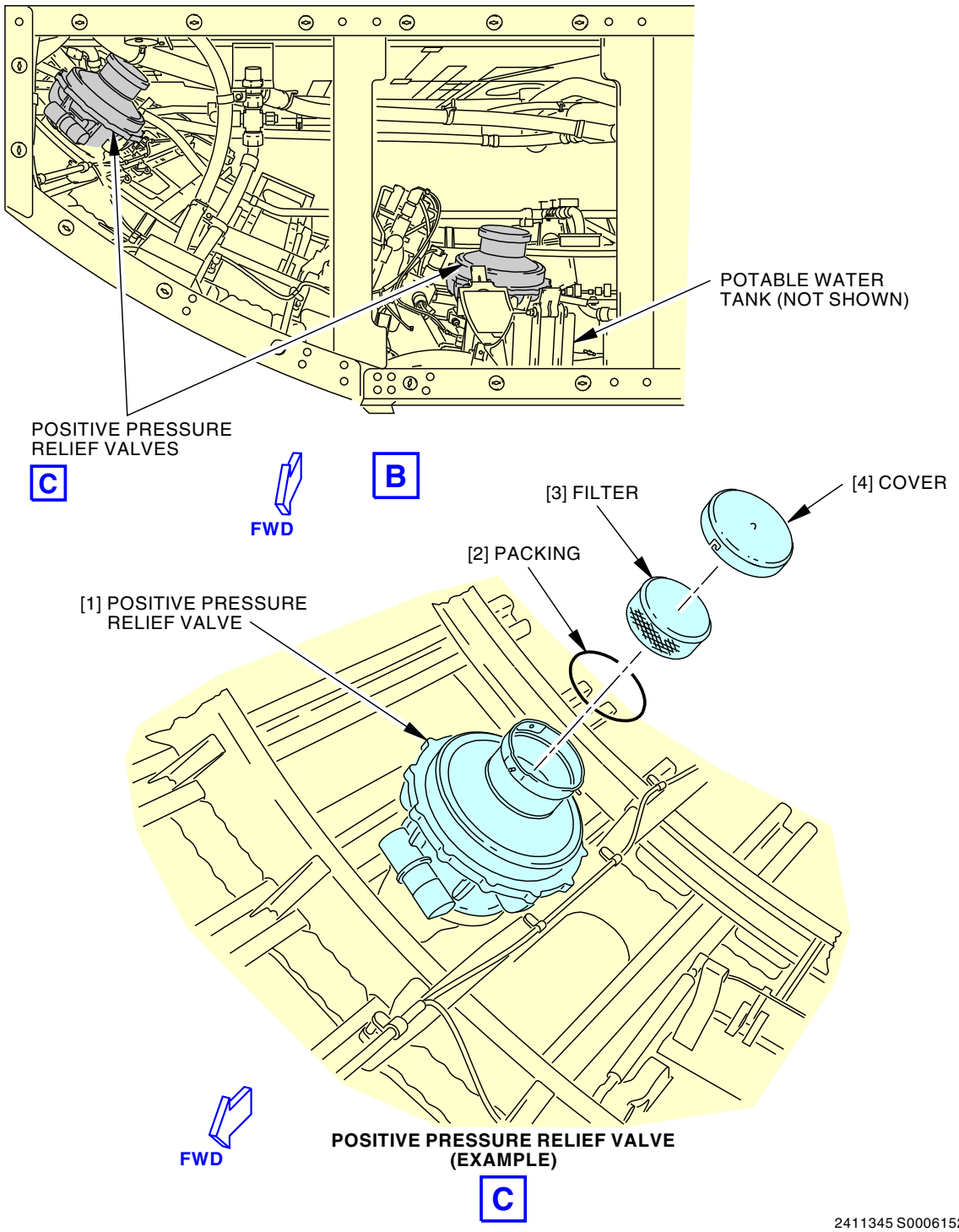
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Positive Pressure Relief Valve Filter Installation**
**Figure 401/21-32-02-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Positive Pressure Relief Valve Filter Installation**
**Figure 401/21-32-02-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-32-02-400-801**

**3. Positive Pressure Relief Valve Filter Installation**

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 21-31-03-400-801 | Aft Outflow Valve Assembly Installation (P/B 401) |
| 38-11-01-400-801 | Water Tank Installation (P/B 401) |
| 50-12-02-400-801 | Aft Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |
| 53-21-00-400-801 | Passenger Cabin Floor Panel Installation (P/B 401) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Packing | 21-32-02-01-015 | SIA ALL |
| 3 | Filter | 21-32-02-01-020 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |

**D. Positive Pressure Relief Valve Filter Installation**

**SUBTASK 21-32-02-420-001**

(1) Install new filter [3] and new packing [2] in the top of the positive pressure relief valve [1].

**SUBTASK 21-32-02-420-002**

(2) Install and turn the cover [4] until it snaps into position.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-32-02-410-001**

(1) If it is removed, install the potable water tank (TASK 38-11-01-400-801).

**SUBTASK 21-32-02-410-003**

(2) If it is removed, install the aft outflow valve (TASK 21-31-03-400-801).

**SUBTASK 21-32-02-410-004**

(3) If it is removed, install the floor panels above the positive pressure relief valve [1] (TASK 53-21-00-400-801).

**SUBTASK 21-32-02-410-002**

(4) Install the aft bulkhead liner (TASK 50-12-02-400-801).

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## NEGATIVE PRESSURE RELIEF VALVE - MAINTENANCE PRACTICES

### 1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has these tasks:

(1) Negative pressure relief valve removal

(2) Negative pressure relief valve installation

(3) Negative pressure relief valve adjustment/test.

**TASK 21-32-03-000-801**

### 2. Negative Pressure Relief Valve Removal

(Figure 201)

#### A. References

| Reference | Title |
|---|---|
| 50-10-02-000-801 | Cargo Compartment Sidewall Liners Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |

#### C. Prepare for the Removal

**SUBTASK 21-32-03-010-001**

(1) Open the aft cargo compartment door.

**SUBTASK 21-32-03-010-002**

(2) Remove the sidewall liner on the right side of the aft cargo compartment, just forward of the aft bulkhead (TASK 50-10-02-000-801).

#### D. Negative Pressure Relief Valve Removal

**SUBTASK 21-32-03-020-001**

(1) Do these steps to remove the door assembly [6] from the frame:

(a) Remove the nut [5] and washer [4] from the end of the bolt [1].

(b) Remove the bolt [1] and washer [2].

(c) Remove the bushing [3] from the frame.

(d) Carefully lower the door assembly [6] and disengage the end of the spring [7] from the hole in the frame.

1) Hold the end of the spring [7] as you disengage it from the hole in the frame so that it does not move suddenly when it is free from the frame hole.

**SUBTASK 21-32-03-020-002**

(2) Do these steps to remove the spring [7] from the door assembly [6]:

(a) Remove the nut [14] and washer [13] from the end of the bolt [10].

(b) Remove the bolt [10] and washer [11].

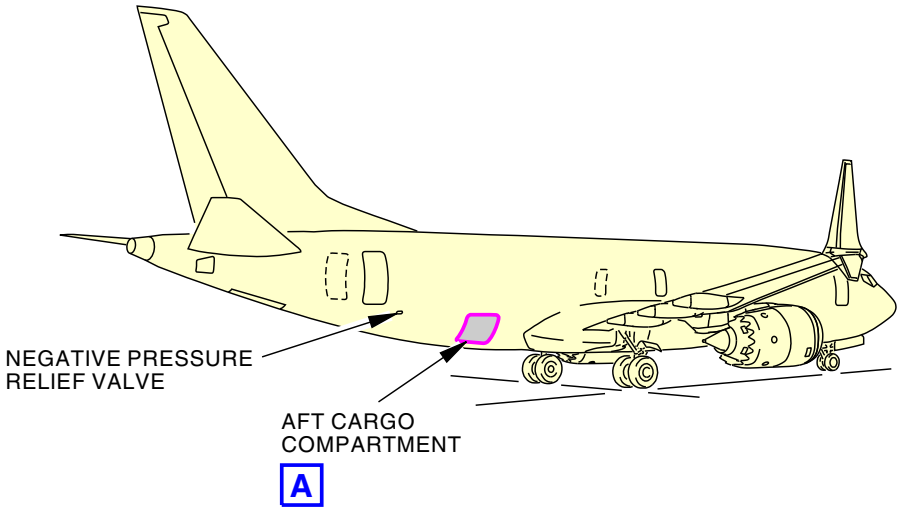
(c) Remove the retainer [9] and shim [12].

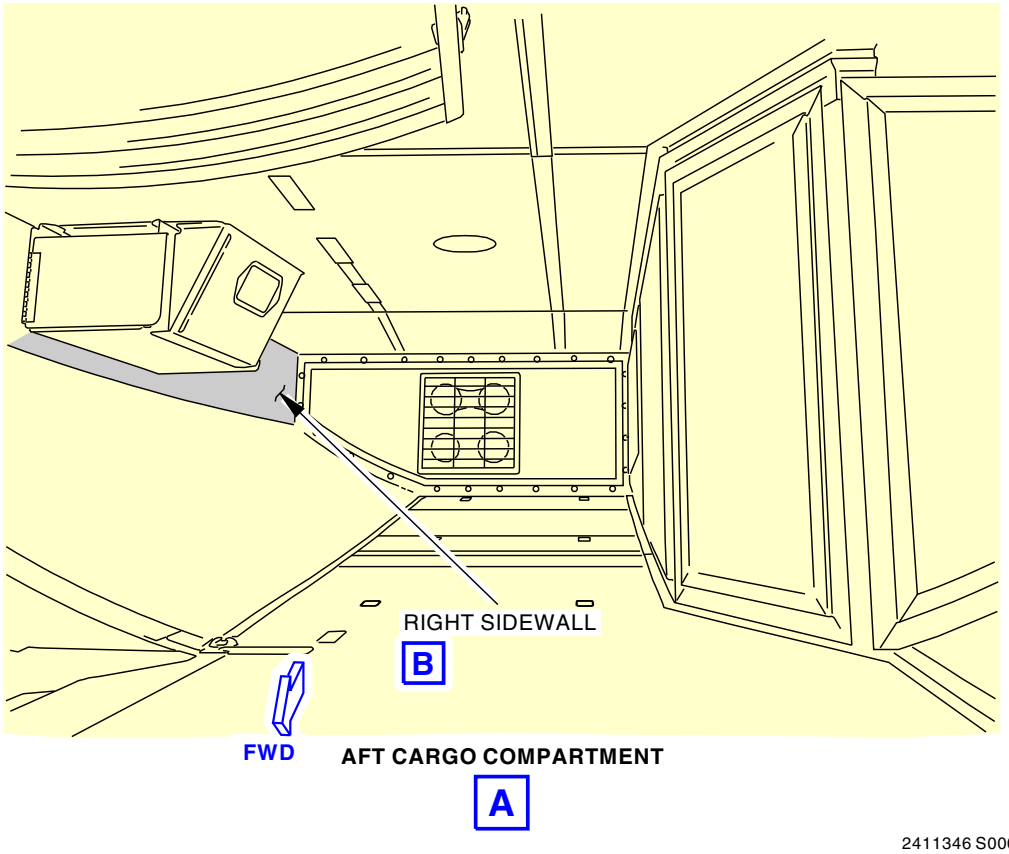
(d) Remove the spring support [8] and spring [7].

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



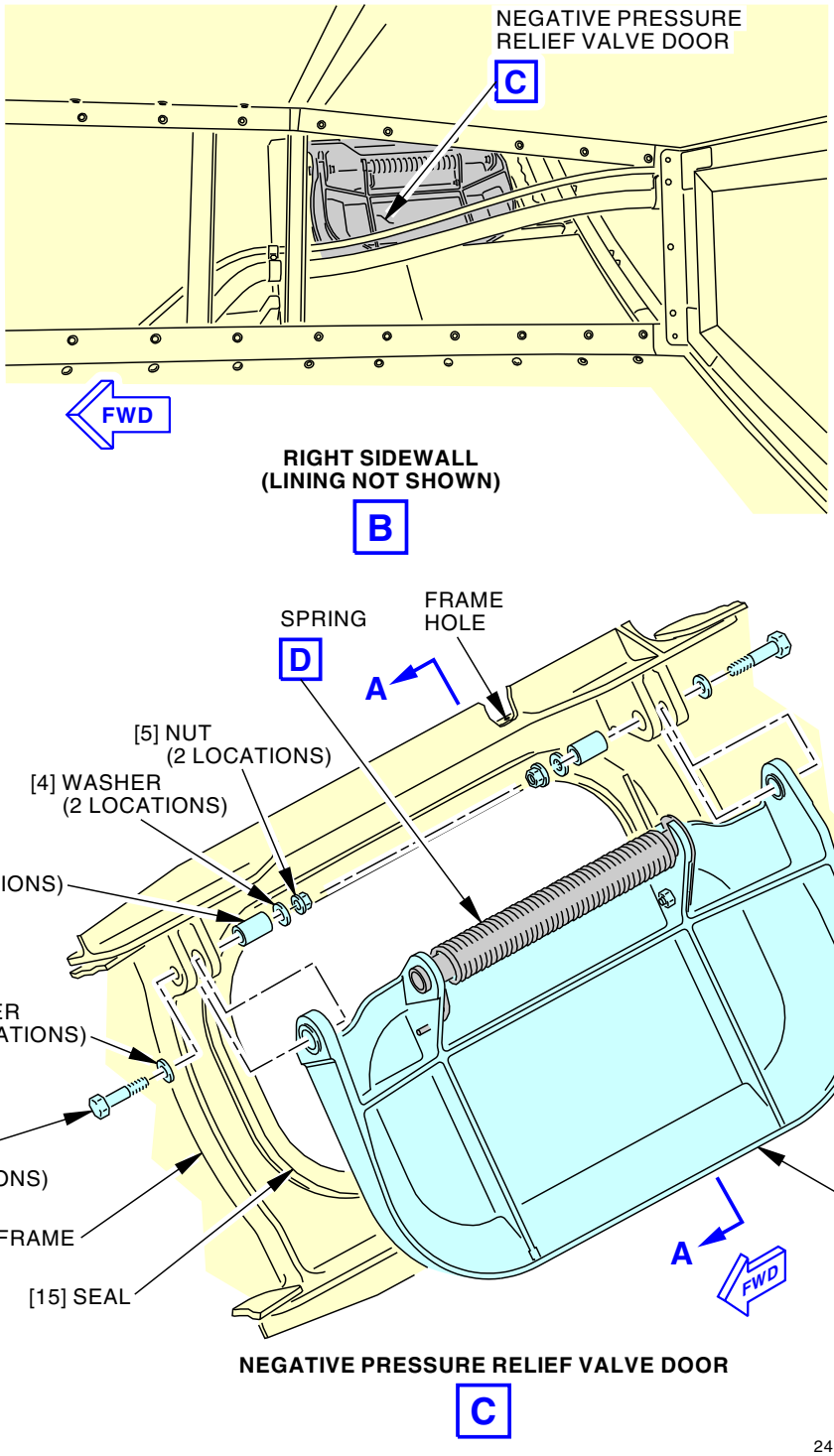




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**Negative Pressure Relief Valve Installation**
**Figure 201/21-32-03-990-801 (Sheet 1 of 3)**



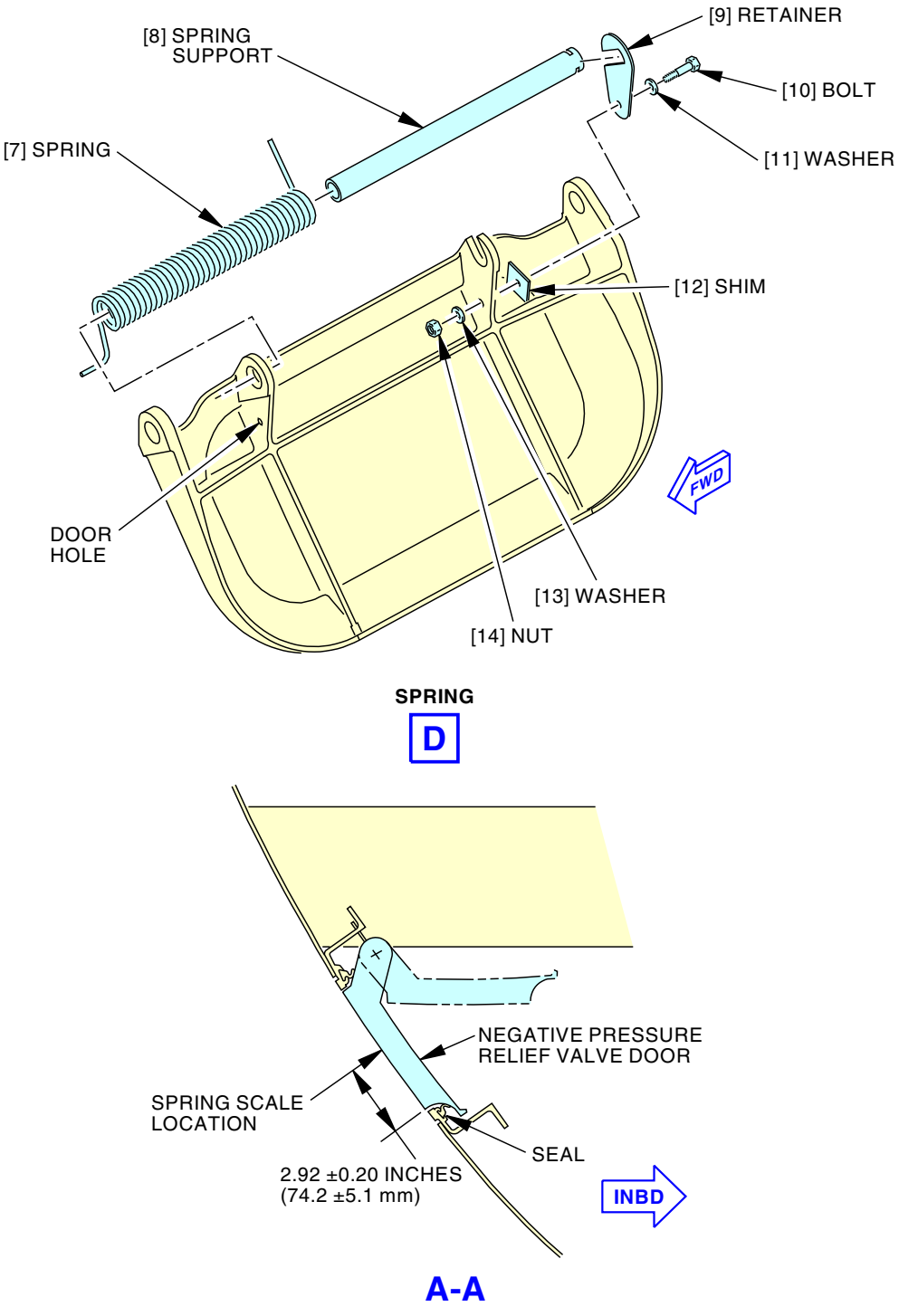
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Negative Pressure Relief Valve Installation**
**Figure 201/21-32-03-990-801 (Sheet 2 of 3)**



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**Negative Pressure Relief Valve Installation**
**Figure 201/21-32-03-990-801 (Sheet 3 of 3)**



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**TASK 21-32-03-400-801**

## 3. Negative Pressure Relief Valve Installation

(Figure 201)

### A. References

| Reference | Title |
|---|---|
| 50-10-02-400-801 | Cargo Compartment Sidewall Liners Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00013 | Grease - Aircraft And Instrument Grease | MIL-PRF-23827 (NATO G-354) (Supersedes MIL-G-23827) |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 6 | Door assembly | 21-32-03-01-100 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |

### E. Negative Pressure Relief Valve Installation

**SUBTASK 21-32-03-420-001**

(1) Do the steps which follow to install the spring [7] on the door assembly [6]:

(a) Put the spring [7] on the spring support [8].

(b) Put the end of the spring [7] in the door hole.

(c) Put the end of the spring support [8] in the large hole in the door.

(d) Turn the spring [7] approximately one full turn and hold it in that position.

(e) Put the free end of the spring support [8] in the slot of the door assembly [6].

(f) Slowly release the free end of the spring [7] until it rests against the edge of the door assembly [6].

(g) Put the shim [12] and the retainer [9] in their position.

(h) Install the bolt [10] and washer [11].

(i) Install the washer [13] and nut [14].

1) Tighten the nut [14] to 20 in-lb (2.3 N·m) – 25 in-lb (2.8 N·m).

**SUBTASK 21-32-03-210-001**

(2) Examine the condition of the seal [15] and replace it if it is damaged.

**SUBTASK 21-32-03-420-002**

(3) Do the steps which follow to install the door assembly [6] in the frame:

(a) Lubricate the bolt [1] with the grease, D00013.

(b) Put the door assembly [6] in its position.

1) Hold the door assembly [6] in an approximately 45° open position while you turn the free end of the spring [7] and insert it into the frame hole.

(c) Install the bushing [3].

(d) Install the bolt [1] and washer [2].



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(e) Install the washer [4] and nut [5].

1) Tighten the nut [5] to 60 in-lb (6.8 N·m) – 70 in-lb (7.9 N·m).

SUBTASK 21-32-03-720-001

(4) Do this task: Negative Pressure Relief Valve Adjustment/Test, TASK 21-32-03-700-801.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-32-03-410-001

(1) Install the sidewall liner (TASK 50-10-02-400-801).

——— END OF TASK ———

**TASK 21-32-03-700-801**

**4. Negative Pressure Relief Valve Adjustment/Test**

(Figure 201)

NOTE: This procedure is a scheduled maintenance task.

**A. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-753 | Scale - Push/Pull, 0-25 pound (0-11 kilogram) Capacity, 1/4 pound (113 gram) Accuracy |

**B. Location Zones**

| Zone | Area |
|---|---|
| 142 | Aft Cargo Compartment - Right |

**C. Procedure**

SUBTASK 21-32-03-480-001

(1) On the external surface of the airplane, hold the push/pull scale 0-25 pound (0-11 kilogram), STD-753, against the relief valve (View A-A, Figure 201).

(a) Put the push/pull scale 0-25 pound (0-11 kilogram), STD-753, at approximately the center of the relief valve door and 2.92 ±0.20 in. (74.2 ±5.1 mm) above the lower edge of the relief valve door.

SUBTASK 21-32-03-720-002

(2) Slowly push the push/pull scale 0-25 pound (0-11 kilogram), STD-753, against the relief valve door.

(a) Keep the push/pull scale 0-25 pound (0-11 kilogram), STD-753, at approximately a 90° angle to the relief valve door.

SUBTASK 21-32-03-720-003

(3) Make sure the relief valve door starts to open when the push/pull scale 0-25 pound (0-11 kilogram), STD-753, shows between 4 lbf (17.8 N) and 8 lbf (35.6 N).

SUBTASK 21-32-03-720-004

(4) Continue to push the relief valve door to the full open position.

(a) Make sure the door moves smoothly without any binding.

SUBTASK 21-32-03-720-005

(5) Make sure the push/pull scale 0-25 pound (0-11 kilogram), STD-753, shows between 8 lbf (35.6 N) and 10.5 lbf (46.7 N) when the relief valve door is in the full open position.

NOTE: The door will be at an 80° angle in the full open position.


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SUBTASK 21-32-03-720-006

(6) Slowly release the relief valve door until it is in the closed position.

SUBTASK 21-32-03-080-001

(7) Remove the push/pull scale 0-25 pound (0-11 kilogram), STD-753.

——— END OF TASK ———



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## CARGO COMPARTMENT BLOWOUT PANELS - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the cargo compartment ceiling blowout panels.

(2) An installation of the cargo compartment ceiling blowout panels.

(3) A removal of the cargo compartment bulkhead blowout panels.

(4) An installation of the cargo compartment bulkhead blowout panels.

B. There are three ceiling blowout panels, two in the aft cargo compartment and one in the forward cargo compartment.

C. There are seven bulkhead blowout panels, three in the forward cargo forward bulkhead, three in the forward cargo aft bulkhead and one in the aft cargo compartment waste tank enclosure.

**TASK 21-32-05-000-801**

### 2. Ceiling Blowout Panel Removal

(Figure 401)

#### A. Location Zones

| Zone | Area |
|---|---|
| 122 | Forward Cargo Compartment - Right |
| 142 | Aft Cargo Compartment - Right |

#### B. Prepare for the Removal

**SUBTASK 21-32-05-010-001**

(1) Do this step to access the blowout panels [1] in the forward cargo compartment:

(a) Open the forward cargo door.

**SUBTASK 21-32-05-010-002**

(2) Do this step to access the blowout panels [1] in the aft cargo compartment:

(a) Open the aft cargo door.

#### C. Ceiling Blowout Panel Removal

**SUBTASK 21-32-05-020-001**

(1) Remove the screws [3] on one of the cap strips [4].

**SUBTASK 21-32-05-020-002**

(2) Remove the cap strip [4].

**SUBTASK 21-32-05-020-003**

(3) Loosen the screws [2] on the remaining three cap strips [4].

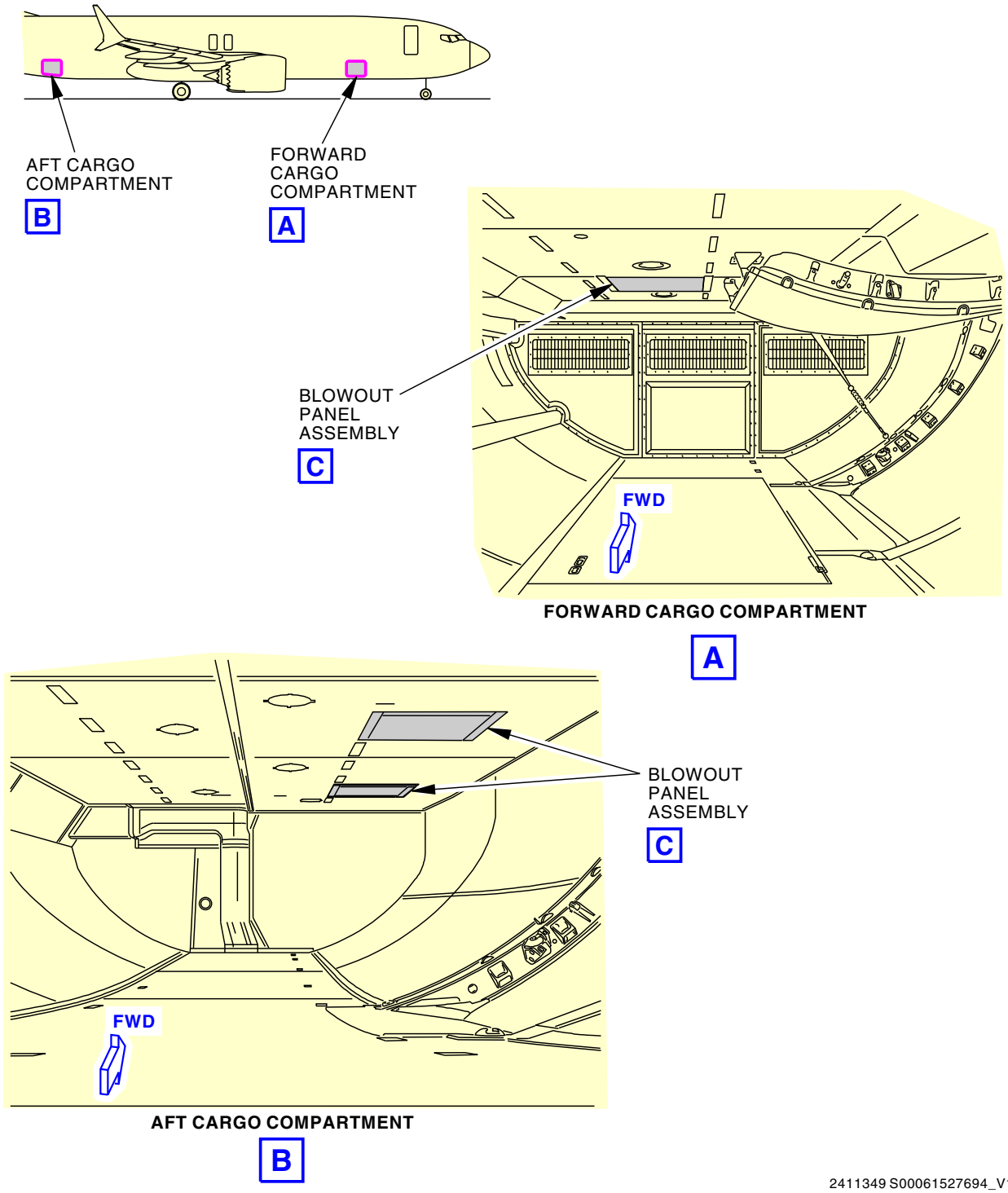
**SUBTASK 21-32-05-020-004**

(4) Slide out the blowout panel [1].

**END OF TASK**



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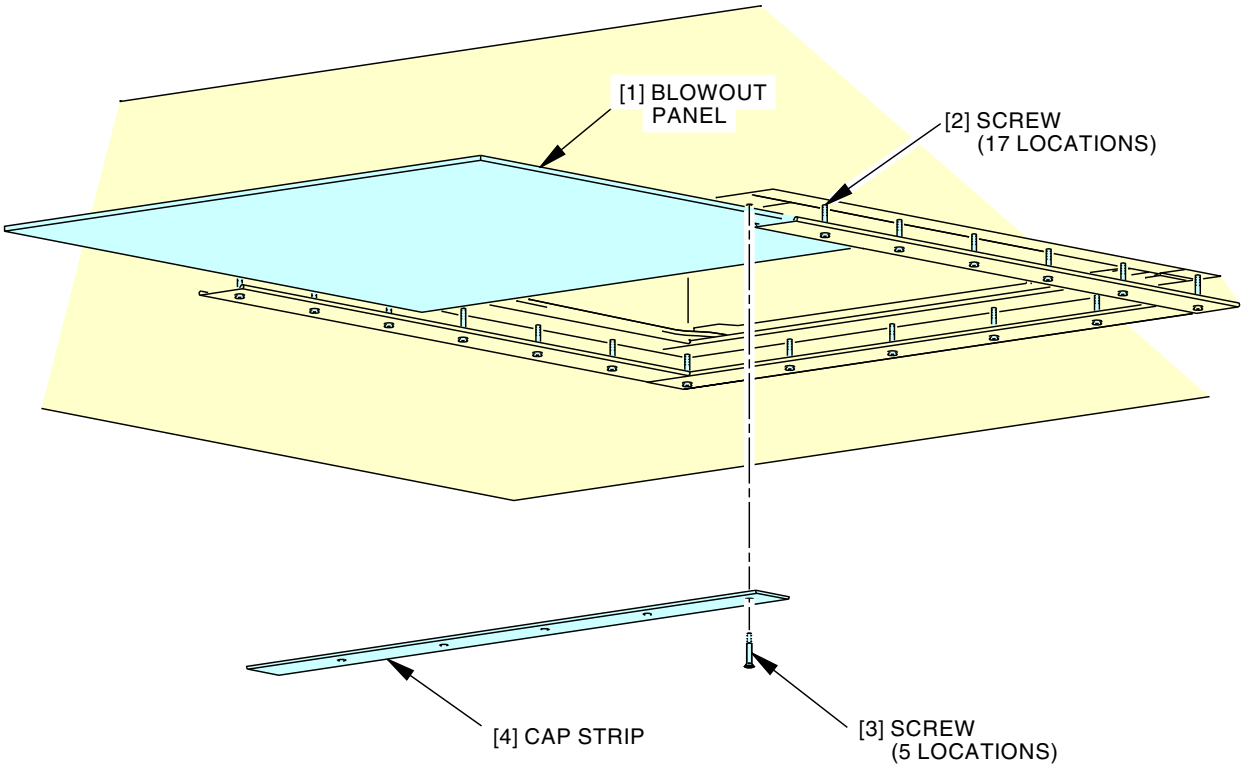



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**Cargo Compartment Ceiling Blowout Panels Installation**
**Figure 401/21-32-05-990-801 (Sheet 1 of 2)**



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**BLOWOUT PANEL ASSEMBLY**

C

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**Cargo Compartment Ceiling Blowout Panels Installation**
**Figure 401/21-32-05-990-801 (Sheet 2 of 2)**



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**TASK 21-32-05-400-801**

**3. Ceiling Blowout Panel Installation**

(Figure 401)

**A. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Blowout panel | 21-32-05-30-050 | SIA ALL |
| | | 21-32-05-40-065 | SIA ALL |

**B. Location Zones**

| Zone | Area |
|---|---|
| 122 | Forward Cargo Compartment - Right |
| 142 | Aft Cargo Compartment - Right |

**C. Ceiling Blowout Panel Installation**

**SUBTASK 21-32-05-420-001**

(1) Tighten the screws [2] on the three cap strips [4] on the ceiling until there is about a 0.125 in. (3.18 mm) gap in the cap strips [4].

**SUBTASK 21-32-05-420-002**

(2) Slide the blowout panel [1] into its position.

(a) Engage the blowout panel [1] edges to expose the black edge band 0.00 to 0.10 in. (2.5 mm).

**SUBTASK 21-32-05-420-003**

(3) Put the cap strip [4] that was removed in its position.

**SUBTASK 21-32-05-420-004**

(4) Install the remaining screws [3] loosely in the cap strip [4].

**SUBTASK 21-32-05-420-005**

(5) Tighten the screws [3] to 20 in-lb (2.3 N·m) – 25 in-lb (2.8 N·m).

NOTE: Do not apply tape over the cap strips [4].

**D. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-32-05-010-003**

(1) Do this step if you installed the blowout panel [1] in the forward cargo compartment:

(a) Close the forward cargo door.

**SUBTASK 21-32-05-010-004**

(2) Do this step if you installed the blowout panels [1] in the aft cargo compartment:

(a) Close the aft cargo door.

**——— END OF TASK ———**

**TASK 21-32-05-000-802**

**4. Cargo Compartment Bulkhead Blowout Panel Removal**

(Figure 402)

**A. Location Zones**

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 122 | Forward Cargo Compartment - Right |



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(Continued)

| Zone | Area |
|---|---|
| 141 | Aft Cargo Compartment - Left |
| 142 | Aft Cargo Compartment - Right |
| 821 | Forward Cargo Door |
| 822 | Aft Cargo Door |

## B. Prepare for the Removal

SUBTASK 21-32-05-010-005

(1) Open the applicable forward or aft cargo door.

## C. Cargo Compartment Bulkhead Blowout Panel Removal

SUBTASK 21-32-05-020-005

(1) Do these steps to remove the blowout panel [15] for the forward bulkhead:

(a) Loosen the quarter-turn fasteners [8] on the blowout panel assembly [7].

(b) Remove the blowout panel assembly [7].

(c) Remove the bolts [4] and washers [5] that attach the grill [1].

(d) Remove the grill [1]. Make sure the seals [6] do not detach.

(e) Remove the bolts [2] that attach the bellmouth [3].

(f) Remove the bellmouth [3].

(g) Remove the nuts [10], washers [11], washers [12], and bolts [13].

(h) Remove the retaining ring [14].

**CAUTION**

MAKE SURE THAT YOU DO NOT TRY TO REMOVE THE INDEX PINS. IF YOU TRY TO REMOVE THE INDEX PINS, YOU CAN DAMAGE THEM.

(i) Remove the blowout panel [15].

SUBTASK 21-32-05-020-006

(2) Do these steps to remove the blowout panel [20] for the aft bulkhead or waste tank enclosure:

(a) Remove the screws [17] that attach the decompression assembly [19] to the bulkhead.

(b) Remove the decompression assembly [19]].

(c) Remove the screws [24] and the nuts [25], at 6 locations.

(d) Remove the grill [22].

(e) Remove the screws [23] and the nuts [16], at 26 locations.

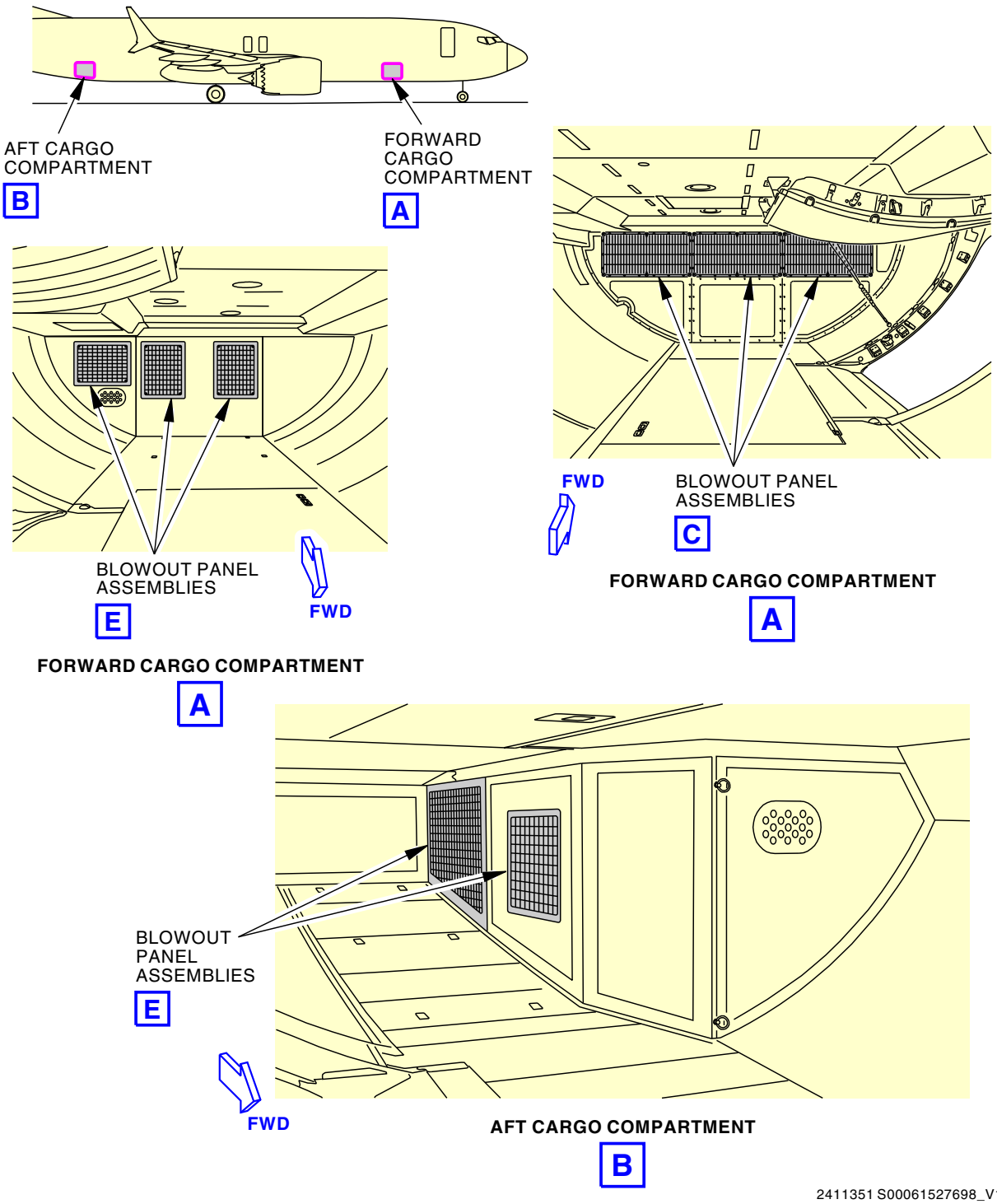
(f) Remove the cap strip [21] assemblies.

(g) Remove the blowout panel [20].

**END OF TASK**



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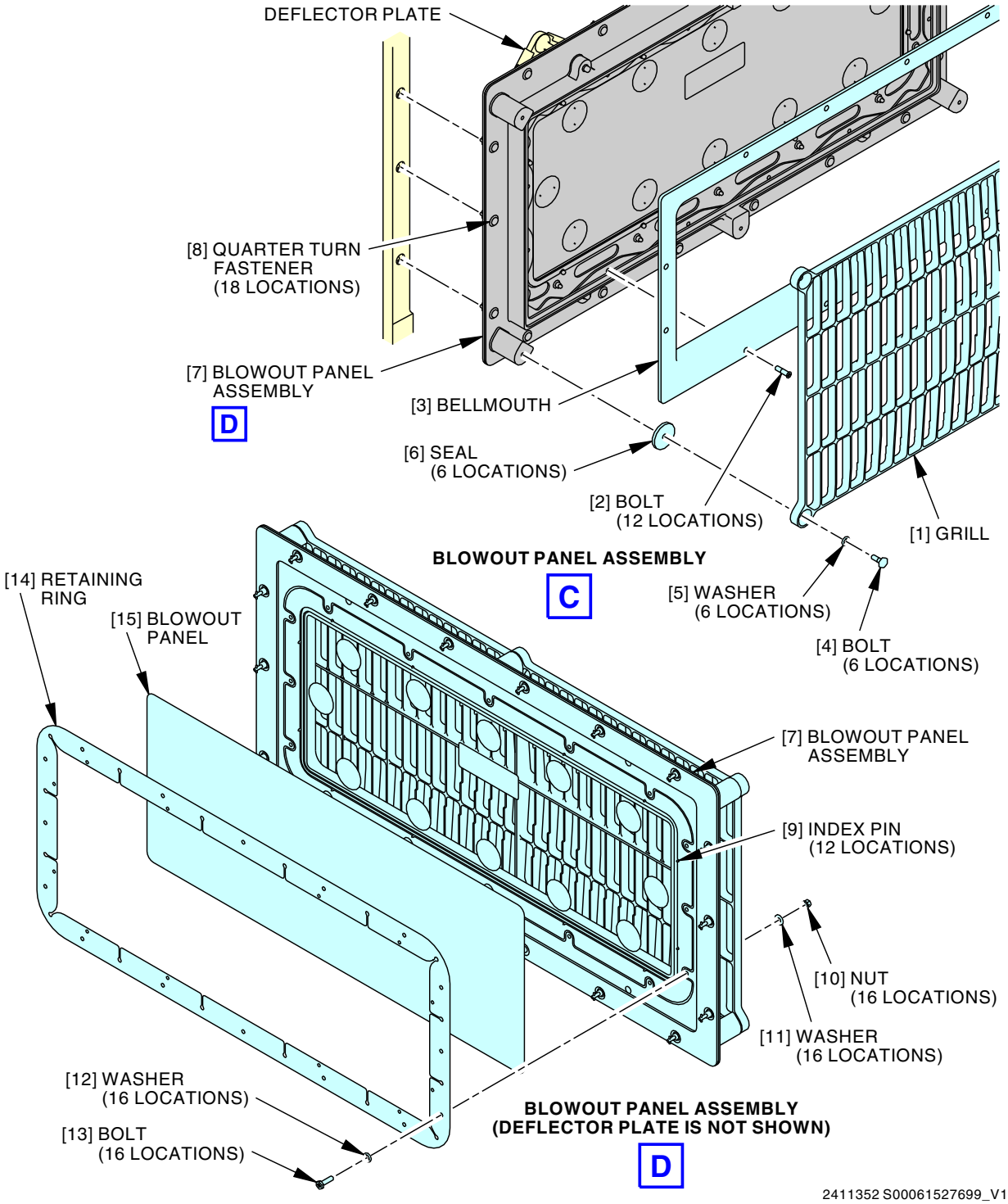



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**Cargo Compartment Bulkhead Blowout Panels Installation**
**Figure 402/21-32-05-990-802 (Sheet 1 of 3)**



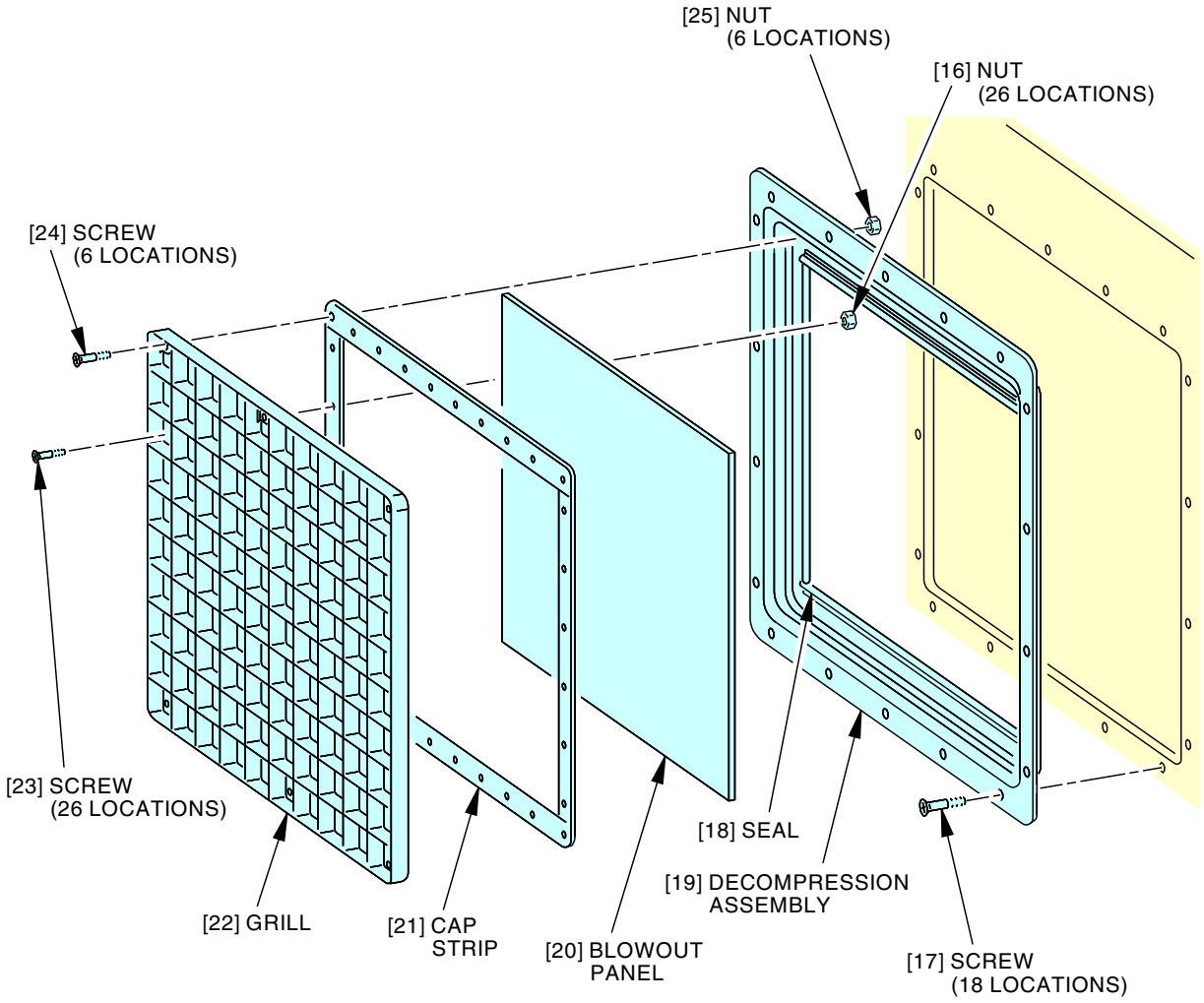
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**Cargo Compartment Bulkhead Blowout Panels Installation**
**Figure 402/21-32-05-990-802 (Sheet 2 of 3)**



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**BLOWOUT PANEL ASSEMBLY**
**(EXAMPLE)**

E

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**Cargo Compartment Bulkhead Blowout Panels Installation**
**Figure 402/21-32-05-990-802 (Sheet 3 of 3)**



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**TASK 21-32-05-400-802**

## 5. Cargo Compartment Bulkhead Blowout Panel Installation

(Figure 402)

### A. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 15 | Blowout panel | 21-32-05-01-205 | SIA ALL |
| 20 | Blowout panel | 21-32-05-10-155 | SIA ALL |
| | | 21-32-05-15-065 | SIA ALL |
| | | 21-32-05-20-060 | SIA ALL |

### B. Location Zones

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 122 | Forward Cargo Compartment - Right |
| 141 | Aft Cargo Compartment - Left |
| 142 | Aft Cargo Compartment - Right |
| 821 | Forward Cargo Door |
| 822 | Aft Cargo Door |

### C. Cargo Compartment Bulkhead Blowout Panel Installation

**SUBTASK 21-32-05-420-006**

(1) Do these steps to install the blowout panel [15] for the forward bulkhead:

(a) Put the retaining ring [14] so you can slide the blowout panel [15] into its position.

(b) Put the blowout panel [15] in its position.

NOTE: The panel will be held in its position by the index pins [9].

(c) Install the nuts [10], washers [11], washers [12], and bolts [13] at 16 locations.

(d) Put the bellmouth [3] in its position.

(e) Install the bolts [2] at 12 locations.

(f) Make sure that the seals [6] are in their positions.

(g) Put the grill [1] in its position.

(h) Install the bolts [4] and washers [5] at 6 locations.

(i) Make sure that the deflector plate is attached to the blowout panel assembly [7].

(j) Put the blowout panel assembly [7] in its position and tighten the quarter-turn fasteners [8] at 18 locations.

**SUBTASK 21-32-05-420-007**

(2) Do these steps to install the blowout panel [20] for the aft bulkhead or waste tank enclosure:

(a) Position the decompression assembly [19] on a flat surface so that the nutplates are facing down.

(b) Put the blowout panel [20] in its position over the seal [18].

(c) Install the cap strip [21] assemblies.

(d) Install the screws [23] and the nuts [16] at 26 locations.

(e) Install the grill [22].

(f) Install the screws [24] and the nuts [25] at 6 locations.



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(g) Put the decompression assembly [19] in its position on the bulkhead.

(h) Install the screws [17] at 18 locations.

**D. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-32-05-010-006**

(1) Close the applicable forward or aft cargo door.

**——— END OF TASK ———**



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## CABIN PRESSURE ALTITUDE WARNING SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has one task:

(1) Cabin pressure altitude warning switch functional test.

**TASK 21-33-00-700-802**

### 2. Cabin Altitude Warning Test

(Figure 501)

#### A. General

(1) This task is for the functional test of the cabin pressure altitude warning system.

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1914 | Test Set - Air Data Model FLMTS (Flight Line Maintenance)<br>Part #: 18910920000 Supplier: 89944<br>Part #: ADSE 650 Supplier: 3BSK6<br>Part #: ADTS2000 Supplier: 52892<br>Part #: ADTS3350ER Supplier: 52892<br>Part #: ADTS405MKII Supplier: U0427<br>Part #: ADTS530 Supplier: U0427<br>Part #: ADTS552F Supplier: U0427<br>Part #: ADTS553F Supplier: U0427<br>Part #: ADTS554F Supplier: U0427<br>Part #: D60340MK Supplier: K1474<br>Part #: DPS1000 Supplier: 21844<br>Part #: DPS350 Supplier: 21844<br>Part #: DPS450 Supplier: 21844<br>Part #: MODEL 6300 Supplier: 0RDZ5<br>Part #: MPS34C Supplier: 48RQ2<br>Part #: MPS43B Supplier: A0197<br>Part #: MPS45 Supplier: 48RQ2<br>Part #: MPS49 Supplier: 48RQ2<br>Part #: TES9463 Supplier: 88277<br>Opt Part #: 01-0987-00 Supplier: 41364<br>Opt Part #: 18910480000 Supplier: 89944<br>Opt Part #: ADTS405F Supplier: U0427<br>Opt Part #: ADTS505 Supplier: U0427<br>Opt Part #: D60302 Supplier: K1474<br>Opt Part #: D60340 Supplier: K1474<br>Opt Part #: D60383 Supplier: K1474<br>Opt Part #: DPS500 Supplier: 21844<br>Opt Part #: MPS31C Supplier: 48RQ2<br>Opt Part #: MPS43 Supplier: A0197 |
| COM-22906 | Adapter - Altitude Pressure Switch to Air Data Test Set<br>Part #: 259-202702-4-3 Supplier: 8W928<br>Part #: 6400-3-4-O Supplier: 22031<br>Part #: 6801-4-3 NWO Supplier: 22031 |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

**E. Prepare for the Test**

SUBTASK 21-33-00-860-002

(1) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 17 | C00129 | LANDING GEAR LATCH & PRESS WARN |

Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 18 | C00451 | LANDING GEAR AURAL WARN |
| E | 12 | C00314 | INDICATOR MASTER DIM SECT 2 |
| F | 12 | C00318 | INDICATOR MASTER DIM SECT 6 |

SUBTASK 21-33-00-010-001

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

**F. Cabin Altitude Warning Functional Test**

SUBTASK 21-33-00-720-001

(1) Do the test of the 10000 feet cabin pressure altitude warning as follows:

NOTE: There are two identical pressure switches (S128 and S1153) for the 10000 feet cabin altitude warning. These switches are set to alert the crew when the cabin pressure altitude goes above 10000 feet. One switch can trip the cabin altitude warning. The second switch is a backup. The test that you will do one at a time for each switch is the same.

(a) Remove the screen port assembly from the cabin pressure altitude warning switch, S128 or S1153.

(b) Install an adapter fitting and matching hose on the cabin pressure altitude warning switch, S128 or S1153.

NOTE: The female threads on the cabin altitude warning switch are 7/16-20-UNJF-3A with a full thread depth of 0.438 in. (1.113 cm) minimum. The total port depth is 0.541 in. (1.374 cm) - 0.551 in. (1.400 cm). Any mating adapter should have threads having a full thread depth of no greater than 0.438 in. (1.113 cm) and an overall length that is less than 0.500 in. (1.270 cm) to avoid false test results.



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1) Use an adapter from the kit (adapter, COM-22906), or an equivalent adapter, and matching hose to connect to the cabin pressure altitude warning switch.

NOTE: Adapters are considered to be equivalent as long as the mating side with the switch is:

- Greater than or equal to 0.265 in. (0.673 cm) X 7/16-20-UNJF-3A and less than or equal to 0.438 in. (1.113 cm) X 7/16-20-UNJF-3A for the flareless end, or
- Less than or equal to 0.500 in. (1.270 cm) total with greater than or equal to 0.265 in. (0.673 cm) X 7/16-20-UNJF-3A thread for AN4 flared end.

a) Make sure that the flat side of the adapter is connected with the cabin pressure altitude warning switch.

NOTE: Do not connect the flared side of the adapter with the cabin altitude warning switch. Connecting the flared side of the adapter with the cabin altitude warning switch may bottom out the cabin altitude warning switch, resulting in false test results.

b) Connect the air data model test set, COM-1914, or equivalent, to the adapter fitting.

<1> Use a Barfield Pitot Hose, or equivalent 25 ft (7.62 m) to 40 ft (12.19 m) long hose, with #4 AN fitting to the adapter and quick disconnect (if applicable) to the air data model test set, COM-1914.

<a> Make sure that the quick disconnect (if applicable) is fully engaged.

(c) Slowly increase the cabin altitude at a rate of not more than 4000 ft/minute.

(d) Make sure that the aural warning signal comes on at an altitude of 10000 ± 1000 feet.

(e) Make a record of the altitude that the aural warning sounds.

(f) Make sure that the red CABIN ALTITUDE indicators on the captain's and the first officer's instrument panels come on.

(g) Press the ALT HORN CUTOUT switch on the P5-16 Cabin Pressure Control Panel.

(h) Make sure that the aural warning signal goes off.

(i) Make sure that the red CABIN ALTITUDE indicators on the captain's and the first officer's instrument panels stay on.

(j) Decrease the cabin altitude to approximately 500 to 1500 feet below the cabin altitude the aural warning came on.

NOTE: Decrease the cabin altitude at a rate of not more than 4000ft/minute.

(k) Make sure that the CABIN ALTITUDE indicators on the captain's and the first officer's instrument panels go off.

(l) Increase the cabin altitude again at a rate of not more than 4000 ft/minute.

(m) Make sure that the aural and visual warnings for the cabin altitude come on at an altitude of 10000 ±1000 feet.

(n) Decrease the cabin altitude to ground level at a rate of not more than 4000 ft/minute.

(o) Make sure that the aural warning signal goes off.

(p) Make sure that the CABIN ALTITUDE indicators on the captain's and the first officer's instrument panels go off.



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(q) Remove the air data model test set, COM-1914, or equivalent, and the adapter fitting from the cabin pressure altitude warning switch.

(r) Install the screen port assembly on the cabin pressure altitude warning switch.

SUBTASK 21-33-00-720-004

(2) Do the steps again to test the second cabin pressure altitude warning switch, S128 or S1153.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-33-00-410-001

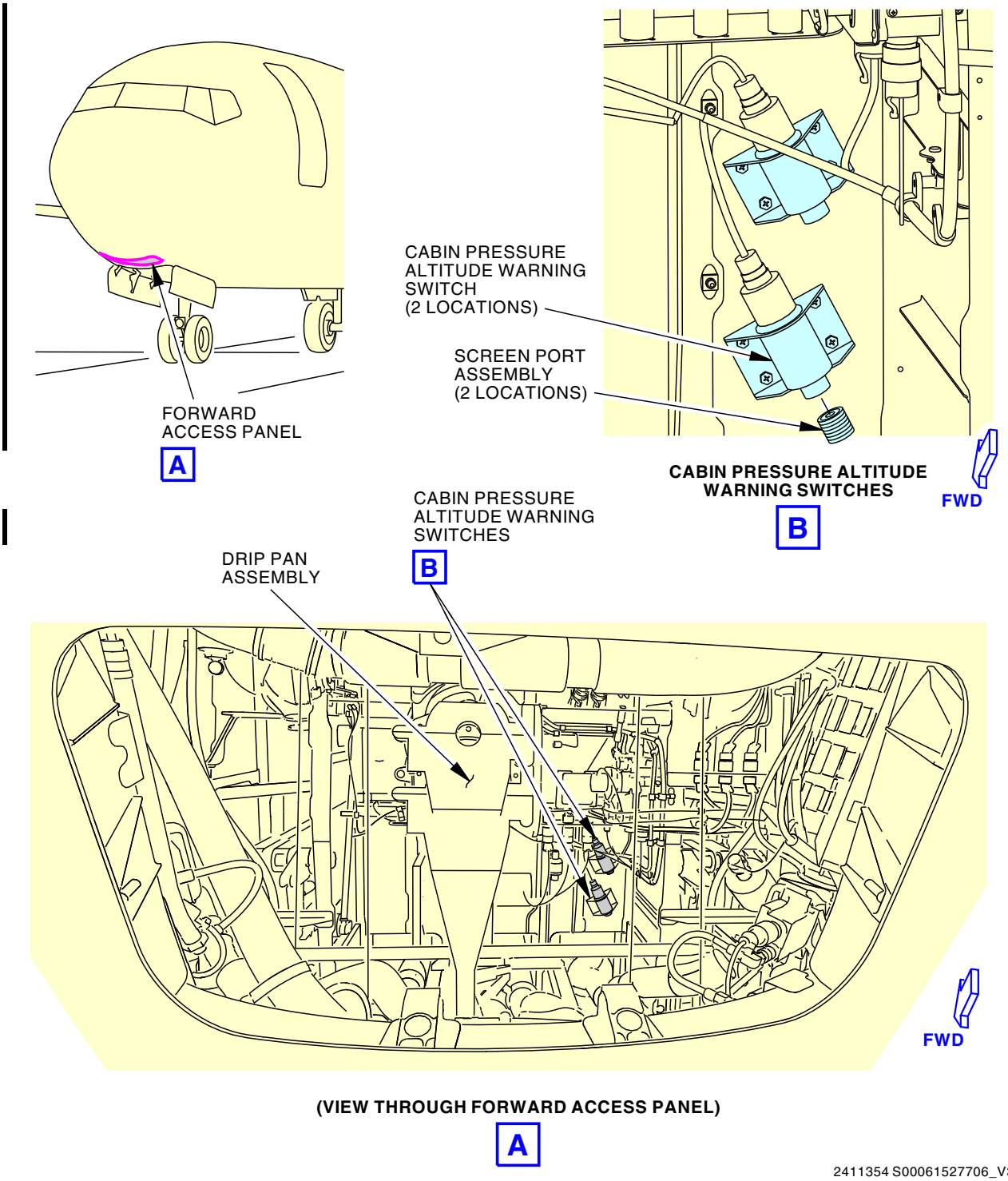
(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

——— END OF TASK ———



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2411354 S00061527706_V3

**Cabin Altitude Warning Test**
**Figure 501/21-33-00-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-33-00-700-801**

**3. Cabin Rate of Climb Indicator Check**

(Figure 502f)

**A. General**

(1) This task is for the check of the cabin rate of climb indicator.

**B. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**C. Cabin Rate of Climb Indicator Check**

**SUBTASK 21-33-00-710-001**

(1) Do a check of the cabin rate of climb indicator as follows:

(a) Make sure that the cabin entry door is open.

NOTE: This will make sure that there is no pressurization on the cabin.

(b) Turn the zero adjustment screw on the lower left corner of the gauge as follows:

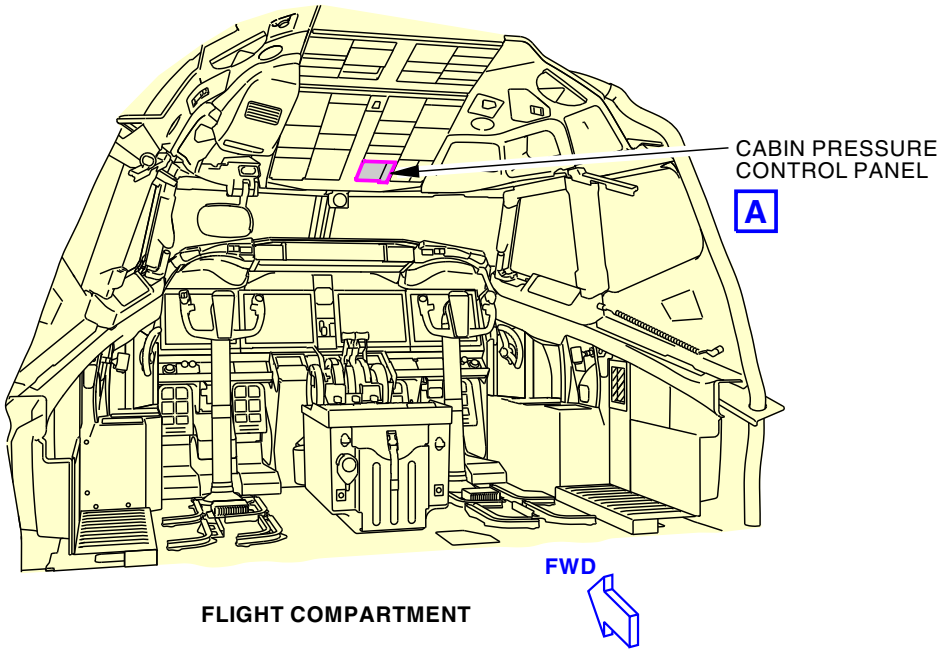
1) Make sure that you can adjust the pointer a minimum of 400 ft/min on both sides of the zero graduation.

(c) Reset the pointer to zero.

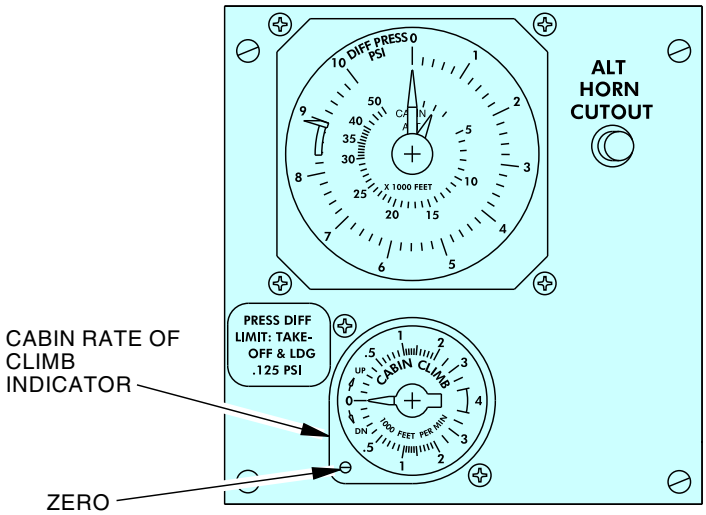
**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




CABIN PRESSURE CONTROL PANEL
(P5-16)
(EXAMPLE)

A

2411355 S00061527708_V4

**Cabin Rate of Climb Indicator Check**
**Figure 502/21-33-00-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

# CABIN RATE OF CLIMB INDICATOR - REMOVAL/INSTALLATION

## 1. General

A. This procedure has these tasks:

(1) Cabin rate of climb indicator removal.

(2) Cabin rate of climb indicator installation.

**TASK 21-33-01-000-801**

## 2. Cabin Rate of Climb Indicator Removal

(Figure 401)

### A. General

(1) This task is for the removal of the cabin rate of climb indicator.

### B. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

### C. Prepare for the Removal

**SUBTASK 21-33-01-860-001**

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 10 | C00328 | OVERHEAD 5V SECONDARY |

### D. Cabin Rate of Climb Indicator Removal

**SUBTASK 21-33-01-020-001**

**CAUTION**

HOLD THE INDICATOR WHEN YOU LOOSEN THE CLAMP. THE INDICATOR CAN FALL WHEN THE CLAMP IS LOOSE. DAMAGE CAN OCCUR TO THE INDICATOR IF IT FALLS.

(1) Loosen the clamp tension screws [3].

**SUBTASK 21-33-01-020-002**

(2) Carefully pull the cabin rate of climb indicator [1] out of the P5-16 panel [4].

**SUBTASK 21-33-01-020-003**

(3) Disconnect the electrical connector [2] from the cabin rate of climb indicator [1].

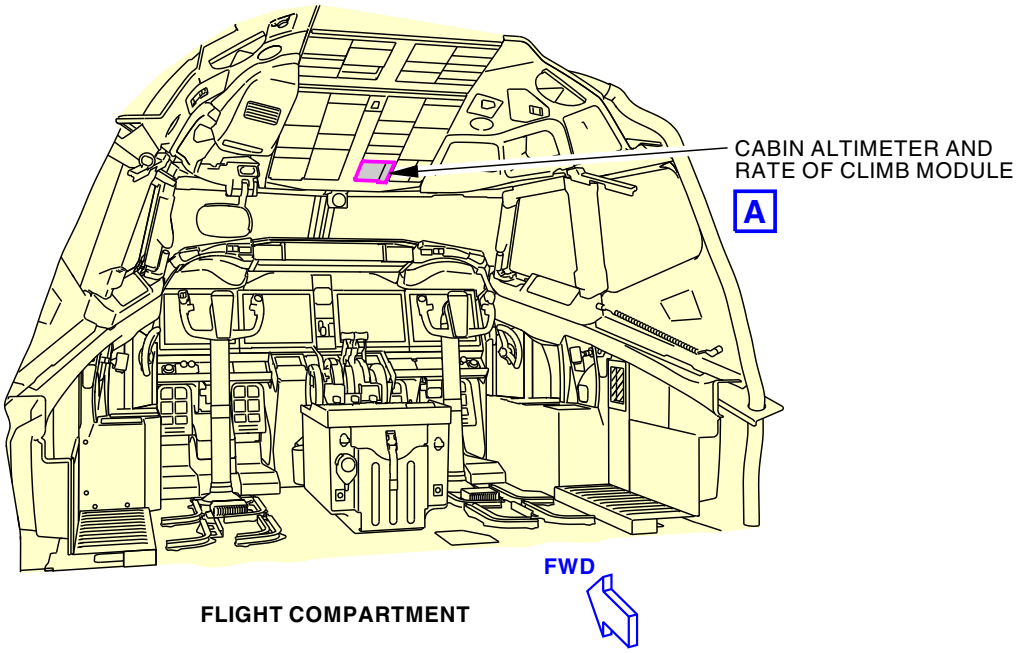
**SUBTASK 21-33-01-480-001**

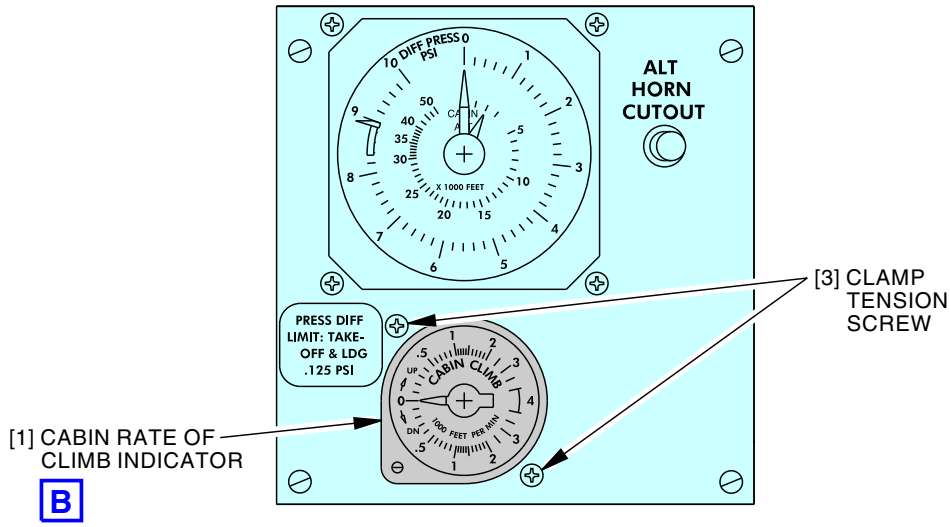
(4) Put a dust cap on the cabin pressure port on the back of the cabin rate of climb indicator [1].

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN ALTIMETER AND RATE OF CLIMB MODULE (P5-16)
(EXAMPLE)**

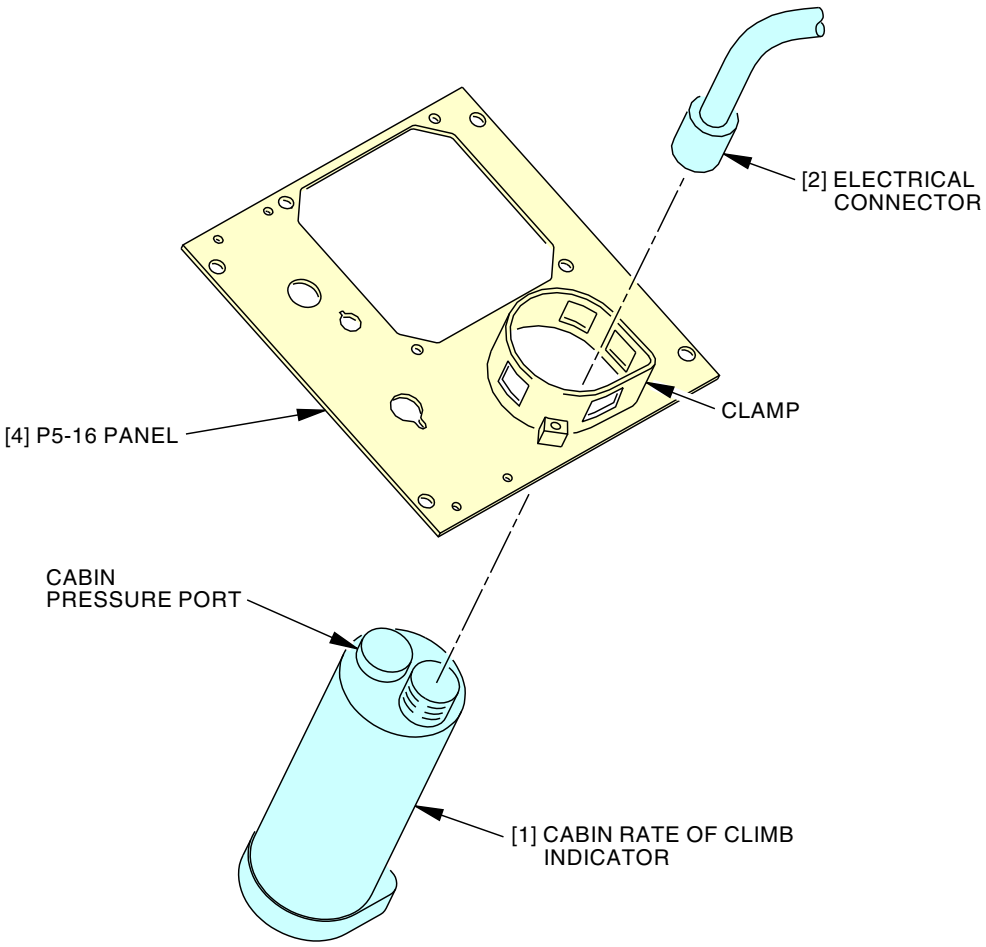
**A**

2411356 S00061527712_V4

**Cabin Rate of Climb Indicator Installation
Figure 401/21-33-01-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN RATE OF CLIMB INDICATOR**

B

2411357 S00061527713_V1

**Cabin Rate of Climb Indicator Installation**
**Figure 401/21-33-01-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-33-01-400-801**

## 3. Cabin Rate of Climb Indicator Installation

(Figure 401)

### A. General

(1) This task is for the installation of the cabin rate of climb indicator.

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin rate of climb indicator | 21-33-01-01-050 | SIA ALL |
| | | 31-11-94-01-025 | SIA 001-014 |
| | | 31-11-94-02-025 | SIA 015-999 |

### C. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

### D. Cabin Rate Indicator Installation

**SUBTASK 21-33-01-080-001**

(1) Remove the dust cap from the cabin pressure port on the back of the cabin rate of climb indicator [1].

**SUBTASK 21-33-01-420-001**

(2) Connect the electrical connector [2] to the cabin rate of climb indicator [1].

**SUBTASK 21-33-01-820-001**

(3) Carefully push the cabin rate of climb indicator [1] into its position in the P5-16 panel [4].

**SUBTASK 21-33-01-420-002**

(4) Hold the cabin rate of climb indicator [1] against the P5-16 panel [4].

(a) Tighten the clamp tension screws [3] 5.0 in-lb (0.6 N·m) to 8.0 in-lb (0.9 N·m).

### E. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-33-01-860-002**

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 10 | C00328 | OVERHEAD 5V SECONDARY |

### F. Cabin Rate of Climb Indicator Installation Test

**SUBTASK 21-33-01-700-001**

(1) Do this steps to do a check of the cabin rate of climb indicator [1]:

(a) Make sure that the cabin is not pressurized.

(b) Turn the zero adjustment screw on the lower left corner of the gauge.

(c) Make sure that the pointer can be adjusted to a minimum of 400 ft/min on both sides of the zero graduation.

(d) Reset the pointer to zero.

**——— END OF TASK ———**



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## CABIN ALTITUDE AND DIFFERENTIAL PRESSURE INDICATOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Cabin altitude and differential pressure indicator removal

(2) Cabin altitude and differential pressure indicator installation.

**TASK 21-33-02-000-801**

### 2. Cabin Altitude and Differential Pressure Indicator Removal

(Figure 401)

#### A. General

(1) This task is for the removal of the cabin altitude and differential pressure indicator.

#### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin altitude and differential pressure indicator | 21-33-02-01-050 | SIA ALL |
| | | 31-11-94-01-020 | SIA 001-014 |
| | | 31-11-94-02-020 | SIA 015-999 |

#### C. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

#### D. Prepare for the Removal

**SUBTASK 21-33-02-860-003**

(1) Open this circuit breaker:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 10 | C00328 | OVERHEAD 5V SECONDARY |

#### E. Cabin Altitude and Differential Pressure Indicator Removal

**SUBTASK 21-33-02-020-001**

**CAUTION** HOLD THE INDICATOR WHEN YOU LOOSEN THE CLAMP. THE INDICATOR CAN FALL WHEN THE CLAMP IS LOOSE. DAMAGE CAN OCCUR TO THE INDICATOR IF IT FALLS.

(1) Loosen the clamp tension screws [6].

**SUBTASK 21-33-02-020-002**

(2) Carefully pull the cabin altitude and differential pressure indicator [1] out of the P5-16 panel [7].

**SUBTASK 21-33-02-020-003**

(3) Disconnect the electrical connector [5] from the cabin altitude and differential pressure indicator [1].

**SUBTASK 21-33-02-020-004**

(4) Disconnect the static pressure hose [4] from the male quick-disconnect [2].

**SUBTASK 21-33-02-020-005**

(5) If you will replace the cabin altitude and differential pressure indicator [1], do these steps:



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(a) Remove the male quick-disconnect [2] and the packing [3] from the cabin altitude and differential pressure indicator [1].

(b) Discard the packing [3].

**SUBTASK 21-33-02-800-001**

(6) If you will install a serviceable cabin altitude and differential pressure indicator [1], keep the male quick-disconnect [2] and packing [3] in place.

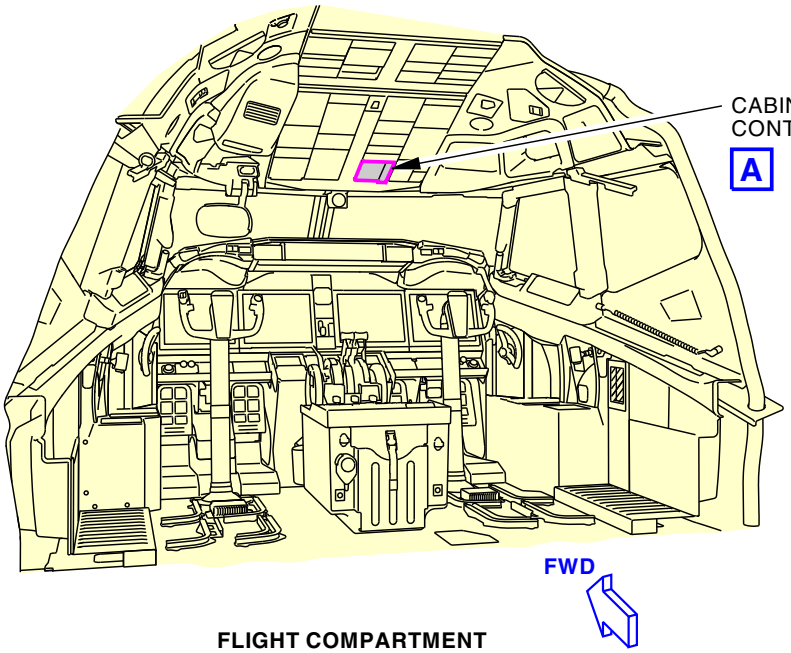
**SUBTASK 21-33-02-480-001**

(7) Put a dust cap on the cabin pressure port.

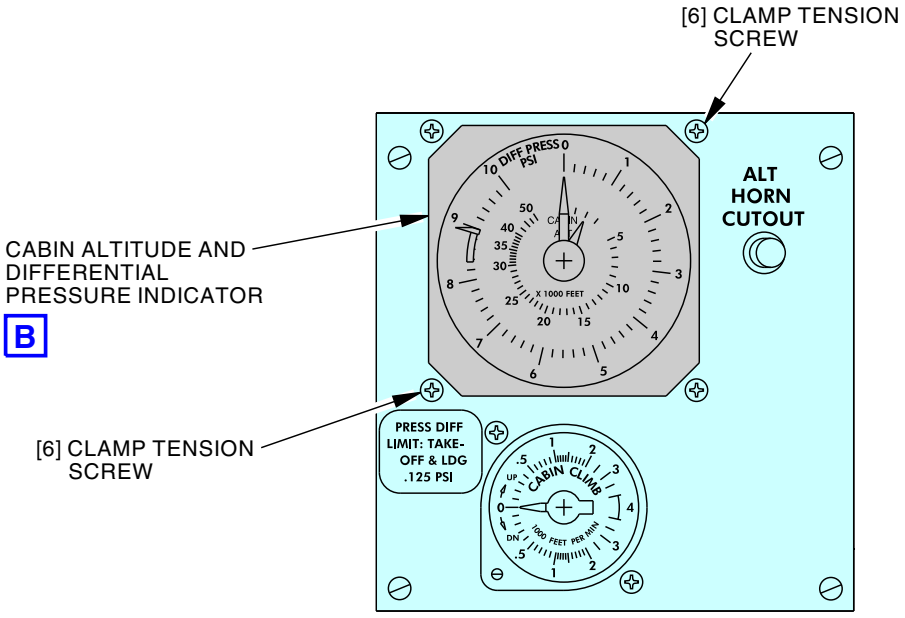
**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




CABIN PRESSURE CONTROL PANEL (P5-16)
(EXAMPLE)

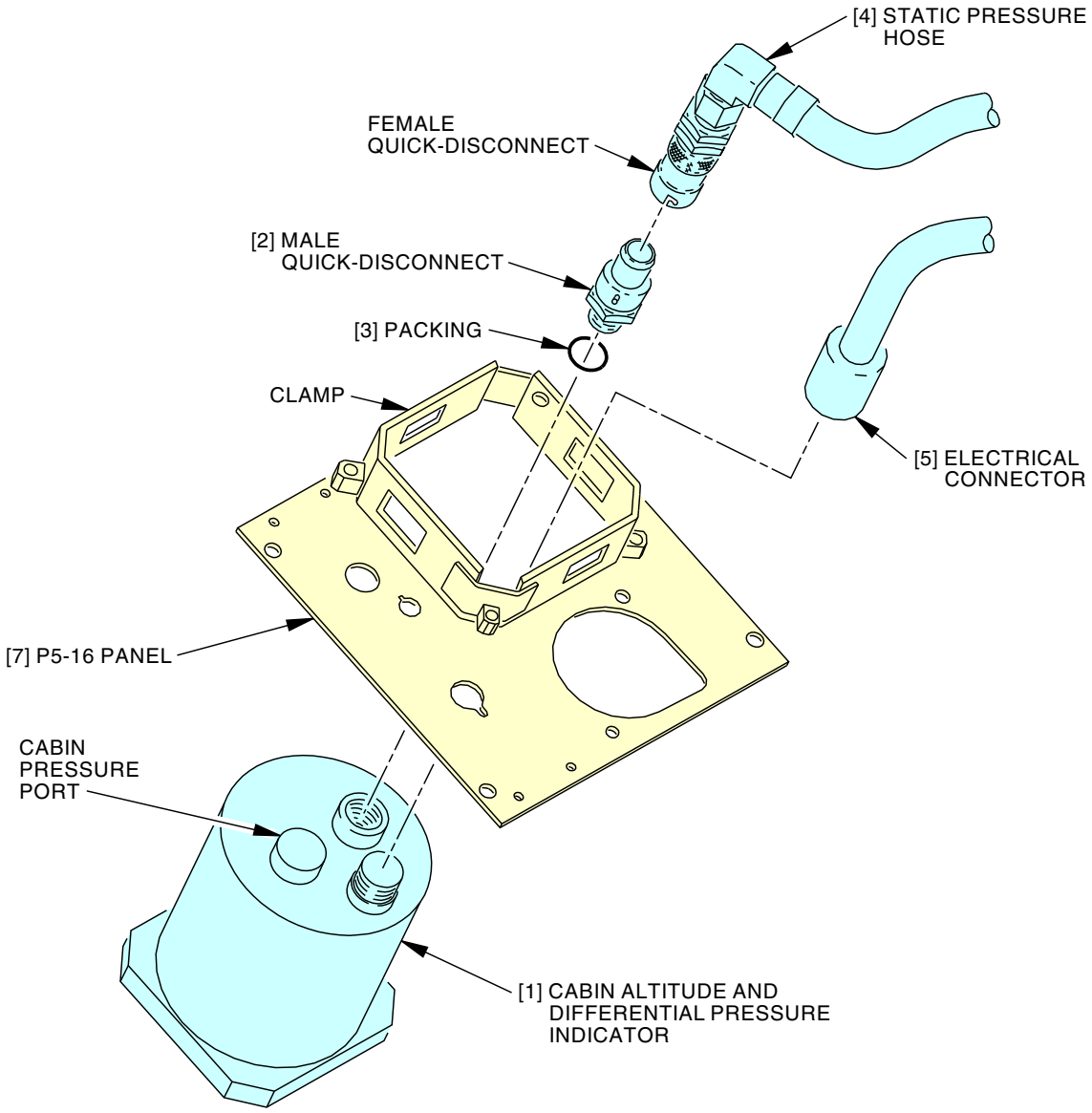
A

2411358 S00061527718_V4

**Cabin Altitude and Differential Pressure Indicator Installation**
**Figure 401/21-33-02-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN ALTITUDE AND DIFFERENTIAL PRESSURE INDICATOR**

B

2411359 S00061527719_V1

**Cabin Altitude and Differential Pressure Indicator Installation**
**Figure 401/21-33-02-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-33-02-400-801**

## 3. Cabin Altitude and Differential Pressure Indicator Installation

(Figure 401)

### A. General

(1) This task is for the installation of the cabin altitude and differential pressure indicator.

### B. References

| Reference | Title |
|---|---|
| 34-11-00-790-805 | Alternate Static System Low-range Leak Test (P/B 501) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D50004 | Compound - Antiseize | BMS3-28 |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin altitude and differential pressure indicator | 21-33-02-01-050 | SIA ALL |
| | | 31-11-94-01-020 | SIA 001-014 |
| | | 31-11-94-02-020 | SIA 015-999 |

### E. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

### F. Cabin Altitude and Differential Pressure Indicator Installation

**SUBTASK 21-33-02-080-001**

(1) Remove the dust cap from the cabin pressure port on the rear of the indicator.

**SUBTASK 21-33-02-420-001**

(2) If it is necessary to install the male quick-disconnect [2], do these steps:

(a) Put a new packing [3] on the male quick-disconnect [2].

(b) Apply anti-seize compound, D50004 to the threads of the male quick-disconnect [2].

(c) Install the male quick-disconnect [2] on the cabin altitude and differential pressure indicator [1].

(d) Torque the male quick-disconnect [2] to 120 ±12 in-lb (13.56 ±1.36 N·m).

**SUBTASK 21-33-02-020-006**

(3) Connect the static pressure hose [4] to the male quick-disconnect [2] on the cabin altitude and differential pressure indicator [1].

**SUBTASK 21-33-02-420-002**

(4) Connect the electrical connector [5] to the cabin altitude and differential pressure indicator [1].

**SUBTASK 21-33-02-820-001**

(5) Carefully push the cabin altitude and differential pressure indicator [1] into its position in the P5-16 panel [7].

**SUBTASK 21-33-02-420-003**

(6) Hold the cabin altitude and differential pressure indicator [1] against the P5-16 panel [7].

(a) Torque the clamp tension screws [6] to 5 in-lb (0.6 N·m) - 8 in-lb (0.9 N·m).



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SUBTASK 21-33-02-790-001

(7) If you installed the male quick-disconnect [2] on the cabin altitude and differential pressure indicator [1], do this task: Alternate Static System Low-range Leak Test, TASK 34-11-00-790-805.

NOTE: If the replacement indicator came with the quick-disconnect installed or if the quick-disconnect was not removed from the indicator, it is not necessary to do the leak test.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-33-02-860-002

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 10 | C00328 | OVERHEAD 5V SECONDARY |

## H. Cabin Altitude and Differential Pressure Indicator Installation

SUBTASK 21-33-02-710-001

(1) Do these steps to do a check of the cabin altimeter gauge:

(a) Make sure that a main entry door is open.

(b) Set the barometric pressure for the pilot's altimeter to 29.92 inches of Hg.

(c) Compare the altitude on the pilot's altimeter to the altitude on the cabin altimeter.

(d) If the altitude on the cabin altimeter is within 1000 feet of the altitude on the pilot's altimeter, the cabin altimeter is satisfactory.

(e) If the altitude on the cabin altimeter is not within 1000 feet of the altitude on the pilot's altimeter, replace the cabin alltitude and differential pressure indicator (TASK 21-33-02-000-801 and TASK 21-33-02-400-801).

SUBTASK 21-33-02-710-002

(2) Do these steps to do a check of the cabin differential pressure gauge:

(a) Observe the differential pressure on the DIFF PRESS gauge.

(b) If the differential pressure is within 0 (± 0.2) psid, the cabin differential pressure gauge is satisfactory.

(c) If the differential pressure is not within 0 (± 0.2) psid, replace the cabin altitude and differential pressure indicator (TASK 21-33-02-000-801 and TASK 21-33-02-400-801).

**——— END OF TASK ———**



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## CABIN PRESSURE SWITCH - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the cabin pressure switch

(2) An installation of the cabin pressure switch.

**TASK 21-33-04-000-801**

### 2. Cabin Pressure Warning Switch Removal

(Figure 401)

#### A. General

(1) This task is for the removal of the cabin pressure warning switch.

#### B. Location Zones

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

#### D. Prepare for the Removal

**SUBTASK 21-33-04-010-001**

(1) Open this access panel:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

**SUBTASK 21-33-04-862-001**

(2) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 17 | C00129 | LANDING GEAR LATCH & PRESS WARN |

#### E. Cabin Pressure Warning Switch Removal

**SUBTASK 21-33-04-020-001**

(1) Remove the cabin pressure warning switch [1] as follows:

(a) Disconnect the electrical connector from the cabin pressure warning switch [1].

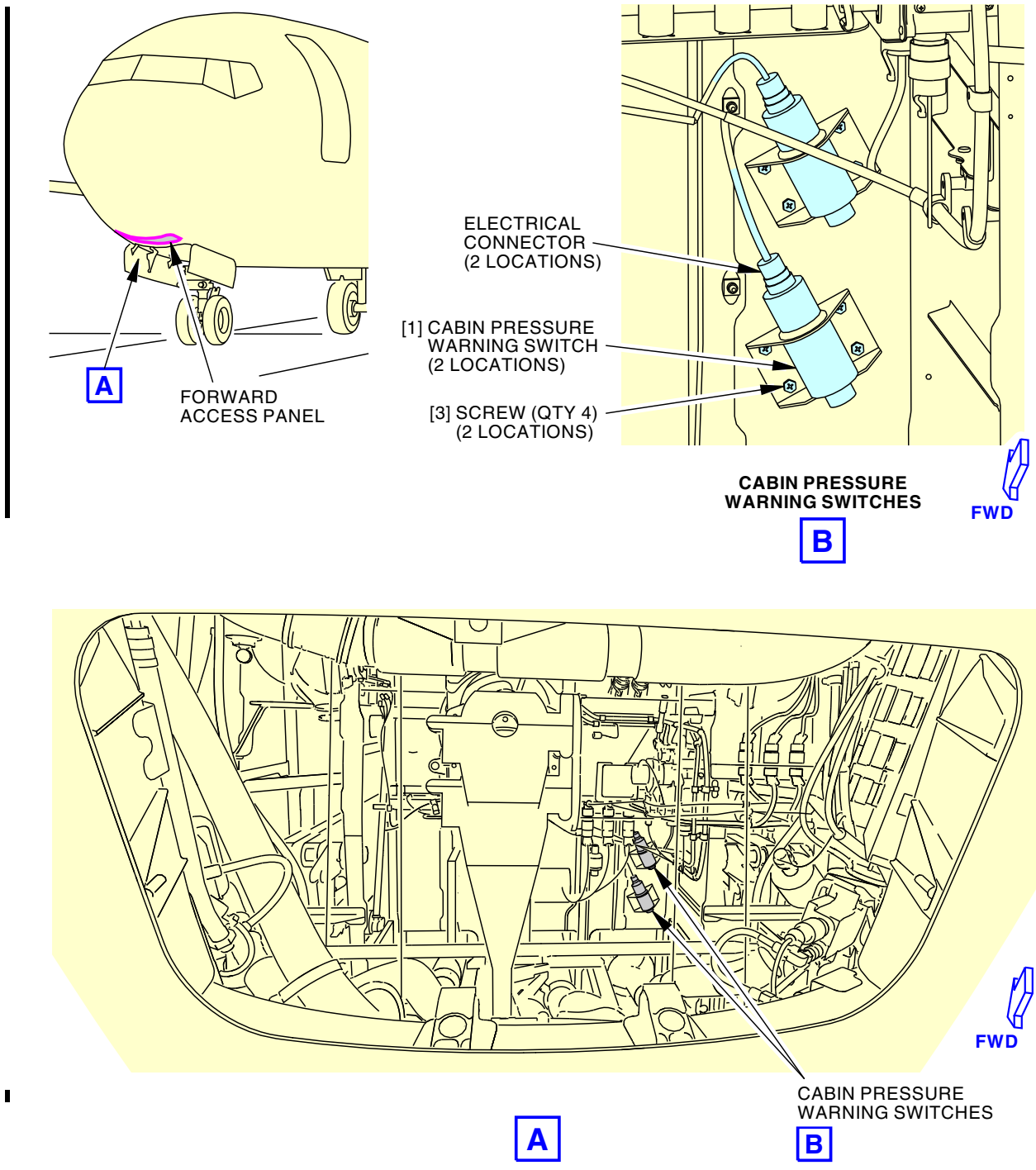
(b) Remove the screws [3] from the cabin pressure warning switch [1].

(c) Remove the cabin pressure warning switch [1].

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2411360 S00061527724_V3

**Cabin Pressure Warning Switch Installation**
**Figure 401/21-33-04-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-33-04-400-801**

## 3. Cabin Pressure Warning Switch Installation

(Figure 401)

### A. General

(1) This task is for the installation of the cabin pressure warning switch.

### B. References

| Reference | Title |
|---|---|
| 20-50-11-910-801 | Standard Torque Values (P/B 201) |
| 21-33-00-700-802 | Cabin Altitude Warning Test (P/B 501) |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin pressure warning switch | 21-33-04-01-015 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 112 | Area Forward of Nose Landing Gear Wheel Well |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

### F. Cabin Pressure Warning Switch Installation

**SUBTASK 21-33-04-820-001**

(1) Install the cabin pressure warning switch [1] as follows:

(a) Put the cabin pressure warning switch [1] in its position.

(b) Install the screws [3] that attach the cabin pressure warning switch [1].

(c) Tighten the screws [3] to specifications (TASK 20-50-11-910-801).

(d) Connect the electrical connector to the cabin pressure warning switch [1].

### G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-33-04-410-001**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 112A | Forward Access Door |

**SUBTASK 21-33-04-865-001**

(2) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 17 | C00129 | LANDING GEAR LATCH & PRESS WARN |

### H. Cabin Pressure Warning Switch Installation Test

**SUBTASK 21-33-04-720-001**

(1) Do this task: Cabin Altitude Warning Test, TASK 21-33-00-700-802.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## CABIN ALTIMETER AND RATE OF CLIMB MODULE - REMOVAL AND INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Cabin altimeter and rate of climb module removal

(2) Cabin altimeter and rate of climb module installation.

**TASK 21-33-07-000-801**

### 2. Cabin Altimeter and Rate of Climb Module Removal

Figure 401

#### A. General

(1) This task is for the removal of the cabin altimeter and rate of climb module.

#### B. References

| Reference | Title |
|---|---|
| 21-33-02-000-801 | Cabin Altitude and Differential Pressure Indicator Removal (P/B 401) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

#### D. Prepare for the Removal

**SUBTASK 21-33-07-860-001**

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 10 | C00328 | OVERHEAD 5V SECONDARY |

**SUBTASK 21-33-07-000-001**

(2) Loosen the 1/4-turn fasteners that hold the P5 Forward Overhead Panel in its position and let the panel rotate down.

#### E. Cabin Altimeter and Rate of Climb Module Removal

**SUBTASK 21-33-07-020-001**

(1) Remove the P5-16 Cabin Altimeter and Rate of Climb Module from the P5 Forward Overhead Panel as follows:

(a) Disconnect the electrical connector in the back of the cabin altimeter and rate of climb module.

(b) Disconnect the static pressure hose from the male quick-disconnect on the back of the cabin altitude and differential pressure indicator (TASK 21-33-02-000-801).

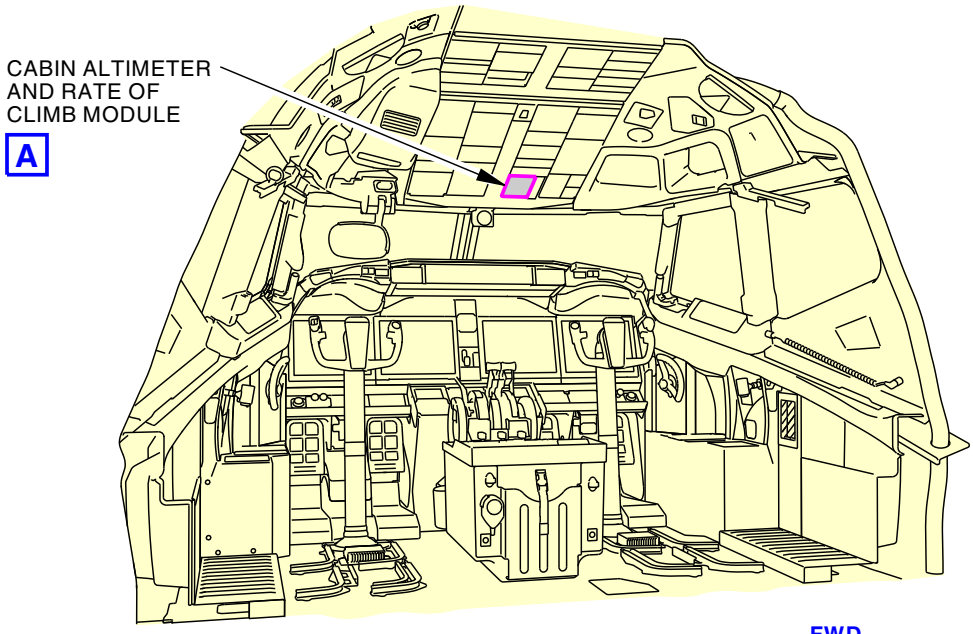
(c) Hold the cabin altimeter and rate of climb module [1] in its position and loosen the 1/4-turn fasteners that hold the module to the P5 Forward Overhead Panel.

(d) Remove the cabin altimeter and rate of climb module [1].

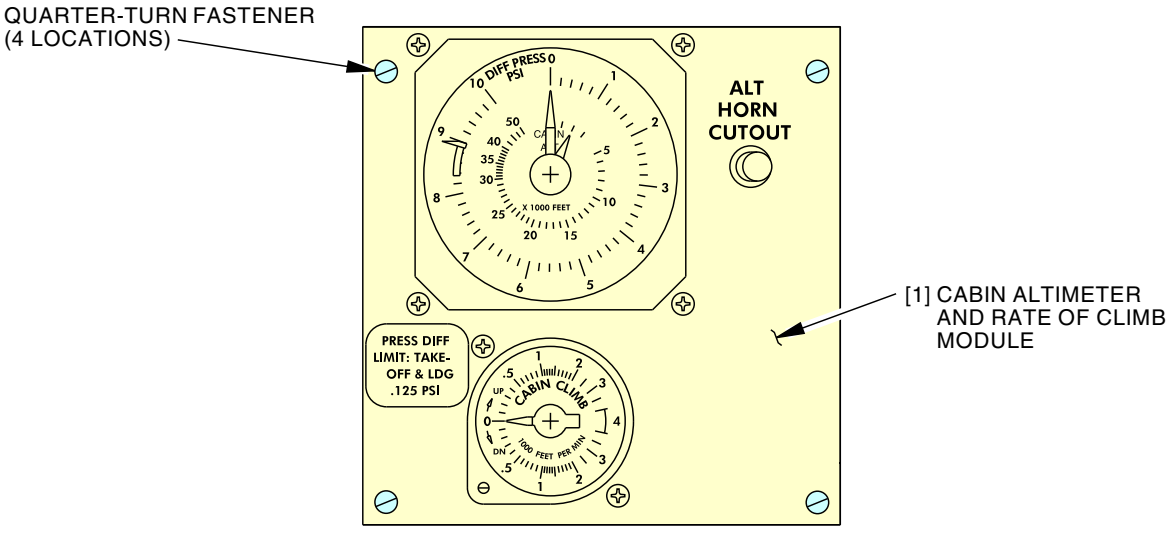
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




CABIN ALTIMETER AND RATE OF CLIMB MODULE
(EXAMPLE)

A

2411361 S00061527729_V4

**Cabin Altimeter and Rate of Climb Module Installation**
**Figure 401/21-33-07-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-33-07-400-801**

**3. Cabin Altimeter and Rate of Climb Module Installation**

Figure 401

**A. References**

| Reference | Title |
|---|---|
| 34-11-00-790-805 | Alternate Static System Low-range Leak Test (P/B 501) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin altimeter and rate of climb module | 21-33-07-01-050 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**D. Procedure**

**SUBTASK 21-33-07-020-002**

(1) If it has not already been done, lower the P5 Forward Overhead Panel.

**SUBTASK 21-33-07-420-001**

(2) Install the P5-16 Cabin Altimeter and Rate of Climb Module into the P5 Forward Overhead Panel as follows:

(a) Put the cabin altimeter and rate of climb module [1] into the P5 Forward Overhead Panel.

(b) Turn the 1/4-turn fasteners on the cabin altimeter and rate of climb module [1] to hold the module to the P5 Forward Overhead Panel.

(c) Connect the static pressure hose to the quick-disconnect at the back of the cabin altitude and differential pressure indicator.

(d) Connect the electrical connector to the cabin rate of climb indicator and the cabin altitude and differential pressure indicator at the back of the module.

**SUBTASK 21-33-07-410-001**

(3) Lift the P5 Forward Overhead Panel to the closed position and turn the 1/4-turn fasteners.

**SUBTASK 21-33-07-720-001**

(4) Do this task: Alternate Static System Low-range Leak Test, TASK 34-11-00-790-805.

NOTE: It is not necessary to do the (Alternate Static System Low-range Leak Test, TASK 34-11-00-790-805) if the replacement module has the quick-disconnect already installed on the cabin altitude and differential pressure indicator.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## OVERBOARD EXHAUST VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Equipment Cooling Overboard Exhaust Valve Removal.

(2) Equipment Cooling Overboard Exhaust Valve Installation.

B. The equipment cooling overboard exhaust valve is installed in the electronic equipment center.

**TASK 21-43-01-000-801**

### 2. Overboard Exhaust Valve Removal

(Figure 401)

#### A. General

(1) This task provides the instructions to remove the overboard exhaust valve.

#### B. References

| Reference | Title |
|---|---|
| 12-15-21-600-804 | Crew Oxygen Cylinder Replacement (P/B 301) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-43-01-860-001**

**CAUTION**

MAKE SURE YOU REMOVE ELECTRICAL POWER FROM THE AIRPLANE. IF YOU SUPPLY ELECTRICAL POWER TO THE ELECTRICAL/ELECTRONIC EQUIPMENT WHEN THE AFT EQUIPMENT COOLING SYSTEM IS NOT IN OPERATION, THE EQUIPMENT CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE ELECTRICAL/ELECTRONIC EQUIPMENT.

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**SUBTASK 21-43-01-010-001**

(2) To get access to the overboard exhaust valve [1], do this step:

Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-43-01-010-002**

(3) Remove the access panel [5] on the top of the raised platform just aft and right of the aircraft center line as follows (Figure 401):

(a) Remove the screws [4] that attach the access panel [5] to the top of the raised platform.

(b) Remove the access panel [5].



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SUBTASK 21-43-01-010-003

(4) Remove the crew oxygen system cylinder (TASK 12-15-21-600-804).

**F. Equipment Cooling Overboard Exhaust Valve Removal**

SUBTASK 21-43-01-020-001

(1) Disconnect the electrical connector [2] from the overboard exhaust valve [1] (Figure 401).

SUBTASK 21-43-01-020-002

(2) Loosen the couplings [3].

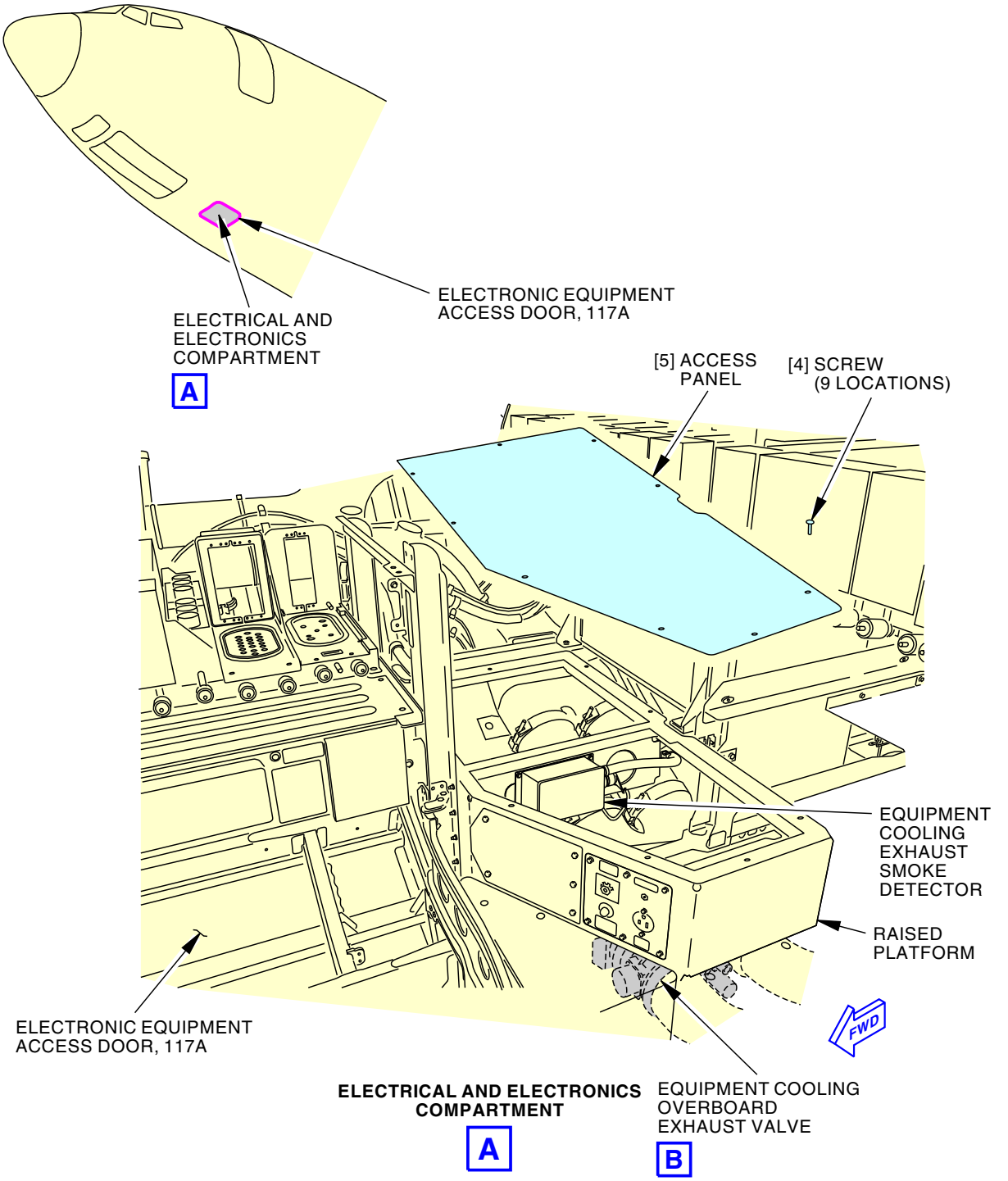
SUBTASK 21-43-01-020-003

(3) Remove the overboard exhaust valve [1].

——— END OF TASK ———



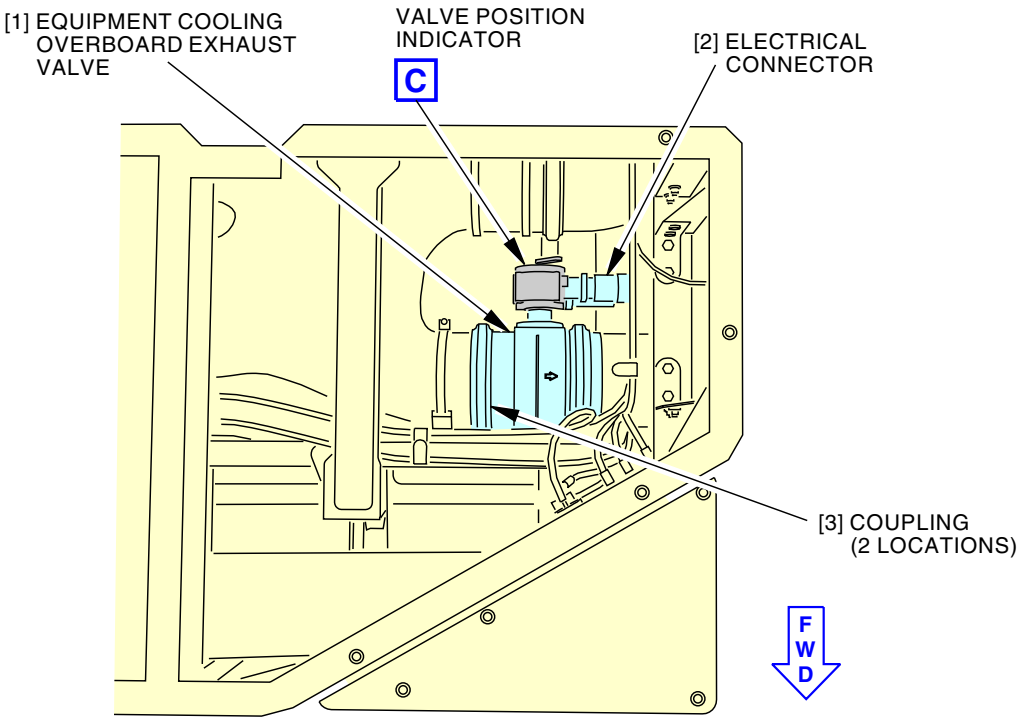
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Equipment Cooling Overboard Exhaust Valve Installation**
**Figure 401/21-43-01-990-801 (Sheet 1 of 2)**

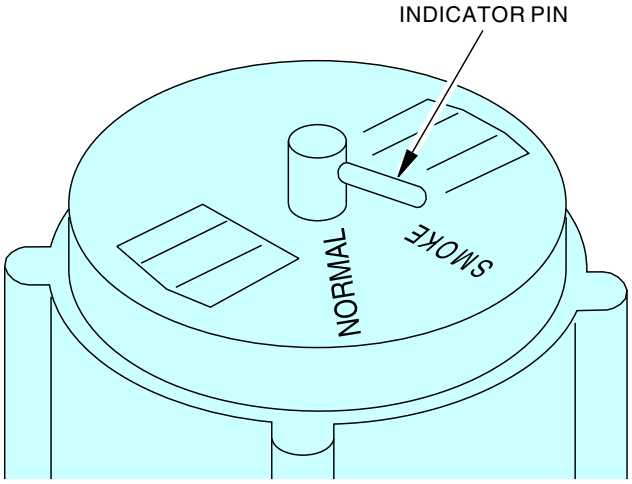


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**EQUIPMENT COOLING OVERBOARD EXHAUST VALVE (OXYGEN BOTTLE INSTALLATION NOT SHOWN)**

B




**NOTE:**

EQUIPMENT COOLING EXHAUST SMOKE DETECTOR REMOVED FOR CLARITY

**VALVE POSITION INDICATOR**

C

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**Equipment Cooling Overboard Exhaust Valve Installation**
**Figure 401/21-43-01-990-801 (Sheet 2 of 2)**



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**TASK 21-43-01-400-801**

## 3. Overboard Exhaust Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 12-15-21-600-804 | Crew Oxygen Cylinder Replacement (P/B 301) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Overboard exhaust valve | 21-27-05-01-015 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### E. Exhaust Valve Installation

**SUBTASK 21-43-01-420-001**

(1) Put the overboard exhaust valve [1] in its position.

**SUBTASK 21-43-01-420-002**

(2) Tighten the couplings [3].

**SUBTASK 21-43-01-420-003**

(3) Connect the electrical connector [2] to the overboard exhaust valve [1].

### F. Equipment Cooling Overboard Exhaust Valve Installation Test

**SUBTASK 21-43-01-860-002**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-43-01-860-003**

(2) Operate the air conditioning packs (TASK 21-00-00-800-803).

**SUBTASK 21-43-01-860-004**

(3) Make sure that these switches, on the P5 Forward Overhead Panel, are in the AUTO position:

(a) L PACK

(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

**SUBTASK 21-43-01-860-005**

(4) Make sure that these switches, on the P5 Forward Overhead Panel, are in the NORMAL position:



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(a) EQUIP COOLING, EXHAUST

(b) EQUIP COOLING, SUPPLY

SUBTASK 21-43-01-790-001

(5) Make sure that there is no air leakage at thecouplings [3].

SUBTASK 21-43-01-860-006

(6) Make sure that the overboard exhaust valve [1] is in the NORMAL position (Figure 401).

NOTE: Look at the indicator on the valve actuator to see the position of the valve.

SUBTASK 21-43-01-860-007

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-43-01-860-008

(8) Put these switches, on the P5 Forward Overhead Panel, to the HIGH position:

(a) L PACK

(b) R PACK

SUBTASK 21-43-01-860-009

(9) Put the R RECIRC FAN switch, on the P5 Forward Overhead Panel, to the OFF position.

SUBTASK 21-43-01-860-010

(10) Make sure that the overboard exhaust valve [1] is in the SMOKE position (Figure 401).

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-43-01-860-011

(1) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-43-01-860-012

(2) Shutdown the air conditioning packs (TASK 21-00-00-800-804).

SUBTASK 21-43-01-860-013

(3) Put these switches, on the P5 Forward Overhead Panel, in the AUTO position:

(a) L PACK

(b) R PACK

(c) L RECIRC FAN

(d) R RECIRC FAN

SUBTASK 21-43-01-420-004

(4) Install the crew oxygen system cylinder (TASK 12-15-21-600-804).

SUBTASK 21-43-01-410-001

(5) Install the access panel [5] on the top of the raised platform that you removed as follows:

(a) Install the access panel [5].

(b) Install the screws [4] that attach the access panel [5] to the top of the raised platform.



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SUBTASK 21-43-01-410-002

(6) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

END OF TASK



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## DOOR AREA HEATING SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tasks:

(1) An operational test of the door area heaters.

(2) An operational test of the emergency exit hatch heaters.

NOTE: The emergency exit hatch heaters have over-temperature thermostats. The thermostats will turn the heaters off very shortly after they come on when the airplane is on the ground, in the air mode, with an air conditioning pack on. You must have a minimum of two persons to do this test correctly.

B. The door area and emergency exit hatch heaters operate when these conditions are met:

(1) The airplane is in the air.

(2) One or both of the air conditioning packs are on.

C. There are five heater blankets associated with each emergency exit hatch. The heaters are installed as follows:

(1) There are two heaters behind the lining of the emergency exit hatch.

(2) There are two heaters for the emergency exit hatch doorway. There is a heater behind the forward and the aft surround panels.

(3) There is a heater on the outboard side of the closeout panel of emergency exit hatch.

**TASK 21-45-00-700-801**

### 2. Door Area Heater Operational Test

#### A. General

(1) This task will test the operation of the door area heater.

#### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 220 | Subzone - Passenger Compartment - Body Station 259.50 to 360.00 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

#### D. Prepare for the Test

**SUBTASK 21-45-00-860-012**

(1) Make sure that the GALLEY switch on the P5-13 electrical meters, battery and galley power panel is set at ON.

**SUBTASK 21-45-00-860-013**

(2) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

#### E. Door Area Heater Operational Test

**SUBTASK 21-45-00-200-005**

(1) Feel the airflow from the door heater outlet.



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(a) Make sure that the airflow from the door heater outlet is cool.

SUBTASK 21-45-00-860-015

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-45-00-200-006

(3) Feel the airflow from the door heater outlet.

(a) Make sure that the air that exits the outlet becomes warmer.

SUBTASK 21-45-00-860-016

(4) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-45-00-840-001

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**——— END OF TASK ———**

**TASK 21-45-00-700-802**

## 3. Emergency Exit Hatch Heaters Operational Test

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G02319 | Spray - Freeze - Miller-Stephenson MS-242N | |

**C. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

**D. Prepare for the Test**

NOTE: The emergency exit hatch heaters have over-temperature thermostats. The thermostats will turn the heaters off very shortly after they come on when the airplane is on the ground, in the air mode, with an air conditioning pack on. The exit hatch heaters will not operate when the temperature is more than approximately 70 ±5°F (21 ±3°C) (when the overheat thermostat is closed) or 50 ±7°F (10 ±4°C) (when the overheat thermostat is open due to a previous overheat condition). In warm temperatures, the heater thermostats may need to be cooled before the heaters will operate.


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SUBTASK 21-45-00-860-018

(1) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

SUBTASK 21-45-00-200-015

(2) Make sure that the temperature in the area of the associated thermostats is low enough to make the heaters operate during the test (Figure 501).

- 70°F (21°C) or less for the hatch heaters and trim heaters.
- 80°F (27°C) or less for the closeout panel heater.

(a) If necessary, remove any lining required for access to cool the thermostats during the heater test.

## E. Emergency Exit Hatch Heater Operational Test

SUBTASK 21-45-00-200-016

(1) For the applicable heater(s), check the adjacent surface temperature as follows (Figure 501):

(a) Feel the surface of the emergency exit hatch lining along the vertical edges.

1) Make sure that the temperature of the lining is approximately the same as the ambient air temperature.

(b) Feel the surface of the trim strips of the emergency exit hatch doorway.

1) Make sure that the temperature of the trim strips is approximately the same as the ambient air temperature.

(c) Feel the surface of the closeout panel.

1) Make sure that the temperature of the closeout panel is approximately the same as the ambient air temperature.

SUBTASK 21-45-00-860-020

(2) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

SUBTASK 21-45-00-860-021

**WARNING** OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-45-00-860-022

(4) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

(a) Have one person turn the air conditioning pack on. Have one or more persons check the operation of the emergency exit hatch heaters.

SUBTASK 21-45-00-200-013

(5) If necessary, cool the associated control thermostat and overheat thermostat to make the heater operate.

- 70°F (21°C) or less for the hatch heaters and trim heaters.
- 80°F (27°C) or less for the closeout panel heater.

NOTE: The time to cool the thermostats and the amount of cooling required will vary depending on the ambient temperature.

(a) Check the heater quickly after cooling the thermostats.

NOTE: The thermostats will shut the hatch and trim heaters down when the heaters reach 80°F (27°C). The closeout heater will shut down at 100°F (38°C).



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(b) Cool air source MS-242N spray, G02319 or equivalent can be used to cool the thermostats.

**SUBTASK 21-45-00-200-014**

(6) Make sure that the applicable heaters operate as follows (Figure 501):

(a) Feel the surface of the emergency exit hatch lining along the vertical edges.

1) Make sure that you feel the warmth from the heater.

(b) Feel the surface of the trim strips for the emergency exit hatch doorway.

1) Make sure that you feel the warmth from the heater.

(c) Feel the surface of the closeout panel.

1) Make sure that you feel the warmth from the heater.

## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-45-00-860-023**

(1) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

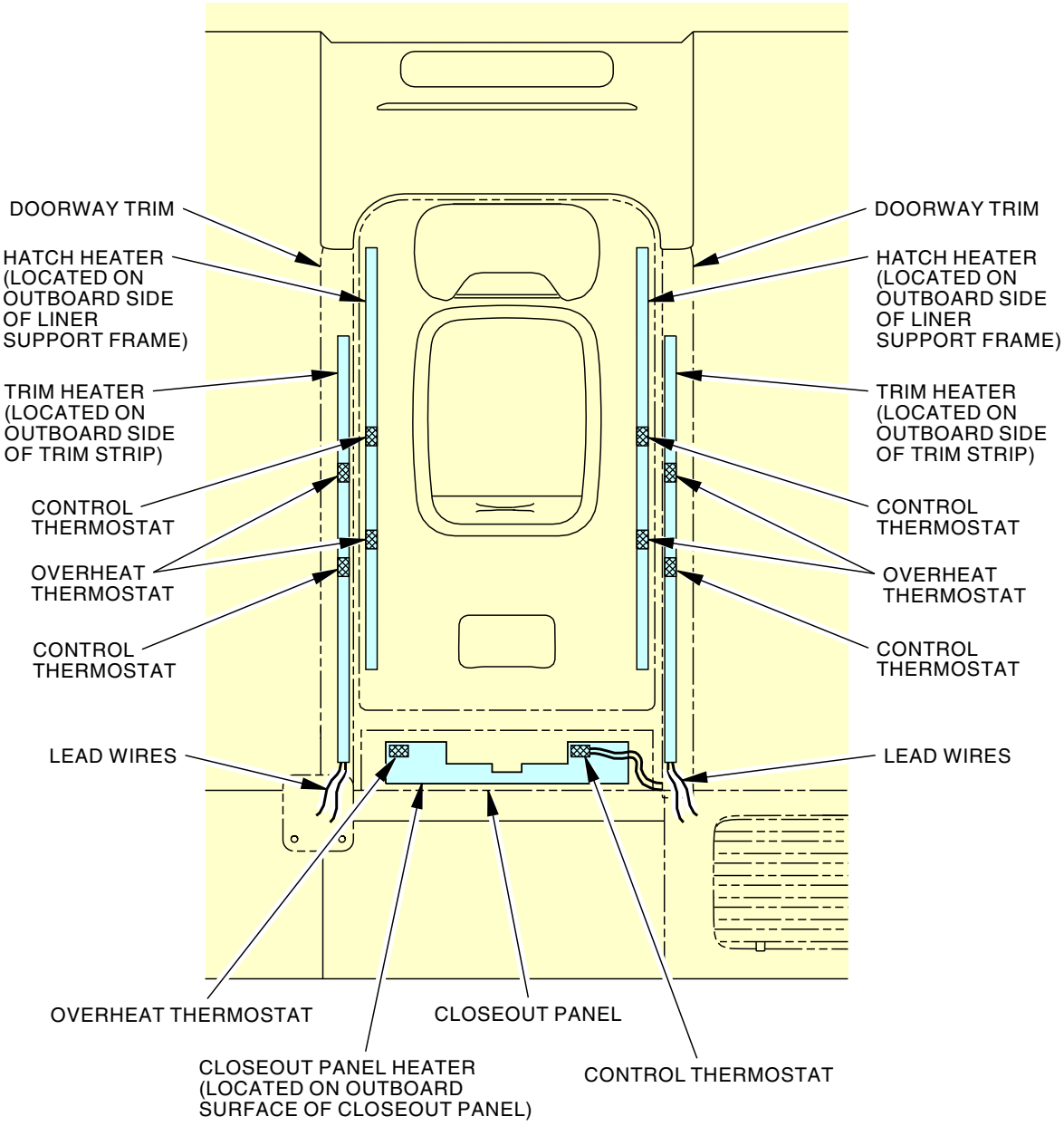
**SUBTASK 21-45-00-840-003**

(2) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**——— END OF TASK ———**



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**Exit Hatch Heater Locations**
**Figure 501/21-45-00-990-804**



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## DOOR AREA HEATER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the door area heater

(2) An installation of the door area heater.

B. The door area heaters operate when these conditions are met:

(1) The airplane is in the air.

(2) One or two of the air conditioning packs are on.

**TASK 21-45-01-000-801**

### 2. Door Area Heater Removal

(Figure 401 or Figure 402)

**A. General**

(1) This task is for the removal of the forward or mid or aft door area heater.

**B. References**

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |

**C. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**D. Location Zones**

| Zone | Area |
|---|---|
| 113 | Area Above and Outboard of Nose Landing Gear Wheel Well - Left |
| 117 | Electrical and Electronics Compartment - Left |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 113BW | Forward Nose Wheel Well Panel |
| 117A | Electronic Equipment Access Door |

**F. Prepare for the Removal**

**SUBTASK 21-45-01-840-001**

(1) Do these steps to make sure that conditioned air is not supplied to the passenger compartment:

NOTE: This will make sure that there is no airflow in the ducts when the door area heater is removed.

(a) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

NOTE: Do not operate a ground conditioned air source.

(b) Make sure that the L RECIRC FAN and R RECIRC FAN switches, on the P5-10 air conditioning panel, are set to the OFF position.

**SUBTASK 21-45-01-010-001**

(2) If the forward door area heater [1] will be removed, do these steps:



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(a) To get access to the P91 and P92 panels, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(b) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 113BW | Forward Nose Wheel Well Panel |

SUBTASK 21-45-01-010-002

(3) If the aft door area heater [1B] will be removed, do these steps:

(a) To get access to the P91 and P92 panels, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.



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**(WARNING PRECEDES)**

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(b) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01279 | DOOR AREA HTR-AFT |

(c) At the forward attendant panel, set the switch for the entry lights to the OFF position and attach the DO NOT OPERATE tag, STD-858.

**WARNING**

DO NOT TOUCH THE SOCKETS OR THE METAL ENDS OF THE LAMP. SHOCK CAN OCCUR WHEN YOU SUPPLY ELECTRICAL POWER TO THE LIGHT.

(d) Lower the aft side of the aft entry light lens assembly.

## G. Door Area Heater Removal

SUBTASK 21-45-01-020-008

(1) If the forward door area heater [1] will be removed, do these steps:

(a) Disconnect the electrical connector [2] from the forward door area heater [1].

(b) Loosen the clamps [3] and clamp [5].

(c) Move the clamps [3] and clamp [5] away from the forward door area heater [1] and onto the flex ducts.

(d) Remove and discard the tape from the insulation [4].

(e) Remove the insulation [4] from the forward door area heater [1].

NOTE: If there is no damage, keep the insulation for re-installation.

(f) Remove the forward door area heater [1] from the flex ducts.

SUBTASK 21-45-01-020-002

(2) If the aft door area heater [1B] will be removed, do these steps:

(a) Disconnect the electrical connector [2] from the aft door area heater [1B].

(b) Remove the nut [6], washer [7], and wire bundle mounting plate [8].

(c) Loosen the duct support clamps [9] from around the insulation [4].

(d) Remove and discard the tape from the insulation [4].

(e) Remove the insulation [4] from the aft door area heater [1B].

NOTE: If there is no damage, keep the insulation for re-installation.

(f) Loosen the clamp [3A] and clamp [5].

(g) Move the clamp [3A] and clamp [5] away from the aft door area heater [1B] and onto the flex ducts.



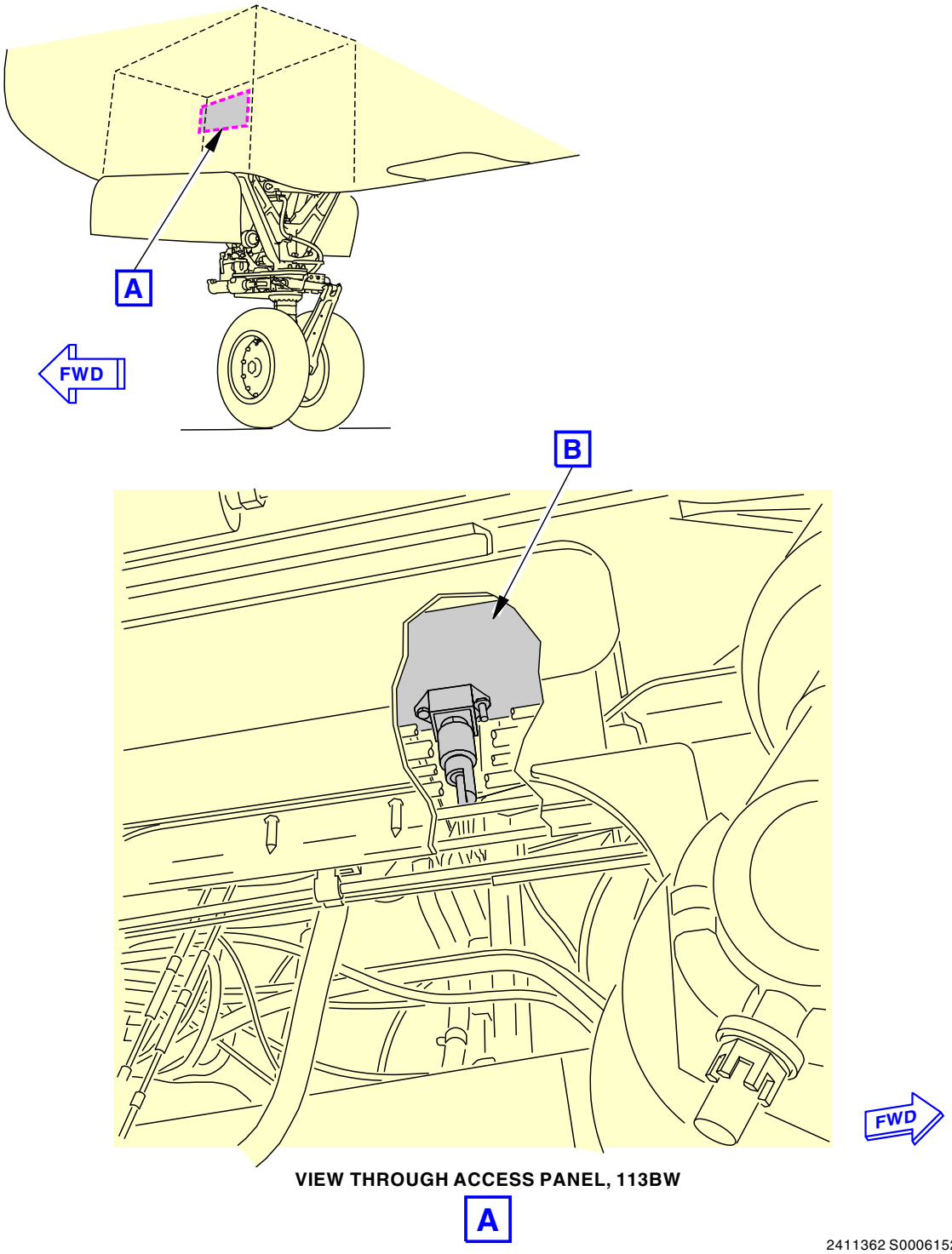
ECCN 9E991 BOEING PROPRIETARY - See title page for details

(h) Remove the aft door area heater [1B] from the flex ducts.

——— END OF TASK ———



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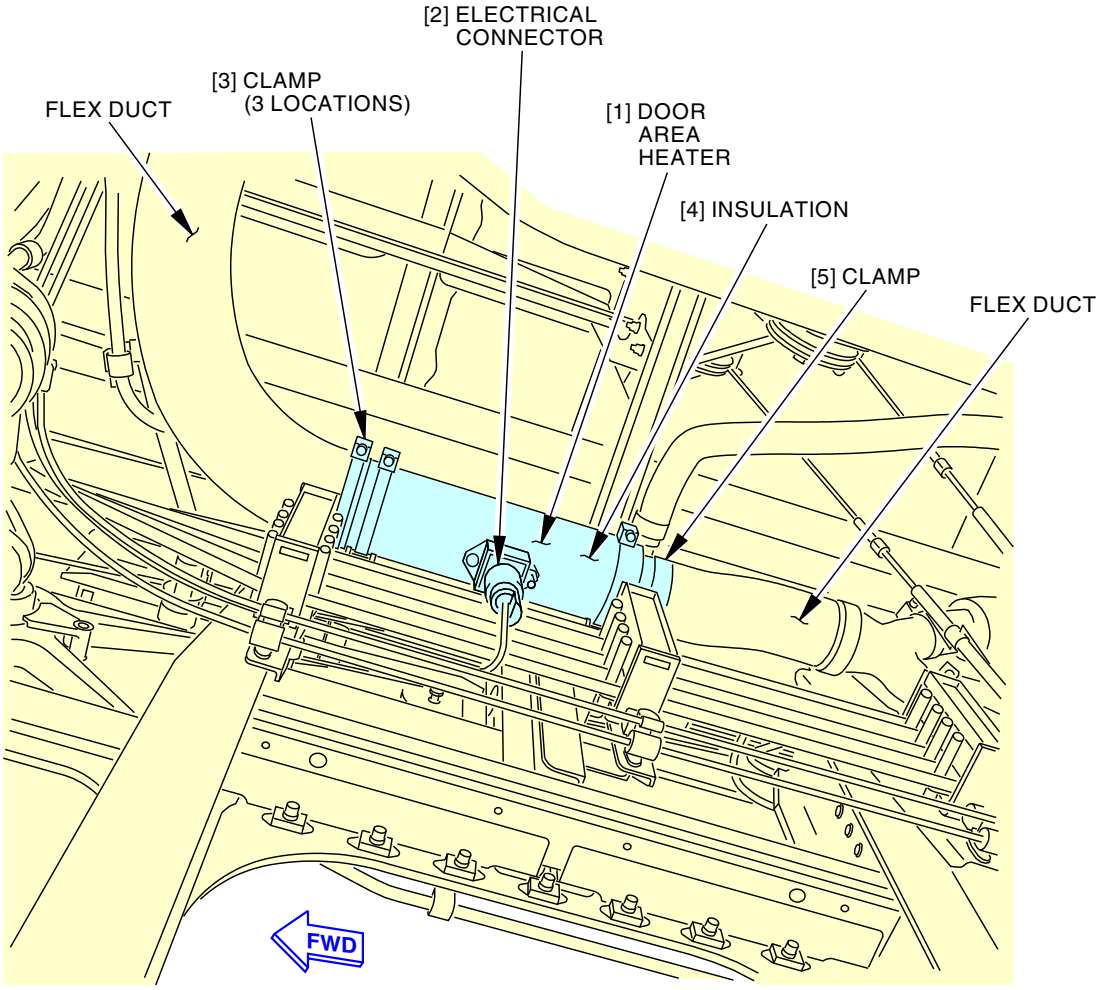



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**Forward Door Area Heater Installation**
**Figure 401/21-45-01-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**VIEW THROUGH ACCESS PANEL, 113BW**

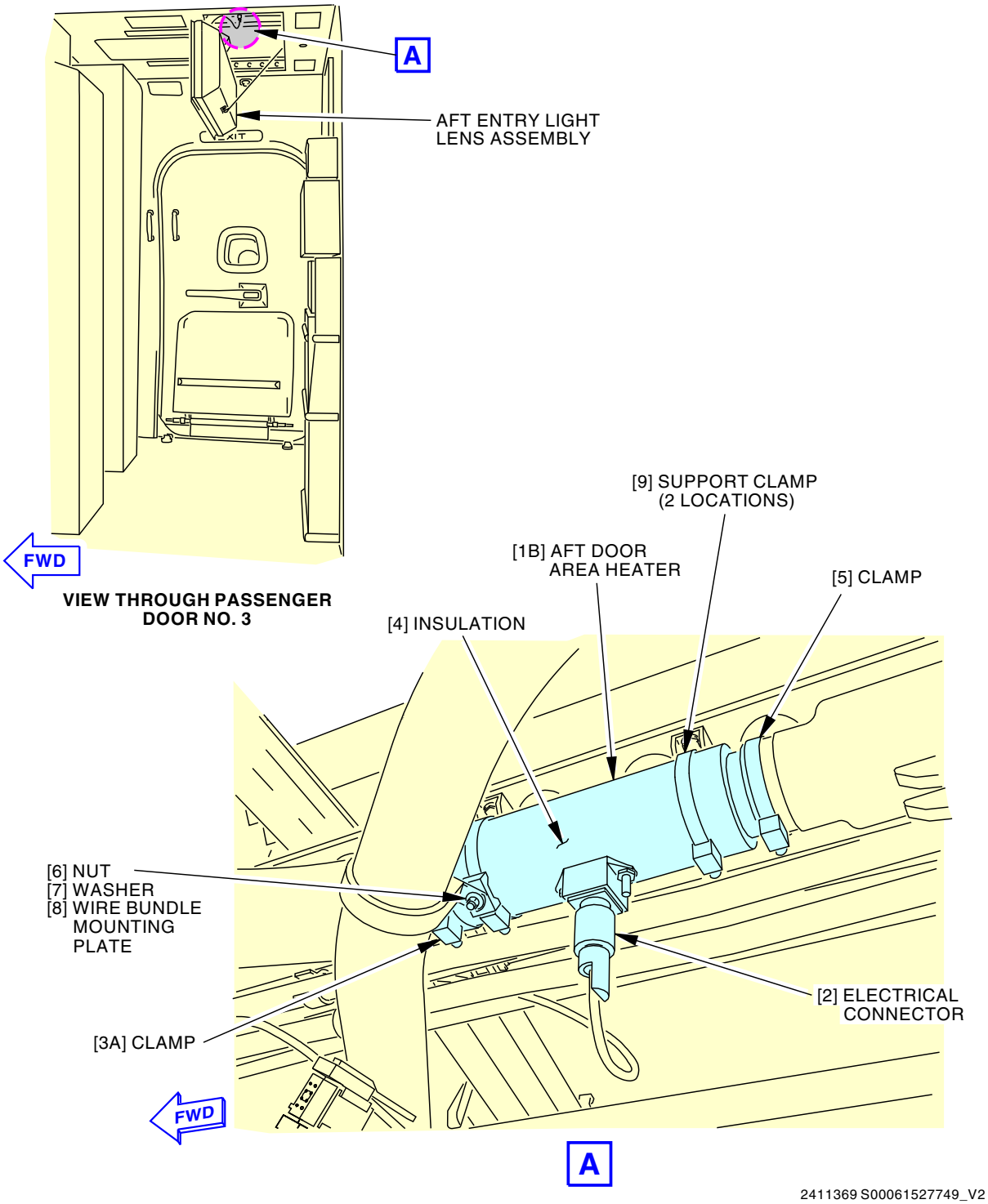
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**Forward Door Area Heater Installation**
**Figure 401/21-45-01-990-801 (Sheet 2 of 2)**



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**Aft Door Area Heater Installation**
**Figure 402/21-45-01-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-45-01-400-801**

**3. Door Area Heater Installation**

(Figure 401 or Figure 402)

**A. General**

(1) Some of the ducts and equipment in the air distribution system are wrapped with insulation material. CFR 14 Part 121.312 mandates that insulation material installed in the fuselage as a replacement after September 2, 2005 must meet the flame propagation requirements of CFR Part 25.856, effective September 2, 2003.

(2) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation requirement.

(3) Melamine foam insulation, G50449, BMS8-385, is the preferred foam insulation material that meets the flame propagation requirement. BMS8-385 Type 4 is the preferred foam insulation material that meets the flame propagation requirement. BMS 8-385 Type 6 and BMS 8-300 Type VIII insulation is optional to BMS8-385 Type 4.

(4) Air conditioning ducts with polyimide foam insulation, G02470 must be wrapped with tape, G50327, tape, G51202, or tape, G50789, to meet the flammability/flame propagation requirements. Wrap the tape, G50327, tape, G51202, or tape, G50789, across 100% of the brown hypalon insulation surface on the polyimide foam insulation, G02470.

(5) Do not use BMS8-39 polyurethane foam insulation for repairs due to the degradation in flammability properties over time.

(6) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation requirement must be removed or completely covered with tape that does meet the requirement.

(a) Tape specifications BMS 5-157, Type I, Class 1, Grade B, composition MPVF and BMS 5-157, Type I, Class 2, Grade C, composition MPEEK are qualified tapes used to secure insulation to ducts.

**B. References**

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G02470 | Foam - Flexible Polyimide | BMS8-300 Type I |
| G50327 | Tape - Advanced Insulation Blanket (use until stock depleted) | BMS5-157 Type I Class 1 Grade B Composition MPVF |
| G50449 | Foam - Flexible Melamine | BMS8-385 Type 4 Grade 1 |
| G50789 | Tape - Adhesive Insulation Blanket | BMS5-157 Type I Class 2 Grade C Composition MPEEK |
| G51202 | Tape - Advanced Insulation Blanket | BMS5-157 Type I Class 1 Grade A Composition MPVF |



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**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Forward door area heater | 21-45-01-01-150 | SIA ALL |
| | | 21-45-01-07-045 | SIA ALL |
| 1B | Aft door area heater | 21-45-01-07-045 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 113 | Area Above and Outboard of Nose Landing Gear Wheel Well - Left |
| 117 | Electrical and Electronics Compartment - Left |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 113BW | Forward Nose Wheel Well Panel |
| 117A | Electronic Equipment Access Door |

**G. Door Area Heater Installation**

SUBTASK 21-45-01-420-001

(1) Install the forward door area heater [1] between the flex ducts as follows:

(a) Put the forward door area heater [1] in its position with the electrical connector [2] pointed down.

NOTE: Point the flow arrow on the heater in the same direction as the flow arrow on the support structure.

(b) Install the free ends of the forward and aft flex ducts on the forward door area heater [1] as follows:

NOTE: Route the flex ducts such that the duct length that is not necessary is taken up.

1) Use large radius bends to prevent a kink or turn of the ducts.

2) Compress the flex duct between the support clamps.

(c) Make sure that the flex ducts overlap the ends of the heater duct 1.25 ±0.13 in. (31.75 ±3.30 mm).

(d) Move the clamps [3] and clamp [5] into their positions 0.38 ±0.13 in. (9.65 ±3.30 mm) from the ends of the flex ducts.

(e) Tighten the clamps [3] and clamp [5] to 5 in-lb (0.6 N·m) - 6 in-lb (0.7 N·m).

(f) Close this access panel:

| Number | Name/Location |
|---|---|
| 113BW | Forward Nose Wheel Well Panel |

SUBTASK 21-45-01-420-002

(2) Install the aft door area heater [1B] between the flex ducts as follows:

(a) Put the aft door area heater [1B] in its position with the electrical connector [2] pointed down.

NOTE: Point the flow arrow on the heater in the same direction as the flow arrow on the support structure.

(b) Install the free ends of the forward and aft flex ducts on the aft door area heater [1B] until the ends of the flex ducts overlap the heater duct by 1.25 ±0.13 in. (31.75 ±3.30 mm).



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(c) Move the clamp [3A] and clamp [5] into their positions 0.38 ±0.13 in. (9.65 ±3.30 mm) from the ends of the heater duct.

(d) Tighten the clamp [3A] and clamp [5] to 5 in-lb (0.6 N·m) - 6 in-lb (0.7 N·m).

(e) Install new tape, G50327, tape, G51202, or tape, G50789, on the seam of the insulation [4].

(f) Install the insulation [4] on the aft door area heater [1B].

(g) Install the two duct support clamps [9] around the insulation [4] on the aft door area heater [1B].

(h) Connect the electrical connector [2] to the aft door area heater [1B].

(i) Close the aft entry light lens assembly.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-45-01-840-002

(1) Close the applicable circuit breaker as follows:

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(a) Remove the safety tags and close these circuit breakers:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01279 | DOOR AREA HTR-AFT |
| D | 9 | C01280 | DOOR AREA HTR-FWD |

(b) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-01-860-006

(2) Make sure that the L RECIRC FAN and R RECIRC FAN switches, on the P5-10 bleed control air panel, are set to the AUTO position.

## I. Door Area Heater Installation Test

SUBTASK 21-45-01-860-002

(1) Make sure that the GALLEY switch, on the P5-13 electrical meters, battery and galley power panel, is set to the ON position.

SUBTASK 21-45-01-860-003

(2) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.


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**SUBTASK 21-45-01-700-001**

(3) Make sure that the airflow from the door heater outlet is cool.

**SUBTASK 21-45-01-860-004**

(4) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

**SUBTASK 21-45-01-700-002**

(5) Make sure that the airflow from the door heater outlet becomes warmer.

**SUBTASK 21-45-01-860-005**

(6) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

**SUBTASK 21-45-01-840-003**

(7) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**——— END OF TASK ———**



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## EMERGENCY EXIT DOOR HEATER SYSTEM - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the emergency exit door heater blanket

(2) An installation of the emergency exit door heater blanket.

(3) A removal of the door surround panel heater blanket of the emergency exit door

(4) An installation of the door surround panel heater blanket of the emergency exit door.

(5) A removal of the closeout panel heater blanket of the emergency exit door

(6) A installation of the closeout panel heater blanket of the emergency exit door.

B. There are two heater blankets in each emergency exit door. There is one heater blanket behind the closeout panel of each emergency exit door doorway. There is a heater blanket behind the forward and aft door surround panel of each emergency exit door.

C. The emergency exit door heater blankets operate when these conditions are met:

(1) The airplane is in the air

(2) One or two of the air conditioning packs are on.

**TASK 21-45-02-000-801**

### 2. Emergency Exit Door Heater Blanket Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 25-21-20-000-801 | Emergency Exit Doorway Lining Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-45-02-010-014**

(1) To get access to the P91 and P92 panels, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |



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SUBTASK 21-45-02-840-001

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-010-001

(3) Open the emergency exit door.

## E. Emergency Exit Door Heater Blanket Removal

SUBTASK 21-45-02-010-002

**CAUTION** DO NOT APPLY TENSION TO THE WIRE BUNDLE BEHIND THE LINING. DAMAGE TO THE WIRE BUNDLE CAN OCCUR.

(1) Remove the lining on the emergency exit door (TASK 25-21-20-000-801).

SUBTASK 21-45-02-020-001

(2) Disconnect the electrical connectors from the heater blanket [1].

SUBTASK 21-45-02-020-002

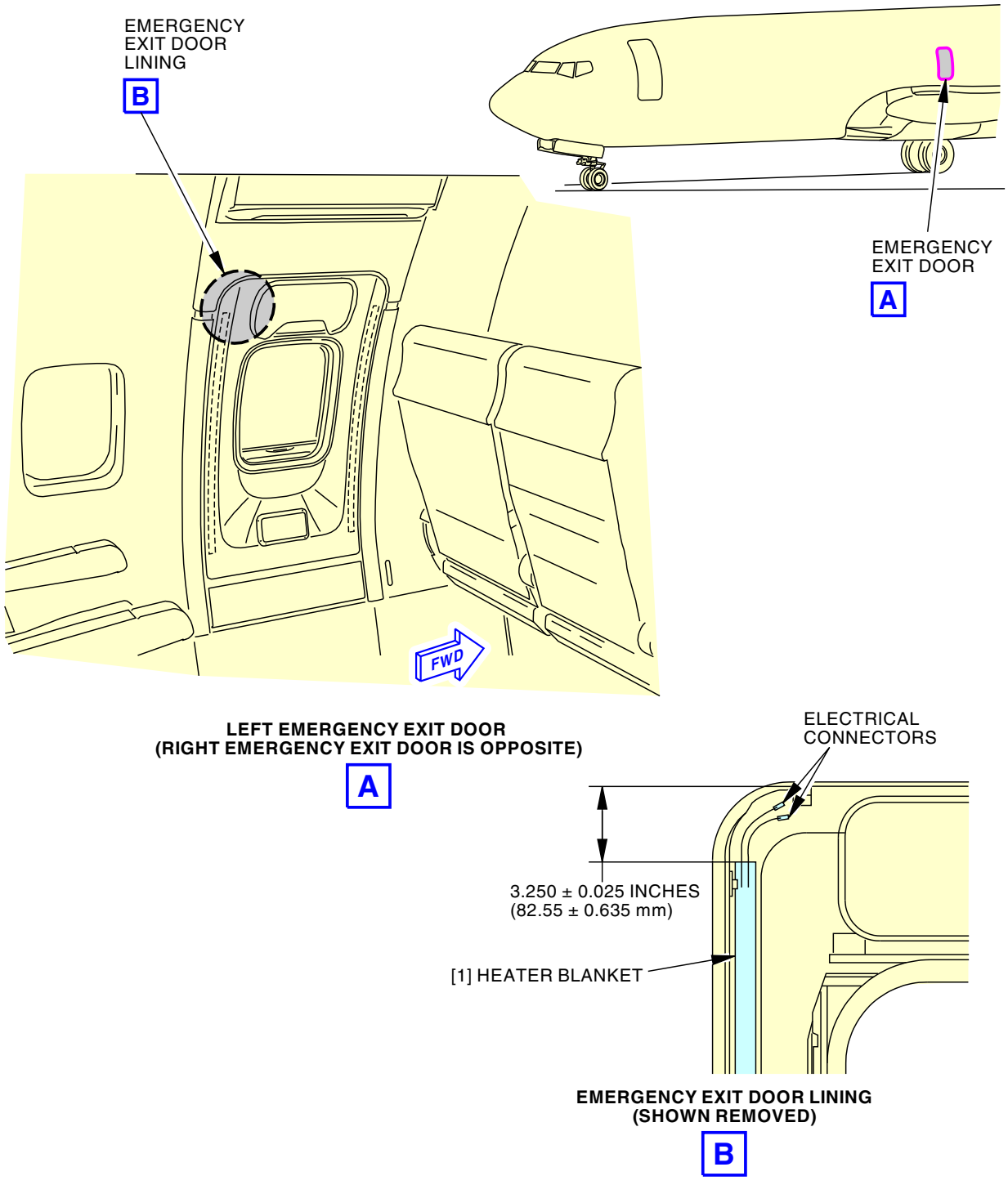
(3) Remove the heater blanket [1].

NOTE: The heater blanket is attached to the lining with adhesive.

——— END OF TASK ———



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**Emergency Exit Door Heater Blanket Installation**
**Figure 401/21-45-02-990-801**



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**TASK 21-45-02-400-801**

## 3. Emergency Exit Door Heater Blanket Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-45-00-700-802 | Emergency Exit Hatch Heaters Operational Test (P/B 501) |
| 25-21-20-400-801 | Emergency Exit Doorway Lining Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Heater blanket | 52-22-51-01-165 | SIA ALL |
| | | 52-22-51-03-257 | SIA ALL |
| | | 52-22-51-03-280 | SIA ALL |
| | | 52-22-51-04-260 | SIA ALL |
| | | 52-22-51-04-300 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Emergency Exit Door Heater Blanket Installation

**SUBTASK 21-45-02-110-001**

(1) Clean the lining assembly with solvent, B00083, to remove all the adhesive.

**SUBTASK 21-45-02-420-001**

(2) Install the heater blanket [1] 3.250 ±0.025 in. (82.6 ±0.7 mm) from the top of the lining assembly.

(a) Make sure that there are no air bubbles between the heater and lining assembly.

**SUBTASK 21-45-02-020-003**

(3) Connect the electrical connectors for the heater blanket [1].



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SUBTASK 21-45-02-010-003

**CAUTION**

DO NOT APPLY TENSION TO THE WIRE BUNDLE BEHIND THE LINING. DAMAGE TO THE WIRE BUNDLE CAN OCCUR.

(4) Install the lining on the emergency exit door (TASK 25-21-20-400-801).

SUBTASK 21-45-02-010-004

(5) Close the emergency exit door.

SUBTASK 21-45-02-840-002

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(6) Remove the safety tag and close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-410-001

(7) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-02-710-001

(8) Do an operational test of the emergency exit hatch heaters (TASK 21-45-00-700-802).

**END OF TASK**

**TASK 21-45-02-000-802**

## 4. Emergency Exit Door Surround Panel Heater Blanket Removal

(Figure 402)

### A. References

| Reference | Title |
|---|---|
| 25-21-20-000-801 | Emergency Exit Doorway Lining Removal (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |



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(Continued)

| Zone | Area |
|---|---|
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Prepare for the Removal**

SUBTASK 21-45-02-010-013

(1) To get access to the P91 and P92 panels, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-02-840-003

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-010-005

(3) Open the emergency exit door.

**E. Emergency Exit Door Surround Panel Heater Blanket Removal**

SUBTASK 21-45-02-010-006

**CAUTION**

DO NOT APPLY TENSION TO THE WIRE BUNDLE BEHIND THE TRIM STRIP. DAMAGE TO THE WIRE BUNDLE CAN OCCUR.

(1) Remove the door surround panel from the emergency exit door doorway (TASK 25-21-20-000-801).

SUBTASK 21-45-02-020-004

(2) Disconnect the electrical connectors from the heater blanket [21].



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SUBTASK 21-45-02-020-005

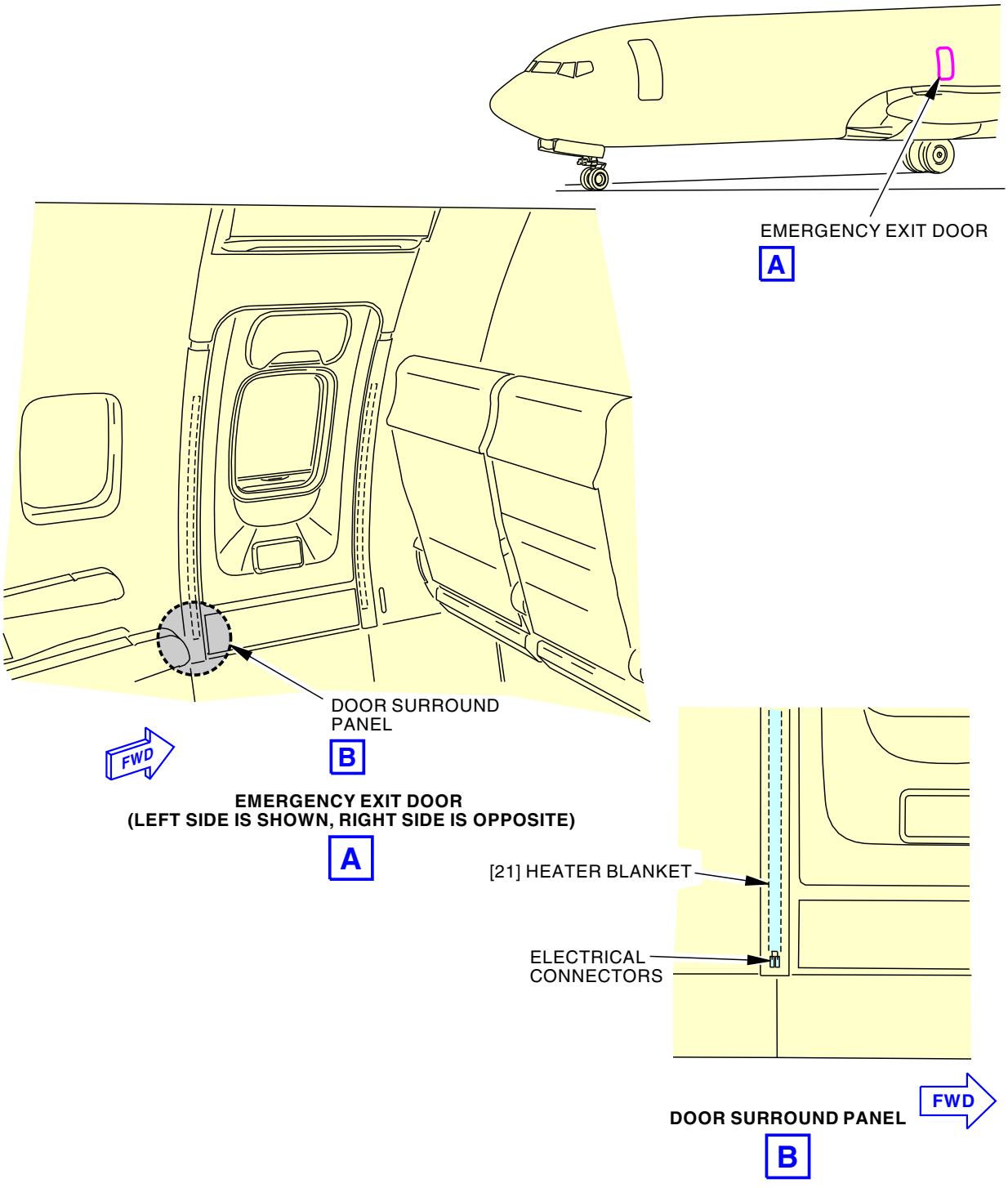
(3) Remove the heater blanket [21].

NOTE: The heater blanket is attached to the trim strip with adhesive.

——— END OF TASK ———



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**Emergency Exit Door Surround Panel Heater Blanket Installation**
**Figure 402/21-45-02-990-802**



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**TASK 21-45-02-400-802**

## 5. Emergency Exit Door Surround Panel Heater Blanket Installation

(Figure 402)

### A. References

| Reference | Title |
|---|---|
| 21-45-00-700-802 | Emergency Exit Hatch Heaters Operational Test (P/B 501) |
| 25-21-20-400-801 | Emergency Exit Doorway Lining Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 21 | Heater blanket | 52-22-51-01-165 | SIA ALL |
| | | 52-22-51-03-257 | SIA ALL |
| | | 52-22-51-03-280 | SIA ALL |
| | | 52-22-51-04-260 | SIA ALL |
| | | 52-22-51-04-300 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Emergency Exit Door Surround Heater Blanket Installation

**SUBTASK 21-45-02-110-002**

(1) Clean the aluminum part of the surround panel assembly with solvent, B00083, to remove all the adhesive.

**SUBTASK 21-45-02-420-002**

(2) Install the heater blanket [21] in the center of the aluminum part of the surround panel assembly.

(a) Make sure that there are no air bubbles between the heater and lining assembly.

**SUBTASK 21-45-02-020-006**

(3) Connect the electrical connectors for the heater blanket [21].



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SUBTASK 21-45-02-010-007

**CAUTION**

DO NOT APPLY TENSION TO THE WIRE BUNDLE BEHIND THE TRIM STRIP. DAMAGE TO THE WIRE BUNDLE CAN OCCUR.

(4) Install the surround panel in the emergency exit doorway (TASK 25-21-20-400-801).

SUBTASK 21-45-02-010-008

(5) Close the emergency exit door.

SUBTASK 21-45-02-840-004

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(6) Remove the safety tag and close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-410-002

(7) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-02-710-002

(8) Do an operational test of the emergency exit hatch heaters (TASK 21-45-00-700-802).

**END OF TASK**

**TASK 21-45-02-000-803**

## 6. Emergency Exit Door Closeout Panel Heater Blanket Removal

(Figure 403)

### A. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |


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(Continued)

| Zone | Area |
|---|---|
| 843 | Right Emergency Exit (STA 627.5) |

**B. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**C. Prepare for the Removal**

SUBTASK 21-45-02-010-015

(1) To get access to the P91 and P92 panels, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-02-840-005

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-010-009

(3) Open the emergency exit door.

**D. Emergency Exit Door Closeout Panel Heater Blanket Removal**

SUBTASK 21-45-02-010-010

(1) Push the prop [42] on the support assembly to release the closeout panel.

SUBTASK 21-45-02-010-011

(2) Hold the closeout panel in the vertical position to remove the heater blanket [41].

SUBTASK 21-45-02-020-007

(3) Disconnect the electrical connectors from the heater blanket [41].

SUBTASK 21-45-02-020-008

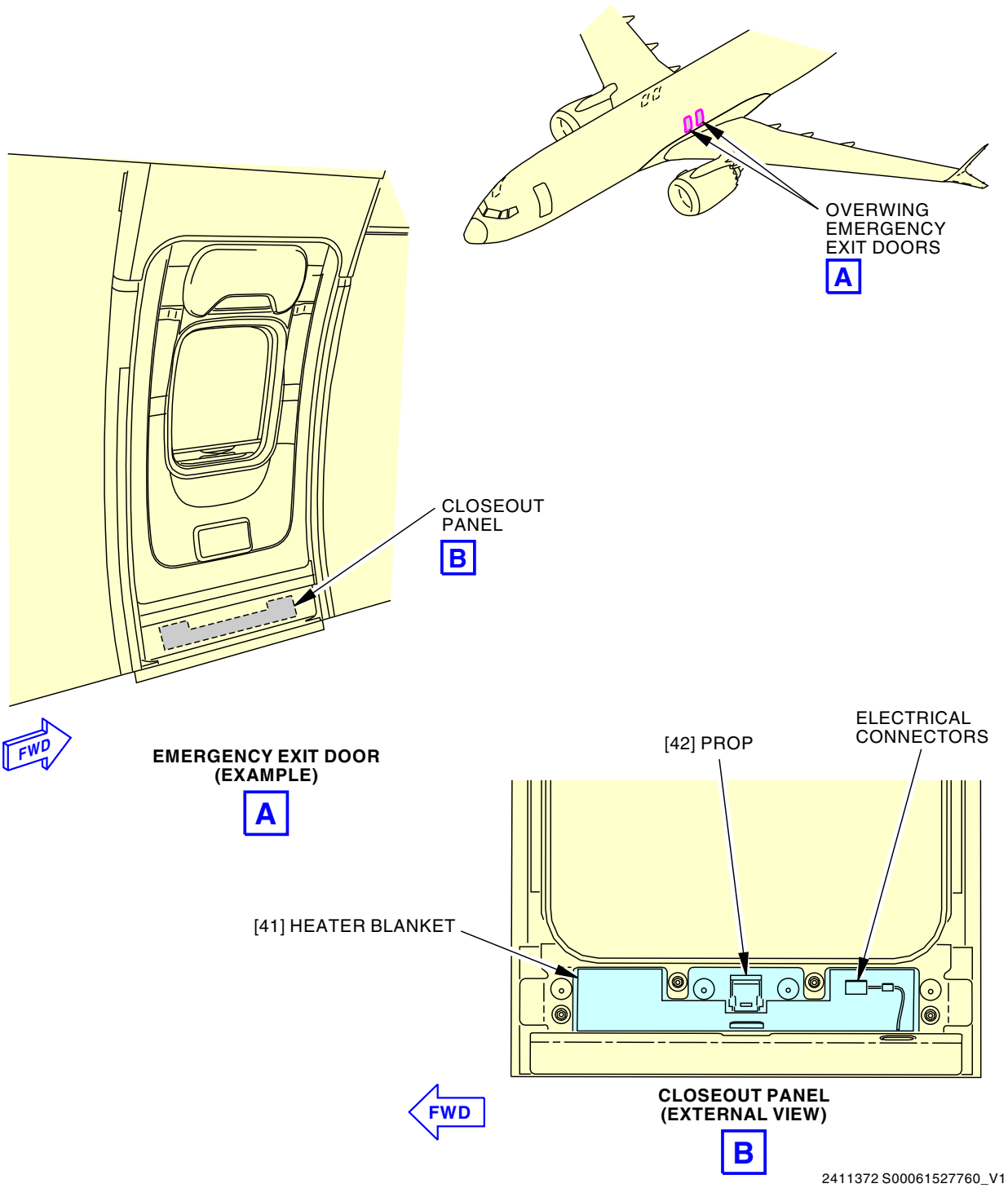
(4) Remove the heater blanket [41].

NOTE: The heater blanket is attached to the panel with adhesive.

**END OF TASK**



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**Emergency Exit Door Closeout Panel Heater Blanket Installation**
**Figure 403/21-45-02-990-803**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-45-02-400-803**

## 7. Emergency Exit Door Closeout Panel Heater Blanket Installation

(Figure 403)

### A. References

| Reference | Title |
|---|---|
| 21-45-00-700-802 | Emergency Exit Hatch Heaters Operational Test (P/B 501) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A00188 | Adhesive - Urethane, Two Component | BMS5-105 Type V |
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 41 | Heater blanket | 52-22-51-03-410 | SIA ALL |
| | | 52-22-51-04-415 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 212 | Flight Compartment - Right |
| 832 | Left Forward Emergency Exit |
| 833 | Left Emergency Exit (STA 627.5) |
| 842 | Right Forward Emergency Exit |
| 843 | Right Emergency Exit (STA 627.5) |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Emergency Exit Door Closeout Panel Heater Blanket Installation

**SUBTASK 21-45-02-110-003**

(1) Clean the closeout panel with solvent, B00083, to remove all the adhesive.

**SUBTASK 21-45-02-420-003**

(2) Apply a layer of adhesive, A00188, to the closeout panel where the heater blanket and closeout panel touch.

**SUBTASK 21-45-02-420-004**

(3) Apply a layer of adhesive, A00188, to the heater blanket [41].

**SUBTASK 21-45-02-420-005**

(4) Put the heater blanket [41] in its position on the closeout panel and apply pressure.

**SUBTASK 21-45-02-420-006**

(5) Connect the electrical connectors to the heater blanket [41].

**SUBTASK 21-45-02-420-007**

(6) Let the adhesive dry, refer to the manufacturers specifications.

**SUBTASK 21-45-02-010-012**

(7) Close the emergency exit door.



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SUBTASK 21-45-02-840-006

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(8) Remove the safety tag and close this circuit breaker:

**Power Distribution Panel Number 1, P91**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01280 | DOOR AREA HTR-FWD |

SUBTASK 21-45-02-410-003

(9) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-45-02-710-003

(10) Do an operational test of the emergency exit hatch heaters (TASK 21-45-00-700-802).

——— END OF TASK ———



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## PACK FLOW CONTROL AND PACK COOLING SYSTEM - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Air Cycle Air Conditioning and Temperature Control System - Deactivation

(2) Air Cycle Air Conditioning and Temperature Control System - Activation

(3) Ram Air System - Deactivation

(4) Ram Air System - Activation

**TASK 21-51-00-800-801**

### 2. Air Cycle Air Conditioning and Temperature Control System - Deactivation

(Figure 201)

#### A. General

(1) This task will deactivate these components in the air cycle air conditioning and temperature control system.

- Flow Control and Shutoff Valve (FCSOV)
- Heat Exchanger and Plenum/Diffuser Assembly
- Air Cycle Machine (ACM)
- Conditioned Air Check Valve
- Duct Water Extractor
- Temperature Control Valve (TCV)
- Standby Temperature Control Valve (STCV)
- Condenser
- Reheater
- Water Extractor
- Water Extractor Duct
- Water Spray Nozzle
- Compressor Discharge Overheat Switch
- Turbine Inlet Overheat Switch
- Pack Discharge Duct Overheat Switch
- Ram Air Control Temperature Sensor
- Mix Manifold Temperature Sensor
- Pack Temperature Sensor
- Pack Temperature Bulb
- Air Conditioning Module.

#### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |



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**D. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**E. Air Cycle Air Conditioning and Temperature Control System Deactivation**

SUBTASK 21-51-00-860-001

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM BEFORE YOU DO MAINTENANCE. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure that the pneumatic system is off (TASK 36-00-00-860-806).

SUBTASK 21-51-00-860-002

(2) Do these steps, on the P5-10 air conditioning panel:

(a) Put the L and R PACK switches to the OFF position.

1) Attach the DO NOT OPERATE tags, STD-858, on the switches.

(b) Put the ISOLATION VALVE switch to the OPEN position.

1) Attach the DO NOT OPERATE tag, STD-858, on the switch.

(c) Put the BLEED 1 and 2 switches to the OFF position.

1) Attach the DO NOT OPERATE tags, STD-858, on the switches.

(d) Put the BLEED APU switch to the OFF position.

1) Attach the DO NOT OPERATE tag, STD-858, on the switches.

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(e) If an external ground air source was used, disconnect the external ground air source from the ground pneumatic service connector.

SUBTASK 21-51-00-860-003

(3) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |
| A | 5 | C00259 | AIR CONDITIONING BLEED AIR VALVE ISLN |
| A | 7 | C00796 | AIR CONDITIONING BLEED AIR VALVES L |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |
| B | 7 | C00797 | AIR CONDITIONING BLEED AIR VALVES R |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |


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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 2 | C01169 | A/C ZONE TEMP DUCT OVHT AFT PASS |
| C | 3 | C01166 | A/C ZONE TEMP DUCT OVHT FWD PASS |
| C | 4 | C01164 | A/C ZONE TEMP DUCT OVHT FLT DECK |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

## F. System Check

NOTE: This check is to make sure that the air cycle air conditioning and temperature control system is in a zero energy state.

**SUBTASK 21-51-00-210-001**

(1) Make sure that the duct temperature indicator, on the P5-17 cabin temperature control panel, shows less than 200°F (93°C).

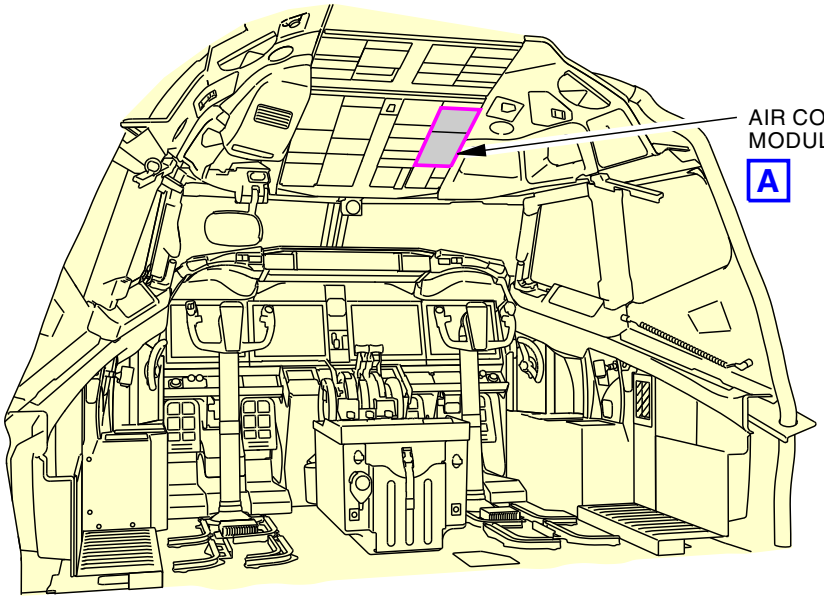
**SUBTASK 21-51-00-210-002**

(2) Make sure that both duct pressure needles on the dual duct pressure indicator, on the P5-10 air conditioning panel, show 0 psi (0 kPa).

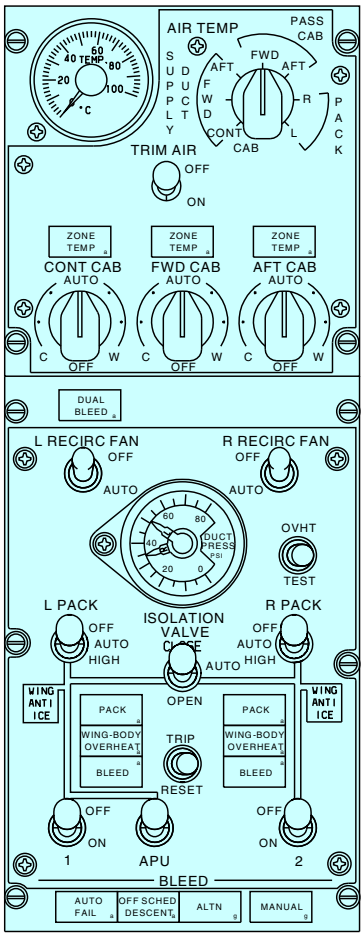
**——— END OF TASK ———**



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**FLIGHT COMPARTMENT**




**AIR CONDITIONING MODULE**

**A**

2411231 S00061527313_V2

**Air Conditioning Module (P5-10)**
**Figure 201/21-51-00-990-801**



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**TASK 21-51-00-800-802**

**3. Air Cycle Air Conditioning and Temperature Control System - Activation**

(Figure 201)

**A. General**

(1) This task will activate these components in the air cycle air conditioning and temperature control system.

- Flow Control and Shutoff Valve (FCSOV)
- Heat Exchanger and Plenum/Diffuser Assembly
- Air Cycle Machine (ACM)
- Conditioned Air Check Valve
- Duct Water Extractor
- Temperature Control Valve (TCV)
- Standby Temperature Control Valve (STCV)
- Condenser
- Reheater
- Water Extractor
- Water Extractor Duct
- Water Spray Nozzle
- Compressor Discharge Overheat Switch
- Turbine Inlet Overheat Switch
- Pack Discharge Duct Overheat Switch
- Ram Air Control Temperature Sensor
- Mix Manifold Temperature Sensor
- Pack Temperature Sensor
- Pack Temperature Bulb
- Air Conditioning Module.

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Air Cycle Air Conditioning and Temperature Control System Activation**

**SUBTASK 21-51-00-840-001**

(1) Do these steps, on the P5-10 air conditioning panel:

(a) Remove the DO NOT OPERATE tags, STD-858, from the L and R PACK switches.

1) Put the L and R PACK switches to the AUTO position.

(b) Remove the DO NOT OPERATE tag, STD-858, from the ISOLATION VALVE switch.

1) Put the ISOLATION VALVE switch to the AUTO position.



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(c) Remove the DO NOT OPERATE tags, STD-858, from the BLEED 1 and 2 switches.

1) Put the BLEED 1 and 2 switches to the ON position.

(d) Remove the DO NOT OPERATE tag, STD-858, from the BLEED APU switch.

1) Put the BLEED APU switch to the ON position.

**SUBTASK 21-51-00-860-004**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM BEFORE YOU DO MAINTENANCE. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |
| A | 5 | C00259 | AIR CONDITIONING BLEED AIR VALVE ISLN |
| A | 7 | C00796 | AIR CONDITIONING BLEED AIR VALVES L |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |
| B | 7 | C00797 | AIR CONDITIONING BLEED AIR VALVES R |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 2 | C01169 | A/C ZONE TEMP DUCT OVHT AFT PASS |
| C | 3 | C01166 | A/C ZONE TEMP DUCT OVHT FWD PASS |
| C | 4 | C01164 | A/C ZONE TEMP DUCT OVHT FLT DECK |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

**END OF TASK**

**TASK 21-51-00-800-803**

## 4. Ram Air System - Deactivation

### A. General

(1) This task will deactivate these components in the ram air system.

- Ram Air Inlet Actuator
- Ram Air Inlet Deflector Door



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- Ram Air Inlet Modulation Panels
- Ram Air Exhaust Actuator

**B. Location Zones**

| Zone | Area |
|---|---|
| 191 | Lower Wing-To-Body Fairing - Forward of Wing Box |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**C. Procedure**

**SUBTASK 21-51-00-040-001**

(1) When the ram air components for left cooling pack will be deactivated, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-00-040-002**

(2) When the ram air components for the right cooling pack will be deactivated, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**——— END OF TASK ———**

**TASK 21-51-00-800-804**

## 5. Ram Air System - Activation

**A. General**

(1) This task will activate these components in the ram air system.

- Ram Air Inlet Actuator
- Ram Air Inlet Deflector Door
- Ram Air Inlet Modulation Panels
- Ram Air Exhaust Actuator

**B. Location Zones**

| Zone | Area |
|---|---|
| 191 | Lower Wing-To-Body Fairing - Forward of Wing Box |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |



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(Continued)

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

## C. Procedure

SUBTASK 21-51-00-440-001

(1) If the ram air inlet door and ram air exhaust duct louvers for the left cooling pack were deactivated, do this step:

**WARNING** MOVE ALL PERSONNEL AWAY FROM THE PANELS, DOORS, VANES, AND LINKAGES FOR RAM AIR. THESE CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-00-440-002

(2) If the ram air inlet door and ram air exhaust duct louvers for the right cooling pack were deactivated, do this step:

**WARNING** MOVE ALL PERSONNEL AWAY FROM THE PANELS, DOORS, VANES, AND LINKAGES FOR RAM AIR. THESE CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**END OF TASK**



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## PACK FLOW CONTROL AND PACK COOLING SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tasks:

(1) Pack Flow Control Valve Operational Test.

(2) Ram Air System Operational Test.

**TASK 21-51-00-700-802**

### 2. Pack Flow Control Valve Operational Test

#### A. General

(1) This test does a check of the pack flow control and shutoff valve AUTO and APU high flow modes.

#### B. References

| Reference | Title |
|---|---|
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### E. Procedure

**SUBTASK 21-51-00-010-003**

(1) Make sure that these access panels are open:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**SUBTASK 21-51-00-860-013**

(2) Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

**SUBTASK 21-51-00-860-014**

(3) Do these steps to make sure the left pack and right pack flow control valves are closed with the pack switches in the OFF position:

(a) Put the L PACK switch and the R PACK switch, on the P5-10 air conditioning panel, to the OFF position.



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(b) Make sure the position indicators on the left and right flow control and shutoff valves are in the closed position.

1) Use a mirror to verify the valve position.

(c) Make sure that the air conditioning maintenance data page indicates that the pack flow is 0 lb/min (0 kg/min).

**SUBTASK 21-51-00-860-015**

(4) Do these steps to make sure the left and right flow control valves are partially open with the pack switches in the AUTO position:

(a) Make sure that either the BLEED 1 or BLEED 2 switch, on the P5-10 air conditioning panel, is set to the ON position.

(b) Set the CONT CAB, FWD CAB and AFT CAB temperature selectors, on the P5-17 cabin temperature panel, to the AUTO position.

(c) Put the L PACK switch and the R PACK switch in the AUTO position.

NOTE: The packs will operate.

(d) Make sure that the air conditioning maintenance data page indicates that both packs have a pack flow greater than 0 lb/min (0 kg/min).

**SUBTASK 21-51-00-710-001**

(5) Do these steps to make sure that a pack in operation will go to the engine high position when the other pack shuts down:

(a) Put the airplane in the air mode (TASK 32-09-00-860-801).

(b) Retract the trailing edge flaps to the fully up position (TASK 27-51-00-860-804).

(c) Position the L PACK switch in the AUTO position.

(d) Position the R PACK switch to the OFF position.

(e) Make sure that the air conditioning maintenance data page indicates that pack flow increases on the L PACK.

(f) Position the R PACK switch to the AUTO position.

(g) Position the L PACK switch to the OFF position.

(h) Make sure that the air conditioning maintenance data page indicates that pack flow increases on the R PACK.

(i) Put the L PACK switch and the R PACK switch, on the P5-10 air conditioning panel, to the OFF position.

**SUBTASK 21-51-00-860-016**

(6) Return the airplane to the ground mode (TASK 32-09-00-860-802).

**SUBTASK 21-51-00-860-018**

(7) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-00-410-006**

(8) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



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**TASK 21-51-00-730-801**

## 3. Ram Air System Operational Test

(Figure 501)

### A. General

(1) This procedure does a test of the ram air system actuators and associated components.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Prepare for the Operational Test

**SUBTASK 21-51-00-860-023**

(1) Set the switches, on the P5-10 Air Conditioning Module, to these positions:

(a) BLEED 1 and BLEED 2 switches to OFF

(b) APU BLEED switch to OFF

(c) L PACK and R PACK switches to AUTO

**SUBTASK 21-51-00-860-024**

(2) Set the switches, on the P5-17 Cabin Temperature Selector, to these positions:

(a) TRIM AIR switch to ON

(b) CONT CAB selector switch to AUTO

(c) FWD CAB selector switch to AUTO

(d) AFT CAB selector switch to AUTO

### E. Ram Air Modulation Operational Test

**SUBTASK 21-51-00-730-001**

(1) Do this ground test: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

NOTE: There are two system test procedures within the task referenced above: one for the left system and one for the right system.

(a) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(b) If FAILED shows, go to the IFIM and do the applicable procedure(s).

**SUBTASK 21-51-00-860-025**

(2) Make sure that the aircraft is in the ground mode (TASK 32-09-00-860-802).



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SUBTASK 21-51-00-710-002

(3) Make sure that the left and right ram air inlet deflector doors are extended (View B, Figure 501).

SUBTASK 21-51-00-860-026

(4) Extend the trailing edge flaps to position 1 (TASK 27-51-00-860-803).

SUBTASK 21-51-00-210-003

(5) Make sure that the left and right ram air inlet deflector doors are still extended.

SUBTASK 21-51-00-860-027

(6) Put the airplane in the air mode (TASK 32-09-00-860-801).

SUBTASK 21-51-00-710-006

(7) Make sure that the left and right ram air inlet deflectors door move to the stowed position (View A, Figure 501).

SUBTASK 21-51-00-860-028

(8) Retract the trailing edge flaps to the fully up position (TASK 27-51-00-860-804).

SUBTASK 21-51-00-710-009

(9) Make sure that the left and right exhaust deflector doors move to the partially stowed position (View C, Figure 501).

SUBTASK 21-51-00-860-029

(10) Return the airplane to the ground mode (TASK 32-09-00-860-802).

SUBTASK 21-51-00-860-030

(11) Make sure that the left and right ram air inlet deflector doors are extended (View B, Figure 501).

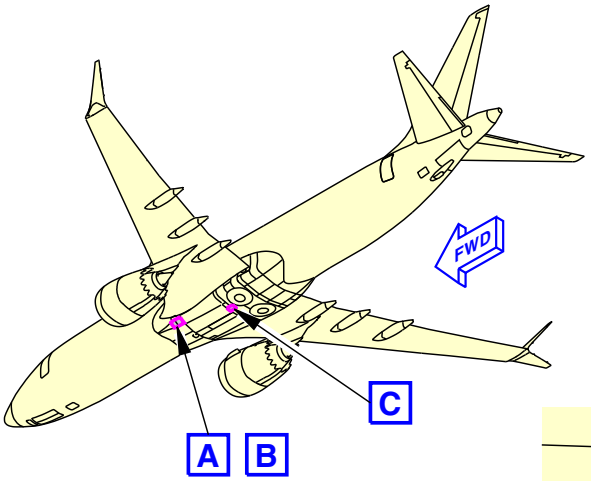
SUBTASK 21-51-00-860-031

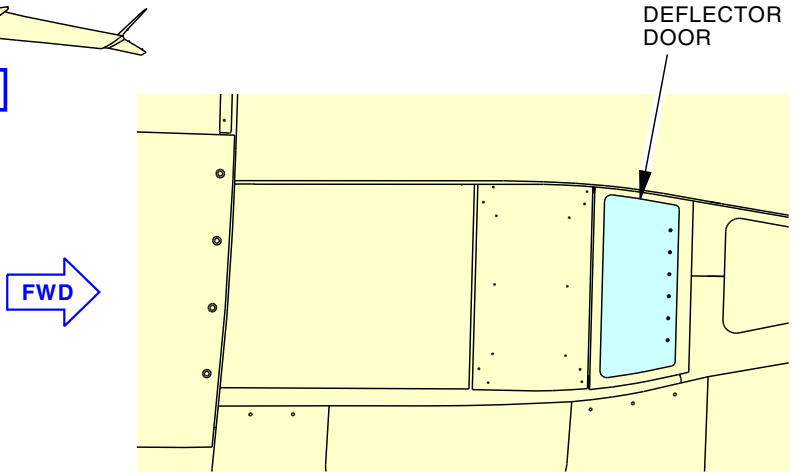
(12) Put the switches back to the usual condition.

——— END OF TASK ———



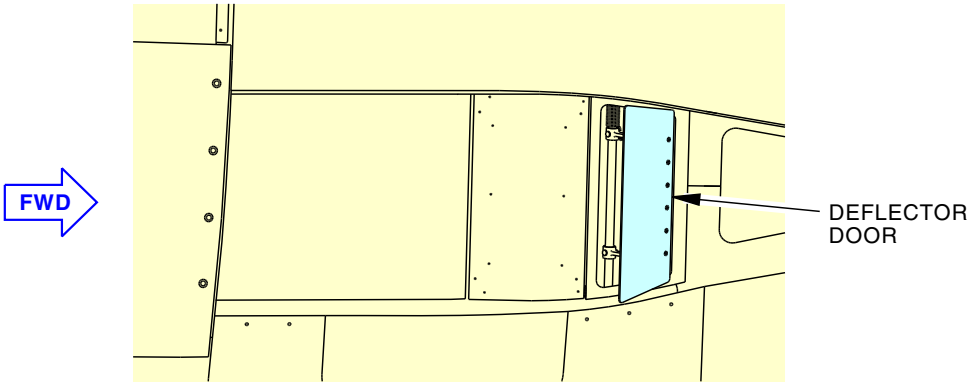
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**LEFT INLET DEFLECTOR DOOR - STOWED**
**(RIGHT INLET DEFLECTOR DOOR IS EQUIVALENT)**

**A**




**LEFT INLET DEFLECTOR DOOR - EXTENDED**
**(RIGHT INLET DEFLECTOR DOOR IS EQUIVALENT)**

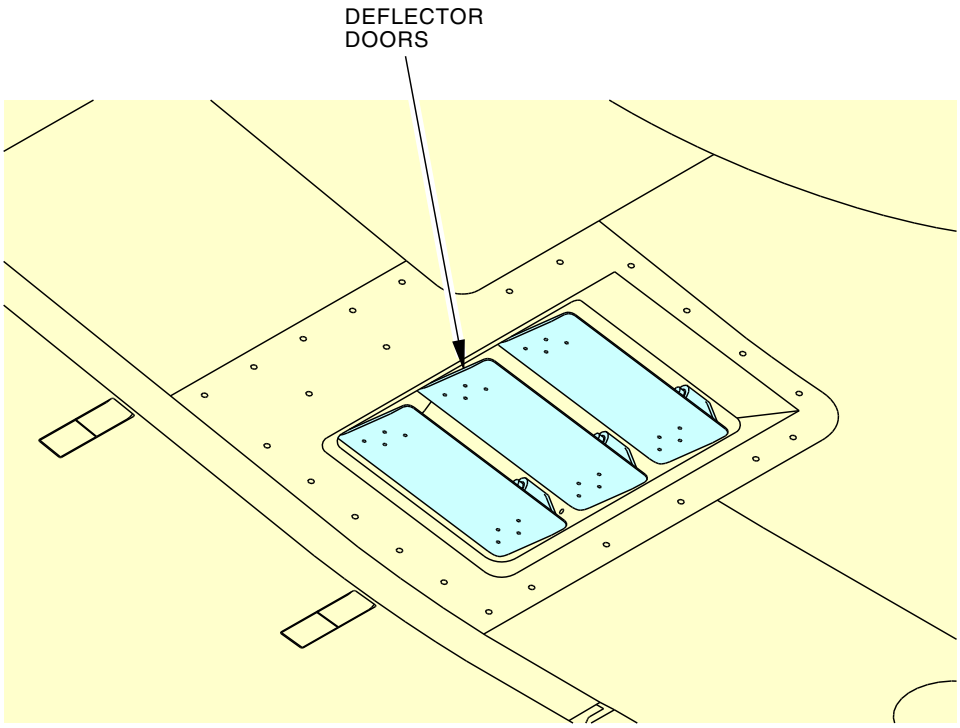
**B**

2538805 S0000601860_V2

**RAM Air System Operational Test**
**Figure 501/21-51-00-990-806 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**LEFT EXHAUST DEFLECTOR DOORS - PARTIALLY OPEN**
**(RIGHT EXHAUST DEFLECTOR DOORS ARE EQUIVALENT)**

C

2538817 S0000601861_V2

**RAM Air System Operational Test**
**Figure 501/21-51-00-990-806 (Sheet 2 of 2)**



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## PACK FLOW CONTROL AND PACK COOLING SYSTEM - INSPECTION/CHECK

### 1. General

A. This procedure has this task:

(1) A static breakaway torque check of the Air Cycle Machine (ACM).

**TASK 21-51-00-700-803**

### 2. Air Cycle Machine Static Breakaway Torque Check

(Figure 601)

#### A. General

(1) This task gives instructions to do the static breakaway torque check the Air Cycle Machine (ACM).

#### B. References

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-51-04-000-801 | Air Cycle Machine Removal (P/B 401) |
| 21-51-04-400-801 | Air Cycle Machine Installation (P/B 401) |
| 21-51-17-000-801 | High Pressure Water Separator Mix Muff Removal (P/B 401) |
| 21-51-17-400-801 | High Pressure Water Separator Mix Muff Installation (P/B 401) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

#### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00504 | Grease - Petrolatum | VV-P-236 |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |
| D50320 | Lubricant - Moly-50 Anti-Seize | MIL-PRF-83483 |
| G01061 | Water - Distilled | |

#### E. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Air cycle machine | 21-51-04-01-025 | SIA ALL |
| | | 21-51-04-01-510 | SIA ALL |
| 5 | Packing | 21-51-03-02-040 | SIA ALL |
| | | 21-51-03-02-200 | SIA ALL |
| 9 | Packing | 21-51-03-02-055 | SIA ALL |
| | | 21-51-03-02-210 | SIA ALL |
| 13 | Flexible duct | 21-51-08-05-130 | SIA ALL |
| | | 21-51-17-02-020 | SIA ALL |



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**F. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**G. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**H. Prepare for the Check**

SUBTASK 21-51-00-860-032

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure that there is no pressure in the pneumatic system.

(a) If it is necessary, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-00-860-033

(2) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L PACK and R PACK switches to the OFF position.

1) Attach the DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and BLEED 2 switches to the OFF position.

1) Attach the DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position.

1) Attach the DO NOT OPERATE tag, STD-858.

SUBTASK 21-51-00-860-039

(3) Make sure that these circuit breakers are open and have safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |


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SUBTASK 21-51-00-010-010

(4) When the air cycle machine for the left pack will be removed, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-00-010-011

(5) When the air cycle machine for the right pack will be removed, open these access panels in this sequence:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## I. Air Cycle Machine Static Breakaway Torque Check

SUBTASK 21-51-00-010-012

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) To remove the compressor outlet duct, do these steps:

(a) Disconnect the flex hose from the compressor outlet duct [12].

(b) Remove the electrical connector [3] from the ram air control sensor.

(c) Remove the electrical connector [6] from the compressor discharge overheat switch.

(d) Remove the nut [10] and washer [11] that hold the bonding jumper to the clamp on the duct.

(e) Remove the clamshell clamps [7] at the air cycle machine [1].

1) Lift the latch pawls at the same time to release the clamps [7].

(f) Move the sleeves [8] to the compressor outlet duct [12].

(g) Remove the coupling [4] at the heat exchanger.

(h) Remove the compressor outlet duct [12].

(i) Remove and discard the packing [5] at the heat exchanger.

(j) Remove and discard the packings [9].

SUBTASK 21-51-00-000-001

(2) Remove the HPWS mix muff [2], do this task: High Pressure Water Separator Mix Muff Removal, TASK 21-51-17-000-801.

SUBTASK 21-51-00-210-006

(3) Check the flexible duct [13] that is connected to the high pressure water separator condenser for any of the conditions listed below:

(a) Fraying

(b) Discoloration

(c) Rips



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(d) Splits

(e) Tears

(f) Rupture defects.

SUBTASK 21-51-00-210-007

(4) If any of the above conditions are found, remove the flexible duct [13].

(a) Loosen the clamp [14] that attach the flexible duct [13] to the water separator condenser.

(b) Remove the flexible duct [13] from the water separator condenser.

(c) Discard the flexible duct [13].

SUBTASK 21-51-00-720-001

(5) Do the torque check of the air cycle machine [1] as follows:

**CAUTION** TURN THE ROTATING COMPONENTS OF THE ACM ONLY IN THE DIRECTION THAT THEY TURN WHEN IN OPERATION. IF YOU TURN THE ACM ROTATING COMPONENTS IN THE INCORRECT DIRECTION, YOU CAN CAUSE DAMAGE TO THE FOIL AIR BEARINGS.

(a) Use a torque wrench on the nut to turn the turbine wheel in the direction of normal rotation.

NOTE: Normal rotation is clockwise when viewed from the turbine end and counterclockwise when viewed from the fan end.

(b) The torque necessary to turn the nut must not be more than 20 in-lb (2 N·m).

(c) If the torque is more than specified, replace of the ACM (TASK 21-51-04-000-801 and TASK 21-51-04-400-801).

NOTE: Wheel rub, endplay is too tight, dirt on the bearings or shaft, components not seated correctly, shaft surface finish, journal bearing set preload is too high, or housing assembly misalignment are probable cause for incorrect torque.

SUBTASK 21-51-00-420-001

(6) Install the new flexible duct [13] as follows:

(a) Loosely position the clamps [14] onto the flexible duct [13].

(b) Install the flexible duct [13] onto the water separator condenser.

(c) Position the forward clamp [14] to retain the flexible duct [13] onto the water separator condenser.

(d) Tighten the forward clamp [14] to 13 in-lb (1.5 N·m) - 17 in-lb (1.9 N·m).

NOTE: The aft clamp is connected in the installation of the HPWS mix muff in the next step.

SUBTASK 21-51-00-400-001

(7) Do this task: High Pressure Water Separator Mix Muff Installation, TASK 21-51-17-400-801.

SUBTASK 21-51-00-420-002

(8) To install the compressor outlet duct, do these steps:

(a) Apply a light coat of distilled water, G01061, or grease, D00504, or Molykote 44 grease, medium, D50104, to the new packing [5] and new packings [9].

(b) Install the packings [9] on the duct ends.

(c) Install the packing [5] at the heat exchanger.

(d) Put the compressor outlet duct [12] into its position.



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(e) Apply compound, D50320, to the bolt threads of the coupling [4].

(f) Install the coupling [4] at the heat exchanger.

1) Do not tighten the coupling [4] fully.

(g) Move the sleeve [8] over the outlet duct connection.

(h) Install the clamshell clamp [7] over the outlet duct connection.

(i) Tighten the nut on the coupling [4] to 45 in-lb (5.1 N·m) - 50 in-lb (5.6 N·m).

(j) With hand force, gently push the compressor outlet duct [12] in the direction of the adjacent mix muff duct until the compressor outlet duct [12] reaches the maximum flexed position.

(k) Make sure that there is a minimum clearance of 0.20 in. (5.1 mm) to the adjacent mix muff duct when the compressor outlet duct [12] is in the flexed position.

(l) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flex hose.

(m) Connect the flex hose to the compressor outlet duct [12].

(n) Install the electrical connector [3] to the ram air control sensor.

(o) Install the electrical connector [6] to the compressor discharge overheat switch.

(p) Install the nut [10] and washer [11] that hold the bonding jumper to the clamp on the duct.

## J. ACM Installation Test

**SUBTASK 21-51-00-860-042**

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

**SUBTASK 21-51-00-860-034**

(2) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

**SUBTASK 21-51-00-860-036**

(3) Remove the DO NOT OPERATE tags, STD-858, from the L PACK, R PACK, BLEED 1, BLEED 2, and BLEED APU switches, on the P5-10 air conditioning panel.

**SUBTASK 21-51-00-860-035**

(4) Put the applicable pack L PACK or R PACK switch, on the P5-10 air conditioning panel, to the AUTO position.



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SUBTASK 21-51-00-790-001

(5) Do a soap bubble test of all the duct joints at the HPWS mix muff [2] and at the air cycle machine [1].

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

2) Loosen the clamp [14] and clamp [15].

3) Make sure that the HPWS mix muff [2] and air cycle machine [1] are aligned at the joints.

4) Tighten the clamp [14] to 13 in-lb (1.5 N·m) - 17 in-lb (1.9 N·m).

5) Tighten the clamp [15] to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).

6) Put the L PACK and R PACK switches to the AUTO position.

7) Make sure that the leak has been repaired.

SUBTASK 21-51-00-740-004

(6) Do a IBIT test on the left and right pack/zone temperature controllers (M2957 and M2939).

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

(a) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

## K. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-00-860-037

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-00-410-007

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-00-410-008

(3) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

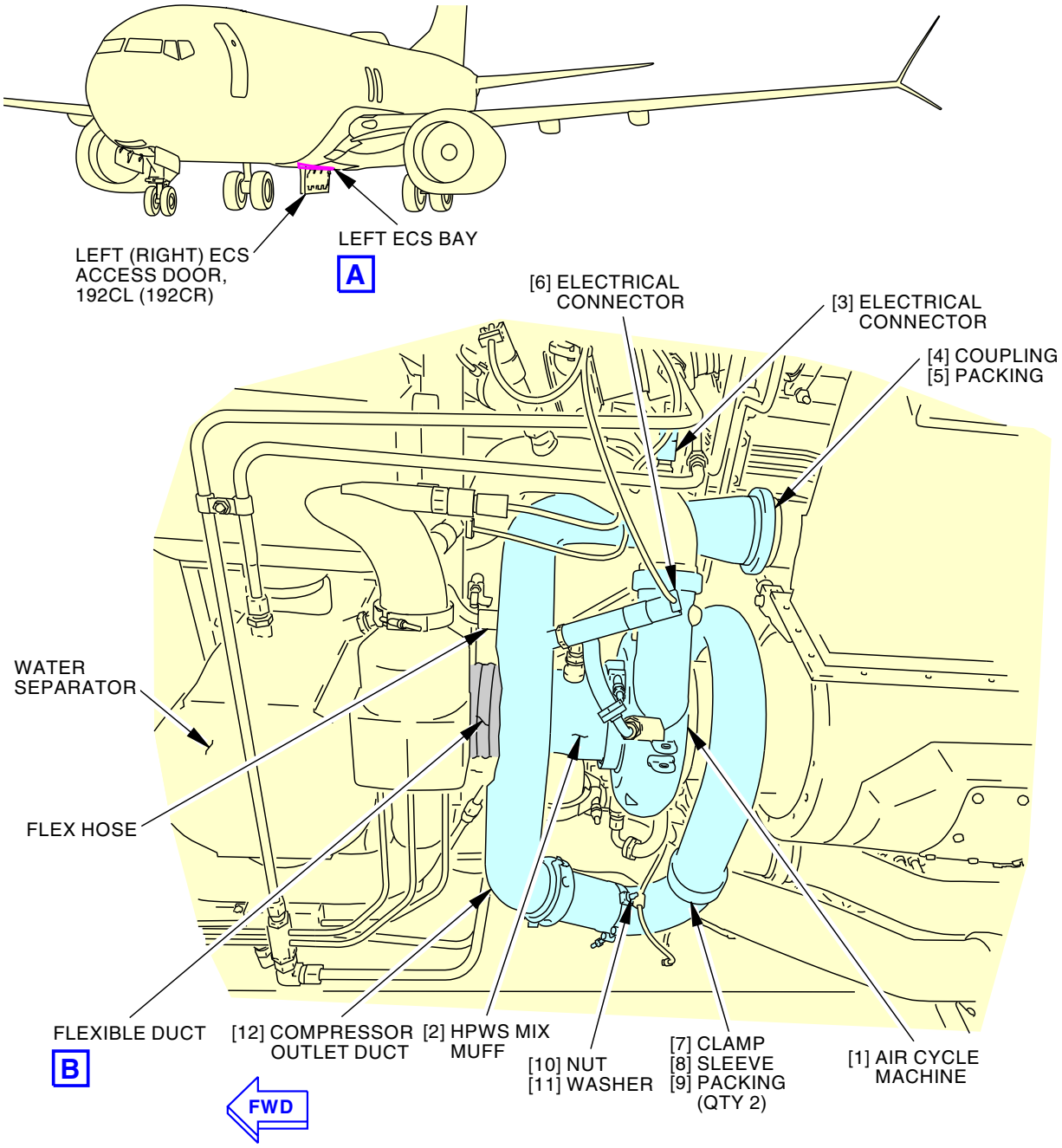
SUBTASK 21-51-00-860-038

(4) Put the L PACK and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

**END OF TASK**



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**LEFT ECS BAY**
**(RIGHT ECS BAY IS EQUIVALENT)**

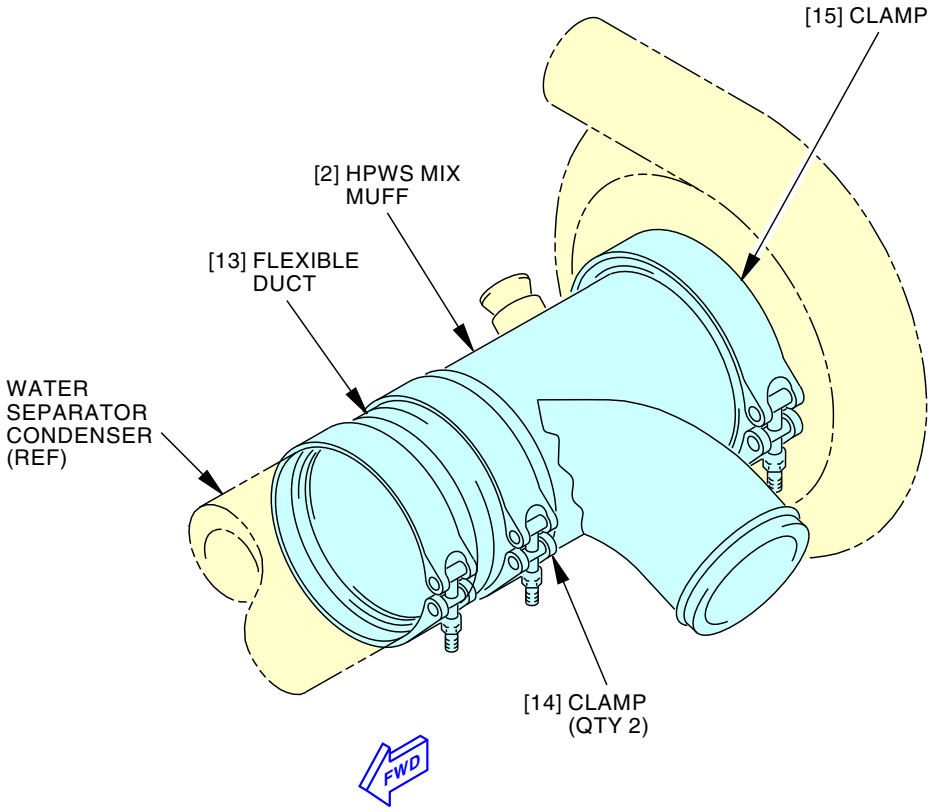
**A**

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**Air Cycle Machine Static Breakaway Torque Check**
**Figure 601/21-51-00-990-807 (Sheet 1 of 2)**



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**FLEXIBLE DUCT**
**(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)**

**B**

3008687 S0000782530_V1

**Air Cycle Machine Static Breakaway Torque Check**
**Figure 601/21-51-00-990-807 (Sheet 2 of 2)**



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## FLOW CONTROL AND SHUTOFF VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Left Flow Control and Shutoff Valve Removal

(2) Left Flow Control and Shutoff Valve Installation

(3) Right Flow Control and Shutoff Valve Removal

(4) Right Flow Control and Shutoff Valve Installation.

**TASK 21-51-01-000-801**

### 2. Left Flow Control and Shutoff Valve Removal

(Figure 401)

#### A. General

(1) The high pressure water separator mix muff is referred to as HPWS mix muff in this task.

#### B. References

| Reference | Title |
|---|---|
| 20-10-51-000-801 | Flareless Tubing Assembly Removal (P/B 401) |
| 21-51-17-000-801 | High Pressure Water Separator Mix Muff Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

#### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

#### F. Prepare for the Removal

**SUBTASK 21-51-01-860-008**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Remove pressure from the pneumatic system (TASK 36-00-00-860-806).

**SUBTASK 21-51-01-860-009**

(2) On the P5-10 Bleed Air Control Module, set the switches and attach DO NOT OPERATE tags, STD-858, as follows:

(a) Set the L PACK and R PACK switches to the OFF position.

(b) Set the BLEED 1 and 2 switches to the OFF position.

(c) Set the BLEED APU switch to the OFF position.



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SUBTASK 21-51-01-010-003

(3) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-51-01-010-004

(4) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-01-020-041

(5) Remove the electrical connector [1] from the ram air control sensor.

SUBTASK 21-51-01-020-042

(6) Remove the electrical connector [15] from the compressor discharge overheat switch.

SUBTASK 21-51-01-010-005

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(7) Remove the compressor outlet duct [11], as follows:

(a) Disconnect the flexhose [2] from the compressor outlet duct [11] (TASK 20-10-51-000-801).

(b) Remove and discard the O-ring [3].

(c) Remove the coupling [12] between the compressor outlet duct [11] and the air cycle machine.

NOTE: Lift the three latch pawls at the same time to release the coupling [12].

(d) Move the sleeve [13] to the adjacent duct.

(e) Remove the clamp coupling [16] between the compressor outlet duct [11] and the heat exchanger.

(f) Remove the compressor outlet duct [11].

(g) Remove and discard the packing [17].

(h) Remove and discard the two O-rings [14].

SUBTASK 21-51-01-020-014

(8) Remove the mix muff duct [5], as follows:

(a) Remove the screw [6], three washers [7], nut [8] that holds the bonding jumper [9] and bonding jumper [10] to the bonding tab on the mix muff duct [5].

(b) Hold the mix muff duct [5].

(c) Remove the two coupling clamps [4].

(d) Remove the mix muff duct [5].

SUBTASK 21-51-01-010-006

(9) Remove the HPWS mix muff (TASK 21-51-17-000-801).

SUBTASK 21-51-01-010-007

(10) Remove the compressor inlet duct [21], as follows:



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(a) Remove the screw [25] and plain washer [26] that holds the ground clip [27] to the air cycle machine.

(b) Move the jumper [28] from the air cycle machine.

NOTE: Keep the ground clip [27] on the jumper [28].

(c) Remove the two screws [22] and plain washers [23] that holds the compressor inlet duct [21] to the air cycle machine.

(d) Remove and discard the O-ring [24].

(e) Remove the self-bonding coupling [18].

NOTE: Lift the three latch pawls at the same time to release the clamp.

(f) Move the sleeve [19] to the compressor inlet duct [21].

(g) Remove and discard the two O-rings [20].

## G. Left Flow Control and Shutoff Valve Removal

**SUBTASK 21-51-01-020-043**

(1) Disconnect the electrical connector [29] from the flow control and shutoff valve [35].

**SUBTASK 21-51-01-020-015**

(2) Disconnect the electrical connector [33] from the flow control and shutoff valve [35].

**SUBTASK 21-51-01-020-016**

(3) Disconnect the electrical connector [34] from the flow control and shutoff valve [35].

**SUBTASK 21-51-01-020-017**

(4) Remove the screw [37], three plain washers [38], and nut [40] that connects the jumper [39] to the bonding tab on the flow control and shutoff valve [35].

**SUBTASK 21-51-01-020-018**

(5) Hold the flow control and shutoff valve [35].

**SUBTASK 21-51-01-020-044**

(6) Remove the two coupling clamps [36].

**SUBTASK 21-51-01-020-019**

(7) Remove the flow control and shutoff valve [35].

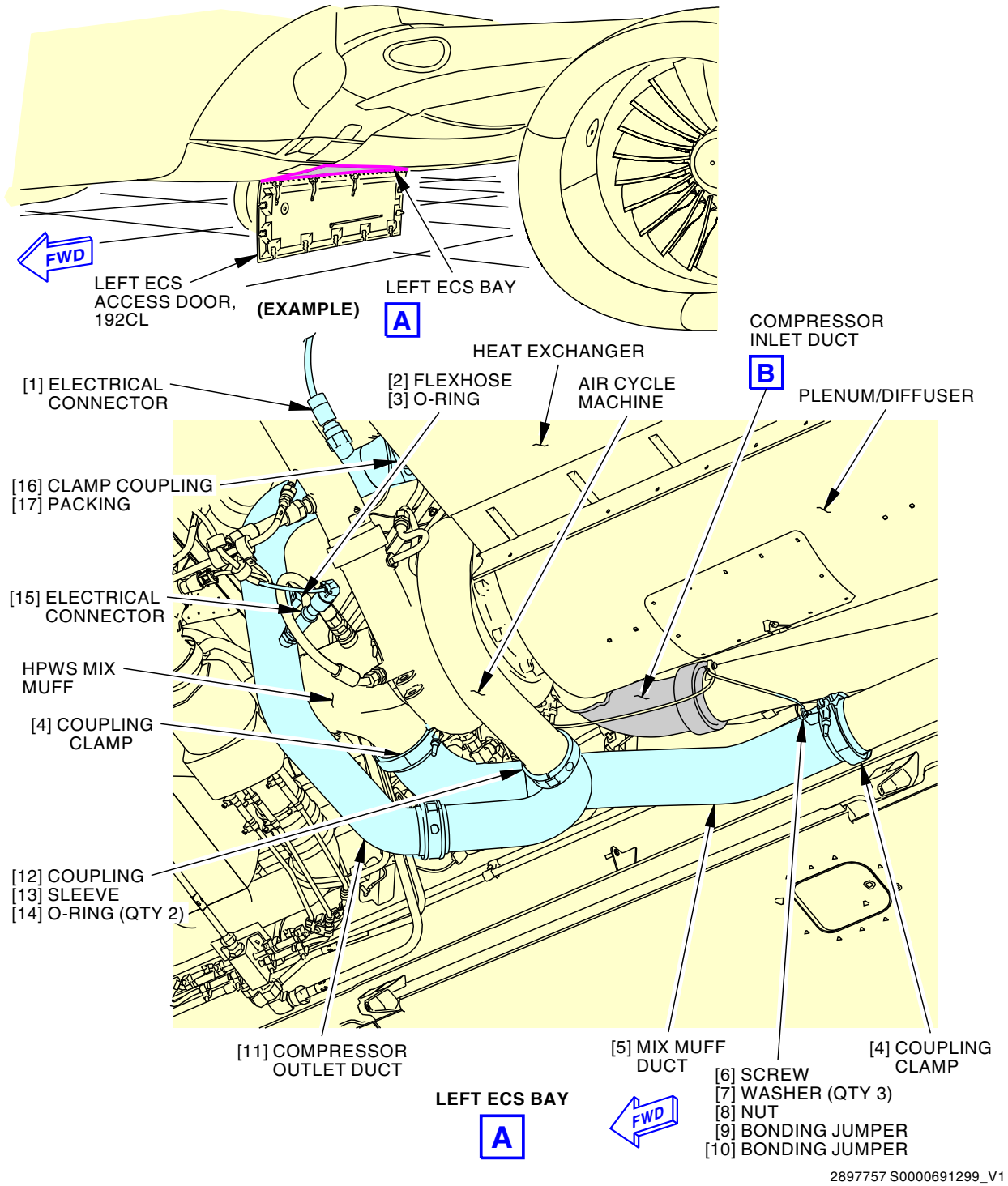
**SUBTASK 21-51-01-410-010**

(8) Put covers on the duct openings to keep out unwanted materials.

**——— END OF TASK ———**



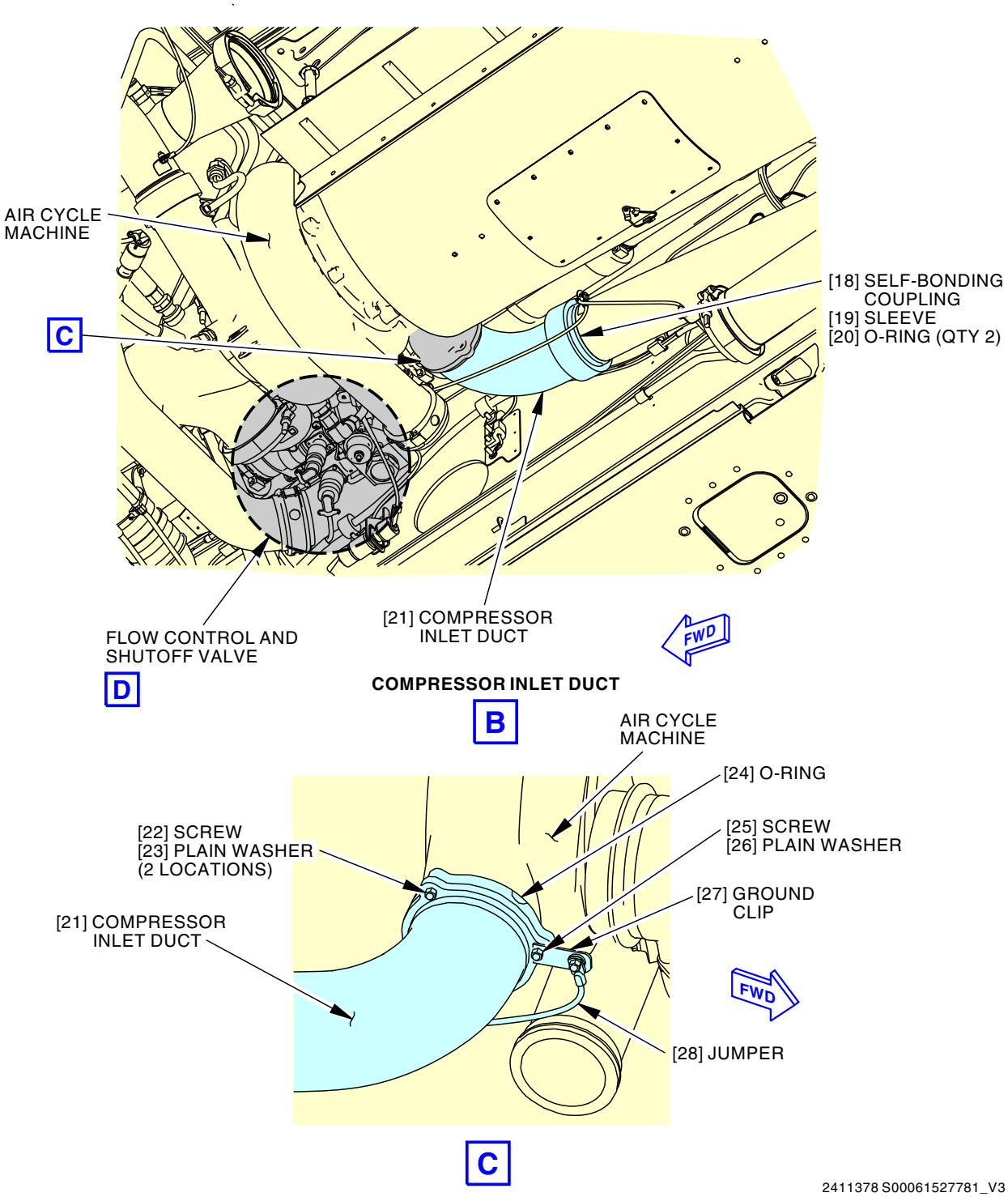
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Left Flow Control and Shutoff Valve Installation**
**Figure 401/21-51-01-990-801 (Sheet 1 of 3)**



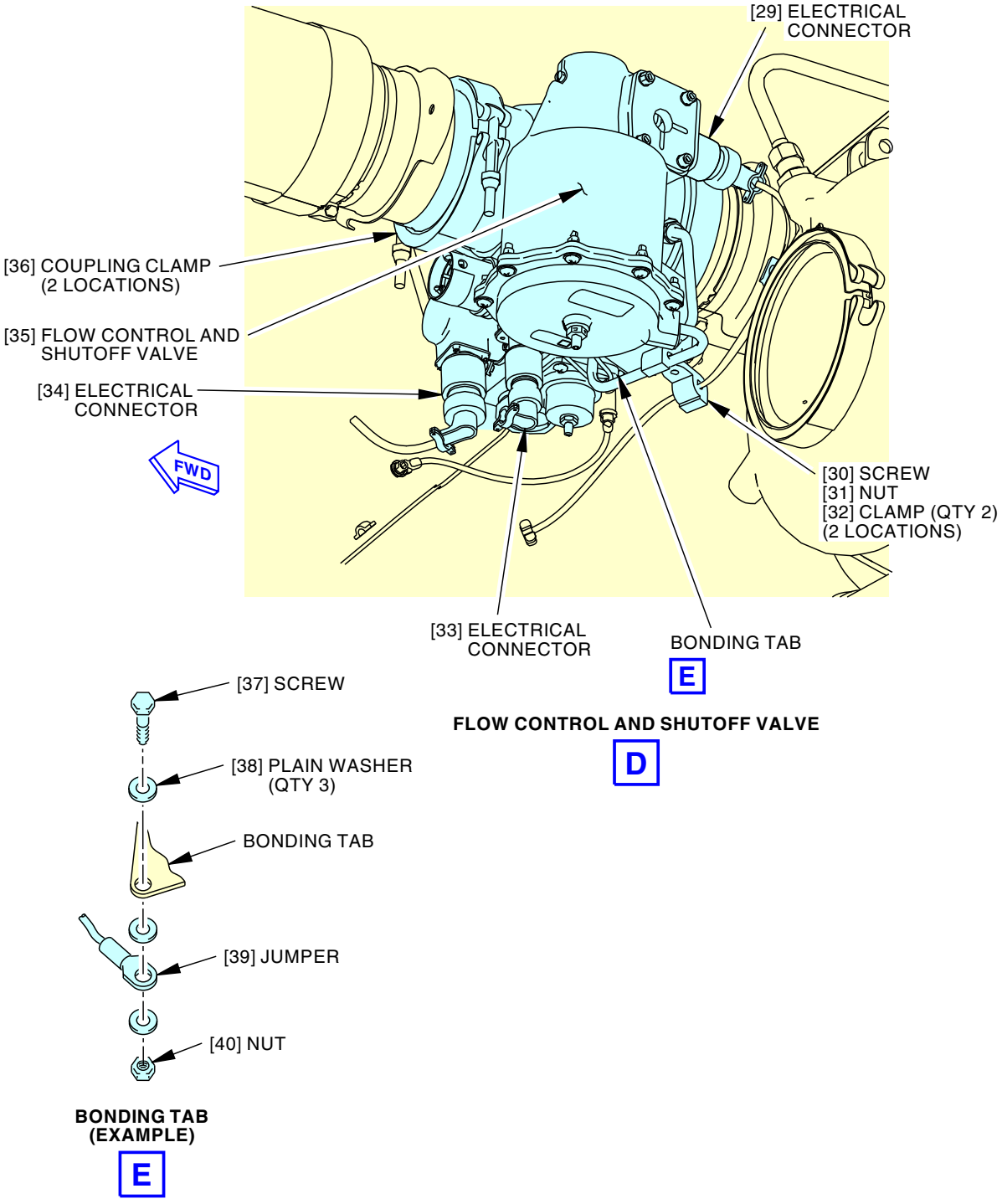
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**Left Flow Control and Shutoff Valve Installation**
**Figure 401/21-51-01-990-801 (Sheet 2 of 3)**



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**Left Flow Control and Shutoff Valve Installation**
**Figure 401/21-51-01-990-801 (Sheet 3 of 3)**



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**TASK 21-51-01-400-801**

## 3. Left Flow Control and Shutoff Valve Installation

(Figure 401)

### A. General

(1) The high pressure water separator mix muff is referred to as HPWS mix muff in this task.

### B. References

| Reference | Title |
|---|---|
| 20-10-51-400-801 | Flareless Tubing Assembly Installation (P/B 401) |
| 21-51-00-700-802 | Pack Flow Control Valve Operational Test (P/B 501) |
| 21-51-17-400-801 | High Pressure Water Separator Mix Muff Installation (P/B 401) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-614 | Bonding Meters - Non-Intrinsically Safe (For use in outside Class I, Divisions I & II non-hazardous locations. For hazardous locations, use COM-1550).<br>Part #: 247000 Supplier: 00426<br>Part #: 620LK Supplier: 1CRL2<br>Part #: BLR-0003-XX Supplier: KC432<br>Part #: BT51 Supplier: 00426<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659<br>Opt Part #: 247001 Supplier: 00426 |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| C00852 | Compound - Antiseize, Molybdenum Disulfide-Petrolatum | MIL-PRF-83483 |
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00602 | Lubricant - Fluorinated | BMS3-25 |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |
| D50294 | Compound - Antiseize, Pure Nickel Special - Never Seez | BAC5008 |

### E. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 3 | O-ring | 21-51-03-01-100 | SIA ALL |
| 14 | O-ring | 21-51-03-02-055 | SIA ALL |
| 17 | Packing | 21-51-03-02-040 | SIA ALL |
| 20 | O-ring | 21-51-10-01-068 | SIA ALL |



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(Continued)

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 24 | O-ring | 21-51-03-02-025 | SIA ALL |
| 35 | Flow control and shutoff valve | 21-51-01-10-050 | SIA ALL |

**F. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 131 | Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left |

**G. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**H. Prepare for the Installation**

SUBTASK 21-51-01-010-013

(1) Remove the covers from the duct openings.

SUBTASK 21-51-01-640-001

(2) Apply Never Seez, D50294, to the T-bolt threads on the coupling clamps [36].

**I. Left Flow Control and Shutoff Valve Installation**

SUBTASK 21-51-01-980-001

(1) Put the flow control and shutoff valve [35] in its position.

SUBTASK 21-51-01-420-014

(2) Loosely install the two coupling clamps [36].

SUBTASK 21-51-01-110-001

(3) Clean the fay surfaces of the steel bonding tab on the flow control and shutoff valve [35], the blue terminal on the jumper [39], and the three plain washers [38] (SWPM 20-20-00, Paragraph 2).

SUBTASK 21-51-01-420-015

(4) Install the screw [37], three plain washers [38], jumper [39], and nut [40] to the bonding tab on the flow control and shutoff valve [35].

SUBTASK 21-51-01-420-021

(5) Tighten the nut [40] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

SUBTASK 21-51-01-760-001

(6) Measure the bonding resistance between the flow control and shutoff valve [35] and structure with an non-intrinsically safe bonding meter, COM-614 (SWPM 20-20-00, Paragraph 21).

(a) Make sure that the overall bonding resistance is 0.010 ohms (10.0 ohms) or less.

SUBTASK 21-51-01-420-022

(7) Connect the electrical connector [29], electrical connector [33], and electrical connector [34] to the flow control and shutoff valve [35].

SUBTASK 21-51-01-420-023

(8) Find the running torque of the locknut on each clamp trunnion on the coupling clamp [36], as follows:

NOTE: The running torque is the torque necessary to turn the locknut on the trunnion. The running torque must be 6.5 ±3.5 in-lb (0.7 ±0.4 N·m).



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(a) With an applicable torque wrench, measure the torque that is necessary to turn the locknut on the trunnion.

(b) Record the torque value.

SUBTASK 21-51-01-420-024

(9) Tighten each locknut on the trunnion on the coupling clamp [36], as follows:

(a) Tighten the locknut to 5 in-lb (1 N·m) above the running torque.

NOTE: If the running torque was measured at 8 in-lb (1 N·m), the torque required will be 13 in-lb (1 N·m).

(b) Align the valve flanges with the adjacent duct flanges.

(c) Tighten the locknut to 60 +5 / -0 in-lb (6.8 +0.6 / -0.0 N·m).

SUBTASK 21-51-01-410-020

(10) Install the compressor inlet duct [21].

(a) Apply a light coating of Molykote 44 grease, medium, D50104, on a new O-ring [24].

(b) Install the new O-ring [24] on the flange of the compressor inlet duct [21].

(c) Apply compound, C00852, on the threads of the screw [25] and two screws [22].

(d) Align the compressor inlet duct [21] with the air cycle machine.

(e) Install the screw [25], plain washer [26], and ground clip [27] into the compressor inlet duct [21].

(f) Install the two screws [22] and plain washers [23] into the compressor inlet duct [21].

(g) Apply a light coating of lubricant, D00602, on new O-rings [20].

(h) Install the new O-rings [20] on the compressor inlet duct [21] and adjacent duct.

(i) Move the sleeve [19] over the duct ends.

(j) Install the self-bonding coupling [18].

SUBTASK 21-51-01-410-012

(11) Install the HPWS mix muff (TASK 21-51-17-400-801).

SUBTASK 21-51-01-410-021

(12) Install the mix muff duct [5].

(a) Apply Never Seez, D50294, to the T-bolt threads on the two coupling clamps [4].

(b) Align the mix muff duct [5] in its position.

(c) Install the two coupling clamps [4].

(d) Tighten the nut on coupling clamps [4] to 60 +5 / -0 in-lb (6.8 +0.6 / -0.0 N·m).

SUBTASK 21-51-01-110-002

(13) Clean the fay surfaces of the titanium bonding tab on the mix muff duct [5], the blue terminal on the bonding jumper [9] and bonding jumper [10], and the three washers [7] (SWPM 20-20-00, Paragraph 2).

SUBTASK 21-51-01-420-025

(14) Install the screw [6], three washers [7], bonding jumper [9], bonding jumper [10], and nut [8] on the bonding tab on the mix muff duct [5].

SUBTASK 21-51-01-420-036

(15) Tighten the nut [8] to 36.5 ±3.5 in-lb (4.1 ±0.4 N·m).



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SUBTASK 21-51-01-760-002

(16) Measure the bonding resistance between the bonding tab on the mix muff duct [5] and structure with an non-intrinsically safe bonding meter, COM-614 (SWPM 20-20-00, Paragraph 21).

(a) Make sure that the overall bonding resistance is 0.0010 ohms (1.0 milliohms) or less.

SUBTASK 21-51-01-410-022

(17) Prepare the compressor outlet duct [11] for installation, as follows:

(a) Apply a light coat of Molykote 44 grease, medium, D50104, to a new packing [17] and two new O-rings [14].

(b) Install the new O-ring [14] on the flange of the compressor outlet duct [11].

(c) Install the new O-ring [14] on the flange of the air cycle machine.

(d) Install the new packing [17] on the flange of the heat exchanger.

(e) Apply compound, C00852 to the T-bolt threads on the clamp coupling [16].

SUBTASK 21-51-01-410-013

(18) Install the compressor outlet duct [11].

(a) Align the compressor outlet duct [11] into its position.

(b) Loosely install the clamp coupling [16] between the heat exchanger and compressor outlet duct [11].

(c) Slide the sleeve [13] between the air cycle machine and compressor outlet duct [11].

(d) Install the coupling [12] over the outlet duct connection.

(e) Tighten the nut on the clamp coupling [16] to 47.5 ±2.5 in-lb (5.4 ±0.3 N·m).

(f) With hand force, gently push the compressor outlet duct in the direction of the adjacent mix muff duct until the compressor outlet duct reaches the maximum flexed position.

(g) Make sure that there is a minimum clearance of 0.20 in. (5.1 mm) to the adjacent mix muff duct when the compressor outlet duct is in the flexed position.

(h) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flexhose [2].

(i) Apply a light coating of lubricant, D00602, on new O-ring [3].

(j) Install the new O-ring [3] on the compressor outlet duct [11].

(k) Connect the flexhose [2] to the compressor outlet duct [11] (TASK 20-10-51-400-801).

SUBTASK 21-51-01-410-023

(19) Install the electrical connector [1] to the ram air control sensor.

SUBTASK 21-51-01-420-026

(20) Install the electrical connector [15] to the compressor discharge overheat switch.

## J. Left Flow Control and Shutoff Valve Installation Test

SUBTASK 21-51-01-860-030

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |



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SUBTASK 21-51-01-860-012

(2) On the P5-10 Bleed Air Control Module, remove the DO-NOT-OPERATE tags from these switches:

(a) L PACK and R PACK switches

(b) BLEED 1 and 2 switches

(c) BLEED APU switch.

SUBTASK 21-51-01-710-003

(3) Do an operational check of the flow control and shutoff valve [35] (TASK 21-51-00-700-802).

**K. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-51-01-410-014

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**END OF TASK**

**TASK 21-51-01-000-802**

## 4. Right Flow Control and Shutoff Valve Removal

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 20-10-51-000-801 | Flareless Tubing Assembly Removal (P/B 401) |
| 21-51-04-000-801 | Air Cycle Machine Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

SUBTASK 21-51-01-860-010

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Remove pressure from the pneumatic system (TASK 36-00-00-860-806).



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SUBTASK 21-51-01-860-011

(2) On the P5-10 Bleed Air Control Module, set the switches and attach DO NOT OPERATE tags, STD-858, as follows:

(a) Set the L PACK and R PACK switches to the OFF position.

(b) Set the BLEED 1 and 2 switches to the OFF position.

(c) Set the BLEED APU switch to the OFF position.

SUBTASK 21-51-01-010-008

(3) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-51-01-010-009

(4) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-01-010-010

(5) Remove the air cycle machine (TASK 21-51-04-000-801).

SUBTASK 21-51-01-020-021

(6) Remove the mix muff duct [51].

(a) Remove the cap screw [74], three plain washers [75], jumper [76], and nut [77] from the bonding tab.

(b) Hold the mix muff duct [51] while you remove the coupling clamp [53].

(c) Remove the mix muff duct [51].

SUBTASK 21-51-01-010-011

(7) Remove the compressor inlet duct [52].

(a) Remove the self-bonding coupling [56].

NOTE: Lift the three latch pawls at the same time to release the clamp.

(b) Move the sleeve [55] to the compressor inlet duct [52].

(c) Remove the compressor inlet duct [52].

(d) Remove and discard the two O-rings [54].

SUBTASK 21-51-01-010-012

(8) Disconnect the sense line [64], as follows:

(a) Remove the nut [60], washer [61], and loop clamp [59] from the clip [63].

(b) Disconnect the B-nut [57] and B-nut [58] (TASK 20-10-51-000-801).

(c) Remove the sense line [64].

## F. Right Flow Control and Shutoff Valve Removal

SUBTASK 21-51-01-020-022

(1) Remove the electrical connector [66], electrical connector [67], and electrical connector [69] from the flow control and shutoff valve [68].



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SUBTASK 21-51-01-020-025

(2) Remove the cap screw [70], three washers [71], jumper [72], and nut [73] from the bonding tab on the flow control and shutoff valve [68].

SUBTASK 21-51-01-020-027

(3) Remove the flow control and shutoff valve [68] from the ducts, as follows:

(a) Support the flow control and shutoff valve [68].

(b) Loosen the T-bolts on the two coupling clamps [65].

(c) Remove the flow control and shutoff valve [68].

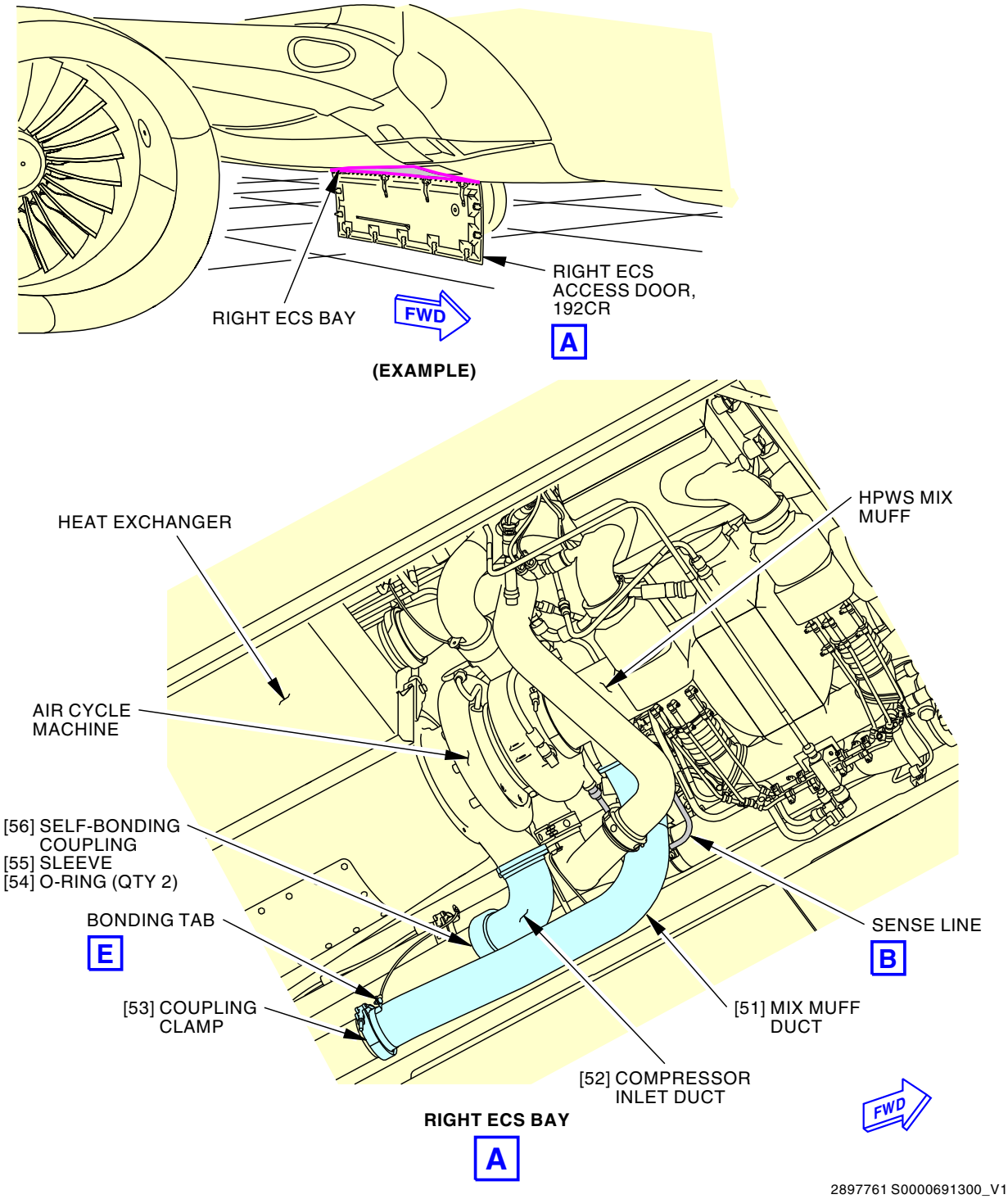
SUBTASK 21-51-01-410-011

(4) Put covers on the duct openings to keep out unwanted materials.

——— END OF TASK ———



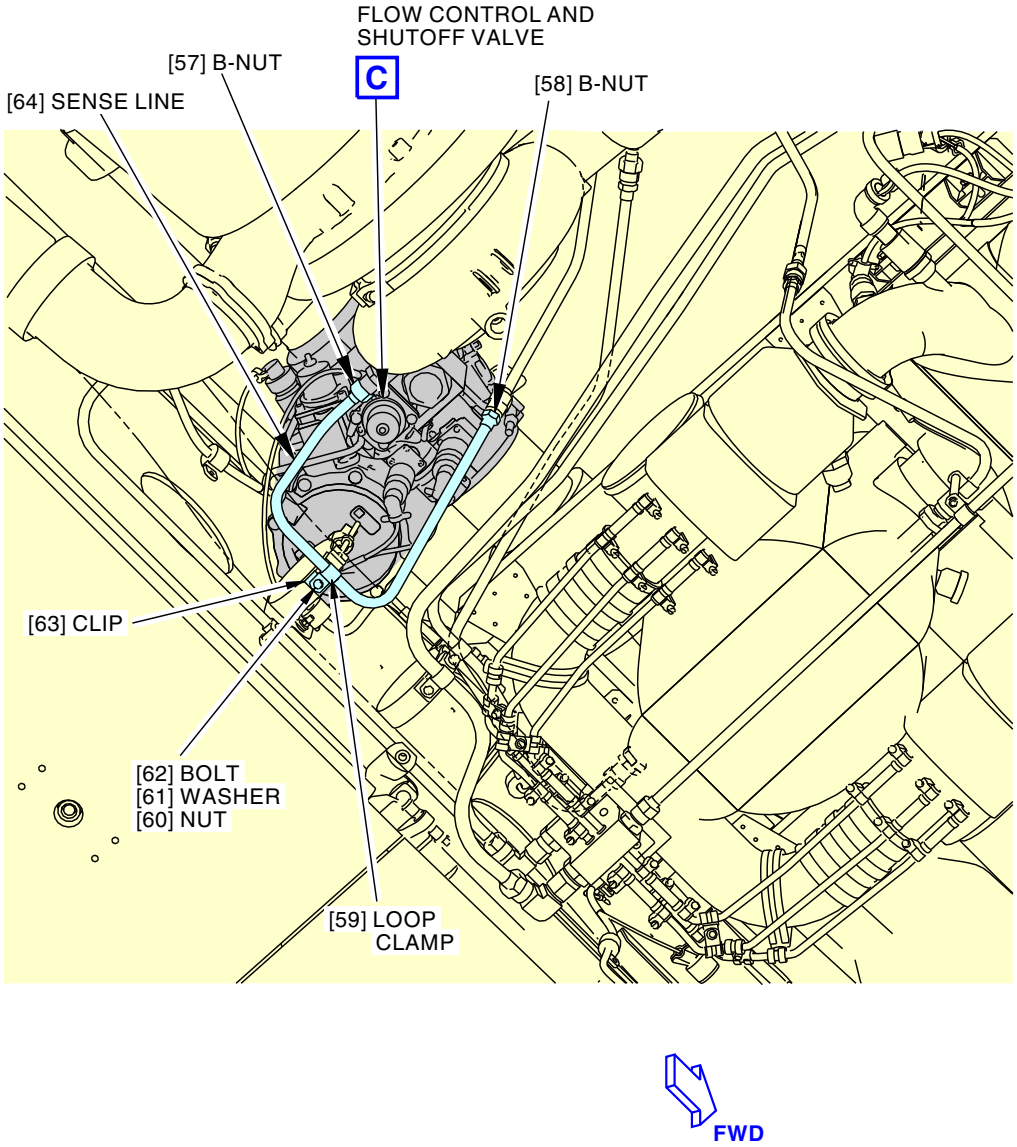
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**Right Flow Control and Shutoff Valve Installation**
**Figure 402/21-51-01-990-802 (Sheet 1 of 3)**



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**SENSE LINE**
**(HPWS MIX MUFF NOT SHOWN)**

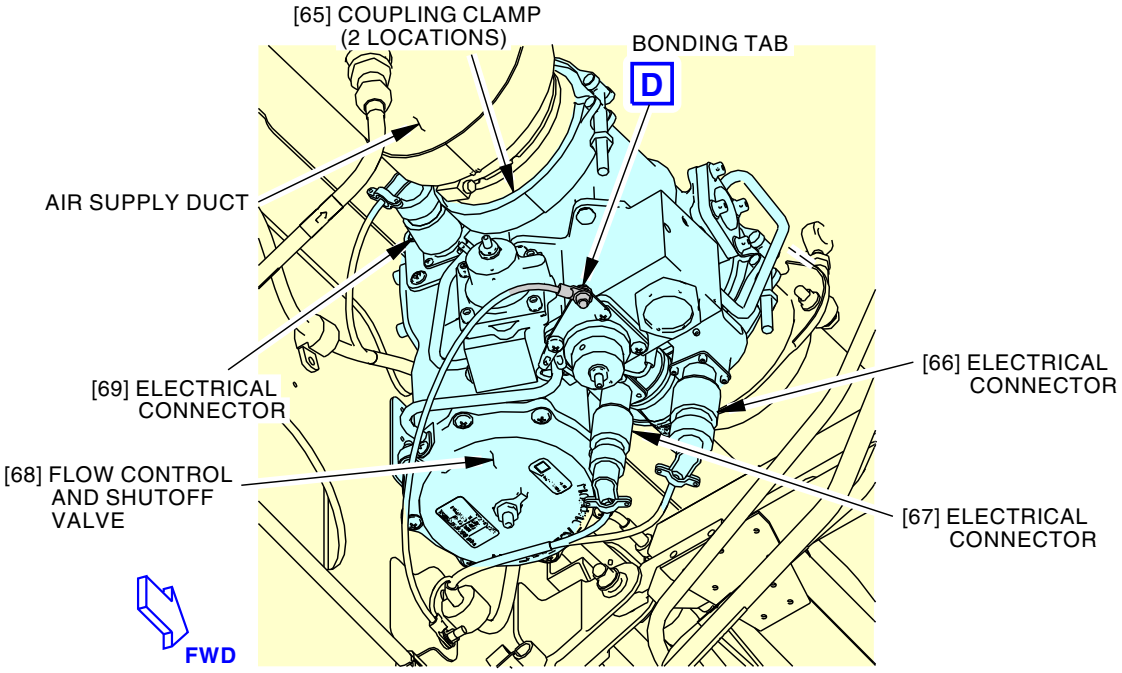
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**Right Flow Control and Shutoff Valve Installation**
**Figure 402/21-51-01-990-802 (Sheet 2 of 3)**

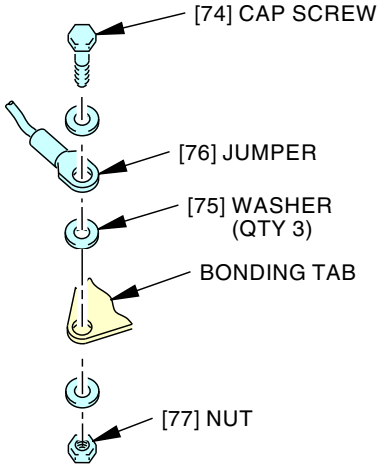


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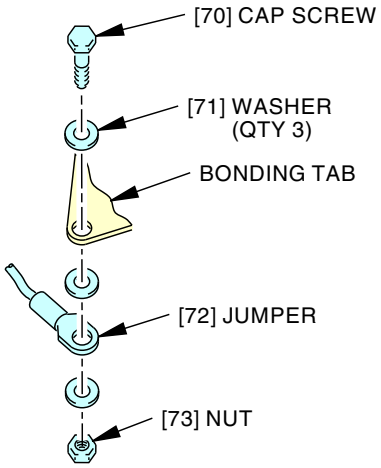

**FLOW CONTROL AND SHUTOFF VALVE**

**C**




**BONDING TAB**

**E**




**BONDING TAB**

**D**

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**Right Flow Control and Shutoff Valve Installation**
**Figure 402/21-51-01-990-802 (Sheet 3 of 3)**



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**TASK 21-51-01-400-802**

**5. Right Flow Control and Shutoff Valve Installation**

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 20-10-51-400-801 | Flareless Tubing Assembly Installation (P/B 401) |
| 21-51-00-700-802 | Pack Flow Control Valve Operational Test (P/B 501) |
| 21-51-04-400-801 | Air Cycle Machine Installation (P/B 401) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-614 | Bonding Meters - Non-Intrinsically Safe (For use in outside Class I, Divisions I & II non-hazardous locations. For hazardous locations, use COM-1550).<br>Part #: 247000 Supplier: 00426<br>Part #: 620LK Supplier: 1CRL2<br>Part #: BLR-0003-XX Supplier: KC432<br>Part #: BT51 Supplier: 00426<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659<br>Opt Part #: 247001 Supplier: 00426 |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00602 | Lubricant - Fluorinated | BMS3-25 |
| D50294 | Compound - Antiseize, Pure Nickel Special - Never Seez | BAC5008 |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 54 | O-ring | 21-51-10-02-068 | SIA ALL |
| 68 | Flow control and shutoff valve | 21-51-01-10-050 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Prepare for the Installation**

**SUBTASK 21-51-01-010-016**

(1) Remove the covers from the duct openings.


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SUBTASK 21-51-01-640-002

(2) Apply Never Seez, D50294, to the T-bolt threads on the coupling clamps [65].

SUBTASK 21-51-01-980-003

(3) Put the flow control and shutoff valve [68] in its position.

## H. Right Flow Control and Shutoff Valve Installation

SUBTASK 21-51-01-420-017

(1) Loosely install the coupling clamps [65] on the ends of the flow control and shutoff valve [68].

SUBTASK 21-51-01-110-003

(2) Clean the fay surfaces of the steel bonding tab on the flow control and shutoff valve [68], the blue terminal on the jumper [72], and the washer [71] (SWPM 20-20-00, Paragraph 2).

SUBTASK 21-51-01-420-027

(3) Install the cap screw [70], three washers [71], jumper [72], and nut [73] to the bonding tab on the flow control and shutoff valve [68].

SUBTASK 21-51-01-420-028

(4) Tighten the nut [73] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

SUBTASK 21-51-01-760-003

(5) Measure the bonding resistance between the flow control and shutoff valve [68] and structure with an non-intrinsically safe bonding meter, COM-614 (SWPM 20-20-00, Paragraph 21).

(a) Make sure that the overall bonding resistance is 0.010 ohms (10.0 milliohms) or less.

SUBTASK 21-51-01-420-029

(6) Connect the electrical connector [66], electrical connector [67], and electrical connector [69] to the flow control and shutoff valve [68].

SUBTASK 21-51-01-210-001

(7) Make sure that there is a minimum of 0.10 in. (2.5 mm) clearance between the flow control and shutoff valve [68] and the keel beam.

(a) If necessary, turn the flow control and shutoff valve [68] clockwise to get clearance.

SUBTASK 21-51-01-420-030

(8) Find the running torque of the locknut on each trunnion on the coupling clamp [65], as follows:

NOTE: The running torque is the torque necessary to turn the locknut on the trunnion. The running torque must be 6.5 ±3.5 in-lb (0.7 ±0.4 N·m).

(a) With an applicable torque wrench, measure the torque that is necessary to turn the locknut on the trunnion.

(b) Record the torque value.

SUBTASK 21-51-01-420-031

(9) Tighten each locknut on the trunnion on the coupling clamp [65], as follows:

(a) Tighten the locknut to 5 in-lb (1 N·m) above the running torque.

NOTE: If the running torque was measured at 8 in-lb (1 N·m), the torque required will be 13 in-lb (1 N·m).

(b) Align the valve flanges with the adjacent duct flanges.

(c) Tighten the locknut to 60 +5 / -0 in-lb (6.8 +0.6 / -0.0 N·m).

SUBTASK 21-51-01-420-032

(10) Connect the sense line [64], as follows:

(a) Put the sense lines into position.



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(b) Connect the B-nut [57] and B-nut [58] (TASK 20-10-51-400-801).

(c) Put the loop clamp [59] on the sense line [64].

(d) Align the loop clamp [59] with the clip [63]

(e) Install the washer [61] and nut [60] on the bolt [62] that attaches the loop clamp [59] to the clip [63].

**SUBTASK 21-51-01-420-033**

(11) Install the compressor inlet duct [52].

(a) Apply a light coating of lubricant, D00602, on new O-rings [54].

(b) Install the new O-rings [54] on the flanges of the compressor inlet duct [52] and adjacent duct.

(c) Put the compressor inlet duct [52] in its position.

(d) Move the sleeve [55] over the duct ends.

(e) Install the self-bonding coupling [56].

**SUBTASK 21-51-01-410-016**

(12) Install the air cycle machine (TASK 21-51-04-400-801).

**SUBTASK 21-51-01-020-037**

(13) Install the mix muff duct [51].

(a) Apply Never Seez, D50294, to the T-bolt threads on the two coupling clamps [53].

(b) Align the mix muff duct [51] in its position.

(c) Install the two coupling clamps [53].

(d) Tighten the nut on coupling clamps [53] to 60 +5 / -0 in-lb (6.8 +0.6 / -0.0 N·m).

(e) With hand force, gently push the compressor outlet duct in the direction of the adjacent mix muff duct until the compressor outlet duct reaches the maximum flexed position.

(f) Make sure that there is a minimum clearance of 0.20 in. (5.1 mm) to the adjacent mix muff duct when the compressor outlet duct is in the flexed position.

**SUBTASK 21-51-01-110-004**

(14) Clean the fay surfaces of the titanium bonding tab on the mix muff duct [51], the blue terminal on the jumper [76], and the plain washers [75] (SWPM 20-20-00, Paragraph 2).

**SUBTASK 21-51-01-420-034**

(15) Install the cap screw [74], three plain washers [75], jumper [76], and nut [77] on the bonding tab on the mix muff duct [51].

**SUBTASK 21-51-01-420-035**

(16) Tighten the nut [77] to 36.5 ±3.5 in-lb (4.1 ±0.4 N·m).

**SUBTASK 21-51-01-760-004**

(17) Measure the bonding resistance between the bonding tab on the mix muff duct [51] and structure with an non-intrinsically safe bonding meter, COM-614 (SWPM 20-20-00, Paragraph 21).

(a) Make sure that the overall bonding resistance is 0.0010 ohms (1.0 milliohms) or less.



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## I. Flow Control and Shutoff Valve Installation Test

SUBTASK 21-51-01-010-019

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-51-01-860-021

(2) On the P5-10 Bleed Air Control Module, remove the DO-NOT-OPERATE tags from these switches:

(a) L PACK and R PACK switches

(b) BLEED 1 and 2 switches

(c) BLEED APU switch.

SUBTASK 21-51-01-710-004

(3) Do an operational test of the flow control and shutoff valve [68] (TASK 21-51-00-700-802).

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-01-410-017

(1) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**——— END OF TASK ———**



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## AIR CONDITIONING ACCESSORY UNIT (ACAU) - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the air conditioning accessory unit (ACAU).

(2) An installation of the air conditioning accessory unit (ACAU).

(3) There are two air conditioning accessory units (ACAU) installed in the electronic equipment center on the E4-1 shelf.

**TASK 21-51-02-000-801**

### 2. Air Conditioning Accessory Unit (ACAU) Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-07-000-801 | E/E Box Removal (P/B 401) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Procedure**

**SUBTASK 21-51-02-860-001**

(1) Remove electrical power. To remove electrical power, do this task: Remove Electrical Power, TASK 24-22-00-860-802

**SUBTASK 21-51-02-010-001**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

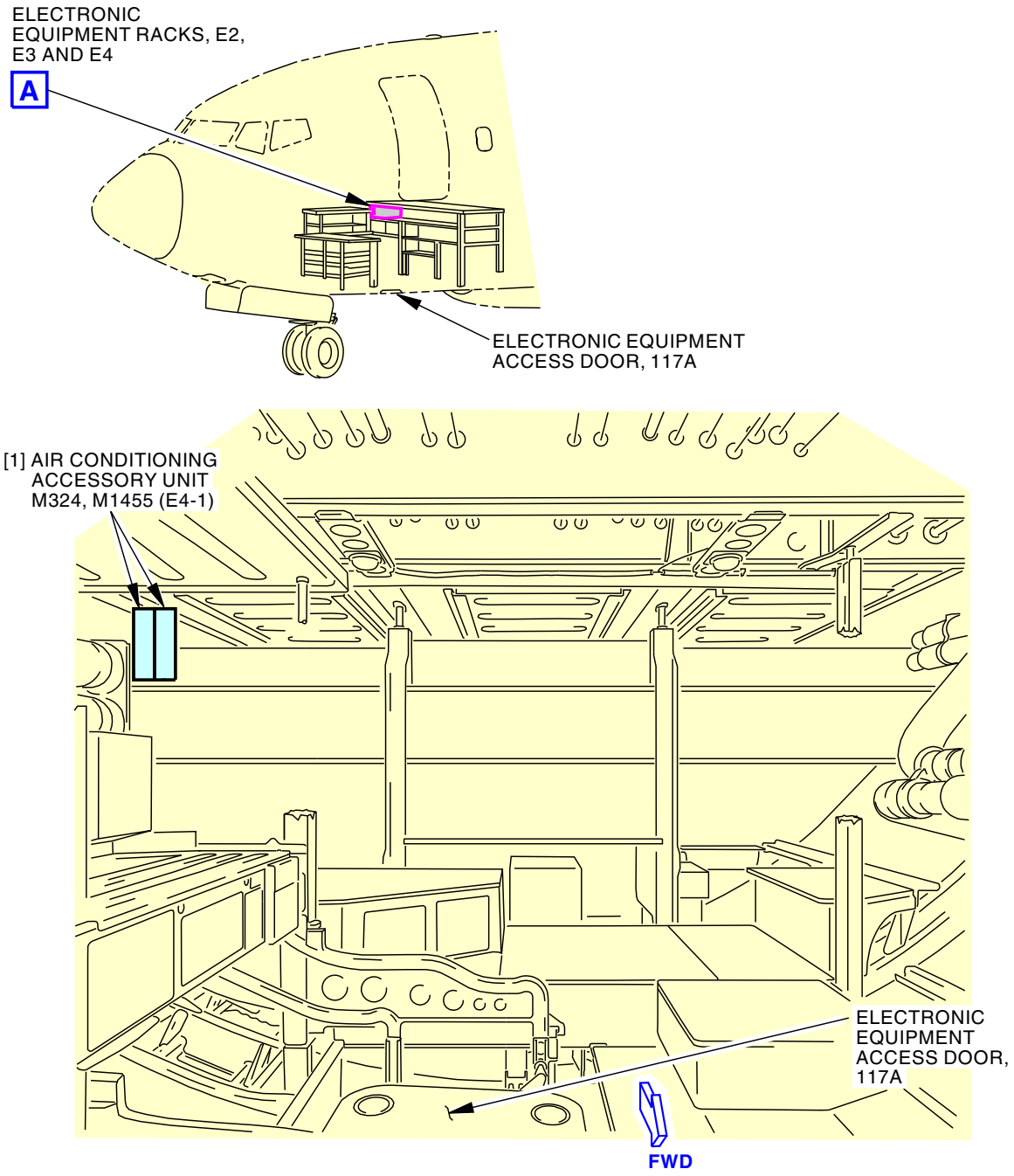
**SUBTASK 21-51-02-020-001**

(3) Remove the ACAU [1]. To remove the ACAU [1], do this task: E/E Box Removal, TASK 20-10-07-000-801.

**——— END OF TASK ———**



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**ELECTRONIC EQUIPMENT RACKS, E2, E3 AND E4**

**A**

2411383 S00061527792_V1

**Air Conditioning Accessory Unit (ACAU) Installation**
**Figure 401/21-51-02-990-801**



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**TASK 21-51-02-400-801**

**3. Air Conditioning Accessory Unit (ACAU) Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-07-400-801 | E/E Box Installation (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

**D. Air Conditioning Accessory Unit (ACAU) Installation**

**SUBTASK 21-51-02-420-001**

(1) Install the ACAU [1]. To install the ACAU [1], do this task: E/E Box Installation, TASK 20-10-07-400-801.

**E. Air Conditioning Accessory Unit (ACAU) Installation Test**

**SUBTASK 21-51-02-710-001**

(1) Do this test of the ACAU [1]:

NOTE: If you replaced the Air Conditioning Accessory Unit (ACAU M324 or M1455) because it had a defect, it is recommended that the complete adjustment/test procedure for the affected system be performed. For example, if an ACAU was replaced to correct a defect in the ram air system, then it is recommended that a test of the ram air system be performed. If the ACAU is being replaced for any other reason you may do just the test that follows:

(a) If you installed the M324 ACAU [1], do this test of the left pack overheat relay:

1) Make sure that the L and R PACK switches on the P5-10 Air Conditioning Panel are set to OFF.

2) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

3) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

4) Disconnect electrical connector D532 from the left compressor discharge overheat switch, S2.

5) Install a jumper wire between pins 1 and 2 of connector D532 on the ships' wiring.

6) Make sure that the left PACK light on the P5-10 Air Conditioning Panel comes on.

7) Make sure that the AIR COND and MASTER CAUTION lights on the P7 glareshield panel come on.



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8) Remove the jumper wire that was installed between pins 1 and 2 of connector D532 on the ships' wiring.

9) Re-connect electrical connector D532 to the left compressor discharge overheat switch, S2.

10) Depress the TRIP RESET switch on the P5-10 Air Conditioning Panel.

11) Make sure the left PACK light on the P5-10 Air Condtioning Panel goes off.

12) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

13) Make sure the AIR COND and MASTER CAUTION lights on the P7 glareshield go off.

14) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

(b) If you installed the M1455 ACAU [1], do this test of the right pack overheat relay:

1) Make sure that the L and R PACK switches on the P5-10 Air Conditioning Panel are set to OFF.

2) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

3) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

4) Disconnect electrical connector D538 from the right compressor discharge overheat switch, S5.

5) Install a jumper wire between pins 1 and 2 of connector D538 on the ships' wiring.

6) Make sure the right PACK light on the P5-10 Air Conditioning Panel comes on.

7) Make sure that the AIR COND and MASTER CAUTION lights on the P7 glareshield panel come on.

8) Remove the jumper wire that was installed between pins 1 and 2 of connector D538 on the ships' wiring.

9) Reconnect electrical connector D538 to the right compressor discharge overheat switch, S5.

10) Depress the TRIP RESET switch on the P5-10 Air Conditioning Panel.

11) Make sure the right PACK light on the P5-10 Air Conditioning Panel goes off.

12) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

13) Make sure the AIR COND and MASTER CAUTION lights on the P7 glareshield go off.

14) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



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**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-51-02-410-001**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



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## AIR CONDITIONING ACCESSORY UNIT - ADJUSTMENT/TEST

### 1. General

A. This procedure has one task. The task is an operational test of the Air Conditioning Accessory Unit (M324 or M1455 relays module) after installation.

B. There are two air conditioning accessory units (ACAU) installed in the electronic equipment center on the E4-1 shelf.

**TASK 21-51-02-710-801**

### 2. Air Conditioning Accessory Unit Operational Test

#### A. References

| Reference | Title |
|---|---|
| 21-25-00-710-801 | Recirculation System - Operational Test (P/B 501) |
| 25-21-45-000-801 | Main Ceiling Panel - Removal (P/B 401) |
| 25-21-45-400-801 | Main Ceiling Panel - Installation (P/B 401) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### D. Prepare for the Test

**SUBTASK 21-51-02-410-002**

(1) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Air Conditioning Accessory Unit (ACAU) Relay Module Test

**SUBTASK 21-51-02-710-002**

(1) Do these checks for the post-installation test of the M324 ACAU No. 1:

(a) Do a test of the left pack overheat relay:

1) Set the L PACK and R PACK switches, on the P5-10 Air Conditioning Panel, to the OFF position.



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2) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

3) Open this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

4) Disconnect electrical connector, D532, from the left compressor discharge overheat switch, S2.

5) Install a jumper wire between pins 1 and 2 of electrical connector, D532.

6) Make sure that the left PACK light, on the P5-10 Air Conditioning Panel, comes on.

7) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, come on.

8) Remove the jumper wire that was installed between pins 1 and 2 of electrical connector, D532.

9) Reconnect electrical connector, D532, to the left compressor discharge overheat switch, S2.

10) Push the TRIP RESET switch, on the P5-10 Air Conditioning Panel.

11) Make sure that the left PACK light, on the P5-10 Air Conditioning Panel, goes off.

12) If the MASTER CAUTION or AIR COND annunciator lights are on, push and release one of the two MASTER CAUTION lights.

13) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, go off.

14) Close this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

(b) Do a test of the left ram air system relays:

1) Make sure that the deflector door for the left ram air inlet is extended.

2) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

3) Open this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

4) Disconnect electrical connector, D40844, near the left pack valve.

NOTE: A disconnected electrical connector, D40844, simulates that the left pack valve is open.

**WARNING**

MAKE SURE PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES. THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

5) Extend the trailing edge flaps to Flaps Position 1 (TASK 27-51-00-860-803).

6) Make sure that the deflector door for the left ram air system is fully extended.



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7) Put the airplane in the air mode (TASK 32-09-00-860-801).

8) Make sure that these results occur:

a) Make sure that the left ram air inlet deflector door retracts fully.

b) Make sure that the left RAM DOOR FULL OPEN light remains on.

**WARNING**

MAKE SURE PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES. THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

9) Retract the trailing edge flaps to the fully up position (TASK 27-51-00-860-804).

10) Make sure that these results occur:

a) Make sure that the left ram air inlet modulation panels stay near the closed position.

b) Make sure that the left RAM DOOR FULL OPEN light goes off.

11) Return the airplane to the ground mode (TASK 32-09-00-860-802).

12) Make sure that these results occur:

a) Make sure that the left ram air inlet modulation panels move to the fully open position.

b) Make sure that the left ram air inlet deflector door moves to the extended position.

13) Reconnect the electrical connector, D40844, near the left pack valve.

14) Close this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

(c) Do a test of the cabin air recirculation fan relays:

1) Do an operational test of the recirculation system (TASK 21-25-00-710-801).

(d) Do a test of the flight deck zone overheat relay:

NOTE: The flight deck zone overheat relay is in the Air Conditioning Accessory Unit, M324.

1) Make sure that the L and R PACK switches, on the P5-10 Air Conditioning Panel, are set to the OFF position.

2) Get access to the duct overheat switch for the control cabin as follows:

a) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

b) Find the duct overheat switch, S931, to the left of the E2 rack.

c) Disconnect electrical connector, D3892, from the control cabin duct overheat switch, S931.

d) Install a jumper wire between pins 1 and 2 of electrical connector, D3892.

e) Make sure that the CONT CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, comes on.



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f) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, come on.

g) Remove the jumper wire that was installed between pins 1 and 2 of electrical connector, D3892.

h) Reconnect electrical connector, D3892, to the control cabin duct overheat switch, S931.

i) Depress the TRIP RESET switch, on the P5-10 Air Conditioning Panel.

j) Make sure that the CONT CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, goes off.

k) Push and release one of the two MASTER CAUTION lights, on the P7 glareshield panel.

l) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, go off.

m) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

(e) Do a test of the aft passenger cabin zone overheat relay:

1) Set the L PACK and R PACK switches, on the P5-10 Air Conditioning Panel, to the OFF position.

2) Get access to the duct overheat switch, S1077, for the aft passenger cabin duct as follows:

a) Remove the applicable ceiling panel that is forward of the overwing escape hatches (TASK 25-21-45-000-801).

3) Disconnect electrical connector, D11836, from the aft passenger cabin duct overheat switch, S1077.

4) Install a jumper wire between pins 1 and 2 of electrical connector, D11836.

5) Make sure that the AFT CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, comes on.

6) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, come on.

7) Remove the jumper wire that was installed between pins 1 and 2 of electrical connector, D11836.

8) Reconnect electrical connector, D11836, to the aft passenger cabin duct overheat switch, S1077.

9) Depress the TRIP RESET switch, on the P5-10 Air Conditioning Panel.

10) Make sure that the AFT CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, goes off.

11) Push and release one of the two MASTER CAUTION lights, on the P7 glareshield panel.

12) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, go off.

13) Install the applicable ceiling panel that was removed to gain access (TASK 25-21-45-400-801).



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SUBTASK 21-51-02-730-001

(2) Do these checks for the post-installation test of the M1455 ACAU No. 2:

(a) Do a test of the right pack overheat relay:

1) Set the L PACK and R PACK switches, on the P5-10 Air Conditioning Panel, to the OFF position.

2) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

3) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

4) Disconnect electrical connector, D538, from the right compressor discharge overheat switch, S5.

5) Install a jumper wire between pins 1 and 2 of electrical connector, D538.

6) Make sure that the right PACK light, on the P5-10 Air Conditioning Panel, comes on.

7) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, come on.

8) Remove the jumper wire that was installed between pins 1 and 2 of electrical connector, D538.

9) Reconnect electrical connector, D538, to the right compressor discharge overheat switch, S5.

10) Push the TRIP RESET switch, on the P5-10 Air Conditioning Panel.

11) Make sure that the right PACK light, on the P5-10 Air Conditioning Panel, goes off.

12) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, go off.

13) Close these access doors:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

(b) Do a test of the right ram air system relays:

1) Make sure that the deflector door for the right ram air inlet is extended.

2) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

3) Open this access door:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

4) Disconnect electrical connector, D40846, near the right pack valve.

NOTE: A disconnected electrical connector, D40846, simulates that the right pack valve is open.



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**WARNING** MAKE SURE PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES. THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

5) Extend the trailing edge flaps to Flaps Position 1 (TASK 27-51-00-860-803).
6) Make sure that the deflector door for the right ram air system is fully extended.
7) Put the airplane in the air mode (TASK 32-09-00-860-801).
8) Make sure that these results occur:
   a) Make sure that the right ram air inlet deflector door retracts fully.
   b) Make sure that the right ram air inlet modulation panels move toward the closed position.

**WARNING** MAKE SURE PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES. THE LEADING EDGE AND TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

9) Retract the trailing edge flaps to the fully up position (TASK 27-51-00-860-804).
10) Make sure that these results occur:
   a) Make sure that the right ram air inlet modulation panels stay near the closed position.
11) Return the airplane to the ground mode (TASK 32-09-00-860-802).
12) Make sure that these results occur:
   a) Make sure that the right ram air inlet modulation panels move to the fully open position.
   b) Make sure that the right ram air inlet deflector door moves to the extended position.
13) Reconnect electrical connector D40846 near the right pack valve.
14) Close this access door:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

(c) Do a test of the cabin air recirculation fan relays:
   1) Do an operational test of the recirculation system (TASK 21-25-00-710-801).

(d) Do a test of the passenger zone overheat relay:
   1) Set the L PACK and R PACK switches, on the P5-10 Air Conditioning Panel, re set to the OFF position.
   2) Get access to the forward cabin duct overheat switch:
      a) Remove the applicable ceiling panel that is forward of the overwing escape hatches (TASK 25-21-45-000-801).
   3) Disconnect electrical connector, D11834, from the forward cabin duct overheat switch, S1076.
   4) Install a jumper cable between pins 1 and 2 of electrical connector, D11834.


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5) Make sure that the FWD CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, comes on.
6) Make sure the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, comes on.
7) Remove the jumper cable that was installed between pins 1 and 2 of electrical connector, D11834.
8) Reconnect electrical connector, D11834, to the forward cabin duct overheat switch, S1076.
9) Depress the TRIP RESET switch, on the P5-10 Air Conditioning Panel.
10) Make sure that the FWD CAB ZONE TEMP light, on the P5-17 Temperature Control Panel, goes off.
11) Push and release one of the two MASTER CAUTION lights, on the P7 glareshield panel.
12) Make sure the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, go off.
13) Install the ceiling panel that was removed for access to the forward cabin duct overheat switch, S1076 (TASK 25-21-45-400-801).

**F. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-51-02-410-003**

(1) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**

**TASK 21-51-02-710-802**

## 3. Pack Overheat Shutoff Operational Test

NOTE: This procedure is a scheduled maintenance task.

**A. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**B. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**C. Prepare for the Test**

**SUBTASK 21-51-02-860-009**

(1) Make sure that the switches, on the P5-10 air conditioning module, set to these positions:
   (a) L PACK to OFF
   (b) R PACK to OFF
   (c) BLEED 1 to OFF
   (d) BLEED 2 to OFF
   (e) ISOLATION VALVE to OPEN



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(f) L RECIRC FAN to AUTO

(g) R RECIRC FAN to AUTO

SUBTASK 21-51-02-710-003

(2) Set the CONT CAB, FWD CAB, and AFT CAB temperature selector switches on the P5-17 temperature control module to the OFF position.

SUBTASK 21-51-02-010-002

(3) Make sure that these access panels are open:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

## D. Procedure

SUBTASK 21-51-02-710-005

(1) Do a test of the pack overheat relays:

(a) Disconnect these electrical connectors from the pack overheat switches:

1) Electrical connector, D532, from the left pack compressor discharge overheat switch, S2.

2) Electrical connector, D10056, from the left pack air cycle machine overheat switch, S938.

3) Electrical connector, D538, from the right pack compressor discharge overheat switch, S5.

4) Electrical connector, D10058, from the right pack air cycle machine overheat switch, S939.

(b) Install a jumper wire between pins 1 and 2 of electrical connector, D532, for the left compressor discharge overheat switch, S2.

(c) Make sure that the AIR COND and MASTER CAUTION lights, on the P7 glareshield panel, and the left PACK light, on the P5-10 air conditioning panel, come on.

(d) Push either MASTER CAUTION light to reset the light.

(e) Make sure the left PACK lights stays on and the AIR COND annunciator goes off.

(f) Push either of the MASTER CAUTION annunciator lights.

(g) Make sure the MASTER CAUTION and the AIR COND annunciator lights come on and the left PACK light stays on.

(h) Remove the jumper wire from electrical connector, D532.

(i) Push the TRIP RESET switch, on the P5-10 air conditioning panel.

(j) Make sure the left PACK light goes off.

(k) Install a jumper wire between pins 1 and 2 of electrical connector, D10056, for the left air cycle machine overheat switch, S938.

(l) Make sure the left PACK light comes on.

(m) Remove the jumper wire between pins 1 and 2 of electrical connector, D10056.

(n) Push the TRIP RESET switch, on the P5-10 air conditioning panel.

(o) Make sure the left PACK light goes off.



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(p) Install a jumper wire between pins 1 and 2 of electrical connector, D538, for the right compressor discharge overheat switch, S5.

(q) Make sure the right PACK light come on.

(r) Push either MASTER CAUTION light to cancel the Master Caution.

(s) Make sure the right PACK light stays on.

(t) Push either MASTER CAUTION annunciator light.

(u) Make sure the MASTER CAUTION and AIR COND annunciator lights come on and the R PACK light stays on.

(v) Remove the jumper wire from electrical connector, D538.

(w) Push the TRIP RESET switch, on the P5-10 air conditioning panel.

(x) Make sure the right PACK light goes off.

(y) Install a jumper wire between pins 1 and 2 of electrical connector, D10058, for the right air cycle machine overheat switch, S939.

(z) Make sure the right PACK light comes on.

(aa) Remove the jumper wire from electrical connector, D10058.

(ab) Push the TRIP RESET switch, on the P5-10 air conditioning panel.

(ac) Make sure the right PACK light goes off.

**SUBTASK 21-51-02-710-004**

(2) Connect these electrical connectors to the pack overheat switches:

(a) Electrical connector, D532, to the left pack compressor discharge overheat switch, S2.

(b) Electrical connector, D10056, to the left pack air cycle machine overheat switch, S938.

(c) Electrical connector, D538, to the right pack compressor discharge overheat switch, S5.

(d) Electrical connector, D10058, to the right pack air cycle machine overheat switch, S939.

## E. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-02-410-006**

(1) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**SUBTASK 21-51-02-860-012**

(2) Make sure that the R PACK and L PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

**SUBTASK 21-51-02-860-013**

(3) Make sure that the BLEED 1 and BLEED 2 switches, on the P5-10 air conditioning panel, are in the OFF position.

**SUBTASK 21-51-02-860-014**

(4) Make sure that the ISOLATION VALVE switch, on the P5-10 air conditioning panel, is in the OPEN position.



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SUBTASK 21-51-02-860-015

(5) Make sure that the L and R RECIRC FAN switches, on the P5-10 air conditioning panel, are in the AUTO position.

——— END OF TASK ———



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## HEAT EXCHANGER AND PLENUM/DIFFUSER ASSEMBLY - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the primary and secondary heat exchangers.

NOTE: The plenum/diffuser assembly is attached to the heat exchangers.

(2) An installation of the primary and secondary heat exchangers.

**TASK 21-51-03-000-803**

### 2. Heat Exchanger and Plenum/Diffuser Assembly - Removal

(Figure 401, Figure 402, Figure 403)

#### A. General

(1) It is recommended that you remove the primary heat exchanger, the secondary heat exchanger, the primary plenum/diffuser, and the secondary plenum/diffuser as one unit. As an option, you may choose to remove and install a heat exchanger separately, or with the air cycle machine as an assembly, if you determine this best suits your maintenance needs.

(2) The heat exchangers, the plenum/diffusers and air cycle machine together weigh approximately 125 lb (57 kg). If the adapter, SPL-1608, is not used, a minimum of three persons will be necessary to complete this task.

#### B. References

| Reference | Title |
|---|---|
| 21-51-04-000-801 | Air Cycle Machine Removal (P/B 401) |
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-1570 | Fixture - Lift, Engine Accessory<br>Part #: A71015-157 Supplier: 81205<br>Opt Part #: A71015-108 Supplier: 81205 |
| SPL-1608 | Jack Adapter - Installation/Removal, Air Conditioning Pack<br>Part #: C21005-70 Supplier: 81205<br>Opt Part #: C21005-62 Supplier: 81205 |
| STD-858 | Tag - DO NOT OPERATE |

#### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### E. Access Panels

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |



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(Continued)

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**F. Prepare for the Removal**

SUBTASK 21-51-03-040-001

(1) Make sure that the pneumatic power is off (TASK 36-00-00-860-806).

SUBTASK 21-51-03-860-001

(2) Do these steps, on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position.

1) Attach a DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position.

1) Attach a DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position.

1) Attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-51-03-860-002

(3) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-03-860-032

(4) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

SUBTASK 21-51-03-860-028

(5) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-03-010-001

(6) To remove the heat exchangers for the left pack, do these steps:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-03-010-002

(7) To remove the heat exchangers for the right pack, do these steps in this sequence:

(a) Remove this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## G. Heat Exchanger and Plenum/Diffuser Assembly Removal

SUBTASK 21-51-03-020-001

(1) Disconnect the flexible hose [71] from the spud on the top of the heat exchanger inlet duct [15] as follows:

(a) Loosen the hose clamps [70].

(b) Slide the flexible hose [71] aft toward the Nitrogen Generation System (NGS) heat exchanger until the flexible hose [71] is off the spud on the heat exchanger inlet duct [15].

SUBTASK 21-51-03-020-002

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(2) If it is necessary, remove the outer seal [12] for the Environmental Control System (ECS) access door:

(a) Remove the bolts [10] and nutplates.

(b) Remove the retainer [13] and seal [12].

SUBTASK 21-51-03-020-003

(3) Remove the ram air exhaust elbow [2] from the primary plenum/diffuser [8], do these steps:

(a) Loosen the aft clamp [4].

(b) Move the aft end of the flexible duct [114] forward off of the ram air exhaust duct [107].

(c) If it is necessary remove the bolts [106] and ram air exhaust duct [107] (TASK 21-51-24-000-801).

(d) Remove the bolts [6] and washers [7].

(e) Remove the bolt [115], washer [116], bonding jumper [117], and washer [118].



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(f) Remove the ram air exhaust elbow [2].

(g) Remove the gasket [3].

SUBTASK 21-51-03-020-004

(4) Do these steps to remove the heat exchanger inlet duct [15]:

(a) Remove the bolts [111] and washers [112] that hold each bonding jumpers [113] to the inlet duct.

NOTE: These bolts are longer to accommodate the bonding jumper. Keep them separate from the other bolts for the installation.

(b) Loosen the clamp [14].

(c) Move the flexible hose off the heat exchanger inlet duct [15].

(d) Remove the screws [16] and washers [17].

(e) Move the heat exchanger inlet duct [15] down to disengage the upper flange from the retainer on the lower wing beam.

SUBTASK 21-51-03-010-003

**WARNING**

DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(5) To remove the compressor outlet duct [29], do these steps:

(a) Disconnect the flex hose [105] from the compressor outlet duct [29].

(b) Remove the electrical connector [18] from the ram air control sensor.

(c) Remove the electrical connector [22] from the compressor discharge overheat switch.

(d) Remove the clamp [24] at the air cycle machine [39].

1) Lift the three latch pawls at the same time to release the clamp [24].

(e) Move the sleeve [25] to the compressor outlet duct [29].

(f) Remove the coupling [19] at the secondary heat exchanger [58].

(g) Remove the compressor outlet duct [29].

(h) Remove and discard the packing [20] at the secondary heat exchanger [58].

(i) Remove and discard the packings [26].

SUBTASK 21-51-03-020-009

(6) Remove the clamp [21] from the outboard duct of the secondary heat exchanger [58].

SUBTASK 21-51-03-020-011

(7) Do this step to disconnect the tie rod assemblies [89] from the forward and aft end of each of the two heat exchangers:

(a) Remove the bolt [54], washer [55], and bushing [56] from each of the four tie rod assemblies [89].

SUBTASK 21-51-03-020-012

(8) Do these steps to remove the duct [108]:

(a) Remove the clamp [109] and clamp [110].

(b) Remove the duct [108].

SUBTASK 21-51-03-020-013

(9) Remove the clamp [1] from primary heat exchanger [9] outlet and bleed air inlet ducts.



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SUBTASK 21-51-03-020-014

(10) If the hoist adapter, SPL-1608, is to be used, do these steps to install the adapter:

(a) Install the adapter, SPL-1608, on the engine accessory lift fixture, SPL-1570.

(b) Put the engine accessory lift fixture, SPL-1570, in its position under the heat exchangers.

(c) Make sure that the frame of the adapter, SPL-1608, is horizontal.

1) If it is necessary, use the square drive socket [104] to adjust the angle of the frame at the bottom of the adapter, SPL-1608.

(d) Lift the engine accessory lift fixture, SPL-1570, until it touches the heat exchangers.

1) Make sure that the straps [101] are not caught between the adapter, SPL-1608, and the heat exchangers.

(e) If it is necessary, adjust the sliding tray [103] to make sure that both heat exchangers are firmly seated the in the trays.

1) Loosen the nuts [102].

2) Move the sliding tray [103] forward or aft.

3) Make sure that the heat exchangers are between the end pieces of the trays and the flanges of the heat exchangers are not on the tabs.

4) Tighten the nuts [102].

(f) Put the straps [101] around the heat exchangers.

(g) Tighten the straps [101].

SUBTASK 21-51-03-020-015

**WARNING** IF YOU DO NOT USE THE HOIST ADAPTER, HAVE A MINIMUM OF TWO PERSONS HELP YOU REMOVE THE HEAT EXCHANGERS. THE HEAT EXCHANGERS WEIGH APPROXIMATELY 125 POUNDS, AND IF THEY FALL, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Do these steps to disconnect the heat exchangers from the lower wing beam:

(a) Remove the bolts [59] and washers [60] that attach the primary heat exchanger [9] and secondary heat exchanger [58] to the lower wing beam.

(b) Remove the bolts [57] that attach the primary heat exchanger [9] and secondary heat exchanger [58] to the lower wing beam.

SUBTASK 21-51-03-020-074

(12) Do these steps to disconnect the secondary plenum/diffuser [23] from the air cycle machine [39]:

(a) Remove the bolts [37] and washers [38] that connect the air cycle machine [39] to the secondary plenum/diffuser [23].

(b) Carefully pull the secondary plenum/diffuser [23] from the air cycle machine [39].

(c) Remove and discard the gasket [36] on the air cycle machine [39].

SUBTASK 21-51-03-020-075

**CAUTION** KEEP THE HEAT EXCHANGERS LEVEL IN RELATION TO EACH OTHER. IF THE HEAT EXCHANGERS BEND AT THE FLEXIBLE DUCT, DAMAGE TO THE DIFFUSERS AND THE FLEXIBLE DUCT CAN OCCUR.

(13) Carefully lower the heat exchangers from the ECS bay.



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SUBTASK 21-51-03-480-001

(14) Put covers on the duct openings to keep out unwanted materials.

SUBTASK 21-51-03-020-017

(15) Do these steps to separate the primary plenum/diffuser [8] from the secondary plenum/diffuser [23]:

(a) Remove the clamps [61] that attach the flexible ducts [62] to the plenum/diffusers.

(b) Carefully move one heat exchanger away from the other.

(c) Move the flexible duct [62] off the plenum/diffuser.

SUBTASK 21-51-03-020-019

(16) Do these steps to remove the secondary heat exchanger [58] from the secondary plenum/diffuser [23] or the primary heat exchanger [9] from the primary plenum/diffuser [8]:

(a) Remove the bolts [63] and washers [64] that attach the clip assembly [65] to the heat exchanger.

(b) Remove the clip assembly [65].

(c) Remove the bolts [63] and washers [64] that attach the clip assembly [66] to the heat exchanger.

(d) Remove the clip assembly [66].

(e) Remove the bolts [67] and washers [68] that attach the plenum/diffuser to the heat exchanger.

(f) Remove the primary plenum/diffuser [8] from the primary heat exchanger [9] or the secondary plenum/diffuser [23] from the secondary heat exchanger [58].

(g) Remove and discard the gasket [69] from the primary heat exchanger [9] or secondary heat exchanger [58].

(h) Remove the shim [69A] from the primary heat exchanger [9].

SUBTASK 21-51-03-020-020

(17) To remove the primary diffuser assembly [82] from the primary plenum, do these steps (Figure 402):

(a) Remove the screws [81].

(b) Remove the bolts [83] and washers [84].

(c) Make a record of the orientation of the diffuser assembly [82] with respect to its position in the plenum so that it can be reinstalled in the same orientation as follows:

1) The smaller diameter end of the diffuser is installed forward.

2) Make a record of the side of the diffuser that is up and which side is down with respect to the installed position on the aircraft.

NOTE: The primary diffuser has a fan bypass check valve which is installed in the down position. The primary diffuser is aft of the secondary diffuser.

(d) Remove the diffuser assembly [82] from the primary plenum.

SUBTASK 21-51-03-020-021

(18) To remove the secondary diffuser [85] from the secondary plenum, do these steps (Figure 402):

(a) Remove the bolts [83] and washers [84].



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(b) Make a record of the orientation of the secondary diffuser with respect to its position in the plenum as follows:

NOTE: This is necessary so that you can reinstall the diffuser in the same orientation.

1) The smaller diameter end of the diffuser is installed forward.

2) Make a record of the side of the diffuser that is up and which side is down with respect to the installed position on the aircraft.

(c) Remove the secondary diffuser [85] from the secondary plenum.

SUBTASK 21-51-03-212-001

(19) Inspect the diffuser assembly [82] from the primary plenum/diffuser as follows:

(a) Make sure that the fan bypass check valve door is installed.

(b) Make sure that the fan bypass check valve door operates normally.

(c) If the fan bypass check valve door is not installed or does not operate normally, replace the diffuser assembly [82] with a serviceable unit.

## H. Inspection of the Air Cycle Machine

SUBTASK 21-51-03-211-001

NOTE: It is recommended to do an inspection of the Air Cycle Machine (ACM) when you get access to the fan wheel. This inspection makes sure that the component operates correctly and helps to prevent a non-scheduled removal. If you remove the heat exchanger and plenum/diffuser assembly to clean the off-wing heat exchanger and do not have ECS related problems, then the ACM inspection is not necessary.

NOTE: If operators choose to remove the heat exchangers, plenum/diffusers, and air cycle machine as one assembly, refer to Air Cycle Machine Removal, TASK 21-51-04-000-801.

(1) If the air cycle machine [39] was removed from the secondary plenum/diffuser [23], do these steps to inspect the impeller blade [74] of the air cycle machine [39]:

(a) Make sure that the chord length (width) of each impeller blade tip is a minimum of 0.38 in. (9.65 mm).

(b) Do a visual check that no impeller blades [74] are broken or cracked.

(c) Replace the air cycle machine [39] with a new or serviceable unit if the inspection is unsatisfactory.

SUBTASK 21-51-03-700-001

(2) Do these steps to do a check of the torque necessary to turn the rotating assembly of the air cycle machine [39]:

(a) Put the air cycle machine [39] in a horizontal position.

(b) Put a torque wrench on nut [73].

NOTE: A torque wrench with a gage that shows the torque applied is recommended.

1) You will have to turn nut [72] if the air cycle machine [39] was not removed from the secondary plenum/diffuser [23].

**CAUTION**

TURN THE ROTATING COMPONENTS OF THE ACM ONLY IN THE DIRECTION THAT THEY TURN WHEN IN OPERATION. IF YOU TURN THE ACM ROTATING COMPONENTS IN THE INCORRECT DIRECTION, YOU CAN CAUSE DAMAGE TO THE FOIL AIR BEARINGS.

(c) Make sure that you turn nut [72] clockwise or nut [73] counterclockwise while you turn the rotating assembly.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

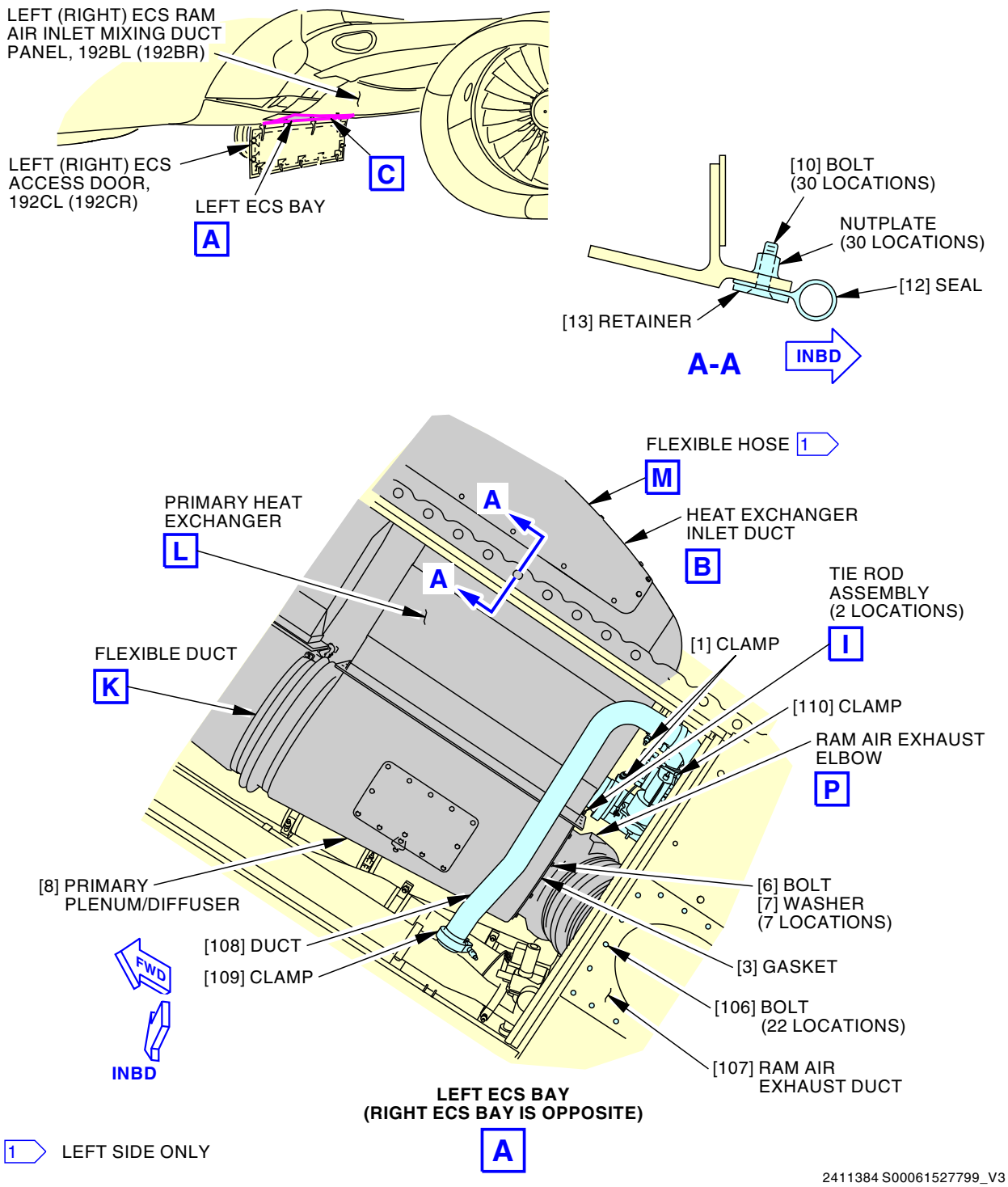
(d) Record the torque necessary to turn the rotating assembly.

(e) If the torque was more than 20 in-lb (2 N·m), replace the air cycle machine [39] with a new or serviceable unit.

——— END OF TASK ———



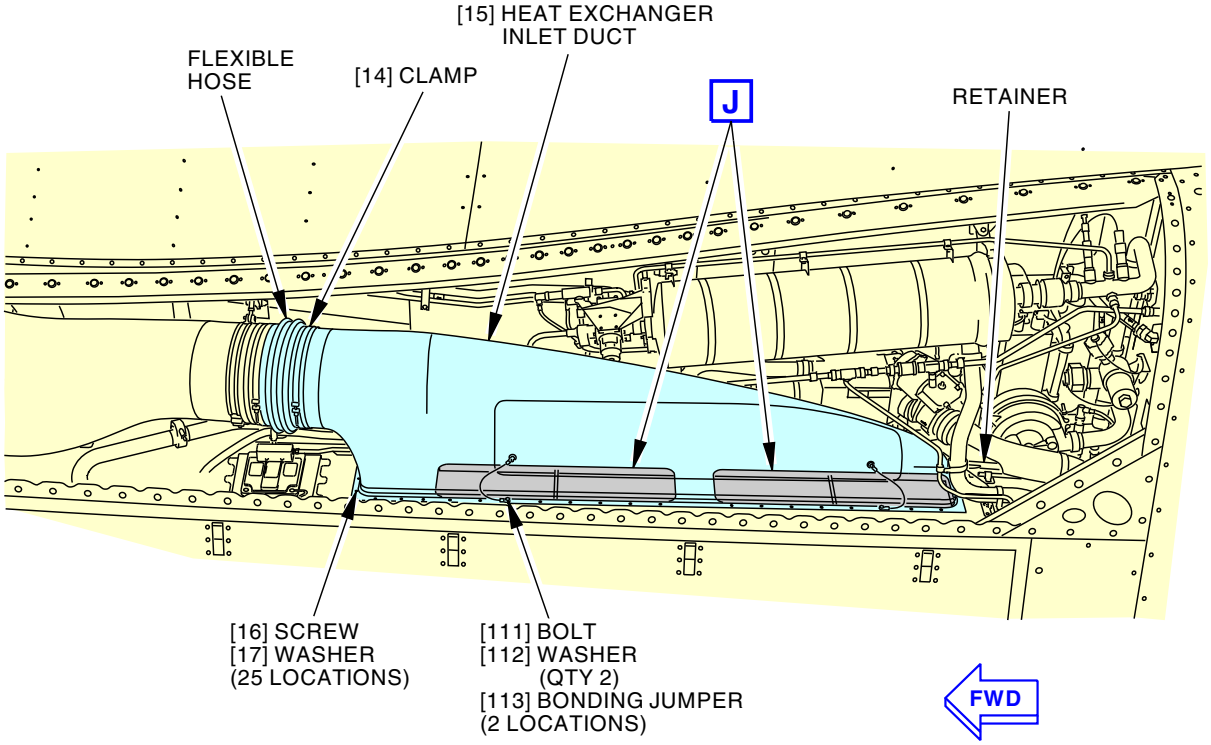
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 1 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

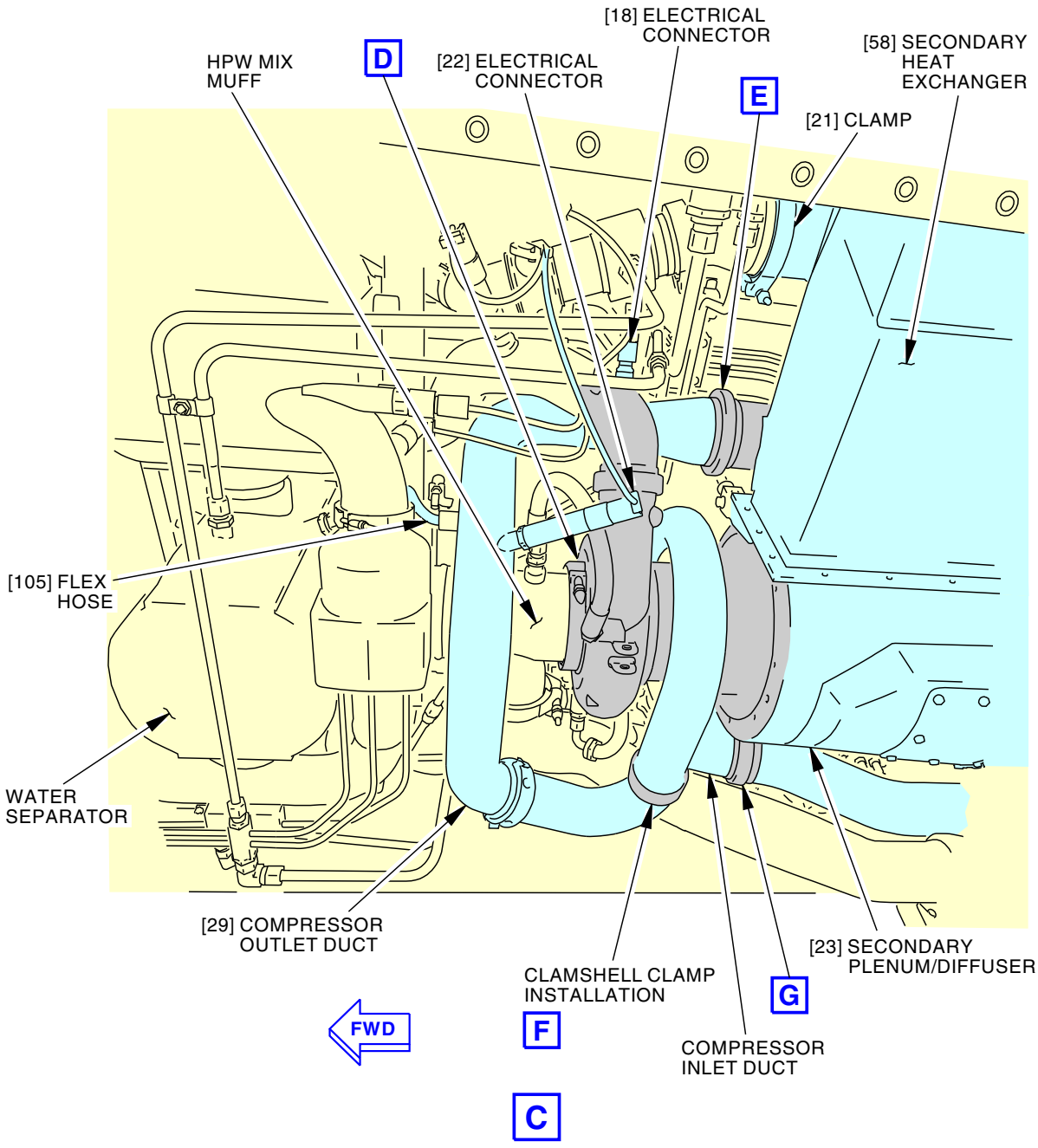



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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 2 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

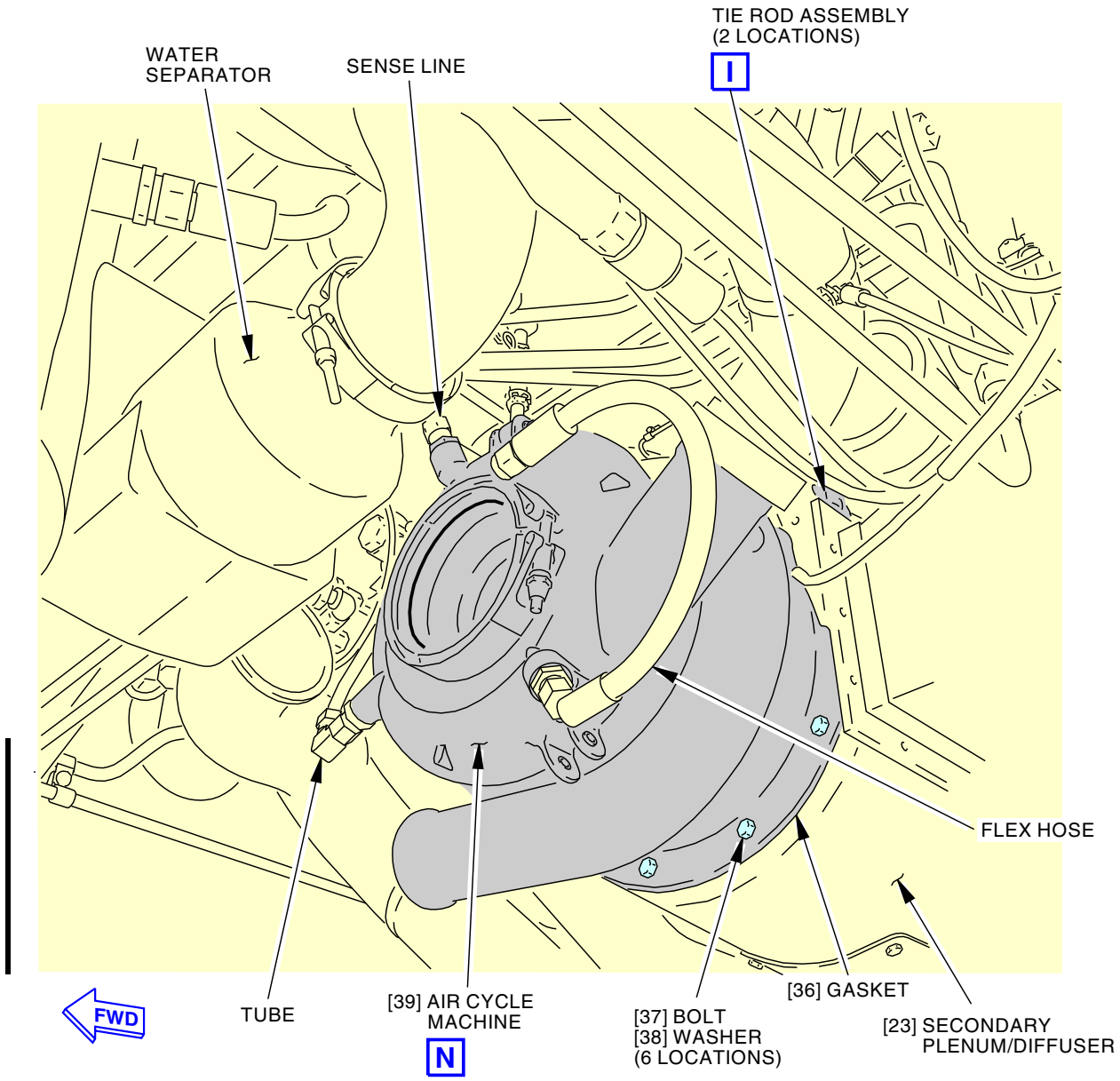



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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 3 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

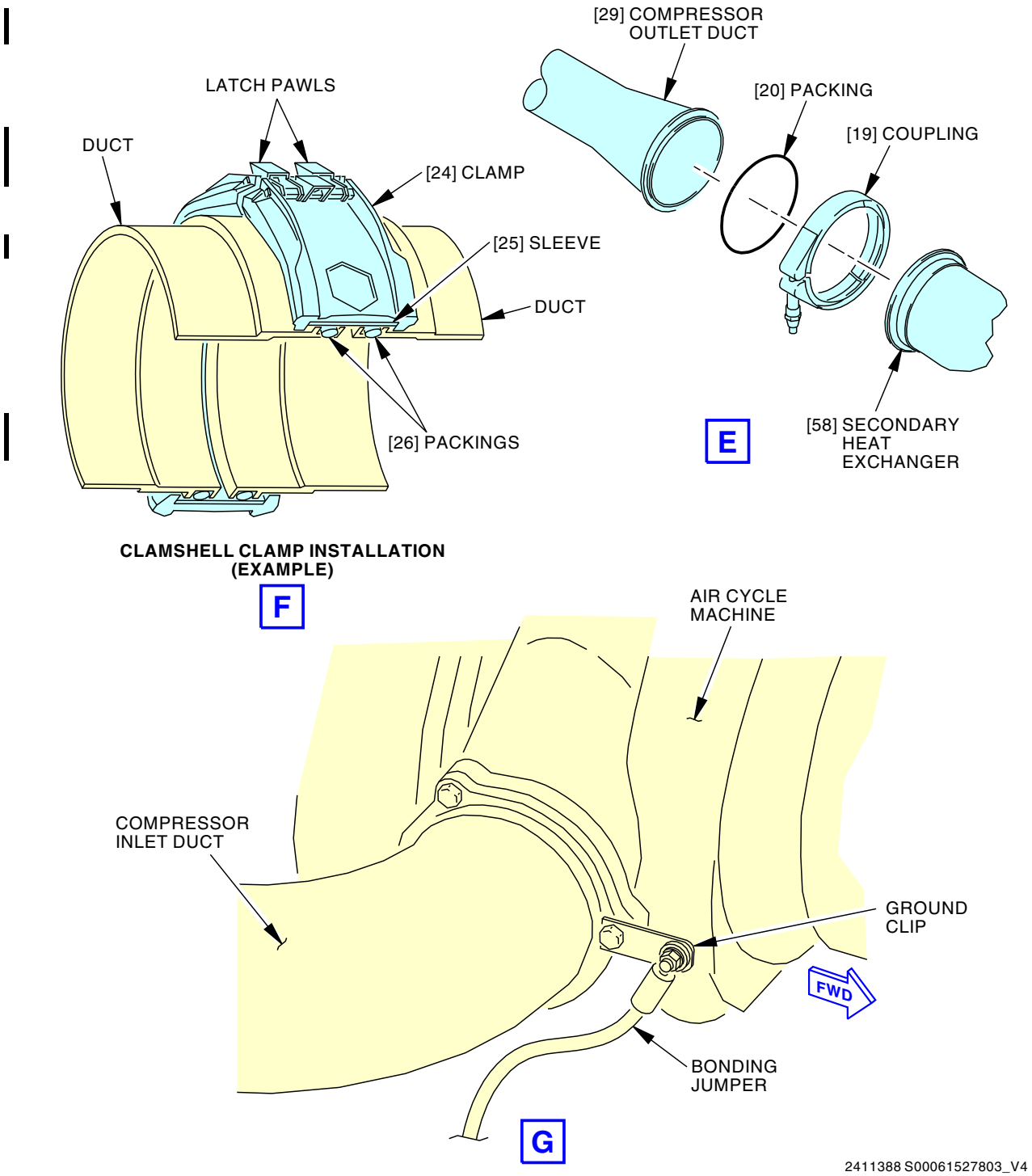



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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 4 of 11)**



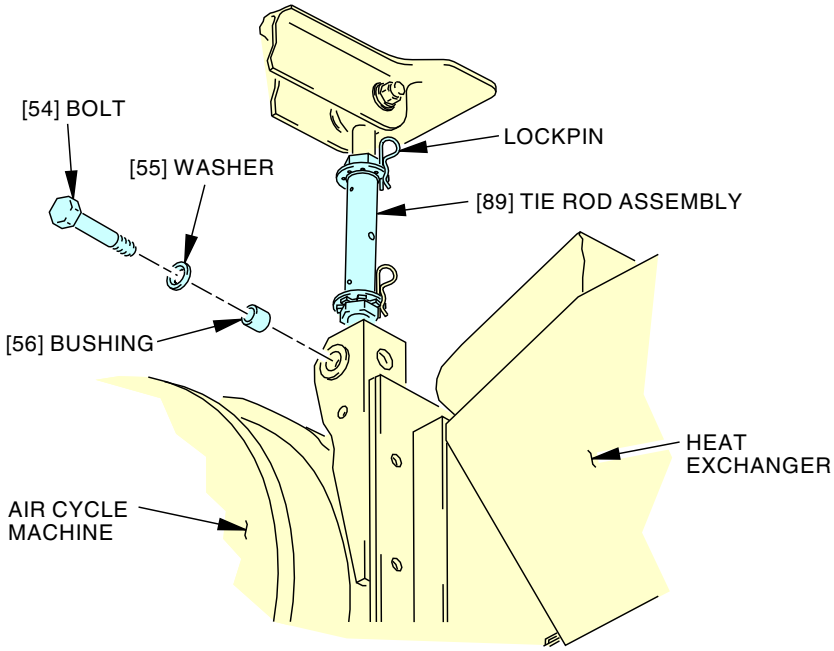
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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 5 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**TIE ROD ASSEMBLY**
**(EXAMPLE)**

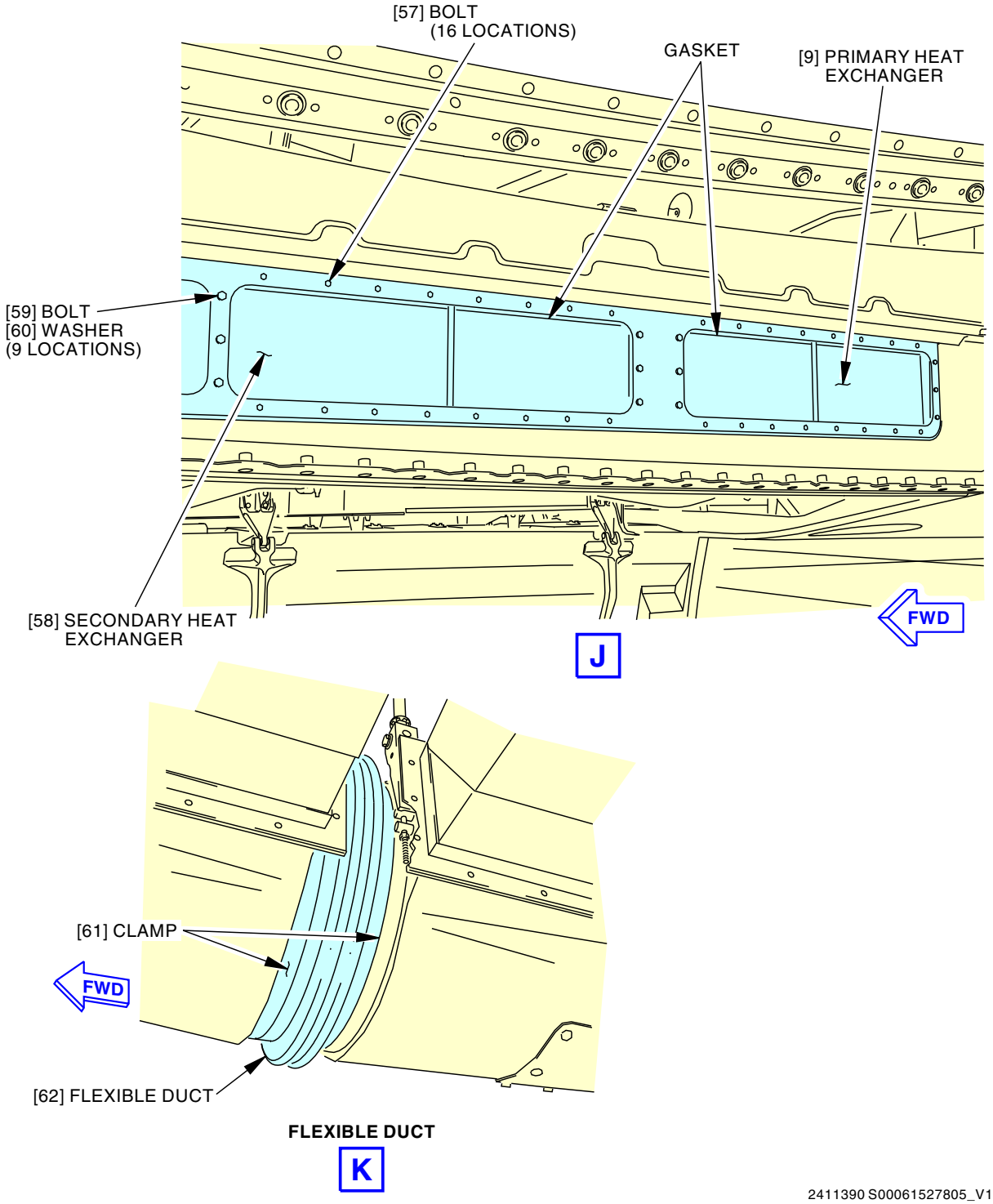
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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 6 of 11)**



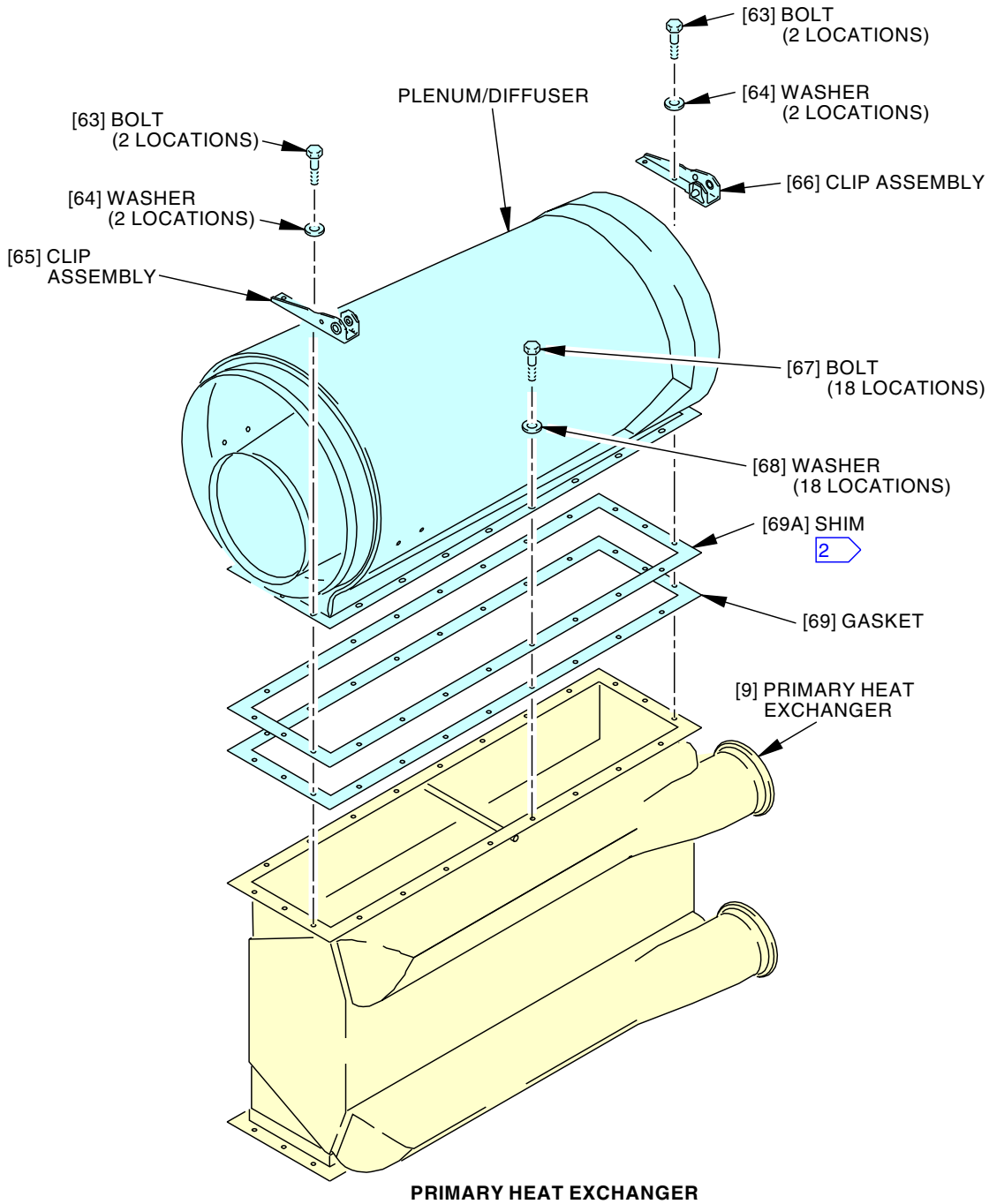
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 7 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PRIMARY HEAT EXCHANGER**
**(SECONDARY HEAT EXCHANGER IS EQUIVALENT)**

2 FOR PRIMARY HEAT EXCHANGER ONLY

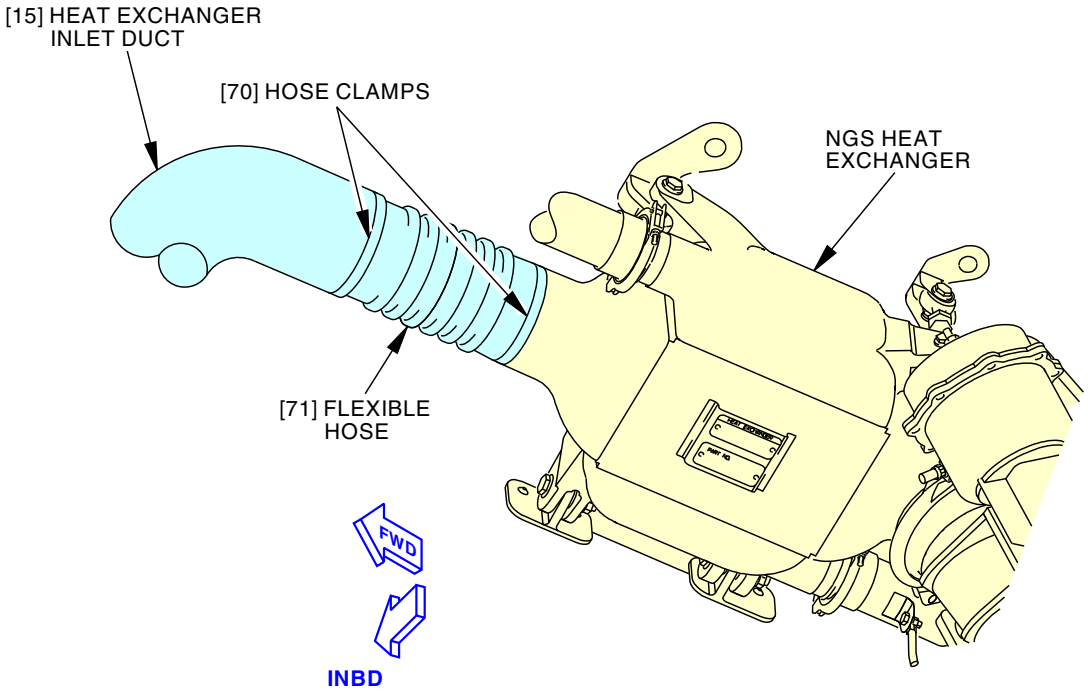
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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 8 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

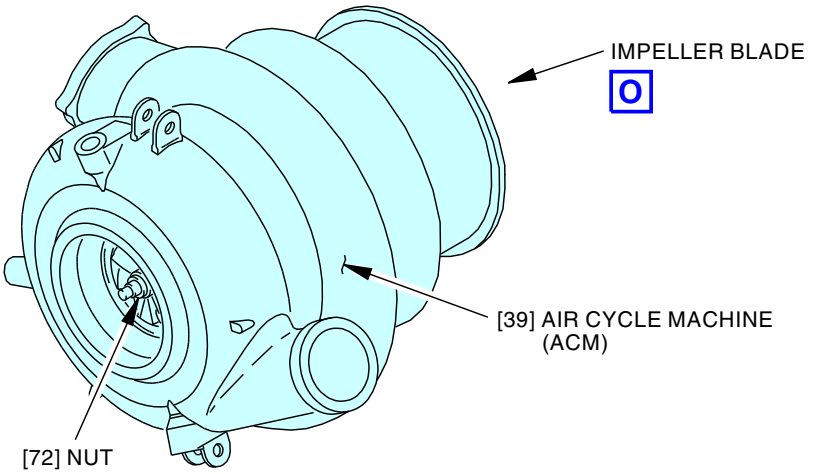



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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 9 of 11)**

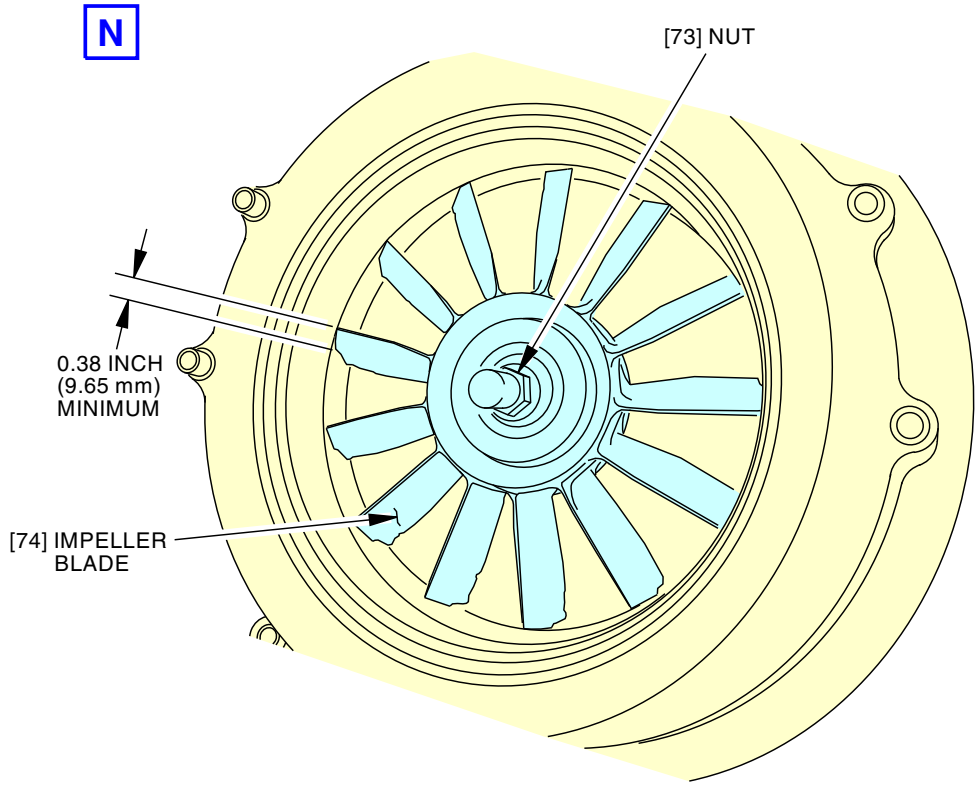


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**AIR CYCLE MACHINE (ACM)**

N




**IMPELLER BLADE**

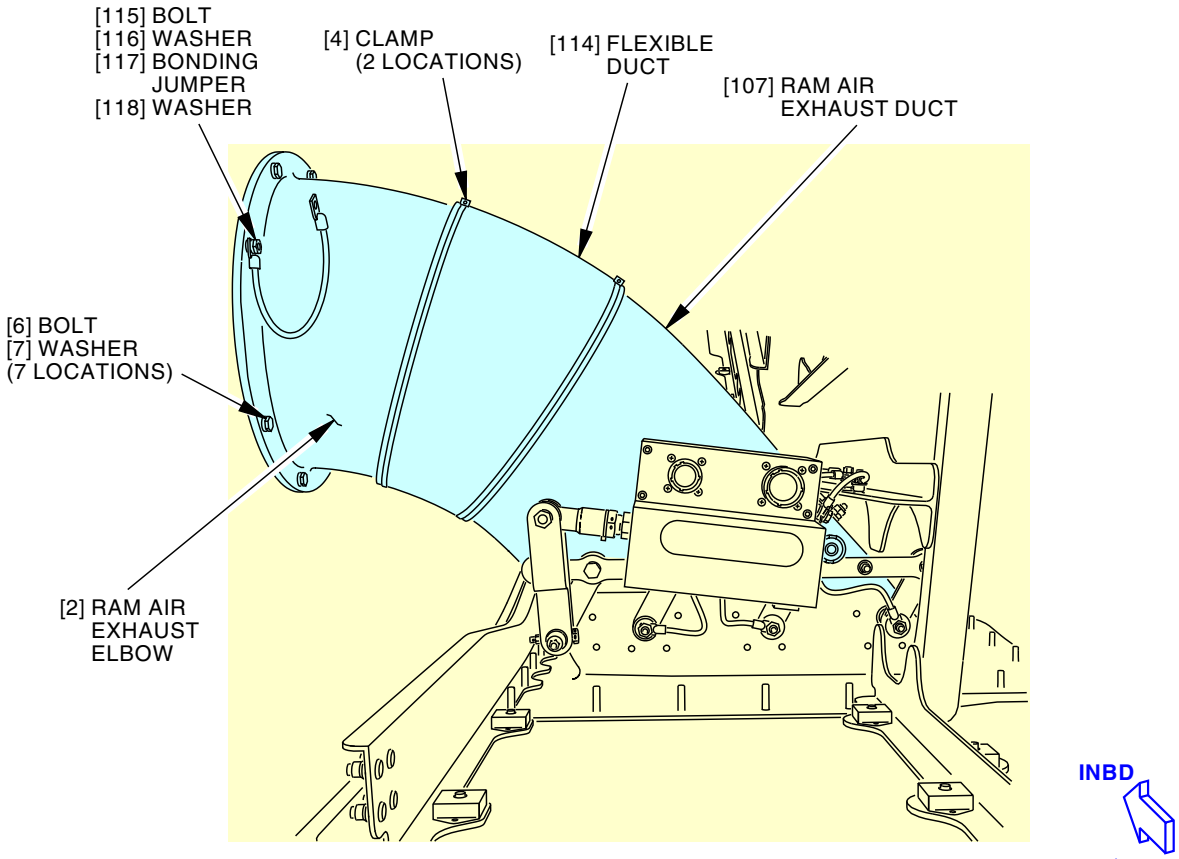
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**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 10 of 11)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR EXHAUST ELBOW**

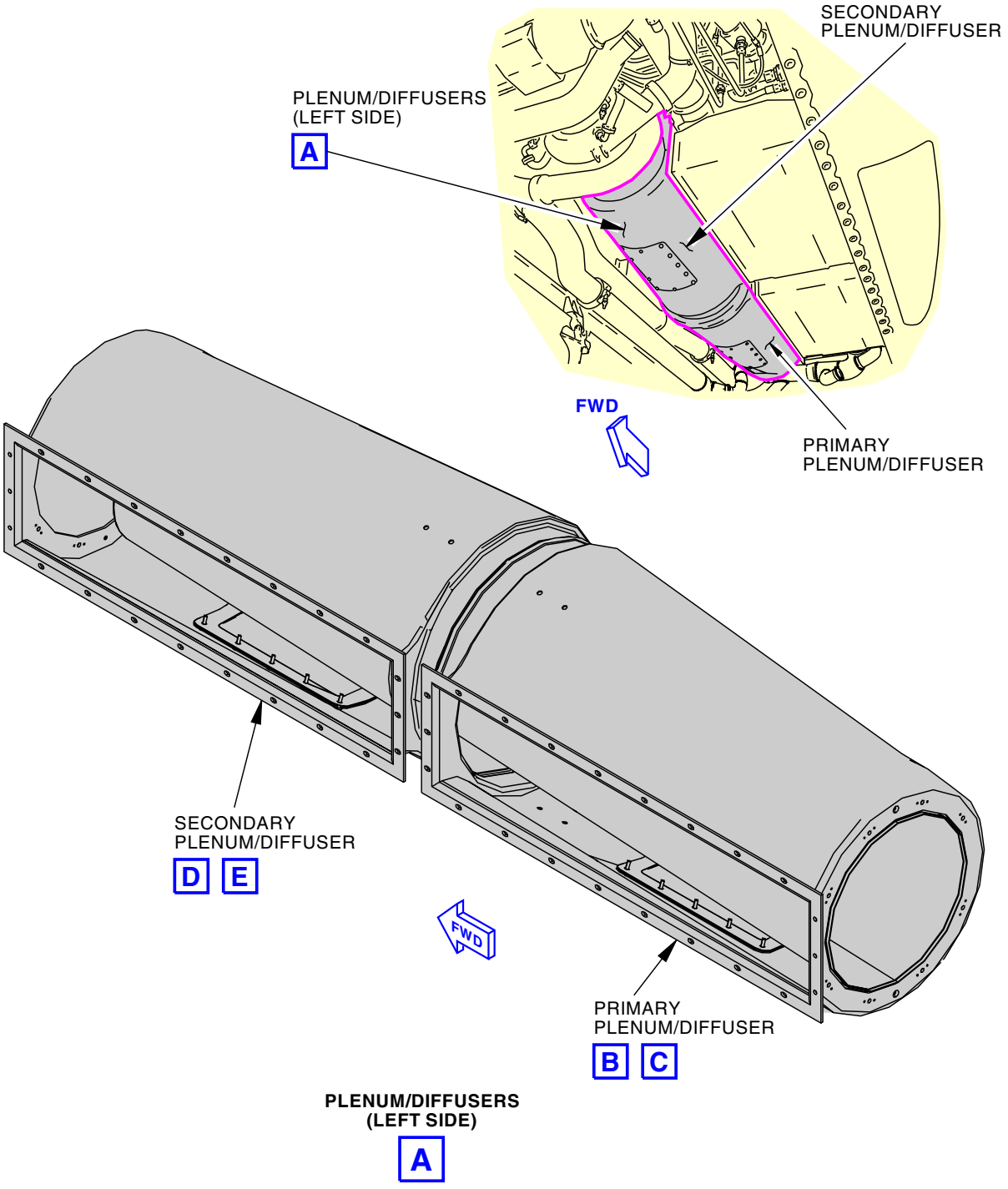
P

2920082 S0000702934_V1

**Heat Exchanger and Plenum/Diffuser Assembly Installation**
**Figure 401/21-51-03-990-801 (Sheet 11 of 11)**



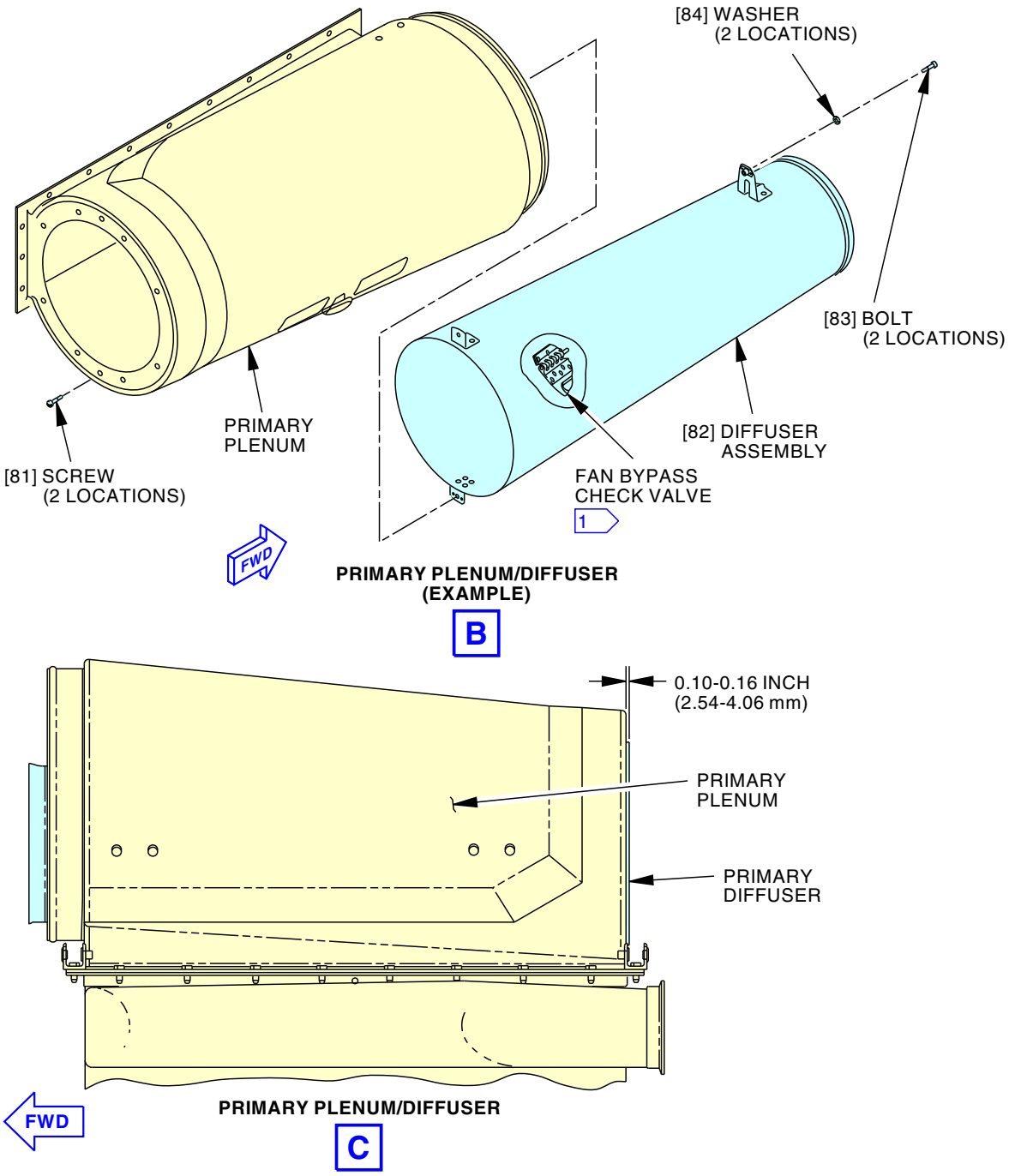
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Diffuser Assembly Installation**
**Figure 402/21-51-03-990-802 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



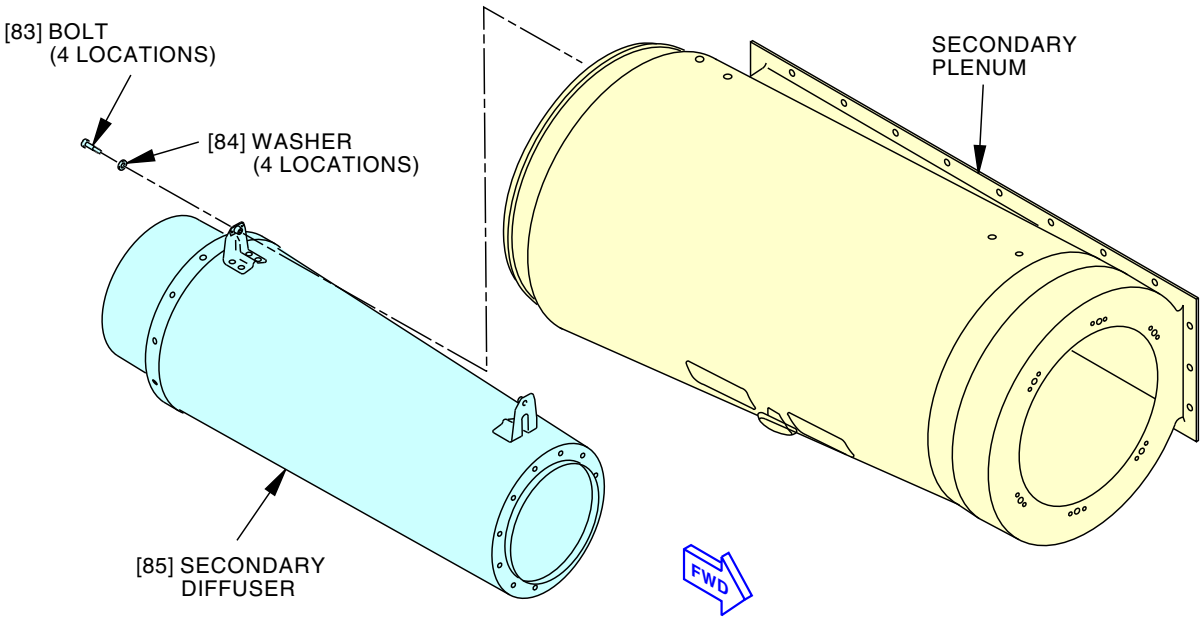

1 INSTALL PRIMARY PLENUM/DIFFUSER SO THAT FAN BYPASS CHECK VALVE IS AT BOTTOM OF DIFFUSER WHEN PLENUM/DIFFUSER IS INSTALLED ON PRIMARY HEAT EXCHANGER.

2411395 S00061527810_V1

**Diffuser Assembly Installation**
**Figure 402/21-51-03-990-802 (Sheet 2 of 3)**

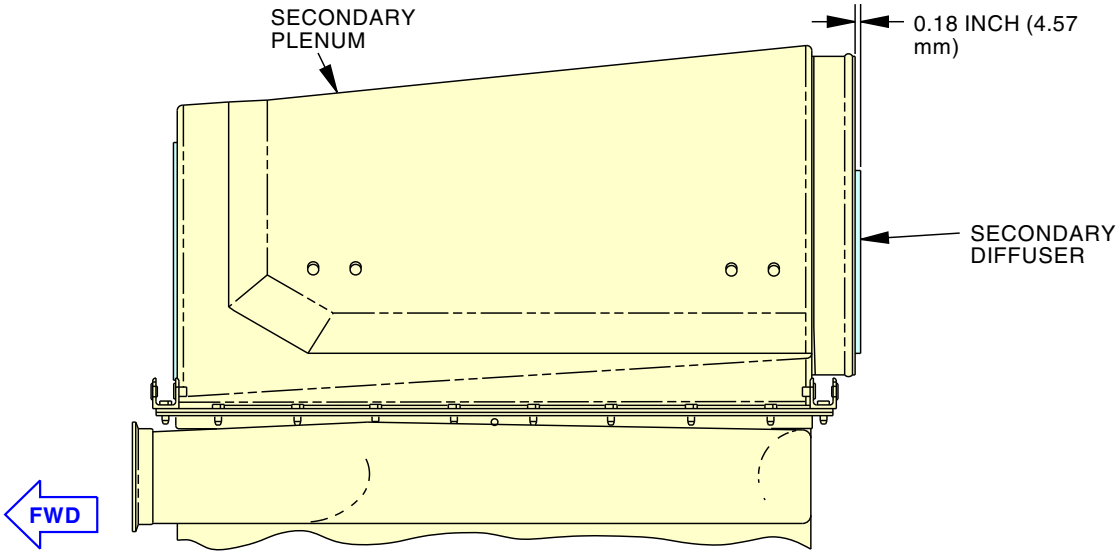


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**SECONDARY PLENUM/DIFFUSER
(EXAMPLE)**

**D**




**SECONDARY PLENUM/DIFFUSER**

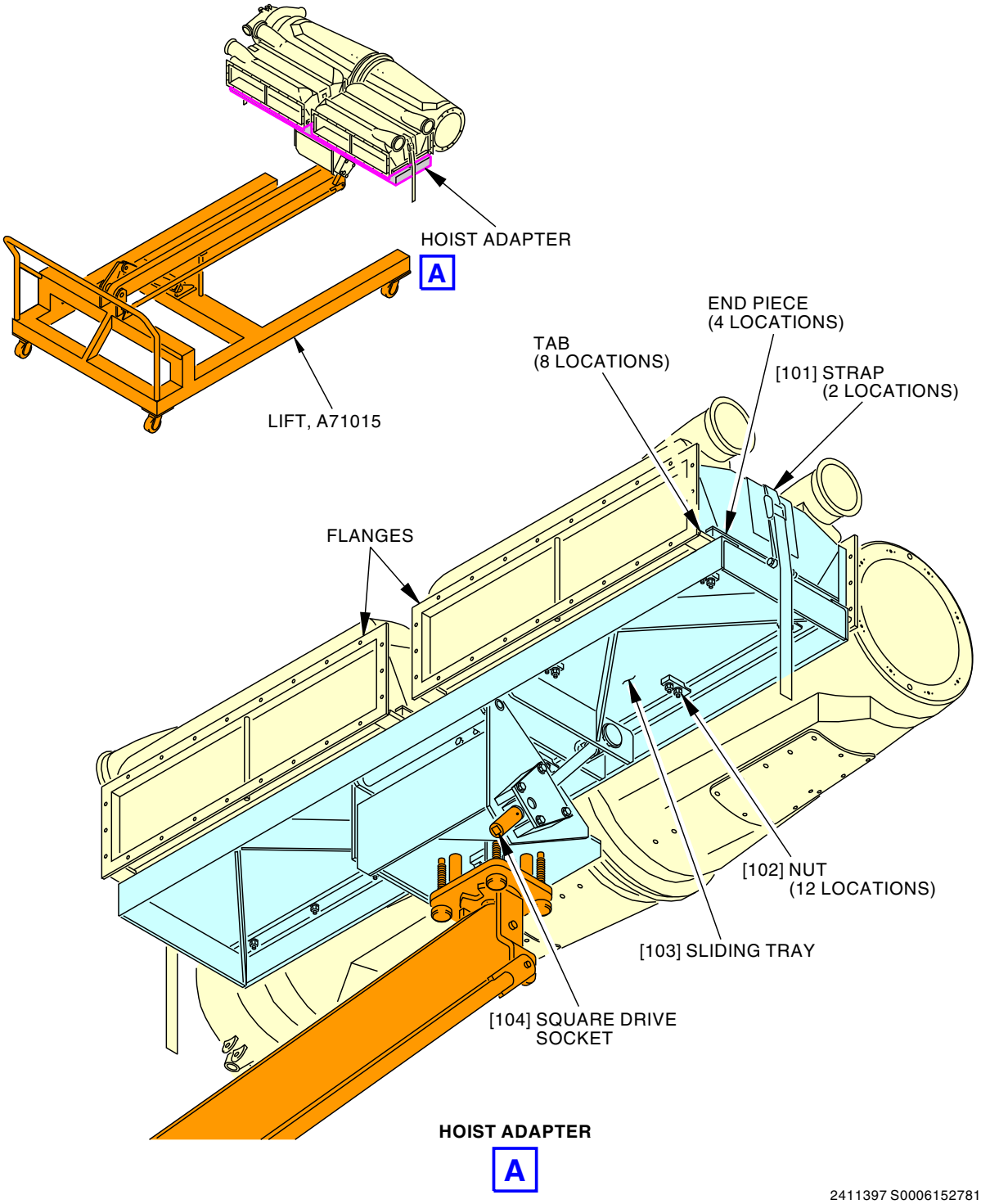
**E**

2411396 S00061527811_V1

**Diffuser Assembly Installation
Figure 402/21-51-03-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Heat Exchanger Tool Installation**
**Figure 403/21-51-03-990-803**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-03-400-802**

## 3. Heat Exchanger and Plenum/Diffuser Assembly - Installation

(Figure 401, Figure 402, Figure 403)

### A. General

(1) This task gives the instructions for the installation of the heat exchanger and the plenum/diffuser assembly.

(2) It is recommended that you install the primary heat exchanger, secondary heat exchanger, primary plenum/diffuser, and secondary plenum/diffuser as an assembly. As an option, you may choose to remove and install a heat exchanger separately, or with the air cycle machine as an assembly, if you determine this best suits your maintenance needs.

### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| SWPM 20-00-00 | Standard Wiring Practices Manual |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| SPL-1570 | Fixture - Lift, Engine Accessory<br>Part #: A71015-157 Supplier: 81205<br>Opt Part #: A71015-108 Supplier: 81205 |
| SPL-1608 | Jack Adapter - Installation/Removal, Air Conditioning Pack<br>Part #: C21005-70 Supplier: 81205<br>Opt Part #: C21005-62 Supplier: 81205 |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329<br>(Supersedes O-A-51) |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

| Reference | Description | Specification |
|---|---|---|
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00766 | Primer - Nonchromated Primer For Composites | BMS10-103 Type I |
| C00767 | Coating - Anti-Static Coating | BMS10-21 Type III |
| C00852 | Compound - Antiseize, Molybdenum Disulfide-Petrolatum | MIL-PRF-83483 |
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00649 | Lubricant - O-Ring - Krytox GPL206 | |
| D50063 | Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC | MIL-PRF- 27617 Type III |
| D50320 | Lubricant - Moly-50 Anti-Seize | MIL-PRF-83483 |
| G50637 | Wiper - MicroCare Fiber Wipes | |

**E. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 8 | Primary plenum/diffuser | 21-51-03-03-072 | SIA ALL |
| | | 21-51-03-03-250 | SIA ALL |
| 9 | Primary heat exchanger | 21-51-03-01-245 | SIA ALL |
| | | 21-51-03-01-250 | SIA ALL |
| | | 21-51-03-03-200 | SIA ALL |
| 20 | Packing | 21-51-03-02-040 | SIA ALL |
| | | 21-51-03-02-200 | SIA ALL |
| 23 | Secondary plenum/diffuser | 21-51-03-02-090 | SIA ALL |
| | | 21-51-03-02-280 | SIA ALL |
| 26 | Packing | 21-51-03-02-055 | SIA ALL |
| | | 21-51-03-02-210 | SIA ALL |
| 36 | Gasket | 21-51-03-02-075 | SIA ALL |
| | | 21-51-03-02-230 | SIA ALL |
| 58 | Secondary heat exchanger | 21-51-03-02-138 | SIA ALL |
| | | 21-51-03-02-400 | SIA ALL |
| 69 | Gasket | 21-51-03-02-134 | SIA ALL |
| | | 21-51-03-02-395 | SIA ALL |
| | | 21-51-03-03-195 | SIA ALL |
| 69A | Shim | 21-51-03-03-194 | SIA ALL |
| | | 21-51-03-03-196 | SIA ALL |
| 82 | Diffuser assembly | 21-51-03-03-325 | SIA ALL |

**F. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |


ECCN 9E991 BOEING PROPRIETARY - See title page for details

**G. Access Panels**

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**H. Plenum and Diffuser Assemble**

SUBTASK 21-51-03-200-002

(1) Make sure that the identification (ID) plates are installed on the primary and secondary plenum.

NOTE: The configuration of the equipment is shown by the part number, dash number, series number, and change number stamped on the identification plate. It is necessary to order and install ID plates if the new plenum assemblies are supplied without ID plates.

(a) If the new plenum assembly will be installed, make sure that all applicable data from the original identification plate are transferred.

SUBTASK 21-51-03-420-001

(2) Do these steps to install the primary diffuser assembly [82] in the primary plenum (Figure 402).

NOTE: The diffuser assembly with the fan bypass check valve is installed in the primary plenum/diffuser assembly.

**CAUTION**

MAKE SURE THAT THE FAN BYPASS CHECK VALVE IS INSTALLED AT THE BOTTOM OF THE DIFFUSER. THE AIR CONDITIONING PACK WILL OVERHEAT IF THE FAN BYPASS CHECK VALVE IS NOT INSTALLED AT THE BOTTOM OF THE DIFFUSER.

(a) Put the diffuser assembly [82] in its position in the primary plenum with the smaller diameter end of the diffuser assembly forward and with the fan bypass check valve at the bottom with respect to the installed position on the aircraft.

1) Examine your records to make sure that the diffuser in the same orientation in the plenum as it was before it was removed.

(b) Lubricate the threads of the screws [81] and bolts [83] with compound, C00852.

(c) Align the forward diffuser brackets with the forward plenum brackets and loosely install the bolts [83] and washers [84].

(d) If the bolts [83] have a self-locking feature, determine the run-on torque as follows:

NOTE: Run-on torque is the torque required to overcome the nutplate self-locking feature.

1) Use a 1/4-inch drive torque wrench to measure the torque required to turn the bolts [83] before the washers [84] contacts the bracket.

(e) Loosely install the screws [81] through the holes in the plenum into the aft brackets on the diffuser assembly.

(f) If the screws [81] has a self-locking feature, determine the run-on torque as follows:

NOTE: Run-on torque is the torque required to overcome the nutplate self-locking feature.

1) Use a 1/4-inch drive torque wrench to measure the torque required to turn the screw [81] before the screw [81] head contacts the plenum.

(g) Position the diffuser assembly [82] to the dimension (View C, Figure 402).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(h) Make sure that the fan bypass check valve is installed at the bottom of the diffuser.

(i) Torque the bolts [83] and screws [81] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m) plus the value of the run-on torque of the fastener.

**SUBTASK 21-51-03-420-002**

(3) Do these steps to install the secondary diffuser [85] in the secondary plenum:

(a) Put the secondary diffuser [85] in the large end of the secondary plenum with the smaller diameter end of the diffuser assembly forward with respect to the installed position on the aircraft.

(b) Lubricate the threads of the bolts [83] with compound, C00852.

(c) Align the secondary diffuser brackets with the secondary plenum brackets and loosely install the bolts [83] and washers [84].

(d) If the bolts [83] has a self-locking feature, determine the run-on torque as follows:

NOTE: Run-on torque is the torque required to overcome the nutplate self-locking feature.

1) Use a 1/4-inch drive torque wrench to measure the torque required to turn the bolts [83] before the washers [84] contacts the bracket.

(e) Position the secondary diffuser [85] to the dimension (View E, Figure 402).

(f) Torque the bolts [83] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m) plus the value of the run-on torque of the bolt.

## I. Heat Exchanger and Plenum/Diffuser Assemble

**SUBTASK 21-51-03-420-012**

(1) Do these steps to attach the secondary heat exchanger [58] to the secondary plenum/diffuser [23] or primary heat exchanger [9] to the primary plenum/diffuser [8]:

(a) Do these steps to attach the heat exchanger to the plenum:

1) Put a new gasket [69] in its position on the primary heat exchanger [9] or secondary heat exchanger [58].

2) For the primary heat exchanger [9], put the shim [69A] in its position between the plenum/diffuser and gasket [69].

3) Put the primary plenum/diffuser [8] on the primary heat exchanger [9] or secondary plenum/diffuser [23] on the secondary heat exchanger [58].

4) Install the clip assembly [65] using the bolts [63] and washers [64] as follows:

a) Lubricate the threads of the bolts [63] with compound, C00852.

b) Align the clip assembly [65] with the primary heat exchanger [9].

<1> Find the run-on torque as you install the bolts [63] in the nutplate self-locking feature.

NOTE: Run-on torque is the torque required to overcome the nutplate self-locking feature.

<2> Use a torque wrench to measure the torque required to turn the bolt [63] before the washer [64] contacts the clip assembly [65].

c) Torque the bolts [63] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m) plus the value of the run-on torque of the bolt.

5) Install the clip assembly [66] using the bolts [63] and washers [64] as follows:

a) Lubricate the threads of the bolts [63] with compound, C00852.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

b) Torque the bolts [63] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m) plus the value of the run-on torque of the bolt.

6) Install the bolts [67] and washers [68] as follows:

a) Lubricate the threads of the bolts [67] with compound, C00852.

b) Align the primary plenum/diffuser [8] with the primary heat exchanger [9].

<1> Find the run-on torque as you install the bolts [67] in the nutplate self-locking feature.

NOTE: Run-on torque is the torque required to overcome the nutplate self-locking feature.

<2> Use a torque wrench to measure the torque required to turn the bolt [67] before the washer [68] contacts the primary plenum.

c) Torque the bolts [67] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m) plus the value of the run-on torque of the bolt.

SUBTASK 21-51-03-020-066

(2) Do these steps to join the primary plenum/diffuser [8] to the secondary plenum/diffuser [23]:

(a) Put the flexible duct [62] in its position on the end of the secondary plenum/diffuser [23].

(b) Carefully move the heat exchangers together while you align the diffusers.

NOTE: The end of the diffuser in the secondary plenum must be installed in the end of the diffuser in the primary plenum.

(c) Move the ends of the flexible duct [62] over the ends of the plenums.

(d) Install the clamps [61] that attach the flexible duct [62] to the plenum/diffusers.

## J. Heat Exchanger and Plenum/Diffuser Installation

SUBTASK 21-51-03-080-001

(1) Remove the covers from the duct openings.

SUBTASK 21-51-03-020-025

(2) If the hoist adapter, SPL-1608, is to be used, do these steps:

(a) Put the heat exchangers in their position on the adapter, SPL-1608.

(b) Put the straps [101] around the heat exchangers.

(c) Tighten the straps [101].

(d) Put the engine accessory lift fixture, SPL-1570, in its position below the Environmental Control System (ECS) bay.

SUBTASK 21-51-03-020-026

**WARNING** IF YOU DO NOT USE THE HOIST ADAPTER, HAVE A MINIMUM OF TWO PERSONS HELP YOU INSTALL THE HEAT EXCHANGERS. THE HEAT EXCHANGERS WEIGH APPROXIMATELY 125 POUNDS, AND IF THEY FALL, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do these steps to attach the heat exchangers to the lower wing beam:

(a) Examine the gasket that is bonded to the lower wing beam.

1) If the gasket is damaged replace the gasket.

NOTE: A new gasket can be made from raw material to replace the damaged gasket.



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CAUTION

KEEP THE HEAT EXCHANGERS LEVEL IN RELATION TO EACH OTHER. IF THE HEAT EXCHANGERS BEND AT THE FLEXIBLE DUCT, DAMAGE TO THE DIFFUSERS AND THE FLEXIBLE DUCT CAN OCCUR.

(b) Carefully raise the primary heat exchanger [9] and secondary heat exchanger [58] to their position in the ECS bay.

1) Install a new gasket [36] on the air cycle machine [39].

2) Align the holes in the gasket [36] with the holes on the plenum.

(c) Install the bolts [57] that attach the primary heat exchanger [9] and secondary heat exchanger [58] to the lower wing beam.

(d) Install the bolts [59] and washers [60].

(e) Install the bolts [37] and washers [38] that connect the air cycle machine [39] to the secondary plenum/diffuser [23].

SUBTASK 21-51-03-020-027

(4) If the hoist adapter, SPL-1608, is being used, do these steps:

(a) Release the straps [101] on the adapter, SPL-1608.

(b) Lower the engine accessory lift fixture, SPL-1570, and remove it from the ECS bay.

SUBTASK 21-51-03-820-001

(5) Do these steps to install the tie rod assemblies [89] on the forward and aft ends of the primary heat exchanger [9] and secondary heat exchanger [58]:

(a) Install the bolt [54], washer [55], and bushing [56] on each of the four tie rod assemblies.

(b) Adjust the tie rod assemblies to align the duct connections on the heat exchangers and the air cycle machine with the ducts in the ECS bay.

(c) Install the lock pins on the tie rods.

SUBTASK 21-51-03-420-004

(6) Do these steps to install the duct [108]:

(a) Put the duct [108] in its position.

(b) Install the clamp [109] and clamp [110].

1) Torque the clamp [109] and clamp [110] to 55 in-lb (6.2 N·m) - 60 in-lb (6.8 N·m).

SUBTASK 21-51-03-020-028

(7) Install the clamps [1] for the primary heat exchanger [9] outlet and bleed air inlet ducts.

(a) Torque the nut on the clamps to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).

SUBTASK 21-51-03-020-029

(8) Install the clamp [21] on the outboard duct of the secondary heat exchanger [58].

(a) Torque the nut on the clamp to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).

SUBTASK 21-51-03-410-001

(9) To install the compressor outlet duct [29], do these steps:

(a) Apply a light coat of Krytox GPL206 lubricant, D00649, or Krytox 240AC perfluoropolyether grease, D50063, to the packing [20] and packings [26].

(b) Install the packings [26] on the duct ends.

(c) Install the packing [20] at the secondary heat exchanger [58].

(d) Put the compressor outlet duct [29] into its position.



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(e) Apply compound, D50320, to the bolt threads of the coupling [19].

(f) Install the coupling [19] at the secondary heat exchanger [58].

NOTE: Do not tighten the clamp fully.

(g) Move the sleeve [25] over the outlet duct connection.

(h) Install the clamp [24] over the outlet duct connection.

(i) Torque the nut on the coupling [19] to 45 in-lb (5.1 N·m) - 50 in-lb (5.6 N·m).

(j) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flex hose [105].

(k) Connect the flex hose [105] to the duct.

(l) Install the electrical connector [18] for the ram air control sensor.

(m) Install the electrical connector [22] for the compressor discharge overheat switch.

(n) Put the bonding jumper on the clamp on the compressor outlet duct [29].

SUBTASK 21-51-03-020-033

(10) Install the ram air exhaust elbow [2] to the primary plenum/diffuser [8], do these steps:

(a) Examine the gasket [3].

1) If it is necessary, replace the gasket [3].

(b) Put the ram air exhaust elbow [2] and flexible duct [114] in position.

(c) Install the bolts [6] and washers [7].

(d) Install the bonding jumper [117], bolt [115], washer [116], and washer [118] with the countersink side of the washer [116] under the head of the bolt [115].

1) Measure the bonding resistance between the bonding jumper [117] terminal and anti-static coating on the ram air exhaust elbow [2] (SWPM 20-00-00).

a) Use an digital/analog multimeter, COM-1793.

b) Make sure that the bonding resistance is 300,000 ohms or less.

2) Apply primer, C00766, on the exposed anti-static primer area around the ground stud.

(e) Install the flexible duct [114] with clamps [4].

SUBTASK 21-51-03-020-034

(11) Do these steps to install the heat exchanger inlet duct [15]:

(a) Examine the gasket on the heat exchanger inlet duct [15].

1) If it is necessary, install a new gasket.

(b) Put the heat exchanger inlet duct [15] in its position with the upper flange under the retainer on the lower wing beam.

**CAUTION** MAKE SURE THAT YOU INSTALL THE SCREWS THAT HAVE THE CORRECT DIAMETER. THE INCORRECT SCREWS CAN BREAK THE NUT PLATE.

(c) Install the screws [16] and washers [17].

NOTE: There are two different screw lengths.

(d) Move the flexible hose on to heat exchanger inlet duct [15].

(e) Tighten the clamp [14].



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(f) Connect the flexible hose [71] from the Nitrogen Generation System (NGS) heat exchanger to the heat exchanger inlet duct [15].

1) Slide the flexible hose [71] over the spud on the top of the heat exchanger inlet duct [15].

2) Torque the hose clamps [70] to 13 in-lb (1.5 N·m) - 18 in-lb (2.0 N·m).

(g) Clean the mating surfaces of the bolts [111], washers [112], and bonding jumpers [113].

1) Use solvent, B00148, or solvent, B00062, to clean the mating surfaces.

2) Remove all traces of the solvent with MicroCare fiber wipes, G50637.

(h) Install the bolts [111], washers [112], and bonding jumpers [113] that hold the heat exchanger inlet duct to the airplane structure.

1) Make sure that the bolts [111] are the same length as the ones that were removed.

2) Install one washer [112] between the bonding jumper [113] and bolt head.

a) Make sure that the washer [112] is installed with the countersink next to the bolt head.

3) Install one washer [112] between the inlet duct and bonding jumper [113].

(i) Make sure that the resistance between the jumper terminal and anti-static coating is less than 300,000 ohms (SWPM 20-00-00).

1) Make a resistance measurement between coating, C00767, of the heat exchanger inlet duct and bolt [111].

NOTE: The measurement point on the duct surface should be more than 0.25 in. (6.35 mm) away from the bolt.

2) The measurement point on the duct surface must be more than 0.25 in. (6.35 mm) away from the bolt [111].

3) If it is necessary, you can remove a small area of the surface finish to gain access to the anti-static coating of the heat exchanger inlet duct.

4) Make sure that the resistance between the bolt [111] and airplane structure near the bonding jumper [113] is less than 300,000 ohms.

5) If it is necessary, you can remove a small area of the surface finish to gain access to the bare metal of the airplane structure.

6) If the resistance measurement is not satisfactory, disassemble the bonding connection, clean the mating surfaces, and repeat the bonding connection installation.

7) Put a thin coating of primer, C00766, on the surface of the heat exchanger inlet duct after the measurement.

8) If the surface finish of the airplane structure was removed for the measurement, then repair the surface finish.

**SUBTASK 21-51-03-020-035**

(12) If it was removed, install the outer seal [12] for the ECS access door:

(a) Put the seal [12] and retainer [13] in their position on the lower wing beam.

(b) Install the bolts [10] and nutplates.

**SUBTASK 21-51-03-860-003**

(13) Remove the DO NOT OPERATE tags from these switches, on the P5-10 air conditioning panel:



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(a) The L PACK and R PACK switches

(b) The BLEED 1 and BLEED 2 switches

(c) The BLEED APU switch.

SUBTASK 21-51-03-860-004

(14) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

SUBTASK 21-51-03-860-029

(15) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-03-860-031

(16) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

## K. Heat Exchanger and Plenum/Diffuser Installation Test

SUBTASK 21-51-03-860-006

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-03-860-007

(2) Put the applicable L PACK or R PACK switch, on the P5-10 air conditioning panel, to the AUTO position.

SUBTASK 21-51-03-790-001

(3) Do a soap bubble test of all the applicable duct joints.

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the applicable clamps.

3) Make sure that the ducts are aligned at the joints.



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4) Tighten the clamps to the applicable installation torque value:
   a) Torque the clamp [109] and clamp [110] to 55 in-lb (6.2 N·m) - 60 in-lb (6.8 N·m).
   b) Torque the nut on clamp [1], clamp [21], and clamp [40] to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).
   c) Torque the nut on coupling [19] to 45 in-lb (5.1 N·m) - 50 in-lb (5.6 N·m).
   d) Torque the hose clamps [70] to 13 in-lb (1.5 N·m) - 18 in-lb (2.0 N·m).
5) Put the L PACK and R PACK switches to the AUTO position.
6) Make sure that the leak stops.

**L. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-51-03-860-008

(1) Put the applicable L PACK or R PACK switches to the OFF position.

SUBTASK 21-51-03-860-009

(2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-03-410-002

(3) Close these panels when the heat exchangers for the left pack were removed.
   (a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

   (b) Install this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-03-410-003

(4) Close these panels in the specified sequence when the heat exchangers for the right pack were removed.
   (a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

   (b) Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

   (c) Install this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

**END OF TASK**



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## FAN BYPASS CHECK VALVE DOOR - INSPECTION/CHECK

### 1. General

A. This procedure has this task:

(1) An operational check of the fan bypass check valve door.

**TASK 21-51-03-710-802**

### 2. Fan Bypass Check Valve Door - Operational Check

(Figure 601)

#### A. General

(1) This procedure has instructions to make sure that the Fan Bypass Check Valve Door is operational.

#### B. References

| Reference | Title |
|---|---|
| 21-51-03 P/B 401 | HEAT EXCHANGER AND PLENUM/DIFFUSER ASSEMBLY - REMOVAL/INSTALLATION |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| C00852 | Compound - Antiseize, Molybdenum Disulfide-Petrolatum | MIL-PRF-83483 |

#### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

#### F. Prepare for the Fan Bypass Check Valve Door Operational Check

**SUBTASK 21-51-03-040-003**

(1) If necessary remove pneumatic pressure, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-03-860-024**

(2) Do these steps on the P5-10 air conditioning panel (found on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(c) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-51-03-860-025**

(3) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |



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(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

SUBTASK 21-51-03-010-016

(4) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

## G. Fan Bypass Check Valve Door Operational Check

SUBTASK 21-51-03-010-018

(1) Do the steps that follow to remove the plenum/diffuser access panel [3] and gasket [4]:

(a) Remove the bolts [1] and washers [2] from the plenum/diffuser access panel [3] and gasket [4].

(b) Remove the bolt [7] and the washer [8] that attaches the bonding jumper [10] to the plenum/diffuser access panel [3].

SUBTASK 21-51-03-200-001

(2) Make sure that the fan bypass check valve door [5] is installed and closed.

NOTE: Gravity force keeps the door closed when the system is off.

SUBTASK 21-51-03-710-001

(3) Make sure the fan bypass check valve door [5] moves freely, do the steps that follow:

(a) Lightly push the fan bypass check valve door [5] up until it hits the fan bypass check valve door stop.

(b) Operate the door through 3 cycles and examine the door for free movement.

SUBTASK 21-51-03-100-005

(4) If you see dirt or contamination, clean the dirt or contamination with soap and water where the fan bypass check valve door [5] and the primary diffuser assembly [6] touch.

SUBTASK 21-51-03-400-001

(5) If the fan bypass check valve door [5] is not installed or does not operate correctly, replace the primary diffuser assembly [6] with a serviceable unit. Do these tasks: HEAT EXCHANGER AND PLENUM/DIFFUSER ASSEMBLY - REMOVAL/INSTALLATION, PAGEBLOCK 21-51-03/401.



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## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-03-420-014

(1) Do the steps that follow to install the bonding jumper [10]:

(a) Make sure that the bonding jumper [10], washer [8], bolt [7], nutplate, and plenum/diffuser access panel [3] are clean.

(b) Put the bonding jumper [10] in its position on the plenum/diffuser access panel [3].

(c) Apply anti-seize compound, C00852 to the threads of the bolt [7].

(d) Install the bolt [7] and the washer [8].

SUBTASK 21-51-03-420-015

(2) Do the steps that follow to install the gasket [4] and plenum/diffuser access panel [3]:

(a) Put the gasket [4] and plenum/diffuser access panel [3] in its position.

(b) Install the washers [2] and bolts [1].

(c) Torque the bolts [1] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m).

SUBTASK 21-51-03-410-018

(3) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

SUBTASK 21-51-03-860-026

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-03-860-027

(5) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Remove the DO-NOT-OPERATE tags from the L and R Pack switches.

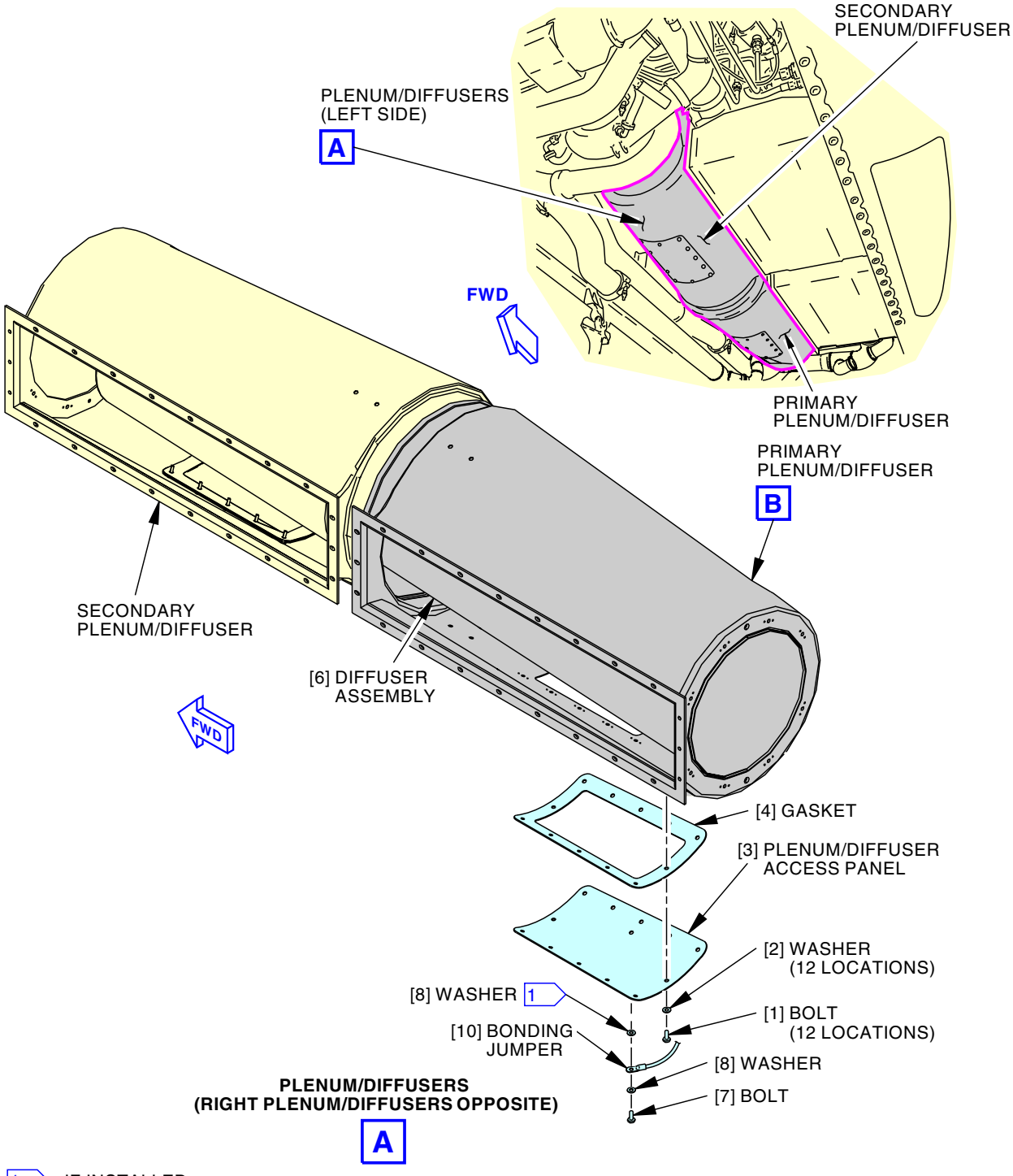
(b) Remove the DO-NOT-OPERATE tags from the BLEED 1 and 2 switches.

(c) Remove the DO-NOT-OPERATE tag from the BLEED APU switch.

**END OF TASK**



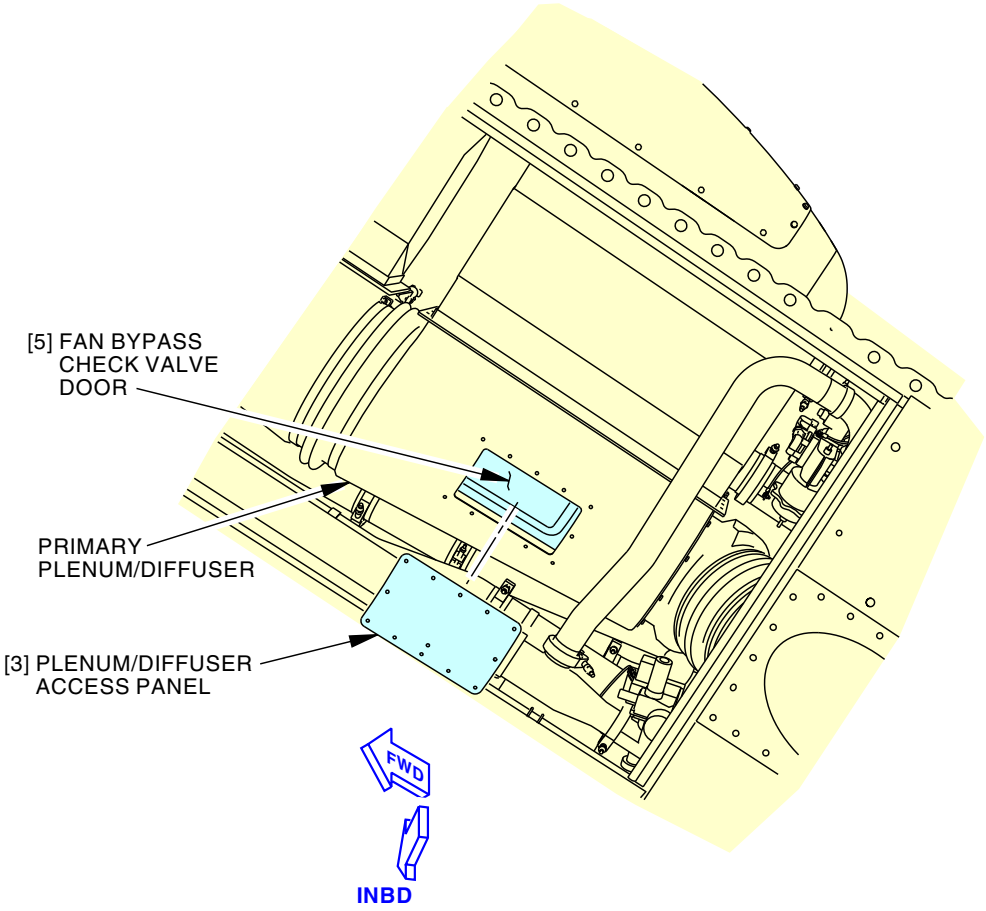
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**Fan Bypass Check Valve Door Operational Check**
**Figure 601/21-51-03-990-812 (Sheet 1 of 2)**



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**LEFT ECS BAY**
**(RIGHT ECS BAY IS OPPOSITE)**

**B**

2974894 S0000754009_V1

**Fan Bypass Check Valve Door Operational Check**
**Figure 601/21-51-03-990-812 (Sheet 2 of 2)**



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## HEAT EXCHANGER AND PLENUM/DIFFUSER ASSEMBLY - CLEANING/PAINTING

### 1. General

A. This procedure has these tasks to clean the primary and secondary heat exchangers:

NOTE: All of these procedures can be accomplished solely to meet the scheduled maintenance task requirement (i.e. each procedure is an alternate to the other).

(1) A heat exchanger and plenum/diffuser assembly on-wing cleaning procedure with backflush equipment that uses air and water.

(2) Heat exchangers on-wing cleaning with Soap-Water-Air.

(3) Alternatively to on-wing cleaning, replace heat exchanger with new or shop-cleaned (per vendor CMM) heat exchanger.

**TASK 21-51-03-000-802**

### 2. Heat Exchanger and Plenum/Diffuser Assembly Cleaning

(Figure 701)

NOTE: This procedure is a scheduled maintenance task.

#### A. General

(1) You may use either a ground air source or Auxiliary Power Unit (APU) bleed air to do this procedure.

#### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-1607 | Equipment - Backflush, A/C Pack Heat Exchanger<br>Part #: C21003-160 Supplier: 81205<br>Part #: C21003-161 Supplier: 81205<br>Opt Part #: C21003-133 Supplier: 81205<br>Opt Part #: C21003-134 Supplier: 81205<br>Opt Part #: C21003-155 Supplier: 81205<br>Opt Part #: C21003-156 Supplier: 81205<br>Opt Part #: C21003-80 Supplier: 81205<br>Opt Part #: C21003-81 Supplier: 81205<br>Opt Part #: C21003-82 Supplier: 81205 |



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(Continued)

| Reference | Description |
|---|---|
| SPL-2462 | Deactivator - Check Valve<br>Part #: C21006-7 Supplier: 81205<br>Opt Part #: C21006-1 Supplier: 81205<br>Opt Part #: PF80-012-500 Supplier: 053H3 |
| SPL-13921 | Backflush Equipment - Bleed Air Hose<br>Part #: C21003-135 Supplier: 81205 |
| STD-858 | Tag - DO NOT OPERATE |
| STD-3926 | Water Source - Cold, Regulated, 0 to 60 PSIG |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Gasket | 21-51-24-04A-190 | SIA ALL |
| | | 21-51-24-04B-190 | SIA ALL |
| 5 | Gasket | 21-51-03-02-118 | SIA ALL |
| | | 21-51-03-03-145 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Prepare for the Cleaning**

**SUBTASK 21-51-03-040-002**

(1) Set the L PACK and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

(a) Put DO NOT OPERATE tags, STD-858, on the switches.

**SUBTASK 21-51-03-860-011**

(2) Set the ISOLATION VALVE switch, on the P5-10 air conditioning panel, to the OPEN position.

**SUBTASK 21-51-03-010-004**

(3) To get access to the left pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |

**SUBTASK 21-51-03-010-005**

(4) To get access to the right pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |


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(Continued)

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-010-006

(5) Remove the bolts [4] and washers [3] that attach the ram air inlet duct access panel [2] to the ram air inlet duct.

SUBTASK 21-51-03-010-007

(6) Remove the ram air inlet duct access panel [2].

NOTE: Removal of the access panel is necessary so that the cleaning water will not accumulate in the ram air inlet duct.

NOTE: There is a gasket bonded to the access panel. The gasket can stay in place and reused if it is not damaged.

SUBTASK 21-51-03-010-008

(7) Remove the bolts [8] and washers [7] that attach each of the two access panels [6] and gaskets [5] to the plenum/diffuser assemblies for the primary and secondary heat exchangers.

NOTE: Each access panel are installed with a gasket. The gaskets can be reused if there in no damage.

SUBTASK 21-51-03-020-036

(8) Remove the bolt [9] and washer [10] that attach the bonding jumper [11] to the access panel [6].

SUBTASK 21-51-03-010-009

(9) Remove the two access panels [6] from the plenum/diffuser.

SUBTASK 21-51-03-480-002

(10) Install a backflusher, SPL-1607, heat exchanger cleaning heads, do these steps:

(a) Install the backflush units (cleaning heads) as follows:

1) Use the applicable backflush unit to clean the left pack primary heat exchanger or the right pack secondary heat exchanger.

2) Use the applicable backflush unit to clean the left pack secondary heat exchanger or the right pack primary heat exchanger.

**CAUTION** DO NOT APPLY FORCE TO THE PLENUM/DIFFUSER ASSEMBLY WHEN YOU INSTALL THE CLEANING HEADS OF THE HEAT EXCHANGER. YOU CAN CAUSE DAMAGE TO THE PLENUM/DIFFUSER ASSEMBLY.

(b) Carefully insert the supply tubes of the cleaning head into the access holes in the plenum/diffuser assembly so that the ends of the supply tubes point toward the exit of the heat exchanger.

**CAUTION** DO NOT TIGHTEN THE SCREWS ON THE CLEANING HEAD TOO MUCH. TOO MUCH TORQUE WILL CAUSE DAMAGE TO THE PLENUM/DIFFUSER.

(c) Carefully tighten the screws on the cleaning head so that the rubber seals of the cleaning head just make good contact with the plenum/diffuser.

(d) Do the above steps again to install the cleaning head for the other heat exchanger.



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SUBTASK 21-51-03-480-003

(11) If the backflusher, SPL-1607, has a water supply valve and air supply valve, make sure that they are closed.

NOTE: Not all configurations of the backflush equipment have the water supply valve and air supply valve.

SUBTASK 21-51-03-480-004

(12) Install plastic sheeting to seal off the plenum/diffuser as follows:

(a) Remove the two clamps that attach the flexible duct between the elbow duct at the aft end of the plenum/diffuser and the ram air exhaust duct (TASK 21-51-24-000-801).

(b) Remove the flexible duct.

(c) Install a piece of plastic sheeting to cover the opening of the elbow duct that is attached to the aft end of the plenum/diffuser.

(d) Secure the plastic sheeting to the end of the elbow duct with the clamps that are used to install the flexible duct.

SUBTASK 21-51-03-940-001

(13) Connect the water line of the 0 to 60 PSIG regulated cold water source, STD-3926, to the water supply hose of the backflush equipment.

(a) Do not start the flow of water at this time.

SUBTASK 21-51-03-941-001

(14) Do these steps if you use the airplane APU pneumatic air to back flush the heat exchangers:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(b) Look at the dual duct pressure indicator on the P5-10 air conditioning panel to make sure that there is no pressure in the pneumatic system.

1) If there is pressure in the pneumatic system, remove the pressure as follows:

a) Do this step: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

(c) Do the two steps that follow at the same time to prepare to supply pneumatic air to the backflush equipment:

**WARNING** WEAR GLOVES THAT WILL GIVE YOU PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. THE GROUND AIR CONNECTOR CAN BE VERY HOT IF THE PACKS HAVE BEEN OPERATED IMMEDIATELY BEFORE THIS PROCEDURE. YOU CAN BADLY BURN YOUR HANDS IF YOU TOUCH A HOT GROUND AIR CONNECTOR.

1) Install the deactivator, SPL-2462, in the ground pneumatic connector to hold the check valve open.

2) Connect the bleed air hose, SPL-13921, supplied with the backflush equipment to the ground pneumatic connector.

NOTE: The air hose connector holds the deactivator, SPL-2462, in position.

(d) Connect the other end of the air hose that you just connected to the ground pneumatic connector to the air inlet fitting on the backflush equipment air hose.


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SUBTASK 21-51-03-941-002

(15) If you use a ground pneumatic air source to back flush the heat exchangers, do this step:

(a) Connect the ground pneumatic air supply line to the air inlet fitting on the backflush equipment.

## H. Heat Exchanger and Plenum/Diffuser Assembly Cleaning

SUBTASK 21-51-03-020-037

**CAUTION** DO NOT USE SOAP OR A DETERGENT SOLUTION TO CLEAN THE HEAT EXCHANGERS. USE COLD WATER ONLY. SOAP OR A DETERGENT SOLUTION CAN CAUSE DAMAGE TO THE AIR CYCLE MACHINE.

(1) Use the backflusher, SPL-1607, to clean the heat exchanger.

NOTE: You must do these steps for each of the heat exchangers.

(a) Connect the air hose to the cleaning head.

(b) Connect the water supply hose to the cleaning head.

(c) If you use the airplane pneumatic system air for the air source, do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

(d) If you use a ground pneumatic air for the air source, do the following step:

**CAUTION** DO NOT SUPPLY MORE THAN 30 PSIG OF GROUND AIR PRESSURE TO THE HEAT EXCHANGERS. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE HEAT EXCHANGERS OR THE RAM AIR EXIT DUCTS.

1) Start the ground air source and adjust the pressure regulator to a maximum of 30 psig (2 $kg/cm^2$).

**WARNING** MAKE SURE THAT YOU CORRECTLY ATTACH THE HOSE ASSEMBLY BEFORE YOU SUPPLY PRESSURE. WHEN YOU PUT PRESSURE ON THE HOSE, THE ASSEMBLY CAN MOVE QUICKLY. IF YOU DO NOT OBEY, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(e) If installed, slowly open the air supply valve on the manifold of the cleaning tool.

(f) Slowly open the water supply valve on the 0 to 60 PSIG regulated cold water source, STD-3926.

(g) If installed, slowly open the water supply valve on the manifold of the cleaning tool.

(h) Clean the heat exchanger for 5 minutes.

(i) Close the water supply valve on the 0 to 60 PSIG regulated cold water source, STD-3926, and continue to supply air for an additional 2 minutes.

(j) If you use the airplane pneumatic system air, set the APU BLEED switch, on the P5-10 panel, to the OFF position.

(k) If you use a ground pneumatic air for the air source, set the valve on the ground pneumatic cart to the off position.



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**WARNING** PUT ON GLOVES FOR PROTECTION FROM THE HOT WATER IN THE HOSES. HOT WATER CAN BURN YOU.

(l) Disconnect the air hose from the cleaning head.

**WARNING** PUT ON GLOVES FOR PROTECTION FROM THE HOT WATER IN THE HOSES. HOT WATER CAN BURN YOU.

(m) Disconnect the water supply hose from the cleaning head.

(n) Do the steps above, as necessary, for the other heat exchangers.

SUBTASK 21-51-03-020-038

(2) If not already done, close the valve at the water source.

SUBTASK 21-51-03-030-001

(3) Disconnect the water line from the 0 to 60 PSIG regulated cold water source, STD-3926, and the water supply hose of the backflush equipment.

(4) If you used a ground air supply for the air source, do these steps:

(a) Stop the operation of the ground air source.

(b) Disconnect the ground air supply line from the air hose inlet fitting.

SUBTASK 21-51-03-880-001

(5) If you used the airplane pneumatic system air for the air source, do these steps:

(a) If not already done, set the APU BLEED switch, on the P5-10 panel, to the OFF position.

(b) If installed, open the air supply valve on the backflusher equipment.

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(c) Disconnect the bleed air hose, SPL-13921, from the ground pneumatic connector and from the air hose inlet fitting.

**WARNING** PUT ON GLOVES FOR PROTECTION FROM HOT SURFACES WHEN YOU CONNECT OR DISCONNECT PNEUMATIC FITTINGS. PACK OPERATION CAN MAKE THE GROUND AIR CONNECTOR VERY HOT. A HOT GROUND AIR CONNECTOR WILL BURN YOUR BARE HANDS.

(d) Remove the check valve deactivator from the ground pneumatic connector.

(e) Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-020-039

(6) Remove the heat exchanger cleaning heads, do these steps:

(a) If not already done, disconnect the air hose from the cleaning head.

(b) If not already done, disconnect the water supply hose from the cleaning head.



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(c) Loosen the screws on the cleaning head.

(d) Carefully remove the cleaning head.

SUBTASK 21-51-03-410-004

(7) Put the bonding jumper [11] in its position and install the bolt [9] and washer [10] that attach them to the access panel [6].

SUBTASK 21-51-03-211-002

(8) Examine the gasket [1] and gasket [5] for damage.

(a) Replace the gasket if there is damage or deterioration.

SUBTASK 21-51-03-420-007

(9) Install the plenum/diffuser access panels [6] and the gasket [5] with the bolts [8] and washers [7].

(a) Torque the bolts [8] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m).

SUBTASK 21-51-03-420-008

(10) Install the ram air inlet access panel [2] and the gasket [1] with the bolts [4] and washers [3].

SUBTASK 21-51-03-080-002

(11) Remove the plastic sheeting from the elbow duct at the aft end of the plenum/diffuser as follows:

(a) Remove the clamp that secures the plastic sheeting to the elbow duct.

(b) Remove the plastic sheeting.

(c) Install the flexible duct between the elbow duct at the aft end of the plenum/diffuser and the ram air exhaust duct (TASK 21-51-24-400-801).

(d) Install the clamps to secure the flexible duct:

(e) Torque the clamps to 13 in-lb (1.5 N·m) - 17 in-lb (1.9 N·m).

SUBTASK 21-51-03-880-002

(12) Operate the air conditioning pack for five minutes (TASK 21-00-00-800-803).

NOTE: This will remove all water in the ram air ducts and the air cycle machine bearings.

SUBTASK 21-51-03-880-003

(13) Stop the air conditioning pack (TASK 21-00-00-800-804).

## I. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-03-860-012

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-03-100-001

(2) If you cleaned the left pack heat exchangers, close these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |

SUBTASK 21-51-03-100-002

(3) If you cleaned the right pack heat exchangers, close these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-51-03-080-004

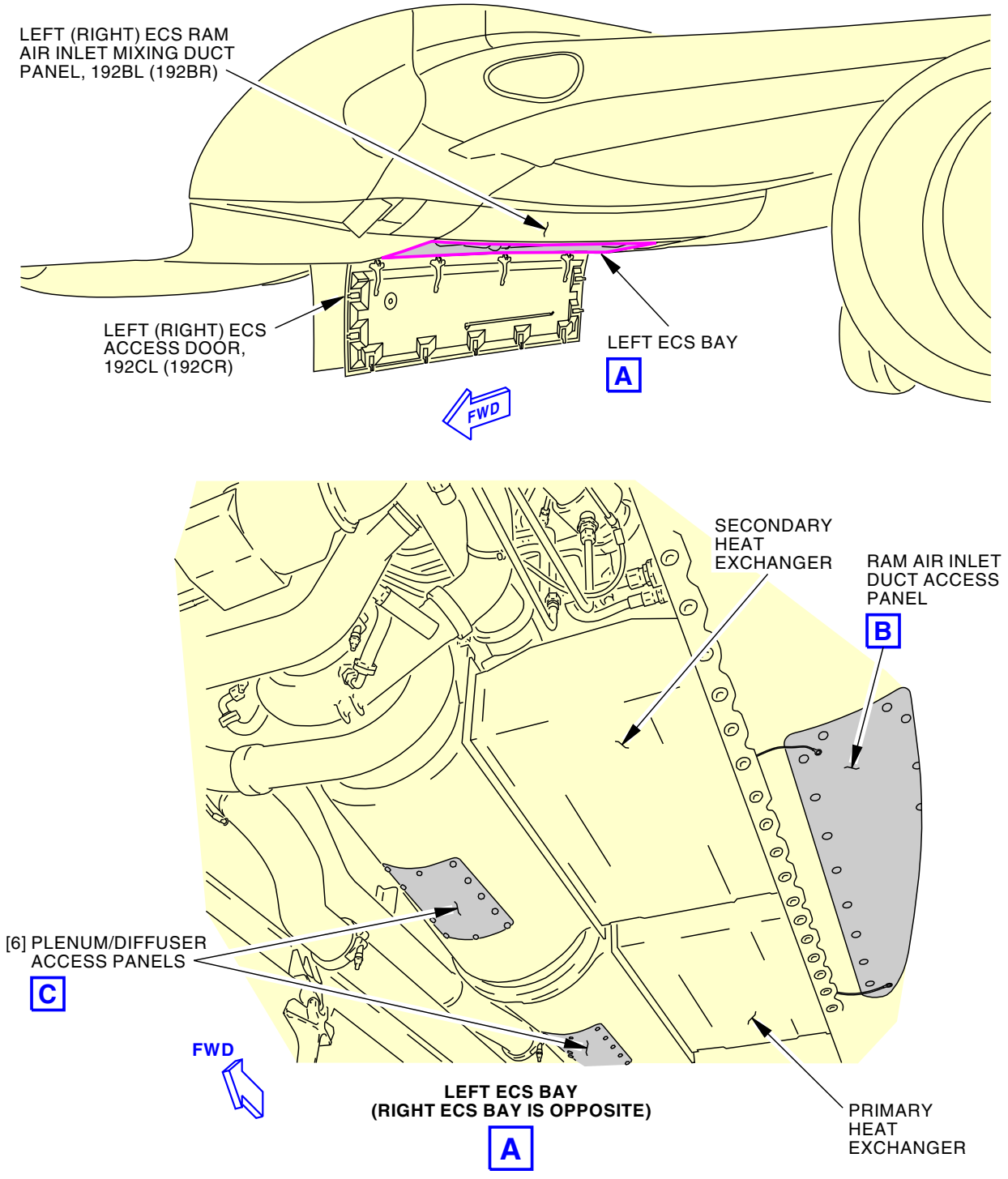
(4) Remove the DO NOT OPERATE tag, STD-858, from the L PACK and R PACK switches.

(a) Make sure that the R PACK and L PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

——— END OF TASK ———



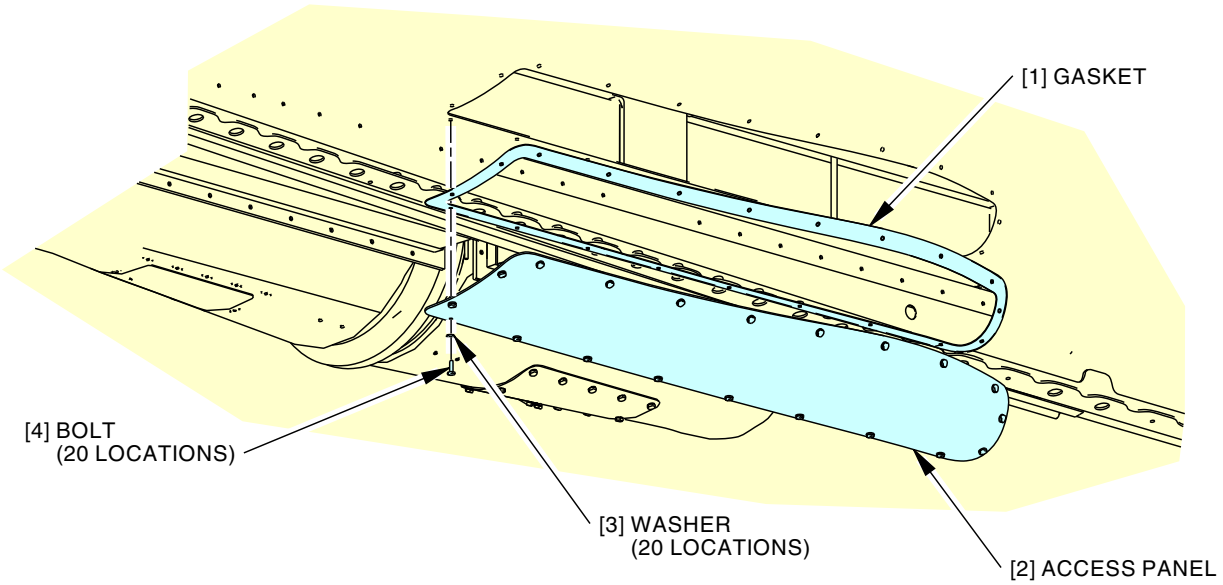
ECCN 9E991 BOEING PROPRIETARY - See title page for details



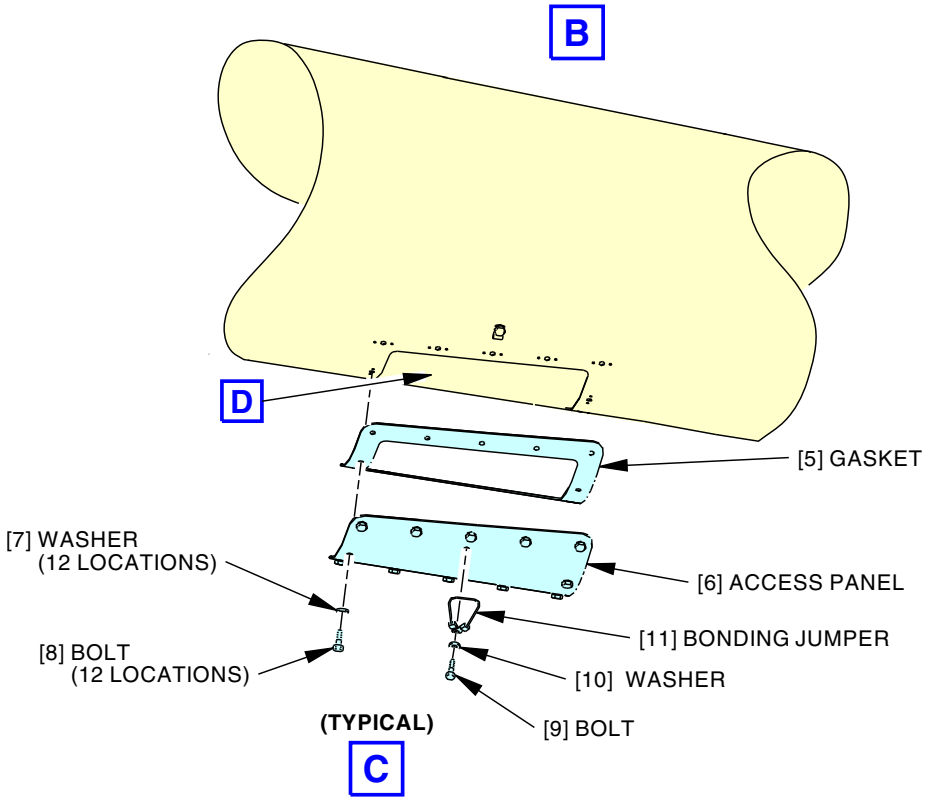

**Heat Exchanger and Plenum/Diffuser Assembly Cleaning**
**Figure 701/21-51-03-990-804 (Sheet 1 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR INLET DUCT ACCESS PANEL**
**(BONDING JUMPERS ARE NOT SHOWN)**

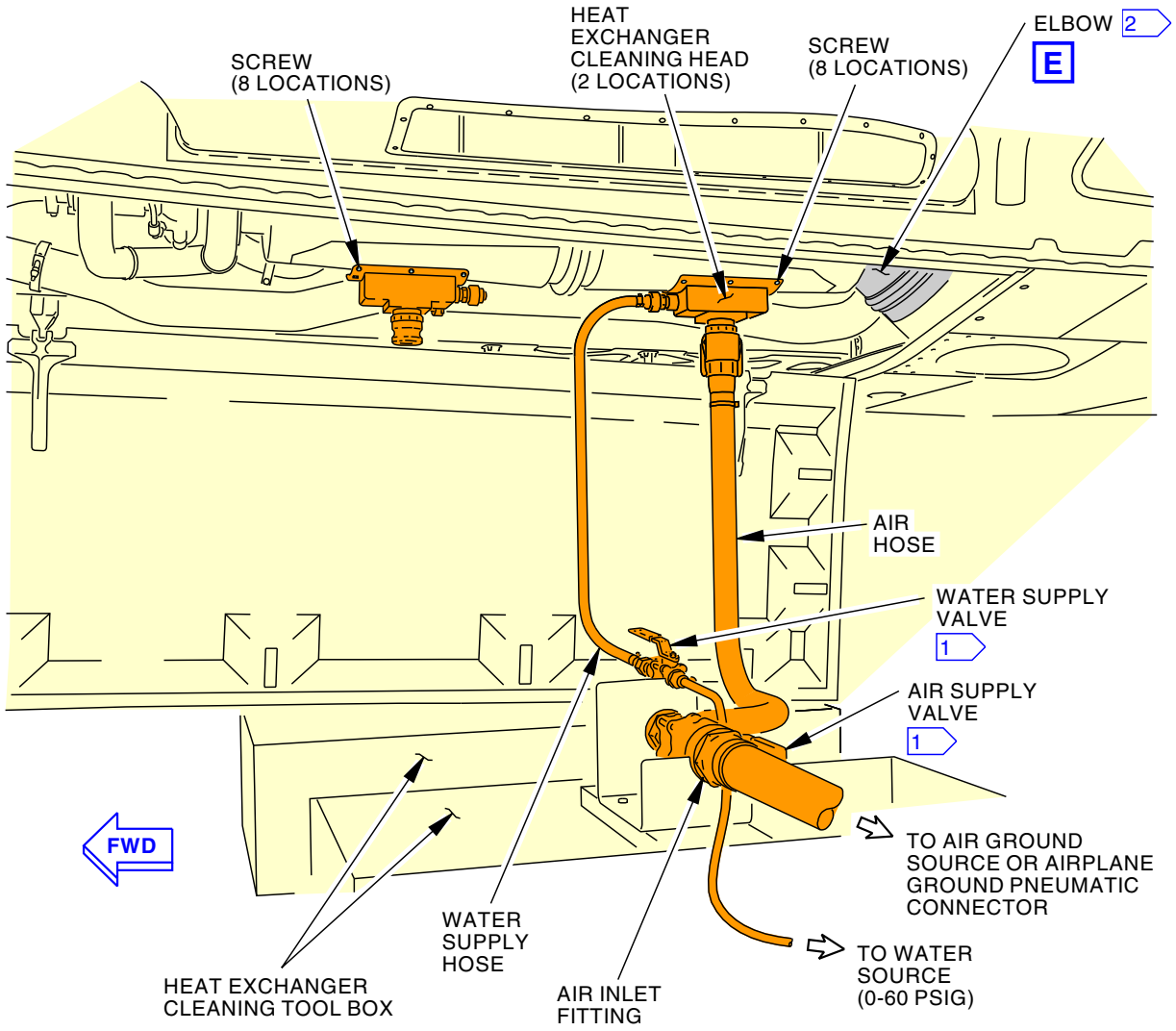



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**Heat Exchanger and Plenum/Diffuser Assembly Cleaning**
**Figure 701/21-51-03-990-804 (Sheet 2 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




1 IF INSTALLED

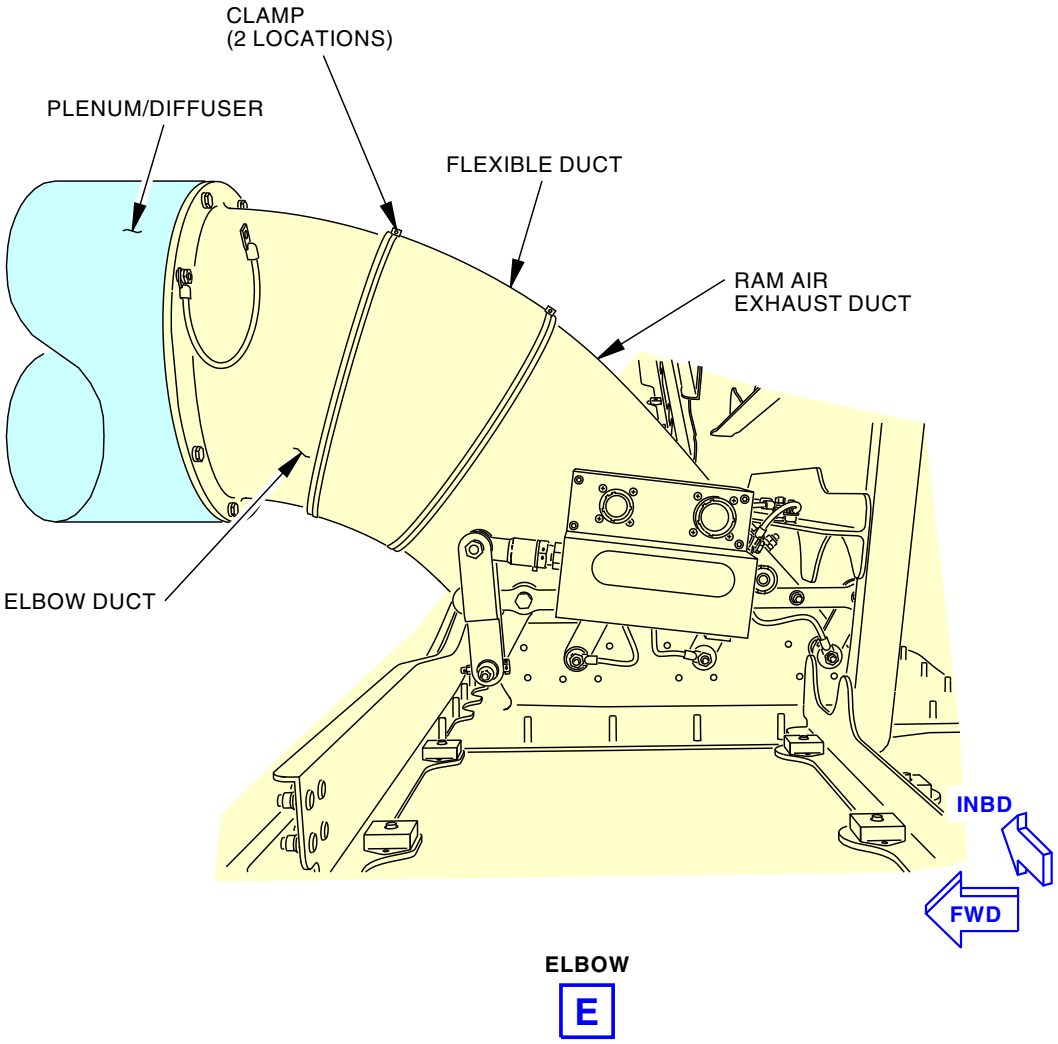
2 AIRPLANES WITH
EXHAUST LOUVERS

2411399 S00061527817_V1

**Heat Exchanger and Plenum/Diffuser Assembly Cleaning**
**Figure 701/21-51-03-990-804 (Sheet 3 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2411400 S00061527818_V1

**Heat Exchanger and Plenum/Diffuser Assembly Cleaning**
**Figure 701/21-51-03-990-804 (Sheet 4 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-03-160-803**

## 3. Heat Exchanger - Cleaning with Soap-Water-Air

(Figure 702, Figure 703, Figure 704)

NOTE: This procedure is a scheduled maintenance task.

### A. General

(1) This procedure can improve heat exchanger performance between scheduled maintenance intervals when internal heat exchanger contamination is present (resulting in decreased performance) due to local environment conditions.

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-14922 | Cleaning Wand Eqpt - Heat Exchanger<br>Part #: C21010-1 Supplier: 81205 |
| STD-858 | Tag - DO NOT OPERATE |
| STD-1290 | Source - Nitrogen, 0-200 PSIG |
| STD-6452 | Air Source - Regulated, Dry Filtered, 0-200psig |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B50026 | Soap - Clear Liquid Dishwashing | |
| G00018 | Nitrogen - Gaseous, Pressurizing, 99.5 Percent Pure | A-A-59503 Type I Grade B, MIL-PRF-27401 Type I Grade A |
| G50256 | Water, Regular | |
| G50321 | Air - Clean, Dry | BAC5402 Table I |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 5 | Gasket | 21-51-03-02-118 | SIA ALL |
| | | 21-51-03-03-145 | SIA ALL |

### E. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

### F. Access Panels

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### G. Prepare for the Cleaning

**SUBTASK 21-51-03-860-016**

(1) Set the L PACK or R PACK switches, on the P5–10 air conditioning panel, to the OFF position.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put DO NOT OPERATE tags, STD-858, on the switches.

SUBTASK 21-51-03-860-017

(2) Set the ISOLATION VALVE switch, on the P5-10 air conditioning panel, to the CLOSE position.

SUBTASK 21-51-03-010-010

(3) To get access to the left pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |

SUBTASK 21-51-03-010-011

(4) To get access to the right pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-020-048

(5) Remove the bolts [4] and washers [3] that attach the ram air inlet duct access panel [2] to the ram air inlet duct.

SUBTASK 21-51-03-010-012

(6) Remove the ram air inlet duct access panel [2].

NOTE: Removal of the access panel is necessary so that the cleaning water will not accumulate in the ram air inlet duct.

NOTE: There is a gasket bonded to the access panel. The gasket can stay in place and reused if it is not damaged.

SUBTASK 21-51-03-020-049

(7) Remove the bolts [8] and washers [7] that attach each of the two access panels [6] and gaskets [5] to the plenum/diffuser assemblies for the primary and secondary heat exchangers.

NOTE: Each access panel are installed with a gasket. The gaskets can be reused if there in no damage.

SUBTASK 21-51-03-020-050

(8) Remove the bolt [9] and washer [10] that attach the bonding jumper [11] to the forward access panel [6].

SUBTASK 21-51-03-020-051

(9) Remove the two access panels [6] from the plenum/diffuser.

SUBTASK 21-51-03-160-003

(10) Make sure that the regulator connected to the 0-200psig dry filtered regulated air source, STD-6452, or the nitrogen source, STD-1290, have a pressure gauge capable of adjusting pressure outlet from 0 psi (0 kPa) to 200 psi (1379 kPa).

## H. Heat Exchanger Cleaning with Soap-Water-Air

SUBTASK 21-51-03-160-004

(1) Clean the heat exchangers with soap, water, and compressed air as follows:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WARNING** COMPRESSED GAS CAN BE DANGEROUS. EYE PROTECTION IS MANDATORY. APPLY DRY NITROGEN CAREFULLY IN DIRECTION AWAY FROM EYES AND FACE AND OTHER PERSONNEL TO AVOID POSSIBLE INJURY.

(a) Soak with soap, B50026, and water, G50256, to remove dust/fine particle residue (Figure 703).

1) Connect the cleaning wand, SPL-14922, soap injector to the cleaning wand, SPL-14922, water wand water inlet.
   a) Make sure that the lever on the cleaning wand, SPL-14922, water wand is OFF (CLOSE).
2) Put the cleaning wand, SPL-14922, soap injector tube inlet into the soap container.
3) Connect one end of the cleaning wand, SPL-14922, water hose to the cleaning wand, SPL-14922, soap injector.
   a) Make sure that the lever on the cleaning wand, SPL-14922, soap injector is OFF (CLOSE).
4) Connect other end of the cleaning wand, SPL-14922, water hose to the water cart.
5) If using clean dry air, G50321, (Optional – Not Required):
   a) Make sure that one end of the cleaning wand, SPL-14922, air hose connected to either the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, outlet.
   b) Connect other end of the cleaning wand, SPL-14922, air hose to the cleaning wand, SPL-14922, water wand air inlet.
   c) Adjust the regulator on the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, to supply 50 psi (345 kPa) maximum to the cleaning wand, SPL-14922.
6) Insert the cleaning wand, SPL-14922, through the plenum/diffuser access openings and spray the soap, B50026, and water, G50256, through the cooling fins of the primary and secondary heat exchangers.
   a) Put the cleaning wand, SPL-14922, through the plenum/diffuser access panel openings.
   b) Make sure that you do not damage the cooling fins of the heat exchangers when you put the cleaning wand, SPL-14922, through the plenum/diffuser access panel openings.
   c) Do not touch the cooling fins of the heat exchangers with the tip of the cleaning wand, SPL-14922, when you spray the soap, B50026, and water, G50256, through the heat exchangers.
   d) Move the lever on the cleaning wand, SPL-14922, water wand to ON (OPEN).
   e) Move the lever on the cleaning wand, SPL-14922, soap injector to ON (OPEN).

      NOTE: Switching the order will most likely cause user to get wet.
   f) Spray the soap, B50026, and water, G50256, through the heat exchangers to soak and to remove dust and small particles.


ECCN 9E991 BOEING PROPRIETARY - See title page for details

<1> Squeeze the handle on the cleaning wand, SPL-14922, air wand to blow the clean dry air, G50321, or nitrogen, G00018, with soap, B50026, and water, G50256, if clean dry air, G50321, or nitrogen, G00018, is needed.

<2> Spray through all the areas of the heat exchangers.

7) Remove the cleaning wand, SPL-14922, from the plenum/diffuser access opening.

8) Decrease the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, pressure to zero psi (if clean dry air, G50321, or nitrogen, G00018, is used, but not required).

9) Move the lever on the cleaning wand, SPL-14922, soap injector to OFF (CLOSE).

10) Move the lever on the cleaning wand, SPL-14922, water wand to OFF (CLOSE).

11) Remove the cleaning wand, SPL-14922, water hose from the cleaning wand, SPL-14922, soap injector.

12) Remove the cleaning wand, SPL-14922, soap injector.

(b) Rinse with high pressure clean water, G50256 (Figure 704).

1) Make sure that the cleaning wand, SPL-14922, air hose is connected to the cleaning wand, SPL-14922, water wand air inlet.

2) Connect the cleaning wand, SPL-14922, water hose to the cleaning wand, SPL-14922, water wand water inlet.

3) Adjust the regulator on the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, to supply 50 psi (345 kPa) maximum to the cleaning wand, SPL-14922.

NOTE: Vaporized clean dry air, G50321, is made with use of pressure over 100 psi.

4) Put the cleaning wand, SPL-14922, through the plenum/diffuser access opening.

5) Clean with strong pressure clean water, G50256, through the cooling fins of the primary and secondary heat exchangers as follows:

a) Make sure that you do not damage the cooling fins of the heat exchangers when you put the cleaning wand, SPL-14922, through the plenum/diffuser access panel openings.

b) Make sure that you do not touch the cooling fins of the heat exchangers with the tip of the cleaning wand, SPL-14922, when you wash the heat exchangers with high pressure water.

c) Put the lever on the cleaning wand, SPL-14922, water wand to ON (OPEN) for water, G50256, to start flowing.

d) Squeeze the handle on the cleaning wand, SPL-14922, water wand to clean dry air, G50321, or nitrogen, G00018, to start flowing.

e) Wash through the heat exchangers with the strong pressure clean water, G50256, to clean the soap, B50026.

<1> Clean all the areas of the heat exchangers.

6) Remove the cleaning wand, SPL-14922, from the plenum/diffuser access opening.

7) Decrease the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, pressure to zero psi.

8) Put the lever on the cleaning wand, SPL-14922, water wand to OFF (CLOSE).



ECCN 9E991 BOEING PROPRIETARY - See title page for details

9) Remove the cleaning wand, SPL-14922, water hose and cleaning wand, SPL-14922, water wand air inlet.

(c) Blow off residual water, G50256, to protect the Air Cycle Machine (ACM) (Figure 704).

1) Connect the cleaning wand, SPL-14922, air hose to the cleaning wand, SPL-14922, air inlet.

2) Adjust the regulator on 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, to supply 100 psi (689 kPa) maximum to the cleaning wand, SPL-14922.

3) Put the cleaning wand, SPL-14922, through the plenum/diffuser openings.

4) Blow clean dry air, G50321, or nitrogen, G00018, through the cooling fins of the primary and secondary heat exchangers to dry of remaining water, G50256.

a) Put the cleaning wand, SPL-14922, through the plenum/diffuser access panel.

<1> Make sure that you do not damage the cooling fins of the heat exchangers when you put the cleaning wand, SPL-14922, through the plenum/diffuser access panel.

b) Blow clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until all water, G50256, is blown out of the cooling fins as follows:

<1> Do not touch the cooling fins of the heat exchangers with the cleaning wand, SPL-14922, when you blow clean dry air, G50321, or nitrogen, G00018, through the heat exchangers.

<2> Make sure that the pressure gage on the regulator does not show more than 100 psi when you operate the cleaning wand, SPL-14922.

<3> Blow the clean dry air, G50321, or nitrogen, G00018, through all the areas of the heat exchangers.

<4> Make sure that water, G50256, is fully removed from the heat exchanger.

<5> Blow clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until water, G50256, is not being blown out.

5) Remove the cleaning wand, SPL-14922, from the plenum/diffuser access opening.

6) Decrease the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, pressure to zero psi.

## I. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-03-410-010**

(1) Install the plenum/diffuser access panels [6] and the gaskets [5] with the bolts [8] and washers [7].

(a) Torque the bolts [8] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m).

**SUBTASK 21-51-03-410-011**

(2) Put the bonding jumper [11] in its position and install with the bolt [9] and washer [10].

**SUBTASK 21-51-03-410-012**

(3) If you cleaned the left pack heat exchangers, close these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-51-03-410-013

(4) If you cleaned the right pack heat exchangers, close these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-080-006

(5) Remove the DO NOT OPERATE tag, STD-858, from the L PACK and R PACK switches.

(a) Make sure that the R PACK and L PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

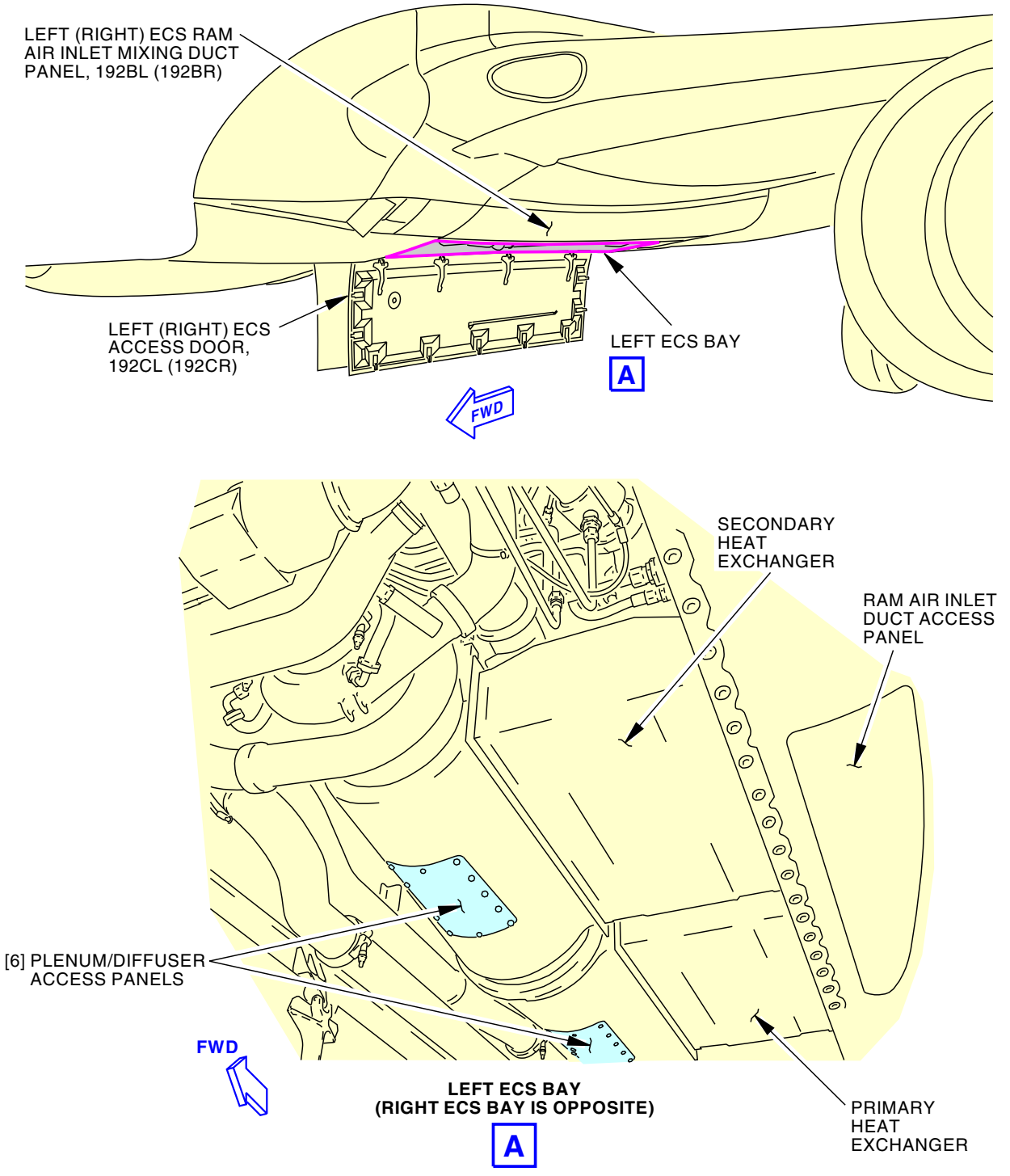
SUBTASK 21-51-03-860-023

(6) Set the ISOLATION VALVE switch, on the P5-10 air conditioning panel, to the OPEN position.

——— END OF TASK ———



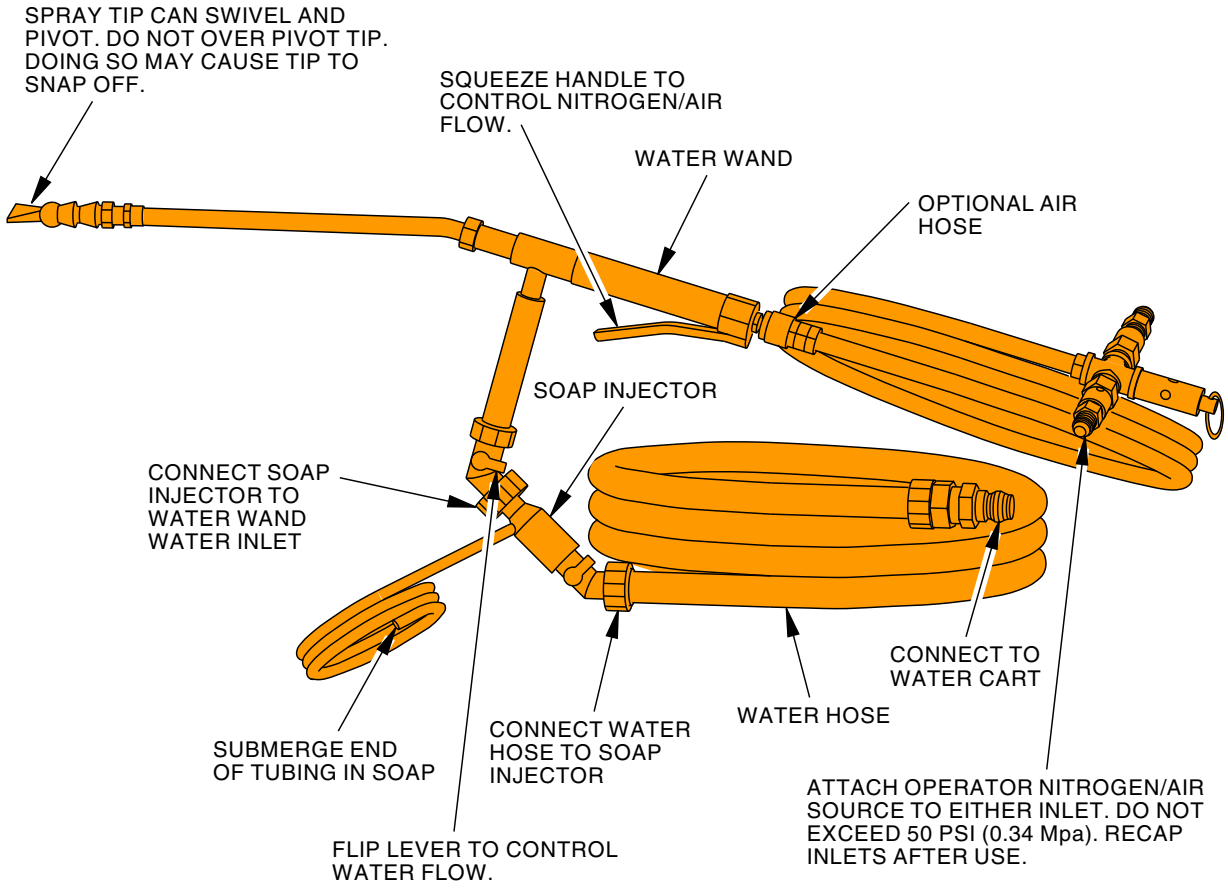
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Heat Exchanger Cleaning**
**Figure 702/21-51-03-990-806**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

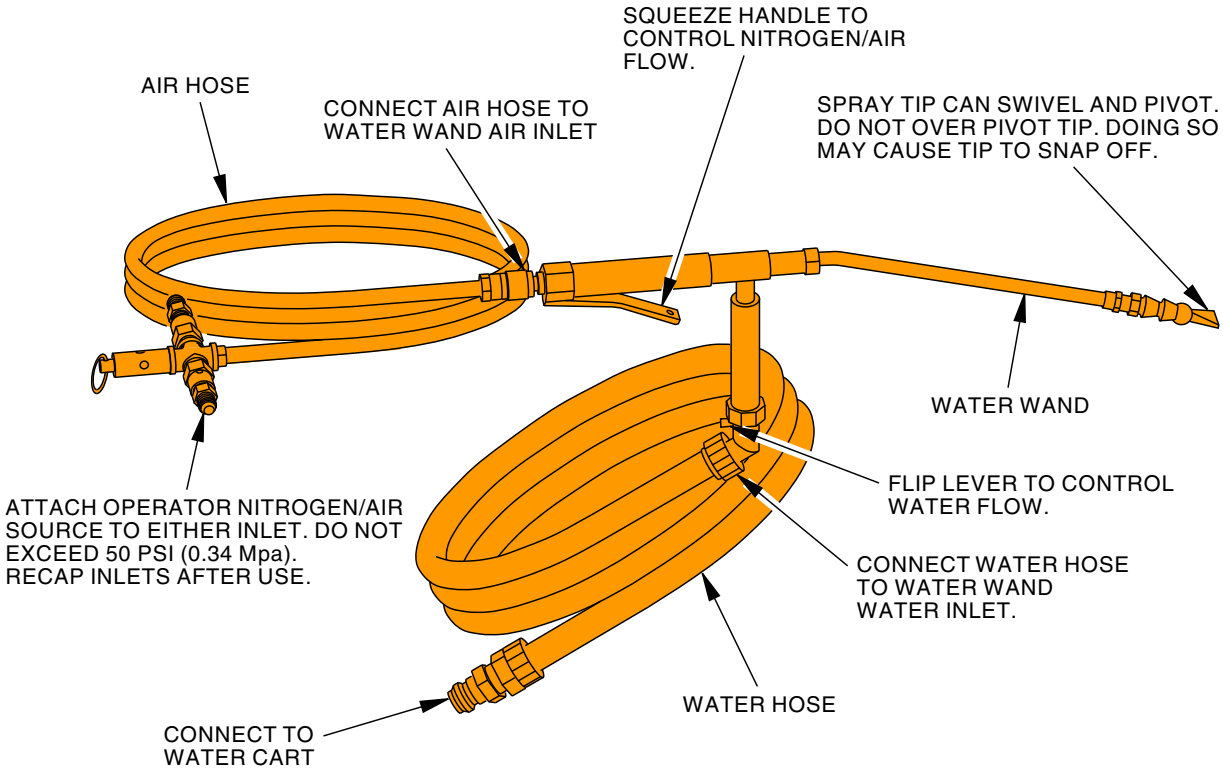



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**Soap Injector with Water Wand and Hose**
**Figure 703/21-51-03-990-807**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Water Wand, Water Hose and Air/Nitrogen Hose**
**Figure 704/21-51-03-990-808**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## HEAT EXCHANGER AND PLENUM/DIFFUSER ASSEMBLY - CLEARING DEBRIS/BLOCKAGES

### 1. General

A. This procedure has this task:

(1) A blowing out of debris/blockages with nitrogen gas/compressed air from the heat exchanger.

**TASK 21-51-03-160-805**

### 2. Heat Exchanger - Blowing Out Debris/Blockages with Nitrogen Gas/Compressed Air

(Figure 201, Figure 202)

#### A. General

(1) This task includes instructions to blow out debris or contaminant blockages trapped within the cool air side heat exchanger grills.

(a) This is an effective method for clearing debris/blockages, especially for aircraft operating in challenging environments (cottonwood/bug season, etc.).

(b) This method does not clean/break down contaminants (dust, dirt, airborne particles, pollen, etc.) baked onto the heat exchanger grills over time.

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-10099 | Cleaning Wand Eqpt - Heat Exchanger, Pneumatic<br>Part #: B21005-10 Supplier: 81205<br>Opt Part #: B21005-1 Supplier: 81205 |
| SPL-14922 | Cleaning Wand Eqpt - Heat Exchanger<br>Part #: C21010-1 Supplier: 81205 |
| STD-858 | Tag - DO NOT OPERATE |
| STD-1290 | Source - Nitrogen, 0-200 PSIG |
| STD-6452 | Air Source - Regulated, Dry Filtered, 0-200psig |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00018 | Nitrogen - Gaseous, Pressurizing, 99.5 Percent Pure | A-A-59503 Type I Grade B, MIL-PRF-27401 Type I Grade A |
| G50321 | Air - Clean, Dry | BAC5402 Table I |

#### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### E. Access Panels

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## F. Prepare for the Blowing Out

SUBTASK 21-51-03-860-036

(1) Set the L PACK or R PACK switches, on the P5–10 air conditioning panel, to the OFF position.

(a) Install the DO NOT OPERATE tags, STD-858, on the switches.

SUBTASK 21-51-03-860-037

(2) Set the ISOLATION VALVE switch, on the P5-10 air conditioning panel, to the CLOSE position.

SUBTASK 21-51-03-010-022

(3) To get access to the left pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |

SUBTASK 21-51-03-010-023

(4) To get access to the right pack heat exchangers, open these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-020-080

(5) Remove the bolts [4] and washers [3] that attach the ram air inlet duct access panel [2] to the ram air inlet duct.

SUBTASK 21-51-03-010-024

(6) Remove the ram air inlet duct access panel [2].

NOTE: Removal of the access panel is necessary so that the debris and blockages will not accumulate in the ram air inlet duct.

NOTE: There is a gasket bonded to the access panel. The gasket can stay in place and reused if it is not damaged.

SUBTASK 21-51-03-020-081

(7) Remove the bolts [8] and washers [7] that attach each of the access panel [6] and gasket [5] to the plenum/diffuser assemblies for the primary and secondary heat exchangers.

NOTE: Each access panel is installed with a gasket. The gaskets can be reused if there in no damage.

SUBTASK 21-51-03-020-082

(8) Remove the bolts [9], washers [10], and washers [12] that attach the bonding jumpers [11] to the access panels [6].

SUBTASK 21-51-03-020-083

(9) Remove the access panels [6] and gaskets [5] from the plenum/diffuser.

## G. Heat Exchanger - Blowing Out Debris/Blockages with Nitrogen Gas/Compressed Air

SUBTASK 21-51-03-160-011

(1) To blow out debris/blockages with the nitrogen gas/compressed air in the heat exchanger grills with the cleaning wand, SPL-14922, do the following steps:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WARNING** COMPRESSED GAS CAN BE DANGEROUS. EYE PROTECTION IS MANDATORY. APPLY DRY NITROGEN CAREFULLY IN DIRECTION AWAY FROM EYES AND FACE AND OTHER PERSONNEL TO AVOID POSSIBLE INJURY.

(a) Blow out contaminant blockages with compressed clean dry air, G50321, or nitrogen, G00018 (Figure 202).

1) Connect one end of the cleaning wand, SPL-14922, air hose to either the 0-200psig dry filtered regulated air source, STD-6452, or nitrogen source, STD-1290, outlet.

NOTE: The cleaning wand, SPL-14922, includes an air hose, air wand, water hose, water wand, and soap injector.

2) Connect other end of the cleaning wand, SPL-14922, air hose to the cleaning wand, SPL-14922, air wand inlet.

3) Adjust the regulator on compressed clean dry air, G50321, or nitrogen, G00018, to supply a recommended pressure of 100 psi (689 kPa) maximum to the cleaning wand, SPL-14922.

**CAUTION** DO NOT TOUCH THE COOLING FINS OF THE HEAT EXCHANGERS WITH THE TIP OF THE CLEANING WAND. DAMAGE TO THE COOLING FINS OF THE HEAT EXCHANGERS CAN OCCUR.

4) Insert the cleaning wand, SPL-14922, through the plenum/diffuser access openings and blow clean dry air, G50321, or nitrogen, G00018, through the cooling fins of the primary and secondary heat exchangers.

a) Make sure that the cooling fins of the heat exchanger are not damaged when the cleaning wand, SPL-14922, was inserted through the plenum/diffuser access panel openings.

b) Squeeze the handle on the cleaning wand, SPL-14922, air wand to blow the clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until all debris is blown out of the cooling fins.

<1> Make sure that the pressure gauge on the regulator does not indicate more than 100 psi (689 kPa) when the cleaning wand, SPL-14922, operates.

<2> Blow the clean dry air, G50321, or nitrogen, G00018, through all the areas of the heat exchangers.

<3> Make sure that dirt, sand, gravel or plant fiber is no longer being blown out on the opposite side (inlet side) of the heat exchanger.

<4> Continue blowing the clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until debris is no longer detected being blown out.

c) Make sure that all loose dirt, sand, gravel, or plant fiber is removed from the ram air inlet that was blown out of the heat exchangers.

5) Remove the cleaning wand, SPL-14922, from the inside of the plenum/diffuser access opening.

6) Decrease the compressed clean dry air, G50321, or nitrogen source, STD-1290, pressure to 0 psi (0 kPa).

7) Remove the cleaning wand, SPL-14922.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-51-03-160-012

(2) To blow out heat exchanger debris/blockage with nitrogen gas/compressed air with the heating exchanger cleaning wand, SPL-10099, do the following steps:

**WARNING** COMPRESSED GAS CAN BE DANGEROUS. EYE PROTECTION IS MANDATORY. APPLY DRY NITROGEN CAREFULLY IN DIRECTION AWAY FROM EYES AND FACE AND OTHER PERSONNEL TO AVOID POSSIBLE INJURY.

(a) Attach the heating exchanger cleaning wand, SPL-10099, to the regulator on a clean dry air, G50321, bottle or nitrogen, G00018, bottle.

(b) Adjust the regulator on a clean dry air, G50321, bottle or nitrogen, G00018, bottle to supply a maximum of 80 psi (552 kPa) to the heating exchanger cleaning wand, SPL-10099.

NOTE: If a clean dry air, G50321, bottle is used, the moisture contaminant or water concentration in the air of 0.00002 grams maximum is not required.

**CAUTION** DO NOT TOUCH THE COOLING FINS OF THE HEAT EXCHANGERS WITH THE TIP OF THE CLEANING WAND. DAMAGE TO THE COOLING FINS OF THE HEAT EXCHANGERS CAN OCCUR.

(c) Insert the heating exchanger cleaning wand, SPL-10099, through the plenum/diffuser access openings and blow clean dry air, G50321, or nitrogen, G00018, through the cooling fins of the primary and secondary heat exchangers.

1) Make sure that the cooling fins of the heat exchanger are not damaged when the heating exchanger cleaning wand, SPL-10099, was inserted through the plenum/diffuser access panel openings.

2) Blow the clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until all debris is blown out of the cooling fins.

a) Make sure that the pressure gauge on the heating exchanger cleaning wand, SPL-10099, does not indicate more than 80 psi (552 kPa) when the wand operates.

b) Blow the clean dry air, G50321, or nitrogen, G00018, through all the areas of the heat exchangers.

c) Make sure that dirt, sand, gravel or plant fiber is no longer being blown out on the opposite side (inlet side) of the heat exchanger.

d) Continue to blow the clean dry air, G50321, or nitrogen, G00018, through the heat exchangers until debris is no longer detected being blown out.

3) Make sure that all loose dirt, sand, gravel, or plant fiber is removed from the ram air inlet that was blown out of the heat exchangers.

(d) Remove the heating exchanger cleaning wand, SPL-10099, from the inside of the plenum/diffuser access opening and decrease the clean dry air, G50321, or nitrogen, G00018, pressure to 0 psi (0 kPa).

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-03-211-004

(1) Examine the gasket [1] and gaskets [5] for damage.

(a) Replace the gasket [1] or gaskets [5] if there is damage or deterioration.


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SUBTASK 21-51-03-410-024

(2) Install the plenum/diffuser access panels [6] and gaskets [5] with the bolts [8] and washers [7].

(a) Tighten the bolts [8] to 22 in-lb (2 N·m) - 26 in-lb (3 N·m).

SUBTASK 21-51-03-420-016

(3) Put the bonding jumpers [11] in their positions and install with the bolts [9], washers [10], washers [12], and nuts [13] that attach them to the access panels [6].

SUBTASK 21-51-03-410-025

(4) Install the ram air inlet access panel [2] and gasket [1] with the bolts [4] and washers [3].

SUBTASK 21-51-03-410-026

(5) If the left pack heat exchangers are blown out, close these access panels:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |

SUBTASK 21-51-03-410-027

(6) If the right pack heat exchangers are blown out, close these access panels:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-03-080-008

(7) Remove the DO NOT OPERATE tags, from the L PACK and R PACK switches.

(a) Make sure that the R PACK and L PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

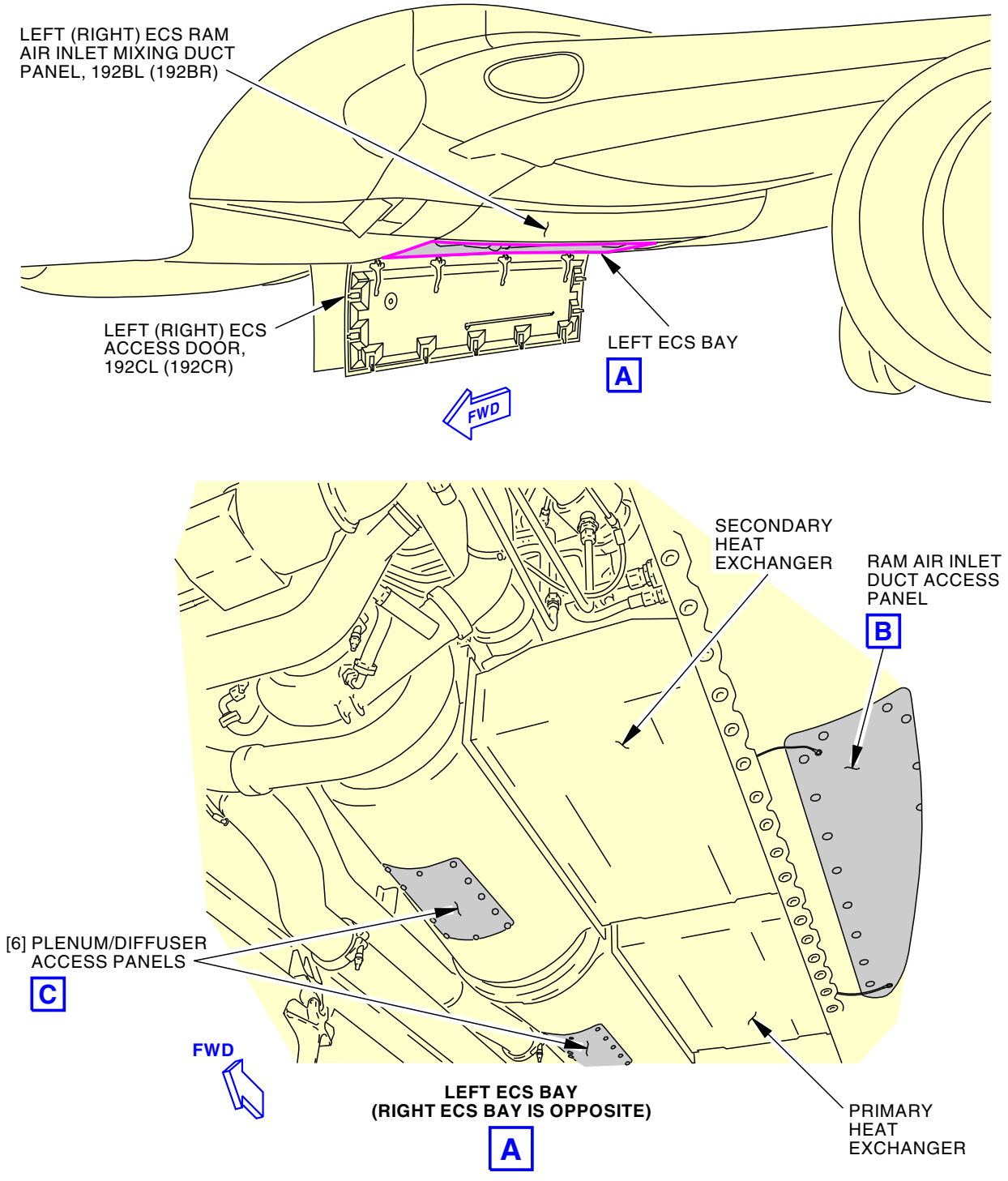
SUBTASK 21-51-03-860-038

(8) Set the ISOLATION VALVE switch, on the P5-10 air conditioning panel, to the OPEN position.

**END OF TASK**



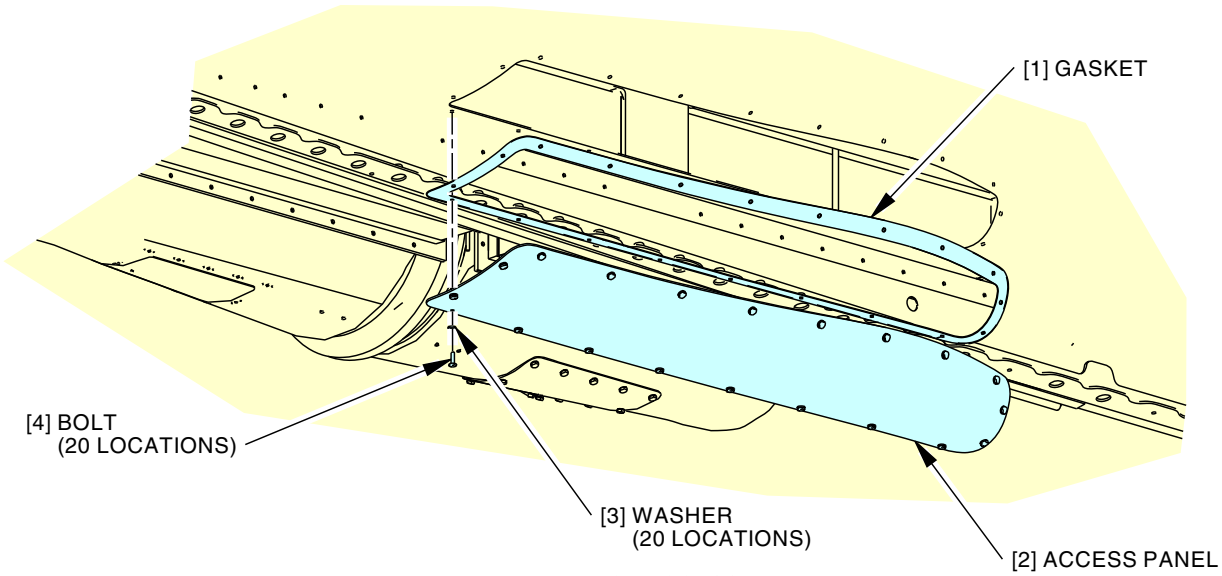
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Heat Exchanger Blowing Out Debris/Blockages with Nitrogen Gas/Compressed Air**
**Figure 201/21-51-03-990-815 (Sheet 1 of 2)**

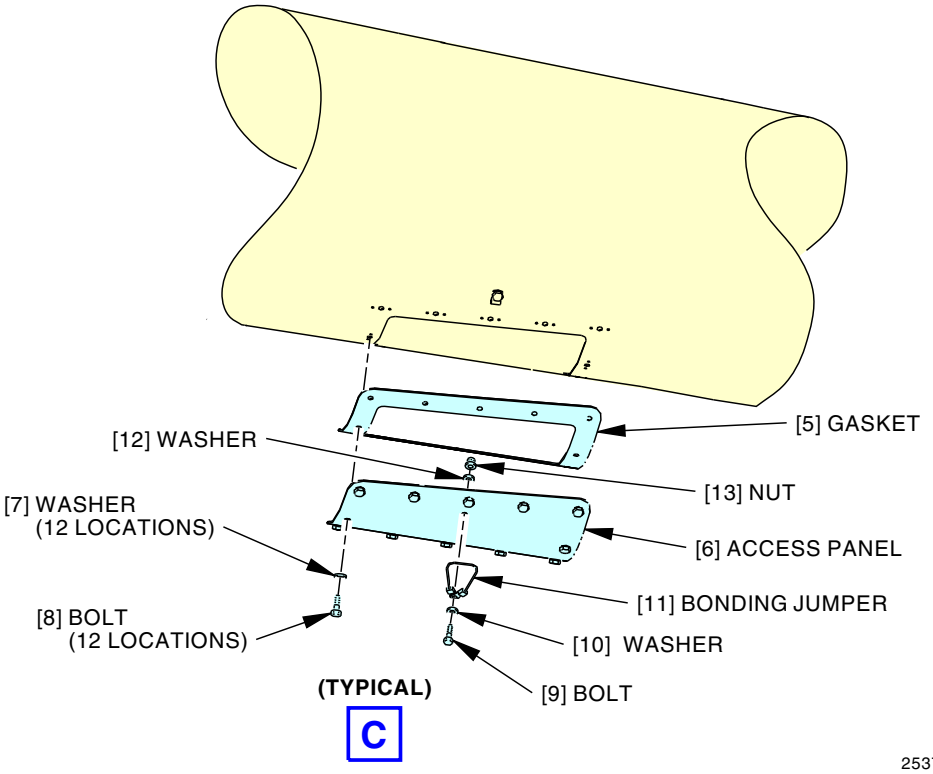


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**RAM AIR INLET DUCT ACCESS PANEL**
**(BONDING JUMPERS ARE NOT SHOWN)**

**B**



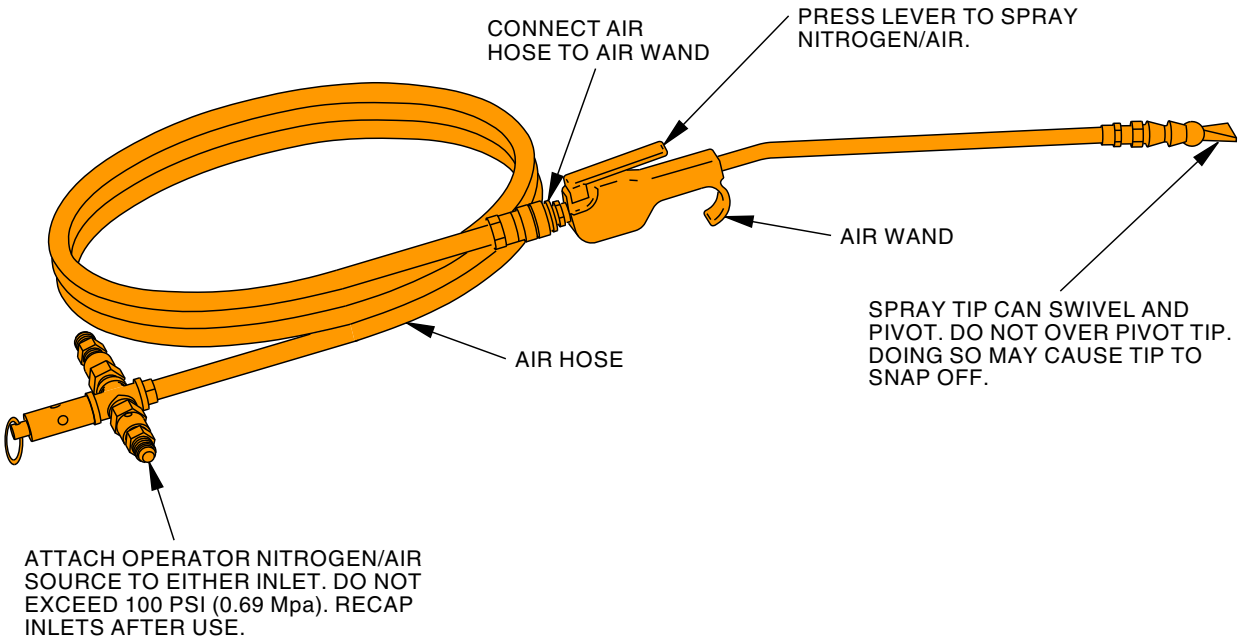

**C**

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**Heat Exchanger Blowing Out Debris/Blockages with Nitrogen Gas/Compressed Air**
**Figure 201/21-51-03-990-815 (Sheet 2 of 2)**



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2522017 S0000594060_V2

**Air Wand and Air/Nitrogen Hose**
**Figure 202/21-51-03-990-816**



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# AIR CYCLE MACHINE - REMOVAL/INSTALLATION

## 1. General

A. This procedure has these tasks:

(1) A removal of the air cycle machine

(2) An installation of the air cycle machine.

B. There is an Air Cycle Machine (ACM) for each pack. The ACMs are located in the forward area of the air conditioning bays.

C. The ACM, together with the heat exchangers, converts high temperature, high pressure airflow to low temperature, low pressure airflow.

D. The high pressure water system mix muff must be removed before the removal of the air cycle machine.

**TASK 21-51-04-000-801**

## 2. Air Cycle Machine Removal

(Figure 401)

### A. General

(1) This task gives instructions to remove the Air Cycle Machine (ACM).

### B. References

| Reference | Title |
|---|---|
| 21-51-17-000-801 | High Pressure Water Separator Mix Muff Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for the Removal

**SUBTASK 21-51-04-860-002**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure that there is no pressure in the pneumatic system.

(a) If it is necessary, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.



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SUBTASK 21-51-04-860-003

(2) Do these steps on the P5-10 air conditioning panel:

(a) Set the L and R PACK switches to the OFF position.

1) Attach a DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position.

1) Attach a DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position.

1) Attach a DO NOT OPERATE tags, STD-858.

SUBTASK 21-51-04-860-010

(3) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-04-010-001

(4) When the air cycle machine for the left pack will be removed, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-04-010-002

(5) When the air cycle machine for the right pack will be removed, open these access panels in this sequence:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



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## G. Air Cycle Machine Removal

SUBTASK 21-51-04-010-003

> **WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Remove the compressor outlet duct [12].
   (a) Disconnect the flex hose from the outlet duct [12].
   (b) Remove the electrical connector [3] from the ram air control sensor.
   (c) Remove the electrical connector [6] from the compressor discharge overheat switch.
   (d) Remove the nut [10] and washer [11] that hold the bonding jumper to the clamp on the duct.
   (e) Remove the clamshell clamps [7] at the air cycle machine [1].
      1) Lift the latch pawls at the same time to release the clamps [7].
   (f) Move the sleeves [8] to the outlet duct [12].
   (g) Remove the coupling [4] at the heat exchanger.
   (h) Remove the compressor outlet duct [12].
   (i) Remove and discard the packing [5] at the heat exchanger.
   (j) Remove and discard the packings [9].

SUBTASK 21-51-04-860-004

(2) Remove the HPWS Mix Muff [2], do this task: High Pressure Water Separator Mix Muff Removal, TASK 21-51-17-000-801.

SUBTASK 21-51-04-210-001

(3) Check the flexible duct [13] that is connected to the high pressure water separator condenser for any of the conditions listed below:
   (a) Fraying
   (b) discoloration
   (c) rips
   (d) splits
   (e) tears
   (f) rupture defects.
   (g) If any of the above conditions are found, remove the flexible duct [13] from the condenser as follows:
      1) Loosen the clamps [39] that attaches the flexible duct [13] to the water separator condenser.
      2) Remove the flexible duct [13] from the water separator condenser.
      3) Discard the flexible duct [13].

SUBTASK 21-51-04-020-001

(4) Disconnect the hoses and sense line from the air cycle machine [1].
   (a) Remove the flex hose 1 [21] from the air cycle machine [1].
   (b) Disconnect the flex hose 2 [25] from the air cycle machine [1].



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(c) Disconnect the sense line [14] from the air cycle machine [1].

(d) If the air cycle machine [1] will be replaced, remove the unions [15] and discard the O-rings [16].

NOTE: Keep the unions for installation on the new air cycle machine.

SUBTASK 21-51-04-020-002

(5) Remove the air cycle machine [1].

(a) Remove the clamshell clamps [7].

1) Lift the latch pawls at the same time to release the clamps [7].

(b) Slide the sleeves [8] away from the air cycle machine [1] and onto the adjacent duct.

(c) Remove and discard the packings [9].

(d) Disconnect the compressor inlet duct.

1) Remove the bolt [33] that holds the ground clip [34] to the air cycle machine [1].

2) Move the bonding jumper [35] away from the air cycle machine [1].

a) Do not remove the ground clip [34] from the bonding jumper [35].

3) Remove the bolts [31] that hold the duct to the air cycle machine [1].

4) Remove and discard the O-ring [32].

(e) Remove the bolts [23] and washers [24] that hold the air cycle machine [1] to the secondary heat exchanger.

**WARNING** HAVE A SECOND PERSON HOLD THE ACM WHEN YOU REMOVE THE NUT. THE ACM CAN FALL WHEN THE NUT IS REMOVED. IF THE ACM FALLS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(f) Remove the nut [30] and washer [29] from the bolt [26] that holds the air cycle machine [1] to the tie rod.

**WARNING** HAVE A SECOND PERSON HOLD THE ACM WHEN YOU REMOVE THE BOLT. THE ACM CAN FALL WHEN THE BOLT IS REMOVED. IF THE ACM FALLS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Remove the bolt [26] and washer [27] from the tie rod.

(h) Carefully move forward then lower the air cycle machine [1] to remove it from the air conditioning bay.

(i) Remove the bushing [28] from the tie rod.

(j) Remove the gasket [22].

(k) Examine the gasket [22] for damage or deterioration.

(l) Discard the gasket [22] if there is damage or deterioration.

SUBTASK 21-51-04-620-001

(6) Put covers on the duct openings to prevent the entry of unwanted materials.

SUBTASK 21-51-04-220-001

(7) Inspect the air cycle machine impeller blades [36].

(a) Make sure that the chord length (width) of each impeller blade tip is a minimum of 0.38 in. (9.65 mm).



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(b) Do a visual of the impeller blades [36], to make sure that they are not broken or cracked.

(c) Replace the air cycle machine [1] with a new or serviceable unit if the inspections are unsatisfactory.

**SUBTASK 21-51-04-700-001**

(8) Check the torque necessary to turn the rotating assembly of the air cycle machine [1] as follows:

(a) Put the air cycle machine [1] in a horizontal position.

(b) Put a torque wrench on the nut [37].

NOTE: A torque wrench with a gage that shows the torque applied is recommended.

**CAUTION**

TURN THE ROTATING COMPONENTS OF THE ACM ONLY IN THE DIRECTION THAT THEY TURN WHEN IN OPERATION. IF YOU TURN THE ACM ROTATING COMPONENTS IN THE INCORRECT DIRECTION, YOU CAN CAUSE DAMAGE TO THE FOIL AIR BEARINGS.

(c) Make sure that you turn the nut [37] counterclockwise while you turn the rotating assembly.

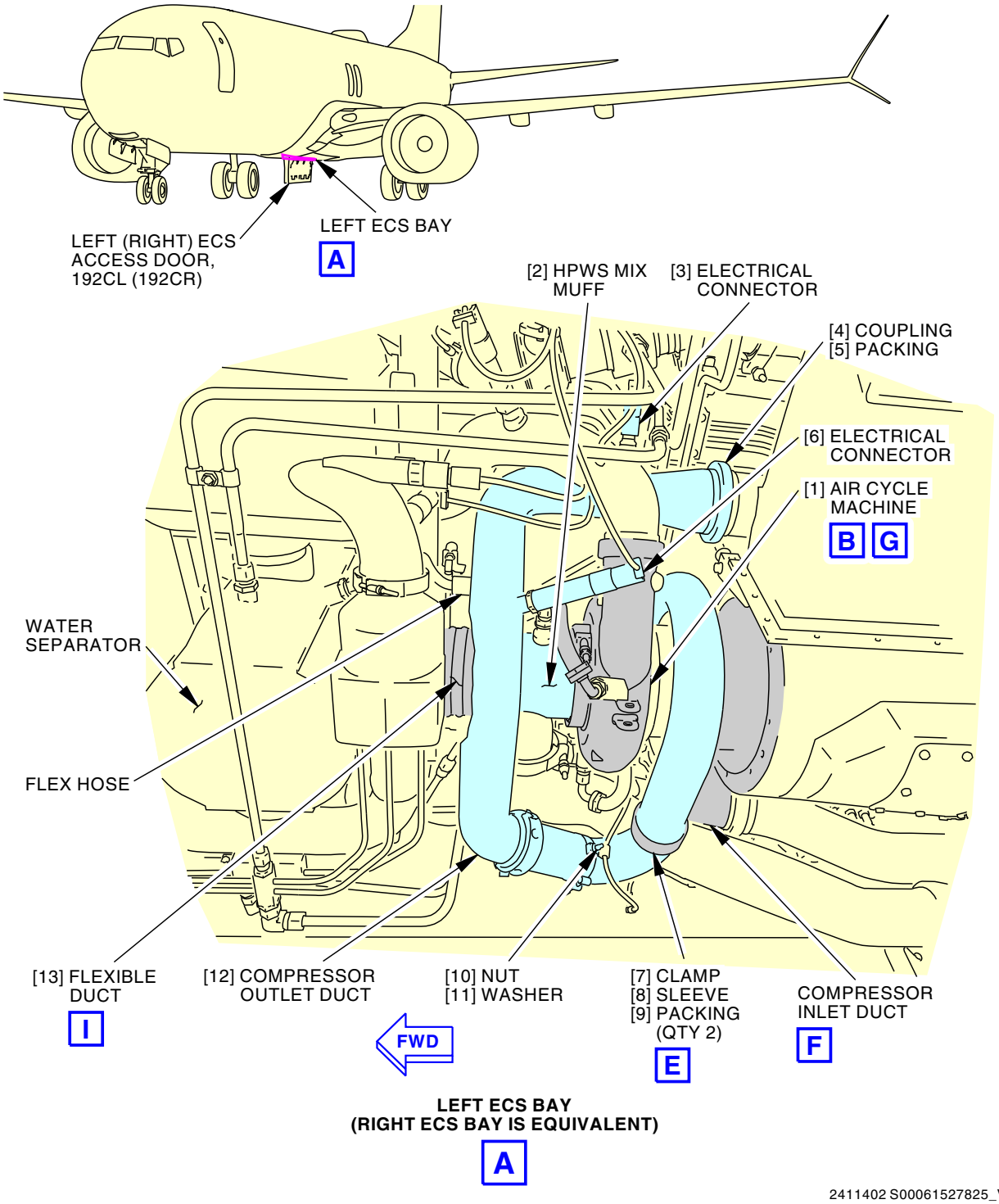
(d) Record the torque necessary to turn the rotating assembly.

(e) If the torque was more than 20.0 in-lb (2.3 N·m), replace the air cycle machine [1] with a new or serviceable unit.

**END OF TASK**



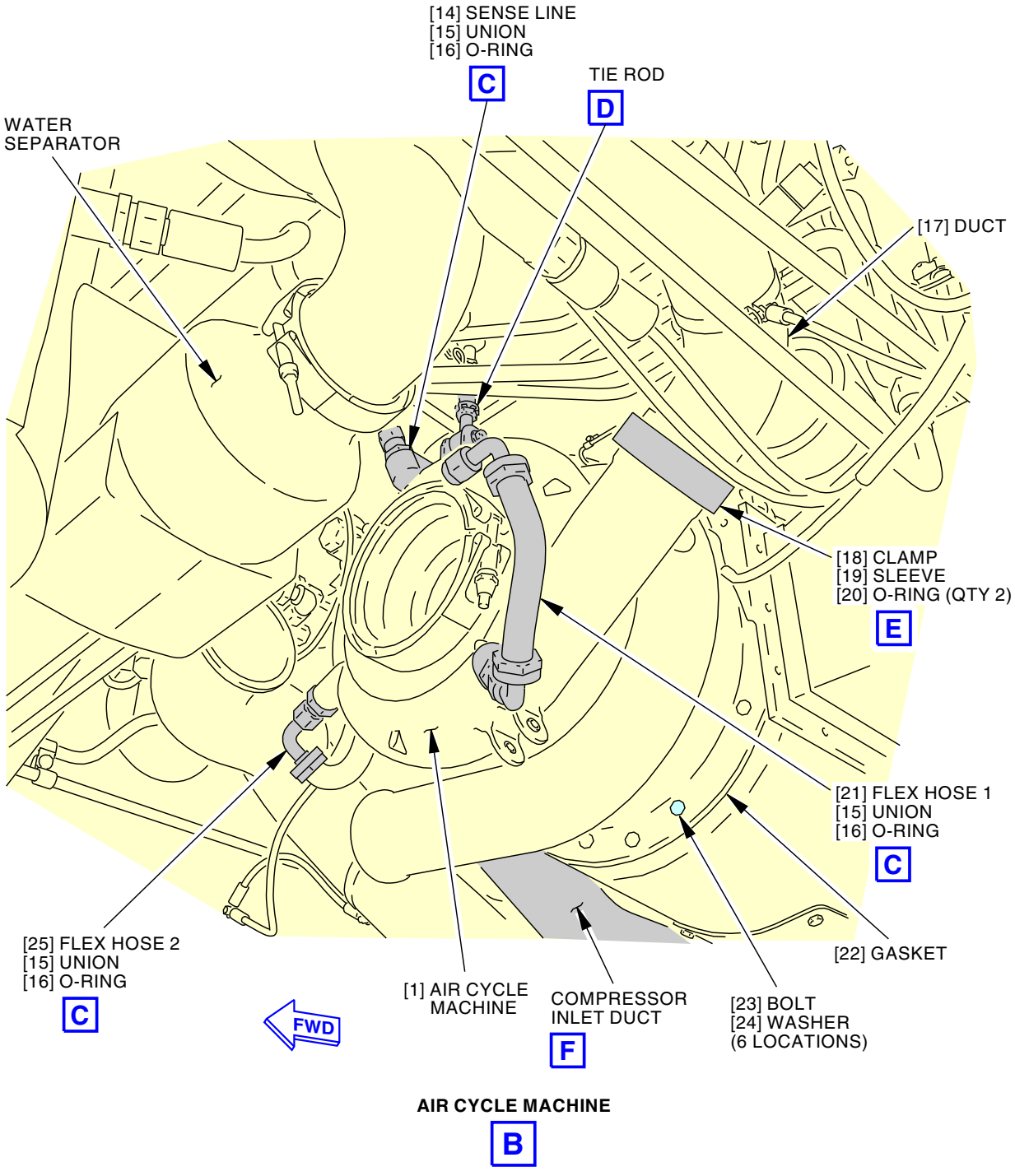
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**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 1 of 6)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

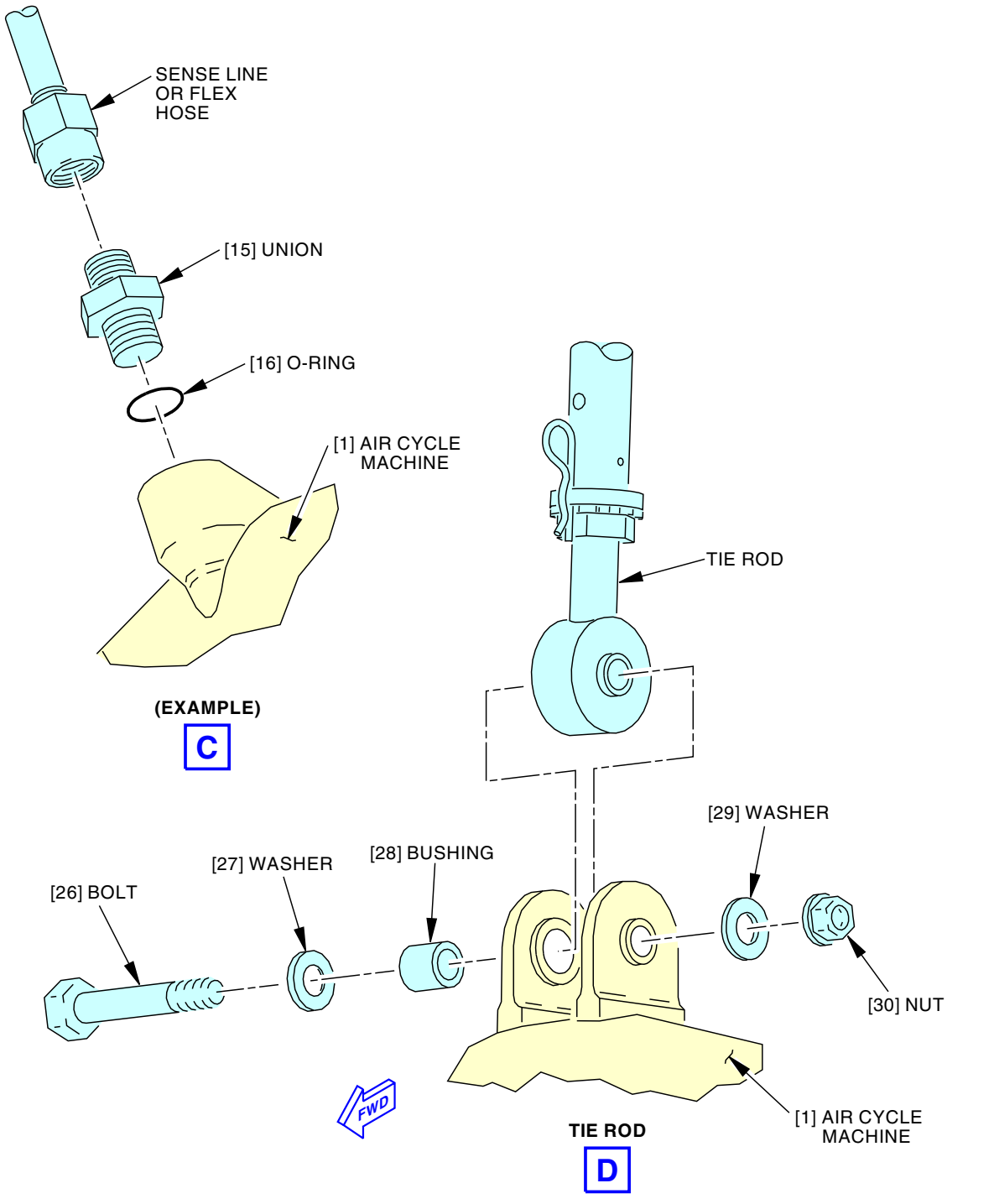



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**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 2 of 6)**



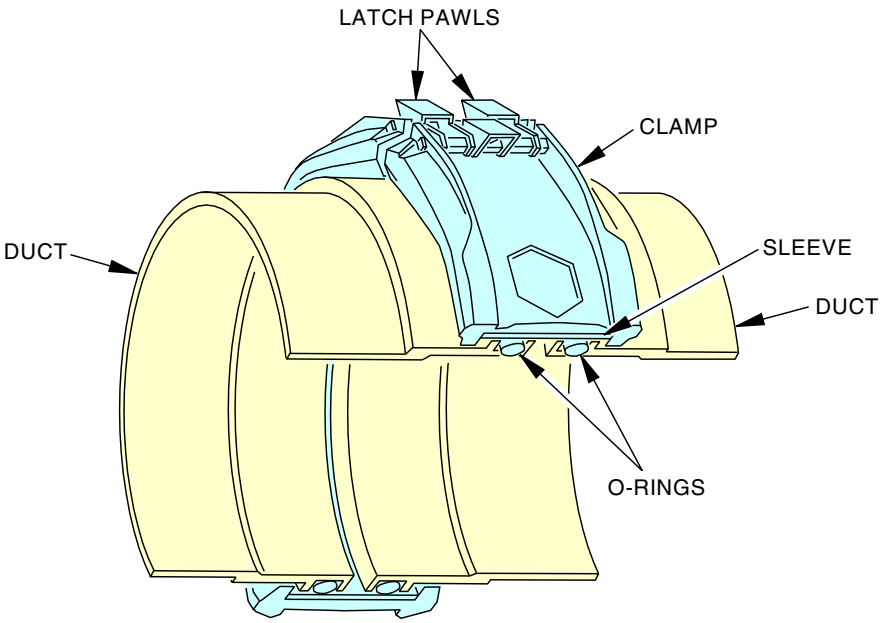
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 3 of 6)**

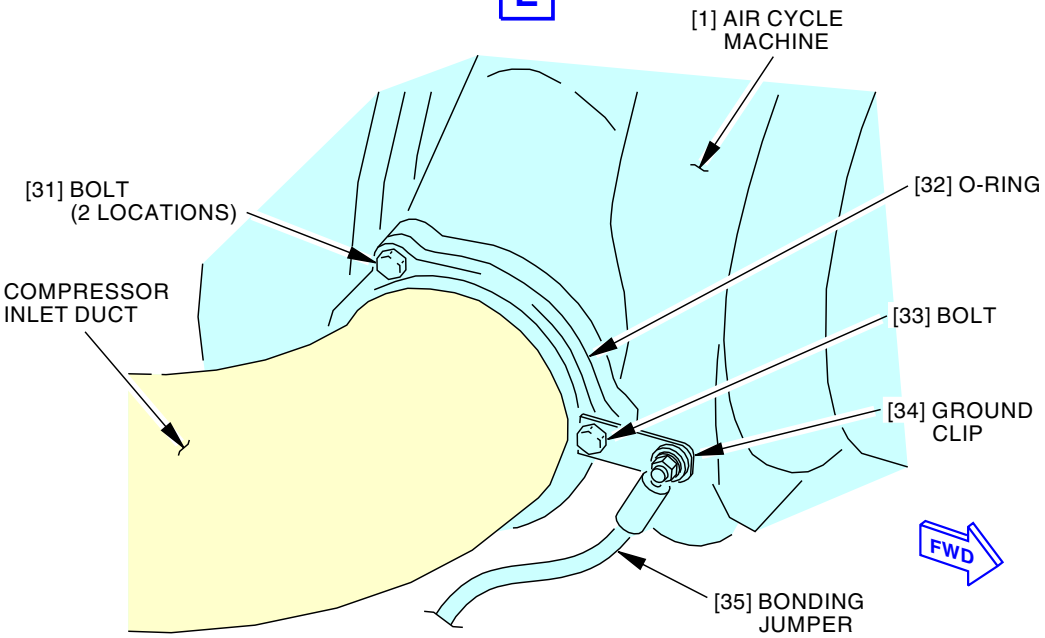


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**CLAMSHELL CLAMP INSTALLATION (EXAMPLE)**

E




**COMPRESSOR INLET DUCT**

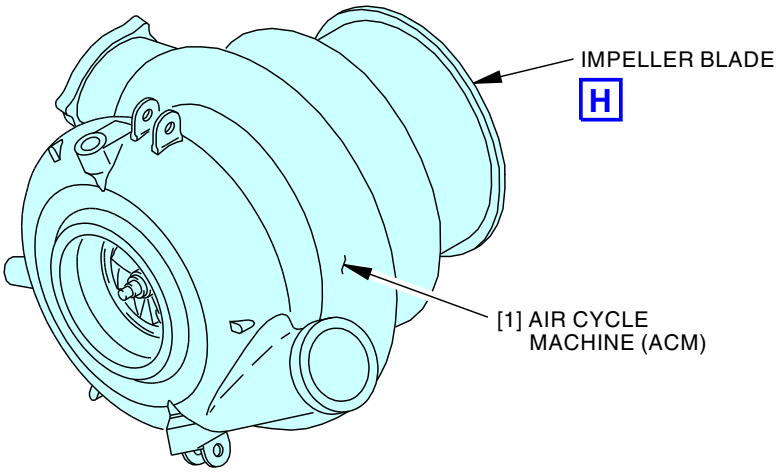
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**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 4 of 6)**

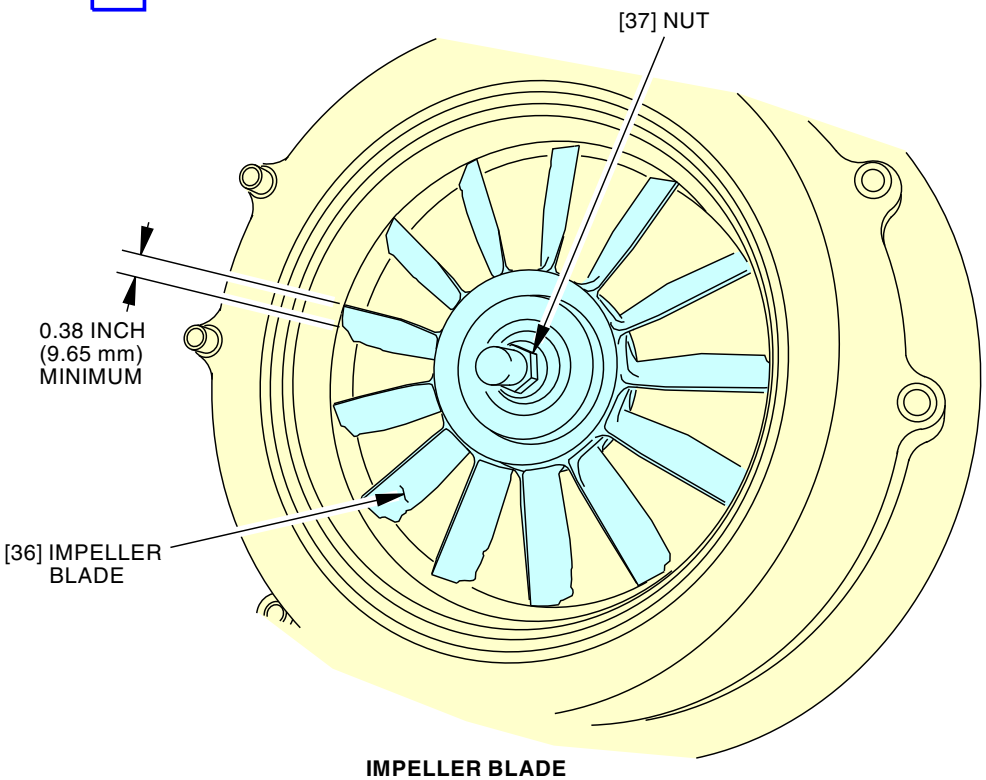


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**AIR CYCLE MACHINE (ACM)**

G




**IMPELLER BLADE**

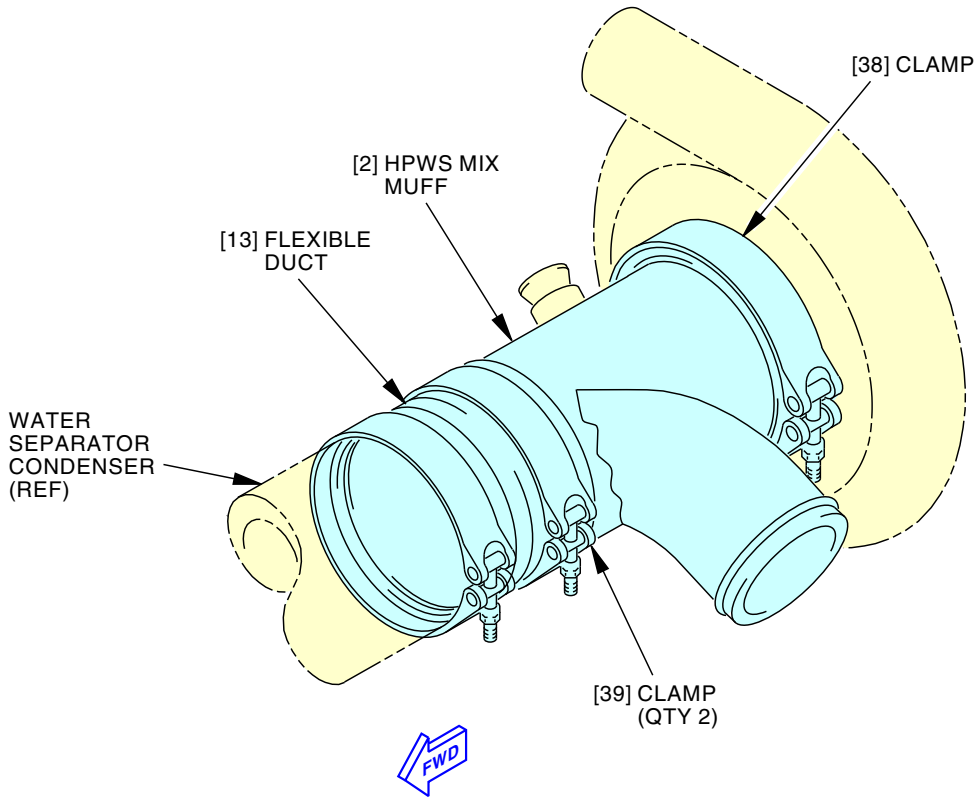
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**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 5 of 6)**



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**FLEXIBLE DUCT**
**(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)**

I

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**Air Cycle Machine Installation**
**Figure 401/21-51-04-990-801 (Sheet 6 of 6)**



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**TASK 21-51-04-400-801**

**3. Air Cycle Machine Installation**

(Figure 401)

**A. General**

(1) This task gives instructions to install the Air Cycle Machine (ACM).

(2) Do the steps in the cooling pack water removal/ice protection system inspection. If the water removal paths are blocked, ice can form in the ACM. The ice can cause failure of the ACM.

**B. References**

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-51-03-000-803 | Heat Exchanger and Plenum/Diffuser Assembly - Removal (P/B 401) |
| 21-51-12-000-801 | Condenser Removal (P/B 401) |
| 21-51-13-000-801 | Reheater Removal (P/B 401) |
| 21-51-14-000-801 | Water Extractor Removal (P/B 401) |
| 21-51-15-000-801 | Water Extractor Duct Removal (P/B 401) |
| 21-51-16-000-801 | Water Spray Nozzle Removal (P/B 401) |
| 21-51-17-400-801 | High Pressure Water Separator Mix Muff Installation (P/B 401) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| C00852 | Compound - Antiseize, Molybdenum Disulfide-Petrolatum | MIL-PRF-83483 |
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00504 | Grease - Petrolatum | VV-P-236 |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |
| D50320 | Lubricant - Moly-50 Anti-Seize | MIL-PRF-83483 |
| G01061 | Water - Distilled | |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Air cycle machine | 21-51-04-01-025 | SIA ALL |
| | | 21-51-04-01-510 | SIA ALL |
| 5 | Packing | 21-51-03-02-040 | SIA ALL |
| | | 21-51-03-02-200 | SIA ALL |
| 9 | Packing | 21-51-03-02-055 | SIA ALL |
| | | 21-51-03-02-210 | SIA ALL |
| 13 | Flexible duct | 21-51-08-05-130 | SIA ALL |
| | | 21-51-17-02-020 | SIA ALL |
| 16 | O-ring | 21-51-53-01-185 | SIA ALL |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 16 (cont.) | | 21-51-53-02-196 | SIA ALL |
| 20 | O-ring | 21-51-41-01-030 | SIA ALL |
| | | 21-51-41-02-085 | SIA ALL |
| 22 | Gasket | 21-51-03-02-075 | SIA ALL |
| | | 21-51-03-02-230 | SIA ALL |
| 32 | O-ring | 21-51-03-02-025 | SIA ALL |
| | | 21-51-03-02-185 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Cooling Pack Water Removal/Ice Protection System Inspection**

**SUBTASK 21-51-04-200-001**

(1) If the cause of the air cycle machine [1] failure is unknown, then do all of the steps that follow.

**SUBTASK 21-51-04-200-002**

(2) If the cause of the air cycle machine [1] failure is known, then do applicable steps that follow.

**SUBTASK 21-51-04-630-002**

(3) Do the steps that follow if the air cycle machine [1] was replaced due to bearing failure or damage to the compressor:

(a) Disconnect the water drain lines from the bottom of the water extractors (TASK 21-51-14-000-801).

1) Use compressed air to remove unwanted material from the water drain lines.

2) Reconnect the water drain lines to the bottom of the water extractors (TASK 21-51-14-000-801).

(b) Disconnect the water line and the air line which are attached to the water spray nozzle (TASK 21-51-16-000-801).

1) Use compressed air to remove unwanted material from the water and air lines.

2) Reconnect the water line and the air line which are attached to the water spray nozzle (TASK 21-51-16-000-801).

(c) Remove the flex hose 1 [21] and flex hose 2 [25].

1) Use compressed air to remove unwanted material from the flex hose 1 [21] and flex hose 2 [25].

2) Reconnect the flex hose 2 [25].

NOTE: The flex hose 1 will be installed after the ACM is installed.

**SUBTASK 21-51-04-630-003**

(4) If the air cycle machine [1] was replaced due to damage to the compressor, do these steps:


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(a) Inspect the components that follow for damage or unwanted materials:

1) Heat Exchangers (TASK 21-51-03-000-803)
2) Water Extractor Duct (TASK 21-51-15-000-801)
3) Water Extractors (TASK 21-51-14-000-801)
4) Reheater (TASK 21-51-13-000-801)
5) Condensor (TASK 21-51-12-000-801)
6) Water Spray Nozzle (TASK 21-51-16-000-801).

(b) Replace the components that have damage or unwanted materials.

SUBTASK 21-51-04-630-004

(5) If the air cycle machine [1] was replaced due to damage to the fan impeller, do these steps:

(a) Remove the plenum/diffuser access panels, do these steps:

1) Remove the bolts and washers that attach the plenum/diffuser access panels to the plenum diffuser assemblies for the primary and secondary heat exchangers.
2) Remove the bolt, washers, and nut that attach the bonding jumper to the forward access panel.
3) Remove the plenum/diffuser access panels and the gaskets.

(b) Inspect the plenum for unwanted materials.

(c) Install the plenum/diffuser access panels, do these steps:

1) Install the plenum/diffuser access panels and the gaskets with the bolts and washers.
2) Put the bonding jumper in its position and install the bolts, washers, and nut.

## H. Air Cycle Machine Installation

SUBTASK 21-51-04-860-011

(1) Make sure that these circuit breakers are open and have safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-04-630-005

(2) Remove the duct covers.

SUBTASK 21-51-04-210-002

(3) Make sure that there are no unwanted materials in the ducts.



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SUBTASK 21-51-04-420-001

(4) Install the air cycle machine [1].

(a) Install the gasket [22].

NOTE: The holes in the gasket must be aligned with the bolt holes in the ACM and the secondary heat exchanger.

(b) Install the O-ring [32] for the compressor inlet duct.

1) If a lubricant is required to aide in working the O-ring [32] into its installed position, use distilled water, G01061, to wet the surface of the O-ring [32].

2) If the use of the distilled water, G01061, is not adequate to install the O-ring [32] or if a lubricant is needed to hold the O-ring [32] in place for the installation, apply a light coat of grease, D00504, or Molykote 44 grease, medium, D50104, to the O-ring [32].

(c) Install the bushing [28] in the tie rod.

(d) Put the air cycle machine [1] into its position.

(e) Put the washer [27] on the shank of the bolt [26].

NOTE: The countersunk side of the washer must be adjacent to the bolt head.

**WARNING** HAVE A SECOND PERSON HOLD THE ACM WHEN YOU INSTALL THE BOLT. THE ACM CAN FALL WHEN THE BOLT IS LOOSE. IF THE ACM FALLS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(f) Push the bolt [26] with the washer [27] through the tie rod and bushing [28].

**WARNING** HAVE A SECOND PERSON HOLD THE ACM WHEN YOU INSTALL THE NUT. THE ACM CAN FALL WHEN THE NUT IS LOOSE. IF THE ACM FALLS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Install the washer [29] and nut [30] on the bolt [26].

1) Do not tighten the nut [30] fully.

(h) Apply a light coat of compound, C00852, to the threads of the bolts [23].

(i) Install the bolts [23] and washers [24] that hold the air cycle machine [1] to the secondary heat exchanger.

1) Do not tighten the bolts [23] fully.

(j) Connect compressor inlet duct to the air cycle machine [1].

1) Apply a light coat of compound, C00852, to the threads of the bolts [31] and bolt [33].

2) Put the ground clip [34] onto the bolt [33].

a) Do not remove the ground clip [34] from the bonding jumper [35].

3) Install the ground clip [34] and bolt [33] on the air cycle machine [1] compressor inlet flange.

a) Do not tighten the bolt [33] fully.

4) Install the bolts [31] on theair cycle machine [1] compressor inlet flange.

a) Do not tighten the bolts [31] fully.



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(k) Apply a light coat of distilled water, G01061, or grease, D00504, or Molykote 44 grease, medium, D50104, on the new O-rings [20].

(l) Install the new O-rings [20] for the turbine inlet duct.

(m) Move the sleeves [19] on to the air cycle machine [1] and duct connections.

(n) Install the clamshell clamps [18] over the duct connections.

(o) Tighten the bolts [23] to 40.0 in-lb (4.5 N·m) - 45.0 in-lb (5.1 N·m).

(p) Tighten the bolts [31] and bolt [33] to 22.0 in-lb (2.5 N·m) - 26.0 in-lb (2.9 N·m).

(q) Tighten the nut [30] to 50.0 in-lb (5.6 N·m) - 65.0 in-lb (7.3 N·m).

**SUBTASK 21-51-04-420-002**

(5) Connect the sense line and hoses to the air cycle machine [1].

(a) If you install a new air cycle machine [1], do these steps:

1) Put a new O-ring [16] on each of the unions [15].

2) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the three unions [15].

3) Install the union [15] onto the air cycle machine [1].

a) Torque the union [15] to 170 ±9 in-lb (19 ±1 N·m).

(b) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the sense line [14].

(c) Connect the sense line [14] to the air cycle machine [1].

1) Torque the sense line [14] to 170 ±9 in-lb (19 ±1 N·m).

(d) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flex hose 1 [21].

(e) Install the flex hose 1 [21] on the air cycle machine [1].

1) Torque the flex hose 1 [21] to 170 ±9 in-lb (19 ±1 N·m).

(f) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flex hose 2 [25].

(g) Connect the flex hose 2 [25] to the air cycle machine [1].

1) Torque the flex hose 2 [25] to 170 ±9 in-lb (19 ±1 N·m).

**SUBTASK 21-51-04-420-003**

(6) If the flexible duct [13] was discarded after inspection, install a new flexible duct [13] as follows:

(a) Loosely position the clamps [39] onto the new flexible duct [13].

(b) Install the new flexible duct [13] onto the water separator condenser.

(c) Position the forward clamp [39] to retain the new flexible duct [13] onto the water separator condenser.

(d) Tighten the forward clamp [39] to 13.0 in-lb (1.5 N·m) - 17.0 in-lb (1.9 N·m).

NOTE: The aft clamp is connected in the installation of the HPWS mix muff in the next step.

**SUBTASK 21-51-04-860-005**

(7) Do this task: High Pressure Water Separator Mix Muff Installation, TASK 21-51-17-400-801.

**SUBTASK 21-51-04-410-001**

(8) Install the compressor outlet duct [12].



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(a) Apply a light coat of distilled water, G01061, or grease, D00504, or Molykote 44 grease, medium, D50104, to the new packing [5] and new packings [9].

(b) Install the packings [9] on the duct ends.

(c) Install the packing [5] at the heat exchanger.

(d) Put the compressor outlet duct [12] into its position.

(e) Apply compound, D50320 to the bolt threads of the coupling [4].

(f) Install the coupling [4] at the heat exchanger.

1) Do not tighten the coupling [4] fully.

(g) Move the sleeves [8] over the outlet duct connection.

(h) Install the clamshell clamps [7] over the outlet duct connection.

(i) Tighten the nut on the coupling [4] to 45.0 in-lb (5.1 N·m) - 50.0 in-lb (5.6 N·m).

(j) With hand force, gently push the compressor outlet duct in the direction of the adjacent mix muff duct until the compressor outlet duct reaches the maximum flexed position.

(k) Make sure that there is a minimum clearance of 0.20 in. (5.1 mm) to the adjacent mix muff duct when the compressor outlet duct is in the flexed position.

(l) Apply a light coat of Never-Seez NSBT compound, D00006, to the threads of the flex hose.

(m) Connect the flex hose to the outlet duct [12].

(n) Install the electrical connector [3] for the ram air control sensor.

(o) Install the electrical connector [6] for the compressor discharge overheat switch.

(p) Install the nut [10] and washer [11] that hold the bonding jumper to the clamp on the duct.

## I. Air Cycle Machine Installation Test

**SUBTASK 21-51-04-860-013**

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

**SUBTASK 21-51-04-860-006**

(2) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

**SUBTASK 21-51-04-080-001**

(3) Remove the DO NOT OPERATE tags from the L PACK, R PACK, BLEED 1, BLEED 2, and BLEED APU switches, on the P5-10 air conditioning panel.


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SUBTASK 21-51-04-860-007

(4) Put the applicable pack L PACK or R PACK switch, on the P5-10 air conditioning panel, to the AUTO position.

SUBTASK 21-51-04-790-001

(5) Do a soap bubble test of all the duct joints at the mix muff and at the air cycle machine [1].

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

2) Loosen the clamps.

3) Make sure that the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches to the AUTO position.

6) Make sure that the leak has been repaired.

SUBTASK 21-51-04-740-001

(6) Do an IBIT test on the left and right integrated air system controllers (M2957 and M2939).

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

(a) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-04-860-008

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-04-410-002

(2) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-04-860-009

(3) Put the L PACK and R PACK switches, on the P5-10 air conditioning panel, to the OFF position.

**END OF TASK**



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## CONDITIONED AIR CHECK VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the conditioned air check valve

(2) An installation of the conditioned air check valve

**SIA 003-999**

(3) A removal of the left pack conditioned air check valve sense line

(4) An installation of the left pack conditioned air check valve sense line.

**SIA ALL**

(5) There is a conditioned air check valve for each pack. The valves are found in the forward end of the air conditioning bays.

**TASK 21-51-07-000-801**

### 2. Conditioned Air Check Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

**SUBTASK 21-51-07-860-002**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-07-860-003**

(2) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L and R PACK switches to the OFF position and attach DO NOT OPERATE tag, STD-858.

(b) Set the BLEED 1 and BLEED 2 switches to the OFF position and attach DO NOT OPERATE tag, STD-858.



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(c) Set the BLEED APU switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-51-07-010-001

(3) For the left conditioned air check valve open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-07-010-002

(4) For the right conditioned air check valve, open these access panels in the specified sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Conditioned Air Check Valve Removal

SUBTASK 21-51-07-020-001

(1) To disconnect the sense line from the conditioned air check valve [1], do these steps:

(a) Loosen the b-nut to disconnect the sense line.

(b) Remove the union [5].

(c) Remove and discard the o-ring [6].

SUBTASK 21-51-07-020-002

(2) Remove the conditioned air check valve [1] as follows:

(a) Make a record of the position of the conditioned air check valve [1] to make sure it is installed in the same position.

(b) Remove the clamp assembly [2] from the conditioned air check valve [1] as follows:

1) Remove the washers [11] and nuts [12].

2) Remove the brackets [13].

3) Loosen the nuts [4] on the clamps [14] of the clamp assembly [2] so that the clamps [14] are free to slide.

4) Slide the flexible duct [3] aft until it is free of the conditioned air check valve [1].

(c) Remove the bolts [10], the washers [8], and the nuts [9], at 14 locations, that hold the conditioned air check valve [1] to the bulkhead penetration duct assembly [15].

(d) Remove the conditioned air check valve [1].

(e) Leave the flexible duct [3] on the condensor outlet duct [16].

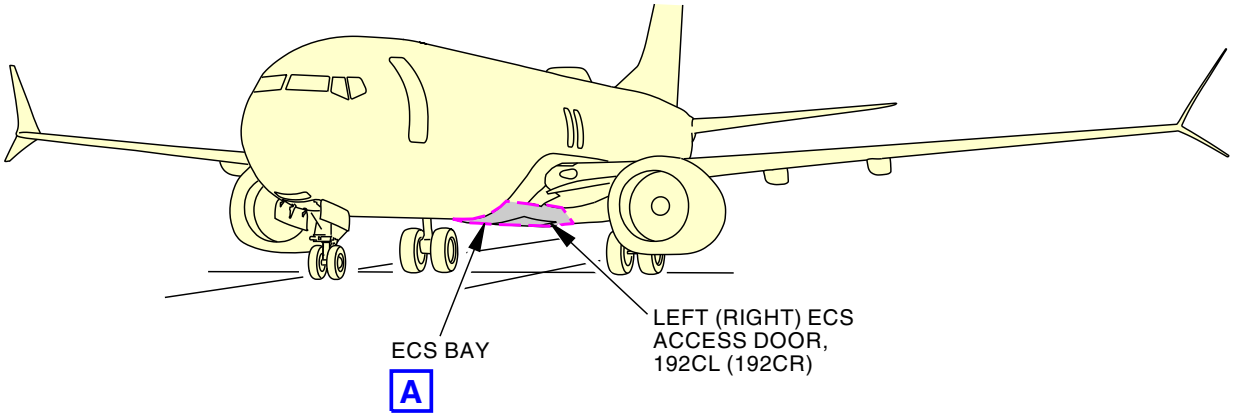
SUBTASK 21-51-07-620-001

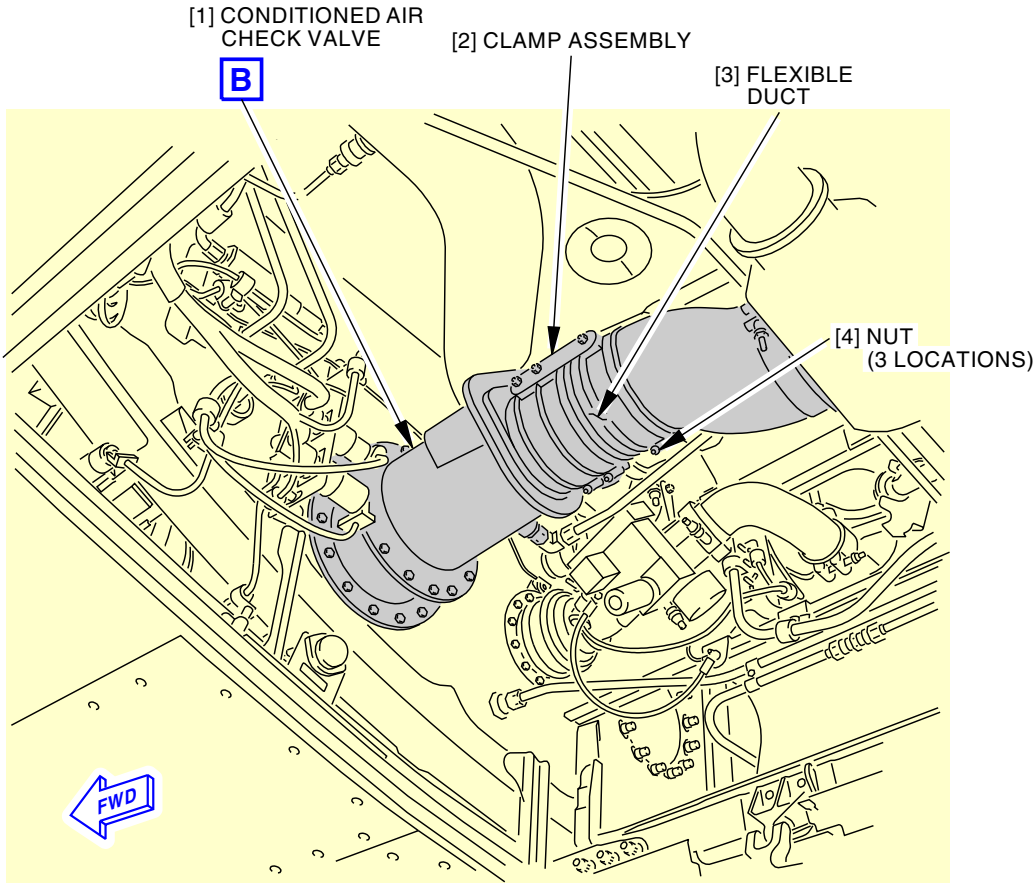
(3) Put covers on the duct openings to prevent the entry of unwanted materials.

**END OF TASK**



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**LEFT ECS BAY**
**(RIGHT ECS BAY IS EQUIVALENT)**

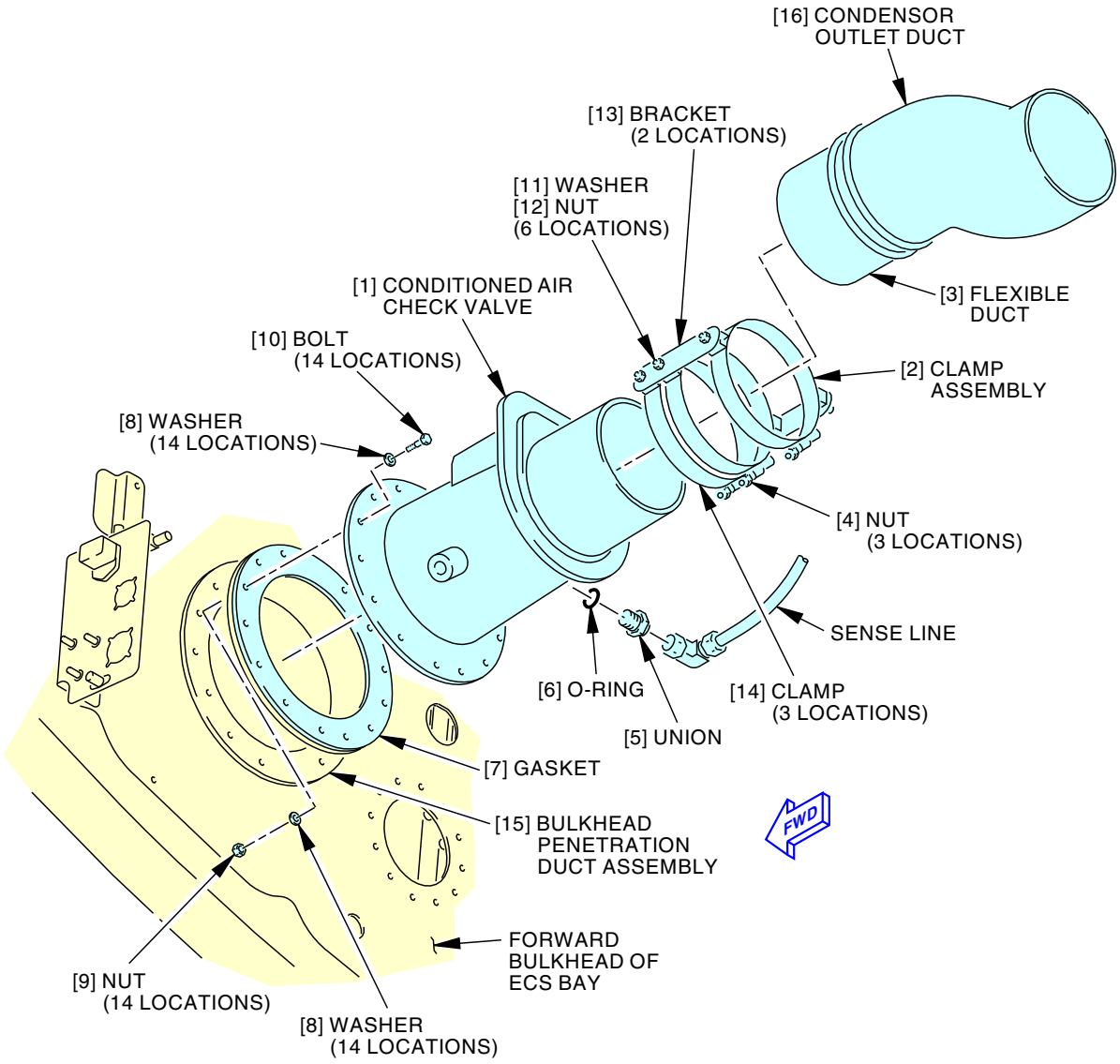
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2411408 S00061527835_V1

**Conditioned Air Check Valve Installation**
**Figure 401/21-51-07-990-801 (Sheet 1 of 2)**



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**CONDITIONED AIR CHECK VALVE**

**B**

2411409 S00061527836_V1

**Conditioned Air Check Valve Installation**
**Figure 401/21-51-07-990-801 (Sheet 2 of 2)**



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**TASK 21-51-07-400-801**

## 3. Conditioned Air Check Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Conditioned air check valve | 21-51-07-01-050 | SIA ALL |
| | | 21-51-07-02-050 | SIA ALL |
| 6 | O-ring | 21-51-07-01-045 | SIA ALL |
| | | 21-51-07-02-075 | SIA ALL |
| 7 | Gasket | 21-51-07-01-017 | SIA ALL |
| | | 21-51-07-02-040 | SIA ALL |

### E. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### F. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### G. Conditioned Air Check Valve Installation

**SUBTASK 21-51-07-630-001**

(1) Remove the duct covers.

**SUBTASK 21-51-07-420-001**

(2) Install the conditioned air check valve [1] as follows:

(a) Examine the gasket [7] on the flange of the bulkhead penetration duct assembly [15].

(b) Replace the gasket [7] if it is damaged or worn.

(c) Put the conditioned air check valve [1] in its position.



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1) Make sure the check valve is installed in the same orientation as when it was removed.

(d) Install the bolts [10], the washers [8], and the nuts [9], at 14 locations, that attach the conditioned air check valve [1] to the bulkhead penetration duct assembly [15].

(e) Slide the forward end of the flexible duct [3] forward onto the aft end of the conditioned air check valve [1].

(f) Position the individual clamps [14] so that these conditions are met:

1) Make sure the clamps are not installed on the duct bead.

2) Keep a 0.125 in. (3.175 mm) minimum distance between the clamps [14] and the edge of the flexible duct [3].

3) Make sure that the two forward clamps [14] are located forward of the bead on the aft end of the conditioned air check valve [1].

4) Make sure the aft clamp [14] is located aft of the bead on the forward end of the condensor outlet duct [16].

5) Make sure that the forward clamp [14] is located inside (aft) of the bead on the flexible duct [3].

6) Make sure that the aft clamp [14] is located inside (forward) of the bead on the flexible duct [3].

7) Install the brackets [13] that connect the clamps [14] together.

a) If necessary, reposition the clamps [14] axially so that the brackets [13] can be installed.

b) Make sure that the clamps [14] are positioned so that the position requirements are still met.

c) Install the washers [11] and nuts [12] that retain the brackets [13] to the clamps [14].

d) Tighten the nuts [12] to a torque of 63 in-lb (7 N·m) - 67 in-lb (8 N·m).

(g) Install the nuts [4] on the clamps [14].

(h) Determine the run-on torque value of the nuts on the T-bolts for each nut and T-bolt combination as follows:

1) Rotate the nut [4] onto the T-bolt until it is approximately one turn from seating and at least 3 T-bolt threads are protruding from the top of the nut.

2) Measure the torque value required to turn the nut [4] the last revolution before it seats.

3) Make a record of this torque value.

NOTE: The torque value should be between 2 in-lb (0.2 N·m) - 18 in-lb (2 N·m).

(i) Tighten the nuts [4] to a torque of 8 in-lb (1 N·m) - 12 in-lb (1.4 N·m) plus the run-on torque value determined for each nut.

1) For example, if the measured run-on torque value for a nut was 5 in-lb (0.6 N·m), then add 5 in-lb (0.6 N·m) to 8 in-lb (1 N·m) - 12 in-lb (1.4 N·m) to determine a final torque value of 13 in-lb (1.5 N·m) - 17 in-lb (1.9 N·m).

**SUBTASK 21-51-07-020-003**

(3) Do these steps to install the sense line:

(a) Install a new o-ring [6] on the union [5].



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(b) Apply a layer of Never-Seez NSBT compound, D00006 to the threads of the union [5].

(c) Install the union [5] in the conditioned air check valve [1].

(d) Connect the sense line to the union [5].

## H. Conditioned Air Check Valve Installation Test

SUBTASK 21-51-07-860-004

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-07-860-005

(2) Remove the DO NOT OPERATE tag, STD-858 from these switches on the P5-10 Bleed Air Control Module:

(a) BLEED APU

(b) BLEED 1 and BLEED 2

(c) L PACK and R PACK

SUBTASK 21-51-07-860-006

(3) Put the applicable L PACK or R PACK switch on the P5-10 Bleed Air Control Module to the AUTO position:

SUBTASK 21-51-07-790-001

(4) Do a soap bubble test of the joints at the ends of the conditioned air check valve [1].

NOTE: No leakage is permitted.

(a) If there is leakage, tighten the clamps [14] an additional 4 in-lb (0.5 N·m) - 6 in-lb (0.7 N·m).

NOTE: The maximum torque allowed is 18 in-lb (2 N·m).

(b) If there is still leakage, do these steps:

1) Put the L PACK and R PACK switches on the P5-10 Bleed Air Control Module in the OFF position.

2) Loosen the clamps [14].

3) Make sure the valve is aligned with the ducts.

4) Tighten the clamps [14].

5) Put the L PACK and R PACK switches on the P5-10 Bleed Air Control Module in the AUTO position.

6) Make sure the leak has been repaired.

## I. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-07-010-003

(1) When the left conditioned air check valve was replaced close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-07-010-004

(2) When the right conditioned air check valve was replaced close the access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-51-07-860-007

(3) Put these switches on the P5-10 Bleed Air Control Module to the OFF position:

(a) L PACK

(b) R PACK

SUBTASK 21-51-07-860-010

(4) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

——— END OF TASK ———

**SIA 003-999**

**TASK 21-51-07-000-802**

**4. Left Pack Conditioned Air Check Valve Sense Line Removal**

(Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**E. Prepare for the Removal**

SUBTASK 21-51-07-860-011

(1) Make sure that the pneumatic system is off (TASK 36-00-00-860-806).

SUBTASK 21-51-07-860-012

(2) Do these steps, on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L PACK switch to the OFF position.

1) Attach a DO NOT OPERATE tag, STD-858.

(b) Set the BLEED 1 switch to the OFF position.

1) Attach a DO NOT OPERATE tag, STD-858.

(c) Set the BLEED APU switch to the OFF position.

1) Attach a DO NOT OPERATE tag, STD-858.



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**SIA 003-999 (Continued)**

SUBTASK 21-51-07-010-005

(3) For the left conditioned air check valve, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

## F. Left Pack Conditioned Air Check Valve Sense Line Removal

**SUBTASK 21-51-07-020-005**

(1) Remove the sense line [17], do these steps:

(a) Loosen the coupling nuts [24] to disconnect the sense line [17] from the conditioned air check valve and sense line [18].

(b) Remove the bonding jumper [20] as follows:

1) Remove the nut [19], washers [21], and screw [22] that attach the one end of the bonding jumper [20] to the bonding tab bracket.

(c) Remove the clamp [23] that attach the sense line [17] to the bonding tab bracket.

(d) Remove the sense line [17].

**SUBTASK 21-51-07-020-006**

(2) Remove the sense line [18], do these steps:

(a) Loosen the coupling nut [31] to disconnect the sense line [18].

(b) Remove the nut [28], washer [29], screw [30], and spacer [27].

1) Remove the clamp [26].

(c) Remove the sense line [18].

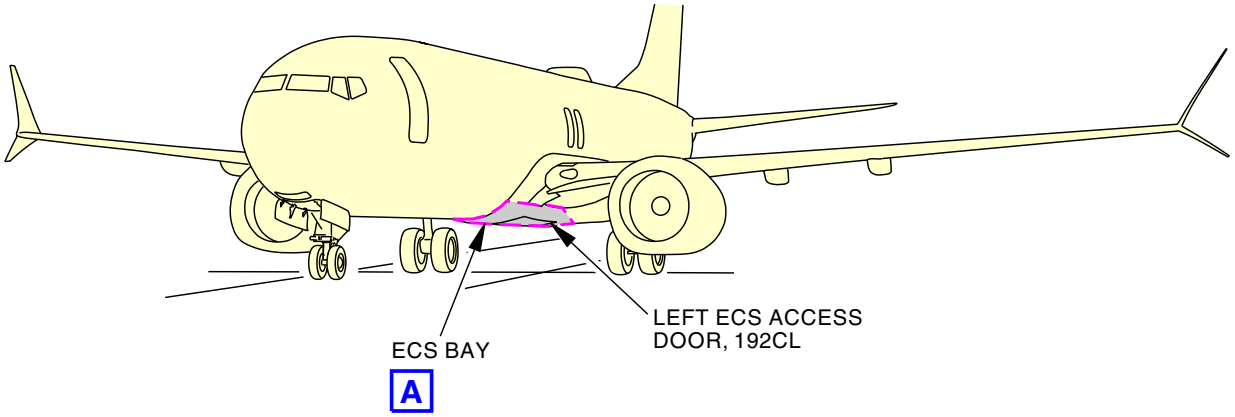
**SUBTASK 21-51-07-620-002**

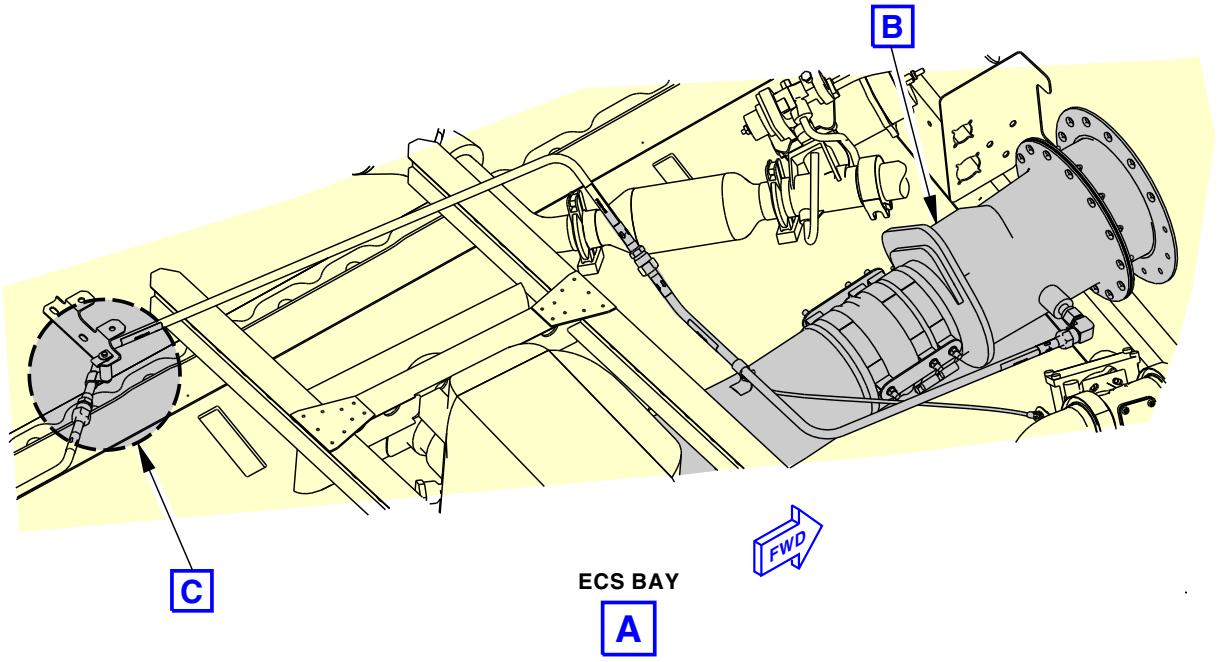
(3) Put the covers on the sense line openings to prevent the entry of unwanted materials.

**——— END OF TASK ———**



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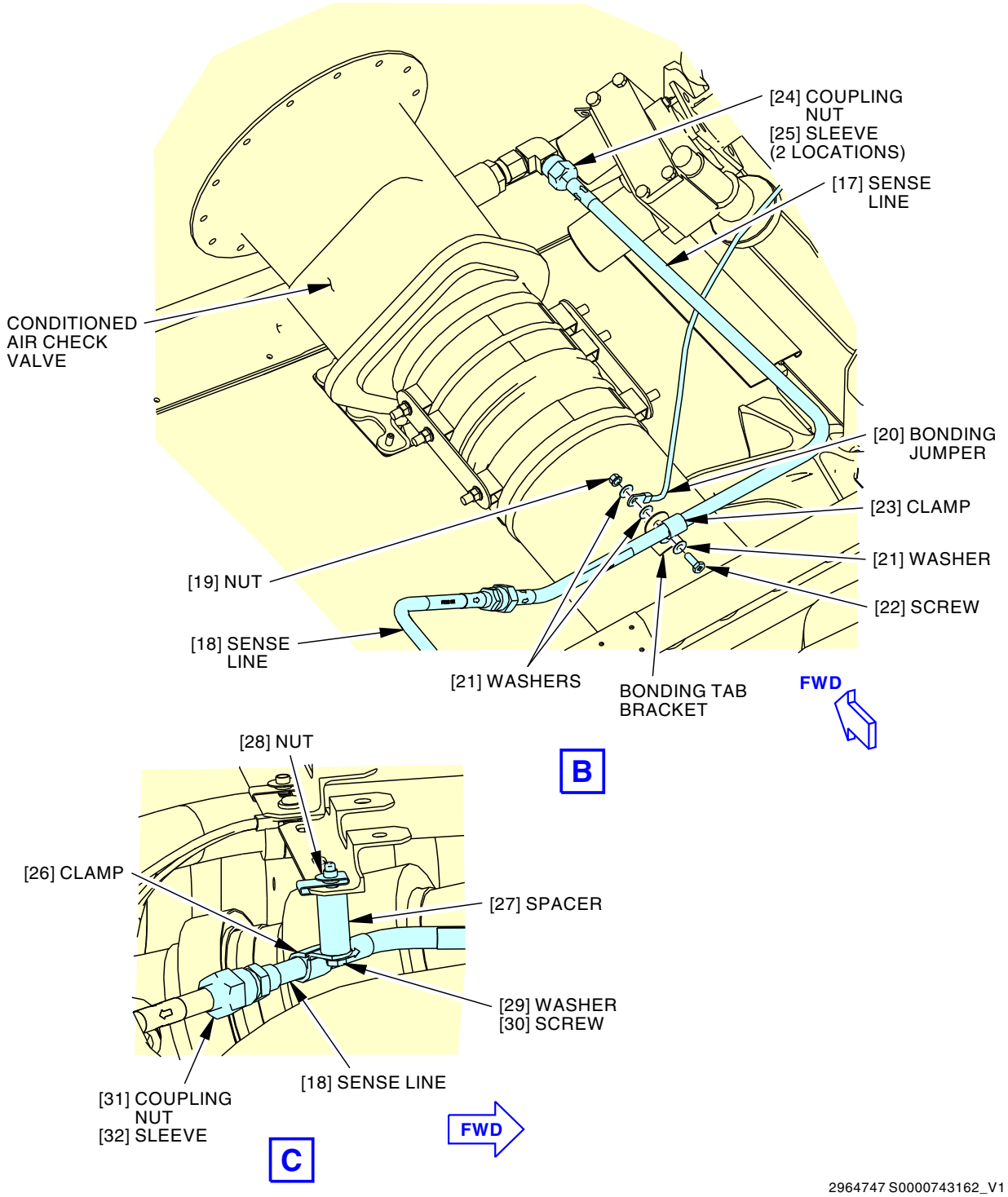




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**Left Pack Conditioned Air Check Valve Sense Line Installation**
**Figure 402/21-51-07-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Left Pack Conditioned Air Check Valve Sense Line Installation**
**Figure 402/21-51-07-990-802 (Sheet 2 of 2)**



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SIA 003-999 (Continued)

TASK 21-51-07-400-802

## 5. Left Pack Conditioned Air Check Valve Sense Line Installation

(Figure 402)

### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G50262 | Wiper - Cleaning | BMS15-5 |

### D. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

### F. Left Pack Conditioned Air Check Valve Sense Line Installation

SUBTASK 21-51-07-620-003

(1) Remove the covers from the sense line openings.

SUBTASK 21-51-07-420-002

(2) Install the sense line [18], do these steps:

(a) Tighten the coupling nut [31] to 165 in-lb (18.6 N·m) - 175 in-lb (19.8 N·m).

(b) Install the clamp [26].

1) Install the nut [28], washer [29], screw [30], and spacer [27].



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**SIA 003-999 (Continued)**

SUBTASK 21-51-07-420-003

(3) Install the sense line [17], do these steps:

(a) Tighten the coupling nuts [24] to 165 in-lb (18.6 N·m) - 175 in-lb (19.8 N·m).

(b) Do these steps to install the bonding jumper [20] to the bonding tab bracket:

1) Clean the contact surfaces with wiper, G50262, soaked with alcohol, B00130.

a) Rub dry with clean and dry wiper, G50262.

b) Continue to clean and dry the surface until the dry wiper, G50262, stays clean.

2) Install the clamp [23] to the bonding tab bracket.

3) Install the nut [19], washers [21], screw [22], and one end of the bonding jumper [20].

4) Tighten the nut [19] to 33 in-lb (3.7 N·m) - 40 in-lb (4.5 N·m).

(c) Measure the electrical bonding resistance between the bonding jumper [20] and airplane skin (SWPM 20-20-00).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the electrical bonding resistance is 0.001 ohm (1.0 milliohm) or less.

## G. Left Pack Conditioned Air Check Valve Sense Line Installation Test

**SUBTASK 21-51-07-860-013**

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

**SUBTASK 21-51-07-020-007**

(2) Remove the DO NOT OPERATE tag from L PACK switch, on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel).

**SUBTASK 21-51-07-860-014**

(3) Put the applicable L PACK switch, on the P5-10 Bleed Air Control Module, to the AUTO position.

**SUBTASK 21-51-07-790-002**

(4) Do a soap bubble test of the joints at the ends of the sense line [17] and sense line [18].

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK switch, on the P5-10 Bleed Air Control Module, to the OFF position.

2) Loosen the coupling nuts [24] and coupling nut [31].

3) Make sure that the sense line [17] and sense line [18] are aligned.

4) Put the L PACK switch, on the P5-10 Bleed Air Control Module, to the AUTO position.

5) Make sure that the leak has been repaired.

## H. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-07-410-001**

(1) For the left conditioned air check valve, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



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**SIA 003-999 (Continued)**

SUBTASK 21-51-07-860-015

(2) Remove the DO NOT OPERATE tags from these switches, on the P5-10 Bleed Air Control Module:

(a) BLEED APU

(b) BLEED 1.

**SUBTASK 21-51-07-860-016**

(3) Put L PACK switch, on the P5-10 Bleed Air Control Module, to the OFF position.

**SUBTASK 21-51-07-860-017**

(4) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**——— END OF TASK ———**



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## HIGH PRESSURE WATER SEPARATOR (HPWS) - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the High Pressure Water Separator (HPWS)

(2) An installation of the HPWS.

B. The HPWS contains: a condenser, a reheater, two water extractors, and a frame assembly.

**TASK 21-51-08-000-801**

### 2. High Pressure Water Separator Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

SUBTASK 21-51-08-860-001

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-08-860-002

(2) Do these steps on the P5-10 bleed air control module (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-51-08-010-001

(3) To get access to the HPWS for the left cooling pack, open this access panel

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



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SUBTASK 21-51-08-010-002

(4) To get access to the High Pressure Water Separator (HPWS) for the right cooling pack, open these access panels in the sequence that follows:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. High Pressure Water Separator Removal

SUBTASK 21-51-08-010-003

(1) For the high pressure water separator [1] at the left cooling pack do this step:

(a) Remove the screw [3], washers [4], nut [5], and clamps [36].

SUBTASK 21-51-08-020-005

(2) Remove the screw [37], washer [45], spacer [38], washer [46], nut [47], and clamps [36] from the sense line [2] and water extractor duct drain line [6].

SUBTASK 21-51-08-010-020

(3) Loosen the b-nut of the sense line [2] to disconnect the sense line [2] from the union [28].

SUBTASK 21-51-08-010-004

(4) Remove the sense line [2].

SUBTASK 21-51-08-010-016

(5) If it is necessary, remove the union [28] and packing [29] from the high pressure water separator [1].

(a) Discard the packing [29].

SUBTASK 21-51-08-010-021

(6) Loosen the b-nut of the water extractor duct drain line [6] to disconnect the water extractor duct drain line [6] from the union [30].

SUBTASK 21-51-08-010-005

(7) Remove the water extractor duct drain line [6].

SUBTASK 21-51-08-010-017

(8) If it is necessary, remove the union [30] and packing [31] from the high pressure water separator [1].

(a) Discard the packing [31].

SUBTASK 21-51-08-010-006

(9) Do these steps to disconnect the lines for the water spray nozzle from the manifold:

(a) Loosen the b-nut of the air line elbow [39] to disconnect the air line elbow [39] from the union [32].

(b) Loosen the b-nut of the water line elbow [40] to disconnect the water line elbow [40] from the union [41].

SUBTASK 21-51-08-010-018

(10) If it is necessary, remove the union [32], union [41], packing [33], and packing [42] from the high pressure water separator [1].

(a) Discard the packing [33] and packing [42].



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SUBTASK 21-51-08-010-007

(11) To remove the coupling assembly from the condenser, do these steps:

(a) Remove the coupling [7].

(b) Move the sleeve [8] and ring [9] onto the duct.

(c) Remove the retainer [10].

SUBTASK 21-51-08-010-008

(12) Remove the clamps [11] from the flexible duct [12].

SUBTASK 21-51-08-010-009

(13) Remove the flexible duct [12].

SUBTASK 21-51-08-010-010

(14) Loosen the b-nut of the condensor outlet sense line [25] to disconnect the condensor outlet sense line [25] from the union [34].

SUBTASK 21-51-08-010-019

(15) If it is necessary, remove the union [34] and packing [35] from the high pressure water separator [1].

(a) Discard the packing [35].

SUBTASK 21-51-08-010-011

(16) Loosen the b-nut of the de-icing hose [26] to disconnect the de-icing hose [26] from the union [43].

SUBTASK 21-51-08-010-022

(17) If it is necessary, remove the union [43] and packing [44] from the high pressure water separator [1].

(a) Discard the packing [44].

SUBTASK 21-51-08-020-001

(18) For the high pressure water separator [1] on the left cooling pack, disconnect the electrical connectors [27] from the pack temperature sensor and pack temperature bulb:

SUBTASK 21-51-08-020-002

(19) For the high pressure water separator [1] on the right cooling pack, disconnect the electrical connectors [27] from the pack temperature sensor and pack temperature bulb:

SUBTASK 21-51-08-020-003

(20) Do these steps to disconnect the two ducts from the reheater:

(a) Remove the bolts [13], washers [14], washers [15], and nuts [16].

(b) Remove and discard the O-rings [17] from each of the two ducts.

SUBTASK 21-51-08-020-004

**WARNING** BE CAREFUL WHEN YOU MOVE THE COMPONENT. THE COMPONENT IS HEAVY. INJURIES TO PERSONS CAN OCCUR.

(21) To remove the high pressure water separator [1] from the airplane, do these steps:

(a) For each of the two forward attach points, do the steps that follow:

1) Remove the nut [21], washer [20], countersunk washer [19], and bolt [18].

2) Remove the bushing [22] from the bracket.



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(b) For each of the two aft attach points, do the steps that follow:

1) Remove the nut [21], washer [20], countersunk washer [19], and bolt [23].

2) Remove the two bushings [24] from the bracket.

(c) Carefully lower the high pressure water separator [1] from the ECS bay.

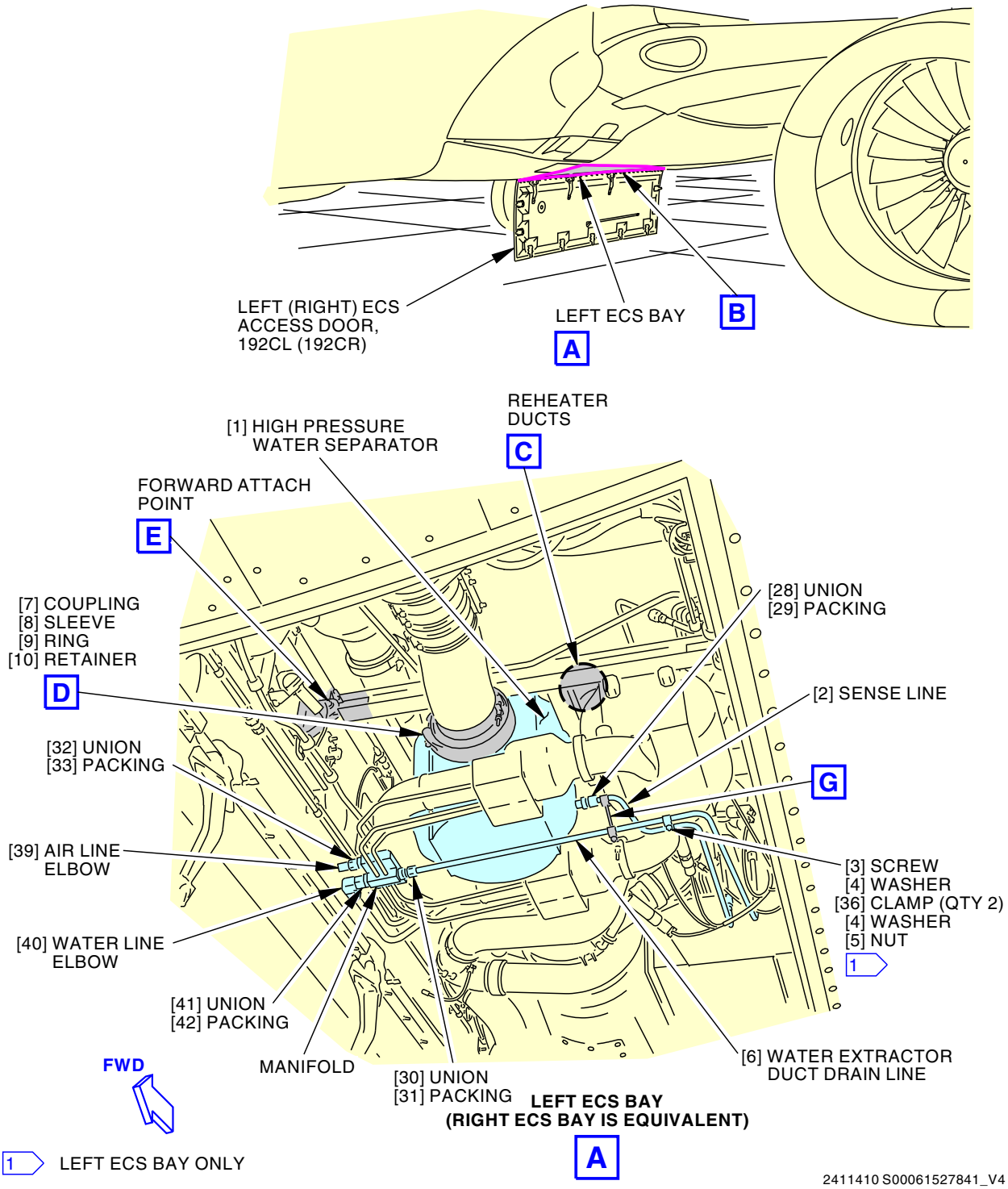
**SUBTASK 21-51-08-480-001**

(22) Put covers on the ducts and lines to keep out unwanted materials.

**——— END OF TASK ———**



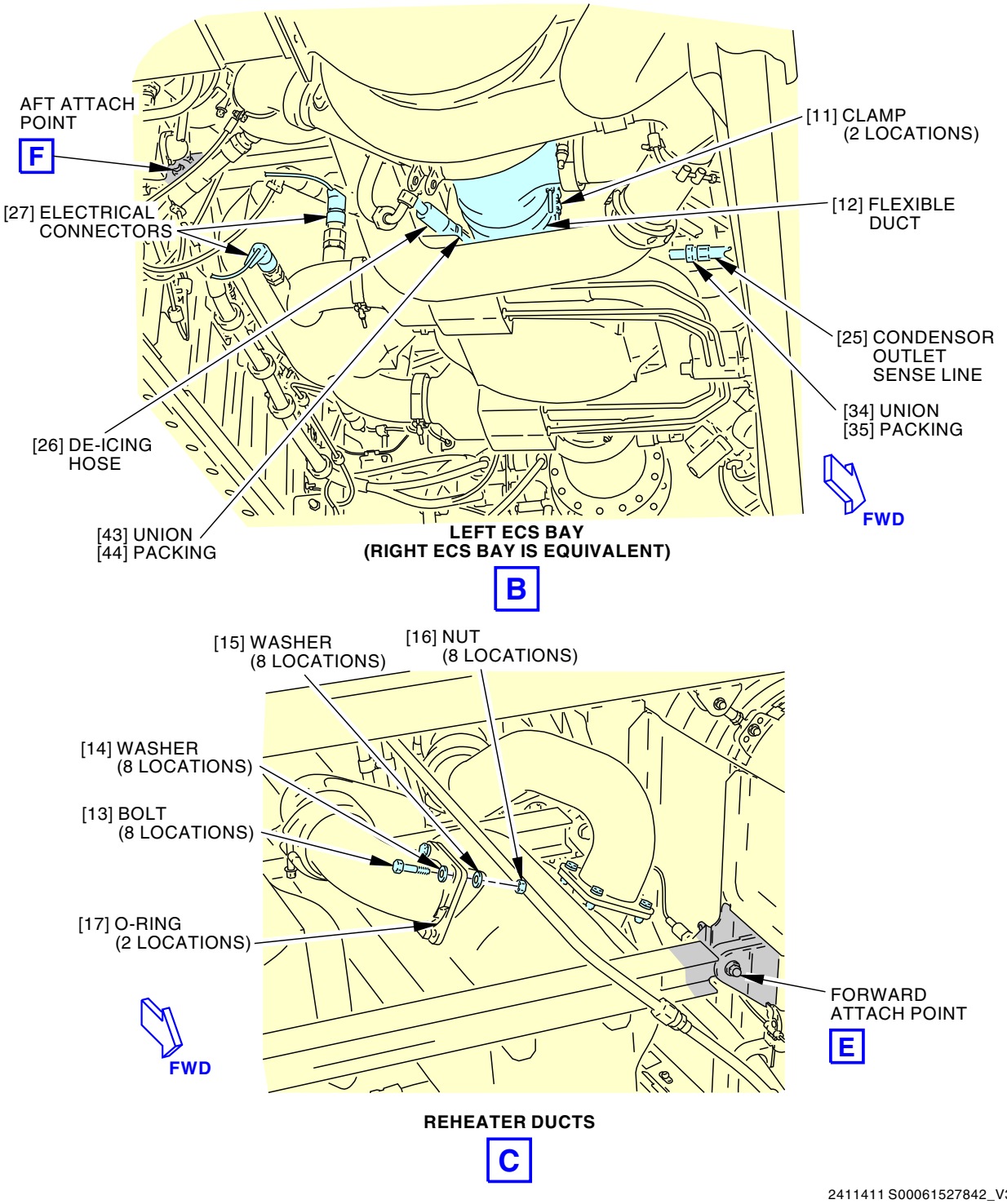
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**High Pressure Water Separator Installation**
**Figure 401/21-51-08-990-801 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

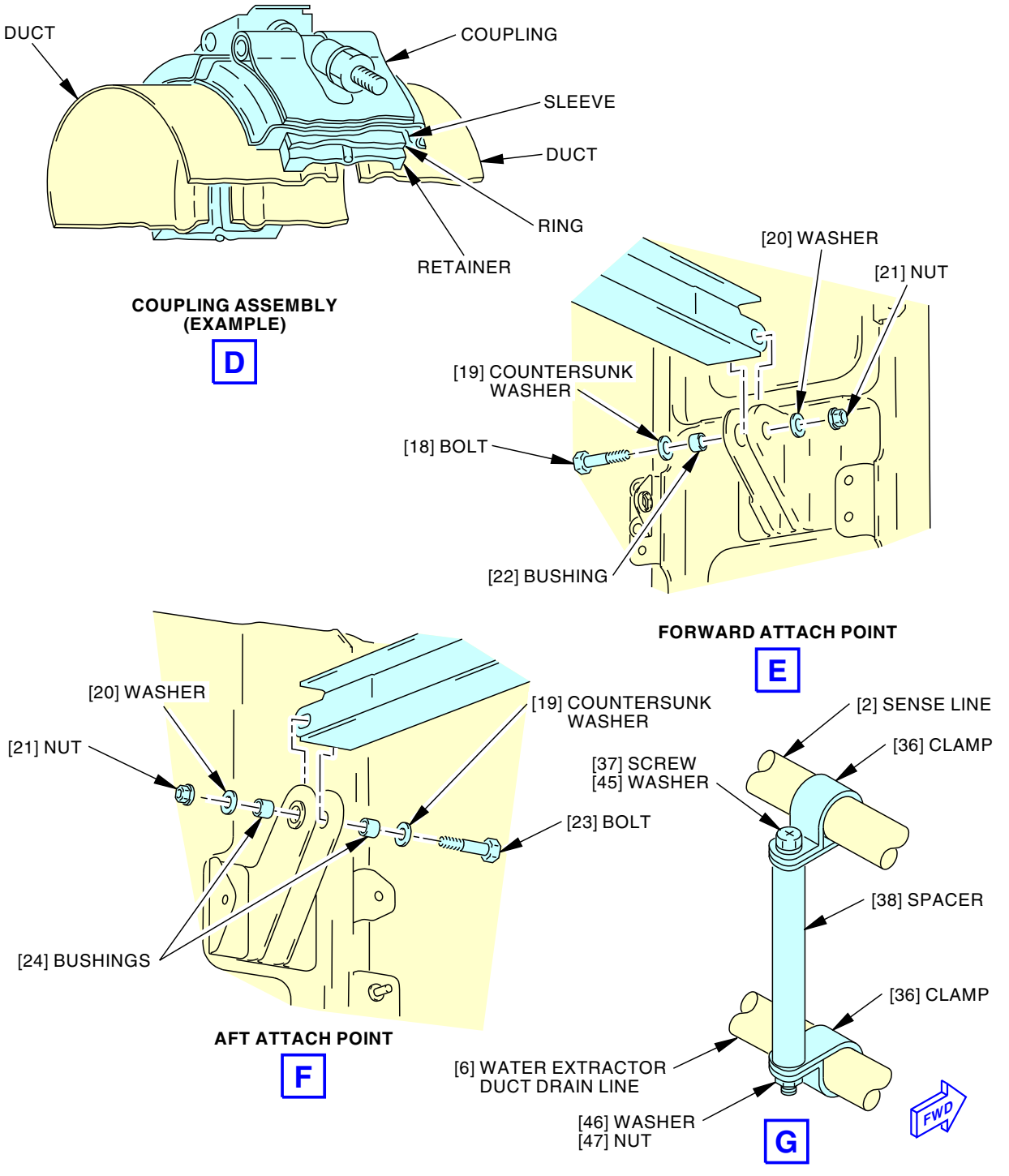



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**High Pressure Water Separator Installation**
**Figure 401/21-51-08-990-801 (Sheet 2 of 3)**



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**High Pressure Water Separator Installation**
**Figure 401/21-51-08-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-08-400-801**

**3. High Pressure Water Separator Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00548 | Lubricant - Fluorolube GR-660 | BAC5506 |
| D00602 | Lubricant - Fluorinated | BMS3-25 |
| D50063 | Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC | MIL-PRF- 27617 Type III |
| D50203 | Grease - Castrol Braycote 601EF | BMS3-25 Type II |
| D50233 | Grease - Dupont Krytox 240AZ | MIL-PRF-27617 Type I |
| D50234 | Grease - Dupont Krytox 240AB | MIL-PRF-27617 Type II |
| D50268 | Lubricant - Castrol Braycote 815Z | BMS3-25 Type I |
| D50380 | Grease - Braycote Micronic 601EF | BMS3-25 Type III |
| D50389 | Grease - Castrol Braycote 1729, Fluorinated Lubricant | |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | High pressure water separator | 21-51-08-01-040 | SIA ALL |
| | | 21-51-08-05-040 | SIA ALL |
| 17 | O-ring | 21-51-08-01-065 | SIA ALL |
| | | 21-51-08-05-065 | SIA ALL |
| | | 21-51-41-09-030 | SIA ALL |
| 29 | Packing | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-165 | SIA ALL |
| 31 | Packing | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-165 | SIA ALL |
| 33 | Packing | 21-51-08-01-145 | SIA ALL |
| | | 21-51-08-05-160 | SIA ALL |
| 35 | Packing | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-170 | SIA ALL |
| 42 | Packing | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-165 | SIA ALL |
| 44 | Packing | 21-51-08-01-155 | SIA ALL |



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(Continued)

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 44 (cont.) | | 21-51-08-05-170 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. High Pressure Water Separator Installation**

SUBTASK 21-51-08-480-002

(1) Remove the duct and line covers.

SUBTASK 21-51-08-420-001



**WARNING**

BE CAREFUL WHEN YOU MOVE THE COMPONENT. THE COMPONENT IS HEAVY. INJURIES TO PERSONS CAN OCCUR.

(2) To install the high pressure water separator [1] assembly on the airplane, do these steps:

(a) Carefully position the high pressure water separator [1] in the ECS bay.

(b) For each of the two forward attach points do the steps that follow:

1) Install the bushing [22] in the bracket.

2) Install the nut [21], washer [20], countersunk washer [19], and bolt [18].

a) Position the countersunk side of the countersunk washer [19] under the bolt head.

(c) For each of the two aft attach points do the steps that follow:

1) Install the bushings [24] in the bracket.

2) Install the nut [21], washer [20], countersunk washer [19], and bolt [23].

a) Position the countersunk side of the countersunk washer [19] under the bolt head.

(d) For the right high pressure water separator [1], make sure that there is a minimum of 0.10 in. (2.54 mm) clearance between the supply duct to the trim air Pressure Regulating and Shutoff Valve (PRSOV) and water collection manifold.

1) If there is not a minimum of 0.10 in. (2.54 mm) clearance, do one of these steps to provide the minimum clearance:

a) Reposition the supply duct to the trim air PRSOV.

b) Remove material from the water collection manifold.

SUBTASK 21-51-08-420-002

(3) Do these steps to connect the two ducts from the reheater:

(a) Apply a thin coat of one of these lubricants to the new O-rings [17]:



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1) Braycote Micronic 601EF grease, D50380
2) Braycote 601EF Grease, D50203
3) Braycote 815Z lubricant, D50268
4) Fluorolube GR-660 lubricant, D00548
5) Braycote 1729 grease, D50389
6) Krytox 240AB grease, D50234
7) Krytox 240AZ grease, D50233
8) Krytox 240AC perfluoropolyether grease, D50063.

(b) Install the O-ring [17] for each of the two ducts.

(c) Position the two ducts on their respective locations.

(d) Install the bolts [13], washers [14], washers [15], and nuts [16].

**SUBTASK 21-51-08-420-003**

(4) Install the flexible duct [12] on the mix muff and the condenser.

**SUBTASK 21-51-08-420-004**

(5) Install the clamps [11] on the flexible duct [12].

**SUBTASK 21-51-08-420-019**

(6) If it is necessary, do these steps to install the union [43]:

(a) Lubricate the new packing [44] with lubricant, D00602, or equivalent.

(b) Install the packing [44] on the union [43].

(c) Lubricate the threads of the union [43] with Never-Seez NSBT compound, D00006.

(d) Install the union [43] on the high pressure water separator [1].

1) Tighten the union [43] to 280 ±28 in-lb (32 ±3 N·m).

**SUBTASK 21-51-08-420-005**

(7) Install the b-nut of the de-icing hose [26] on the union [43].

(a) Tighten the b-nut to 280 ±14 in-lb (32 ±2 N·m).

**SUBTASK 21-51-08-420-014**

(8) If it is necessary, do these steps to install the union [34]:

(a) Lubricate the new packing [35] with lubricant, D00602, or equivalent.

(b) Install the packing [35] on the union [34].

(c) Lubricate the threads of the union [34] with Never-Seez NSBT compound, D00006.

(d) Install the union [34] on the high pressure water separator [1].

1) Tighten the union [34] to 170 ±17 in-lb (19 ±2 N·m).

**SUBTASK 21-51-08-420-006**

(9) Install the b-nut of the condensor outlet sense line [25] on the union [34].

(a) Tighten the b-nut to 170 ±9 in-lb (19 ±1 N·m).

**SUBTASK 21-51-08-420-007**

(10) For the high pressure water separator [1] on the left cooling pack, connect the electrical connectors [27] to the pack temperature sensor and pack temperature bulb:

**SUBTASK 21-51-08-420-008**

(11) For the high pressure water separator [1] on the right cooling pack, connect the electrical connectors [27] to the pack temperature sensor and pack temperature bulb:



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SUBTASK 21-51-08-420-009

(12) To install the coupling assembly on the condenser, do these steps:

(a) Put the retainer [10] over the duct bead and the bead on the condenser.

(b) Move the sleeve [8] and ring [9] over the retainer [10].

(c) Install the coupling [7].

1) Tighten the coupling [7] to 100 ±5 in-lb (11 ±1 N·m).

SUBTASK 21-51-08-420-015

(13) If it is necessary, do these steps to install the union [32] and union [30]:

(a) Lubricate the new packing [33] and new packing [31] with lubricant, D00602, or equivalent.

(b) Install the packing [33] on the union [32].

(c) Install the packing [31] on the union [30].

(d) Lubricate the threads of the union [32] and union [30] with Never-Seez NSBT compound, D00006.

(e) Install the union [32] and union [30] on the high pressure water separator [1].

1) Tighten the union [30] to 170 ±17 in-lb (19 ±2 N·m).

2) Tighten the union [32] to 140 ±14 in-lb (16 ±2 N·m).

SUBTASK 21-51-08-420-020

(14) If it is necessary, do these steps to install the union [41] on the lower port of the manifold:

(a) Lubricate the new packing [42] with lubricant, D00602, or equivalent.

(b) Install the packing [42] on the union [41].

(c) Lubricate the threads of the union [41] with Never-Seez NSBT compound, D00006.

(d) Install the union [41] on the high pressure water separator [1].

1) Tighten the union [41] to 170 ±17 in-lb (19 ±2 N·m).

SUBTASK 21-51-08-420-010

(15) Do these steps to connect the lines for the water spray nozzle to the manifold:

(a) Install the b-nut of the air line elbow [39] on the union [32].

1) Tighten the b-nut of the air line elbow [39] to 170 ±9 in-lb (19 ±1 N·m).

(b) Install the b-nut of the water line elbow [40] on the union [41].

1) Tighten the b-nut of the water line elbow [40] to 280 ±14 in-lb (32 ±2 N·m).

SUBTASK 21-51-08-210-001

(16) Make sure that there is not a plastic plug in the water overflow port in the water collection manifold:

NOTE: This port must be open in case the water spray nozzle becomes clogged.

(a) Remove the plastic plug if it is installed.

SUBTASK 21-51-08-420-016

(17) If it is necessary, do these steps to install the union [28]:

(a) Lubricate the new packing [29] with lubricant, D00602, or equivalent.

(b) Install the packing [29] on the union [28].

(c) Lubricate the threads of the union [28] with Never-Seez NSBT compound, D00006.

(d) Install the union [28] on the high pressure water separator [1].



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1) Tighten the union [28] to 170 ±17 in-lb (19 ±2 N·m).

SUBTASK 21-51-08-420-011

(18) Install the b-nut of the sense line [2] on the union [28].

(a) Tighten the b-nut of the sense line [2] to 170 ±9 in-lb (19 ±1 N·m).

SUBTASK 21-51-08-420-012

(19) Install the b-nut of the water extractor duct drain line [6] on the union [30].

(a) Tighten the b-nut of the water extractor duct drain line [6] to 170 ±9 in-lb (19 ±1 N·m).

SUBTASK 21-51-08-420-018

(20) Install the clamps [36], screw [37], washer [45], washer [46], spacer [38], and nut [47] between the sense line [2] and water extractor duct drain line [6].

SUBTASK 21-51-08-420-013

(21) For the high pressure water separator [1] on the left cooling pack do this step:

(a) Install the clamps [36], screw [3], washers [4], and nut [5].

## H. Post Installation Test

SUBTASK 21-51-08-860-004

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-08-860-005

(2) Do these steps on the P5-10 bleed air control module (located on the P5 forward overhead panel):

(a) Remove the DO NOT OPERATE tags, STD-858, and set the applicable L or R PACK switch to the AUTO position.

(b) Remove the DO NOT OPERATE tags, STD-858, and set the BLEED 1 and 2 switches to the ON position.

(c) Remove the DO NOT OPERATE tag, STD-858, and set the BLEED APU switch to the ON position.

SUBTASK 21-51-08-790-001

(3) Do a soap bubble test of all the applicable duct joints.

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches in the OFF position.

**WARNING**

DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps.

3) Make sure that the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches in the AUTO position.

6) Make sure that the leak has been repaired.



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## I. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-08-860-006**

(1) Do these steps on the P5-10 bleed air control module (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position.

**SUBTASK 21-51-08-860-007**

(2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-08-410-001**

(3) If the HPWS for the right cooling pack was removed, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**SUBTASK 21-51-08-410-002**

(4) If the HPWS for the left cooling pack was removed, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**——— END OF TASK ———**



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## TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Removal of the temperature control valve

(2) Installation of temperature control valve.

B. There are two temperature control valves, one for each cooling pack. The temperature control valves are located in the aft area of each air conditioning bay, inboard of the heat exchanger.

**TASK 21-51-10-000-801**

### 2. Temperature Control Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

**SUBTASK 21-51-10-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-10-860-002**

(2) Put the L PACK and R PACK switches on the P5-10 panel in the OFF position and attach DO NOT OPERATE tags, STD-858.

**SUBTASK 21-51-10-860-003**

(3) For the left temperature control valve [1], do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |



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(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-10-010-001

(4) For the right temperature control valve [1], do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Open these access panels in the sequence that follows:

1) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

2) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Temperature Control Valve Removal

SUBTASK 21-51-10-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(1) Disconnect the electrical connector [7] from the temperature control valve [1].

SUBTASK 21-51-10-020-002

(2) Remove the screw [3], washer [4] and nut [5] that hold the bonding jumper [2] to the temperature control valve [1].

SUBTASK 21-51-10-020-003

(3) Hold the temperature control valve [1] while you remove the two clamps [6].

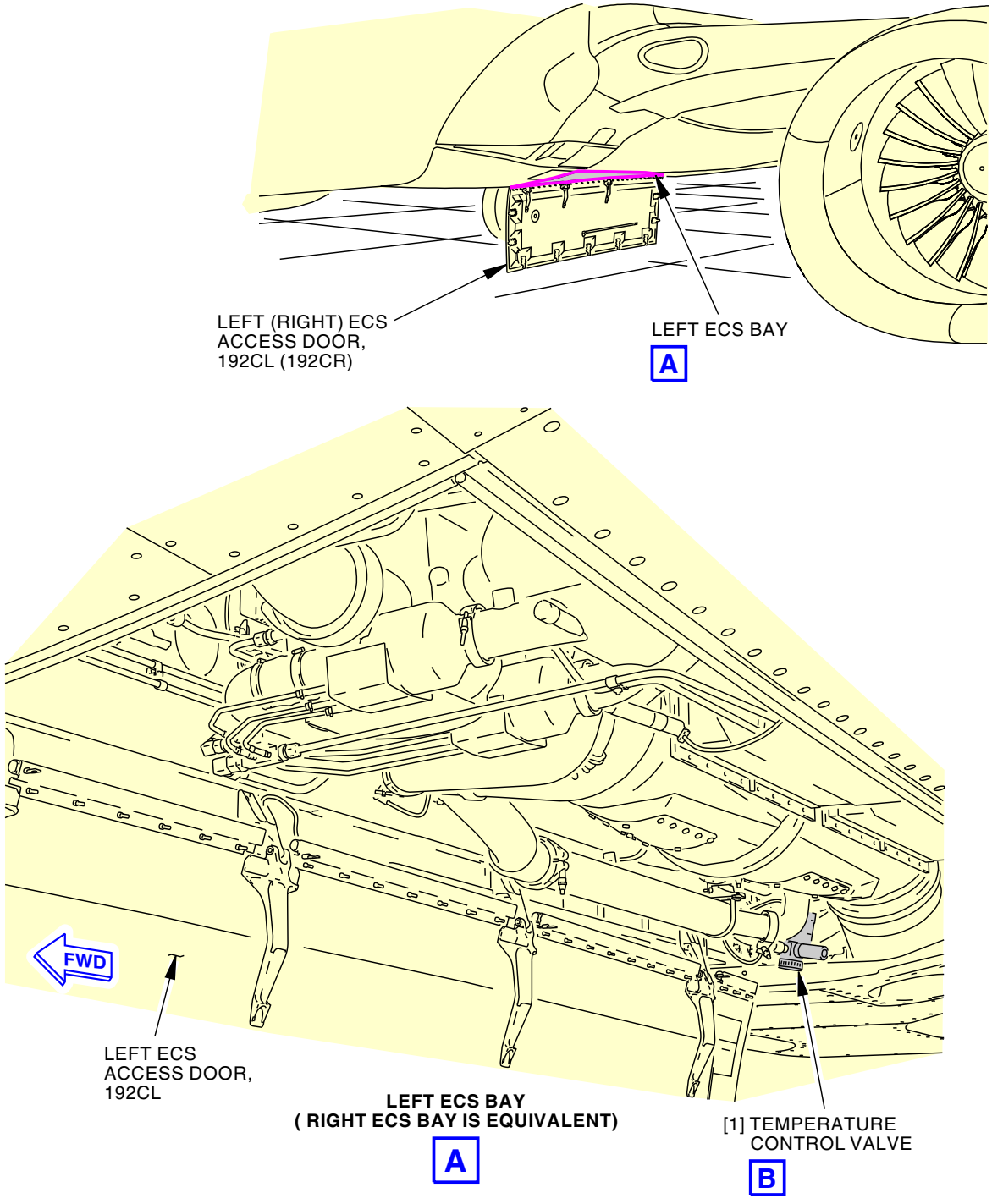
SUBTASK 21-51-10-160-001

(4) Carefully remove the temperature control valve [1] from its position between the ducts.

**——— END OF TASK ———**



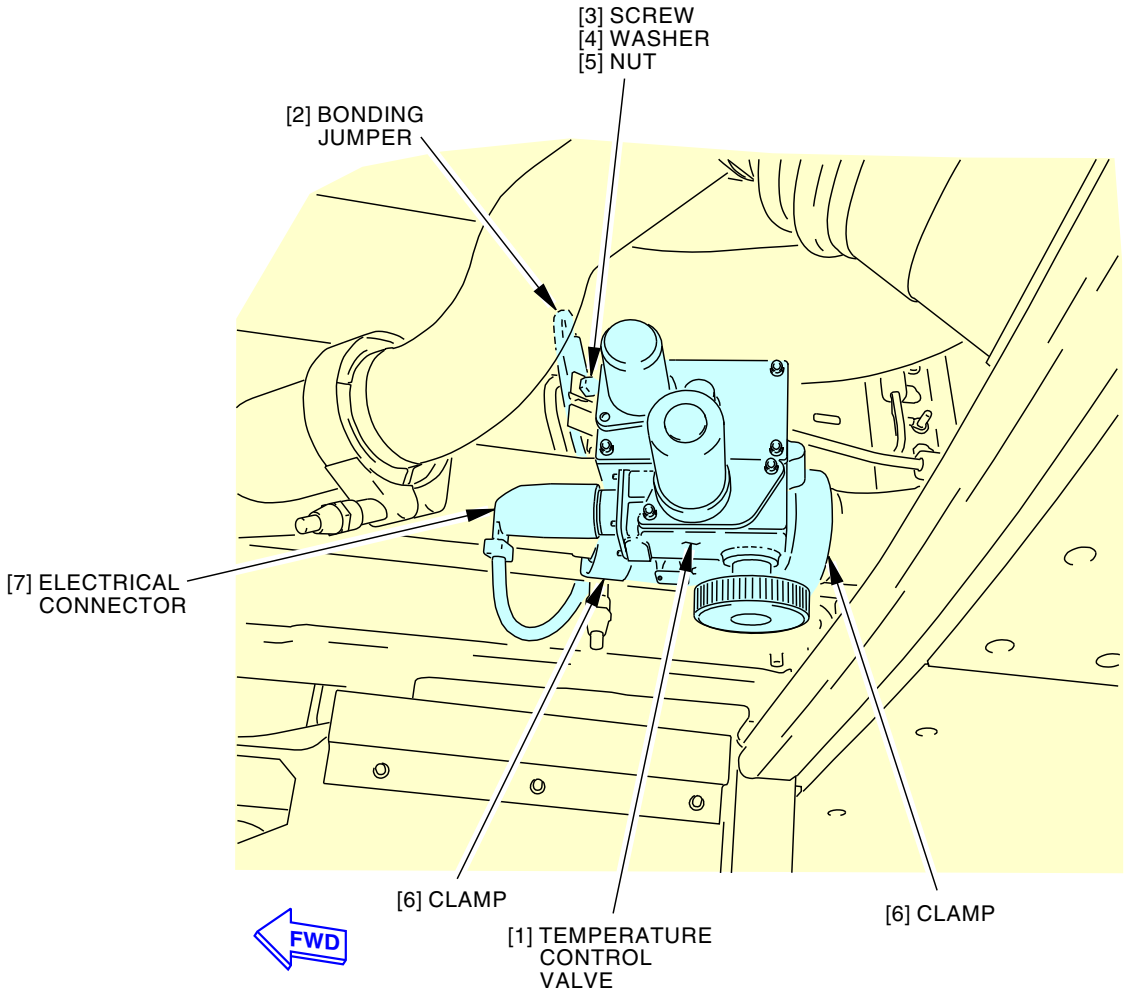
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**Temperature Control Valve Installation**
**Figure 401/21-51-10-990-801 (Sheet 1 of 2)**



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**TEMPERATURE CONTROL VALVE**

**B**

2411414 S00061527849_V1

**Temperature Control Valve Installation**
**Figure 401/21-51-10-990-801 (Sheet 2 of 2)**



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**TASK 21-51-10-400-801**

**3. Temperature Control Valve Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Temperature Control Valve Installation**

**SUBTASK 21-51-10-160-002**

(1) Carefully put the temperature control valve [1] into its position between the air ducts.

**SUBTASK 21-51-10-020-004**

(2) Install the two clamps [6] that hold the temperature control valve [1] to the ducts.

NOTE: Do not fully tighten the clamps [6].

**SUBTASK 21-51-10-420-001**

(3) Do these steps to connect the bonding jumper [2] to the temperature control valve [1]:

(a) Put the bonding jumper [2] in its position on the temperature control valve [1].

(b) Install the screw [3], washer [4], and nut [5] that hold the bonding jumper [2] to the temperature control valve [1].

1) Make sure the bonding jumper [2], screw [3], washer [4], and nut [5] are clean.

**SUBTASK 21-51-10-420-002**

(4) Install the electrical connector [7] on the temperature control valve [1].

**SUBTASK 21-51-10-420-003**

(5) Tighten the two clamps [6] to 57.5 ±2.5 in-lb (6.5 ±0.3 N·m).

**SUBTASK 21-51-10-860-004**

(6) If the left temperature control valve [1] was replaced, do this step:



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(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-10-860-005

(7) If the right temperature control valve [1] was replaced, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

## F. Temperature Control Valve Installation Test

SUBTASK 21-51-10-860-006

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-10-730-001

(2) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

SUBTASK 21-51-10-860-007

(3) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-10-860-008

(4) Do these steps on the P5-10 air conditioning panel:

(a) Set the L and R PACK switches to the AUTO position and remove the DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the ON position.

(c) Set the BLEED APU switch to the ON position.

SUBTASK 21-51-10-860-009

(5) Do these steps on the P5-17 Cabin Temperature Panel:

(a) Set the TRIM AIR switch to the ON position.

(b) Set the cabin temperature selectors (CONT CAB, FWD CAB, and AFT CAB) to the AUTO position.

SUBTASK 21-51-10-790-001

(6) Do a soap bubble test of the duct joints at the temperature control valve [1].

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps [6].



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3) Make sure the ducts are aligned at the joints.

4) Tighten the clamps [6].

5) Put the L PACK and R PACK switches to the AUTO position.

6) Make sure the leak has been repaired.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-10-860-010

(1) For the left temperature control valve, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-10-010-002

(2) For the right temperature control valve, close these access panels in the sequence that follows:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-10-860-011

(3) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-10-860-012

(4) Remove electrical power if it is not necessary (TASK 24-22-00-860-802).

**——— END OF TASK ———**



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## STANDBY TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the standby temperature control valve

(2) An installation of standby temperature control valve.

B. There are two standby temperature control valves, one for each cooling pack. The valves are found in the aft, outboard area of each air conditioning bay.

**TASK 21-51-11-000-801**

### 2. Standby Temperature Control Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

**D. Prepare for the Removal**

**SUBTASK 21-51-11-860-002**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-11-860-003**

(2) Put the L PACK and R PACK switches, on the P5-10 panel, in the OFF position and attach DO-NOT-OPERATE tags.

**SUBTASK 21-51-11-860-004**

(3) For the left standby temperature control valve, open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

**SUBTASK 21-51-11-860-019**

(4) For the left standby temperature control valve, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |

SUBTASK 21-51-11-010-001

(5) For the right standby temperature control valve, open these access panels in this sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192JR | Air Conditioning Panel - Aft |

SUBTASK 21-51-11-860-020

(6) For the right standby temperature control valve, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |

## E. Standby Temperature Control Valve Removal

SUBTASK 21-51-11-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector [3] from the standby temperature control valve [1].

SUBTASK 21-51-11-020-002

(2) Do these steps to disconnect the four sense lines from the valve:

(a) Make a record of the sense line connections to make sure they are installed in the same locations.

(b) Remove the screw [15] and washer [16] that hold the sense line clamps to the structure.

(c) Remove the screw [5], washer [6], and nut [7] that hold the sense line clamps together.

(d) Remove the sense line for the conditioned air check valve sense line [11].



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(e) Remove the sense line for the condensor outlet pressure sense line [10].

(f) Remove the sense line for the turbine outlet pressure sense line [4].

(g) Remove the sense line for the condensor inlet pressure sense line [9].

**SUBTASK 21-51-11-020-003**

(3) Remove the screw [14], washer [13], and nut [12] that hold the bonding jumper [2] to the standby temperature control valve [1].

**SUBTASK 21-51-11-020-004**

(4) Hold the standby temperature control standby temperature control valve [1] while you remove the two clamps [8].

**SUBTASK 21-51-11-160-001**

(5) Carefully remove the standby temperature control standby temperature control valve [1] from its position between the ducts.

**SUBTASK 21-51-11-020-005**

(6) Remove the reducer [19] from the conditioned air check valve sense line [11] location.

**SUBTASK 21-51-11-020-006**

(7) Remove the unions [17] at the remaining three sense line locations.

**SUBTASK 21-51-11-020-007**

(8) Remove and discard the packing [20] from the conditioned air check valve sense line [11] location.

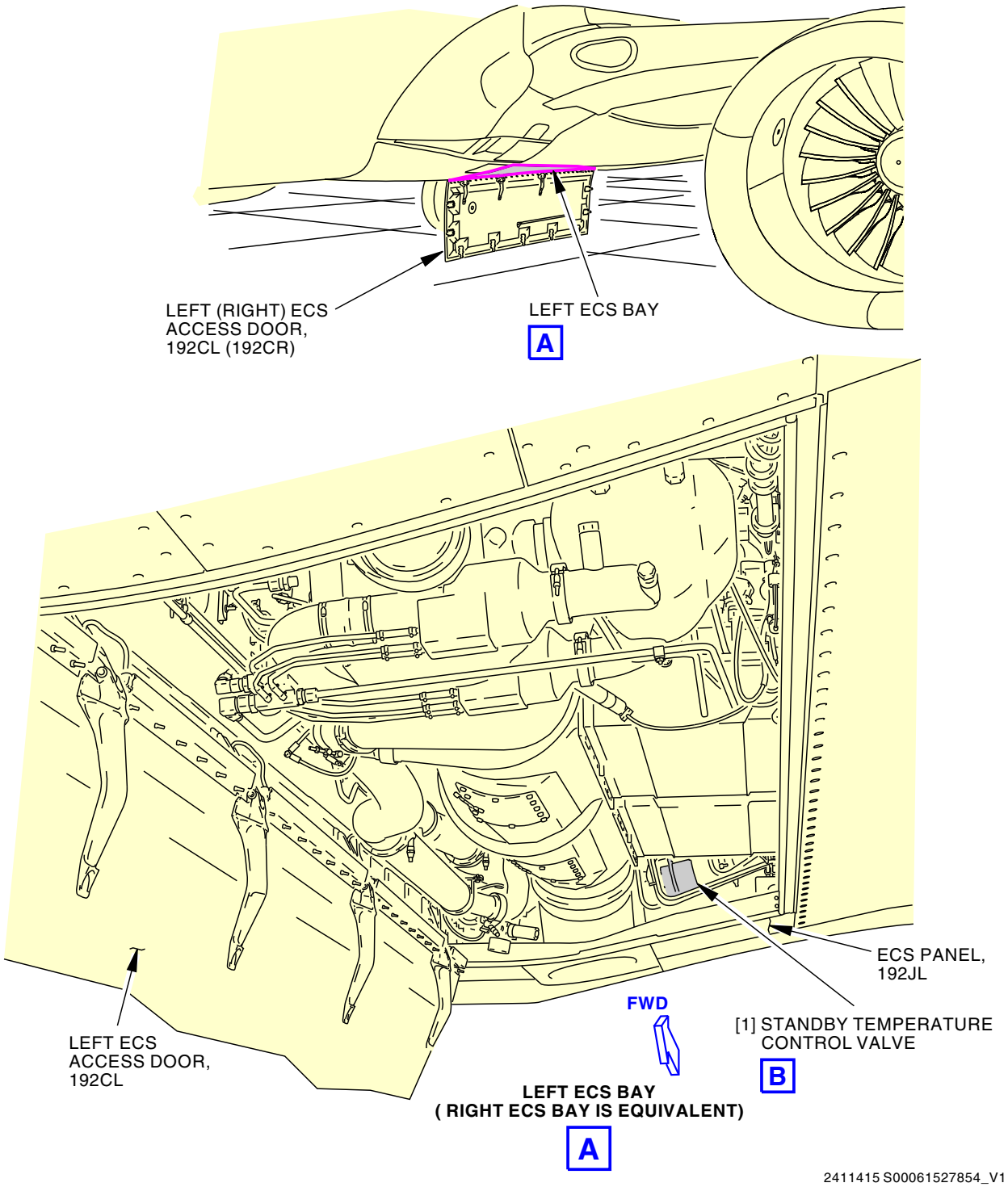
**SUBTASK 21-51-11-020-008**

(9) Remove and discard the packings [18] at the remaining three sense line locations.

**——— END OF TASK ———**



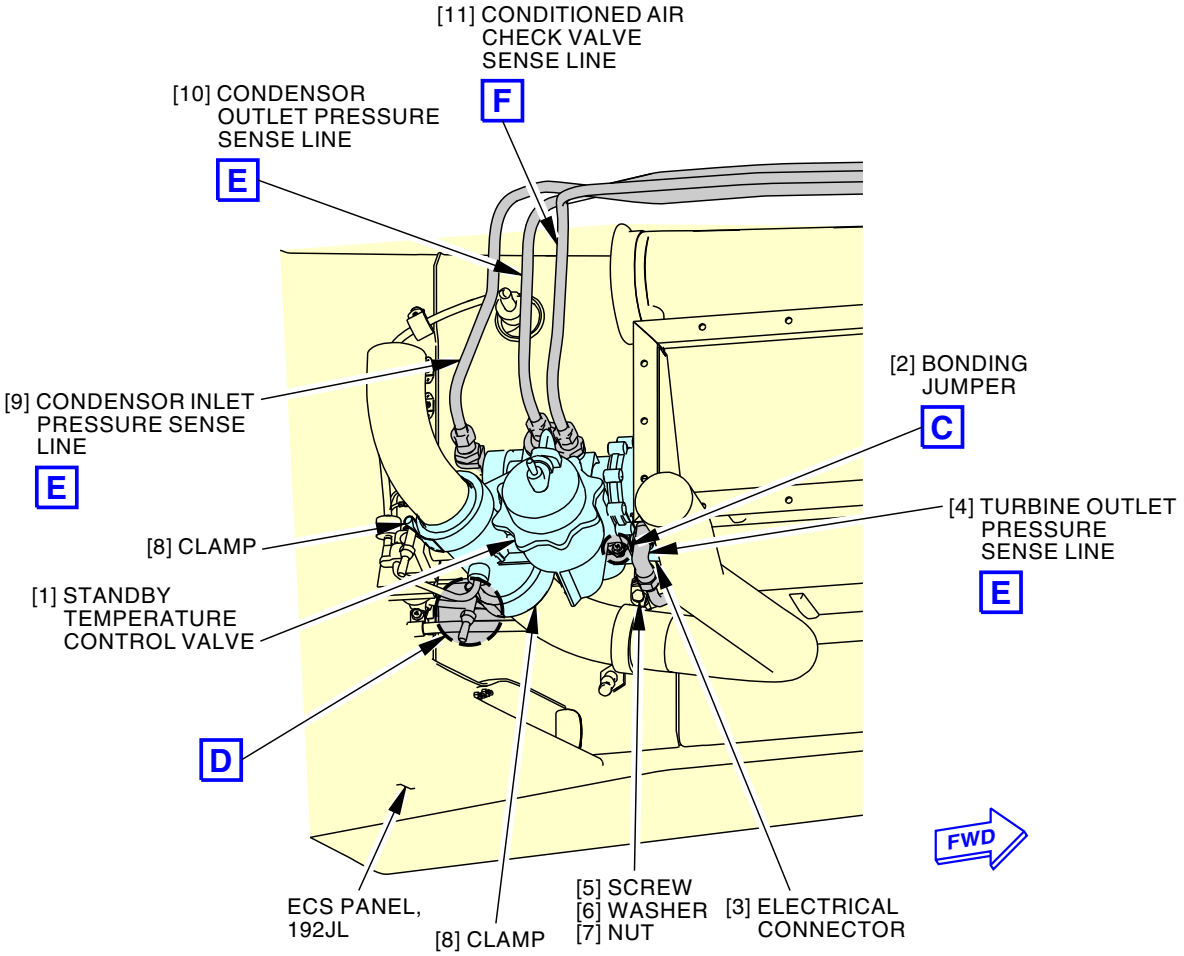
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**Standby Temperature Control Valve Installation**
**Figure 401/21-51-11-990-801 (Sheet 1 of 4)**

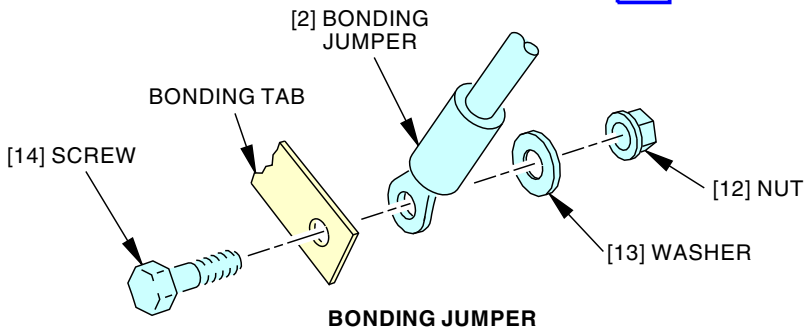


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**STANDBY TEMPERATURE CONTROL VALVE**

B




**BONDING JUMPER**

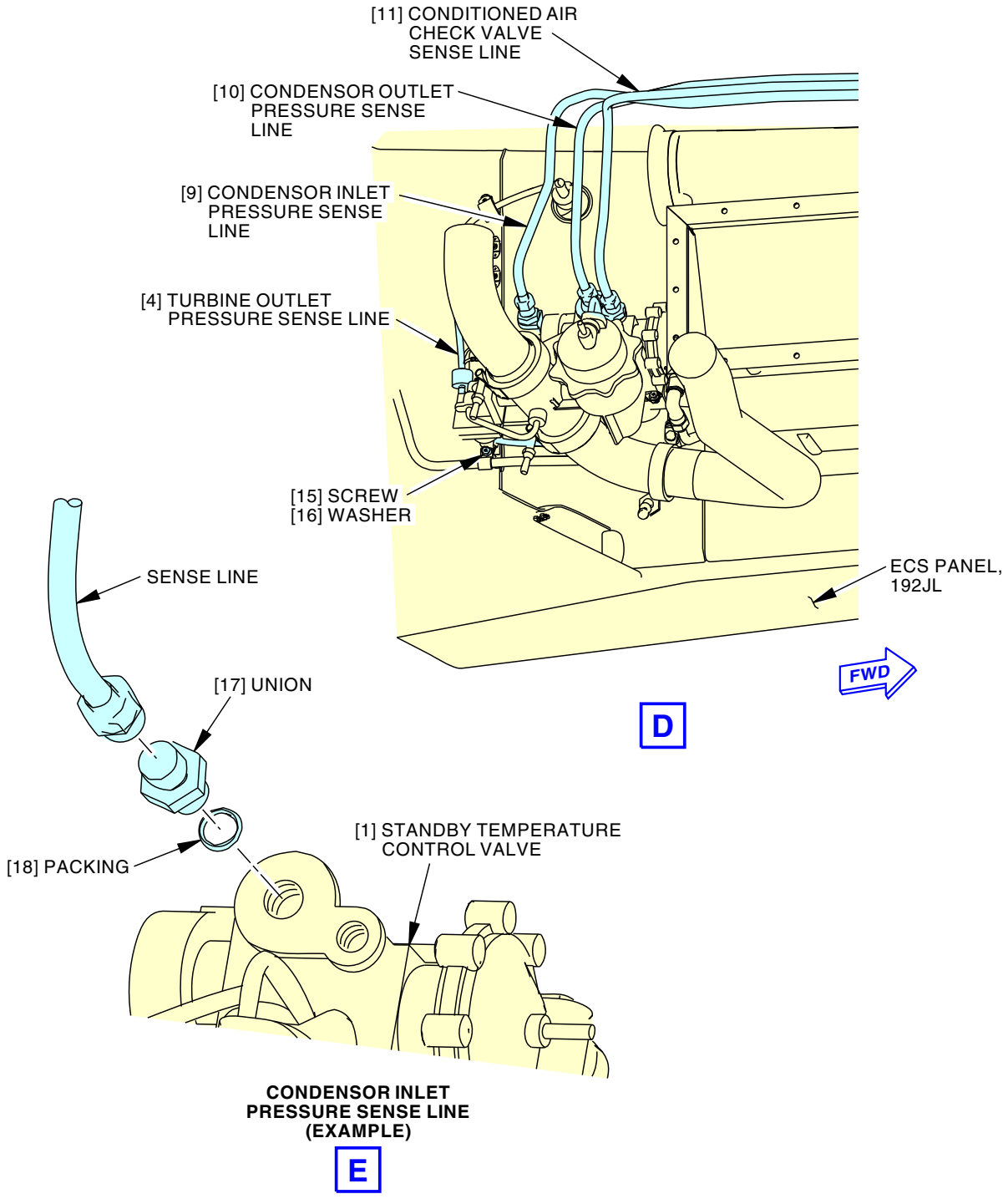
C

2411416 S00061527855_V2

**Standby Temperature Control Valve Installation**
**Figure 401/21-51-11-990-801 (Sheet 2 of 4)**



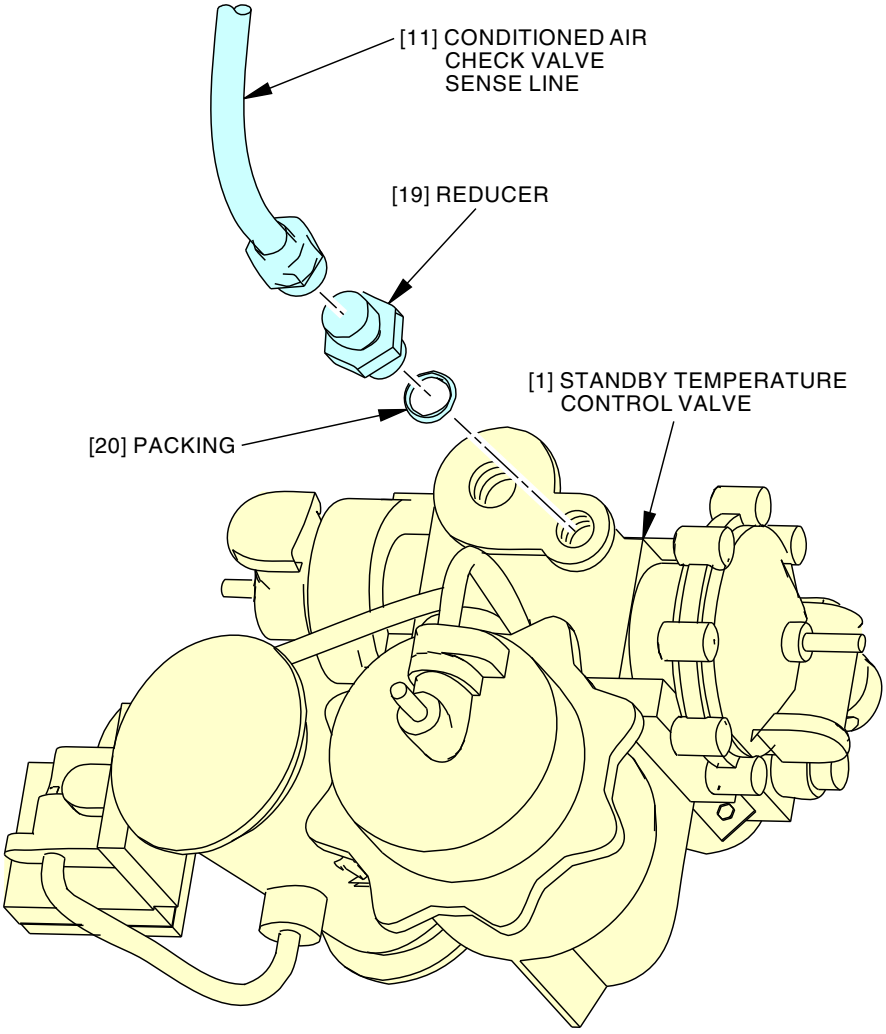
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Standby Temperature Control Valve Installation**
**Figure 401/21-51-11-990-801 (Sheet 3 of 4)**



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**CONDITIONED AIR CHECK VALVE SENSE LINE**

**F**

2411418 S00061527857_V2

**Standby Temperature Control Valve Installation**
**Figure 401/21-51-11-990-801 (Sheet 4 of 4)**



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**TASK 21-51-11-400-801**

**3. Standby Temperature Control Valve Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 18 | Packing | 21-51-11-01-155 | SIA ALL |
| 20 | Packing | 21-51-11-01-150 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

**F. Standby Temperature Control Valve Installation**

**SUBTASK 21-51-11-420-001**

(1) Install the reducer [19] on the new valve.

(a) Do these steps for the reducer at the conditioned air check valve sense line [11] location:

1) Install a new packing [20], on the reducer [19].

2) Apply a thin layer of Never-Seez NSBT compound, D00006, to the threads of the reducer [19].

3) Install the reducer [19], on the standby temperature control valve [1].

**SUBTASK 21-51-11-420-002**

(2) Install the union on the new valve.

(a) Do these steps for each of the remaining three unions:

1) Install a new packing [18], on the union [17].

2) Apply a thin layer of Never-Seez NSBT compound, D00006, to the threads of the union [17].



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3) Install the union [17] on the standby temperature control valve [1].

SUBTASK 21-51-11-160-002

(3) Carefully put the standby temperature control standby temperature control valve [1] into its position between the air ducts.

SUBTASK 21-51-11-020-009

(4) Install the clamps [8] that hold the valve to the ducts.

(a) Do not fully tighten the clamps.

SUBTASK 21-51-11-420-003

(5) Do the steps to connect the bonding jumper to the valve:

(a) Put the bonding jumper [2] in its position on the standby temperature control valve [1].

(b) Install the screw [14], washer [13], and nut [12] that hold the bonding jumper [2] to the valve.

1) Make sure that the bonding jumper [2], screw [14], washer [13], and nut [12] are clean.

SUBTASK 21-51-11-420-004

(6) Install the electrical connector [3] on the standby temperature control valve [1].

SUBTASK 21-51-11-020-010

(7) To connect the four sense lines to the standby temperature control valve, do these steps:

(a) Make sure that they are installed in the positions they were before the removal.

(b) Install the sense line for the condensor inlet pressure sense line [9].

(c) Install the sense line for the turbine outlet pressure sense line [4].

(d) Install the sense line for the condensor outlet pressure sense line [10].

(e) Install the sense line for the conditioned air check valve sense line [11].

(f) Align the three sense line clamps and the wire bundle clamp with the spacer plate nut on the structure.

(g) Install the screw [15] and washer [16] that hold clamps to the spacer plate nut.

(h) Align the two sense line clamps and the wire bundle clamp.

(i) Install the screw [5], washer [6], and nut [7] that hold the clamps together.

SUBTASK 21-51-11-420-005

(8) Tighten the clamps [8] to 55 in-lb (6.2 N·m) to 60 in-lb (6.8 N·m).

SUBTASK 21-51-11-860-026

(9) For the left standby temperature control valve, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C01157 | A/C TEMP CONT VALVE CLOSE LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |



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SUBTASK 21-51-11-860-025

(10) For the right standby temperature control valve, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 1 | C01160 | A/C TEMP CONT VALVE CLOSE RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |

## G. Standby Temperature Control Valve Installation Test

SUBTASK 21-51-11-860-006

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-11-860-007

(2) Do these steps, on the P5-10 air conditioning panel, for the pack with the new standby temperature control valve:

(a) Set the PACK switch to the AUTO position and remove the DO-NOT-OPERATE tag.

1) Keep the other PACK switch in the OFF position.

(b) Set the BLEED 1 and 2 switches to the ON position.

(c) Set the BLEED APU switch to the ON position.

SUBTASK 21-51-11-860-008

(3) Do these steps on the P5-17 Cabin Temperature Panel:

(a) Put the TRIM AIR switch to the ON position.

(b) Put the cabin temperature selectors (CONT CAB, FWD CAB, and AFT CAB) to the AUTO position.

SUBTASK 21-51-11-790-001

(4) Do a soap bubble test of the duct joints and sense line connections of the standby temperature control valve.

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

2) Loosen the clamps.

3) Make sure that the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches to the AUTO position.

6) Make sure that the leak has been repaired.

SUBTASK 21-51-11-860-016

(5) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.



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SUBTASK 21-51-11-740-001

(6) Do a BITE test on the left and right Integrated Air Systems Controllers (M2939 and M2957):

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

(a) To do the BITE test, do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-11-860-018

(1) For the left standby temperature control valve, close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

SUBTASK 21-51-11-010-002

(2) For the right standby temperature control valve, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |
| 192JR | Air Conditioning Panel - Aft |

SUBTASK 21-51-11-010-003

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

——— END OF TASK ———



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## CONDENSER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the condenser.

(2) An installation of the condenser.

(3) You must first remove the HPWS from the plane. You can then remove the condenser from the HPWS.

**TASK 21-51-12-000-801**

### 2. Condenser Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 21-51-08-000-801 | High Pressure Water Separator Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### C. Prepare for the Removal

**SUBTASK 21-51-12-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-12-020-001**

(2) Do this task: High Pressure Water Separator Removal, TASK 21-51-08-000-801.

NOTE: You must first remove the HPWS from the plane. You can then remove the condenser [55] from the HPWS.

#### D. Condenser Removal

**SUBTASK 21-51-12-020-002**

(1) To remove the water extractor drain lines and manifold, do these steps:

(a) Remove the clamps [41] that connect the drain lines to the water extractors.

(b) Remove the screws [51], washers [50], and shim [49] that hold the manifold to the condenser [55].

(c) Remove the screws [45], washers [46], and nuts [47] that connect the drain line support clamps [48].

(d) Remove the drain line support clamps [48].

(e) Move the six hoses off the water extractors to complete the removal.

**SUBTASK 21-51-12-020-003**

(2) To remove the condenser [55] from the frame assembly [54], do these steps:

(a) Remove the clamps [42] that connect the water extractor hoses to the condenser duct.

(b) Remove the bolts [52] and washers [53].

(c) Remove the bolt [44] and washers [43] that connect the condenser [55] to the frame assembly [54].

(d) Remove the condenser [55] from the frame assembly.



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SUBTASK 21-51-12-020-004

(3) Remove the coupling [59].

(a) Discard the packings [58] on the coupling [59].

SUBTASK 21-51-12-020-005

(4) Remove the plug [56] and packing [57] from the condenser [55].

(a) Discard the packing [57].

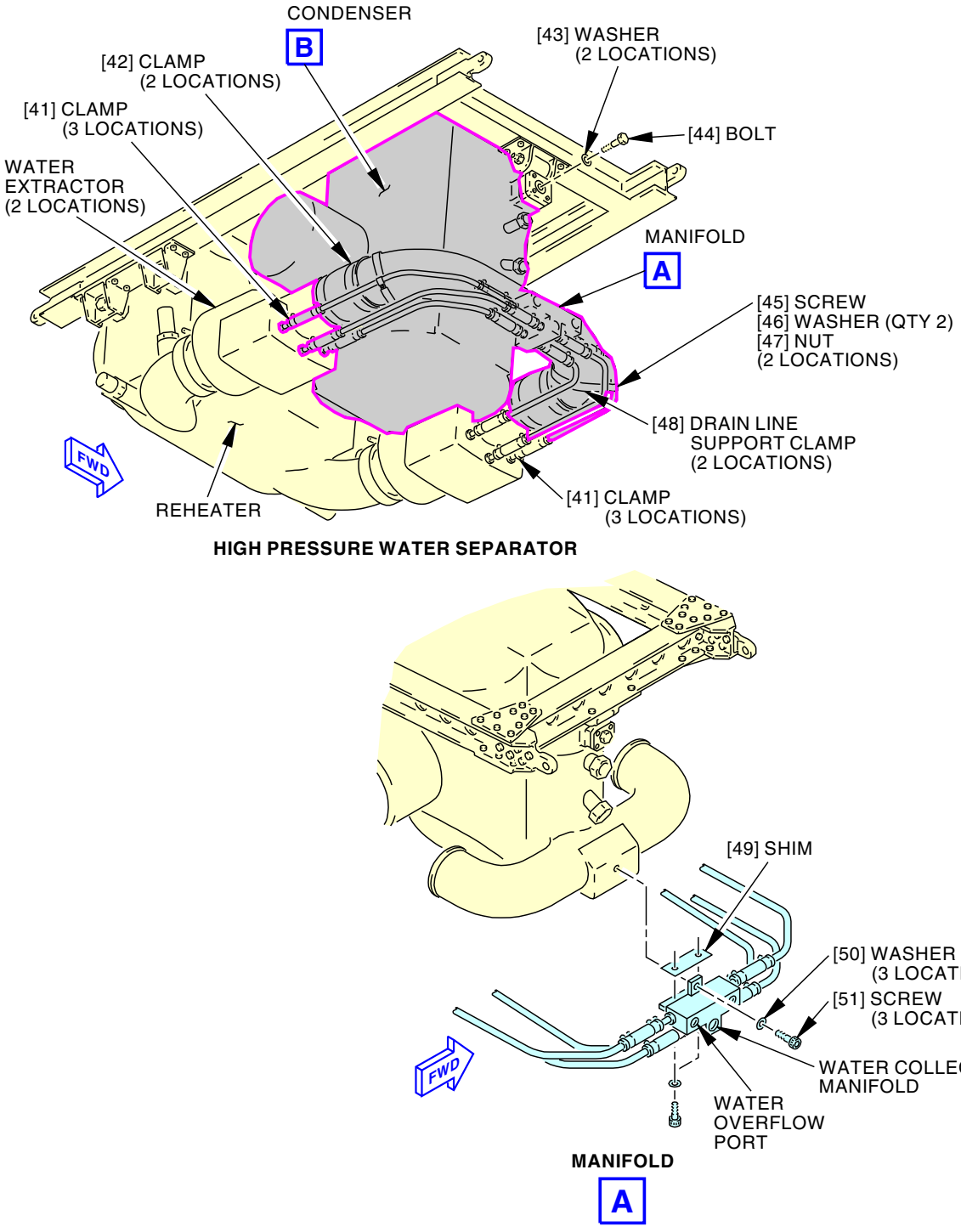
SUBTASK 21-51-12-480-001

(5) Put covers on the ducts and lines to keep out unwanted materials.

——— END OF TASK ———



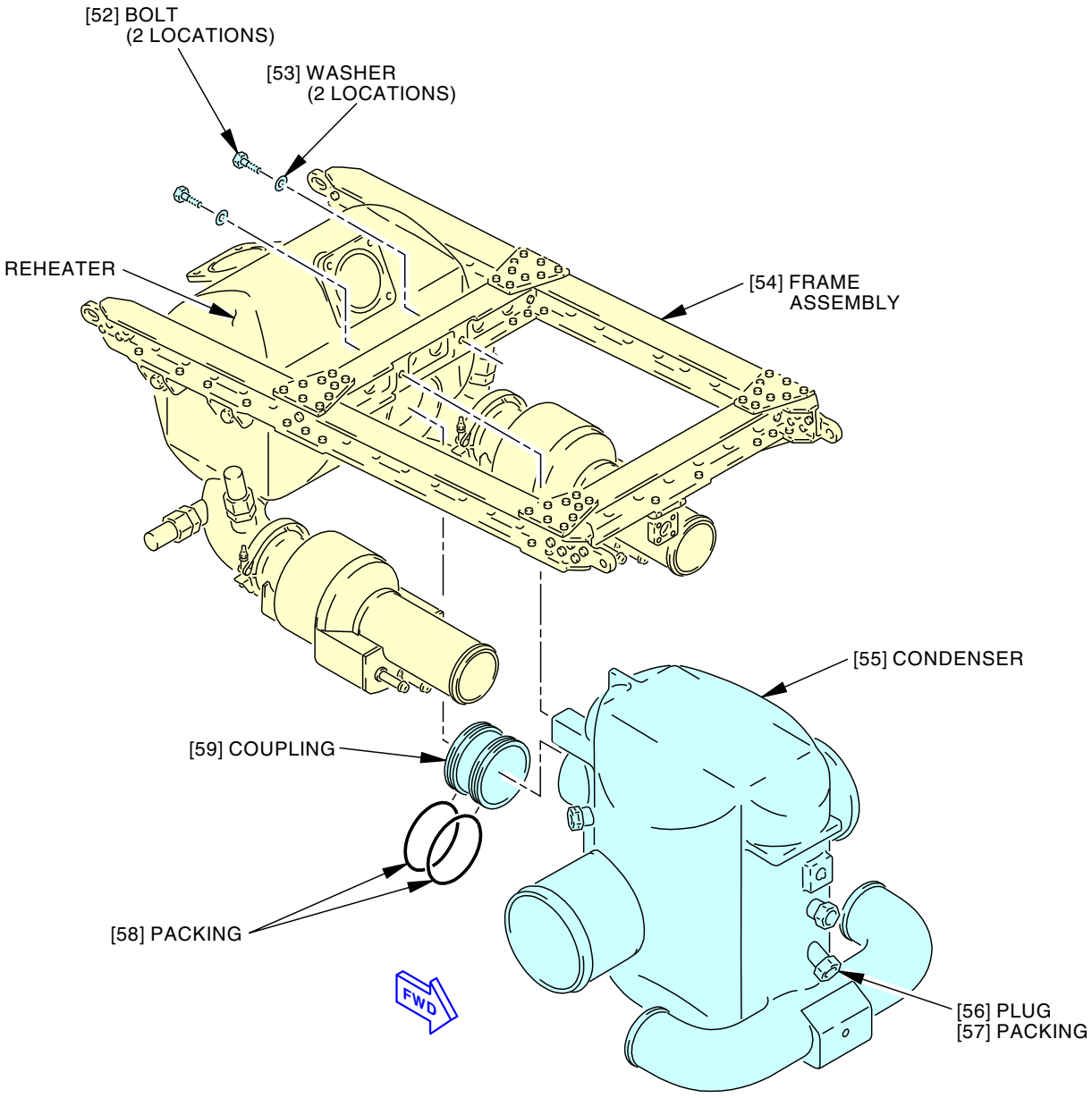
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**Condenser Installation**
**Figure 401/21-51-12-990-801 (Sheet 1 of 2)**



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**Condenser Installation**
**Figure 401/21-51-12-990-801 (Sheet 2 of 2)**



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**TASK 21-51-12-400-801**

**3. Condenser Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-51-08-400-801 | High Pressure Water Separator Installation (P/B 401) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00548 | Lubricant - Fluorolube GR-660 | BAC5506 |
| D50063 | Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC | MIL-PRF- 27617 Type III |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |
| D50203 | Grease - Castrol Braycote 601EF | BMS3-25 Type II |
| D50233 | Grease - Dupont Krytox 240AZ | MIL-PRF-27617 Type I |
| D50234 | Grease - Dupont Krytox 240AB | MIL-PRF-27617 Type II |
| D50268 | Lubricant - Castrol Braycote 815Z | BMS3-25 Type I |
| D50380 | Grease - Braycote Micronic 601EF | BMS3-25 Type III |
| D50389 | Grease - Castrol Braycote 1729, Fluorinated Lubricant | |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 55 | Condenser | 21-51-12-01-075 | SIA ALL |
| 57 | Packing | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-165 | SIA ALL |
| 58 | Packing | 21-51-13-01-030 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

**E. Condenser Installation**

**SUBTASK 21-51-12-480-002**

(1) Remove the duct and line covers.

**SUBTASK 21-51-12-020-006**

(2) To install the plug [56], do these steps:

(a) Apply a thin coat of one of these lubricants to the new packing [57]:

1) Braycote Micronic 601EF grease, D50380
2) Braycote 601EF Grease, D50203
3) Braycote 815Z lubricant, D50268
4) Fluorolube GR-660 lubricant, D00548
5) Braycote 1729 grease, D50389
6) Krytox 240AB grease, D50234
7) Krytox 240AZ grease, D50233



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8) Krytox 240AC perfluoropolyether grease, D50063.

(b) Install the packing [57] on the plug [56].

(c) Install the plug [56] in the condenser [55].

SUBTASK 21-51-12-020-007

(3) To install the coupling [59], do these steps:

(a) Apply a thin coat of Molykote 44 grease, medium, D50104, or an equivalent to the new packings [58].

(b) Install the packings [58] on the coupling [59].

(c) Install the coupling [59] in the duct of the reheater.

SUBTASK 21-51-12-020-008

(4) To install the condenser [55] on the frame assembly, do these steps:

(a) Put the condenser [55] in its position in the frame assembly.

(b) While the condenser [55] is put in the frame assembly, do these steps:

1) Move the hoses on the water extractors over the ducts on the condenser [55].

**CAUTION** DO NOT CAUSE DAMAGE TO THE PACKING AT THE COUPLING DURING CONDENSER INSTALLATION. THE DUCT OF THE CONDENSER SETS ON THE COUPLING. DAMAGE TO THE PACKING CAN CAUSE AIR LEAKS.

2) Put the duct on the condenser [55] over the coupling [59].

(c) Install the bolts [52] and washers [53].

(d) Install the bolt [44] and washers [43] that connect the condenser [55] to the frame assembly.

1) Make sure that one of the washers [43] is installed between the condenser [55] and frame assembly.

(e) Install the clamps [42] on the water extractor hoses.

1) Tighten the clamps [42] to 16 in-lb (1.81 N·m) - 18 in-lb (2.03 N·m).

SUBTASK 21-51-12-020-009

(5) To install the water extractor drain lines and manifold, do these steps:

(a) Move the six hoses over the drain line ports of the water extractors.

(b) Put the drain line support clamps [48] on the condenser ducts.

(c) Align the drain line support clamps [48] with the clamp on the water extractor drain line.

(d) Install the screw [45], washers [46], and nut [47] that connect the drain line support clamps [48].

(e) Install the screws [51], washers [50], and shim [49] that hold the manifold to the condenser [55].

1) If a replacement manifold is installed, make sure that the plastic plug removes from the overflow port of the water collection manifold.

(f) Install the clamps [41] that connect the drain line hoses to the water extractors.

SUBTASK 21-51-12-410-001

(6) Install the high pressure water separator (TASK 21-51-08-400-801).

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## REHEATER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the reheater.

(2) An installation of the reheater.

(3) You must first remove the HPWS from the plane. You can then remove the reheater from the HPWS.

**TASK 21-51-13-000-801**

### 2. Reheater Removal

Figure 401

#### A. References

| Reference | Title |
|---|---|
| 21-51-08-000-801 | High Pressure Water Separator Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### C. Prepare for the Removal

**SUBTASK 21-51-13-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-13-020-001**

(2) Do this task: High Pressure Water Separator Removal, TASK 21-51-08-000-801

NOTE: You must first remove the HPWS from the plane. You can then remove the reheater from the HPWS.

#### D. Reheater Removal

**SUBTASK 21-51-13-020-002**

(1) Remove the couplings [47] and packings [48] from the water extractors.

(a) Discard the two packings [48].

**SUBTASK 21-51-13-020-003**

(2) To remove the reheater [49] from the frame assembly [44], do these steps:

(a) Remove the bolts [43], the washers [41] and the bushings [42].

(b) Remove thebolts [50] and the washers [41].

(c) Remove the reheater [49] from the frame assembly [44].

**SUBTASK 21-51-13-020-004**

(3) Remove the coupling [45].

(a) Discard the two packings [46] on the coupling [45].

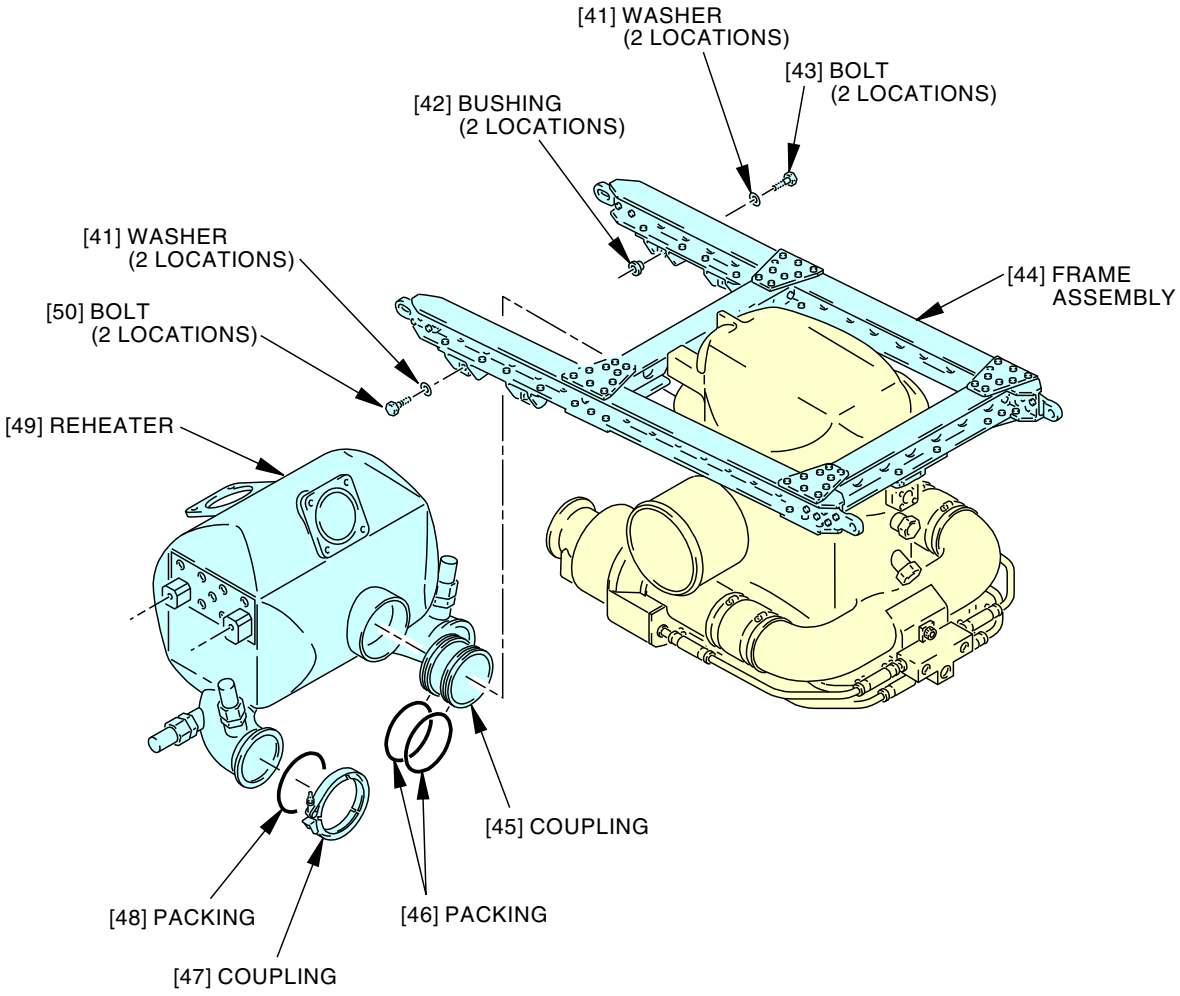
**SUBTASK 21-51-13-480-001**

(4) Put covers on the ducts and lines to keep out unwanted materials.

**END OF TASK**



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**REHEATER**

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**Reheater Installation**
**Figure 401/21-51-13-990-801**



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**TASK 21-51-13-400-801**

## 3. Reheater Installation

Figure 401

### A. References

| Reference | Title |
|---|---|
| 21-51-08-400-801 | High Pressure Water Separator Installation (P/B 401) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-804 | Supply Pressure to the Pneumatic System with One or Both Engines (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Reheater Installation

**SUBTASK 21-51-13-480-002**

(1) Remove the duct and line covers.

**SUBTASK 21-51-13-020-005**

(2) Do these steps to install the coupling [45].

(a) Apply a thin coat of Molykote 44 grease, medium, D50104 or an equivalent to the new packings [46].

(b) Install the new packings [46] on the coupling [45].

(c) Install the coupling [45] in the condenser.

**SUBTASK 21-51-13-020-006**

(3) To install the reheater [49] on the frame assembly [44], do these steps:

(a) Put the bushings [42] in their positions in the frame assembly [44].

(b) Put the reheater [49] in its position in the frame assembly [44].

(c) While you put the reheater [49] in the frame assembly [44], do these steps:

1) Be careful not to damage the new packings [46] as you position the duct on the reheater [49] over the coupling [45].

(d) Install the bolts [43] and the washers [41].

(e) Install the bolts [50] and the washers [41].

**SUBTASK 21-51-13-020-007**

(4) To install the couplings [47] for the water extractors, do these steps:

(a) Apply a thin coat of Molykote 44 grease, medium, D50104 or an equivalent to the new packings [48].



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(b) Put the new packings [48] in their positions on the ducts.

(c) Install the couplings [47] on the ducts.

(d) Tighten the couplings [47] 35 in-lb (3.95 N·m) to 40 in-lb (4.5 N·m).

SUBTASK 21-51-13-410-001

(5) Install the high pressure water separator (High Pressure Water Separator Installation, TASK 21-51-08-400-801).

## E. Reheater Installation Test

SUBTASK 21-51-13-860-002

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET AND EXIT DOORS, LINKAGES AND ACTUATORS BEFORE YOU DO THIS TEST. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-13-780-001

(2) To prepare for a leak check of the reheater [49] installation, do one of the two steps, (a) or (b), that follow:

(a) Supply pneumatic pressure to the packs with the APU as follows:

1) Supply pressure to the pneumatic system with the APU (TASK 36-00-00-860-803).

2) Make sure that the aft outflow valve and a passenger door are open.

3) On the P5-10 Bleed Air Control Module, set the applicable L PACK or R PACK switch to AUTO.

(b) Supply pneumatic pressure to the packs with an engine as follows:

1) Supply pressure to the pneumatic system with one or both engines (TASK 36-00-00-860-804).

2) Make sure that the aft outflow valve and a passenger door are open.

3) On the P5-10 Bleed Air Control Module, set the applicable L PACK or R PACK switch to AUTO.

SUBTASK 21-51-13-790-001

(3) Do a soap bubble test of all the applicable duct joints.

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches in the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps.

3) Make sure that the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches in the AUTO position.

6) Make sure that the leak has been repaired.



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## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-13-860-003**

(1) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L and R PACK switches to the OFF position.

**SUBTASK 21-51-13-860-004**

(2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**——— END OF TASK ———**



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## WATER EXTRACTOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the water extractor

(2) An installation of the water extractor.

(3) The water extractor is a component of the high-pressure water separator (HPWS). There are two water extractors on the HPWS. There is an HPWS for each of the two packs.

**TASK 21-51-14-000-801**

### 2. Water Extractor Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-51-14-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-14-860-002**

(2) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L and R PACK switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(c) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-51-14-010-001**

(3) To get access to the water extractor [1] for the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-14-010-002**

(4) To get access to the water extractor [1] for the right cooling pack, open these access panels in this sequence:



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Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Water Extractor Removal

SUBTASK 21-51-14-020-001

(1) To disconnect the drain lines from the water extractor [1], do these steps:

(a) Remove the clamps [6] that hold the hoses of the drain lines to the water extractor [1].

(b) Remove the screw [3], the washers [4] and the nut [5] that connect the drain line support clamps.

(c) Move the hoses off the water extractor.

SUBTASK 21-51-14-020-002

(2) Remove the clamp [2] that connects the water extractor hose to the condenser duct.

SUBTASK 21-51-14-020-003

(3) Hold the water water extractor [1] while you remove the coupling [7] and packing [8].

(a) Discard the packing [8].

SUBTASK 21-51-14-020-004

(4) Carefully lower the water extractor [1].

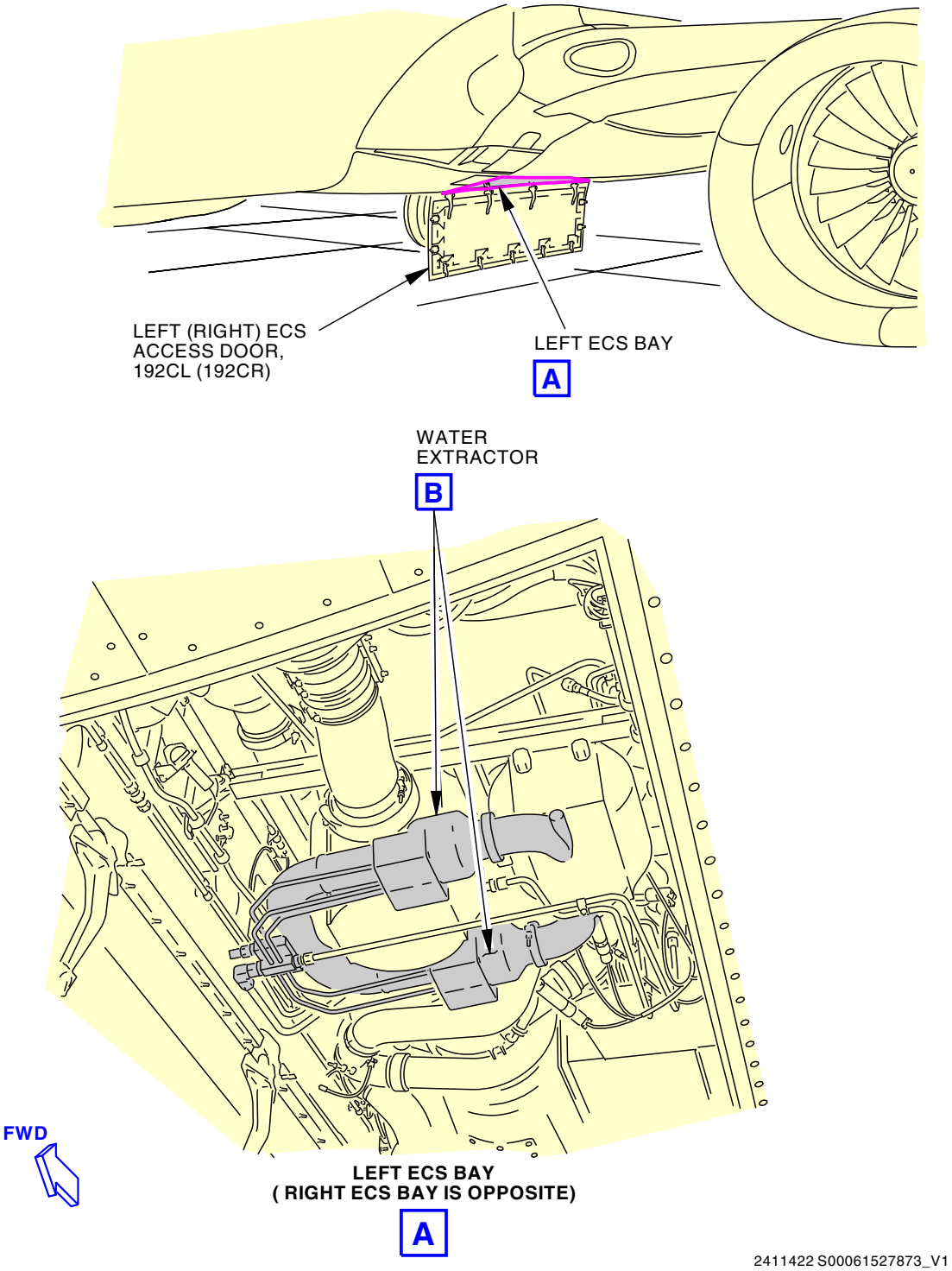
SUBTASK 21-51-14-480-001

(5) Put covers on the ducts and lines to keep out unwanted materials.

——— END OF TASK ———



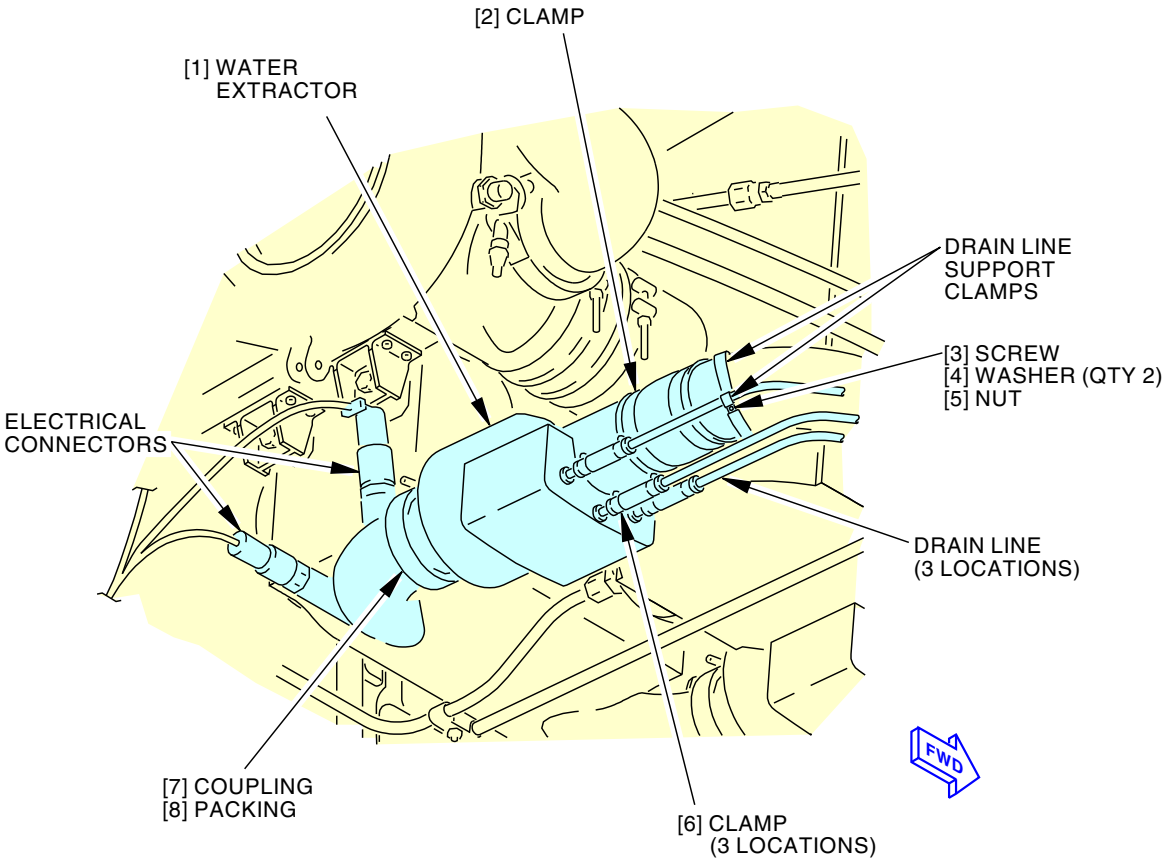
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Water Extractor Installation**
**Figure 401/21-51-14-990-801 (Sheet 1 of 2)**



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**WATER EXTRACTOR (EXAMPLE)**

**B**

2411423 S00061527874_V1

**Water Extractor Installation**
**Figure 401/21-51-14-990-801 (Sheet 2 of 2)**



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**TASK 21-51-14-400-801**

**3. Water Extractor Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-804 | Supply Pressure to the Pneumatic System with One or Both Engines (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Water Extractor Installation**

**SUBTASK 21-51-14-480-002**

(1) Remove the duct and line covers.

**SUBTASK 21-51-14-020-005**

(2) To install the water extractors, do these steps:

(a) Apply a thin coat of Molykote 44 grease, medium, D50104 or an equivalent to the new packing [8].

(b) Put the packing [8] in its position on the duct.

(c) Move the hose over the end of the water extractor [1].

(d) Hold the water extractor [1] in position.

(e) Loosely install the coupling [7].

(f) Loosely install the clamp [2].

**SUBTASK 21-51-14-420-001**

(3) Make sure the water extractor [1] does not touch the condenser.

**SUBTASK 21-51-14-420-002**

(4) Torque the coupling [7] to 40 in-lb (4.52 N·m) to 45 in-lb (5.08 N·m).

**SUBTASK 21-51-14-420-003**

(5) Torque the clamp [2] to 16 in-lb (1.81 N·m) to 18 in-lb (2.03 N·m).



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SUBTASK 21-51-14-020-006

(6) To install the drain lines on the water extractor [1], do these steps:

(a) Put the hoses on the drain ports of the water extractor [1].

(b) Install the clamps [6] that hold the hoses of the drain lines to the water extractor [1].

(c) Install the screw [3], the washers [4] and the nut [5] that connect the drain line support clamps.

## F. Water Extractor Installation Test

SUBTASK 21-51-14-860-003

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET AND EXIT DOORS, LINKAGES AND ACTUATORS BEFORE YOU DO THIS TEST. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-14-780-001

(2) To prepare for a leak check of the water extractor [1] installation, do one of the two steps, (a) or (b), that follow:

(a) Supply pneumatic pressure to the packs with the Auxiliary Power Unit (APU) as follows:

1) Supply pressure to the pneumatic system with the APU(TASK 36-00-00-860-803).

2) Make sure that the aft outflow valve and a passenger door are open.

3) Set the applicable L PACK or R PACK switch on the P5-10 Bleed Air Control Module to AUTO.

(b) Supply pneumatic pressure to the packs with an engine as follows:

1) Supply pressure to the pneumatic system with one or both engines as follows: (TASK 36-00-00-860-804).

2) Make sure that the aft outflow valve and a passenger door are open.

3) Set the applicable L PACK or R PACK switch on the P5-10 Bleed Air Control Module to AUTO.

SUBTASK 21-51-14-790-001

(3) Do a soap bubble test of all the applicable duct joints.

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches in the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps.

3) Make sure the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches in the AUTO position.

6) Make sure the leak has been repaired.



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## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-14-860-004

(1) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L and R PACK switches to the OFF position.

SUBTASK 21-51-14-860-005

(2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-14-410-001

(3) If the water extractor for the right cooling pack was removed, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-14-410-002

(4) If the water extractor for the left cooling pack was removed, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

——— END OF TASK ———



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## WATER EXTRACTOR DUCT - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the water extractor duct.

(2) An installation of the water extractor duct.

(3) There is a water extractor duct installed for each of the two air conditioning packs.

**TASK 21-51-15-000-801**

### 2. Water Extractor Duct Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-51-15-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-15-860-002**

(2) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the L and R PACK switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(c) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-51-15-010-001**

(3) To get access to the water extractor duct [1] for the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-15-010-002**

(4) To get access to the water extractor duct [1] for the right cooling pack, open these access panels in this sequence:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |



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Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Water Extractor Duct Removal

SUBTASK 21-51-15-020-001

(1) To disconnect the water extractor duct drain line [5] for the water extractor duct [1], do these steps:

(a) Remove the screw [2], the washer [3], and the nut [4] that connect the drain line clamps together.

(b) Loosen the b-nut [13] to disconnect the drain line.

(c) Remove the union [12].

(d) Remove and discard the o-ring [11].

SUBTASK 21-51-15-020-002

(2) Do these steps to remove the coupling assembly:

(a) Remove the clamp [7].

(b) Move the sleeve [8] to the adjacent duct.

(c) Move the ring [10] to the adjacent duct.

(d) Remove the retainer [9].

SUBTASK 21-51-15-020-003

(3) Hold the water extractor duct [1] while you remove the clamp [6].

SUBTASK 21-51-15-020-004

(4) Carefully lower the water extractor duct [1].

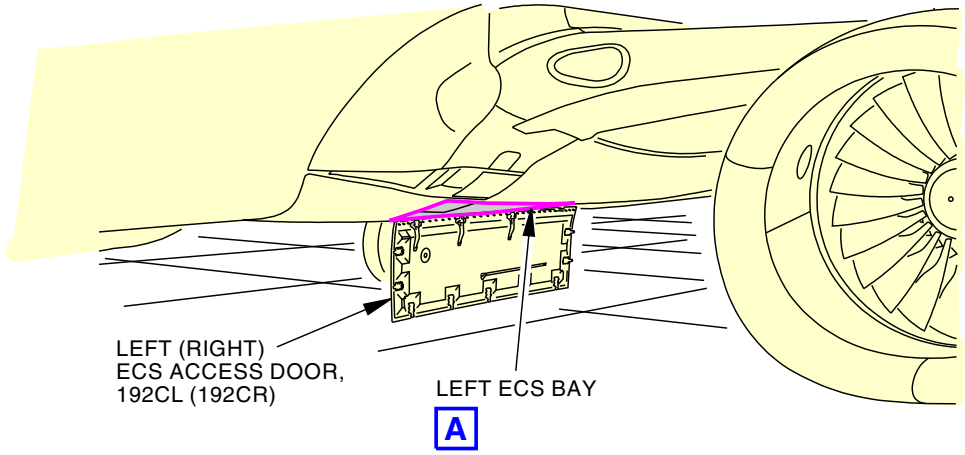
SUBTASK 21-51-15-480-001

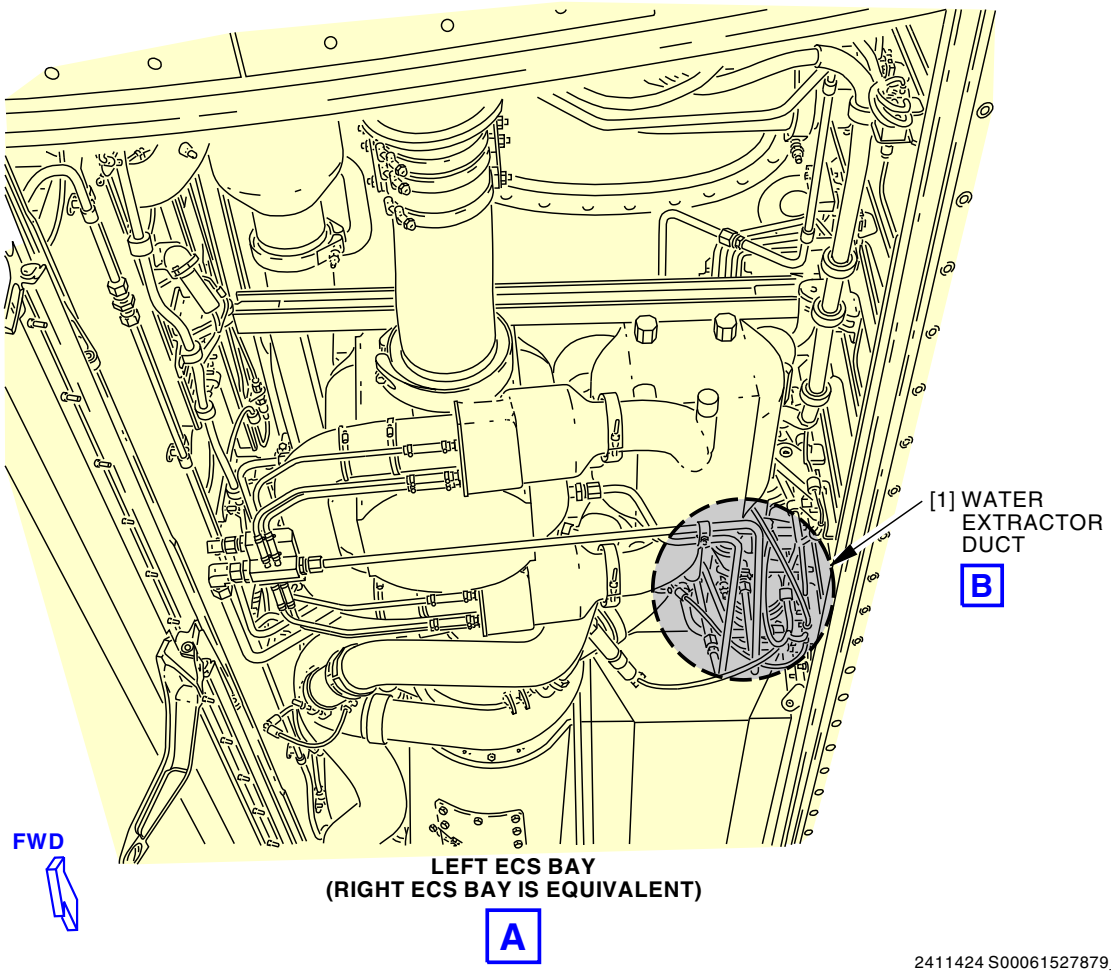
(5) Put covers on the ducts and lines to keep out unwanted materials.

**END OF TASK**



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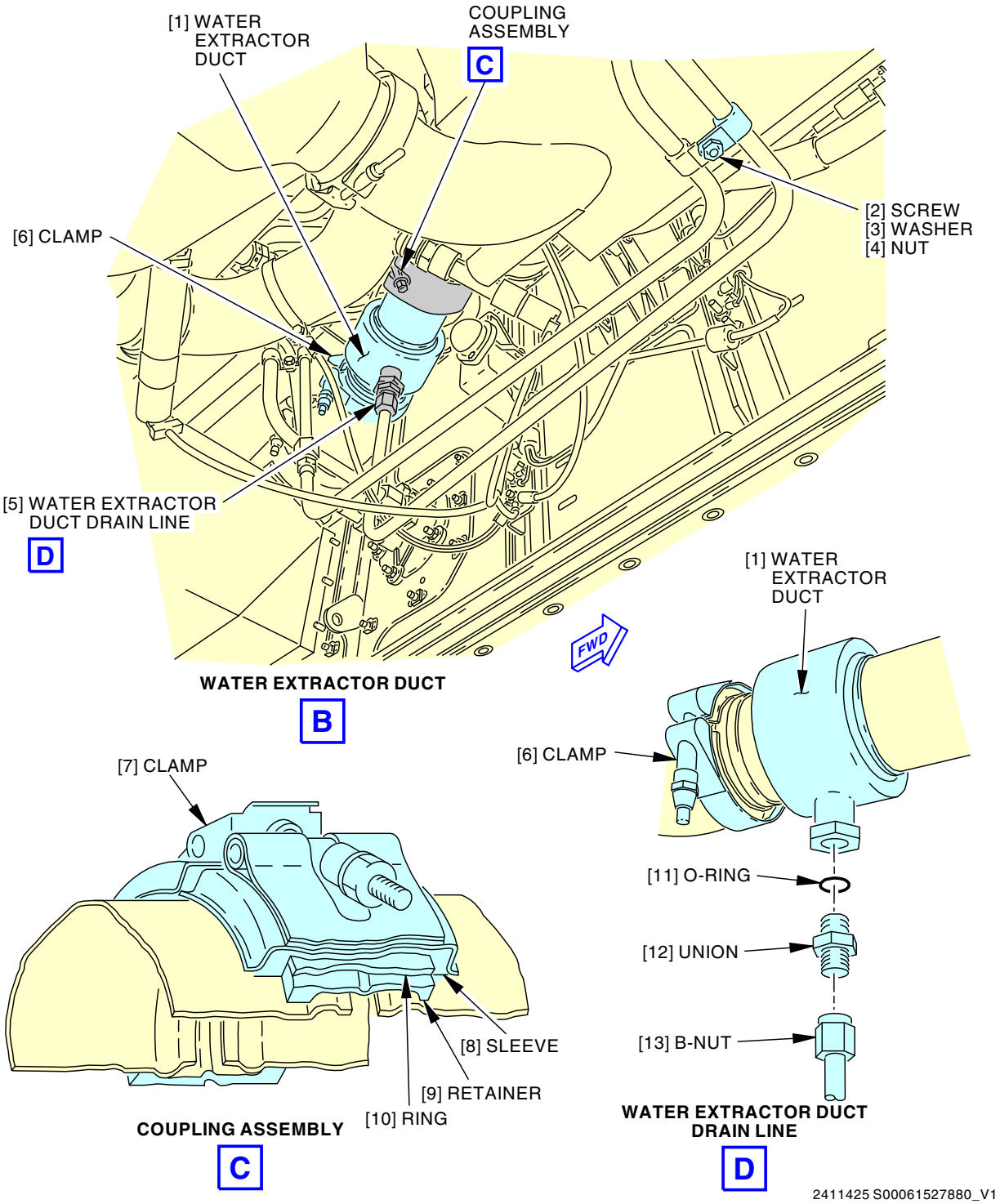



**Water Extractor Duct Installation**
**Figure 401/21-51-15-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Water Extractor Duct Installation**
**Figure 401/21-51-15-990-801 (Sheet 2 of 2)**



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**TASK 21-51-15-400-801**

## 3. Water Extractor Duct Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Water extractor duct | 21-51-08-01-165 | SIA ALL |
| | | 21-51-08-05-180 | SIA ALL |
| 11 | O-ring | 21-51-08-01-150 | SIA ALL |
| | | 21-51-08-05-165 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Water Extractor Duct Installation

**SUBTASK 21-51-15-480-002**

(1) Remove the duct and line covers.

**SUBTASK 21-51-15-020-005**

(2) To install the water extractor duct [1], do these steps:

(a) Hold the water extractor duct [1] in its position.

1) Make sure that the flow arrow on the water extractor duct [1] points in the forward direction.

(b) Loosely install the clamp [6].

(c) Install the retainer [9] that holds the water extractor duct [1] to the adjacent duct.

(d) Move the ring [10] over the retainer [9].

(e) Move the sleeve [8] over the ring [10].

(f) Install the clamp [7] over the sleeve [8].

(g) Tighten the clamp [7] 90 in-lb (10.2 N·m) to 95 in-lb (10.7 N·m).

(h) Tighten the clamp [6] 55 in-lb (6.2 N·m) to 60 in-lb (6.8 N·m).



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SUBTASK 21-51-15-020-006

(3) To connect the water extractor duct drain line [5] to the water extractor duct [1], do these steps:

(a) Install a new o-ring [11] on the union [12].

(b) Apply a thin coating of Never-Seez NSBT compound, D00006 to the threads of the union [12].

(c) Install the union [12] on the water extractor duct [1].

(d) Tighten the b-nut [13] to connect the drain line to the duct.

(e) Install the screw [2], the washer [3], and the nut [4] that hold the drain line clamps together.

## G. Water Extractor Duct Installation Test

SUBTASK 21-51-15-860-003

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET AND EXIT DOORS, LINKAGES AND ACTUATORS BEFORE YOU DO THIS TEST. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-15-860-004

(2) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-15-860-005

(3) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):

(a) Set the applicable L or R PACK switch to the AUTO position.

(b) Set the BLEED 1 and 2 switches to the ON position.

(c) Set the BLEED APU switch to the ON position.

SUBTASK 21-51-15-790-001

(4) Do a soap bubble test of all the applicable duct joints.

NOTE: No leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches in the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps.

3) Make sure the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches in the AUTO position.

6) Make sure that the leak has been repaired.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-15-860-006

(1) Do these steps on the P5-10 Bleed Air Control Module (located on the P5 Forward Overhead Panel):



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(a) Set the L and R PACK switches to the OFF position.

SUBTASK 21-51-15-410-001

(2) If the water extractor duct for the right cooling pack was removed, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-15-410-002

(3) If the water extractor duct for the left cooling pack was removed, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-15-860-007

(4) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**END OF TASK**



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## WATER SPRAY NOZZLE - REMOVAL/INSTALLATION

**TASK 21-51-16-000-801**

### 1. Water Spray Nozzle Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### D. Prepare for the Removal

**SUBTASK 21-51-16-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-16-010-001**

(2) Do these steps to get access to the water spray nozzle [1] for the left cooling pack:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

**SUBTASK 21-51-16-010-002**

(3) Do these steps in the specified sequence to get access to the water spray nozzle [1] for the right cooling pack:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |



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SUBTASK 21-51-16-010-003

(4) Remove the access panel on the bottom of the ram air inlet duct:

(a) Remove the screws [3] and the washers [4], at 20 locations.

(b) Carefully remove the ram air inlet access panel [2].

## E. Water Spray Nozzle Removal

SUBTASK 21-51-16-020-001

(1) To disconnect the water line from the water spray nozzle, do these steps:

(a) Loosen the b-nut on the water line.

(b) Remove the union [5] from the water spray nozzle.

(c) Remove and discard the o-ring [6].

SUBTASK 21-51-16-020-002

(2) To disconnect the air line from the water spray nozzle, do these steps:

(a) Loosen the b-nut on the air line.

(b) Remove the union [10].

(c) Remove and discard the o-ring [9].

SUBTASK 21-51-16-020-003

(3) To remove the water spray nozzle [1], do these steps:

(a) Remove the bolts [11], the washers [8] and the nuts [7], at five locations.

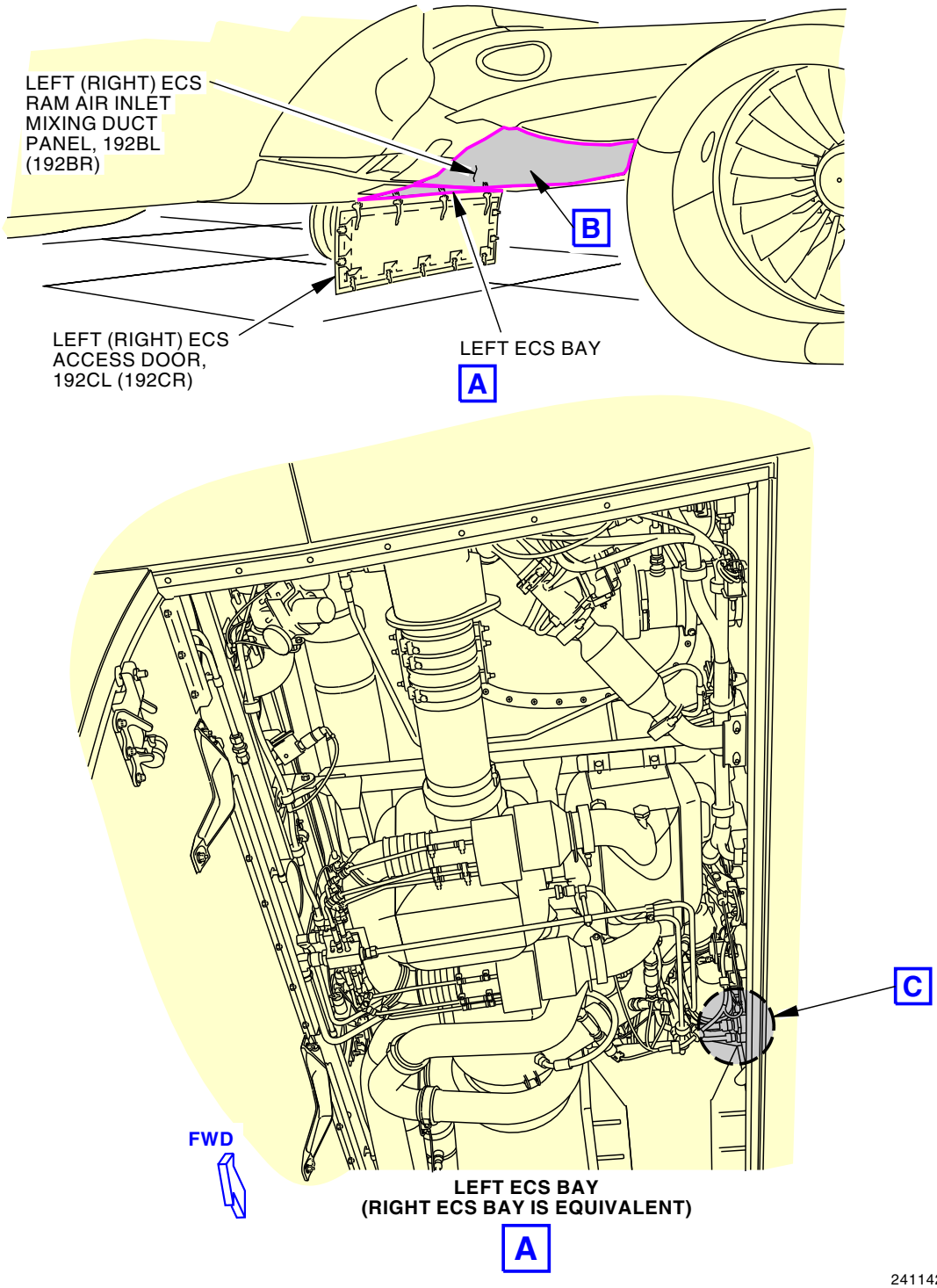
NOTE: You must reach through the access hole in the ram air inlet to access the bolt [11] and washer [8].

(b) Remove the water spray nozzle [1].

**END OF TASK**



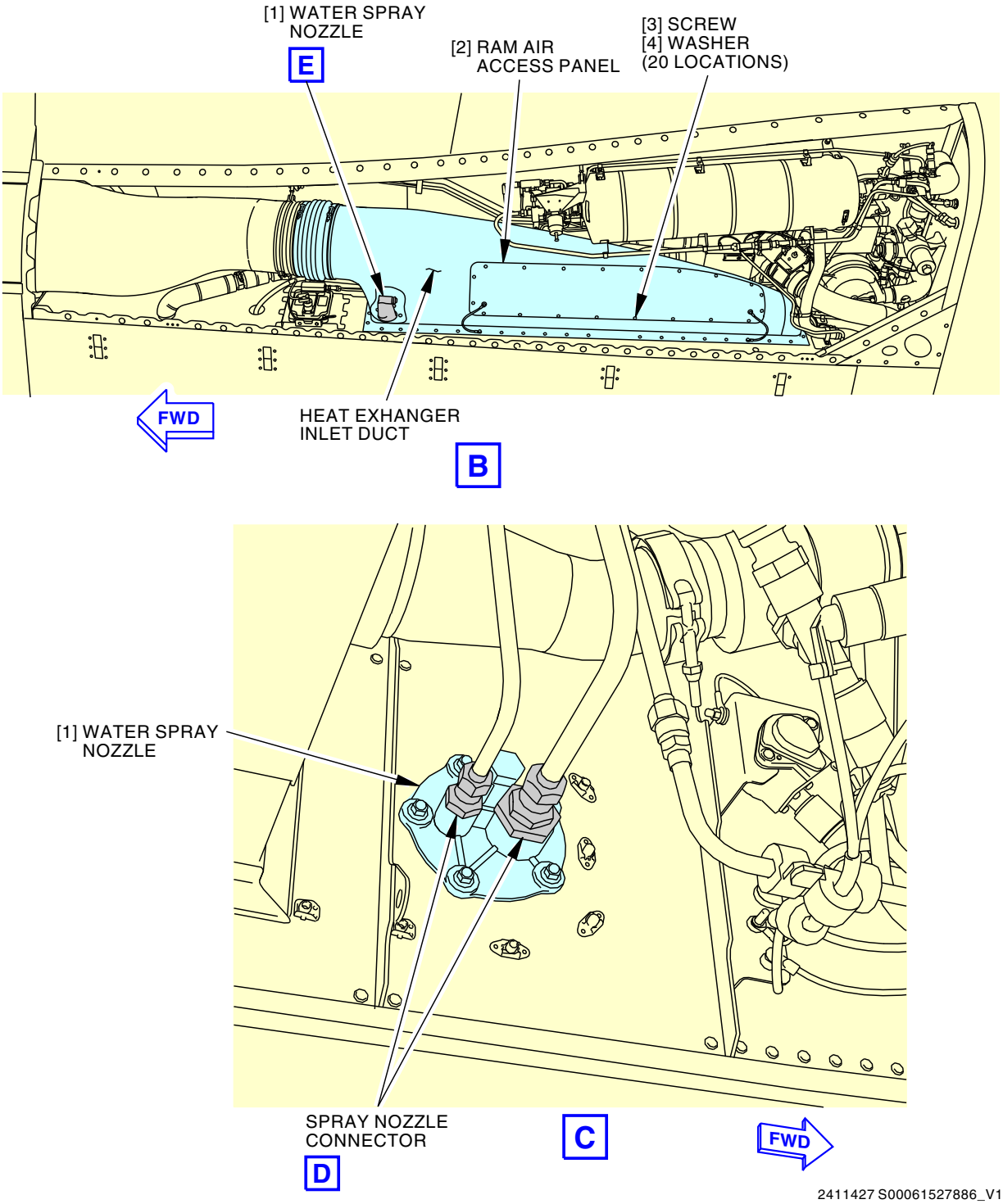
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**Water Spray Nozzle Installation**
**Figure 401/21-51-16-990-801 (Sheet 1 of 3)**



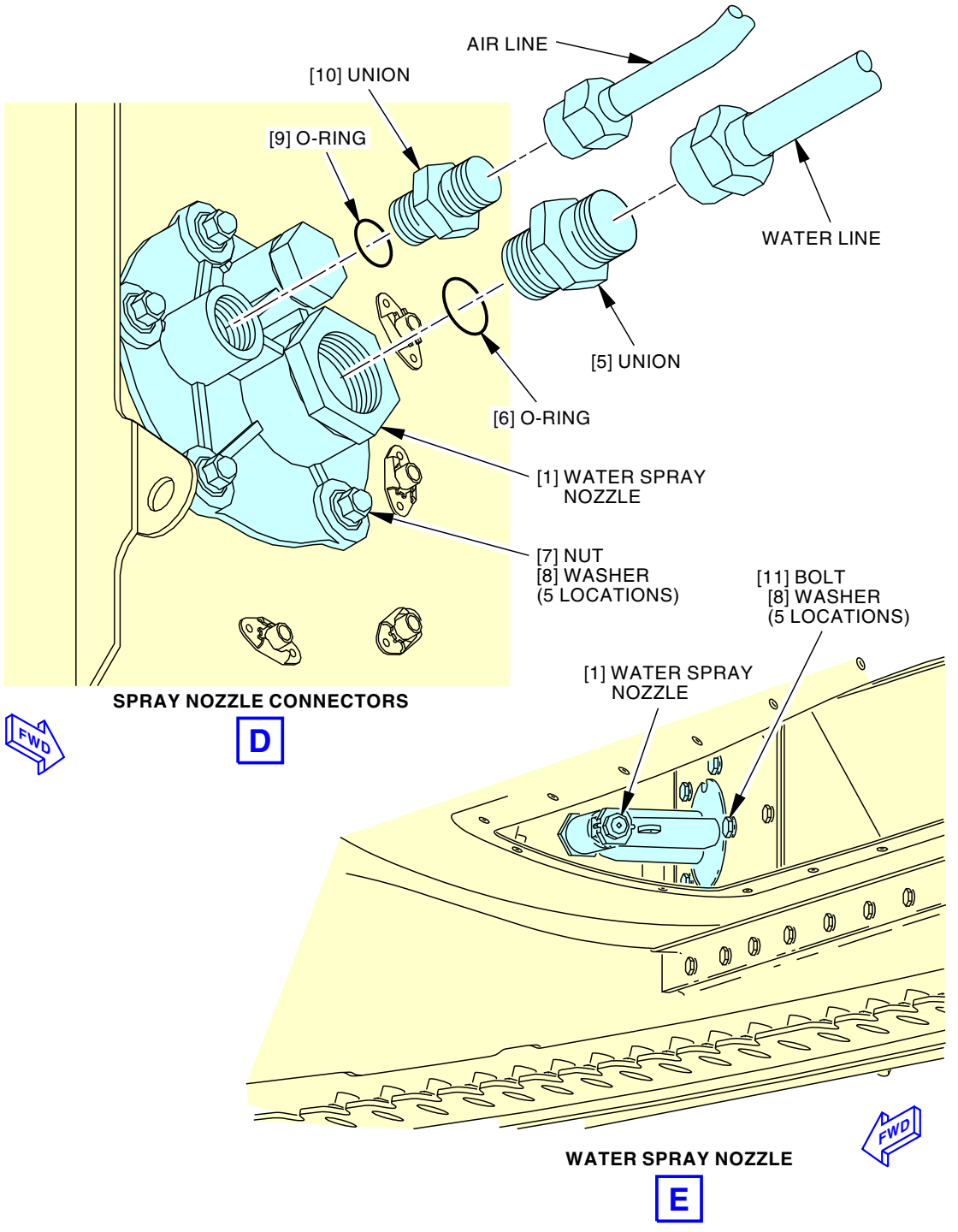
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**Water Spray Nozzle Installation**
**Figure 401/21-51-16-990-801 (Sheet 2 of 3)**



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**Water Spray Nozzle Installation**
**Figure 401/21-51-16-990-801 (Sheet 3 of 3)**



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**TASK 21-51-16-400-801**

## 2. Water Spray Nozzle Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Nozzle | 21-51-16-01-040 | SIA ALL |
| | | 21-51-16-02-040 | SIA ALL |
| 6 | O-ring | 21-51-16-01-080 | SIA ALL |
| | | 21-51-16-02-080 | SIA ALL |
| 9 | O-ring | 21-51-16-01-075 | SIA ALL |
| | | 21-51-16-02-075 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Water Spray Nozzle Installation

**SUBTASK 21-51-16-420-001**

(1) To install the water spray nozzle, do these steps:

(a) Put the water spray nozzle [1] in its position.

(b) Install the bolts [11], the washers [8] and the nuts [7], at five locations.

**SUBTASK 21-51-16-020-004**

(2) To connect the water line to the water spray nozzle, do these steps:

(a) Install a new o-ring [6] on the union [5].

(b) Apply a thin layer of Never-Seez NSBT compound, D00006 to the threads of the union [5].

(c) Install the union [5] on the water spray nozzle.

(d) Connect the water line to the water spray nozzle.



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SUBTASK 21-51-16-020-005

(3) To connect the air line to the water spray nozzle, do these steps:

(a) Install a new o-ring [9] on the union [10].

(b) Apply a thin layer of Never-Seez NSBT compound, D00006 to the threads of the union [10].

(c) Install the union [10] on the water spray nozzle.

(d) Connect the air line to the water spray nozzle.

## G. Water Spray Nozzle - Post Installation Test

SUBTASK 21-51-16-860-002

(1) Do this task:(Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801).

SUBTASK 21-51-16-860-003

(2) Set the L(R) PACK switches to HIGH on the P5-10 overhead panel.

SUBTASK 21-51-16-860-004

(3) Set the trim air switch to the ON position.

SUBTASK 21-51-16-860-005

(4) Set the CONT CAB, FWD CAB and AFT CAB zone temperature selectors to the AUTO-C (fully cold) position.

SUBTASK 21-51-16-710-001

(5) Use a flashlight to see that a spray of air and water comes of the L(R) water spray nozzle.

NOTE: The quantity of water is a function of the air humidity and the pack air flow.

SUBTASK 21-51-16-860-006

(6) Set the CONT CAB, FWD CAB and AFT CAB zone temperature selectors to the OFF position.

SUBTASK 21-51-16-860-007

(7) Set the trim air switch to the OFF position.

SUBTASK 21-51-16-860-008

(8) Set the L(R) PACK switches to the OFF position.

SUBTASK 21-51-16-860-009

(9) Do this task:Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806).

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-16-410-001

(1) Install the access panel on the ram air inlet duct:

(a) Examine the gasket on the ram air inlet access panel [2].

(b) Replace the gasket if it is damaged or deteriorated.

(c) Hold the ram air inlet access panel [2] in its position while you install the screws [3] and the washers [4], at 20 locations.

SUBTASK 21-51-16-410-002

(2) Do these steps if you installed the water spray nozzle [1] for the left cooling pack:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



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Close this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-16-410-003

(3) Do these steps, in the specified sequence, if you installed the water spray nozzle [1] for the right cooling pack:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

——— END OF TASK ———



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## WATER SPRAY NOZZLE - INSPECTION/CHECK

**TASK 21-51-16-200-801**

**1. Water Spray Nozzle Check**

Figure 601

**A. General**

(1) This procedure has instructions to do a check of the water spray nozzle and water spray lines of each pack. If these components have blockage, the Air Cycle Machine can get ice.

**B. References**

| Reference | Title |
|---|---|
| 21-51-16-000-801 | Water Spray Nozzle Removal (P/B 401) |
| 21-51-16-400-801 | Water Spray Nozzle Installation (P/B 401) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**C. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-123 | Brush - Soft Bristle |

**D. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B50117 | Detergent - General | |
| B50126 | Solvent - Degreasing, General Purpose | MIL-PRF-680 |
| G50256 | Water, Regular | |

**E. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Prepare for the Check**

**SUBTASK 21-51-16-010-004**

(1) Do these steps to get access to the water spray nozzle for the left cooling pack:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

Open this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-16-010-005

(2) Do these steps in the specified sequence to get access to the water spray nozzle for the right cooling pack:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-16-860-010

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

## H. Water Spray Nozzle Check

SUBTASK 21-51-16-860-011

(1) Supply pneumatic pressure to the pneumatic system with the APU. Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

SUBTASK 21-51-16-860-012

(2) Set the L(R) PACK switches to HIGH on the P5-10 overhead panel.

SUBTASK 21-51-16-860-013

(3) Set the trim air switch to the ON position.

SUBTASK 21-51-16-860-014

(4) Set the CONT CAB, FWD CAB and AFT CAB zone temperature selectors to the AUTO-C (fully cold) position.

SUBTASK 21-51-16-210-001

(5) Use a flashlight to see that a spray of air and water comes of the L(R) water spray nozzle.

NOTE: The quantity of water is a function of the air humidity and the pack air flow.

(a) Make sure the water spray pattern from each spray nozzle is approximately the same.

(b) Make sure the water sprays are approximately circular and are continuous.

(c) If the water sprays are not satisfactory, do the following steps to examine these parts for leakage or blockage:

1) The water collector manifold
2) The water extractor
3) The water extractor duct
4) The water spray nozzle
5) The air and water supply lines from the water extractor to the water spray nozzle.



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SUBTASK 21-51-16-860-015

(6) Set the L(R) PACK switches to the OFF position.

SUBTASK 21-51-16-210-002

(7) Check the water collection manifold for leakage or blockage.

(a) Disconnect the water output port line [2] at the water collection manifold.

(b) Set the L(R) PACK switches to HIGH on the P5-10 overhead panel.

(c) Feel for air or water to come out of the hole in the water collection manifold where you removed the line.

(d) If there is no air or water, examine the water collection manifold for leakage or blockage.

SUBTASK 21-51-16-420-002

(8) Connect the water output port line [2] at the water collection manifold.

SUBTASK 21-51-16-860-016

(9) Set the L(R) PACK switches to the OFF position.

SUBTASK 21-51-16-210-003

(10) Check the water extractor for leakage or blockage.

(a) Disconnect the water drain lines [1] at each water drain nipple of the water extractors.

(b) Set the L(R) PACK switches to HIGH on the P5-10 overhead panel.

(c) Feel for air or water to come out of the hole in the water extractor where you removed the line.

(d) If there is no air or water, examine the water extractor for leakage or blockage.

SUBTASK 21-51-16-420-003

(11) Connect the water drain lines [1] at each water drain nipple of the water extractors.

SUBTASK 21-51-16-860-017

(12) Set the L(R) PACK switches to the OFF position.

SUBTASK 21-51-16-210-004

(13) Check the water extractor duct for leakage or blockage.

(a) Disconnect the drain line [3] at the water extractor duct.

(b) Set the L(R) PACK switches to HIGH on the P5-10 overhead panel.

(c) Feel for air or water to come out of the hole in the water extractor duct where you removed the line.

(d) If there is no air or water, examine the water extractor duct for leakage or blockage.

SUBTASK 21-51-16-420-004

(14) Connect the drain line [3] at the water extractor duct.

SUBTASK 21-51-16-110-001

(15) If the water spray nozzle is blocked or clogged, do the steps that follow to clean the nozzle:

(a) Remove the nozzle from the airplane. Do this task: Water Spray Nozzle Removal, TASK 21-51-16-000-801.

(b) Soak the nozzle assembly in solvent degreasing solvent, B50126.

(c) Use compressed air to blow out loose particles from the nozzle.

(d) Do steps (b) and (c) again if necessary to clean the inner areas of the nozzle.

(e) Use a soft bristle brush, STD-123 to remove external particles from the nozzle.



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(f) Soak the nozzle in general detergent, B50117 and water, G50256 to remove the solvent.

(g) Dry the nozzle with compressed air.

(h) Examine the nozzle to make sure that there is no external damage.

(i) Use a low pressure air source of between 0.5 psi (34.5 mBar) to 1 psi (69 mBar) to blow air through the nozzle.

1) Make sure that air flows freely through the air inlet and water inlet.

(j) Install the nozzle. Do this task: Water Spray Nozzle Installation, TASK 21-51-16-400-801.

## I. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-16-860-018**

(1) Set the CONT CAB, FWD CAB and AFT CAB zone temperature selectors to the OFF position.

**SUBTASK 21-51-16-860-019**

(2) Set the L(R) PACK switches to the OFF position.

**SUBTASK 21-51-16-860-020**

(3) Set the trim air switch to the OFF position.

**SUBTASK 21-51-16-860-021**

(4) Remove the pneumatic pressure. Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-16-410-004**

(5) Do these steps if you installed the water spray nozzle for the left cooling pack:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

**SUBTASK 21-51-16-410-005**

(6) Do these steps, in the specified sequence, for the right cooling pack:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

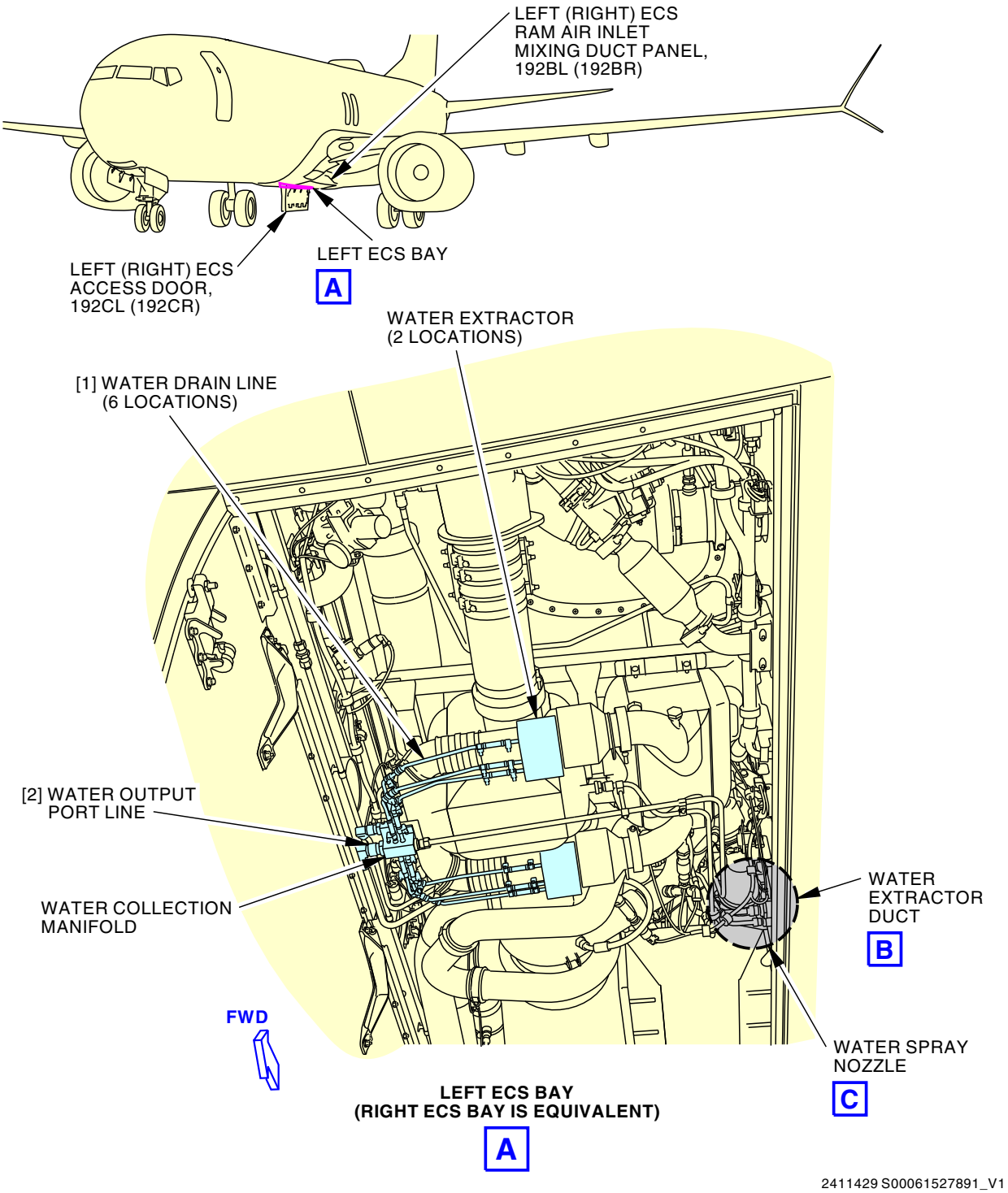
Close this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

**END OF TASK**



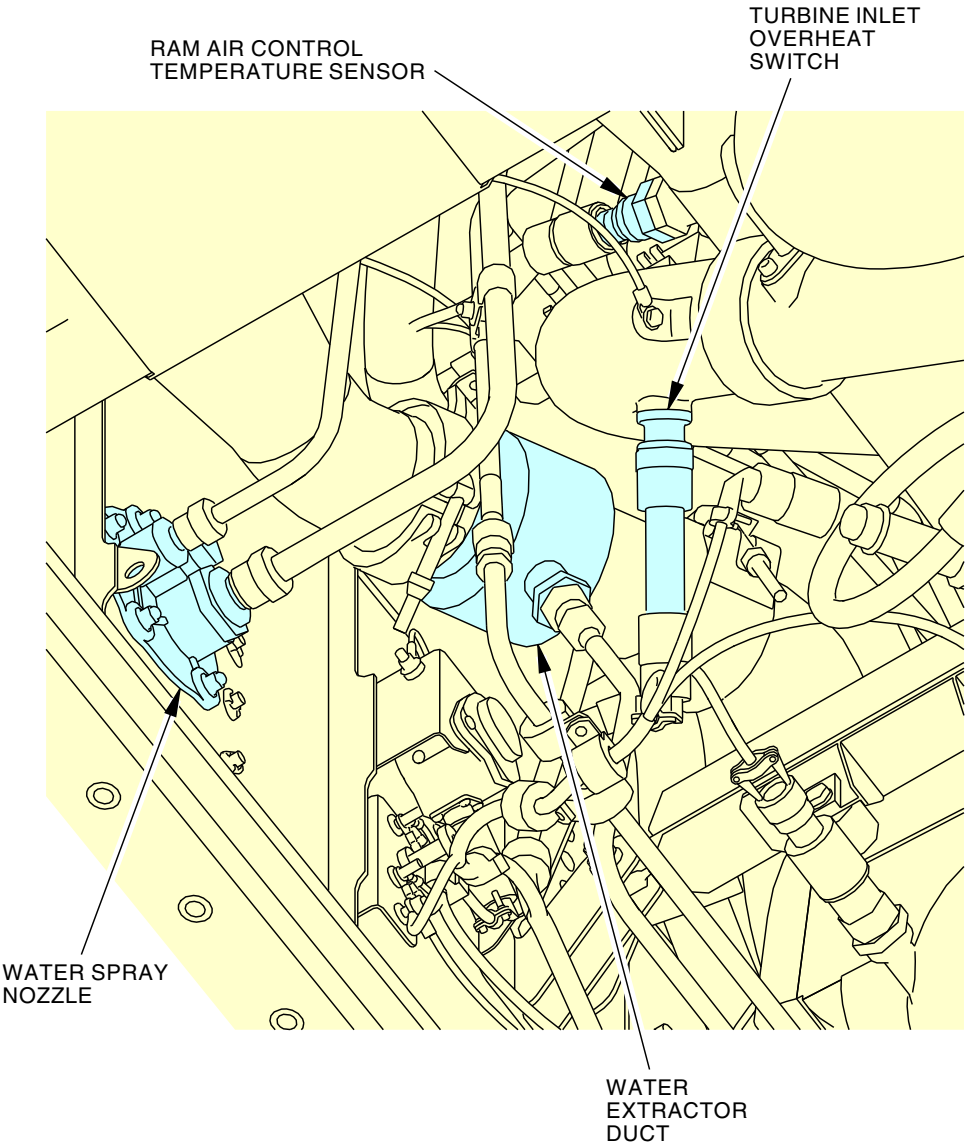
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**Water Spray Nozzle Check**
**Figure 601/21-51-16-990-802 (Sheet 1 of 3)**



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**WATER EXTRACTOR DUCT**

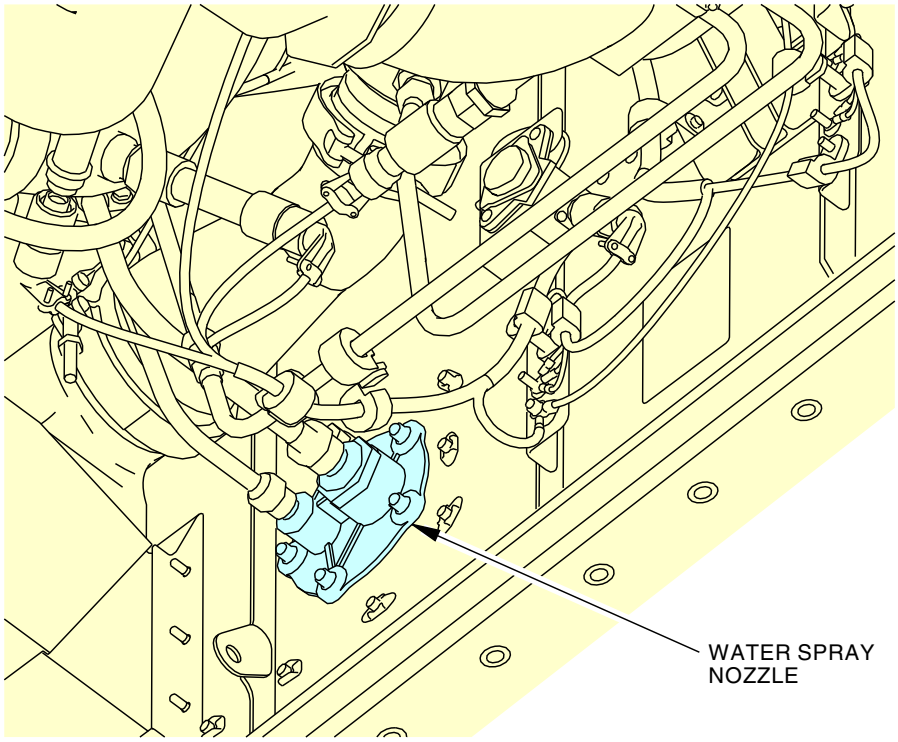
**B**

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**Water Spray Nozzle Check**
**Figure 601/21-51-16-990-802 (Sheet 2 of 3)**



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**WATER SPRAY NOZZLE**

C

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**Water Spray Nozzle Check**
**Figure 601/21-51-16-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## HIGH PRESSURE WATER SEPARATOR MIX MUFF - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the high pressure water separator mix muff.

(2) An installation of the high pressure water separator mix muff.

**TASK 21-51-17-000-801**

### 2. High Pressure Water Separator Mix Muff Removal

(Figure 401)

#### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### D. Prepare for the Removal

**SUBTASK 21-51-17-860-003**

(1) Set switches on the P5-10 panel on the forward overhead panel to these positions:

(a) L and R PACK switches to OFF position.

1) Attach a DO NOT OPERATE tag, STD-858.

(b) BLEED 1 and BLEED 2 switches to OFF position.

1) Attach the DO NOT OPERATE tag, STD-858.

(c) BLEED APU switch to OFF position.

1) Attach the DO NOT OPERATE tag, STD-858.

**SUBTASK 21-51-17-010-001**

(2) To get access to the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-17-010-002**

(3) To get access to the right cooling pack, open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**SUBTASK 21-51-17-020-001**

(4) To get access to the mix muff [16], remove the compressor outlet duct [3], do these steps:



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**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(a) Disconnect the electrical connector [1] from the compressor outlet overheat switch.

(b) Disconnect the electrical connector [2] from the ram air control temperature sensor.

(c) Remove the flexhose [9] from the compressor outlet duct [3].

(d) Remove the clamshell clamp [6].

(e) Remove the sleeve [7] from the compressor outlet duct [3].

**CAUTION** HOLD THE DUCT WHEN YOU LOOSEN THE CLAMP. THE DUCT CAN FALL WHEN THE CLAMP IS LOOSE. THE DUCT CAN BE DAMAGED IF IT FALLS.

(f) Remove the clamp [4] that holds the compressor outlet duct [3] to the heat exchanger.

(g) Remove the compressor outlet duct [3].

(h) Remove and discard the o-rings [8].

(i) Remove and discard the packing [5].

## E. Mix Muff Removal

SUBTASK 21-51-17-020-002

(1) To remove the mix muff [16], do these steps:

(a) Disconnect the flexhose [10] from the mix muff [16].

(b) Loosen the clamps [14] that attach the flexible duct [15] to the mix muff [16].

(c) Move the flexible duct [15] off the mix muff [16].

(d) Remove the clamp [13].

**CAUTION** HOLD THE MIX MUFF WHEN YOU LOOSEN THE CLAMP. THE MIX MUFF CAN FALL WHEN THE CLAMP IS LOOSE. THE MIX MUFF CAN BE DAMAGED IF IT FALLS.

(e) Loosen the clamp [11] that attaches the mix muff [16] to the air cycle machine.

(f) Remove the mix muff [16].

(g) Remove and discard the packing [12].

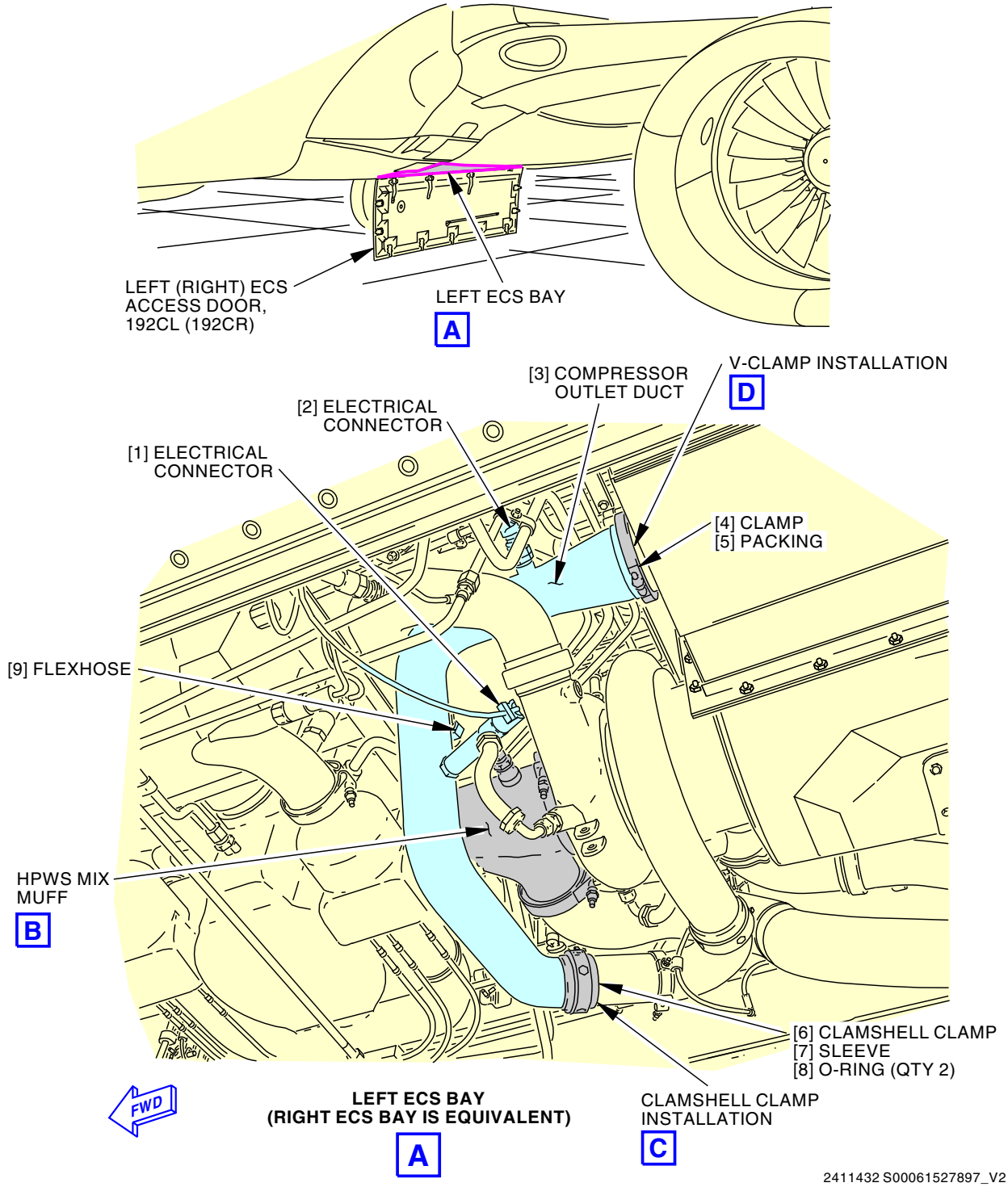
SUBTASK 21-51-17-620-001

(2) Put covers on the duct openings to prevent the entry of unwanted materials.

**END OF TASK**



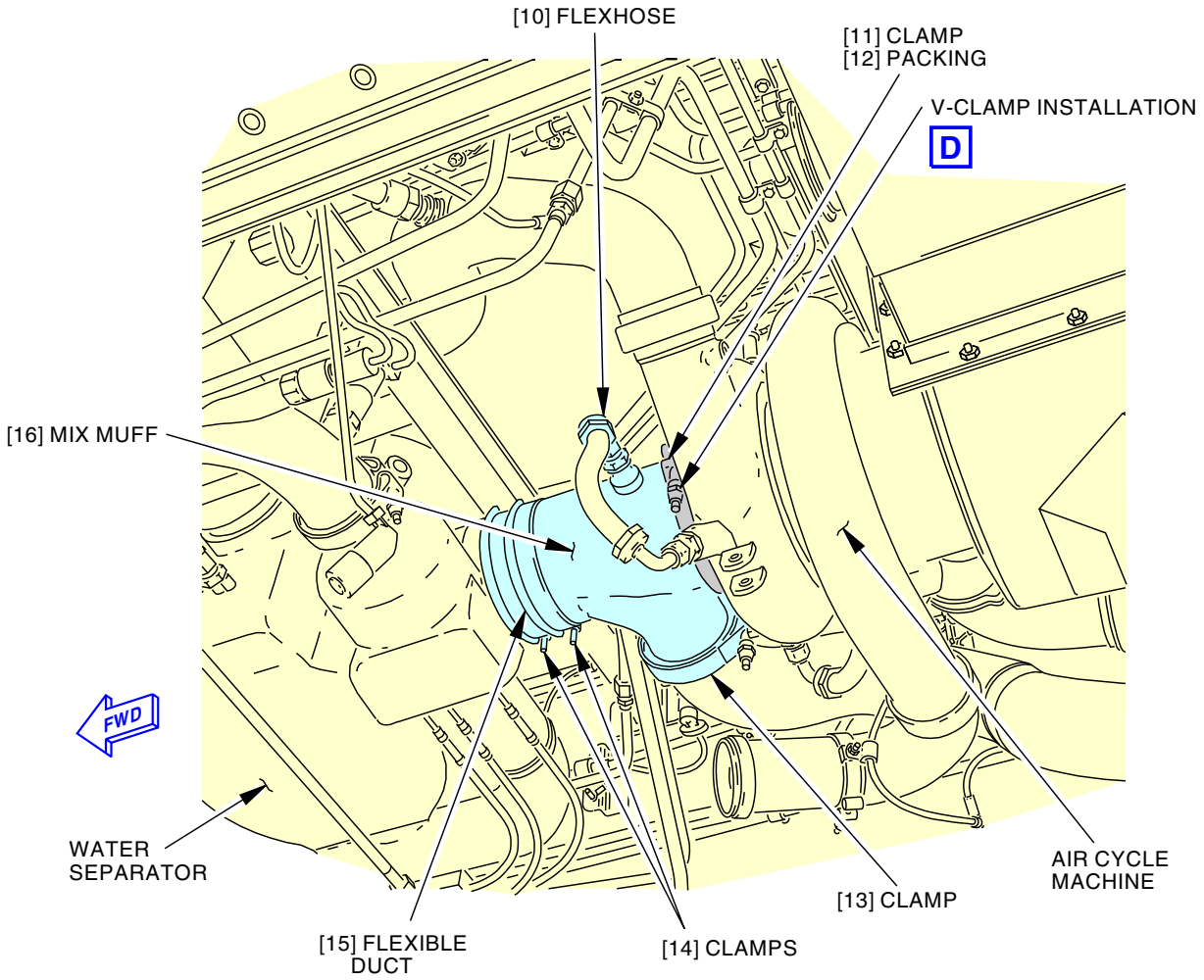
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**High Pressure Water Separator (HPWS) Mix Muff Installation**
**Figure 401/21-51-17-990-801 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**HPWS MIX MUFF**

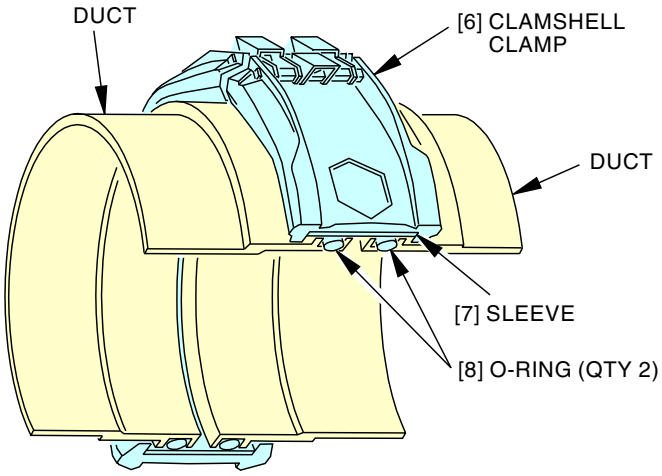
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**High Pressure Water Separator (HPWS) Mix Muff Installation**
**Figure 401/21-51-17-990-801 (Sheet 2 of 3)**

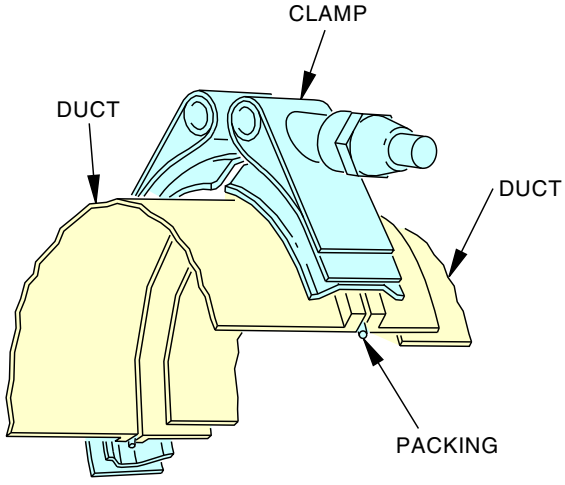


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**CLAMSHELL CLAMP INSTALLATION**

**C**




**V-CLAMP INSTALLATION (EXAMPLE)**

**D**

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**High Pressure Water Separator (HPWS) Mix Muff Installation**
**Figure 401/21-51-17-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-17-400-801**

**3. High Pressure Water Separator Mix Muff Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00504 | Grease - Petrolatum | VV-P-236 |
| D00602 | Lubricant - Fluorinated | BMS3-25 |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 5 | Packing | 21-51-03-02-040 | SIA ALL |
| | | 21-51-03-02-200 | SIA ALL |
| 8 | O-ring | 21-51-03-02-055 | SIA ALL |
| | | 21-51-03-02-210 | SIA ALL |
| 12 | Packing | 21-51-17-02-015 | SIA ALL |
| | | 21-51-17-08-015 | SIA ALL |
| 16 | Mix muff | 21-51-17-02-040 | SIA ALL |
| | | 21-51-17-08-040 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**F. Mix Muff Installation**

**SUBTASK 21-51-17-630-001**

(1) Remove the duct covers.

**SUBTASK 21-51-17-020-003**

(2) To install the mix muff [16], do these steps:

(a) Lubricate the new packing [12] with lubricant, D00602.

(b) Install the new packing [12].

(c) Put the mix muff [16] into its position between the ducts.



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1) Hold the mix muff [16] in position when you install the clamps.

NOTE: The duct connections are not self aligning.

(d) Install the clamp [11] that holds the mix muff [16] to the air cycle machine.

1) Do not fully tighten the clamp [11].

(e) Install the clamp [13] that holds the mix muff [16] to the temperature control duct.

1) Do not fully tighten the clamp [13].

(f) Move the flexible duct [15] on the mix muff [16].

(g) Install the clamps [14] on the flexible duct [15].

(h) Tighten the clamps [14] to 15 ±2 in-lb (1.7 ±0.2 N·m).

(i) Tighten the clamp [11] to 62.5 ±2.5 in-lb (7.1 ±0.3 N·m).

(j) Tighten the clamp [13] to 62.5 ±2.5 in-lb (7.1 ±0.3 N·m).

(k) Apply a light coating of Never-Seez NSBT compound, D00006, to the threads of the flexhose [10].

(l) Install the flexhose [10] on the mix muff [16].

## G. Compressor Outlet Duct Installation

**SUBTASK 21-51-17-020-004**

(1) To install the compressor outlet duct [3], do these steps:

(a) Apply a light coat of grease, D00504, or Molykote 44 grease, medium, D50104, to the packing [5] and o-rings [8].

(b) Install the new packing [5].

(c) Install the new o-rings [8] on the duct ends.

(d) Put the compressor outlet duct [3] into its position.

1) Hold the compressor outlet duct [3] in position when you install the clamps.

NOTE: The duct connections are not self aligning.

(e) Install the clamp [4] that holds the compressor outlet duct [3] to the heat exchanger.

1) Do not fully tighten the clamp [4].

(f) Install the sleeve [7] over the duct ends.

(g) Install the clamshell clamp [6].

(h) Tighten the clamp [4] to 47.5 ±2.5 in-lb (5.4 ±0.3 N·m).

(i) With hand force, gently push the compressor outlet duct in the direction of the adjacent mix muff duct until the compressor outlet duct reaches the maximum flexed position.

(j) Make sure that there is a minimum clearance of 0.20 in. (5.1 mm) to the adjacent mix muff duct when the compressor outlet duct is in the flexed position.

(k) Install the electrical connector [2] on the ram air control temperature sensor.

(l) Install the electrical connector [1] on the compressor outlet overheat switch.

(m) Apply a light coating of Never-Seez NSBT compound, D00006, to the threads of the flexhose [9].

(n) Reconnect the flexhose [9] to the compressor outlet duct [3].



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## H. Mix Muff Installation Test

SUBTASK 21-51-17-860-004

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-51-17-860-005

(2) Put the applicable L PACK or R PACK switch on the P5-10 air conditioning panel to the AUTO position.

SUBTASK 21-51-17-790-001

(3) Do a soap bubble test of the joints at the mix muff and compressor outlet duct.

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches on the P5-10 air conditioning panel in the OFF position.
2) Loosen the clamps.
3) Make sure that the ducts are aligned at the joints.
4) Tighten the clamps.
5) Put the L PACK and R PACK switches on the P5-10 air conditioning panel in the AUTO position.
6) Make sure that the leak has been repaired.

## I. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-17-860-006

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-17-860-007

(2) Put the L PACK and R PACK switches on the P5-10 air conditioning panel in the OFF position.

SUBTASK 21-51-17-010-003

(3) If the mix muff for the left cooling pack was removed, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-17-010-004

(4) If the mix muff for the right cooling pack was removed, close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## RAM AIR INLET ACTUATOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Ram Air Inlet Actuator Removal.

(2) Ram Air Inlet Actuator Installation.

**TASK 21-51-21-000-801**

### 2. Ram Air Inlet Actuator Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 191FL | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191FR | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GL | Ram Air Actuator Panel - Forward |
| 191GR | Ram Air Actuator Panel - Forward |

#### E. Prepare for the Removal

**SUBTASK 21-51-21-860-010**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM BEFORE YOU DO MAINTENANCE. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-21-860-011**

(2) Set these switches on the P5-10 air conditioning panel as follows:

(a) Set the BLEED 1 and BLEED 2 switches to the OFF position.

1) Attach DO NOT OPERATE tags, STD-858.

(b) Set the APU BLEED switch to the OFF position.

1) Attach DO NOT OPERATE tag, STD-858.

**SUBTASK 21-51-21-860-001**

(3) To remove the ram air inlet actuator [15] for the left pack, do these steps:



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(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-51-21-010-001

(4) Open these access panels to remove the ram air inlet actuator for the left pack:

| Number | Name/Location |
|---|---|
| 191FL | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-21-860-002

(5) To remove the ram air inlet actuator [15] for the right pack, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-51-21-010-002

(6) Open these access panels to remove the ram air inlet actuator for the right pack:

| Number | Name/Location |
|---|---|
| 191FR | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GR | Ram Air Actuator Panel - Forward |

## F. Ram Air Inlet Actuator Removal

SUBTASK 21-51-21-020-001

(1) Remove the electrical connector [29] and electrical connector [30] from the actuator [15].

SUBTASK 21-51-21-020-002

(2) Remove the blue end of the bonding jumper [5] from the actuator [15] as follows:

(a) Remove enough of the sealant to get access to the screw [1] and nut [6].



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(b) Remove the screw [1], washer [3], washer [4], and nut [6] from the ground tab [19] on the actuator [15].

**SUBTASK 21-51-21-020-003**

(3) Disconnect the actuator [15] from the support [18] as follows:

(a) Support the actuator [15] and remove the nut [12], washer [9], bolt [17], washer [16], and bushings [28].

**SUBTASK 21-51-21-020-008**

(4) Disconnect the rod end of the actuator [15] from the arm [10] as follows:

(a) Support the actuator [15] and remove the nut [12], washer [9], bushing [28], washer [16], and bolt [8].

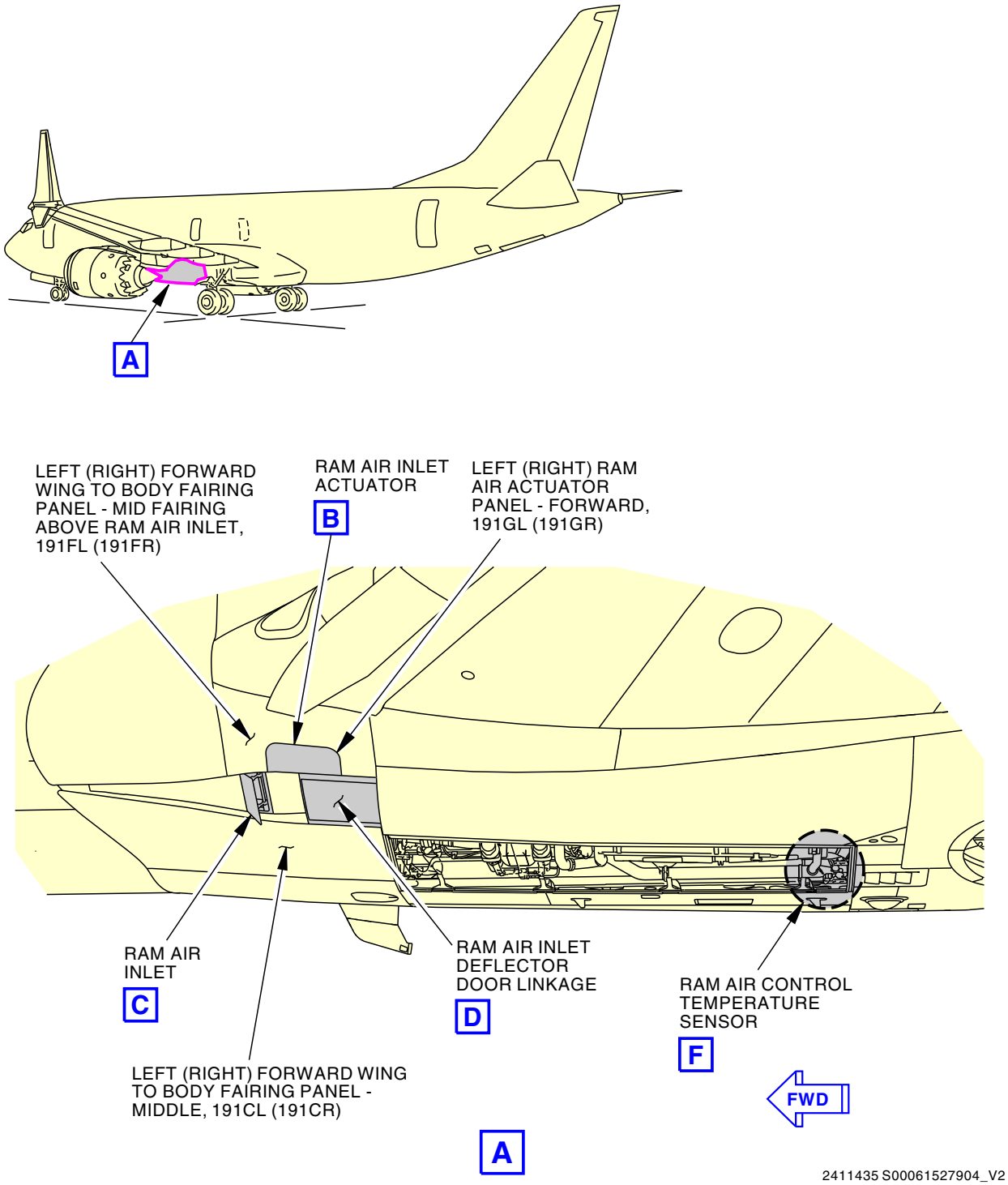
**SUBTASK 21-51-21-020-004**

(5) Remove the actuator [15].

**——— END OF TASK ———**



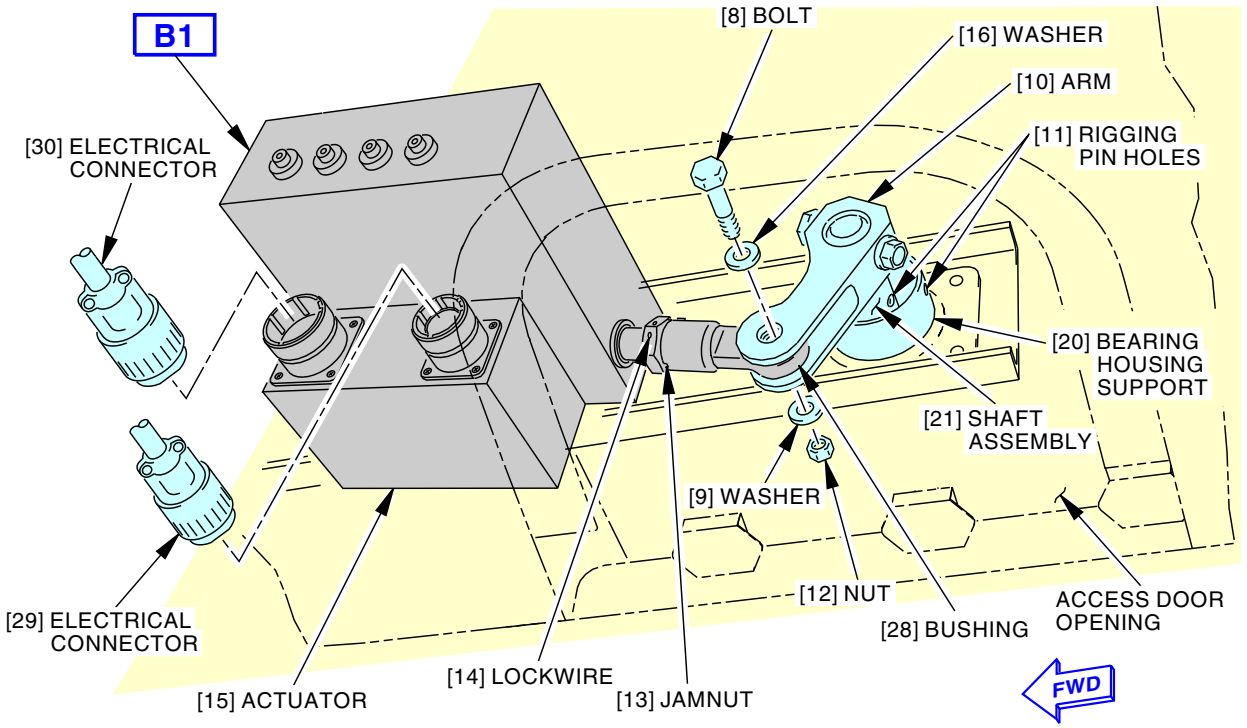
ECCN 9E991 BOEING PROPRIETARY - See title page for details



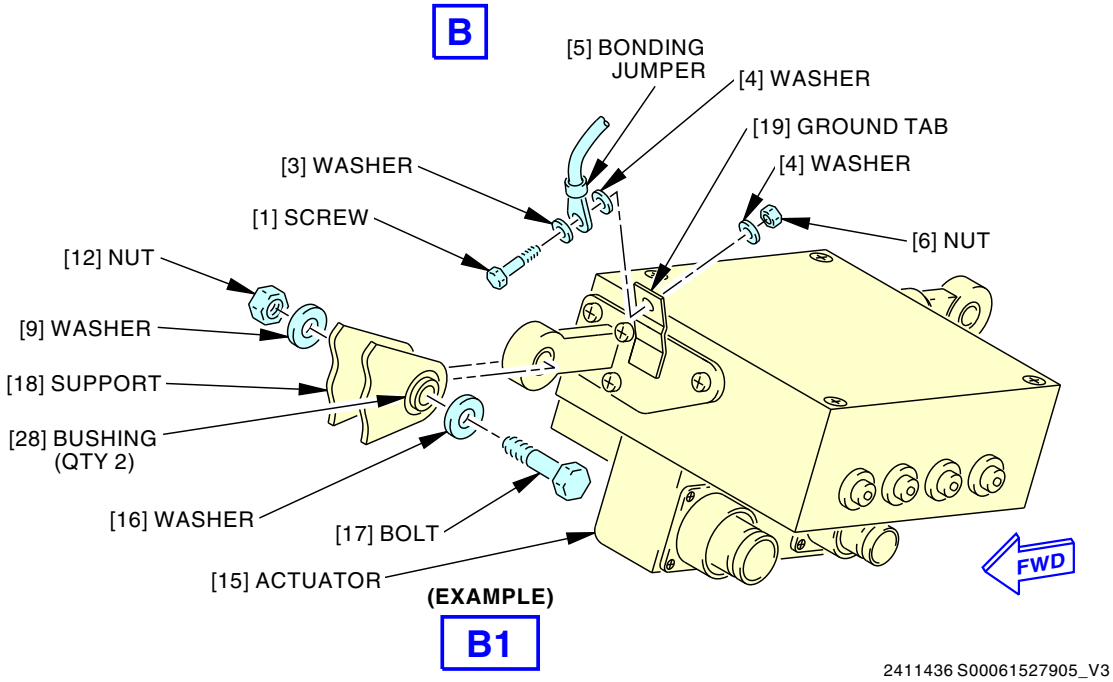

**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 1 of 6)**



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**LEFT RAM AIR INLET ACTUATOR**
**(RIGHT RAM AIR INLET ACTUATOR IS OPPOSITE)**

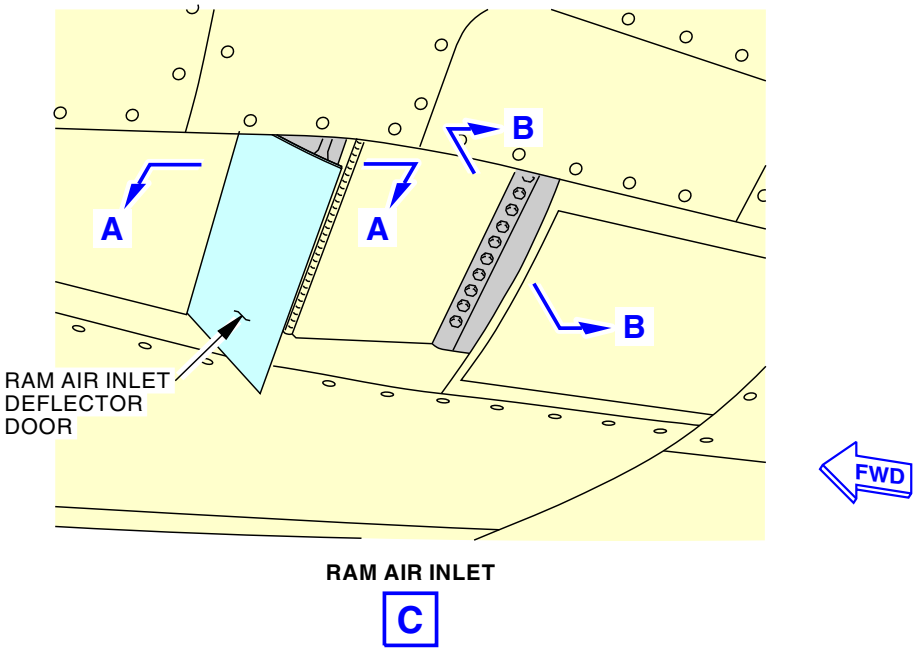



2411436 S00061527905_V3

**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 2 of 6)**

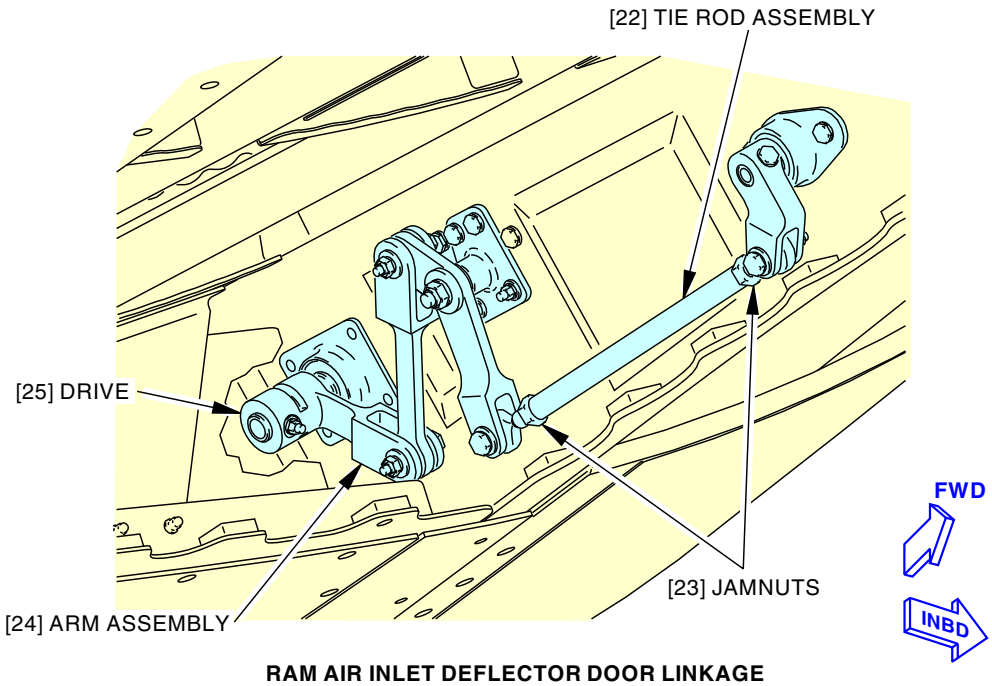


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR INLET**

**C**




**RAM AIR INLET DEFLECTOR DOOR LINKAGE**

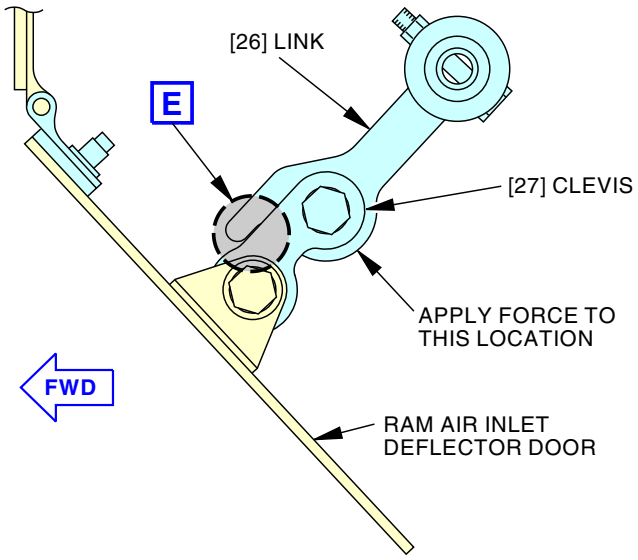
**D**

2411437 S00061527906_V1

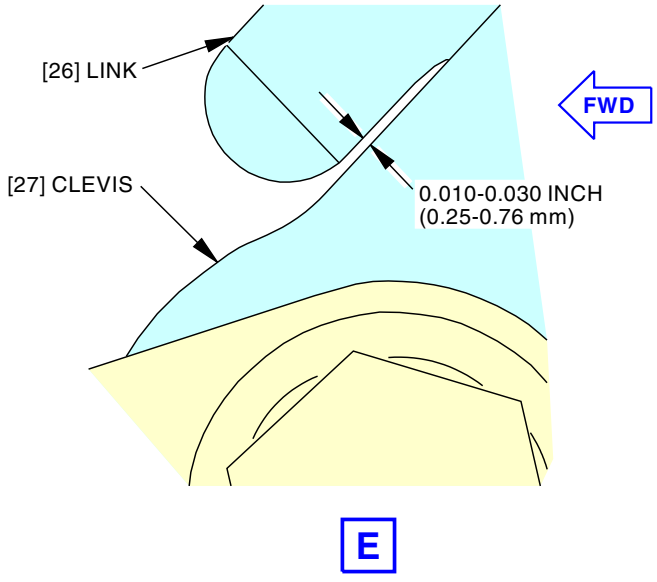
**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 3 of 6)**



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A-A

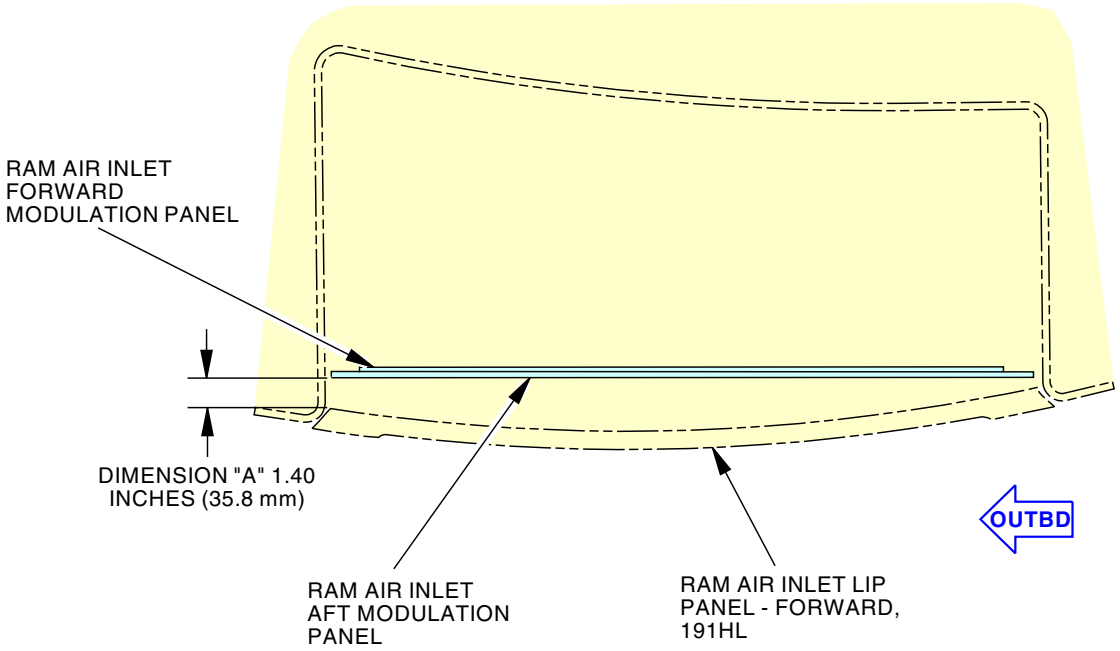



2411438 S00061527907_V1

**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 4 of 6)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**(FORWARD AND AFT MODULATION PANELS SHOWN IN FLIGHT FULL CLOSED POSITION)**

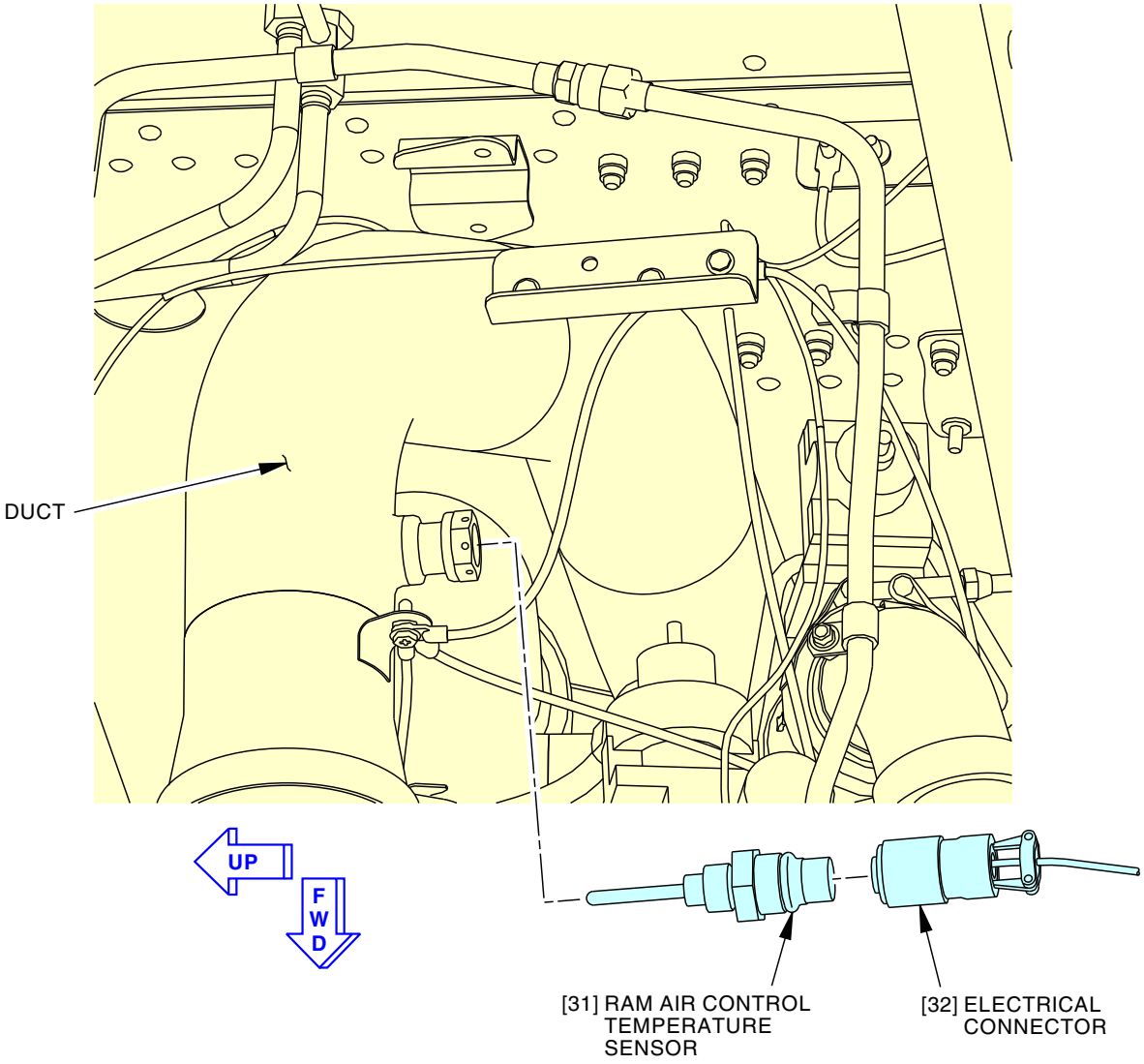
**B-B**

2411439 S00061527908_V1

**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 5 of 6)**



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**RAM AIR CONTROL TEMPERATURE SENSOR**

**F**

2983857 S0000760636_V1

**Ram Air Inlet Actuator Installation**
**Figure 401/21-51-21-990-801 (Sheet 6 of 6)**



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**TASK 21-51-21-400-801**

**3. Ram Air Inlet Actuator Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |
| COM-2481 | Sealant Removal Tool (meets BSS7384 requirements)<br>Part #: 1-6390-A Supplier: 63318<br>Part #: 10810 Supplier: $0855<br>Part #: 10811 Supplier: $0855<br>Part #: 10812 Supplier: $0855<br>Part #: 234350 Supplier: 5HCF1<br>Part #: 235072 Supplier: 5HCF1<br>Part #: 235073 Supplier: 5HCF1<br>Part #: 235074 Supplier: 5HCF1<br>Part #: 235075 Supplier: 5HCF1<br>Part #: 235076 Supplier: 5HCF1<br>Part #: 311/03 Supplier: F6892<br>Part #: 311/14 Supplier: F6892<br>Part #: 311/25 Supplier: F6892<br>Part #: 311/37 Supplier: F6892<br>Part #: AS1 Supplier: $1351<br>Part #: AS2 Supplier: $1351<br>Part #: AS3 Supplier: $1351<br>Part #: DAD5013 Supplier: 7RKH2<br>Part #: DFD5019 Supplier: 7RKH2<br>Part #: JNT411B60 Supplier: 3DN12<br>Part #: JNT411B90 Supplier: 3DN12<br>Part #: SCD5019 Supplier: 7RKH2<br>Part #: ST982LF-9 Supplier: 81205<br>Part #: TS1275-4 Supplier: 22975 |



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(Continued)

| Reference | Description |
|---|---|
| COM-4746 | Handle - Sealant Removal Tool<br>Part #: 310/1 (for SkyScraper) Supplier: F6892<br>Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2<br>Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205<br>Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2 |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| A01076 | Adhesive - Synthetic Rubber | BAC5010 Type 93 (BMS5-95 Class B) |
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00065 | Alcohol - Denatured, Ethyl (Ethanol) | AMS 3002 (Supersedes O-A-396) |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 15 | Actuator | 21-51-21-03-120 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 191FL | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191FR | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GL | Ram Air Actuator Panel - Forward |
| 191GR | Ram Air Actuator Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

**G. Ram Air Inlet Actuator Installation**

**SUBTASK 21-51-21-420-001**

(1) Install the ram air inlet actuator [15] as follows:

(a) Put the ram air inlet actuator [15] in its position.

(b) Attach the actuator [15] to the support [18] as follows:

1) Make sure that the bushings [28] are installed in the support [18].

2) Install the bolt [17], washer [16], washer [9], and nut [12].

a) Put the countersunk side of the washer [16] under the head of the bolt [17].


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SUBTASK 21-51-21-420-002

(2) Attach the bonding jumper [5] to the ground tab [19] on the actuator [15] as follows:

(a) Remove all of the adhesive that remains on the screw [1], washer [3], washer [4], nut [6], and ground tab [19] as follows:

1) Use sealant removal tool, COM-2481, and sealant removal tool handle, COM-4746, to remove the adhesive.

2) Remove adhesive that remains with cotton wiper, G00034, soaked in alcohol, B00065, solvent, B00062, or solvent, B00148, until all the adhesive is removed as follows:

a) Pour the solvent onto the wiper to avoid contamination of the solvent container.

b) Wipe or scrub the surface to be cleaned with the solvent soaked wiper.

c) Immediately wipe the cleaned surfaces with a clean cotton wiper, G00034.

3) Use clean cotton wiper, G00034, to remove all excess solvent that may remain on the parts.

4) Repeat the cleaning action until no discoloration shows on the wiper.

5) Dry the surface before the solvent evaporates.

(b) Install the screw [1], washer [3], washer [4], and nut [6].

1) Tighten the nut [6] to 31.5 ±3.5 in-lb (4 ±1 N·m).

(c) Do a check of the electrical bonding resistance between the ground tab [19] and terminals of the bonding jumper [5].

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the bonding resistance is 0.010 ohm (10 milliohm) or less

(d) Apply adhesive, A01076, so that the bonding installation is totally encapsulated.

SUBTASK 21-51-21-860-003

(3) Install the electrical connector [29] and electrical connector [30] on the ram air actuator [15].

(a) Make sure that the ram air inlet doors move towards the closed position.

## H. Adjustment of the Ram Air Inlet Actuator

SUBTASK 21-51-21-020-005

(1) Disconnect the tie rod assembly [22] from the forward and aft links.

SUBTASK 21-51-21-020-006

(2) Make sure that the rod end of the actuator [15] is not attached to the arm [10].

(a) If the rod end is attached, remove the nut [12], washer [9], bushing [28], washer [16], and bolt [8].

SUBTASK 21-51-21-860-013

(3) To install the ram air actuator [15] for the left pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |



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(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-21-860-014**

(4) To install the ram air actuator [15] for the right pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**SUBTASK 21-51-21-860-005**

(5) Extend the left and right trailing edge flaps to position 1 (TASK 27-51-00-860-803).

**SUBTASK 21-51-21-860-006**

(6) Simulate the air mode (TASK 32-09-00-860-801).

**SUBTASK 21-51-21-860-007**

(7) Retract the left and right trailing edge flaps to the full-up position (TASK 27-51-00-860-804).

**SUBTASK 21-51-21-020-007**

(8) Disconnect the electrical connector [32], D3916 from the left ram air control temperature sensor [31], T481 and electrical connector [32], D3918 from the right ram air control temperature sensor [31], T482.

**SUBTASK 21-51-21-700-001**

(9) Make sure that the ram air actuator [15] retracts.

NOTE: This position is approximately 0.9 in. (22.9 mm) from the fully retracted position.

**SUBTASK 21-51-21-820-001**

(10) Adjust the ram air actuator [15] as follows:

(a) Rotate the shaft assembly [21] until the rigging pin holes [11] in the shaft assembly [21] and bearing housing support [20] align.

(b) Install a 3/16-inch diameter rigging pin through the rigging pin holes [11].

(c) Attach the actuator rod end to the arm [10].

1) Install the bolt [8], washer [16], bushing [28], washer [9], and nut [12] to attach the actuator rod end to the arm [10].

a) Put the countersunk side of the washer [16] under the head of the bolt [8].

2) If the hole in the rod end of the actuator [15] does not align with the holes in the arm [10], do these steps:



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a) Remove the lockwire [14] from the jamnut [13] on the actuator rod end.

b) Adjust the length of the rod end by maximum ±0.125 in. (3.18 mm) (or 4 turns in either direction) until the holes in the rod end and actuator drive arm align.

c) Make sure that the jamnut [13] is rotated so that when the actuator is fully extended (door closed) the jamnut [13] does not interfere with the arm [10].

d) After adjustment of the actuator rod end, tighten the jamnut [13] as follows:

<1> Hold the actuator rod end from turning and tighten the jamnut [13] until it is seated on the rod.

<2> Tighten the jamnut [13] to 110 ±10 in-lb (12.43 ±1.13 N·m).

e) Install lockwire [14] (MS20995C32 lockwire, G01048) to hold the jamnut [13] in place (TASK 20-10-44-400-801).

(d) Remove the 3/16-inch rigging pin.

**SUBTASK 21-51-21-710-001**

(11) Adjust the tie rod assembly [22] as follows:

(a) Extend the left and right trailing edge flaps to position 1 (TASK 27-51-00-860-803).

(b) Put the airplane in the ground mode (TASK 32-09-00-860-802).

(c) Install the tie rod assembly [22] as follows:

1) Adjust the length of the tie rod assembly [22] until contact is just made between the first set of over travel stops (Views A-A and E, Figure 401).

NOTE: The over travel stops are the extensions on the links [26]. One of the over travel stops will hit the clevis [27] before the other travel stop does. It is considered to be the first set of over travel stops.

2) Once contact is made, adjust the tie rod assembly [22] so that it is one full turn shorter.

NOTE: The tie rod can be adjusted without removing it by loosening both jamnuts [23] and rotating the shaft to shorten or lengthen it.

(d) Do a check that the tie rod assembly [22] is properly adjusted as follows:

1) Push with 8 lbf (36 N) - 12 lbf (53 N) at the joint location in the direction indicated by the arrow.

2) Make sure that the smaller of the two gaps is 0.010 in. (0.254 mm) - 0.03 in. (0.76 mm) with the force applied (Views A-A and E, Figure 401).

NOTE: The inboard and outboard gaps on the deflector door linkage may or may not be the same.

3) If the gap is not within the acceptable limits, adjust the tie rod assembly [22] in 1/4 turn increments until the gap is within the 0.010 in. (0.254 mm) - 0.03 in. (0.76 mm) specification.

4) If the gap is within the acceptable limits, tighten both jamnuts [23] on the tie rod assembly [22] to 50 ±10 in-lb (5.65 ±1.13 N·m).

5) Install MS20995C32 lockwire, G01048, to retain the jamnuts [23] in position (TASK 20-10-44-400-801).

**SUBTASK 21-51-21-710-002**

(12) Do this check of the deflection door and ram air inlet doors adjustment.

(a) Simulate the air mode (TASK 32-09-00-860-801).



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(b) Make sure that the inlet doors move towards the closed position smoothly without hanging or binding.

(c) Make sure that the deflector door retracts (closes) to the faired position.

(d) Retract the left and right trailing edge flaps to the full-up position (TASK 27-51-00-860-804).

(e) Connect the electrical connector [32], D3916 to the left ram air control temperature sensor [31], T481 and electrical connector [32], D3918 to the right ram air control temperature sensor [31], T482.

(f) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(g) Wait for a minimum of 10 seconds and then continue.

NOTE: Opening the above circuit breakers for 10 seconds minimum and then closing will clear the Smart Ram Air Door Actuator (SRADA) internal fault memory and allow actuator movement during subsequent steps.

(h) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(i) Make sure that the actuator drives to the fully extended position (flight fully closed).

NOTE: Dimension “A” should be approximately 1.4 in. (35.6 mm).

(j) Put the airplane in the ground mode (TASK 32-09-00-860-802).

(k) Make sure that the ram air inlet doors return to the fully open position smoothly without any hanging or binding.

(l) Make sure that the deflector door returns to the fully extended position.

## I. Ram Air Inlet Actuator Test

**SUBTASK 21-51-21-740-001**

(1) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

(a) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(b) If FAILED shows, then do the fault isolation procedure for the maintenance message.



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## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-21-860-008

(1) For the ram air inlet actuator for the left pack, install these access panels:

| Number | Name/Location |
|---|---|
| 191FL | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-21-410-003

(2) For the left ram air inlet actuator, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-21-860-009

(3) For the ram air inlet actuator for the right pack, install these access panels:

| Number | Name/Location |
|---|---|
| 191FR | Forward Wing-To-Body Fairing Panel - Mid Fairing, Above Ram Air Inlet |
| 191GR | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-21-410-004

(4) For the right ram air inlet actuator, close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

——— END OF TASK ———



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## RAM AIR INLET DEFLECTOR DOOR AND SHAFT ASSEMBLY - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the ram air inlet deflector door

(2) An installation of the ram air inlet deflector door

(3) A removal of the shaft assembly for the ram air inlet deflector door

(4) An installation of the shaft assembly for the ram air inlet deflector door.

**TASK 21-51-22-000-801**

### 2. Ram Air Inlet Deflector Door Removal

(Figure 401)

#### A. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 212 | Flight Compartment - Right |

#### B. Prepare for the Removal

**SUBTASK 21-51-22-860-001**

(1) For the left pack ram air inlet deflector door, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-22-860-002**

(2) For the right pack ram air inlet deflector door, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

#### C. Ram Air Inlet Deflector Door Removal

**SUBTASK 21-51-22-020-001**

(1) Remove the nuts [11] and washers [8] from the ends of the bolts [9] that attach the ram air inlet deflector door [1] to the links.

**SUBTASK 21-51-22-020-002**

(2) Remove the bolts [9] and washers [10] from the links.

(a) Hold the links while you remove the bolts [9].

NOTE: The spring on the deflector door shaft pulls the links.



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SUBTASK 21-51-22-020-003

(3) Remove the screw [4] and washers [6] that attach the bonding jumper [7] to the ram air inlet deflector door [1].

SUBTASK 21-51-22-020-004

(4) Remove the bolts [2] and washers [3] that attach hinge of the ram air inlet deflector door [1] to the airplane.

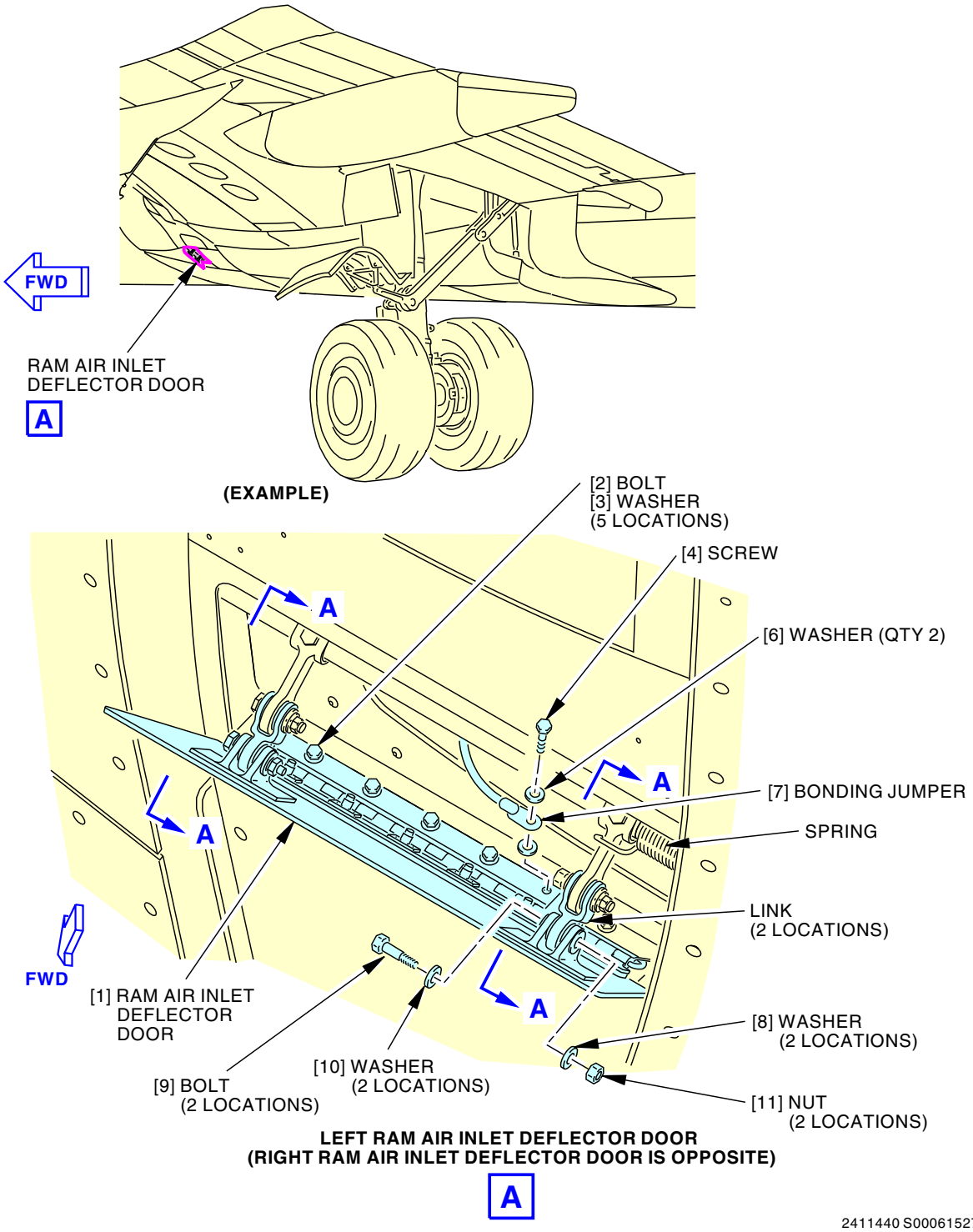
SUBTASK 21-51-22-020-005

(5) Carefully lower the ram air inlet deflector door [1] from the airplane.

——— END OF TASK ———



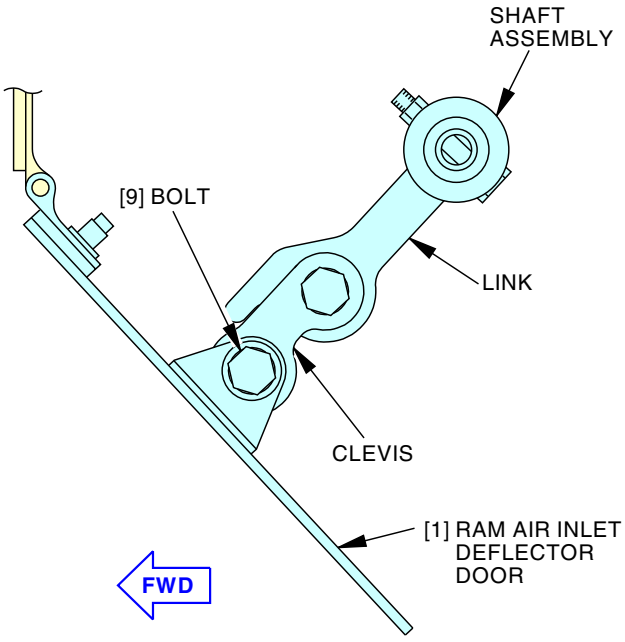
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**Ram Air Inlet Deflector Door Installation**
**Figure 401/21-51-22-990-801 (Sheet 1 of 2)**



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**(EXAMPLE)**

**A-A**

3026782 S0000797712_V1

**Ram Air Inlet Deflector Door Installation**
**Figure 401/21-51-22-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-22-400-801**

## 3. Ram Air Inlet Deflector Door Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-51-22-400-803 | Ram Air Inlet Deflector Door and Modulation Panels Adjustment (P/B 501) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A50231 | Sealant - Pressure And Environmental - Chromate Type | BMS5-95 Class B |
| A50337 | Sealant - Fuel Tank | BMS5-45 Class B |
| A50359 | Sealant - Low Density, Non-Chromate Type | BMS5-142 Type II Class B |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Deflector door | 21-51-22-02-060 | SIA ALL |

### E. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 212 | Flight Compartment - Right |

### F. Ram Air Inlet Deflector Door Installation

**SUBTASK 21-51-22-420-001**

(1) Put the ram air inlet deflector door [1] in its position.

**SUBTASK 21-51-22-420-002**

(2) Install the bolts [2] and washers [3] that attach the hinge of ram air inlet deflector door [1] to the airplane.

**SUBTASK 21-51-22-100-001**

(3) Prepare the mating surfaces (SWPM 20-20-00).

(a) Do abrasive cleaning procedure for mating surface of the airplane structure.



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(b) Do solvent cleaning procedure for mating surfaces of the washers [6] and bonding jumper [7].

SUBTASK 21-51-22-420-003

(4) Install the bonding jumper [7].

(a) Make sure that the bonding jumper [7], screw [4], and washers [6] are clean.

(b) Put the bonding jumper [7] in its position.

(c) Install the screw [4] and washers [6].

(d) Tighten the screw [4] to 32 in-lb (3.6 N·m) - 38 in-lb (4.3 N·m).

SUBTASK 21-51-22-760-001

(5) Measure the electrical bonding resistance between the bonding jumper [7] and the structure (SWPM 20-20-00).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the electrical bonding resistance is 0.001 ohm (1.0 milliohm) or less.

SUBTASK 21-51-22-390-001

(6) Apply sealant, A50337, or sealant, A50231, or sealant, A50359, on the terminal of bonding jumper [7], washers [6], and screw [4].

SUBTASK 21-51-22-420-004

(7) Install the bolts [9], washers [10], washers [8], and nuts [11] that attach the ram air inlet deflector door [1] to the links.

(a) Make sure that the spring is in its position on the support assembly and around the inboard link (Figure 401).

(b) Make sure that the links are in the correct position (View A-A, Figure 401).

(c) If it is necessary, adjust the deflector door [1] (TASK 21-51-22-400-803).

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-22-860-003

(1) For the left pack ram air inlet door deflector door, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-22-860-004

(2) For the right pack ram air inlet deflector door, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**END OF TASK**



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**TASK 21-51-22-000-802**

**4. Ram Air Inlet Deflector Door Shaft Assembly Removal**

(Figure 402)

**A. Location Zones**

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 212 | Flight Compartment - Right |

**B. Access Panels**

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |

**C. Prepare for the Removal**

SUBTASK 21-51-22-860-005

(1) For the left pack ram air inlet deflector door shaft assembly, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Remove this access panel:

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |

SUBTASK 21-51-22-860-006

(2) For the right pack ram air inlet deflector shaft assembly, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Remove this access panel:

| Number | Name/Location |
|---|---|
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |

**D. Ram Air Inlet Deflector Door Shaft Assembly Removal**

SUBTASK 21-51-22-020-006

(1) Do these steps to remove the arm assembly [40]:

(a) Remove the nut [46], washer [45], washer [41], and bolt [42] to disengage the link extension [37] from the arm assembly [40].

(b) Remove the nut [44], washer [43], washer [39], and bolt [38].

(c) Remove the arm assembly [40] from the end of the shaft [48].



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SUBTASK 21-51-22-020-007

(2) Do these steps to remove the shaft [48]:

(a) Remove the nuts [33], washers [32], and bolts [31] that attach the links [49] to the shaft [48].

(b) Remove the nuts [51], washers [52], and bolts [54] that attach the bearing support assembly [53] to the support assembly.

(c) While you hold the links [49], carefully pull the shaft [48] in the inboard direction to remove it.

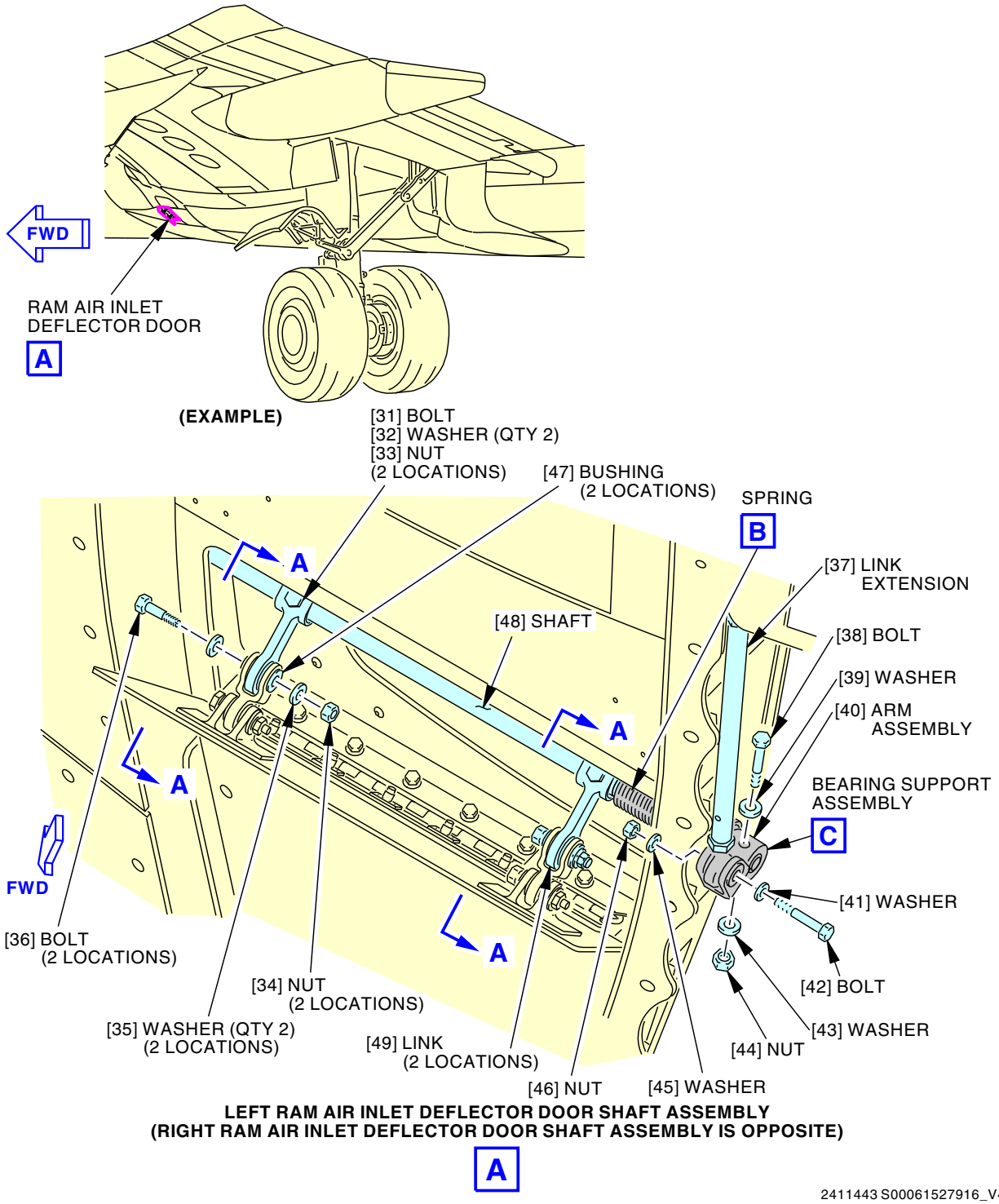
(d) Remove the nuts [34], washers [35], bolts [36], and bushings [47] from the bottom end of the links [49].

(e) Remove the links [49].

**——— END OF TASK ———**



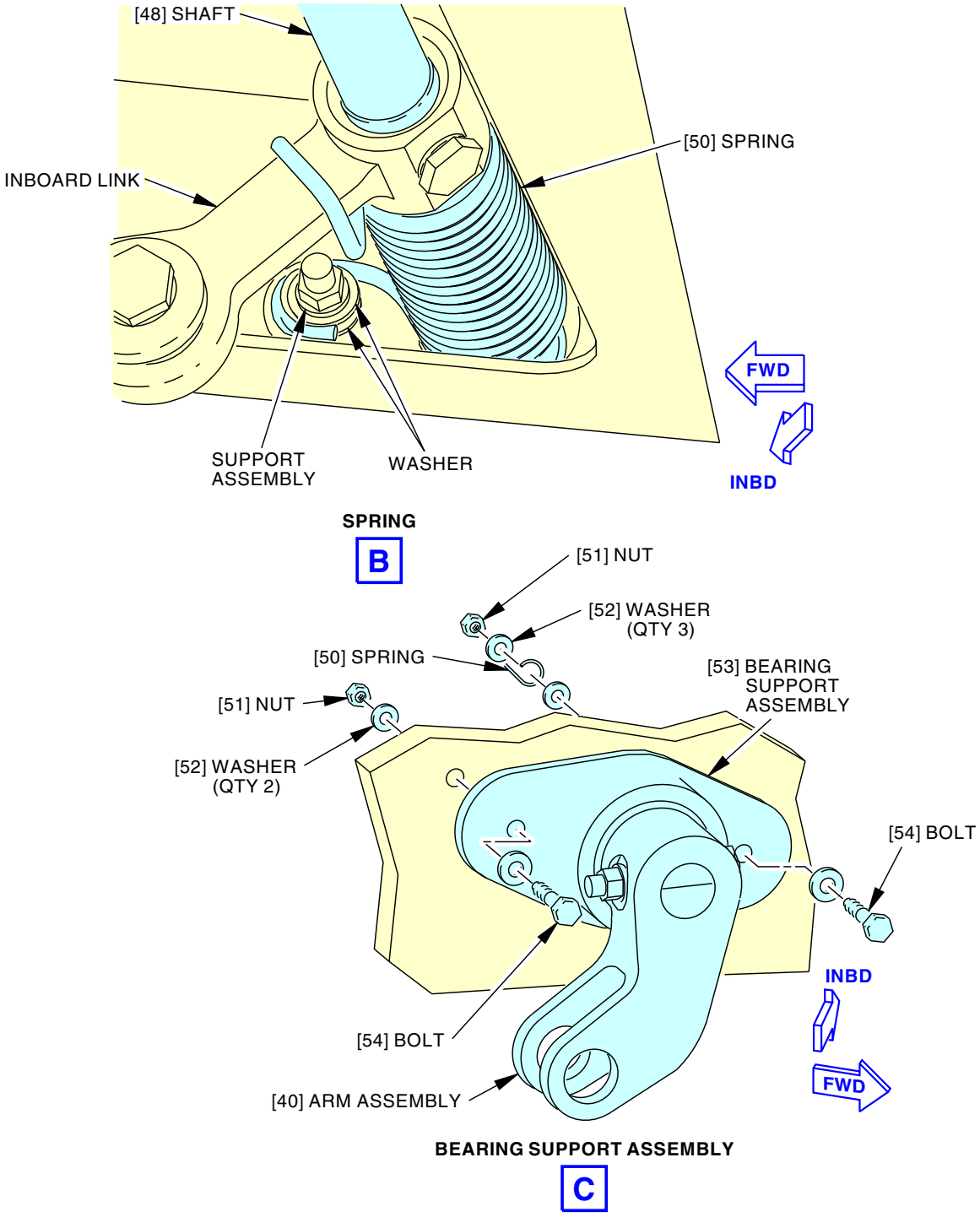
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Inlet Deflector Door Shaft Assembly Installation**
**Figure 402/21-51-22-990-805 (Sheet 1 of 3)**



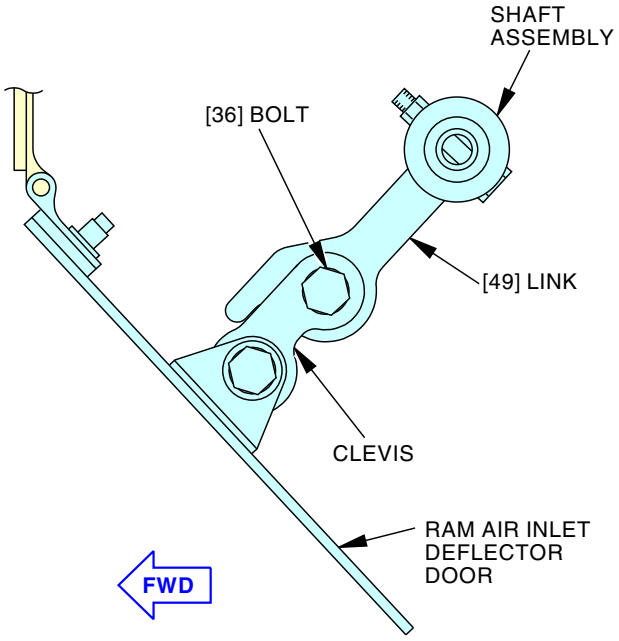
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Inlet Deflector Door Shaft Assembly Installation**
**Figure 402/21-51-22-990-805 (Sheet 2 of 3)**



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**(EXAMPLE)**

**A-A**

3026783 S0000798129_V1

**Ram Air Inlet Deflector Door Shaft Assembly Installation**
**Figure 402/21-51-22-990-805 (Sheet 3 of 3)**



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**TASK 21-51-22-400-802**

## 5. Ram Air Inlet Deflector Door Shaft Assembly Installation

(Figure 402)

### A. References

| Reference | Title |
|---|---|
| 21-51-22-400-803 | Ram Air Inlet Deflector Door and Modulation Panels Adjustment (P/B 501) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A50086 | Primer - Loctite 7471 Primer T Activator | |
| A50463 | Compound - Retaining - Loctite 641 | |
| D00633 | Grease - Aircraft General Purpose | BMS3-33 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 48 | Shaft | 21-51-22-02-060 | SIA ALL |
| 49 | Link | 21-51-22-01-295 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |

### F. Ram Air Inlet Deflector Door Shaft Assembly Installation

**SUBTASK 21-51-22-420-005**

(1) Do these steps to install the shaft [48]:

NOTE: You must remove the link [49] from the shaft assembly before you can install the shaft [48] into the ram air inlet.

(a) Remove the nut [33], washer [32], and bolt [31], that attach the links [49] to the shaft [48].

(b) Remove the links [49] from the shaft [48].

(c) Put the links [49] in their positions.

1) Make sure that the links [49] are in the correct position (View A-A, Figure 402).

2) Make sure that the inboard and outboard links are opposite for the left and right side.

NOTE: The circular edge of each link must point down after the installation.

(d) Apply Loctite 7471 Primer T Activator, A50086, and Loctite 641 compound, A50463, to surfaces contacting mating parts, shafts, and crankarms or collars.

(e) Apply thin coating of grease, D00633, to mating surfaces of the bushings [47].

(f) Install the bushings [47], washers [35], bolts [36], and nuts [34].

(g) While you hold the links [49], insert the shaft [48] into the ram air inlet in an outboard direction, through the spring [50] and the holes in the top ends of the links [49].



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1) Make sure that you insert the shaft [48] so that the end without the hole goes in first.

(h) Install the bolts [31], washers [32], and nuts [33] that attach the links [49] to the shaft [48].

**CAUTION** DO NOT LUBRICATE THE BEARING WITH GREASE OR WD-40. IF YOU LUBRICATE, THE BEARING LINER CAN SWELL, DECREASING THE CLEARANCE AND LEADING TO INCREASED ROTATIONAL BREAK-AWAY TORQUE.

(i) Install the bolt [54], washer [52], and nut [51] that attach the bearing support assembly [53] to the support assembly.

NOTE: The bearing is self lubricating.

(j) Make sure that the spring [50] is in its position on the support assembly and around the inboard link.

1) Make sure that the shaft assembly rotates freely and not bind.

SUBTASK 21-51-22-420-006

(2) Do these steps to install the arm assembly [40]:

(a) Put the arm assembly [40] in its position on the end of the shaft [48] with the free end facing aft.

(b) Install the bolt [38], washer [39], washer [43], and nut [44].

(c) Put the link extension [37] in its position and install the bolt [42], washer [41], washer [45], and nut [46].

SUBTASK 21-51-22-820-004

(3) If it is necessary, adjust the air inlet deflector door (TASK 21-51-22-400-803).

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-22-860-007

(1) For the left pack ram air inlet actuator, do these steps:

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Close this access panel:

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |

SUBTASK 21-51-22-860-008

(2) For the right pack ram air inlet actuator, do these steps:

(a) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |



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(b) Close this access panel:

| Number | Name/Location |
|---|---|
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |

——— END OF TASK ———



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## RAM AIR INLET SYSTEM - ADJUSTMENT

### 1. General

A. This procedure has this task:

(1) An adjustment of the ram air inlet deflector door and the ram air inlet modulation panels.

B. The left and right ram air inlet systems may be adjusted at the same time or adjusted separately.

**TASK 21-51-22-400-803**

### 2. Ram Air Inlet Deflector Door and Modulation Panels Adjustment

(Figure 501)

#### A. References

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-1585 | Kit - Rigging Pin<br>Part #: F70207-151 Supplier: 81205 |

#### C. Location Zones

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |
| 191GL | Ram Air Actuator Panel - Forward |
| 191GR | Ram Air Actuator Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |



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## E. Preparation for the Adjustment

SUBTASK 21-51-22-010-001

(1) For the adjustment of the left ram air inlet system, remove these panels:

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-22-010-002

(2) To get access to the left ram air temperature sensor, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-22-010-003

(3) For the adjustment of the right ram air inlet system, remove these panels:

| Number | Name/Location |
|---|---|
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |
| 191GR | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-22-010-004

(4) To get access the right ram air temperature sensor, open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

SUBTASK 21-51-22-010-005

(5) To get access to the P92 panel, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

## F. Ram Air Inlet System Adjustment/Rigging

SUBTASK 21-51-22-020-008

(1) Do these steps to disconnect the forward end of the tie rod assembly [1]:

(a) Remove the nut [5], washer [30], bolt [3], and washer [4].

(b) Move the end of the tie rod assembly [1] away from the adjacent arm [2].

SUBTASK 21-51-22-860-009

(2) Do these steps to put the actuator in the flight position:

(a) If not already done, attach the electrical connector [28] and electrical connector [29] to the actuator [21].

(b) For the adjustment of the actuator for the left ram air system, do these steps:

1) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

(c) For the adjustment of the actuator for the right ram air system, do these steps:


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1) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

(d) Extend the trailing edge flaps to position 1.

1) To extend the flaps, do this task: Extend the Trailing Edge Flaps, TASK 27-51-00-860-803.

(e) To prevent the standby hydraulic pump from operating when the airplane is in air mode, do this step:

**WARNING** WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING** DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

1) Open this circuit breaker and install safety tag:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 2 | C01449 | STANDBY HYDRAULIC PUMP |

(f) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

(g) Retract the trailing edge flaps to full up position.

1) To retract the flaps, do this task: Retract the Trailing Edge Flaps, TASK 27-51-00-860-804.

(h) Wait for the ram air actuator to fully extend.

(i) Remove the electrical connector D3916 (D3918) from the ram air sensor.

(j) Make sure that the actuator retracts to a position that is approximately 0.90 in. (23 mm) from the fully retracted position when the connector D3916 (D3918) is removed.

**SUBTASK 21-51-22-420-007**

(3) Do these steps to attach the rod end of actuator [21] to the arm [13]:

(a) Turn the shaft assembly [16] to align the rigging pin holes [14] in the shaft assembly [16] and the bearing housing support [15].



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(b) Install a 1-3/4 inch long, 3/16-inch diameter rigging pin (part of rigging pin kit, SPL-1585) through the rigging pin holes [14].

(c) If the hole in the rod end of the actuator [21] does not align with the holes in the arm [13], do these steps:

1) Remove the lockwire [20] from the jam nut [19] on the actuator rod end.

2) Adjust the length of the rod end plus or minus 0.25 in. (0.64 cm) until the holes align.

(d) Tighten the jam nut [19] on the rod end of the actuator [21] as follows:

1) Rotate the jam nut [19] so that it does not interfere with the arm [13] when the actuator is fully extended.

2) Restrain the actuator rod end until the jam nut [19] is seated on the rod and torque the jam nut [19] to 100 in-lb (11 N·m) - 120 in-lb (14 N·m).

(e) Install lockwire [20] between the jam nut [19] on the actuator rod end and the rod end lockwasher next to it (TASK 20-10-44-400-801).

(f) Remove the rigging pin.

**SUBTASK 21-51-22-860-010**

(4) Extend the trailing edge flaps to position 1.

(a) To extend the flaps, do this task: Extend the Trailing Edge Flaps, TASK 27-51-00-860-803.

NOTE: The actuator will retract slightly.

**SUBTASK 21-51-22-860-011**

(5) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

(a) Make sure that the actuator retracts to the fully retracted position (ground fully open).

**SUBTASK 21-51-22-820-001**

(6) Do the steps that follow to adjust the tie rod assembly [1]:

(a) Remove the lockwire [6] from the jam nuts [7] on the tie rod assembly [1].

(b) Loosen the jam nuts [7].

(c) Install the bolt [3], washer [4], washer [30], and nut [5] that attach the tie rod assembly [1] to the arm [2] on the deflector door pivot shaft.

(d) Adjust the length of the tie rod assembly [1] until the over-travel stop on either the inboard or outboard link [25] just touches the applicable inboard or outboard clevis [26].

(e) Adjust the tie rod assembly [1] so that it is one full turn shorter as follows:

1) Rotate the shaft one full turn.

2) Tighten the jam nuts [7].

(f) Apply 8 lbf (36 N) - 12 lbf (53 N) to the link [25] as follows (View A-A, Figure 501):

1) Apply the force through the axis of the bolt in a plane approximately parallel to the surface of the ram air inlet deflector door.

(g) As you apply the force, make sure that the smaller of the two gaps (either inboard or outboard) measures 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm) between the over-travel arm of the link [25] and the clevis [26] (View A-A, Figure 501).

NOTE: The gaps at the inboard and outboard links may or may not be the same.

(h) If the smaller gap is not within 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm), adjust the tie rod assembly [1] in 1/4 turn increments until you get the specified gap.



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(i) Torque the jam nuts [7] on the tie rod assembly [1] to 40 in-lb (5 N·m) - 60 in-lb (7 N·m).

(j) Install the lockwire [6] on the jam nuts [7] (TASK 20-10-44-400-801).

SUBTASK 21-51-22-480-001

(7) Install the electrical connector D3916 (D3918) on the ram air sensor.

SUBTASK 21-51-22-860-017

(8) Do the following steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Wait for a minimum of 10 seconds and then continue.

NOTE: Opening the above circuit breakers for 10 seconds minimum and then closing will clear the Smart Ram Air Door Actuator (SRADA) internal fault memory and allow actuator movement during subsequent steps.

(c) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-22-860-012

(9) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

(a) Make sure that the inlet doors move to a more closed position smoothly without binding.

(b) Make sure that the deflector door closes and is faired with the ram air inlet ramp.

SUBTASK 21-51-22-860-013

(10) Retract the trailing edge flaps to full up position.

(a) To retract the flaps, do this task: Retract the Trailing Edge Flaps, TASK 27-51-00-860-804.

SUBTASK 21-51-22-700-001

(11) Do a check of the dimension shown in View B-B, Figure 501.

(a) The dimension “A” should be approximately 1.40 in. (35.6 mm).

(b) This is a reference check only as no action is required at this point in the adjustment of the system.

SUBTASK 21-51-22-820-002

(12) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.



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(a) Make sure that the deflector door opens to the fully deployed position.

(b) Make sure that the modulation panels move smoothly to the fully open position without any binding.

(c) Apply 8 lbf (36 N) - 12 lbf (53 N) to the link [25] as follows (View A-A, Figure 501):

1) Apply the force through the axis of the bolt in a plane approximately parallel to the surface of the ram air inlet deflector door.

(d) As you apply the force, make sure that the smaller of the two gaps (either inboard or outboard) measures 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm) between the over-travel arm of the link [25] and the clevis [26] (View A-A of Figure 501).

NOTE: The gaps at the inboard and outboard links may or may not be the same.

(e) If the smaller gap is within 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm), do these steps:

1) Torque the jam nuts [7] on the tie rod assembly [1] to 40 in-lb (5 N·m) - 60 in-lb (7 N·m).

2) Install the lockwire [6] on the jam nuts [7] (TASK 20-10-44-400-801).

(f) If the smaller gap is not within 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm), adjust the tie rod assembly [1] in 1/4 turn increments until you get the specified gap.

(g) Torque the jam nuts [7] on the tie rod assembly [1] to 40 in-lb (5 N·m) - 60 in-lb (7 N·m).

(h) Install the lockwire [6] on the jam nuts [7] (TASK 20-10-44-400-801).

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(i) Make sure that this circuit breaker is closed:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 2 | C01449 | STANDBY HYDRAULIC PUMP |

**SUBTASK 21-51-22-740-001**

(13) Do a Built-In-Test Equipment (BITE) test on the left Integrated Air Systems Controller (M2939) and the right Integrated Air Systems Controller (M2957):

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

(a) Do the applicable ground test in this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.


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## G. Ram Air Inlet Deflector Door Adjustment Check

SUBTASK 21-51-22-420-009

(1) Do these steps to secure the tie rod assembly [1].

(a) Torque the jam nuts [7] on the tie rod assembly [1] to 40 in-lb (5 N·m) - 60 in-lb (7 N·m).

(b) Install the lockwire [6] on the jam nuts [7] (TASK 20-10-44-400-801).

SUBTASK 21-51-22-480-002

(2) Install the electrical connector D3916 (D3918) on the ram air sensor.

SUBTASK 21-51-22-860-018

(3) Do the following steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Wait for a minimum of 10 seconds and then continue.

NOTE: Opening the above circuit breakers for 10 seconds minimum and then closing will clear the SRADA internal fault memory and allow actuator movement during subsequent steps.

(c) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-22-860-019

(4) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

(a) Make sure that the inlet doors move to a more closed position smoothly without binding.

(b) Make sure that the deflector door closes and is faired with the ram air inlet ramp.

SUBTASK 21-51-22-860-020

(5) Retract the trailing edge flaps to full up position.

(a) To retract the flaps, do this task: Retract the Trailing Edge Flaps, TASK 27-51-00-860-804.

SUBTASK 21-51-22-700-002

(6) Do a check of the dimension shown in View B-B, Figure 501.

(a) The dimension “A” should be approximately 1.40 in. (35.6 mm).


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(b) This is a reference check only as no action is required at this point in the adjustment of the system.

SUBTASK 21-51-22-820-003

(7) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

(a) Make sure that the deflector door opens to the fully deployed position.

(b) Make sure that the modulation panels move smoothly to the fully open position without any binding.

(c) Apply 8 lbf (36 N) - 12 lbf (53 N) to the link [25] as follows (View A-A, Figure 501):

1) Apply the force through the axis of the bolt in a plane approximately parallel to the surface of the ram air inlet deflector door.

(d) As you apply the force, make sure that the smaller of the two gaps (either inboard or outboard) measures 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm) between the over-travel arm of the link [25] and the clevis [26] (View A-A, Figure 501).

NOTE: The gaps at the inboard and outboard links may or may not be the same.

(e) If the smaller gap is within 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm), do these steps:

1) Torque the jam nuts [7] on the tie rod assembly [1] to 40 in-lb (5 N·m) - 60 in-lb (7 N·m).

2) Install the lockwire [6] on the jam nuts [7] (TASK 20-10-44-400-801).

(f) If the smaller gap is not within 0.010 in. (0.254 mm) - 0.030 in. (0.762 mm), do these steps:

1) Adjust the tie rod assembly [1] in 1/4 turn increments until you get the specified gap (See: Ram Air Inlet System Adjustment/Rigging).

2) Do a check if the gap remains within 0.010 in. (0.25 mm) - 0.03 in. (0.76 mm).

a) Do the steps in Ram Air Inlet Deflector Door Adjustment Check again.

**WARNING**

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

**WARNING**

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(g) Make sure that this circuit breaker is closed:

**Power Distribution Panel Number 2, P92**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 2 | C01449 | STANDBY HYDRAULIC PUMP |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-51-22-740-002

(8) Do a BITE test on the left Integrated Air Systems Controller (M2939) and the right Integrated Air Systems Controller (M2957):

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

(a) Do the applicable ground test in this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-22-410-003

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-51-22-860-014

(2) When the left ram air inlet system was adjusted, install these access panels:

| Number | Name/Location |
|---|---|
| 191CL | Forward Wing-To-Body Fairing Panel - Middle |
| 191GL | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-22-410-001

(3) For the left ram air inlet system, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-22-860-015

(4) When the right ram air inlet system was adjusted, install these access panels:

| Number | Name/Location |
|---|---|
| 191CR | Forward Wing-To-Body Fairing Panel - Middle |
| 191GR | Ram Air Actuator Panel - Forward |

SUBTASK 21-51-22-410-002

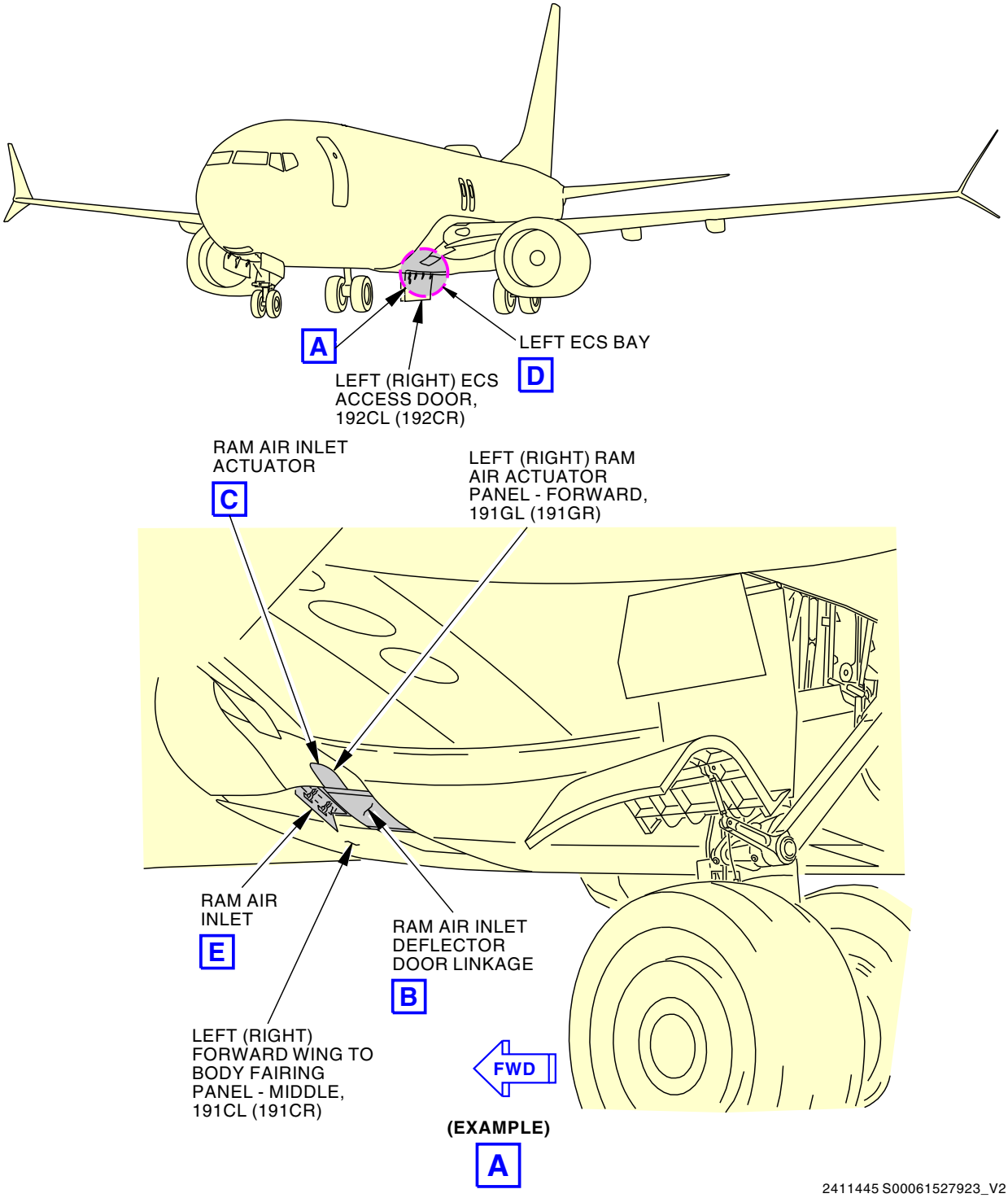
(5) For the right ram air inlet system, close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

**END OF TASK**



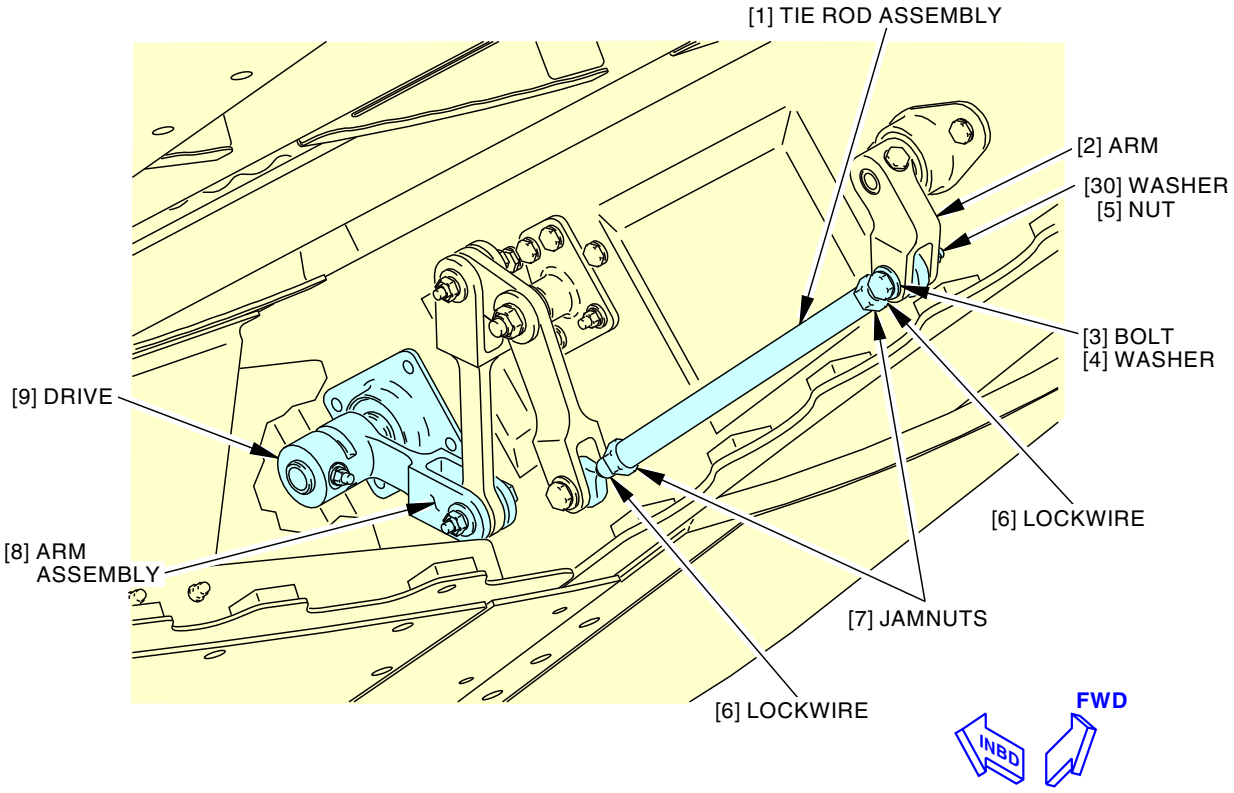
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Inlet System**
**Figure 501/21-51-22-990-803 (Sheet 1 of 5)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**RAM AIR INLET DEFLECTOR DOOR LINKAGE**

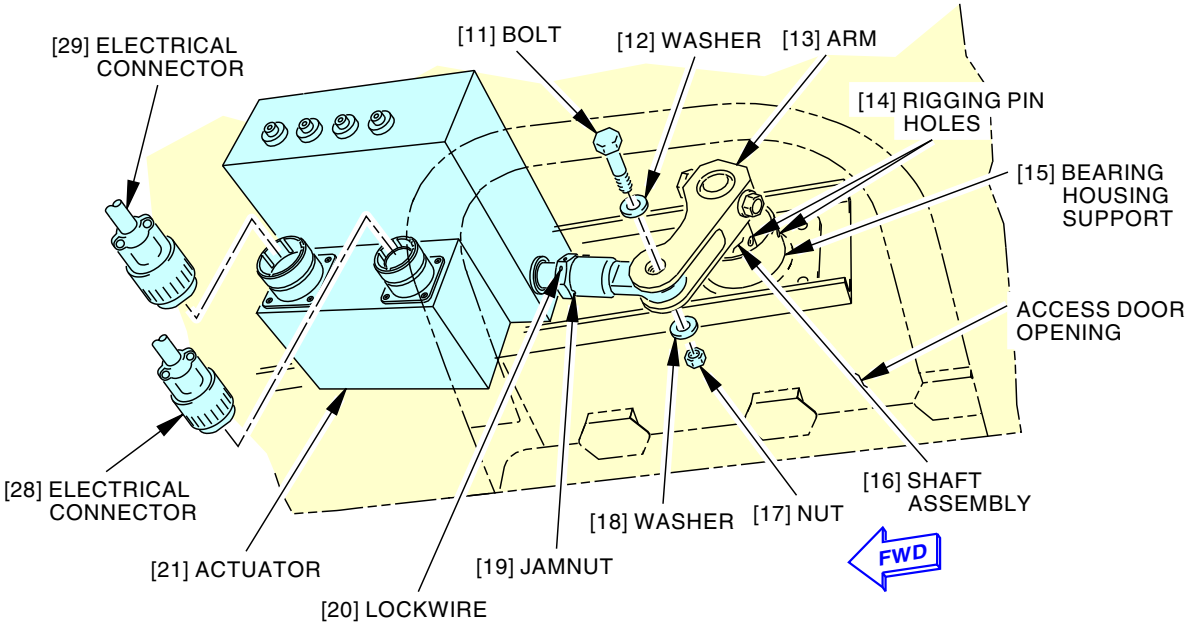
**B**

2411446 S00061527924_V2

**Ram Air Inlet System**
**Figure 501/21-51-22-990-803 (Sheet 2 of 5)**

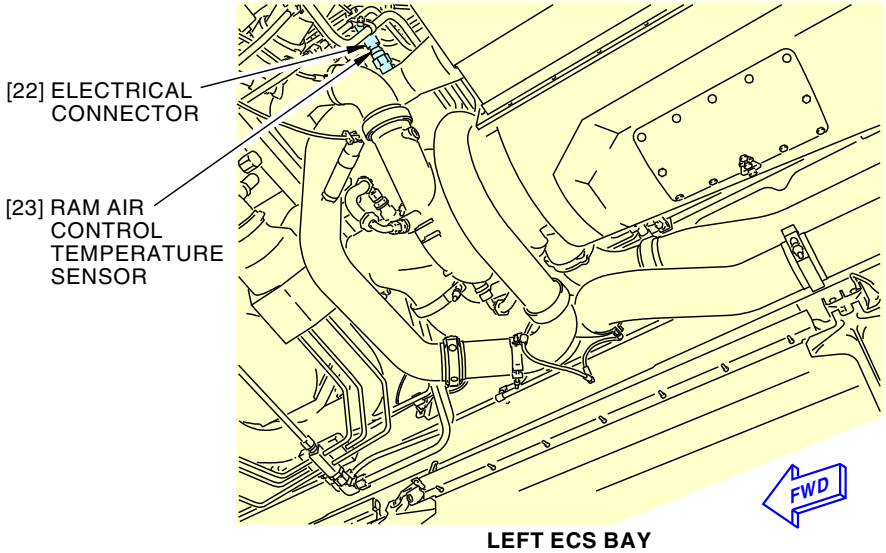


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**LEFT RAM AIR INLET ACTUATOR**
**(RIGHT RAM AIR INLET ACTUATOR IS OPPOSITE)**

**C**




**LEFT ECS BAY**
**(RIGHT ECS BAY IS OPPOSITE)**

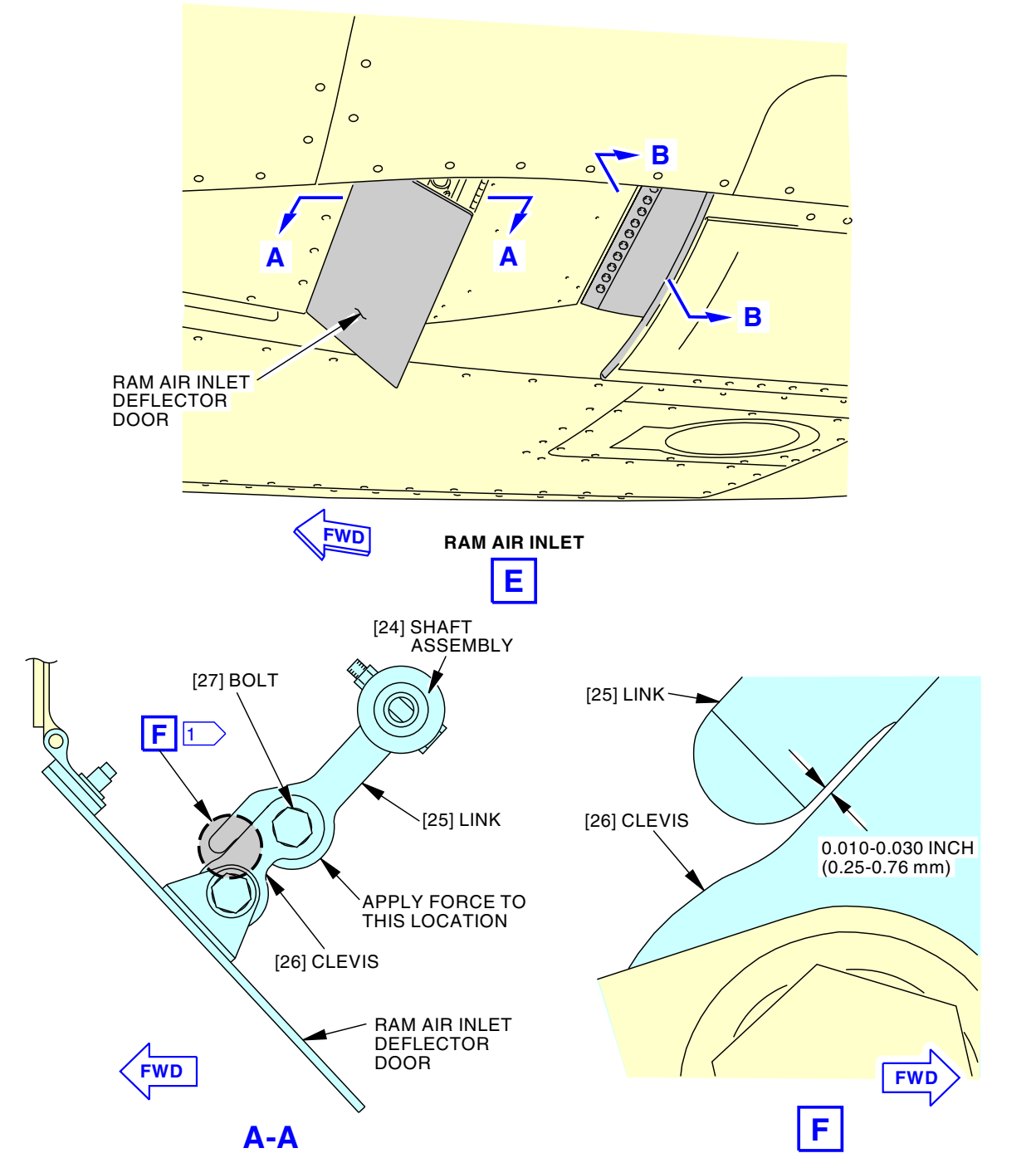
**D**

2411448 S00061527926_V1

**Ram Air Inlet System**
**Figure 501/21-51-22-990-803 (Sheet 3 of 5)**



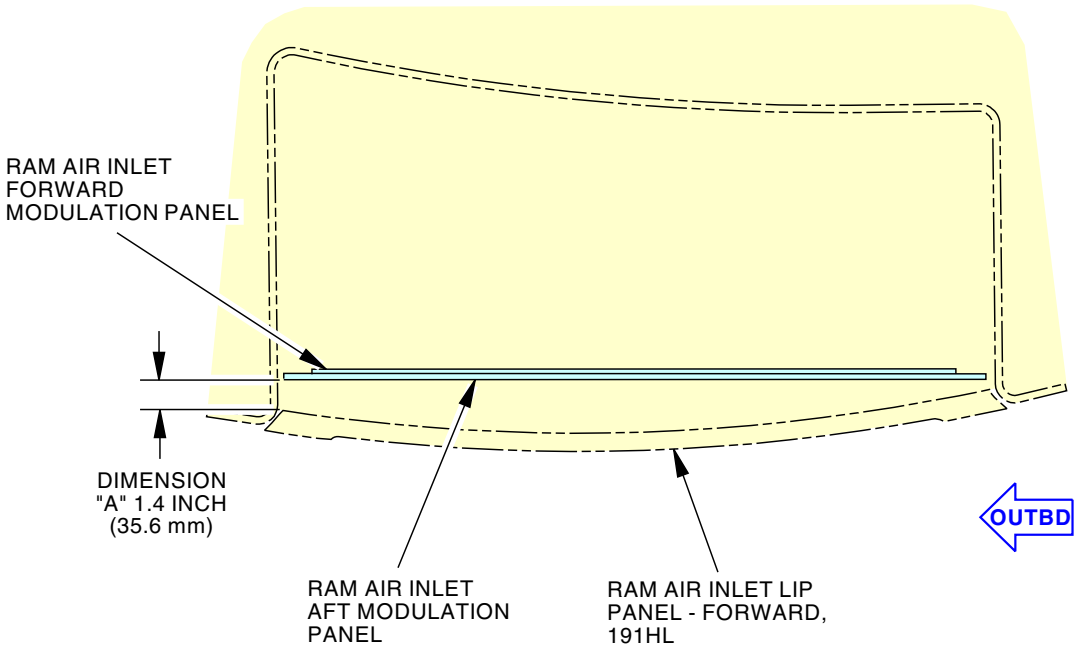
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Inlet System**
**Figure 501/21-51-22-990-803 (Sheet 4 of 5)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**(FORWARD AND AFT MODULATION PANELS SHOWN IN FLIGHT FULL CLOSED POSITION)**

**B-B**

2411450 S00061527928_V2

**Ram Air Inlet System**
**Figure 501/21-51-22-990-803 (Sheet 5 of 5)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## RAM AIR SHAFT ASSEMBLY AND ARM ASSEMBLIES INSPECTION

### 1. General

A. This procedure contains one task:

(1) Ram air inlet door linkage inspection.

**TASK 21-51-22-200-801**

### 2. Ram Air Inlet Door Linkage Inspection

(Figure 601)

#### A. General

(1) This task has the steps to inspect the ram air inlet door linkage inspection.

#### B. References

| Reference | Title |
|---|---|
| 21-51-21-000-801 | Ram Air Inlet Actuator Removal (P/B 401) |
| 21-51-21-400-801 | Ram Air Inlet Actuator Installation (P/B 401) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-7173 | Gage - Force, 0-50 lbs. capacity |

#### D. Prepare for the Inspection

**SUBTASK 21-51-22-020-009**

(1) Disconnect the actuator from the arm assembly [1] (TASK 21-51-21-000-801).

#### E. Ram Air Inlet Door Linkage Inspection

**SUBTASK 21-51-22-710-001**

(1) Use a force gage, STD-7173, to check the bearings in the ram air inlet door linkages assembly.

(a) Connect the force gage, STD-7173, to the arm assembly [1].

(b) Pull the force gage, STD-7173, to rotate the arm assembly [1].

1) Make sure that the direction of the force is perpendicular to the arm assembly [1].

(c) Record the initial force (lbf or N) required to move the ram air inlet linkage assembly and share the results with Boeing.

NOTE: Although a maximum force required has not yet been determined, preliminary data shows that an initial force over 20 lbf (89 N), may indicate that the self-lubricating bearings within the ram air inlet linkage assembly may be degraded.

#### F. Put the Airplane Back to Its Usual Condition

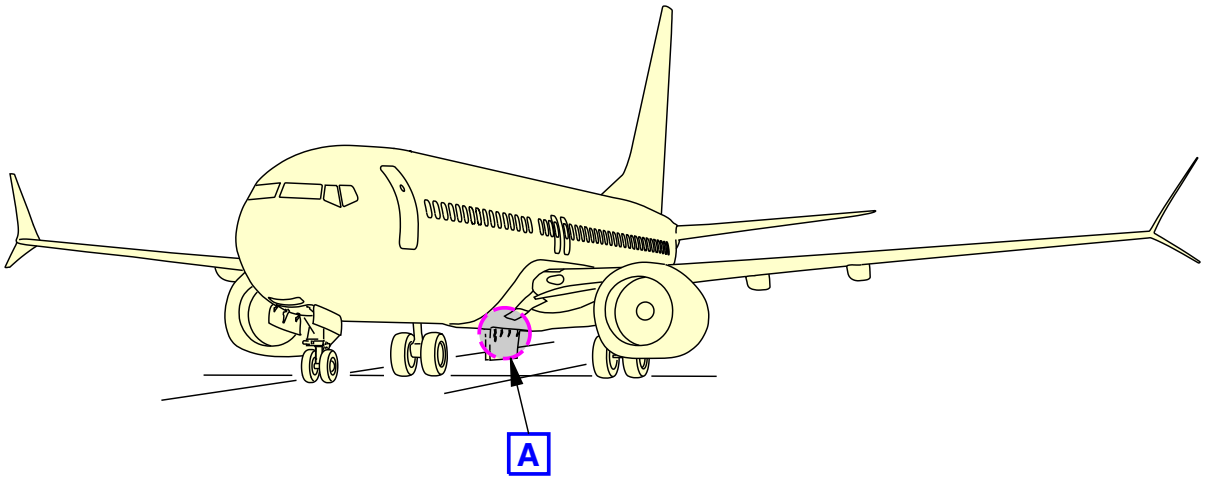
**SUBTASK 21-51-22-420-010**

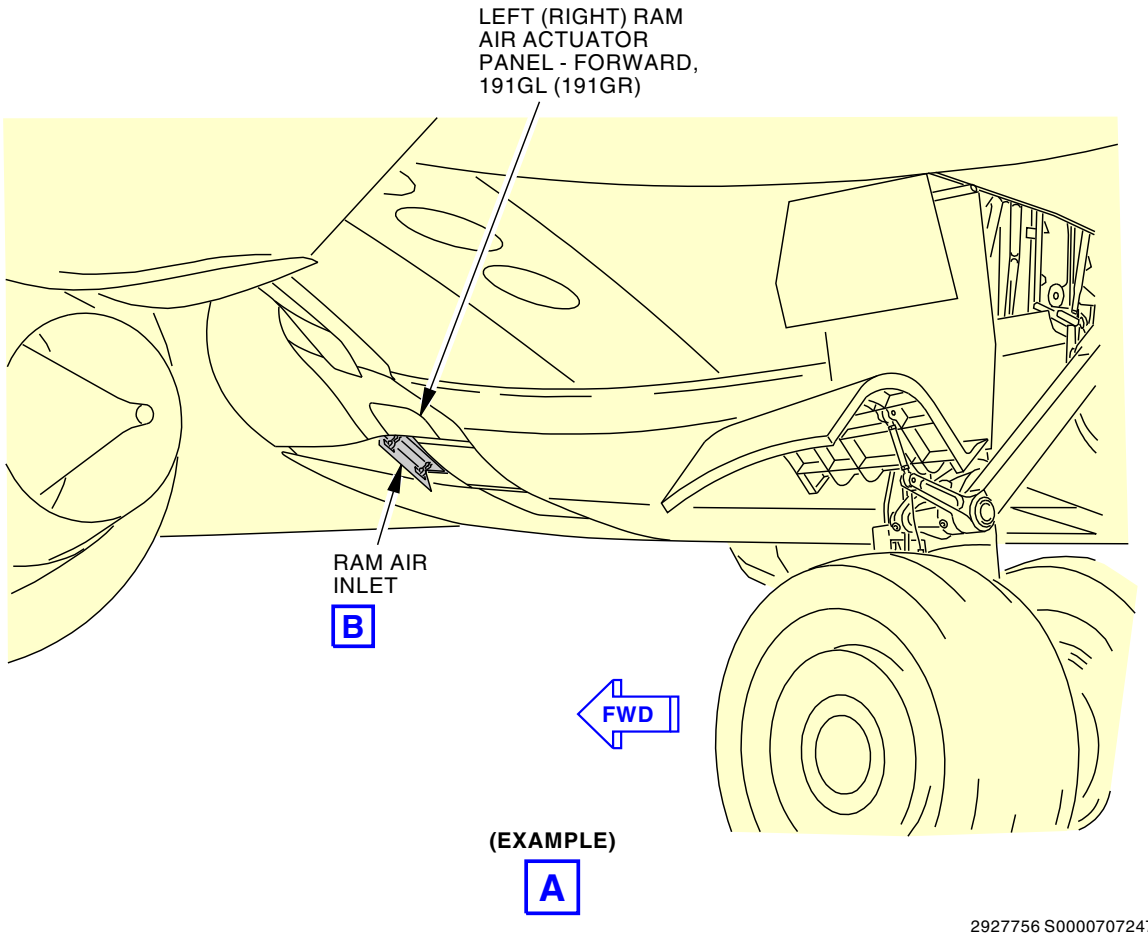
(1) Connect the actuator to the arm assembly [1] (TASK 21-51-21-400-801).

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



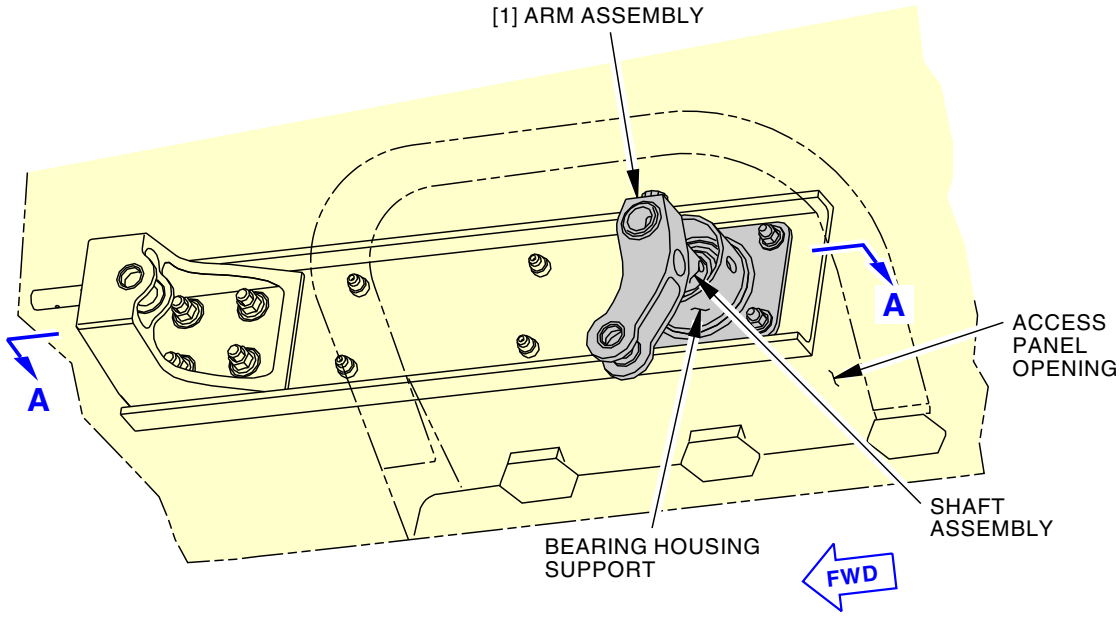




2927756 S0000707247_V1

**Ram Air Inlet Door Linkage Inspection**
**Figure 601/21-51-22-990-804 (Sheet 1 of 2)**

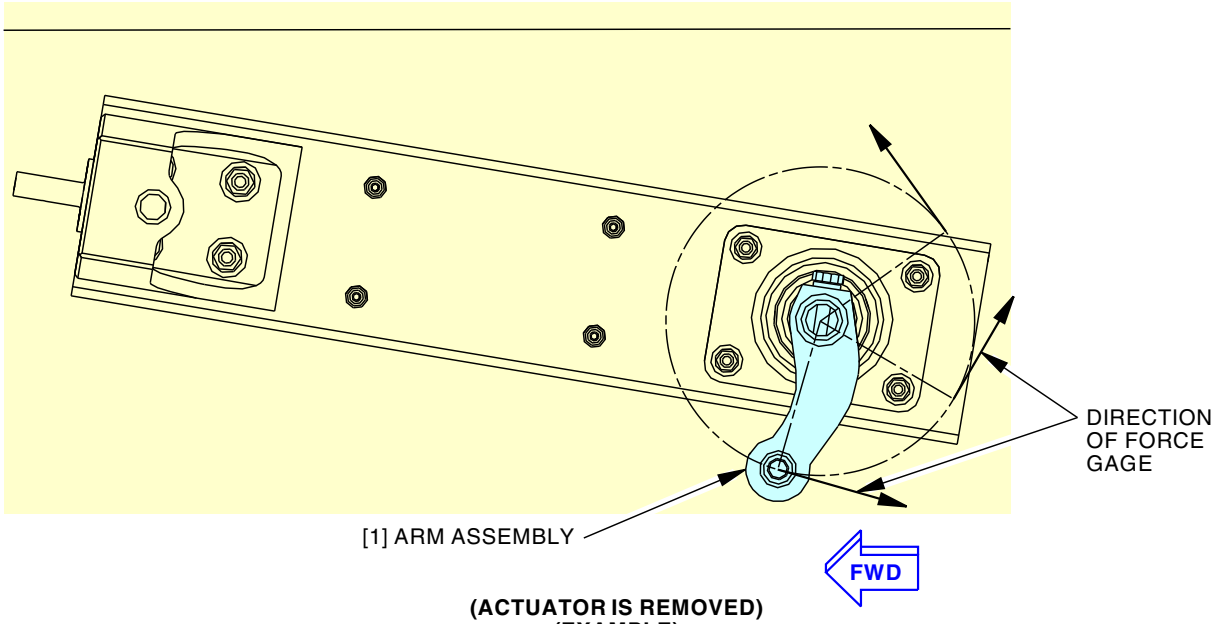


ECCN 9E991 BOEING PROPRIETARY - See title page for details




**LEFT RAM AIR INLET**
**(RIGHT RAM AIR INLET IS OPPOSITE)**

**B**




**(ACTUATOR IS REMOVED)**
**(EXAMPLE)**

**A-A**

2927757 S0000707248_V1

**Ram Air Inlet Door Linkage Inspection**
**Figure 601/21-51-22-990-804 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## RAM AIR INLET MODULATION PANELS - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the ram air inlet modulation panels

(2) An installation of the ram air inlet modulation panels.

B. The ram air inlet modulation panels have a forward panel and an aft panel.

C. The modulation panels are installed at the forward end of the wing-to-body fairings below the wings.

**TASK 21-51-23-000-801**

### 2. Ram Air Inlet Modulation Panels Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 21-51-21-000-801 | Ram Air Inlet Actuator Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 191 | Lower Wing-To-Body Fairing - Forward of Wing Box |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### C. Prepare for the Removal

**SUBTASK 21-51-23-860-001**

(1) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

**SUBTASK 21-51-23-860-002**

(2) For the modulation panels for the left ram air inlet, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |

**SUBTASK 21-51-23-860-003**

(3) For the modulation panels for the right ram air inlet, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

**D. Ram Air Inlet Modulation Panels Removal**

NOTE: The ram air inlet modulation panels have a forward panel and an aft panel. It is necessary to remove the forward panel before you can remove the aft panel.

**SUBTASK 21-51-23-020-001**

(1) Remove the forward modulation panel [1] as follows:

(a) Remove the bolts [3] that attach the forward end of the aft modulation panel [2] to the aft end of the forward modulation panel [1].

NOTE: Let the forward modulation panel come down. This will permit access to the bolts and washers that attach the forward end of the forward modulation panel to the ram air inlet forward fairing support.

(b) Remove the bolts [4] and washers [5] from the forward hinge on the forward modulation panel [1].

(c) Remove the forward modulation panel [1] from the ram air inlet.

**SUBTASK 21-51-23-020-002**

(2) Remove the aft modulation panel [2] as follows:

(a) If it is necessary, disconnect the ram air inlet actuator arm from the shaft of the aft modulation panel [2] (TASK 21-51-21-000-801).

(b) Disconnect the two clevis assemblies [8] from the aft modulation panel [2]:

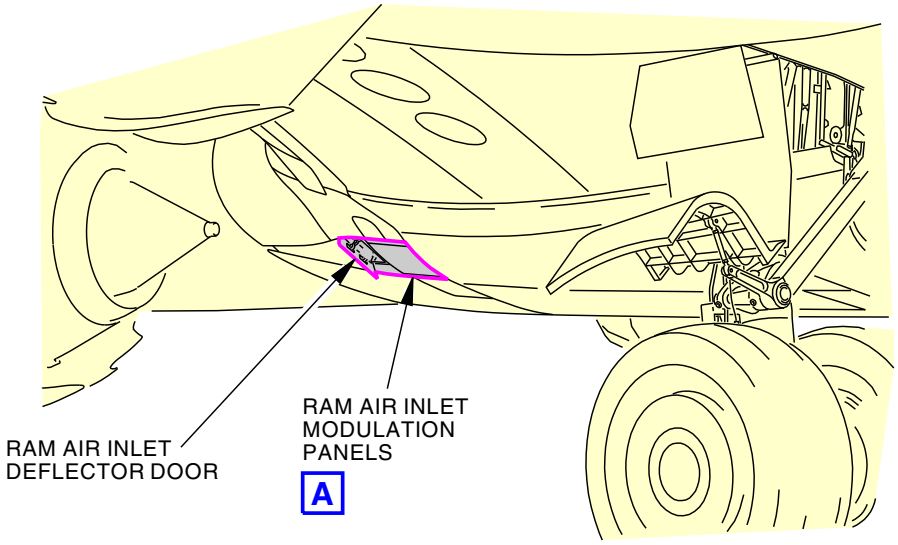
1) Remove the nut [12], washers [10], bushing [11], and bolt [9] that connect each clevis assembly [8] to the aft modulation panel [2].

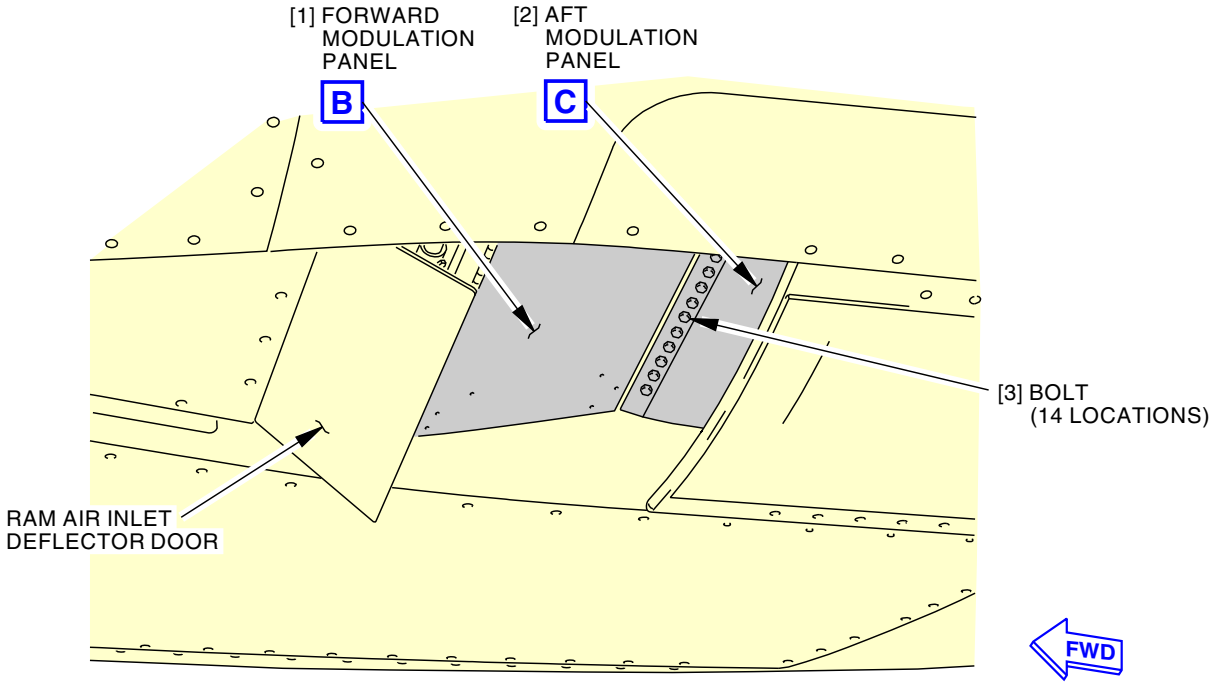
(c) Pull the aft modulation panel [2] out of the ram air inlet.

**——— END OF TASK ———**



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**RAM AIR INLET MODULATION PANELS**
**(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)**

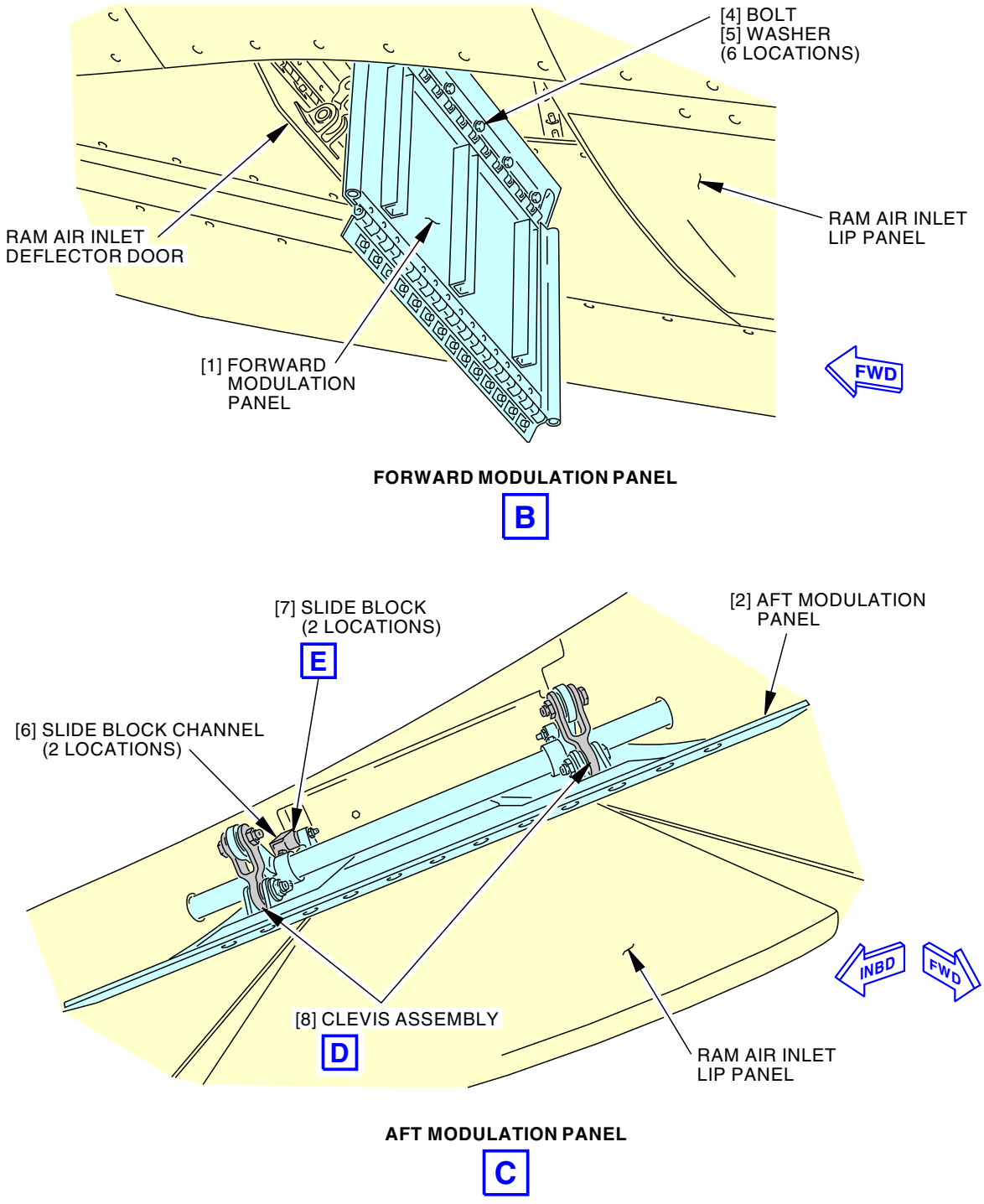
**A**

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**Ram Air Inlet Modulation Panels Installation**
**Figure 401/21-51-23-990-801 (Sheet 1 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

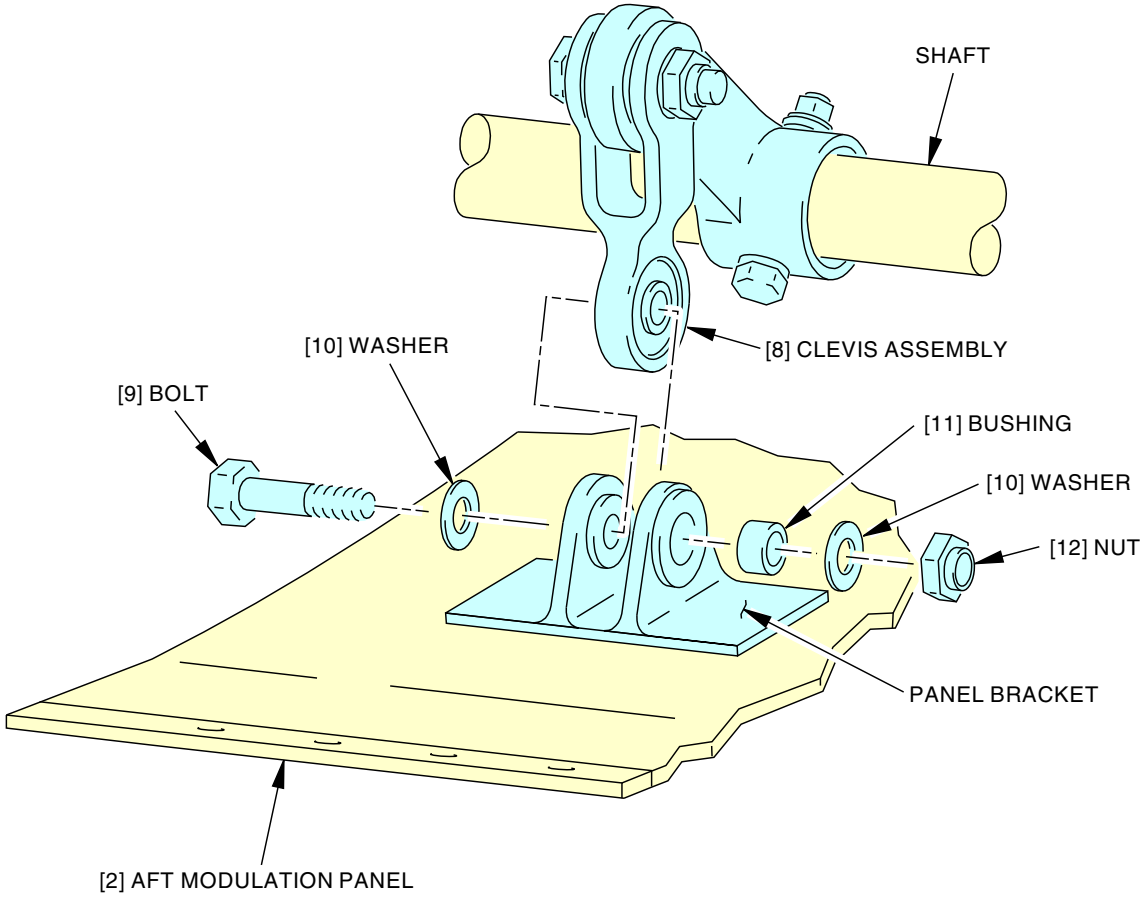



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**Ram Air Inlet Modulation Panels Installation**
**Figure 401/21-51-23-990-801 (Sheet 2 of 4)**



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**CLEVIS ASSEMBLY**
**(EXAMPLE)**

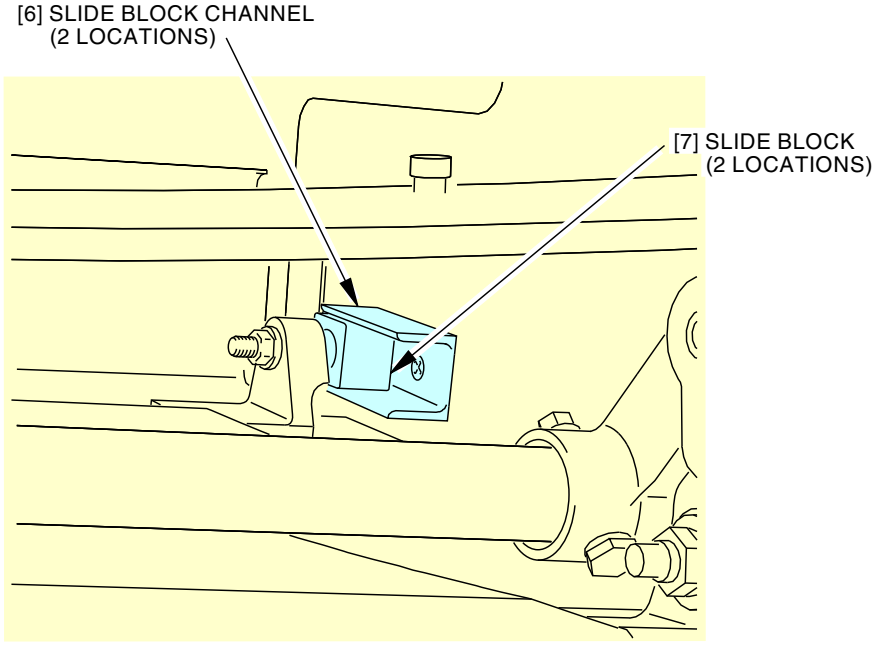
D

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**Ram Air Inlet Modulation Panels Installation**
**Figure 401/21-51-23-990-801 (Sheet 3 of 4)**



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**SLIDE BLOCK**
**(LEFT SIDE)**
**(RIGHT SIDE IS EQUIVALENT)**

E

2411454 S00061527935_V1

**Ram Air Inlet Modulation Panels Installation**
**Figure 401/21-51-23-990-801 (Sheet 4 of 4)**



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**TASK 21-51-23-400-801**

**3. Ram Air Inlet Modulation Panels Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-51-21-400-801 | Ram Air Inlet Actuator Installation (P/B 401) |
| 21-51-22-400-803 | Ram Air Inlet Deflector Door and Modulation Panels Adjustment (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Forward modulation panel | 21-51-23-02-125 | SIA ALL |
| | | 21-51-23-02-130 | SIA ALL |
| 2 | Aft modulation panel | 21-51-23-02-175 | SIA 001-014 |
| | | 21-51-23-02-180 | SIA 001-014 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 191 | Lower Wing-To-Body Fairing - Forward of Wing Box |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

**E. Ram Air Inlet Modulation Panels Installation**

**SUBTASK 21-51-23-420-001**

(1) Install the aft modulation panel [2] in the ram air inlet as follows:

(a) Move the aft modulation panel [2] into its position in the ram air inlet.

(b) Make sure that the slide blocks [7] are in the slide block channels [6].

(c) Install the bolts [9], washers [10], bushings [11], and nuts [12] to connect the clevis assemblies [8] to the aft modulation panel [2].

(d) If disconnected, attach the ram air inlet actuator arm to the shaft of the aft modulation panel [2] (TASK 21-51-21-400-801).

**SUBTASK 21-51-23-420-002**

(2) Install the forward modulation panel [1] in the ram air inlet as follows:


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(a) Put the forward modulation panel [1] in its position in the ram air inlet with the forward hinge against the ram air inlet forward fairing support.

(b) Install the bolts [4] and washers [5] that attach the forward hinge on the forward modulation panel [1] to the ram air inlet forward fairing support.

(c) Adjust the forward modulation panel [1] and aft modulation panel [2] until the aft hinge on the forward modulation panel [1] is against the forward edge of the aft modulation panel [2].

(d) Make sure that the slide blocks [7] are still in the slide block channels [6].

(e) Install the bolts [3] that attach the forward modulation panel [1] and aft modulation panel [2].

**SUBTASK 21-51-23-860-004**

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET MODULATION PANELS, LINKAGES AND ACTUATORS BEFORE YOU SUPPLY POWER TO THE RAM AIR ACTUATOR. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(3) If you replaced a modulation panel for the left pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |

(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-23-860-005**

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET MODULATION PANELS, LINKAGES AND ACTUATORS BEFORE YOU SUPPLY POWER TO THE RAM AIR ACTUATOR. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(4) If you replaced a modulation panel for the right pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |



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## F. Ram Air Inlet Modulation Panels Installation Test

SUBTASK 21-51-23-860-006

**WARNING** MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET AND EXIT DOORS, LINKAGES AND ACTUATORS BEFORE YOU DO THIS TEST. POSSIBLE INJURY TO PERSONNEL CAN OCCUR.

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-23-860-007

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 15 | C01355 | LANDING GEAR AIR/GND SYS 2 |
| C | 16 | C01356 | LANDING GEAR AIR/GND SYS 1 |
| D | 12 | C00310 | INDICATOR MASTER DIM BAT |
| D | 13 | C00311 | INDICATOR MASTER DIM BUS 1 |
| D | 14 | C00312 | INDICATOR MASTER DIM BUS 2 |
| D | 15 | C01401 | LANDING GEAR AIR/GND RELAY |
| E | 11 | C00313 | INDICATOR MASTER DIM SECT 1 |
| E | 12 | C00314 | INDICATOR MASTER DIM SECT 2 |
| E | 13 | C00315 | INDICATOR MASTER DIM SECT 3 |
| E | 14 | C00316 | INDICATOR MASTER DIM SECT 4 |
| F | 11 | C00317 | INDICATOR MASTER DIM SECT 5 |
| F | 12 | C00318 | INDICATOR MASTER DIM SECT 6 |

SUBTASK 21-51-23-860-008

(3) If you replaced the modulation panels for the left pack, do these steps:

(a) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 5 | C00259 | AIR CONDITIONING BLEED AIR VALVE ISLN |
| A | 7 | C00796 | AIR CONDITIONING BLEED AIR VALVES L |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-23-860-009

(4) If you replaced the modulation panels for the right pack, do these steps:

(a) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 5 | C00259 | AIR CONDITIONING BLEED AIR VALVE ISLN |
| B | 7 | C00797 | AIR CONDITIONING BLEED AIR VALVES R |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |



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(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

SUBTASK 21-51-23-860-010

(5) Set these switches, on the P5-10 Bleed Air Control Module, to OFF:

(a) BLEED 1

(b) BLEED 2

(c) APU BLEED

(d) L PACK

(e) R PACK

SUBTASK 21-51-23-730-001

(6) Disconnect the electrical connector D15832 (D15836) from the left (right) pack flow control and shutoff valve.

SUBTASK 21-51-23-010-001

**WARNING**

KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, DRIVE MECHANISMS AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU OPERATE THEM WITH ELECTRICAL OR HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(7) Extend the trailing edge flaps to Flaps Position 1 (TASK 27-51-00-860-803).

SUBTASK 21-51-23-860-011

(8) Put the airplane in the air mode (TASK 32-09-00-860-801).

SUBTASK 21-51-23-700-001

(9) Make sure that the ram air inlet deflector door closes and is faired with the ram air inlet ramp.

SUBTASK 21-51-23-860-012

(10) Make sure that the left (right) modulation panels move in the direction of the closed position.

SUBTASK 21-51-23-730-002

(11) Retract the trailing edge flaps to the full up position (TASK 27-51-00-860-804).

SUBTASK 21-51-23-730-003

(12) Make sure that the left (right) modulation panels move in the direction of the closed position.

SUBTASK 21-51-23-010-002

(13) Disconnect the electrical connector D3916 (D3918) from the left (right) ram air sensor.

SUBTASK 21-51-23-730-004

(14) Make sure that the ram air inlet modulation panels move to a more open position.

SUBTASK 21-51-23-410-001

(15) Connect the electrical connector D3916 (D3918) to the left (right) ram air sensor.

SUBTASK 21-51-23-410-002

(16) Make sure that the ram air inlet modulation panels move to a more closed position.

SUBTASK 21-51-23-860-013

(17) Extend the trailing edge flaps to Flaps Position 1 (TASK 27-51-00-860-803).

SUBTASK 21-51-23-860-014

(18) Make sure that the left (right) ram air inlet modulation panels move to a more open position.



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SUBTASK 21-51-23-860-015

(19) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 21-51-23-730-005

(20) Make sure that the ram air inlet modulation panels move to a more open position.

SUBTASK 21-51-23-700-002

(21) Make sure that the ram air inlet deflector door opens to the fully deployed position.

SUBTASK 21-51-23-860-016

(22) Connect the electrical connector D15832 (D15836) to the left (right) pack flow control and shutoff valve.

SUBTASK 21-51-23-220-001

(23) If the modulation panels do not move smoothly, do this task: Ram Air Inlet Deflector Door and Modulation Panels Adjustment, TASK 21-51-22-400-803.

SUBTASK 21-51-23-740-001

(24) Do this ground test: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

(a) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(b) If FAILED shows, then do the fault isolation procedure for the maintenance message.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-23-410-003

(1) Close the applicable access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

——— END OF TASK ———



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# RAM AIR DUCTS - REMOVAL/INSTALLATION

## 1. General

A. This procedure contains two tasks:

(1) A removal of the ram air ducts

(2) An installation of the ram air ducts.

B. Each pack has a ram air inlet duct and a ram air exhaust duct.

(1) The ram air inlet duct has an anti-static coating that prevents the build up of electric charge on the surface of the duct.

(2) A bonding check is required after the installation of the ram air inlet duct to verify that the ground path is satisfactory.

**TASK 21-51-24-000-801**

## 2. Ram Air Ducts Removal

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-51-23-000-801 | Ram Air Inlet Modulation Panels Removal (P/B 401) |
| 21-51-27-000-801 | Ram Air Exhaust Actuator - Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 191HL | Ram Air Inlet Lip Panel - Forward |
| 191HR | Ram Air Inlet Lip Panel - Forward |
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### D. Prepare for the Removal

**SUBTASK 21-51-24-860-001**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-24-860-002**

(2) Do these steps on the P5-10 air conditioning panel (installed on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO-NOT-OPERATE tags.



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(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(c) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

SUBTASK 21-51-24-010-001

(3) To remove the left ram air inlet duct, do these steps:

Remove this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

Remove this access panel:

| Number | Name/Location |
|---|---|
| 191HL | Ram Air Inlet Lip Panel - Forward |

SUBTASK 21-51-24-010-002

(4) To remove the right ram air inlet duct, do these steps:

Remove this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

Remove this access panel:

| Number | Name/Location |
|---|---|
| 191HR | Ram Air Inlet Lip Panel - Forward |

SUBTASK 21-51-24-010-003

(5) To get access to bolts [8] on the front of the transition duct [2] inlet, remove the applicable ram air inlet modulation panels. To remove them, do this task: Ram Air Inlet Modulation Panels Removal, TASK 21-51-23-000-801.

SUBTASK 21-51-24-010-004

(6) To get access to the left ram air exhaust duct [26],

open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-24-010-005

(7) To get access to the right ram air exhaust duct [26], open these access panels in the sequence that follows:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Ram Air Inlet Duct Removal

SUBTASK 21-51-24-030-001

(1) Do these steps to disconnect the flexible hose [17] between the NGS heat exchanger [19] and the aft, top portion of the left heat exchanger inlet duct [1]:



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(a) Loosen the two hose clamps [18] that attach the flexible hose [17] to the NGS heat exchanger [19] and the heat exchanger inlet duct [1].

(b) Move the end of the flexible hose [17] off of the end of heat exchanger inlet duct [1].

**SUBTASK 21-51-24-020-001**

(2) Do these steps to remove the heat exchanger inlet duct [1]:

(a) Remove the bolt [20] and the washers [21] that hold each bonding jumper [22] to the airplane structure.

NOTE: These bolts are longer to accommodate the bonding jumper. Keep them separate from the other bolts for the installation.

(b) Remove the bolts [4], and the washers [5].

(c) Loosen the clamps [6].

(d) Move the end of the flexible hose [3] off the heat exchanger inlet duct [1].

(e) Move the heat exchanger inlet duct [1] down to disengage the upper flange from the retainer on the lower wing beam.

**SUBTASK 21-51-24-020-002**

(3) Remove the clamps [6].

**SUBTASK 21-51-24-020-003**

(4) Remove the flexible hose [3] from the transition duct [2].

**SUBTASK 21-51-24-020-004**

(5) Do these steps to remove the transition duct [2]:

(a) Open the clamp [7] that holds the transition duct [2].

(b) Remove the bolts [8] and the washers [9].

(c) Remove the transition duct [2].

**SUBTASK 21-51-24-480-001**

(6) Put covers on the duct openings to keep out unwanted materials.

## F. Ram Air Exit Duct Removal

**SUBTASK 21-51-24-020-005**

(1) Remove the ram air exhaust actuator [34]: Ram Air Exhaust Actuator - Removal, TASK 21-51-27-000-801.

**SUBTASK 21-51-24-020-006**

(2) Do these steps to remove the ram air exhaust duct [26]:

(a) Loosen the aft clamp [32].

(b) Move the aft end of the flexible duct [40] forward off of the ram air exhaust duct [26].

(c) Disconnect bonding jumper [36] and bonding jumper [37] from the rear spar [35] as follows:

1) Remove the nut [39] and washer [38].

2) Remove the bonding jumper [36] and bonding jumper [37]].

(d) Support the ram air exhaust duct [26] while you remove the bolts [16] and bolts [27].

(e) Lower the ram air exhaust duct [26] out of the aircraft.

(f) Do these steps to remove the elbow [10]:

1) Remove the bolts [12] and washers [13] at the 7 locations without the bonding jumper.



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2) At the flange location with the bonding jumper, remove the bolt [28], washer [29], bonding jumper [30] and washer [31].

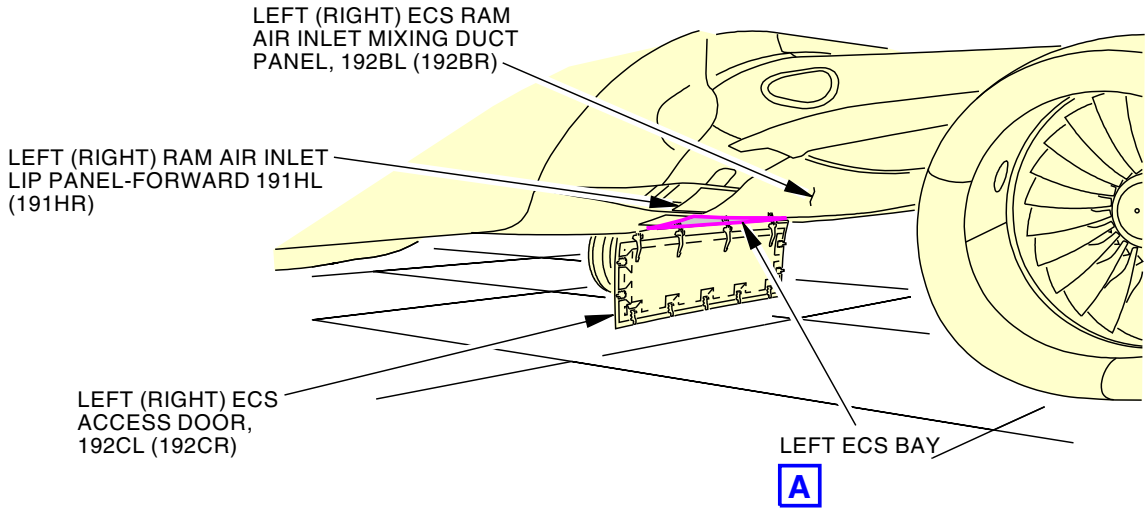
3) Remove the elbow [10] along with the flexible duct [40].

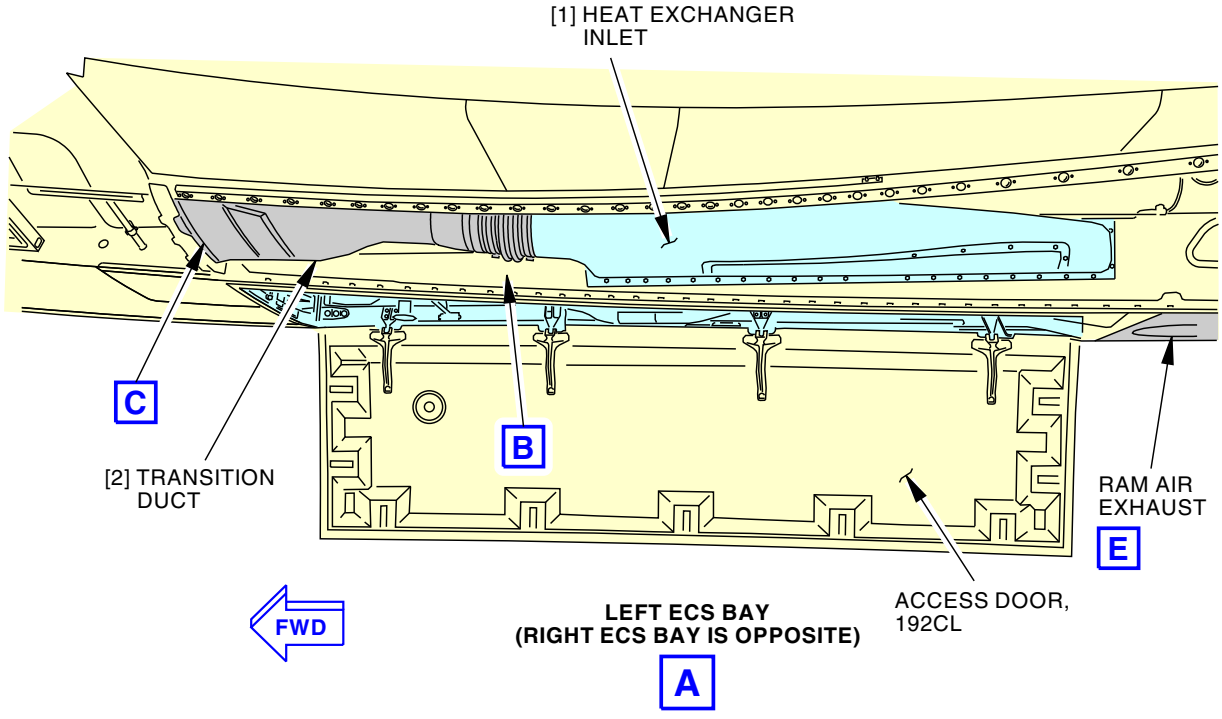
(g) Put a cover on the opening to the plenum/diffuser to keep out unwanted material.

**——— END OF TASK ———**



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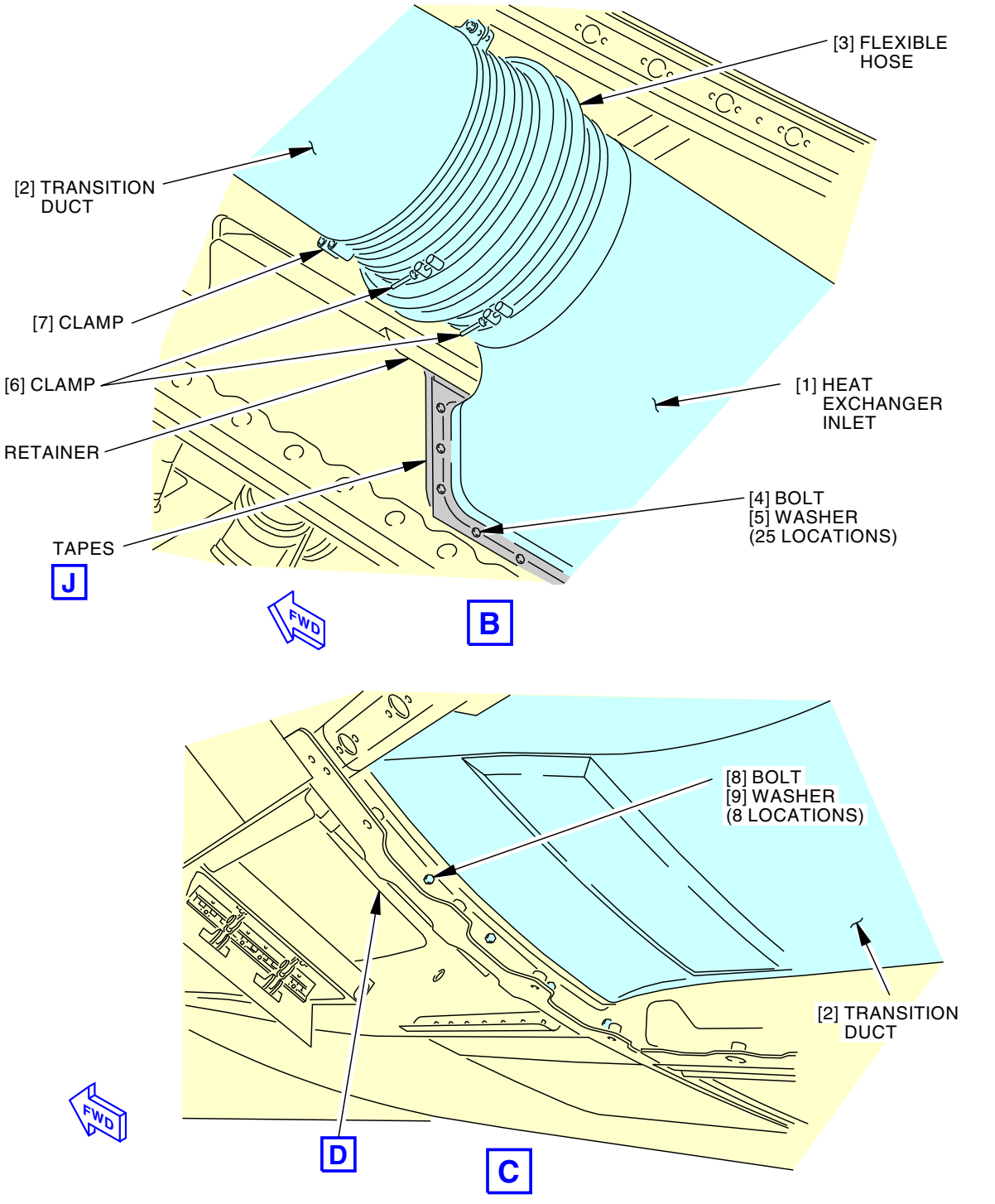




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**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 1 of 7)**



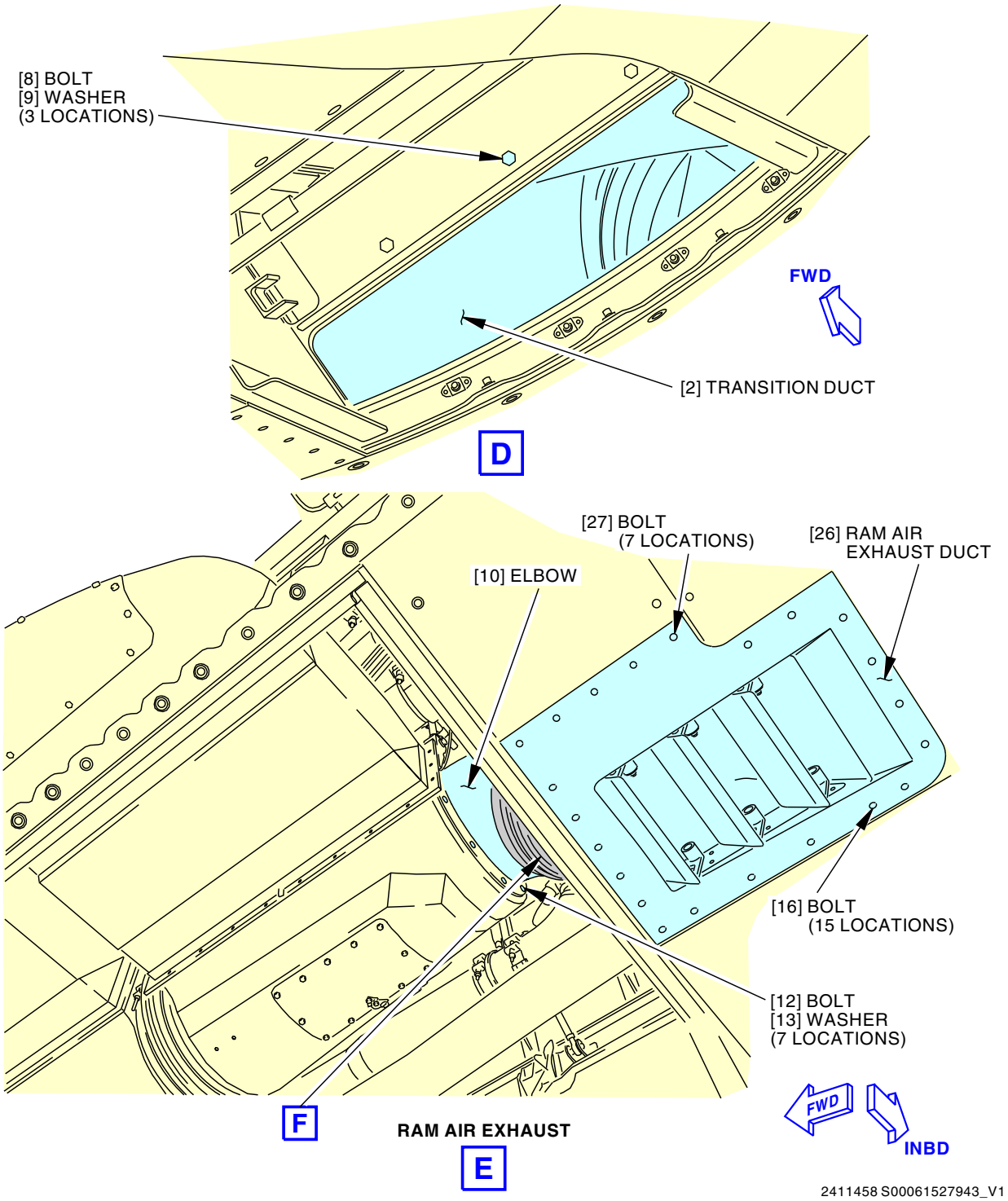
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 2 of 7)**



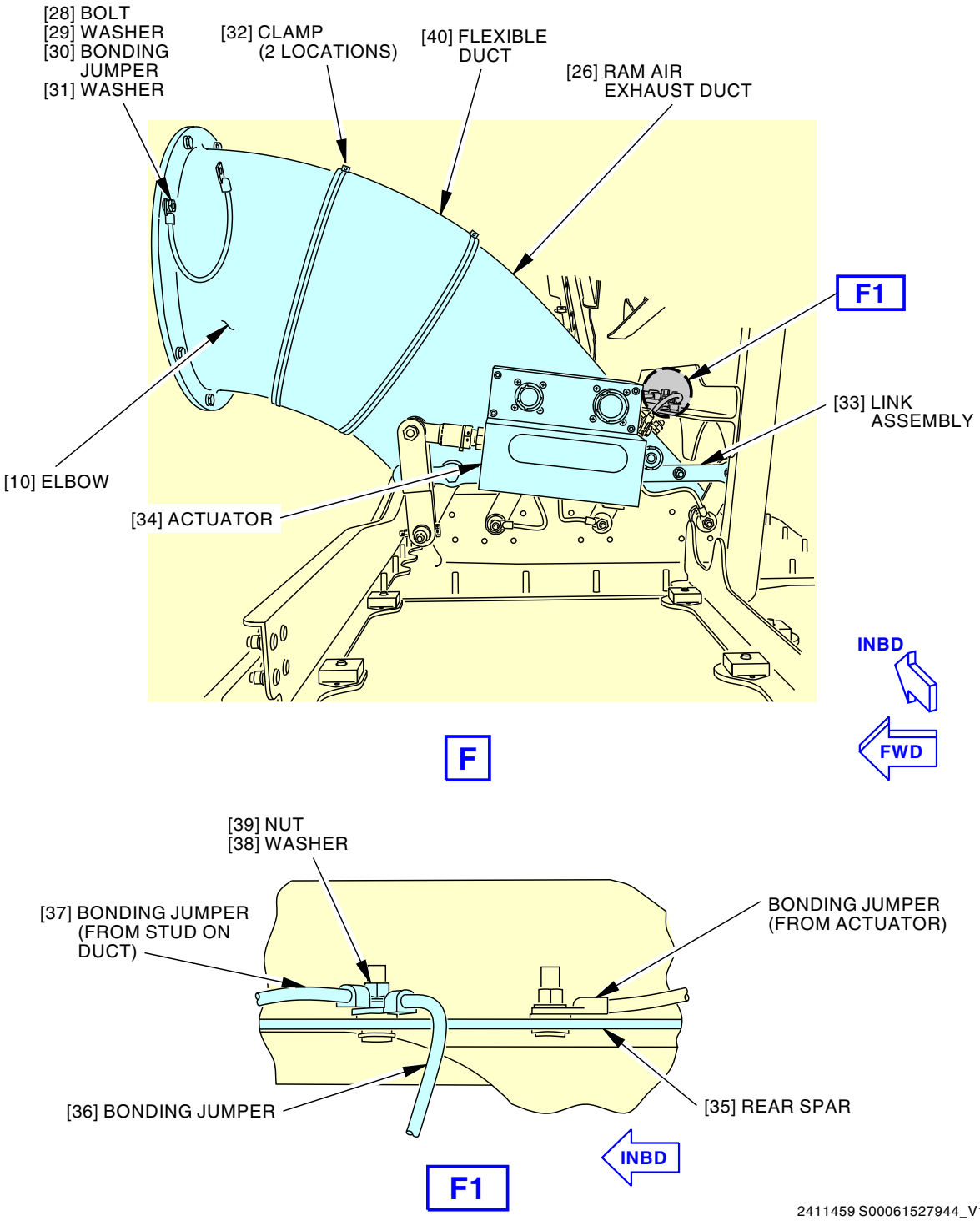
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 3 of 7)**



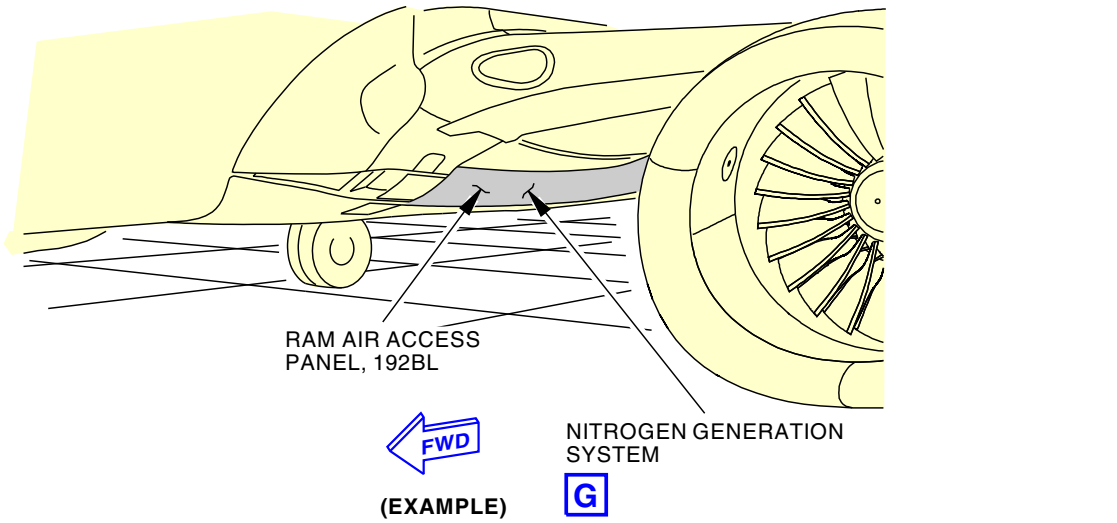
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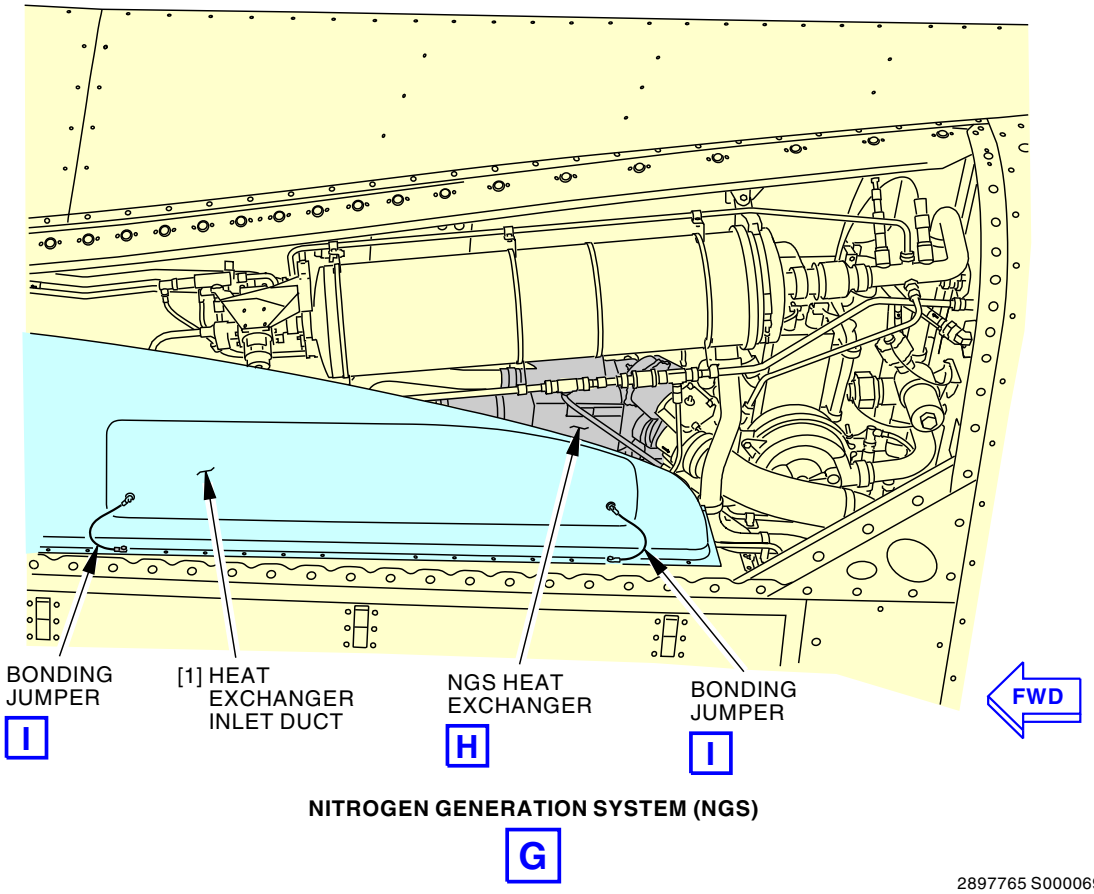



**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 4 of 7)**



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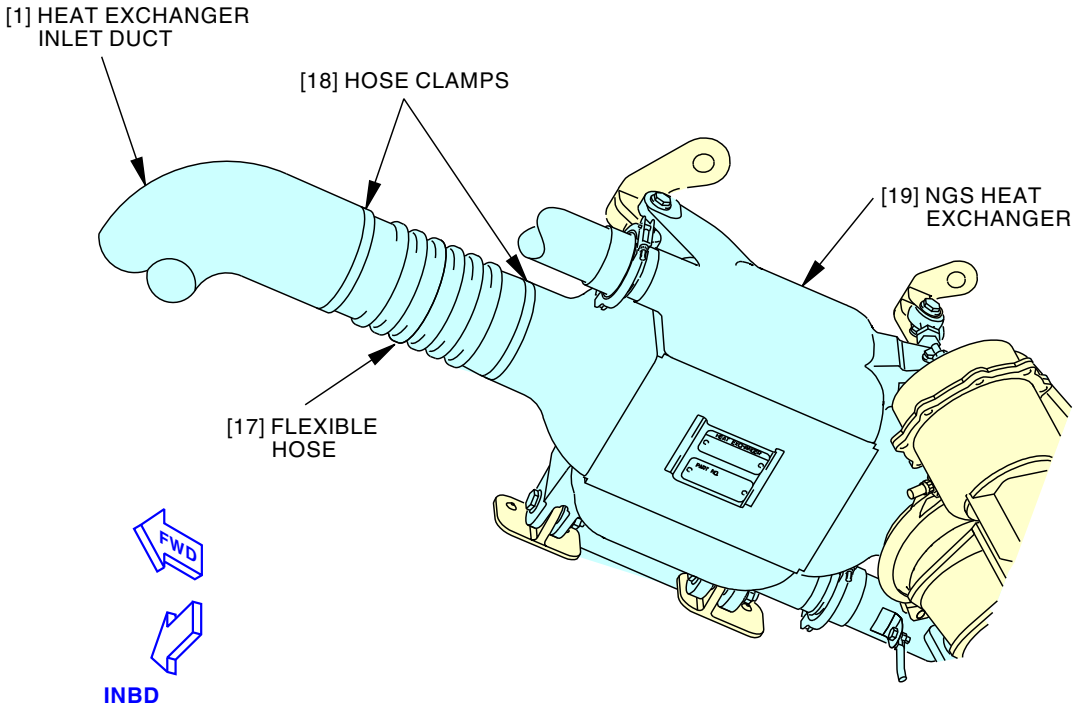




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**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 5 of 7)**

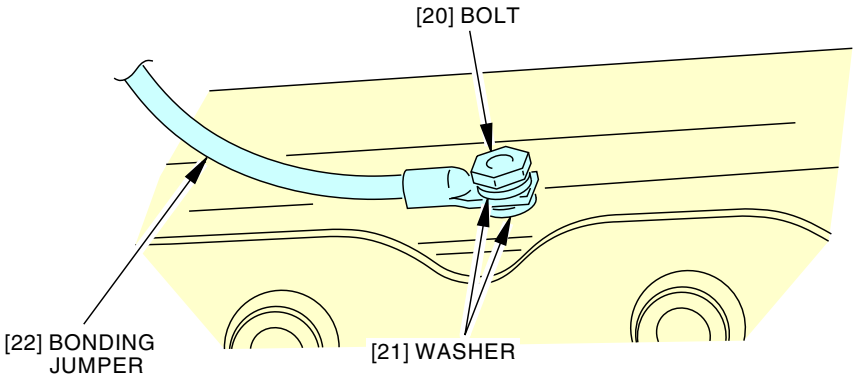


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**NGS HEAT EXCHANGER**

**H**




**BONDING JUMPER (EXAMPLE)**

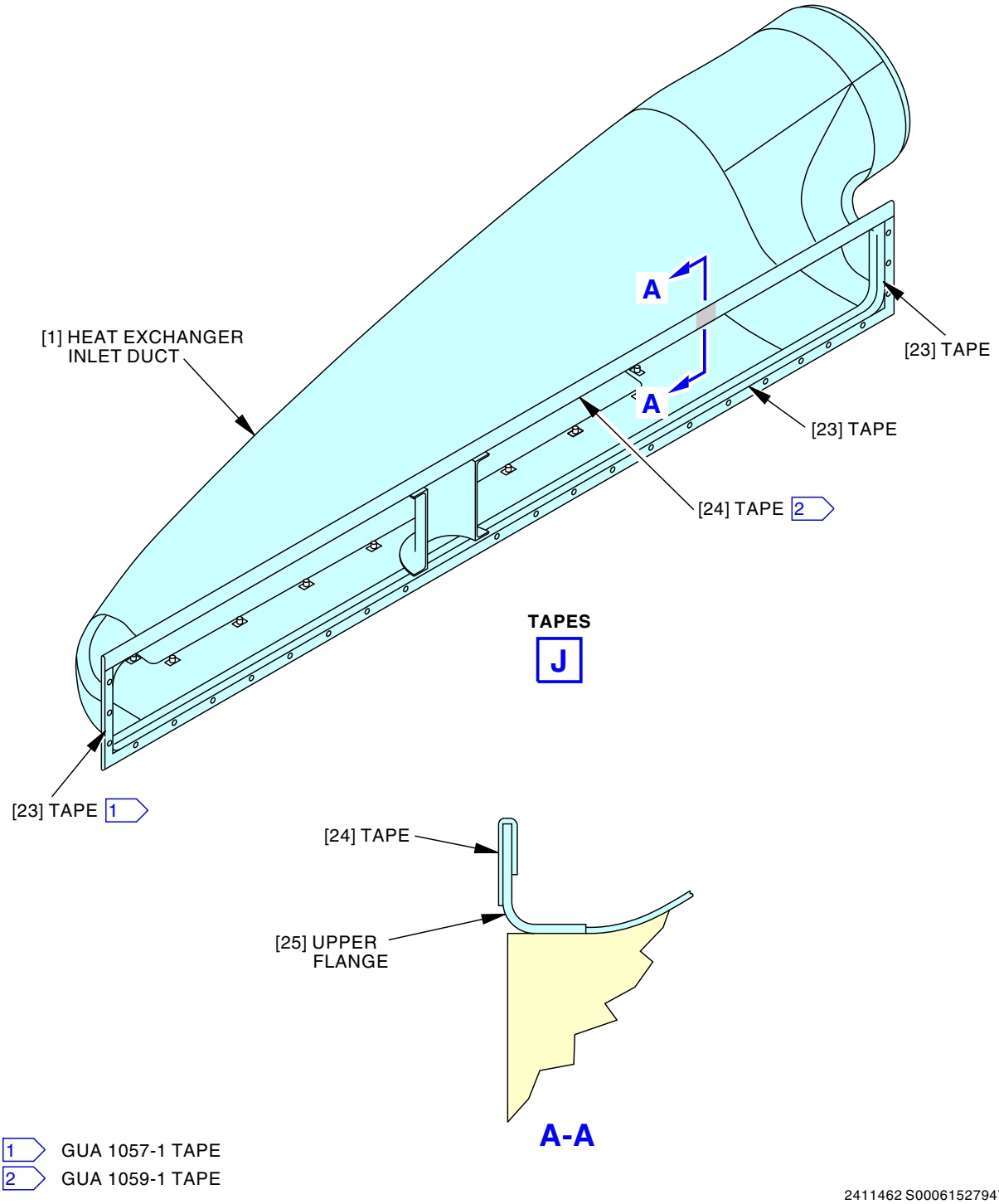
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**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 6 of 7)**



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**Ram Air Ducts Installation**
**Figure 401/21-51-24-990-801 (Sheet 7 of 7)**



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**TASK 21-51-24-400-801**

**3. Ram Air Ducts Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 21-51-23-400-801 | Ram Air Inlet Modulation Panels Installation (P/B 401) |
| 21-51-27-400-801 | Ram Air Exhaust Actuator - Installation (P/B 401) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-614 | Bonding Meters - Non-Intrinsically Safe (For use in outside Class I, Divisions I & II non-hazardous locations. For hazardous locations, use COM-1550).<br>Part #: 247000 Supplier: 00426<br>Part #: 620LK Supplier: 1CRL2<br>Part #: BLR-0003-XX Supplier: KC432<br>Part #: BT51 Supplier: 00426<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659<br>Opt Part #: 247001 Supplier: 00426 |

**C. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00062 | Solvent - Acetone (99.5% Grade) | ASTM D 329 (Supersedes O-A-51) |
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00766 | Primer - Nonchromated Primer For Composites | BMS10-103 Type I |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02424 | Tape - Skyflex Noise Reduction - GUA1057-1, GUA1059-1, GUA1057-144 | |
| G50637 | Wiper - MicroCare Fiber Wipes | |

**D. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Heat exchanger inlet duct | 21-51-24-04A-160 | SIA ALL |
| | | 21-51-24-04B-165 | SIA ALL |


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(Continued)

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Transition duct | 21-51-24-04A-115 | SIA ALL |
| | | 21-51-24-04B-120 | SIA ALL |

**E. Location Zones**

| Zone | Area |
|---|---|
| 118 | Electrical and Electronics Compartment - Right |
| 212 | Flight Compartment - Right |

**F. Access Panels**

| Number | Name/Location |
|---|---|
| 191HL | Ram Air Inlet Lip Panel - Forward |
| 191HR | Ram Air Inlet Lip Panel - Forward |
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Ram Air Inlet Duct Inspection**

**SUBTASK 21-51-24-210-001**

(1) Inspect the tape [23] and tape [24] on the flange of the heat exchanger inlet duct [1] for these conditions:

(a) Missing or damaged sections

(b) Presence of oil or grease

(c) Dirt or debris.

**SUBTASK 21-51-24-360-001**

(2) Remove any damaged or unserviceable section of tape.

**SUBTASK 21-51-24-160-001**

(3) Clean the section of the duct flange where tape is to be installed as follows:

(a) Remove any fragments of tape from the flange surface where the new tape will be applied.

(b) Clean the flange surface with a cotton wiper, G00034, wet with solvent, B00083, until surface is clean.

(c) Dry the cleaned surfaces with a cotton wiper, G00034, until all traces of the solvent are removed.

**SUBTASK 21-51-24-420-001**

(4) Install a new section of GUA1057-1, GUA1059-1, GUA1057-144 tape, G02424, on the duct flange.

(a) GUA 1057-1 for tape [23].

(b) GUA 1059-1 for tape [24].

(c) Cut the tape to the required length.

(d) Install the tape on the flange surface.

1) Do not stretch or wrinkle the tape as you place it on the flange.



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2) Make sure that you install the tape [24] on the upper flange [25] so that it wraps over the top of the flange and onto the back surface of the flange.

(e) If it is necessary, cut holes in the tape at the bolt locations.

## H. Ram Air Inlet Duct Installation

**SUBTASK 21-51-24-080-001**

(1) Remove the covers from the duct openings.

**SUBTASK 21-51-24-420-002**

(2) Do these steps to install the transition duct [2]:

(a) Put the transition duct [2] in its position.

(b) Install the bolts [8] and washers [9].

(c) Install the clamp [7] on the transition duct [2].

1) Tighten the clamp [7] to 40 ±5 in-lb (5 ±1 N·m).

(d) Install the flexible hose [3] and clamp [6] on the transition duct [2].

1) Make sure that the clamp [6] is not installed on the duct bead.

2) Keep a 0.125 in. (3.2 mm) minimum distance between the clamp and the edge of the flexible hose [3].

**SUBTASK 21-51-24-420-003**

(3) Do these steps to install the heat exchanger inlet duct [1]:

(a) Loosely put the other clamp [6] on the flexible hose [3].

(b) Put the heat exchanger inlet duct [1] in its position on the lower wing beam.

1) Make sure that the top flange is in the retainer on the lower wing beam.

2) Make sure that the flexible hose [3] is on the forward end of the heat exchanger inlet duct [1].

(c) Install the bolts [4] and washers [5] that attach the heat exchanger inlet duct [1] to the lower wing beam.

(d) Install the bolts [20], washers [21], and bonding jumpers [22] that hold the ram air inlet duct to the airplane structure.

1) Make sure that the bolts [20] are the same length as the ones that were removed.

2) Clean the mating surfaces of the bolts [20], washers [21], and bonding jumpers [22].

a) Use solvent, B00148, or solvent, B00062, to clean the mating surfaces.

b) Remove all traces of the solvent with MicroCare fiber wipes, G50637.

3) Install washer [21] between the bonding jumper [22] and bolt [20] head.

4) Make sure that the washer [21] is installed with the countersink next to the bolt [20] head.

5) Install washer [21] between the heat exchanger inlet duct [1] and bonding jumper [22].

(e) Make sure that the electrical bonding resistance between the heat exchanger inlet duct [1] and airplane structure is less than 300,000 ohms.

1) Measure the electrical bonding resistance between BMS10-21 anti-static coating, of the heat exchanger inlet duct [1] and bolt [20] (SWPM 20-20-00).

2) The measurement point on the duct surface must be more than 0.25 in. (6.4 mm) away from the bolt [20].



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3) If it is necessary, you can remove a small area of the surface finish to gain access to the anti-static coating of the ram air inlet duct.

4) Measure electrical bonding resistance between the bolt [20] and airplane structure near the bonding jumper (SWPM 20-20-00).

5) If it is necessary, you can remove a small area of the surface finish to gain access to the bare metal of the airplane structure.

6) If the resistance measurement is not satisfactory, then disassemble the bonding connection, clean the mating surfaces, and repeat the bonding connection installation.

7) Put a thin coating of BMS10-103, on the surface of the ram air inlet duct after the measurement is completed.

8) If the surface finish of the airplane structure was removed for the measurement, then repair the surface finish.

(f) Install the other clamp [6] on the flexible hose [3].

1) Make sure that the clamp [6] is not installed on the duct bead.

2) Keep a 0.125 in. (3.2 mm) minimum distance between the clamp [6] and the edge of the flexible hose [3].

**SUBTASK 21-51-24-430-001**

(4) Connect the heat exchanger inlet duct [1] to the NGS heat exchanger [19] at the area above the aft, top portion of the left heat exchanger inlet duct [1].

(a) Move the end of the flexible hose [17] over the end of the cooling duct from the heat exchanger inlet duct [1].

(b) Tighten the hose clamp [18] to 15.5 ±2.5 in-lb (1.8 ±0.3 N·m).

**SUBTASK 21-51-24-410-001**

(5) Install the ram air inlet modulation panels, do this task: Ram Air Inlet Modulation Panels Installation, TASK 21-51-23-400-801.

## I. Ram Air Exit Duct Installation

**SUBTASK 21-51-24-010-006**

(1) Remove the cover from the duct opening.

**SUBTASK 21-51-24-420-004**

(2) Do these steps to install the elbow [10]:

(a) Put the elbow [10] and flexible duct [40] in position.

(b) Install the bolts [12] and washers [13] without the bonding jumper [30].

(c) Put the bonding jumper [30] in position and install the bolt [28], washer [29], and washer [31].

1) Install the bonding jumper [30] between the washer [29] and washer [31] with the countersunk side of the washer [29] under the head of the bolt [28].

(d) Measure the electrical bonding resistance between the bonding jumper [30] terminal and anti-static coating on the elbow [10] (SWPM 20-20-00).

(e) Make sure that the bonding resistance is less than 300,000 ohms.

(f) After the resistance check, apply primer, C00766, on exposed anti-static primer area around the ground stud.



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SUBTASK 21-51-24-420-005

(3) Do these steps to install the ram air exhaust duct [26]:

(a) Put the ram air exhaust duct [26] into its installed position.

(b) Install the bolts [16] and bolts [27] that attach the duct to the airplane structure.

1) Make sure that the longer bolts [27] are installed in the locations around the ram air exhaust actuator [34].

(c) Install the aft end of the flexible duct [40] onto the ram air exhaust duct [26].

(d) Install the clamp [32] onto the ram air exhaust duct [26] as follows:

1) Make sure that the clamp [32] is not installed on the duct bead.

2) Tighten the aft clamp [32] to 13 in-lb (1.47 N·m) - 17 in-lb (1.92 N·m).

SUBTASK 21-51-24-420-006

(4) Install bonding jumper [36] and bonding jumper [37].

(a) Put the bonding jumper [36] and bonding jumper [37] in their position on the rear spar.

(b) Install the washer [38] and nut [39].

(c) Keep the ground stud from turning and tighten the nut [39] to 28 in-lb (3.16 N·m) – 35 in-lb (3.95 N·m).

(d) Measure the electrical bonding resistance between the bonding jumper terminal and structure where the ground stud is installed (SWPM 20-20-00).

1) Use the non-intrinsically safe bonding meter, COM-614.

2) Put one ohmmeter probe on the top bonding jumper terminal and other probe on the structure close to the ground stud.

3) Make sure the electrical bonding resistance is 0.001 ohm (1.0 milliohm) or less.

SUBTASK 21-51-24-410-002

(5) Install the ram air exhaust actuator, do this task: Ram Air Exhaust Actuator - Installation, TASK 21-51-27-400-801.

## J. Ram Air Ducts Installation Test

SUBTASK 21-51-24-860-003

(1) Remove the DO-NOT-OPERATE tags from these switches, on the P5-10 air conditioning panel:

(a) The L PACK and R PACK switches

(b) The BLEED 1 and BLEED 2 switches

(c) The BLEED APU switch.

SUBTASK 21-51-24-860-005

(2) Operate the applicable air conditioning pack, do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

SUBTASK 21-51-24-790-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(3) Make sure that there is no air leakage at the applicable ram air duct connections.



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## K. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-24-860-006

(1) Shut down the applicable air conditioning pack, do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

SUBTASK 21-51-24-410-003

(2) Install this access panel:

| Number | Name/Location |
|---|---|
| 192BL | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-24-410-004

(3) Install this access panel:

| Number | Name/Location |
|---|---|
| 191HL | Ram Air Inlet Lip Panel - Forward |

SUBTASK 21-51-24-410-005

(4) Install this access panel:

| Number | Name/Location |
|---|---|
| 192BR | ECS Ram Air Inlet Mixing Duct Panel - Forward |

SUBTASK 21-51-24-410-006

(5) Install this access panel:

| Number | Name/Location |
|---|---|
| 191HR | Ram Air Inlet Lip Panel - Forward |

SUBTASK 21-51-24-410-007

(6) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-24-410-008

(7) Close these access panels, in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**——— END OF TASK ———**



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## RAM AIR DUCTS - REPAIRS

### 1. General

A. This procedure gives instructions for the repair of the ram air inlet and ram air exhaust ducts.

**TASK 21-51-24-340-801**

### 2. Resin Damage - Fiberglass Ducts

#### A. General

(1) This procedure gives instructions for the repair of a fiberglass ram air duct with an application of resin.

(2) A resin damage repair is applicable when there are no holes or punctures in the ram air duct but one of these defects are present:

(a) Exposed fibers

(b) Soft areas from impact damage

(c) Delamination

(d) Loss of resin or voids

#### B. References

| Reference | Title |
|---|---|
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-122 | Brush |
| STD-854 | Syringe - Hypodermic |

#### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00094 | Solvent - Toluene | A-A-59107 |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00766 | Primer - Nonchromated Primer For Composites | BMS10-103 Type I |
| C00767 | Coating - Anti-Static Coating | BMS10-21 Type III |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02428 | Abrasive - Aluminum Oxide Paper, 150 grit | A-A-1048 |
| G02451 | Resin - Composite Structural Repair, 2 Part (150F Cure) | BMS8-301 Class 2 |
| G50104 | Film, FEP or TFE Solid Parting Film, .001 inch Thick Minimum | |
| G50381 | Abrasive - Aluminum Oxide Paper, 180 Grit | |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |



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## E. Prepare for the Repair

SUBTASK 21-51-24-860-008

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-51-24-840-001

(2) Remove the damaged duct from the airplane. To remove the duct, do this task: Ram Air Ducts Removal, TASK 21-51-24-000-801

SUBTASK 21-51-24-840-002

(3) Do these steps to prepare the damaged area of the duct:

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct repair area.

(b) Sand the damaged area to remove any unwanted contamination from the duct.

(c) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.

SUBTASK 21-51-24-840-003

(4) Prepare the applicable resin:

(a) Ram air inlet duct repair - resin, G50400

(b) Ram air exhaust duct repair - resin, G02451

## F. Repair the Air Conditioning Duct

SUBTASK 21-51-24-340-001

(1) Use resin, G50400 to repair the damaged area of the ram air inlet duct:

(a) Use a brush, STD-122 or hypodermic syringe, STD-854 to apply the resin to the damaged area of the duct.

(b) Apply a thin, smooth layer of the resin to the damaged area of the duct.

(c) Put a piece of solid parting film, G50104 on the duct and press lightly to remove any bubbles or any wrinkles and to remove unwanted resin.

(d) Remove the solid parting film, G50104 from the duct and remove any unwanted resin with a wiping cloth.

(e) Do one of these steps to cure the resin:

1) Permit the resin, G50400 to cure for a minimum of 30 minutes at 150°, ± 10° F.

2) Permit the resin, G50400 to cure for 24 hours at room temperature (70° F minimum).

SUBTASK 21-51-24-340-002

(2) Use resin, G02451 to repair the damaged area of the ram air exhaust duct.

(a) Use a brush, STD-122 or hypodermic syringe, STD-854 to apply the resin to the damaged area of the duct.

(b) Apply a thin, smooth layer of the resin to the damaged area of the duct.



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(c) Put a piece of solid parting film, G50104 on the duct and press lightly to remove any bubbles or any wrinkles and to remove unwanted resin.

(d) Remove the solid parting film, G50104 from the duct and remove any unwanted resin with a wiping cloth.

(e) Permit the resin, G02451 to cure for 3 hours, ± 10 minutes at 150°, ± 10° F.

SUBTASK 21-51-24-340-003

(3) If the repair was made to the outer surface of the ram air inlet duct access panel, do the steps that follow:

(a) Hand sand the surface with 180 grit abrasive paper, G50381 or finer abrasive paper to remove the glossy finish.

(b) Remove the dust with a cotton wiper, G00034.

(c) Prior to the application of the coating, C00767, clean the surface with solvent, B00094 and a cotton wiper, G00034.

(d) Apply the coating, C00767 by spray to a dry film thickness of 0.4 mil (0.010 mm) to 0.8 mil (0.020 mm).

(e) Allow the coating, C00767 to cure a minimum of 2 hours at 60°F (16°C) or 30 minutes at 140°F (60°C).

(f) Hand sand the surface with 150 grit abrasive paper, G02428 or finer abrasive paper.

(g) Remove the dust with a cotton wiper, G00034.

(h) Apply the primer, C00766 by spray to a dry film thickness of 0.5 mil (0.013 mm) to 0.8 mil (0.020 mm).

(i) Allow the primer, C00766 to cure a minimum of 6 hours at 60°F (16°C) or 40 minutes at 140°F (60°C).

**G. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-51-24-840-004

(1) Install the repaired duct on the airplane. To install the duct, do this task: Ram Air Ducts Installation, TASK 21-51-24-400-801

**——— END OF TASK ———**

**TASK 21-51-24-340-802**

**3. External Patch - Fiberglass Ducts**

(Figure 801)

**A. General**

(1) This procedure gives instructions for the repair of a crack or cut in a fiberglass ram air duct with an external patch.

(2) An external patch is applicable when the cut or the crack is less than 0.25 in. (6.35 mm) wide and is less than 3 in. (76 mm) long.

**B. References**

| Reference | Title |
|---|---|
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |



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## C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00094 | Solvent - Toluene | A-A-59107 |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00766 | Primer - Nonchromated Primer For Composites | BMS10-103 Type I |
| C00767 | Coating - Anti-Static Coating | BMS10-21 Type III |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02428 | Abrasive - Aluminum Oxide Paper, 150 grit | A-A-1048 |
| G02451 | Resin - Composite Structural Repair, 2 Part (150F Cure) | BMS8-301 Class 2 |
| G50104 | Film, FEP or TFE Solid Parting Film, .001 inch Thick Minimum | |
| G50381 | Abrasive - Aluminum Oxide Paper, 180 Grit | |
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |

## D. Prepare for the Repair

SUBTASK 21-51-24-840-005

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-51-24-840-006

(2) Remove the damaged duct from the airplane. To remove the duct, do this task: Ram Air Ducts Removal, TASK 21-51-24-000-801

SUBTASK 21-51-24-840-007

(3) Do these steps to prepare the damaged area of the duct.

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct repair area.

(b) Drill a hole at each end of the cut or crack to prevent the cut or crack from getting larger. The holes should be a maximum of 0.062 in. (1.57 mm) diameter.

(c) Sand the damaged area to remove any unwanted contamination from the duct.

(d) Use the solvent, B00148 and a cotton wiper, G00034 to clean the duct joint area.


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SUBTASK 21-51-24-340-004

(4) Cut sufficient pieces of the fiberglass glass fabric, G00031 to equal the thickness of the duct. Cut the fiberglass glass fabric, G00031 pieces 0.5 in. (12.7 mm) larger on all sides than the damage. Round the corners of the pieces of the fiberglass fabric.

SUBTASK 21-51-24-340-005

(5) Prepare the applicable resin:

(a) Ram air inlet duct repair - resin, G50400

(b) Ram air exhaust duct repair - resin, G02451

## E. Repair the Air Conditioning Duct

SUBTASK 21-51-24-340-006

(1) Apply a thin, smooth layer of the applicable resin, G50400 or resin, G02451 to the duct where the fiberglass fabric will be applied. Make sure the area of the resin is a minimum of the size and shape of the fiberglass fabric pieces.

SUBTASK 21-51-24-340-007

(2) Place a piece of the fiberglass fabric on the resin so that it extends beyond the cut or crack a minimum of 0.5 in. (12.7 mm) on all sides.

SUBTASK 21-51-24-340-008

(3) Soak the fiberglass fabric with the applicable resin.

SUBTASK 21-51-24-340-009

(4) Put a piece of solid parting film, G50104 on the fiberglass fabric and press lightly to remove any bubbles or any wrinkles and to remove unwanted resin.

SUBTASK 21-51-24-340-010

(5) Remove the solid parting film, G50104 from the fiberglass fabric piece and remove any unwanted resin with a wiping cloth.

SUBTASK 21-51-24-340-011

(6) Place another piece of the fiberglass fabric on the first piece, soak it with resin, and smooth it. Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

SUBTASK 21-51-24-340-012

(7) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-51-24-340-013

(8) If the repair was made to the outer surface of the ram air inlet duct access panel, do the steps that follow:

(a) Hand sand the surface with 180 grit abrasive paper, G50381 or finer abrasive paper to remove the glossy finish.

(b) Remove the dust with a cotton wiper, G00034.

(c) Prior to the application of the coating, C00767, clean the surface with solvent, B00094 and a cotton wiper, G00034.

(d) Apply the coating, C00767 by spray to a dry film thickness of 0.4 mil (0.010 mm) to 0.8 mil (0.020 mm).

(e) Allow the coating, C00767 to cure a minimum of 2 hours at 60°F (16°C) or 30 minutes at 140°F (60°C).

(f) Hand sand the surface with 150 grit abrasive paper, G02428 or finer abrasive paper.

(g) Remove the dust with a cotton wiper, G00034.



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(h) Apply the primer, C00766 by spray to a dry film thickness of 0.3 mil (0.008 mm) to 0.8 mil (0.020 mm).

(i) Allow the primer, C00766 to cure a minimum of 6 hours at 60°F (16°C) or 40 minutes at 140°F (60°C).

## F. Put the Airplane Back to Its Usual Condition

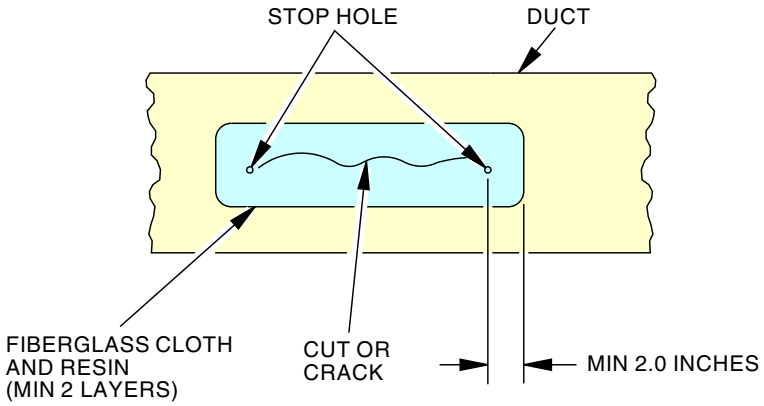
**SUBTASK 21-51-24-840-008**

(1) Install the repaired duct on the airplane. To install the duct, do this task: Ram Air Ducts Installation, TASK 21-51-24-400-801

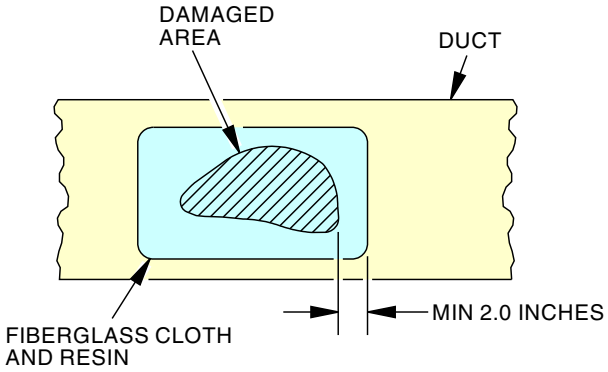
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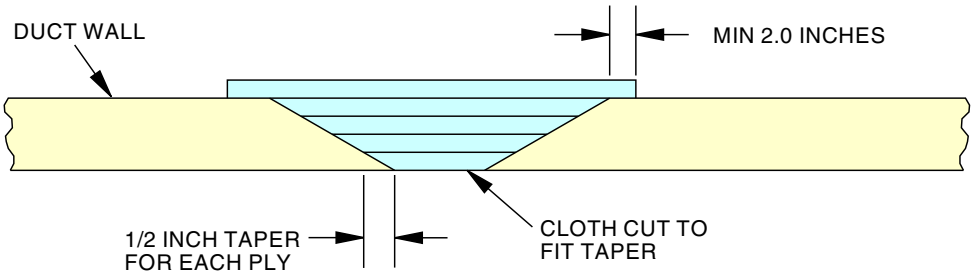
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**EXTERNAL PATCH - FIBERGLASS DUCT**




**STRUCTURAL REPAIR - FIBERGLASS - OVERHEAD VIEW**




**STRUCTURAL REPAIR - FIBERGLASS - CROSS-SECTION VIEW**

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**Ram Air Ducts Repair**
**Figure 801/21-51-24-990-802**



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**TASK 21-51-24-340-803**

## 4. Structural Repair - Fiberglass Ducts

(Figure 801)

### A. General

(1) This procedure gives instructions for making a structural repair to a fiberglass air conditioning duct.

(2) A structural repair is applicable when the damage to the air conditioning duct is a cut or a hole that is more than 0.25 in. (6.4 mm) wide and more than 3 in. (76.2 mm) long but less than 5 percent of the total surface area of the duct. If the damage is more than 5 percent of the total surface area of the duct, then replace the duct section.

### B. References

| Reference | Title |
|---|---|
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-94 | Bag - Vacuum |
| STD-122 | Brush |
| STD-821 | Squeegee - Plastic |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00094 | Solvent - Toluene | A-A-59107 |
| B00148 | Solvent - Methyl Ethyl Ketone (MEK) | ASTM D740 |
| C00766 | Primer - Nonchromated Primer For Composites | BMS10-103 Type I |
| C00767 | Coating - Anti-Static Coating | BMS10-21 Type III |
| G00031 | Fabric - Glass, Finished, For Resin Laminates | AMS-C-9084 Type VIIIA or VIIIB |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02428 | Abrasive - Aluminum Oxide Paper, 150 grit | A-A-1048 |
| G02451 | Resin - Composite Structural Repair, 2 Part (150F Cure) | BMS8-301 Class 2 |
| G50104 | Film, FEP or TFE Solid Parting Film, .001 inch Thick Minimum | |
| G50173 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type H-3 Style 7781 |
| G50381 | Abrasive - Aluminum Oxide Paper, 180 Grit | |
| G50399 | Resin - Fiberglass Layup, Long Worklife, Non-Brominated | BMS8-201 Type III (Supersedes BMS8-201 Type I) |



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(Continued)

| Reference | Description | Specification |
|---|---|---|
| G50400 | Resin - Fiberglass Layup, Short Worklife, Non-Brominated | BMS8-201 Type IV (Supersedes BMS8-201 Type II) |
| G50797 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type D Style 120 |
| G50798 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type D-1 Style 220 |
| G51266 | Fabric - Glass Fabric Reinforcements For Laminated Plastics Products | BMS9-3 Type H-2 Style 1581 |

## E. Prepare for the Repair

SUBTASK 21-51-24-840-009

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

SUBTASK 21-51-24-840-010

(2) Remove the damaged duct from the airplane. To remove the duct, do this task: Ram Air Ducts Removal, TASK 21-51-24-000-801.

SUBTASK 21-51-24-840-011

(3) Do these steps to prepare the damaged area of the duct.

(a) Cut away the damaged area to make a rounded opening with a smooth shape. Cut the sides of the opening at an angle to make a taper of 0.5 in. (12.7 mm) between each ply of material.

(b) Sand the edge of the opening to make a smooth surface.

(c) Sand the surface of the duct around the opening a distance of 0.5 in. (12.7 mm) for each ply in the duct. For example, if there are 6 plies, sand 3 in. (76.2 mm) from the opening on all sides (1/2 x 6 = 3 inches) or (12.7 x 6 = 76.2 millimeters).



**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(d) Use the solvent, B00148 and a cotton wiper, G00034 to clean the edge of the opening and the sanded surface of the duct.

SUBTASK 21-51-24-340-014

(4) Cut sufficient pieces of the fiberglass glass fabric, G00031, fabric, G50173, or fabric, G51266, to equal the thickness of the duct. Cut each piece of the fiberglass fabric 0.5 in. (12.7 mm) larger to fit the taper of the opening. Cut one piece of the fiberglass fabric a minimum of 2 in. (50.8 mm) larger on all sides than the opening in the duct.

SUBTASK 21-51-24-340-015

(5) Cut a piece of solid parting film, G50104, 2 in. (50.8 mm) to 3 in. (76.2 mm) larger on all sides than the opening. Cut a piece of cardboard or aluminum 2 in. (50.8 mm) to 3 in. (76.2 mm) larger than the opening on all sides.



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SUBTASK 21-51-24-340-016

(6) Attach the solid parting film, G50104, to the inside of the opening with adhesive tape so that it covers the opening. Attach the cardboard or aluminum to the inside of the opening with adhesive tape so that it covers the opening and provides support for the solid parting film, G50104.

SUBTASK 21-51-24-340-017

(7) Prepare the applicable resin:

(a) Ram air inlet duct repair - resin, G50399, or resin, G50400

(b) Ram air exhaust duct repair - resin, G02451

## F. Repair the Air Conditioning Duct

SUBTASK 21-51-24-340-018

(1) Apply a thin, smooth layer of resin, G50399, resin, G50400, or resin, G02451, to the solid parting film, G50104, in the opening in the duct.

SUBTASK 21-51-24-340-019

(2) Place a piece of the fiberglass fabric in the opening over the solid parting film, G50104, so that it covers the opening completely.

SUBTASK 21-51-24-340-020

(3) Soak the fiberglass fabric with the applicable resin.

SUBTASK 21-51-24-340-021

(4) Put a piece of solid parting film, G50104, on the fiberglass fabric and press lightly with a plastic squeegee, STD-821, or with your hand. Smooth from the center to the edges of the fiberglass fabric to remove bubbles or wrinkles and to remove unwanted resin.

SUBTASK 21-51-24-340-022

(5) Remove the solid parting film, G50104, from the patch and remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-51-24-340-023

(6) Place the next piece of the fiberglass fabric on the first piece so that it covers the opening. Trim the fiberglass fabric if necessary. Soak the fiberglass fabric with resin and smooth it. Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

SUBTASK 21-51-24-340-024

(7) Place the last piece of the fiberglass fabric on top of the patch so it extends beyond the opening a minimum of 2 in. (50.8 mm) on all sides. Smooth the fiberglass fabric to remove bubbles or winkles.

SUBTASK 21-51-24-340-025

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Wipe the duct around the patch with a cotton wiper, G00034, and solvent, B00148, to remove unwanted resin.

SUBTASK 21-51-24-340-026

(9) To cure resin, G50399, or resin, G50400, do this step (Structural Repair Manual (SRM) 51-30-10):



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(a) Allow the resin to cure for 24 hours at room temperature.

SUBTASK 21-51-24-340-043

(10) To cure resin, G02451, do these steps (SRM 51-30-10):

(a) Attach a vacuum bag, STD-94, to hold the repair layers and to keep the duct shape.

1) Cure for a minimum of 3 hours under a minimum of 22 in/Hg (75 kPa) at 150 ±10°F (66 ±6°C).

2) Decrease the temperature at a maximum rate of 5°F (3°C) for each minute.

3) Below 125°F (52°C), remove the vacuum bag, STD-94, without damage to the cured layers.

SUBTASK 21-51-24-840-012

(11) Remove the solid parting film, G50104, the cardboard or aluminum, and the adhesive tape you used to support the repair.

SUBTASK 21-51-24-340-027

(12) If the repair was made to the outer surface of the ram air inlet duct access panel, do the steps that follow:

(a) Hand sand the surface with 180 grit abrasive paper, G50381, or finer abrasive paper to remove the glossy finish.

(b) Remove the dust with a cotton wiper, G00034.

(c) Prior to the application of the coating, C00767, clean the surface with solvent, B00094, and a cotton wiper, G00034.

(d) Apply the coating, C00767, by spray to a dry film thickness of 0.4 mil (0.010 mm) to 0.8 mil (0.020 mm).

(e) Allow the coating, C00767, to cure a minimum of 2 hours at 60°F (16°C) or 30 minutes at 140°F (60°C).

(f) Hand sand the surface with 150 grit abrasive paper, G02428, or finer abrasive paper.

(g) Remove the dust with a cotton wiper, G00034.

(h) Apply the primer, C00766, by spray to a dry film thickness of 0.3 mil (0.008 mm) to 0.8 mil (0.020 mm).

(i) Allow the primer, C00766, to cure a minimum of 6 hours at 60°F (16°C) or 40 minutes at 140°F (60°C).

**G. Repair the Beaded End**

NOTE: More repair plies are necessary on the external and internal surfaces. If no damage is found on the duct plies (the plies below the bead), do the bead repairs and not the duct plies repairs. Only repair the ply that attaches to the bead.

SUBTASK 21-51-24-340-041

(1) Prepare the resin:

(a) Duct repair of the ram air inlet - resin, G50399, or resin, G50400.

(b) Duct repair of the ram air exhaust - resin, G02451.

SUBTASK 21-51-24-340-029

(2) Apply a thin, smooth layer of resin to the solid parting film, G50104, in the opening in the duct.

SUBTASK 21-51-24-340-030

(3) Place a piece of fabric in the opening over the solid parting film, G50104.



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(a) Use fabric, G50797, fabric, G50798, fabric, G50173, glass fabric, G00031, fabric, G51266, or fabric, G50173, to repair the beaded end.

(b) Make sure that the fabric is on all of the opening.

SUBTASK 21-51-24-340-031

(4) Soak the fabric with resin.

SUBTASK 21-51-24-340-032

(5) Put a piece of the solid parting film, G50104, on the fabric.

(a) Apply light pressure to the solid parting film, G50104, with a plastic squeegee, STD-821, or with your hand.

(b) From the centre of the fabric to the edges, remove all bubbles, wrinkles, and unwanted resin.

SUBTASK 21-51-24-340-033

(6) Remove the solid parting film, G50104, from the patch.

(a) Remove unwanted resin with a cotton wiper, G00034.

SUBTASK 21-51-24-340-034

(7) Put the next piece of fabric on the first piece of fabric.

(a) Make sure that the fabric is on all of the opening.

(b) If necessary, cut the fabric.

(c) Soak the fabric with resin.

1) Make the resin smooth.

(d) Continue the same procedure with the fabric until the bead agrees with the necessary duct end dimensions.

SUBTASK 21-51-24-340-035

(8) Cut the last piece of fabric to the necessary dimensions.

NOTE: The dimensions can include the repaired bead and the internal and external surfaces of the full diameter of the duct.

(a) Make sure that the external layer of the Outer Mold Line (OML) is on all of the repaired bead and is around the part end.

(b) Make sure that the external layer extends more than 0.5 in. (12.7 mm) from the repair layer of the Inner Mold Line (IML).

(c) From the centre of the fabric to the edges, remove all bubbles or wrinkles.

SUBTASK 21-51-24-340-036

**WARNING**

DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(9) Clean the duct around the patch with a cotton wiper, G00034, and solvent, B00148, to remove unwanted resin.

SUBTASK 21-51-24-340-037

(10) To cure resin, G50399, or resin, G50400 (SRM 51-30-10):

(a) Allow the resin to cure for 24 hours at room temperature.



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SUBTASK 21-51-24-340-042

(11) To cure resin, G02451, do these steps (SRM 51-30-10):

(a) Attach a vacuum bag, STD-94, to hold the repair layers and to keep the duct shape.

1) Cure for a minimum of 3 hours under a minimum of 22 in/Hg (75 kPa) at 150 ±10°F (66 ±6°C).

2) Decrease the temperature at a maximum rate of 5°F (3°C) for each minute.

3) Below 125°F (52°C), remove the vacuum bag, STD-94, without damage to the cured layers.

SUBTASK 21-51-24-340-038

(12) If necessary, sand the patch on the outer duct surface to get a correct fit.

(a) Keep a wall thickness of 0.045 in. (1.143 mm) - 0.065 in. (1.651 mm) in this area.

NOTE: Wrinkles, creases, and unwanted resin are not permitted in this area. Sand these items flush where necessary.

SUBTASK 21-51-24-340-039

(13) Use a brush, STD-122, to seal exposed fabric with a layer of resin.

SUBTASK 21-51-24-340-040

(14) Let the resin cure.

SUBTASK 21-51-24-840-014

(15) Remove the solid parting film, G50104, the cardboard or aluminum, and the adhesive tape you used to support the repair.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-24-840-013

(1) Install the repaired duct on the airplane. To install the duct, do this task: Ram Air Ducts Installation, TASK 21-51-24-400-801

——— END OF TASK ———



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# RAM AIR EXHAUST ACTUATOR - REMOVAL/INSTALLATION

## 1. General

A. This procedure has these tasks:

(1) Removal of the ram air exhaust actuator

(2) Installation of the ram air exhaust actuator.

B. There are two ram air exhaust actuators (left and right).

(1) They are located aft of each ECS bay and adjacent to the air exhaust duct.

(2) The removal and installation procedures are the same for the two actuators.

**TASK 21-51-27-000-801**

## 2. Ram Air Exhaust Actuator - Removal

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Tools/Equipment

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

### C. Location Zones

| Zone | Area |
|---|---|
| 131 | Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left |
| 132 | Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

### E. General

**SUBTASK 21-51-27-800-001**

(1) This procedure removes the aft Smart Ram Air Door Actuator (SRADA) from the ram air exit duct assembly.

### F. Prepare for the Removal

**SUBTASK 21-51-27-860-001**

**WARNING** REMOVE THE PRESSURE FROM THE PNEUMATIC SYSTEM BEFORE YOU DO MAINTENANCE. PRESSURE IN THE PNEUMATIC SYSTEM CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-27-860-002**

(2) Set these switches on the P5-10 air conditioning panel as follows:



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(a) Set the BLEED 1 and BLEED 2 switches to OFF and attach DO NOT OPERATE tags, STD-858.

(b) Set the APU BLEED switch to OFF and attach a DO NOT OPERATE tag, STD-858.

**SUBTASK 21-51-27-010-001**

(3) To get access to the left ram air exhaust actuator [2], open these access panels:

(a) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

**SUBTASK 21-51-27-010-002**

(4) To get access to the right ram air exhaust actuator [2], open these access panels in this sequence:

(a) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192JR | Air Conditioning Panel - Aft |

**SUBTASK 21-51-27-020-001**

(5) To remove the ram air exhaust actuator [2] for the left pack, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-51-27-020-002**

(6) To remove the ram air exhaust actuator [2] for the right pack, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |



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## G. Ram Air Exhaust Actuator Removal

**SUBTASK 21-51-27-020-003**

(1) Disconnect the two electrical connectors [8] on the ram air exhaust actuator [2].

**SUBTASK 21-51-27-020-004**

(2) Disconnect the bonding jumper [3] from the bonding tab on the ram air exhaust actuator [2].

(a) Remove the adhesive from the bonding jumper [3] fasteners.

(b) Remove the nut [13], three washers [14], and screw [15].

(c) Remove the bonding jumper [3].

**SUBTASK 21-51-27-020-005**

(3) Disconnect the rod end [17] of the actuator from the actuator drive arm [16]:

(a) Remove the nut [12], washer [10], washer [11], and bolt [9] that retain the rod end [17] to the actuator drive arm [16].

**SUBTASK 21-51-27-020-006**

(4) Disconnect the aft end of the ram air exhaust actuator [2] from the ram air exhaust duct [1] assembly.

(a) Remove the nut [7], washer [5], washer [6], and bolt [4].

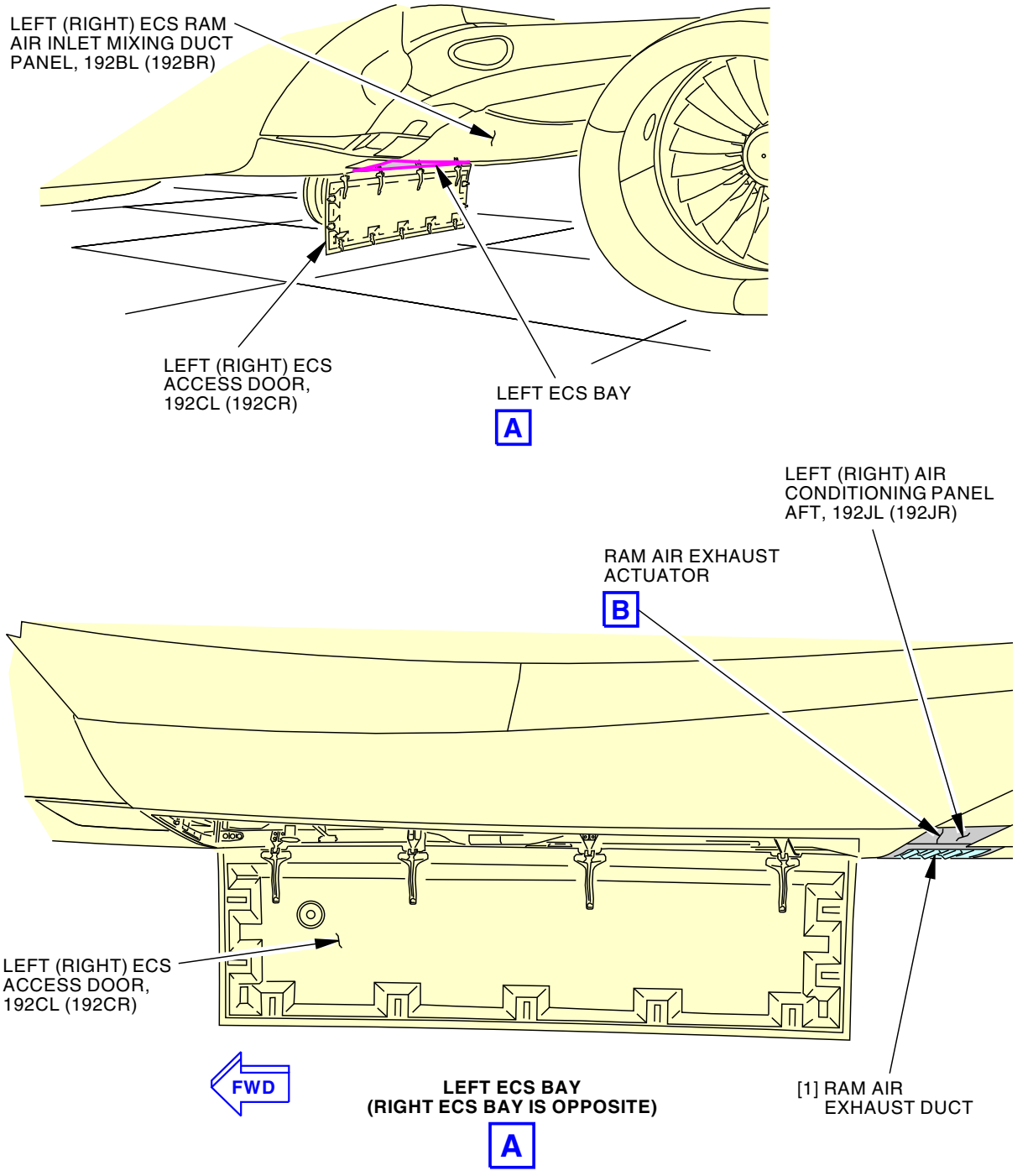
**SUBTASK 21-51-27-020-007**

(5) Remove the ram air exhaust actuator [2].

**——— END OF TASK ———**



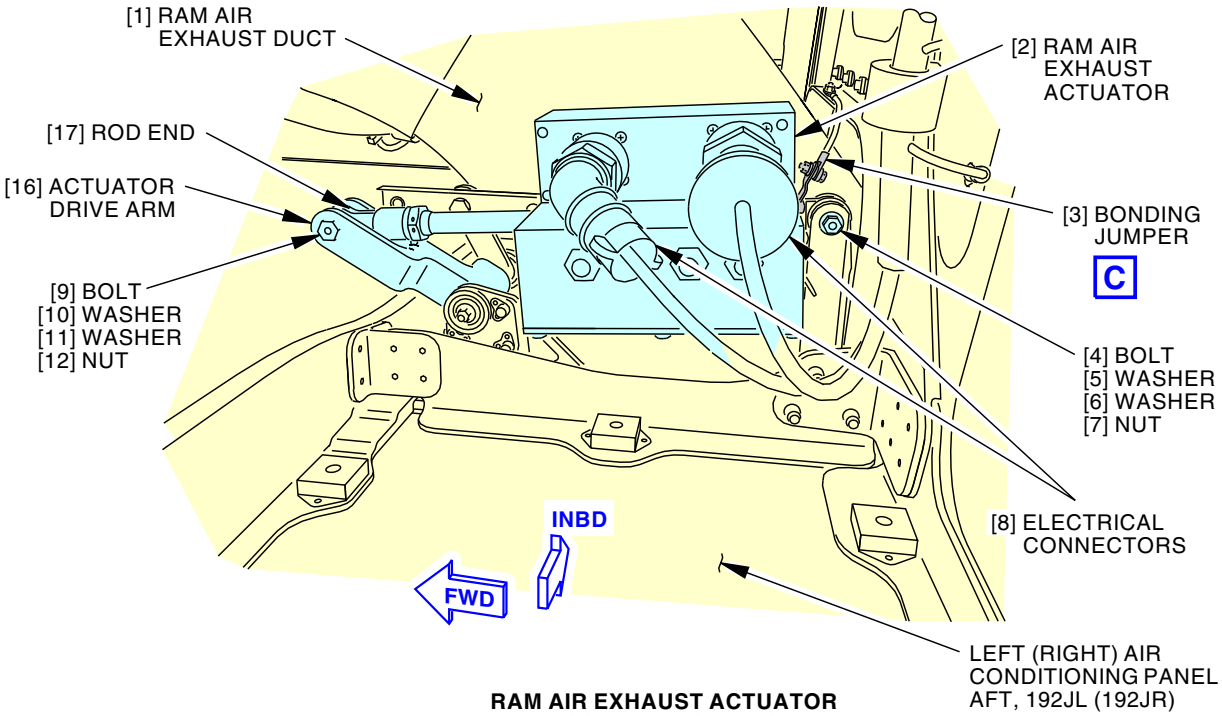
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**Ram Air Exhaust Actuator Installation**
**Figure 401/21-51-27-990-801 (Sheet 1 of 2)**

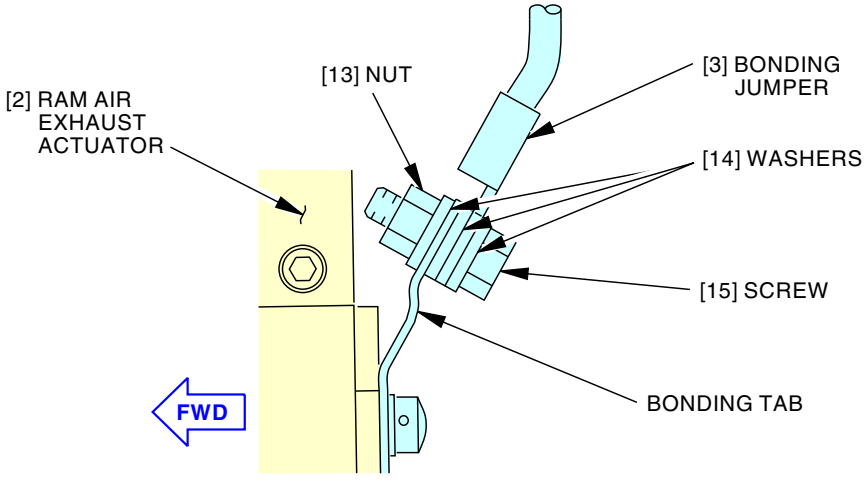


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**RAM AIR EXHAUST ACTUATOR (ACCESS PANEL IS REMOVED)**

**B**




**BONDING JUMPER**

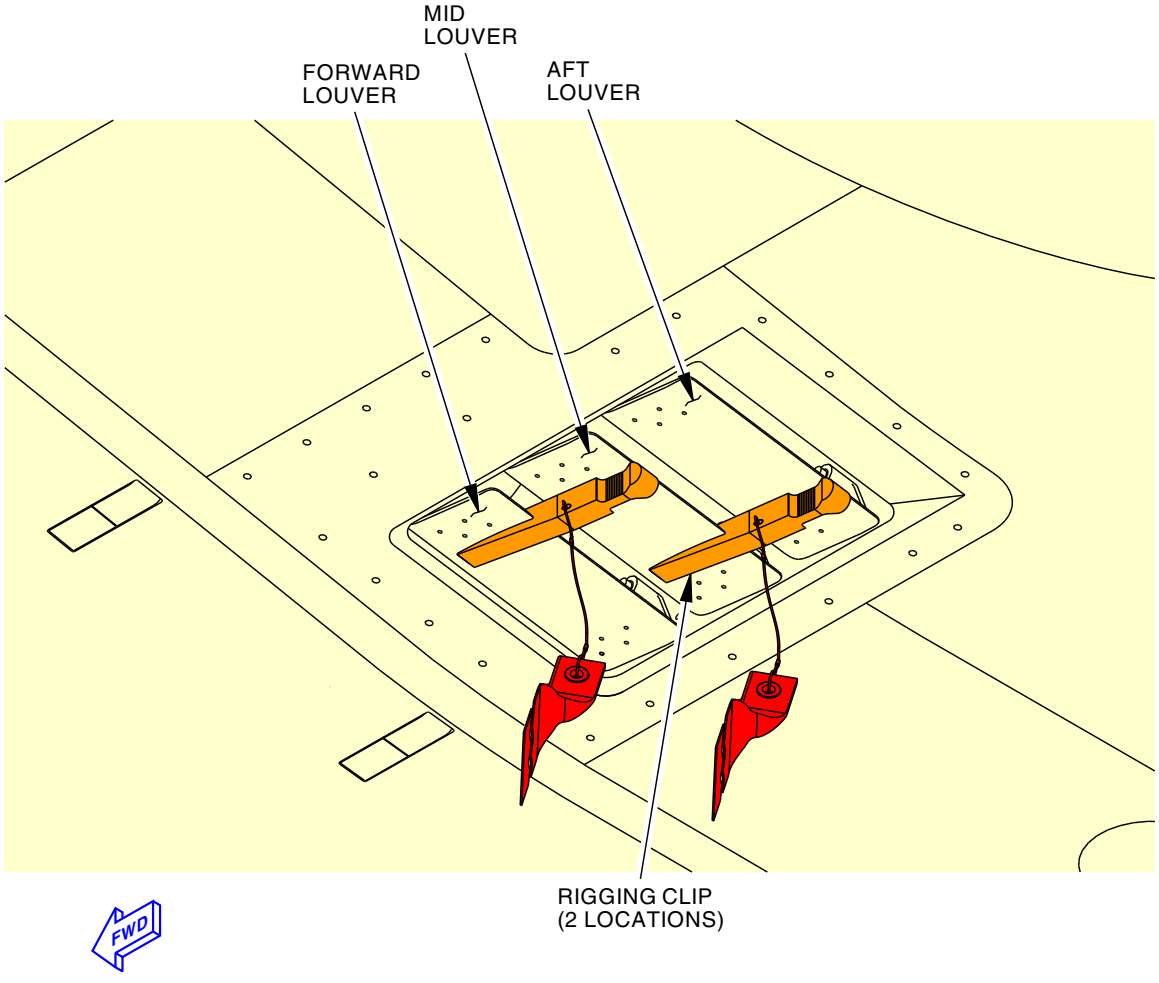
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**Ram Air Exhaust Actuator Installation**
**Figure 401/21-51-27-990-801 (Sheet 2 of 2)**



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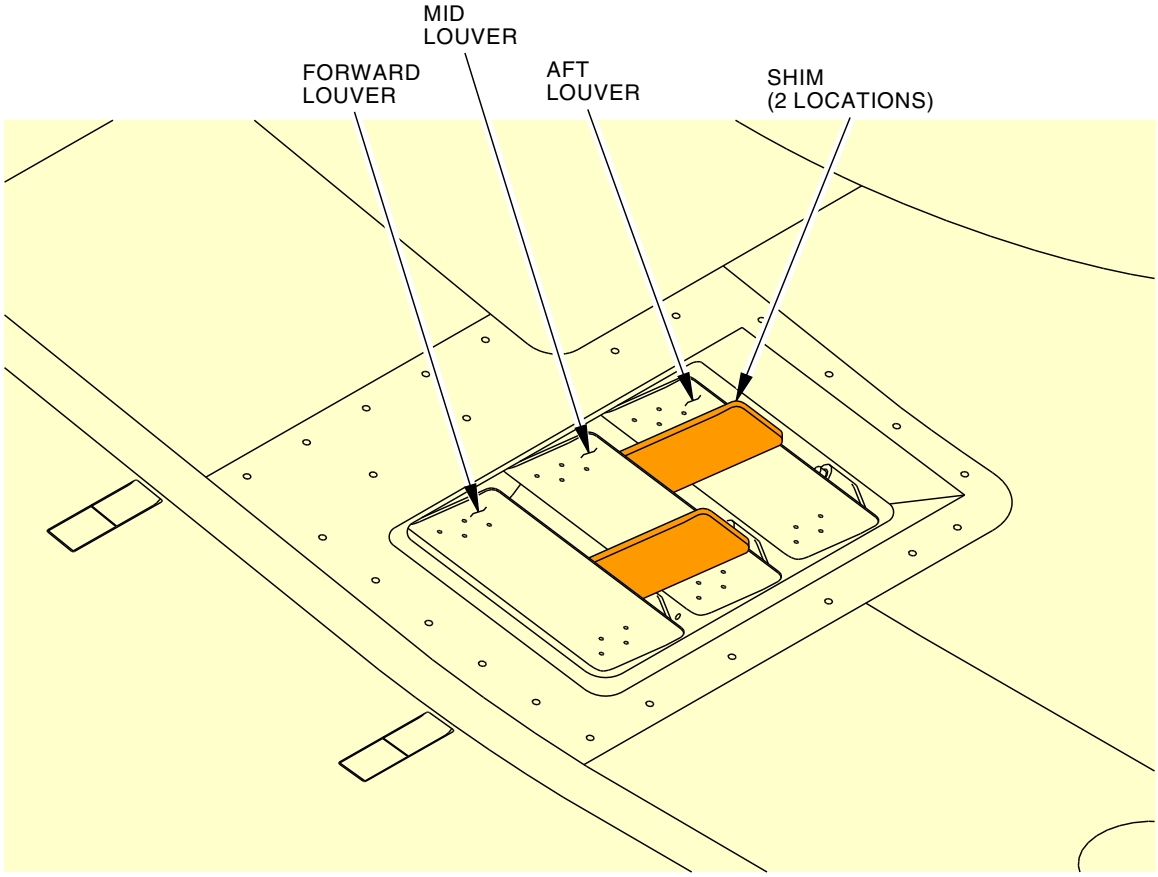



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**Ram Air Exhaust Actuator Adjustment Using Rigging Clips (Preferred Method)**
**Figure 402/21-51-27-990-802**



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**Ram Air Exhaust Actuator Adjustment Using Shims (Alternate Method)**
**Figure 403/21-51-27-990-803**



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**TASK 21-51-27-400-801**

## 3. Ram Air Exhaust Actuator - Installation

(Figure 401 or Figure 402)

### A. General

(1) This task gives instructions for the installation, adjustment and a post-installation test of the aft Smart Ram Air Door Actuator (SRADA).

### B. References

| Reference | Title |
|---|---|
| 20-50-11-910-801 | Standard Torque Values (P/B 201) |
| 27-51-00-860-803 | Extend the Trailing Edge Flaps (P/B 201) |
| 27-51-00-860-804 | Retract the Trailing Edge Flaps (P/B 201) |
| 32-09-00-860-801 | Put the Airplane in the Air Mode (P/B 201) |
| 32-09-00-860-802 | Return the Airplane to the Ground Mode (P/B 201) |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |
| SPL-20203 | Gap Tool - SRADA Exit Louvers<br>Part #: 68SHIMBLOCK Supplier: 81205<br>Part #: C21012-1 Supplier: 81205 |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A01076 | Adhesive - Synthetic Rubber | BAC5010 Type 93 (BMS5-95 Class B) |
| B00666 | Solvent - Methyl Propyl Ketone | BMS11-9 |
| G50221 | Abrasive - Wet/dry Silicon Carbide Sandpaper, 180 grit | |
| G50637 | Wiper - MicroCare Fiber Wipes | |
| G51239 | Shim - Resin Bonded, Laminated, Polyimide | BMS7-335 Type VI Grade B |

### E. Location Zones

| Zone | Area |
|---|---|
| 131 | Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left |
| 132 | Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right |



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**F. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |
| 192JR | Air Conditioning Panel - Aft |

**G. Ram Air Exhaust Actuator Installation**

SUBTASK 21-51-27-420-001

(1) Put the ram air exhaust actuator [2] in its position on the ram air exhaust duct [1] (Figure 401).

SUBTASK 21-51-27-420-002

(2) Attach the aft end of the ram air exhaust actuator [2] to the ram air exhaust duct [1] assembly.

(a) Put the countersunk side of the washer [5] under the head of the bolt [4].

(b) Put the bolt [4] through the ram air exhaust duct [1] assembly and boss on the ram air exhaust actuator [2].

(c) Install the washer [5], washer [6], and nut [7].

(d) Tighten the nut [7] (TASK 20-50-11-910-801).

SUBTASK 21-51-27-420-003

(3) Do not attach the forward end of the ram air exhaust actuator [2] to the actuator drive arm [16] at this time.

SUBTASK 21-51-27-160-001

(4) Prepare the bonding tab and bonding jumper [3] for installation.

(a) Use 180 grit wet/dry silicon carbide sandpaper, G50221, to remove all traces of the adhesive on the washers [14], screw [15], nut [13], bonding jumper [3], and bonding tab used for the previous installation of the bonding jumper [3].

(b) Use solvent, B00666, to clean all surfaces until the wipes are no longer discolored.

(c) Use MicroCare fiber wipes, G50637, to remove all traces of the solvent.

SUBTASK 21-51-27-420-004

(5) Attach the bonding jumper [3] to the bonding tab on the ram air exhaust actuator [2].

(a) Put a washer [14] on the screw [15] and put the screw [15] through the blue end of the bonding jumper [3].

(b) Put a washer [14] on the screw [15] next to the bonding jumper [3] and insert the screw [15] through the bonding tab on the ram air exhaust actuator [2].

(c) Install a washer [14] and nut [13] on the screw [15].

(d) Torque the nut [13] to 40 ±5 in-lb (5 ±1 N·m).

SUBTASK 21-51-27-760-001

(6) Use an intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the bonding tab and bonding jumper [3].

(a) Make sure that the electrical bonding resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 21-51-27-390-001

(7) Apply adhesive, A01076, to completely encapsulate the fasteners.



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## H. Ram Air Exhaust Actuator Adjustment

SUBTASK 21-51-27-820-001

(1) Make sure that the rod end [17] of the ram air exhaust actuator [2] is not attached to the actuator drive arm [16].

SUBTASK 21-51-27-420-006

(2) Connect the two electrical connectors [8] to the left ram air exhaust actuator [2].

SUBTASK 21-51-27-420-007

(3) Connect the two electrical connectors [8] to the right ram air exhaust actuator [2].

SUBTASK 21-51-27-860-010

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-51-27-860-014

(5) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-27-860-011

(6) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-51-27-860-013

(7) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-27-860-003

(8) Extend the trailing edge flaps to position 1 (TASK 27-51-00-860-803).

SUBTASK 21-51-27-860-004

(9) Do this task: Put the Airplane in the Air Mode, TASK 32-09-00-860-801.

SUBTASK 21-51-27-860-005

(10) Retract the left and right trailing edge flaps to the flaps fully up position (TASK 27-51-00-860-804).



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SUBTASK 21-51-27-820-002

(11) Do one of the following steps to set the louvers to the flight fully closed position:

NOTE: The preferred procedure uses rigging clips. The alternate procedure uses non-metallic shims.

(a) Use rigging clips of gap tool, SPL-20203, to set the louvers to the flight fully closed position as follows (Figure 402):

1) Move the actuator drive arm [16] to turn the exhaust louvers until a rigging clip can be inserted on the forward and mid louvers.

2) Insert one rigging clip on the forward louver, and insert another rigging clip on the mid louver.

3) Position the rigging clips with slight separation between them.

4) Manually turn the louvers to the closed position until one of the rigging clips touches the adjacent louver.

NOTE: This position of the exhaust louvers is the flight fully closed position with the louvers set at approximately 12 degrees.

5) Make sure that the rigging clip that touched the adjacent louver does not become loose or fall out during the connection of the actuator rod end [17] to the actuator drive arm [16].

(b) Use non-metallic shims of gap tool, SPL-20203, or non-metallic shims, G51239, to set the louvers to the flight fully closed position as follows (Figure 403):

NOTE: Non-metallic shims can be machined or sanded to get a completed dimension of 0.680 ±0.010 in. (17.272 ±0.254 mm) thick x 7 in. (18 cm) long x 2 in. (5 cm) wide. Multiple thinner laminations can be bonded together to get the correct thickness.

1) Move the actuator drive arm [16] to turn the exhaust louvers until a shim (0.680 ±0.010 in. (17.272 ±0.254 mm) thick x 7 in. (18 cm) long x 2 in. (5 cm) wide) can be inserted between each pair of louvers.

2) Insert one shim between the forward and mid louvers, and insert another shim between the mid and aft louvers.

3) Position the shims with a slight separation between them.

4) Manually turn the louvers to the closed position until one of the shims is caught between the louvers.

NOTE: This position of the exhaust louvers is the flight fully closed position with the louvers set at approximately 12 degrees.

5) Make sure that the shim that was caught between the louvers does not become loose or fall out during the connection of the actuator rod end [17] to the actuator drive arm [16].

SUBTASK 21-51-27-420-005

(12) Connect the rod end [17] of the ram air exhaust actuator [2] to the actuator drive arm [16] (Figure 401):

(a) If the hole in the rod end [17] does not align with the holes in the actuator drive arm [16], do these steps:

1) Remove the lockwire from the jam nut on the rod end [17].



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2) Adjust the length of the rod end [17] by maximum of ±0.125 in. (3.175 mm) (or 4 turns in either direction) until the holes in the rod end [17] and actuator drive arm [16] align.

3) Hold the rod end [17] and tighten the jam nut until it is seated against the rod end.

4) Torque the jam nut to 110 ±10 in-lb (12 ±2 N·m).

5) Install lockwire to keep the jam nut in position.

(b) Put the countersunk side of the washer [10] under the head of the bolt [9].

(c) Put the bolt [9] through the actuator drive arm [16] and rod end [17] of the actuator drive shaft.

(d) Install the washer [11] and nut [12].

(e) Tighten the nut [12] (TASK 20-50-11-910-801).

**SUBTASK 21-51-27-080-001**

(13) Remove the rigging clips of gap tool, SPL-20203, or shims of gap tool, SPL-20203, or shims, G51239 from the louvers.

## I. Ram Air Exhaust Actuator Adjustment Check

**SUBTASK 21-51-27-860-008**

(1) Extend the left and right trailing edge flaps to position 1 (TASK 27-51-00-860-803).

**SUBTASK 21-51-27-710-001**

(2) Make sure that the inlet doors move to the open position smoothly without hanging or binding.

**SUBTASK 21-51-27-860-012**

(3) Retract the trailing edge flaps to the fully up position (TASK 27-51-00-860-804).

**SUBTASK 21-51-27-710-004**

(4) Make sure that the left and right ram air inlets doors move towards the closed position.

**SUBTASK 21-51-27-860-009**

(5) Do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

**SUBTASK 21-51-27-710-002**

(6) Make sure that the deflector door extends.

**SUBTASK 21-51-27-710-003**

(7) Make sure that the ram air exit louvers move to the most open position without hanging or binding.

## J. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-27-410-001**

(1) If you replaced the left ram air exhaust actuator [2], close these access panels:

(a) These are the panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192JL | Air Conditioning Panel - Aft |

**SUBTASK 21-51-27-410-002**

(2) If you replaced the right ram air exhaust actuator [2], close these access panels:

(a) These are the panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



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(Continued)

| Number | Name/Location |
|---|---|
| 192JR | Air Conditioning Panel - Aft |

END OF TASK



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## COMPRESSOR DISCHARGE OVERHEAT SWITCH - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the compressor discharge overheat switch

(2) An installation of the compressor discharge overheat switch.

**TASK 21-51-40-000-801**

### 2. Compressor Discharge Overheat Switch Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**D. Prepare for the Removal**

SUBTASK 21-51-40-860-001

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-40-860-002

(2) To replace the compressor discharge overheat switch [1] for the left cooling pack, do this step:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-40-860-003

(3) To replace the compressor discharge overheat switch [1] for the right cooling pack, do this step:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

SUBTASK 21-51-40-010-001

(4) To get access to the compressor discharge overheat switch [1] on the left cooling pack, do this task:



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Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-40-010-002

(5) To get access to the compressor discharge overheat switch [1] on the right cooling pack, do this task:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Overheat Switch Removal

SUBTASK 21-51-40-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector [2] from the compressor discharge overheat switch [1].

SUBTASK 21-51-40-020-002

(2) Remove and discard the lockwire from the compressor discharge overheat switch [1].

SUBTASK 21-51-40-020-003

**CAUTION** USE TWO WRENCHES TO INSTALL THE OVERHEAT SWITCH IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE OVERHEAT SWITCH, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the compressor discharge overheat switch [1].

(a) Use one wrench to hold the boss. Use the other wrench to turn the compressor discharge overheat switch [1].

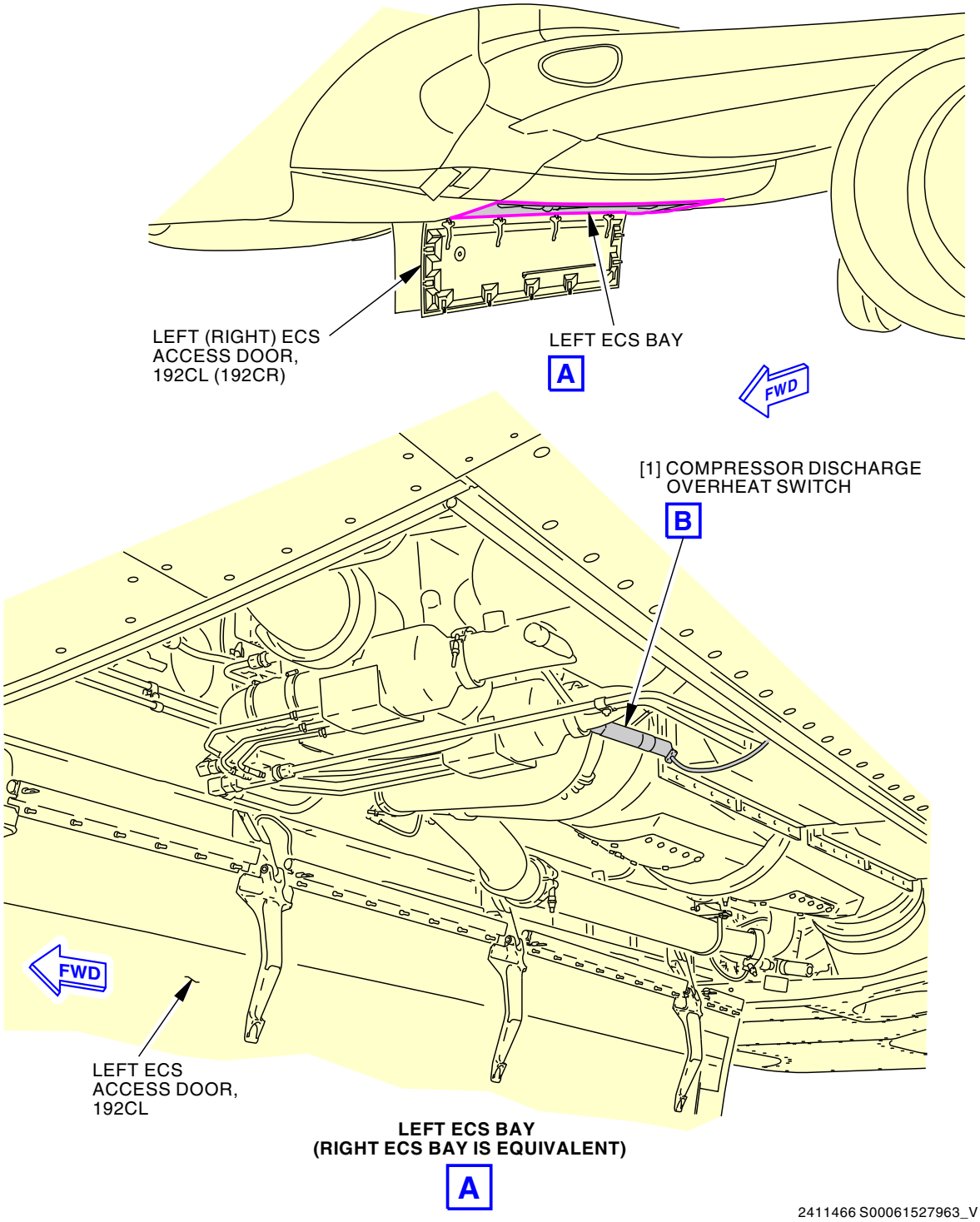
SUBTASK 21-51-40-020-004

(4) Remove and discard the O-ring [3] from the compressor discharge overheat switch [1].

**END OF TASK**



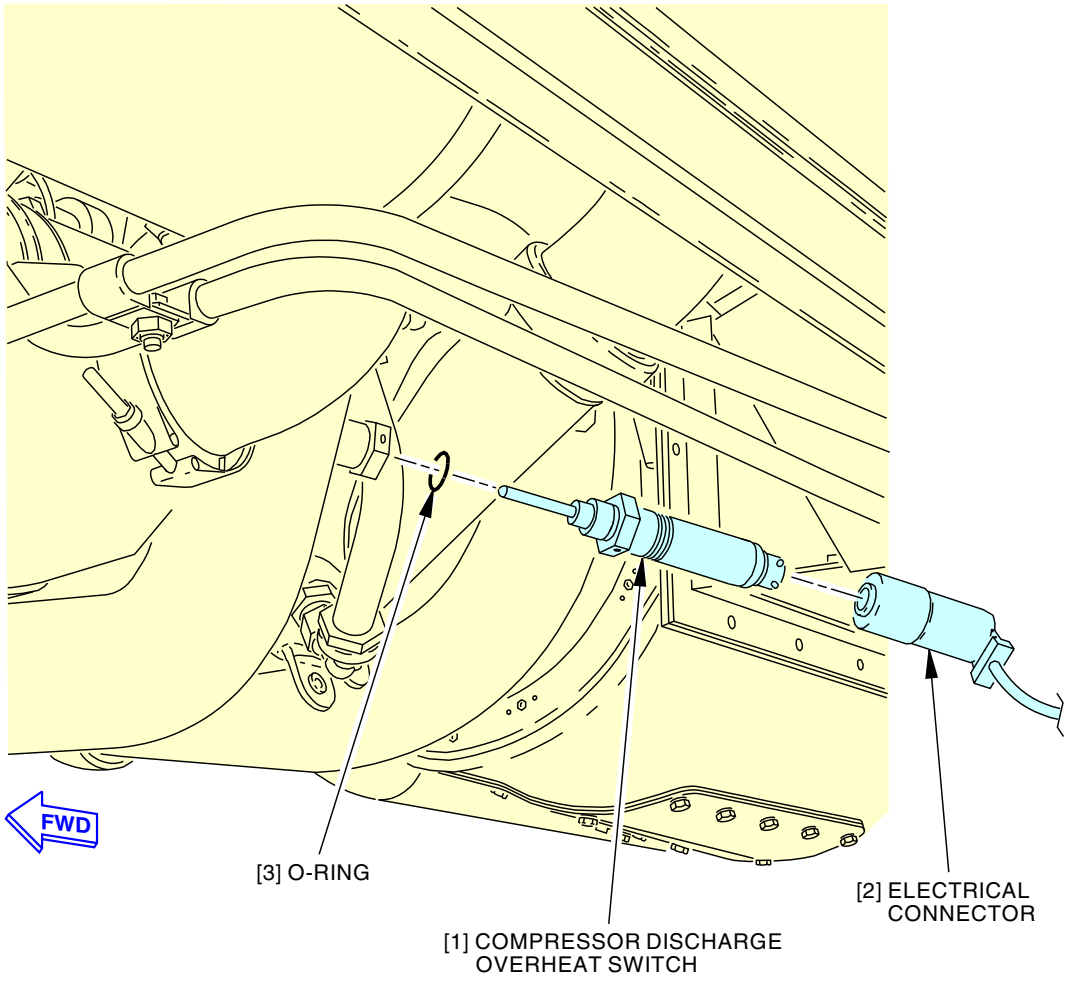
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**Compressor Discharge Overheat Switch Installation**
**Figure 401/21-51-40-990-801 (Sheet 1 of 2)**



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**Compressor Discharge Overheat Switch Installation**
**Figure 401/21-51-40-990-801 (Sheet 2 of 2)**



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**TASK 21-51-40-400-801**

**3. Compressor Discharge Overheat Switch Installation**

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D50104 | Grease - Molykote 44 High Temperature Bearing Grease (Medium) (Formerly Dow Corning DC-44) | |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Compressor discharge overheat switch | 21-51-40-01-015 | SIA ALL |
| | | 21-51-40-02-005 | SIA ALL |
| 3 | O-ring | 21-51-40-01-020 | SIA ALL |
| | | 21-51-40-02-010 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Overheat Switch Installation**

**SUBTASK 21-51-40-640-001**

(1) Apply a light coat of Molykote 44 grease, medium, D50104 to a new O-ring [3].

**SUBTASK 21-51-40-420-001**

(2) Install the lubricated O-ring [3] on the compressor discharge overheat switch [1].

**SUBTASK 21-51-40-160-001**

(3) Make sure the mating surfaces of the boss and the compressor discharge overheat switch [1] nut are clean.

**SUBTASK 21-51-40-640-002**

(4) Apply a thin layer of the Never-Seez NSBT compound, D00006 to the threads of the compressor discharge overheat switch [1].

**SUBTASK 21-51-40-420-002**

(5) Put the compressor discharge overheat switch [1] in the boss on the duct.



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SUBTASK 21-51-40-420-003

**CAUTION** USE TWO WRENCHES TO INSTALL THE OVERHEAT SWITCH IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE OVERHEAT SWITCH, IT CAN CAUSE DAMAGE TO THE DUCT.

(6) Use two wrenches to install the compressor discharge overheat switch [1]:

(a) Use one wrench to hold the boss and the other wrench to turn the compressor discharge overheat switch [1] into the boss.

(b) Tighten the compressor discharge overheat switch [1] to a torque of 133 in-lb (15 N·m) - 147 in-lb (16.6 N·m).

SUBTASK 21-51-40-420-004

(7) Install a new MS20995C32 lockwire, G01048 on the compressor discharge overheat switch [1].

SUBTASK 21-51-40-420-005

(8) Connect the electrical connector [2] to the compressor discharge overheat switch [1].

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-40-860-004

(1) If the compressor discharge overheat switch [1] for the left cooling pack was replaced, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-40-860-005

(2) If the compressor discharge overheat switch [1] for the right cooling pack was replaced, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

SUBTASK 21-51-40-410-001

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-40-410-002

(4) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



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## COMPRESSOR DISCHARGE OVERHEAT SWITCH - ADJUSTMENT/TEST

### 1. General

A. This procedure has this task:

(1) Compressor discharge overheat switch operational test.

**TASK 21-51-40-710-801**

### 2. Compressor Discharge Overheat Switch Operational Test

(Figure 501)

#### A. General

(1) This task is for the operational test of the compressor discharge overheat switch.

#### B. References

| Reference | Title |
|---|---|
| 21-51-40-000-801 | Compressor Discharge Overheat Switch Removal (P/B 401) |
| 21-51-40-400-801 | Compressor Discharge Overheat Switch Installation (P/B 401) |

#### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-3924 | Tester - Thermo Switch, K-Type Thermocouple Switches<br>Part #: H394 SERIES Supplier: 98869<br>Part #: H394R Supplier: 98869<br>Opt Part #: H294 Supplier: 98869 |
| SPL-3952 | Kit - Heater Probes, TEMPCAL<br>Part #: BH24944-13 Supplier: 98869<br>Part #: BH24944-14 Supplier: 98869<br>Part #: BH24944-16 Supplier: 98869 |

#### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### E. Prepare for the Test

**SUBTASK 21-51-40-020-005**

(1) Remove the compressor discharge overheat switch that you will test (TASK 21-51-40-000-801).

#### F. Compressor Discharge Overheat Switch Operational Test

**SUBTASK 21-51-40-420-006**

(1) Connect the electrical connector back to the compressor discharge overheat switch .

**SUBTASK 21-51-40-860-007**

(2) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |



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SUBTASK 21-51-40-480-001

(3) Prepare to use the K-Type thermocouple switch tester, SPL-3924 and the TEMPCAL heater probe kit, SPL-3952 for the test.

NOTE: Use the applicable heater probe to test the overheat switch.

SUBTASK 21-51-40-710-001

(4) Use the test equipment to increase the temperature of the compressor discharge overheat switch as follows:

(a) Set the TEST TEMPERATURE on the tester to 390°F (199°C).

(b) Move the tester POWER switch to ON.

SUBTASK 21-51-40-210-001

(5) When the temperature reaches 390°F (199°C), make sure that the PACK light on the air conditioning panel (P5) and the MASTER CAUTION lights come on.

SUBTASK 21-51-40-860-008

(6) Push one of the MASTER CAUTION lights to reset.

SUBTASK 21-51-40-210-002

(7) Make sure that both MASTER CAUTION lights go off.

SUBTASK 21-51-40-710-002

(8) Move the tester POWER switch to OFF.

SUBTASK 21-51-40-710-003

(9) Let the compressor discharge overheat switch probe cool down.

NOTE: The compressor discharge overheat switch will reset when the probe temperature is 350°F (177°C).

SUBTASK 21-51-40-860-009

(10) Push the TRIP RESET button on the air conditioning panel (P5).

SUBTASK 21-51-40-210-003

(11) Make sure that the PACK light on the air conditioning panel goes off.

SUBTASK 21-51-40-020-006

(12) Disconnect the electrical connector from the compressor discharge overheat switch .

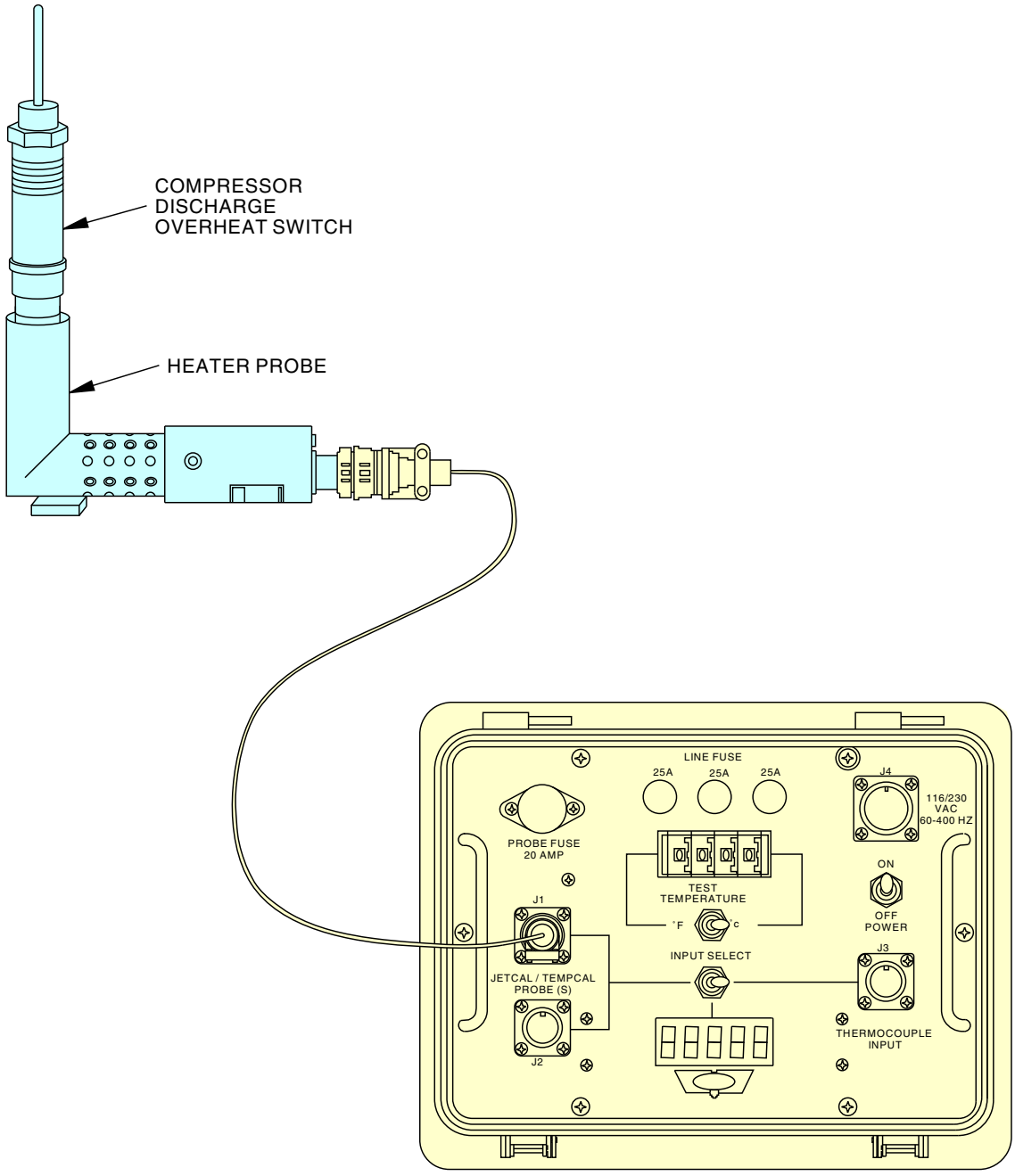
SUBTASK 21-51-40-410-003

(13) Do this task: Compressor Discharge Overheat Switch Installation, TASK 21-51-40-400-801.

**——— END OF TASK ———**



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**(EXAMPLE)**

2821648 S0000652420_V1

**Compressor Discharge Overheat Switch Operational Test**
**Figure 501/21-51-40-990-802**



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## TURBINE INLET OVERHEAT SWITCH - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Turbine Inlet Overheat Switch Removal

(2) Turbine Inlet Overheat Switch Installation.

(a) There is a turbine inlet overheat switch installed on each of the two cooling packs.

**TASK 21-51-41-000-801**

### 2. Turbine Inlet Overheat Switch Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

**SUBTASK 21-51-41-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-41-860-002**

(2) To replace the turbine inlet overheat switch for the left cooling pack, do this task:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

**SUBTASK 21-51-41-860-003**

(3) To replace the turbine inlet overheat switch for the right cooling pack, do this task:



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(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

SUBTASK 21-51-41-010-001

(4) To get access to the overheat switch on the left cooling pack, do this task:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-41-010-002

(5) To get access to the overheat switch for the right cooling pack, do this task:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Overheat Switch Removal

SUBTASK 21-51-41-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector from the overheat switch [1].

SUBTASK 21-51-41-020-002

(2) Remove and discard the MS20995C32 lockwire, G01048 from the overheat switch [1].

SUBTASK 21-51-41-020-003

(3) Remove the overheat switch [1] from the duct.

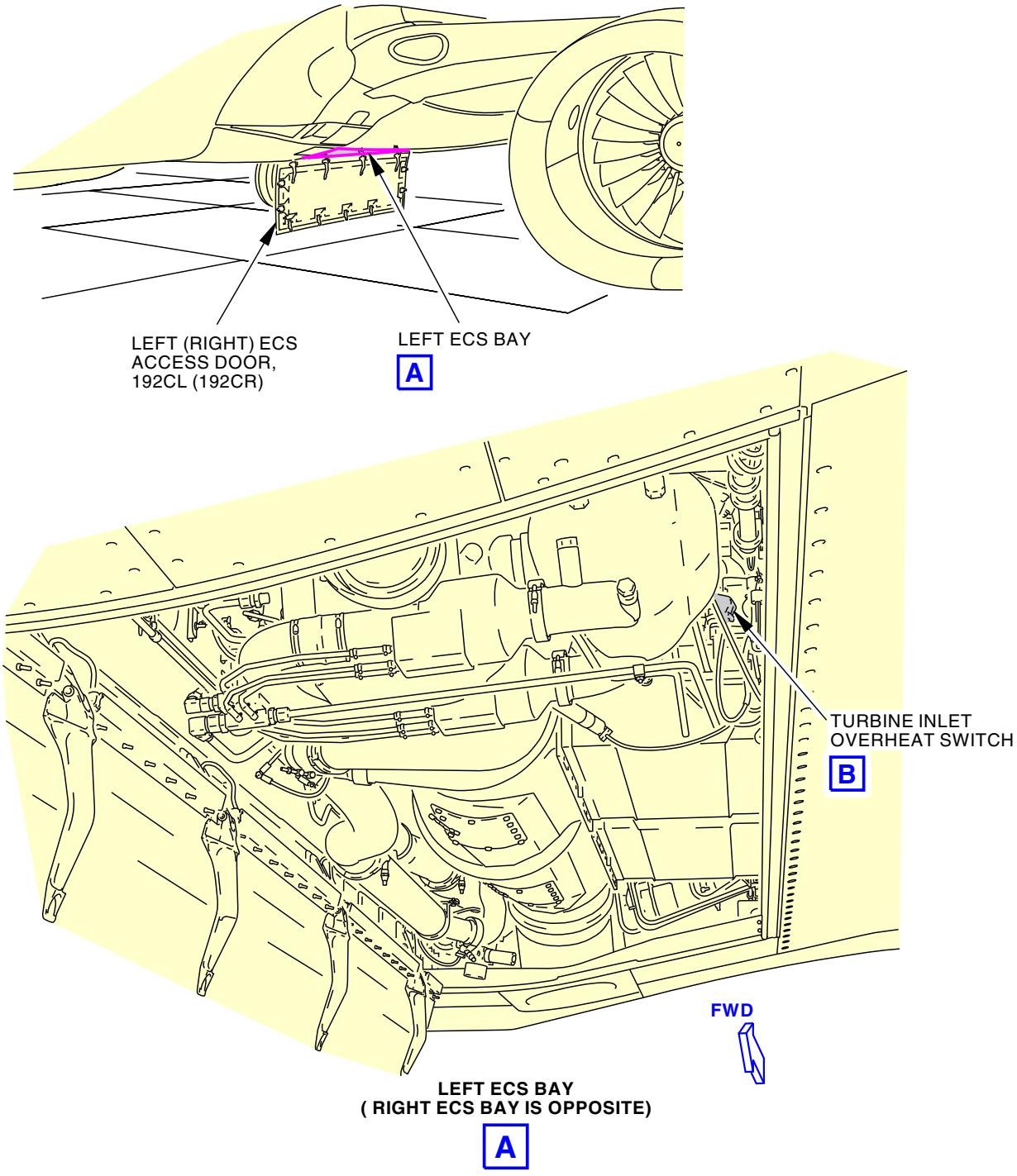
SUBTASK 21-51-41-020-004

(4) Remove and discard theO-ring [2] from the overheatswitch [1].

——— END OF TASK ———



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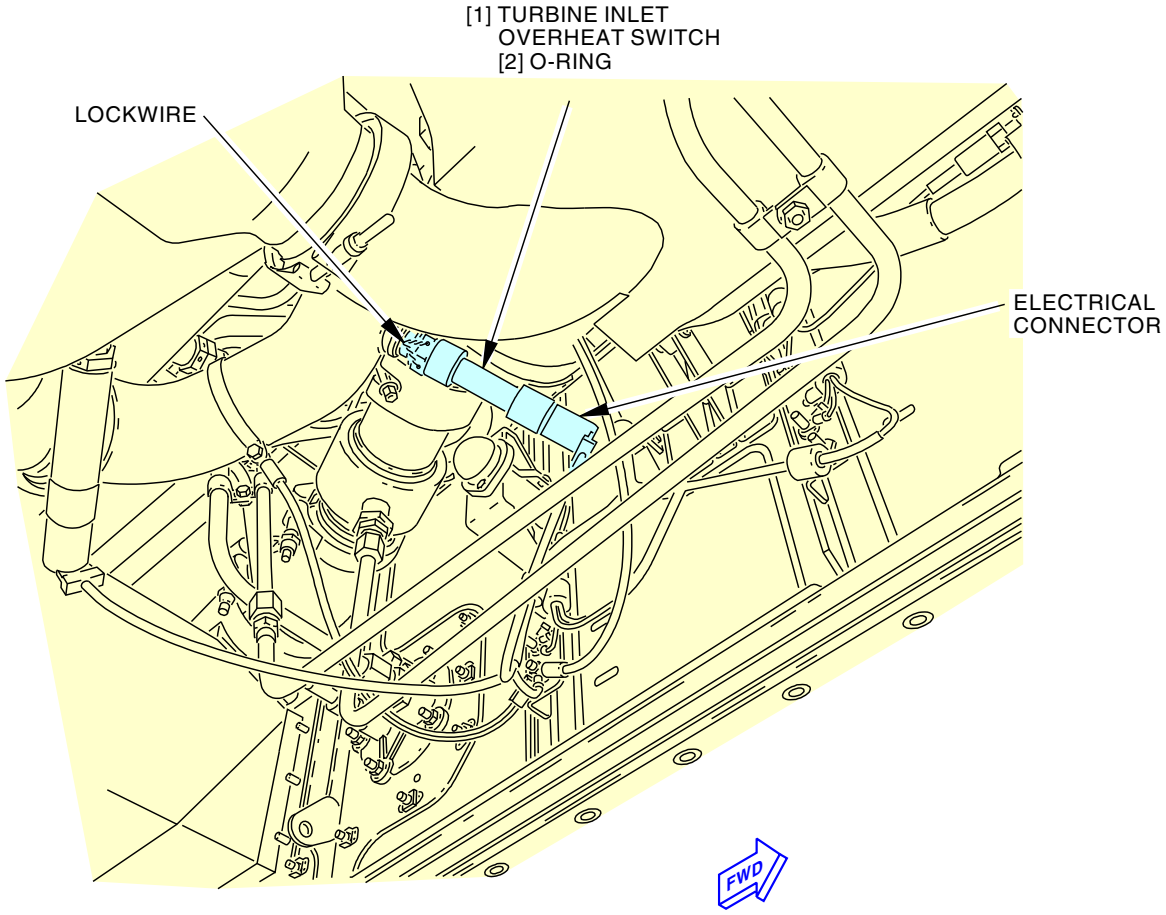



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**Turbine Inlet Overheat Switch Installation**
**Figure 401/21-51-41-990-801 (Sheet 1 of 2)**



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**TURBINE INLET OVERHEAT SWITCH**

**B**

2411469 S00061527970_V1

**Turbine Inlet Overheat Switch Installation**
**Figure 401/21-51-41-990-801 (Sheet 2 of 2)**



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**TASK 21-51-41-400-801**

**3. Turbine Inlet Overheat Switch Installation**

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00649 | Lubricant - O-Ring - Krytox GPL206 | |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Switch | 21-51-41-09-080 | SIA ALL |
| 2 | O-ring | 21-51-41-09-085 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**F. Overheat Switch Installation**

**SUBTASK 21-51-41-160-001**

(1) Make sure the mating surfaces of the boss and the overheat switch nut are clean.

**SUBTASK 21-51-41-640-001**

(2) Lightly lubricate a clean O-ring [2] with Krytox GPL206 lubricant, D00649.

**SUBTASK 21-51-41-420-001**

(3) Install a new O-ring [2] on the overheat switch [1].

**SUBTASK 21-51-41-640-002**

(4) Apply a thin layer of the Never-Seez NSBT compound, D00006 to the threads of the overheat switch [1].

**SUBTASK 21-51-41-420-002**

(5) Install the overheat switch [1] on the duct.

**SUBTASK 21-51-41-420-003**

(6) Tighten the overheat switch [1] to 225 ±10 in-lb (25 ±2 N·m).

**SUBTASK 21-51-41-420-004**

(7) Install the new MS20995C32 lockwire, G01048 on the overheat switch [1].



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SUBTASK 21-51-41-420-005

(8) Connect the electrical connector to the overheat switch [1].

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-41-860-004

(1) When the turbine inlet overheat switch for the left cooling pack was replaced, do this task:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-41-860-005

(2) When the turbine inlet overheat switch for the right cooling pack was replaced, do this task:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

SUBTASK 21-51-41-410-001

(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-41-410-002

(4) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-51-41-860-006

(5) Remove electrical power if it is not necessary. To remove electrical power, do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**——— END OF TASK ———**



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# TURBINE INLET THERMAL SWITCH - ADJUSTMENT/TEST

## 1. General

A. This procedure has this task:

(1) Turbine Inlet Thermal Switch - Operational Test.

**TASK 21-51-41-710-801**

## 2. Turbine Inlet Thermal Switch - Operational Test

(Figure 501)

### A. References

| Reference | Title |
|---|---|
| 21-51-41-000-801 | Turbine Inlet Overheat Switch Removal (P/B 401) |
| 21-51-41-400-801 | Turbine Inlet Overheat Switch Installation (P/B 401) |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-5983 | Lamp - Indicator |
| COM-8671 | Tester - Dielectric Strength, MegOhmmeter (or equivalent meter) |
| SPL-1552 | Kit - Heater Probes, TEMPCAL |
| SPL-3924 | Tester - Thermo Switch, K-Type Thermocouple Switches<br>Part #: H394 SERIES Supplier: 98869<br>Part #: H394R Supplier: 98869<br>Opt Part #: H294 Supplier: 98869 |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |


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**F. Prepare for the Operational Test**

SUBTASK 21-51-41-010-003

(1) For the turbine inlet thermal switch on the left cooling pack:

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-41-010-004

(2) For the turbine inlet thermal switch on the right cooling pack:

Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**G. Turbine Inlet Thermal Switch - Operational Test (Method I)**

SUBTASK 21-51-41-020-005

(1) Do this task: Turbine Inlet Overheat Switch Removal, TASK 21-51-41-000-801.

(a) Re-connect the electrical connector to the turbine inlet thermal switch.

SUBTASK 21-51-41-480-001

(2) Prepare the K-Type thermocouple switch tester, SPL-3924 and the TEMPCAL heater probe kit, SPL-1552 to test the turbine inlet thermal switch.

NOTE: Use the correct heater probe to test overheat switch part number 572757-1.

SUBTASK 21-51-41-710-001

(3) Use the test equipment to increase the temperature of the turbine inlet thermal switch to 210°F (99°C).

SUBTASK 21-51-41-710-002

(4) Make sure that these lights come on when the temperature of the turbine inlet thermal switch probe get to 210 ±10°F (99 ±6°C).

(a) PACK light on the P5-10 panel.

(b) MASTER CAUTION light on the pilots' glareshield.

SUBTASK 21-51-41-710-003

(5) Remove the heat from the turbine inlet thermal switch probe.

SUBTASK 21-51-41-710-004

(6) Let the turbine inlet thermal switch probe become cool.

NOTE: The reset temperature for the turbine inlet thermal switch is 170°F (77°C).

SUBTASK 21-51-41-710-005

(7) Push the TRIP RESET light on the P5-10 panel.

SUBTASK 21-51-41-710-006

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-51-41-710-007

(9) Make sure that the MASTER CAUTION light goes off.

SUBTASK 21-51-41-420-006

(10) Do this task: Turbine Inlet Overheat Switch Installation, TASK 21-51-41-400-801.



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## H. Turbine Inlet Thermal Switch - Operational Test (Method II)

SUBTASK 21-51-41-020-006

(1) Do this task: Turbine Inlet Overheat Switch Removal, TASK 21-51-41-000-801.

SUBTASK 21-51-41-420-007

(2) Install a new or serviceable turbine inlet thermal switch (TASK 21-51-41-400-801).

NOTE: The turbine inlet thermal switch that was removed should be tested according to the vendor CMM before it is put back into service.

SUBTASK 21-51-41-020-007

(3) Remove the electrical connector from the turbine inlet thermal switch.

SUBTASK 21-51-41-480-002

(4) Connect a jumper wire between pin 1 and pin 2 of the electrical connector.

SUBTASK 21-51-41-210-001

(5) Make sure that these lights come on:

(a) PACK light on the P5-10 panel.

(b) MASTER CAUTION light on the pilots' glareshield.

SUBTASK 21-51-41-080-001

(6) Disconnect the jumper wire.

SUBTASK 21-51-41-860-007

(7) Push the TRIP RESET button on the P5-10 panel.

SUBTASK 21-51-41-860-008

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-51-41-210-002

(9) Make sure the MASTER CAUTION light goes off.

SUBTASK 21-51-41-420-008

(10) Connect the electrical connector to the turbine inlet thermal switch.

## I. Turbine Inlet Thermal Switch - Operational Test

SUBTASK 21-51-41-020-008

(1) Do this task: Turbine Inlet Overheat Switch Removal, TASK 21-51-41-000-801.

SUBTASK 21-51-41-710-008

(2) Do the insulation resistance test:

(a) Connect the switch connector pins together.

1) Connect a 500 vdc power source and megohmmeter between the switch case and the pins.

(b) Apply approximately 500 vdc between the switch circuit pins and the switch case.

(c) Make sure that the insulation resistance is a minimum of 10 megohms.

SUBTASK 21-51-41-710-009

(3) Do the dielectric strength test:

(a) Connect the switch connector pins together.

1) Connect a dielectric strength tester, COM-8671 between the switch case and the pins.

(b) Apply approximately 1060 v (RMS), 60 Hz for one minute between the switch connector pins and the case.



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(c) Make sure that there are no arc-over, flashover, or worn insulation.

SUBTASK 21-51-41-710-010

(4) Do the functional test:

(a) Install the unit the oil bath test set-up shown in the Figure 501.

NOTE: Optional to use TEMPCAL heater probe kit, SPL-1552 and K-Type thermocouple switch tester, SPL-3924 in lieu of the oil bath.

**WARNING** USE THE CORRECT PERSONAL PROTECTION. HOT OIL CAN CAUSE SEVERE BURNS.

(b) Heat the oil to a temperature of 170°F (77°C).

NOTE: Mix the bath oil constantly to make sure that the temperature of the oil is uniform during the tests.

(c) Connect the switch in series to the indicator lamp, COM-5983 and a 22 to 29 vdc power source (0.11 amp, maximum).

1) Turn on the power source.

(d) Increase the oil bath temperature to a temperature of 195 ±5°F (91 ±3°C) and keep the temperature stable for five minutes.

(e) Increase the oil bath temperature at a rate of not more than 2°F (1.1°C) per minute until the lamp come on.

1) Make sure that the lamp come on when the oil bath temperature is 210 ±10°F (99 ±6°C).

2) Write down the temperature at which the lamp come on.

(f) Decrease the oil bath temperature at a rate of not more than 2°F (1.1°C) per minute until the lamp go off.

1) Make sure that the lamp go off when the oil bath temperature is at least 10°F (5.5°C) less than the temperature in step (e)1), but not less than 170°F (77°C).

(g) Turn off the 28 vdc power source.

(h) Remove the switch from the test set-up.

(i) Do these steps to clean the switch:

1) Put a cap on the connector before the switch is cleaned.

2) Clean the switch with a cotton wiper, G00034 and alcohol, B00130.

SUBTASK 21-51-41-420-009

(5) Do this task: Turbine Inlet Overheat Switch Installation, TASK 21-51-41-400-801.

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-41-410-003

(1) For the turbine inlet thermal switch on the left cooling pack:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-41-410-004

(2) For the turbine inlet thermal switch on the right cooling pack:



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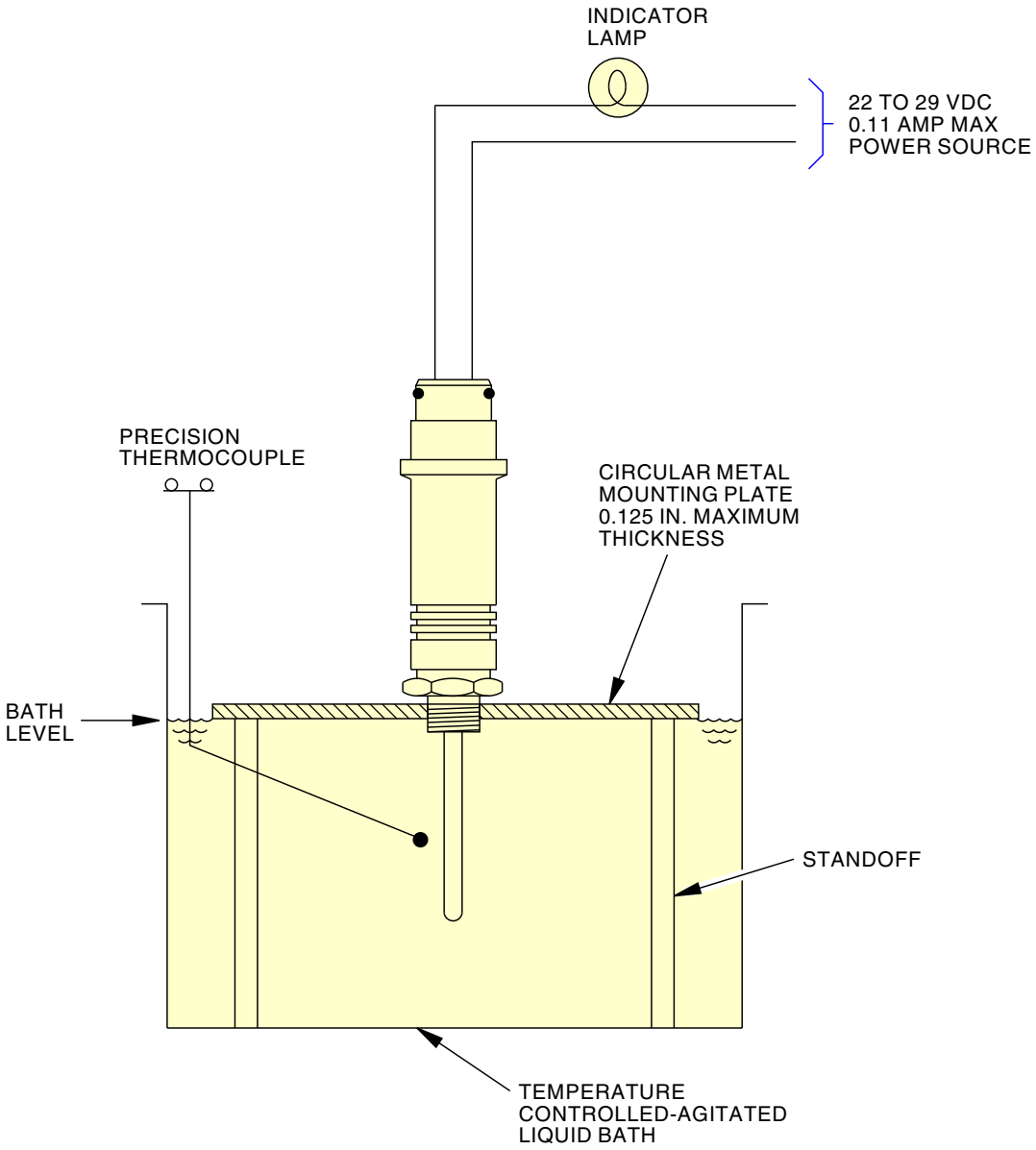
Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




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**Turbine Inlet Thermal Switch Operational Test**
**Figure 501/21-51-41-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## PACK DISCHARGE OVERHEAT SWITCH - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the pack discharge overheat switch

(2) An installation of the pack discharge overheat switch.

B. There is a pack discharge overheat switch for each of the two packs. The pack discharge overheat switches are found in the mix bay.

**TASK 21-51-42-000-801**

### 2. Pack Discharge Overheat Switch Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |

**D. Prepare for the Removal**

SUBTASK 21-51-42-860-001

(1) Do this step for the left pack discharge overheat switch:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

SUBTASK 21-51-42-860-002

(2) Do this step for the right pack discharge overheat switch:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

SUBTASK 21-51-42-860-003

(3) Make sure that the L PACK and R PACK switches, on the P5-10 air conditioning panel, are in the OFF position.

SUBTASK 21-51-42-010-001

(4) Open the forward cargo door.



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SUBTASK 21-51-42-010-002

(5) Remove the aft center bulkhead liner in the forward cargo compartment, do this task: Forward Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-11-02-000-801.

## E. Pack Discharge Overheat Switch Removal

SUBTASK 21-51-42-020-001

(1) Disconnect the electrical connector [1] from the overheat switch [2].

SUBTASK 21-51-42-020-002

(2) Remove MS20995C32 lockwire, G01048, from the overheat switch [2].

SUBTASK 21-51-42-020-003

**CAUTION**

USE TWO WRENCHES TO REMOVE THE OVERHEAT SWITCH FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE OVERHEAT SWITCH, IT CAN CAUSE DAMAGE TO THE DUCT.

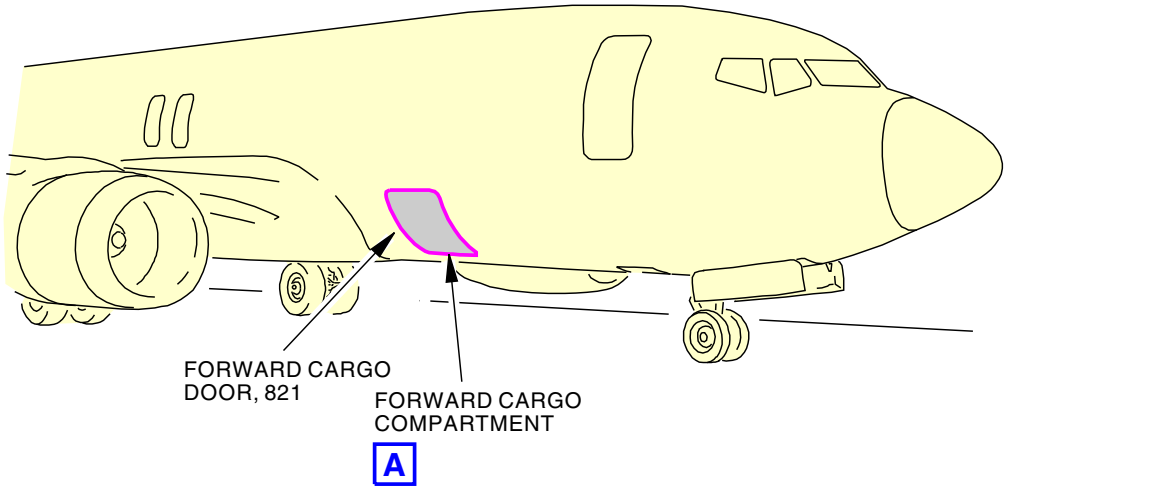
(3) Use two wrenches to remove the pack discharge overheat switch [2].

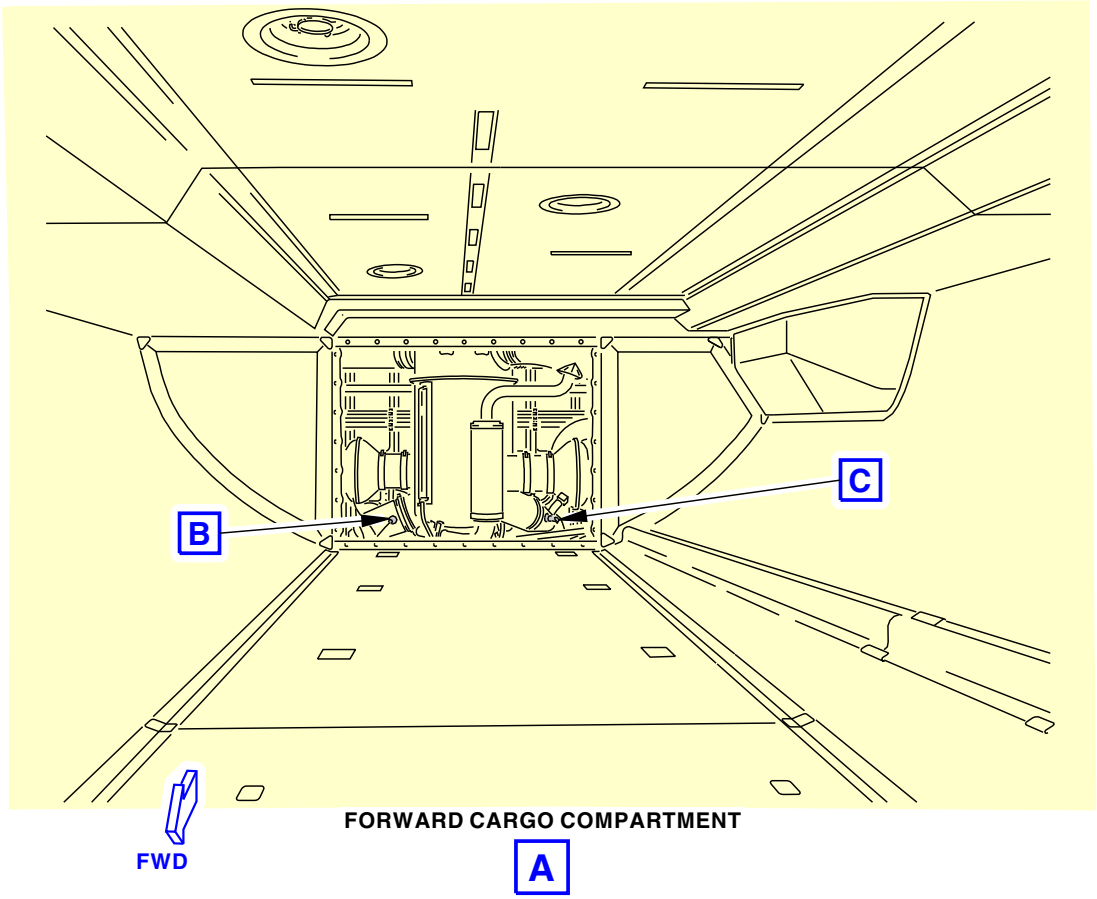
NOTE: Use one wrench to hold the boss. Use the other wrench to turn the overheat switch.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



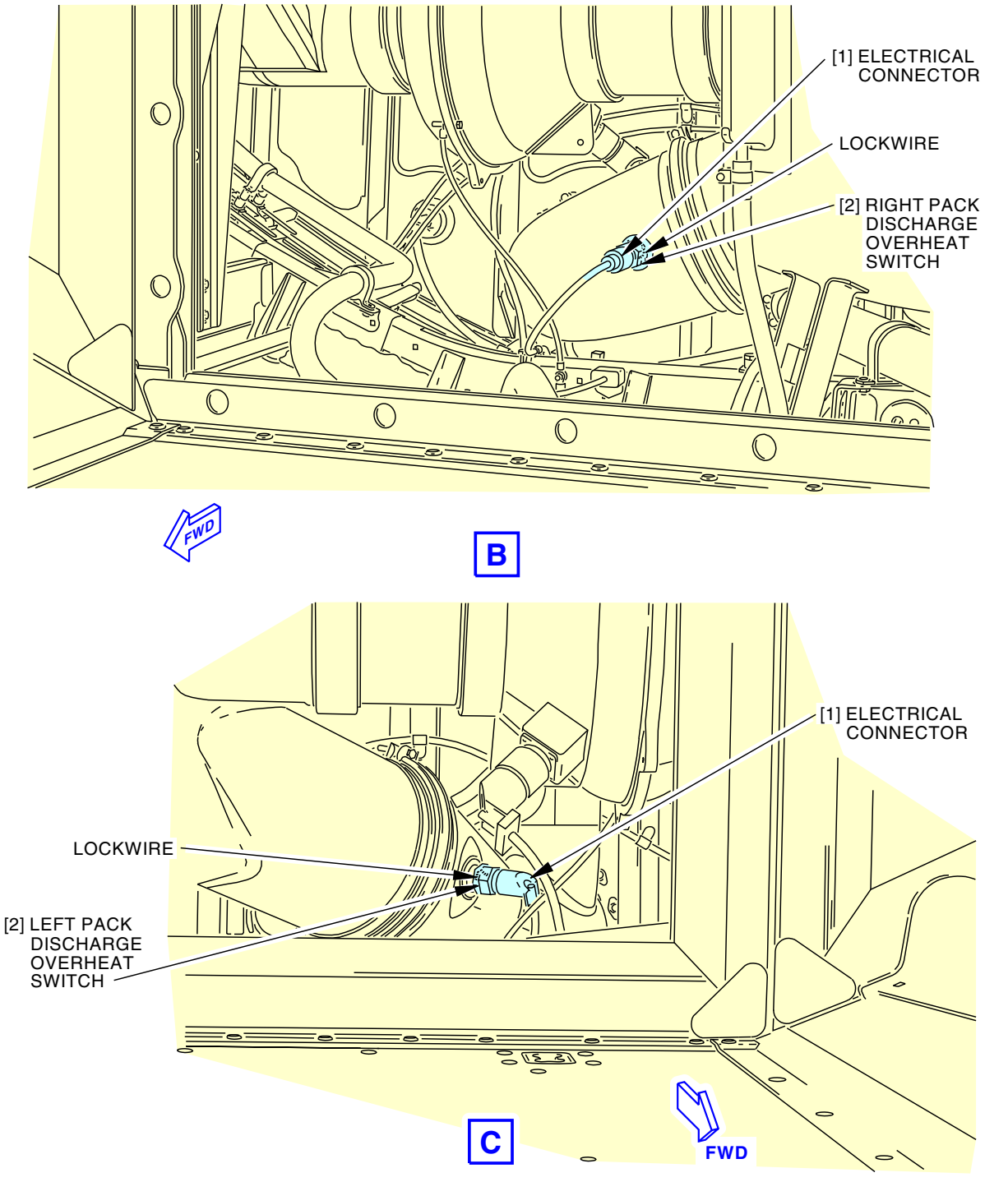




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**Pack Discharge Overheat Switch Installation**
**Figure 401/21-51-42-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Pack Discharge Overheat Switch Installation**
**Figure 401/21-51-42-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-42-400-801**

## 3. Pack Discharge Overheat Switch Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Switch | 21-21-01-02-305 | SIA 004-999 |
| | | 21-21-01-02-380 | SIA 004-999 |
| | | 21-51-42-01-025 | SIA 001-003 |

### D. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### E. Pack Discharge Overheat Switch Installation

**SUBTASK 21-51-42-160-001**

(1) Make sure that the mating surfaces of the boss and overheat switch nut are clean.

**SUBTASK 21-51-42-640-001**

(2) Apply a thin layer of Never-Seez NSBT compound, D00006, to the threads of the overheat switch [2].

**SUBTASK 21-51-42-420-001**

**CAUTION** USE TWO WRENCHES TO INSTALL THE OVERHEAT SWITCH IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE OVERHEAT SWITCH, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to install the pack discharge overheat switch [2].

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the overheat switch.

**SUBTASK 21-51-42-420-002**

(4) Install new MS20995C32 lockwire, G01048, to the overheat switch [2] and boss.

**SUBTASK 21-51-42-420-003**

(5) Connect the electrical connector [1] to the overheat switch [2].

### F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-42-860-004**

(1) If replaced the left pack discharge overheat switch, do this step:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 8 | C01176 | A/C PACK/ENGINE BLEED AIR OVHT LEFT |

**SUBTASK 21-51-42-860-005**

(2) If replaced the right pack discharge overheat switch, do this step:

(a) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 7 | C01177 | A/C PACK/ENGINE BLEED AIR OVHT RIGHT |

**SUBTASK 21-51-42-010-003**

(3) Install the aft center bulkhead liner in the forward cargo compartment, do this task: Forward Cargo Compartment Aft Bulkhead Liner Installation, TASK 50-11-02-400-801.

**SUBTASK 21-51-42-010-004**

(4) Close the forward cargo door.

**——— END OF TASK ———**



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## RAM AIR CONTROL TEMPERATURE SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the ram air control temperature sensor.

(2) An installation of the ram air control temperature sensor.

(3) There is a ram air control temperature sensor installed on each of the two cooling packs.

**TASK 21-51-50-000-801**

### 2. Ram Air Control Temperature Sensor Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-51-50-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-50-010-001**

(2) For the ram air control temperature sensor [1] on the left cooling pack, do these steps:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-50-010-002**

(3) For the ram air control temperature sensor [1] on the right cooling pack, do these steps:



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(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(d) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Temperature Sensor Removal

**SUBTASK 21-51-50-020-001**

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector [2] from the ram air control temperature sensor [1].

**SUBTASK 21-51-50-020-002**

(2) Remove and discard the safety cable from the ram air control temperature sensor [1].

**SUBTASK 21-51-50-020-003**

**CAUTION** USE TWO WRENCHES TO REMOVE THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the ram air control temperature sensor [1].

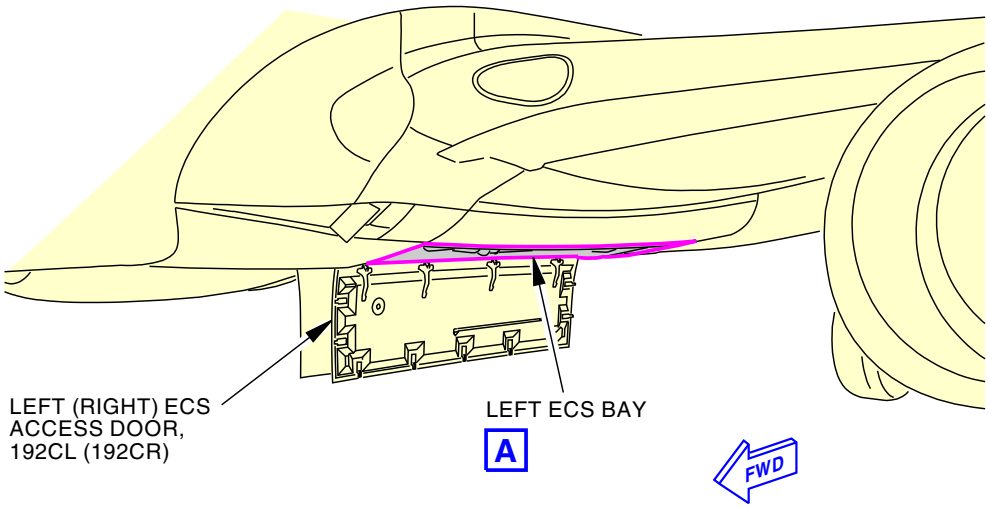
(a) Use one wrench to hold the boss and the other wrench to turn the ram air control temperature sensor [1]

**SUBTASK 21-51-50-020-004**

(4) Remove and discard the o-ring [3] from the ram air control temperature sensor [1].

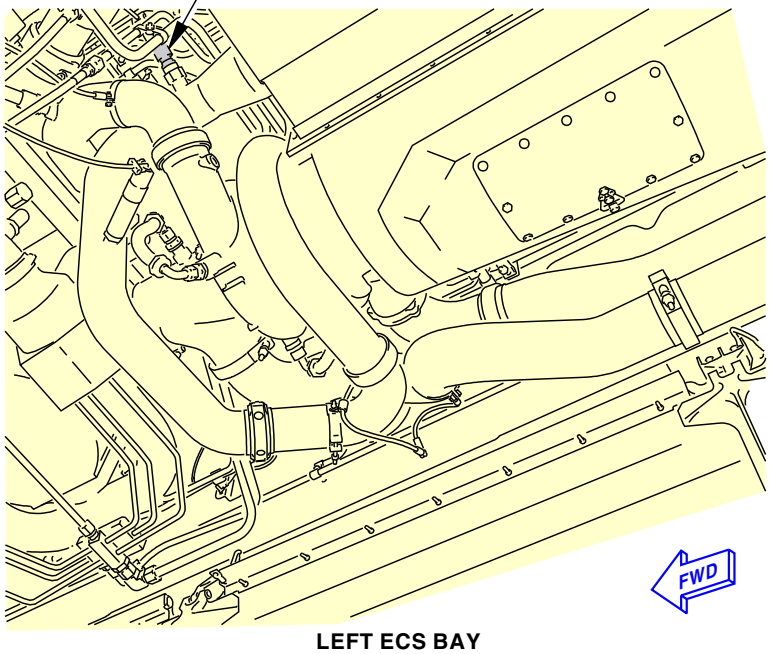
**END OF TASK**


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[1] RAM AIR CONTROL
TEMPERATURE SENSOR

B




**LEFT ECS BAY**
**( RIGHT ECS BAY IS OPPOSITE)**

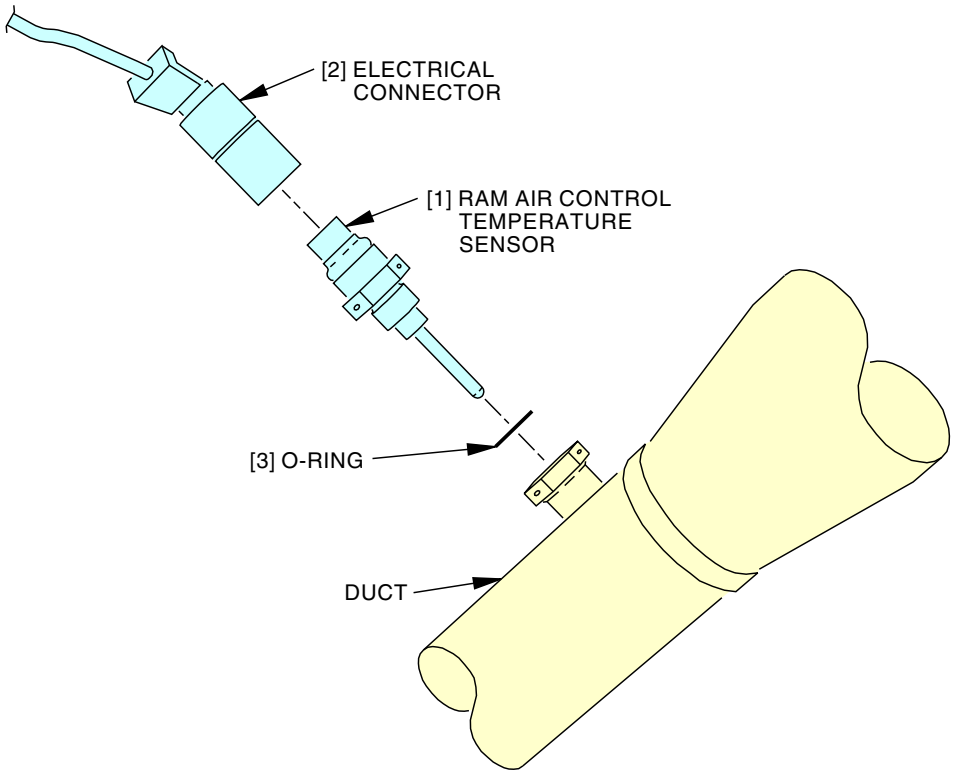
**A**

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**Ram Air Control Temperature Sensor Installation**
**Figure 401/21-51-50-990-801 (Sheet 1 of 2)**



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**RAM AIR CONTROL TEMPERATURE SENSOR**

**B**

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**Ram Air Control Temperature Sensor Installation**
**Figure 401/21-51-50-990-801 (Sheet 2 of 2)**



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**TASK 21-51-50-400-801**

## 3. Ram Air Control Temperature Sensor Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-730-802 | Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test (P/B 501) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00504 | Grease - Petrolatum | VV-P-236 |
| G50375 | Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule) | BACC13AT3K, AMS 5689 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Ram air control temperature sensor | 21-51-52-01-015 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Temperature Sensor Installation

**SUBTASK 21-51-50-600-001**

(1) Apply a light coat of grease, D00504 to a new o-ring [3].

**SUBTASK 21-51-50-420-001**

(2) Install the lubricated o-ring [3] on the ram air control temperature sensor [1].

**SUBTASK 21-51-50-160-001**

(3) Make sure that the mating surfaces of the boss and the temperature sensor nut are clean.

**SUBTASK 21-51-50-640-001**

(4) Apply a thin layer of the Never-Seez NSBT compound, D00006 to the threads of the ram air control temperature sensor [1].



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SUBTASK 21-51-50-420-002

**CAUTION** USE TWO WRENCHES TO INSTALL THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(5) Use two wrenches to install the ram air control temperature sensor [1].

(a) Use one wrench to hold the boss and the other wrench to turn the ram air control temperature sensor [1].

(b) Tighten the ram air control temperature sensor [1] to 220 in-lb (25 N·m) to 230 in-lb (26 N·m).

SUBTASK 21-51-50-420-003

(6) Install a new safety cable kit, G50375 on the ram air control temperature sensor [1] (TASK 20-10-44-400-801).

SUBTASK 21-51-50-420-004

(7) Connect the electrical connector [2] to the ram air control temperature sensor [1].

SUBTASK 21-51-50-860-002

(8) For the left cooling pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01950 | AIR CONDITIONING RAM AIR MOD LEFT |
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |

(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-50-860-003

(9) For the right cooling pack, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 4 | C01951 | AIR CONDITIONING RAM AIR MOD RIGHT |
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |

(b) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-51-50-740-001

(10) Do this ground test: Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test, TASK 21-00-00-730-802.

(a) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.


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(b) If FAILED shows, then do the fault isolation procedure for the maintenance message.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-50-840-001

(1) If you replaced the temperature sensor for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-50-840-002

(2) If you replaced the temperature sensor for the right cooling pack, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



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## MIX MANIFOLD TEMPERATURE SENSOR - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) A removal of the mix manifold temperature sensor

(2) A cleaning of the mix manifold temperature sensor

(3) An installation of the mix manifold temperature sensor.

B. If it is necessary, the mix manifold temperature sensors should be cleaned before the check, to determine if the resistance of the sensors has the drifted out of the specification.

C. There is a mix manifold temperature sensor for each of the two cooling packs. The mix manifold temperature sensors are installed behind the liner at the aft end of the forward cargo compartment.

**TASK 21-51-51-000-801**

### 2. Mix Manifold Temperature Sensor Removal

(Figure 201)

#### A. References

| Reference | Title |
|---|---|
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

#### C. Prepare for the Removal

**SUBTASK 21-51-51-860-001**

(1) To remove the mix manifold temperature sensor [1] for the left cooling pack, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-51-860-002**

(2) To remove the mix manifold temperature sensor [1] for the right cooling pack, do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**SUBTASK 21-51-51-860-003**

(3) Put these switches, on the P5-10 air conditioning panel, to the OFF position:

(a) L PACK

(b) R PACK



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(c) L RECIRC FAN

(d) R RECIRC FAN.

**SUBTASK 21-51-51-010-001**

(4) Open the forward cargo door.

**SUBTASK 21-51-51-010-002**

(5) Remove the aft center bulkhead liner in the forward cargo compartment, do this task: Forward Cargo Compartment Aft Bulkhead Liner Removal, TASK 50-11-02-000-801.

## D. Mix Manifold Temperature Sensor Removal

**SUBTASK 21-51-51-020-001**

(1) Disconnect the elecrical connector [2] from the mix manifold temperature sensor [1].

**SUBTASK 21-51-51-020-002**

(2) Remove the screws [3] that hold the mix manifold temperature sensor [1] to the upper mix manifold.

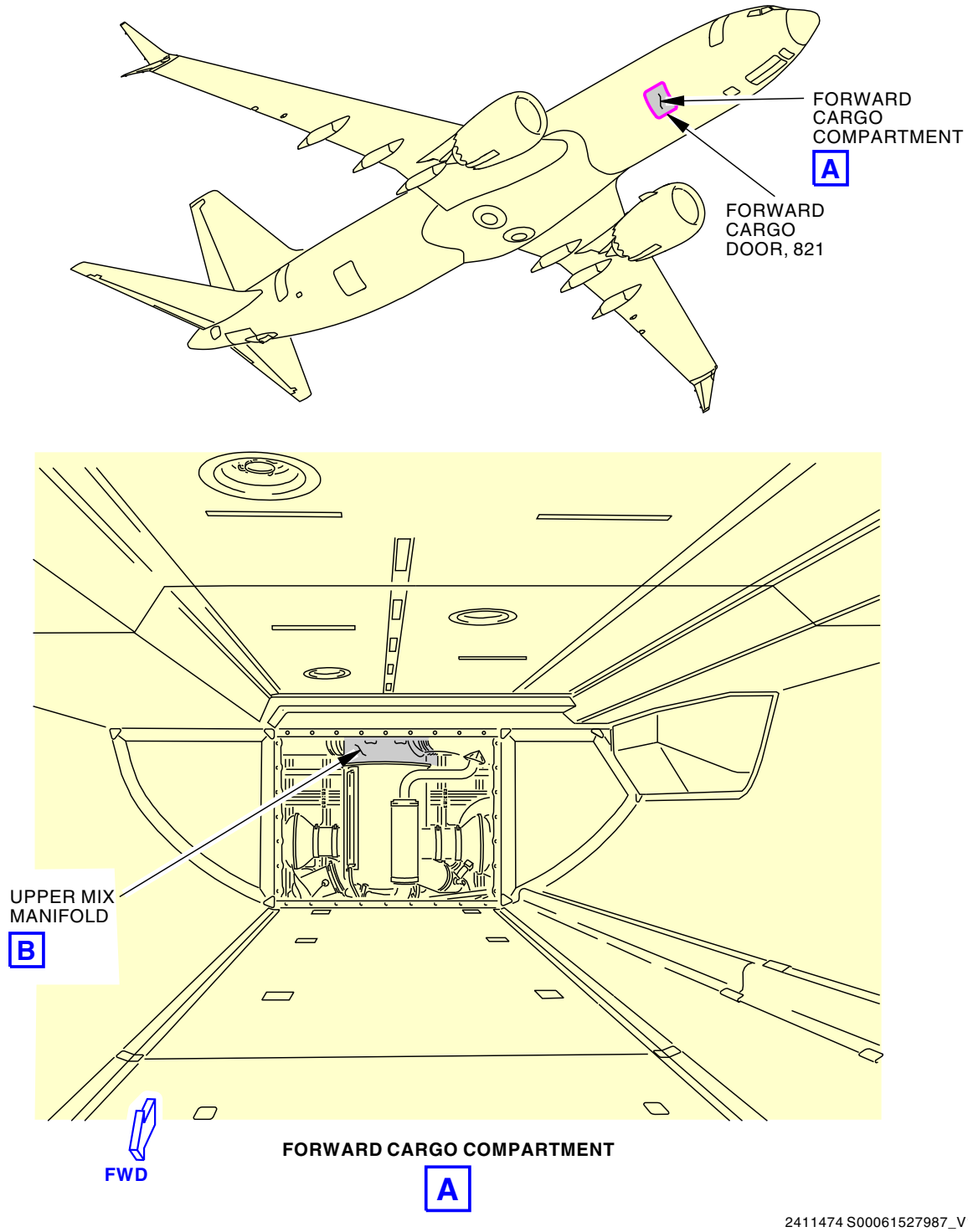
**SUBTASK 21-51-51-020-003**

(3) Remove the mix manifold temperature sensors [1] from the upper mix manifold.

**——— END OF TASK ———**



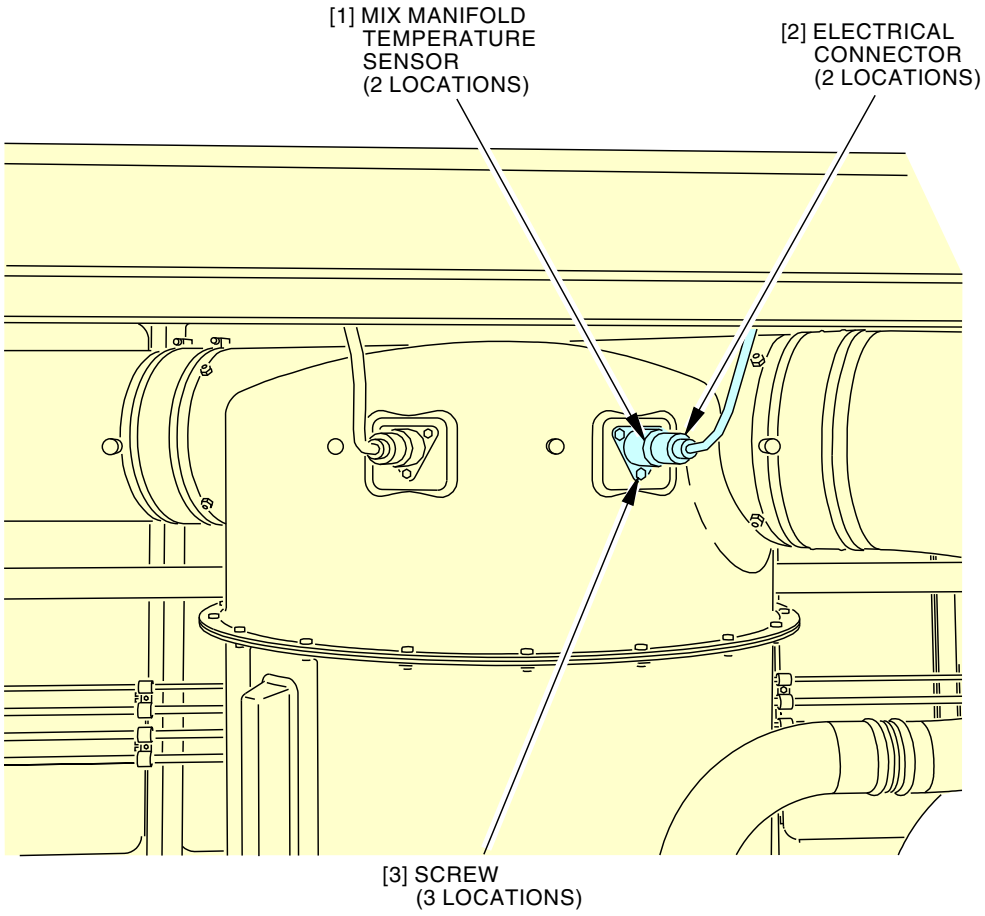
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Mix Manifold Temperature Sensor Installation**
**Figure 201/21-51-51-990-801 (Sheet 1 of 2)**



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**Mix Manifold Temperature Sensor Installation**
**Figure 201/21-51-51-990-801 (Sheet 2 of 2)**



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**TASK 21-51-51-110-801**

**3. Mix Manifold Temperature Sensor Cleaning**

(Figure 201)

**A. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| G00215 | Brush - Soft Bristle Fiber | |
| G50637 | Wiper - MicroCare Fiber Wipes | |

**B. Prepare for the Cleaning**

**SUBTASK 21-51-51-020-004**

(1) Remove the mix manifold temperature sensor [1] (TASK 21-51-51-000-801).

**SUBTASK 21-51-51-960-001**

(2) Replace the mix manifold temperature sensor [1] if you find:

(a) Bent, broken or missing pins

(b) Damaged, stripped or missing threads

(c) Broken or dirty insulation

(d) Broken or cracked thermistor beads.

**C. Mix Manifold Temperature Sensor Cleaning**

**SUBTASK 21-51-51-160-001**

(1) Remove all unwanted material from between the connector pins and around the thermistor beads:

(a) Use soft-bristle brush, G00215, moistened with isopropyl alcohol, B00130.

(b) Use MicroCare fiber wipes, G50637, to remove all traces of the isopropyl alcohol, B00130.

**D. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-51-51-420-001**

(1) Install the mix manifold temperature sensor [1] (TASK 21-51-51-400-801).

**——— END OF TASK ———**

**TASK 21-51-51-400-801**

**4. Mix Manifold Temperature Sensor Installation**

(Figure 201)

**A. References**

| Reference | Title |
|---|---|
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Mix manifold temperature sensor | 21-21-05-01-015 | SIA 004-999 |
| | | 21-51-51-02-005 | SIA 001-003 |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 212 | Flight Compartment - Right |

**D. Mix Manifold Temperature Sensor Installation**

**SUBTASK 21-51-51-080-001**

(1) Remove the protective cap from the mix manifold temperature sensor [1].

**SUBTASK 21-51-51-420-002**

(2) Put the mix manifold temperature sensor [1] in its position in the upper mix manifold.

**SUBTASK 21-51-51-420-003**

(3) Install the screws [3] that attach the mix manifold temperature sensor [1] to the upper mix manifold.

**SUBTASK 21-51-51-420-004**

(4) Connect the elecrical connector [2] to the mix manifold temperature sensor [1].

**SUBTASK 21-51-51-860-004**

(5) If the mix manifold temperature sensor [1] for the left cooling pack was replaced, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-51-51-860-005**

(6) If the mix manifold temperature sensor [1] for the right cooling pack was replaced, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

**SUBTASK 21-51-51-740-001**

(7) Do a BITE test on the left and right Integrated Air Systems Controllers (M2939 and M2957).

NOTE: This will clear any fault introduced during maintenance when power is interrupted.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-51-51-410-001**

(1) Install the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).

**SUBTASK 21-51-51-410-002**

(2) Close the forward cargo door.

**——— END OF TASK ———**



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## MIX MANIFOLD TEMPERATURE SENSOR - ADJUSTMENT/TEST

### 1. General

A. This procedure has this task:

(1) A test of the mix manifold temperature sensors

B. There are two mix manifold temperature sensors installed.

**TASK 21-51-51-710-801**

### 2. Mix Manifold Temperature Sensor Test

(Figure 501)

#### A. References

| Reference | Title |
|---|---|
| 21-51-51 P/B 201 | MIX MANIFOLD TEMPERATURE SENSOR - MAINTENANCE PRACTICES |
| 21-61-22-000-801 | Integrated Air Systems Controller (IASC) Removal (P/B 401) |
| 21-61-22-400-801 | Integrated Air Systems Controller (IASC) Installation (P/B 401) |
| 50-12-01-000-801 | Aft Cargo Compartment Forward Bulkhead Liner Removal (P/B 401) |
| 50-12-01-400-801 | Aft Cargo Compartment Forward Bulkhead Liner Installation (P/B 401) |
| WDM 21-51-12 | D000534451 |
| WDM 21-51-22 | D000534450 |

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| COM-3955 | Thermometer - Digital (Type K)<br>Part #: 51 2B Supplier: 89536<br>Opt Part #: 51 SERIES II Supplier: 89536 |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |

**D. Prepare For The Resistance Test**

SUBTASK 21-51-51-860-006

(1) Do this task: Aft Cargo Compartment Forward Bulkhead Liner Removal, TASK 50-12-01-000-801.

SUBTASK 21-51-51-860-007

(2) To do a test of the left mix manifold sensor, remove the left Integrated Air Systems Controller (IASC) (TASK 21-61-22-000-801).

SUBTASK 21-51-51-860-008

(3) To do a test of the right mix manifold sensor, remove the right Integrated Air Systems Controller (IASC) (TASK 21-61-22-000-801).

SUBTASK 21-51-51-710-001

(4) Make sure the pack has been off for 20 minutes or until it has reached ambient temperature.

**E. Resistance Check Procedure**

SUBTASK 21-51-51-700-001

(1) Use a digital thermometer, COM-3955, or equivalent, to measure the temperature adjacent to the applicable mix manifold temperature sensor.

(a) Write down the temperature.

SUBTASK 21-51-51-760-001

(2) Use the digital/analog multimeter, COM-1793, (preferred) to measure resistance between the following pin connections.

NOTE: An equivalent meter can be used as long as the digital multimeter minimizes self-heating of the sensor element. The instrument must limit the current through the sensor to less than 100 microamperes when set to the 10K ohms scale. If you use resistance measuring instruments without this current-limiting feature you will get an error in resistance value due to self-heating of the sensor element.

SUBTASK 21-51-51-700-002

(3) For the right mix manifold temperature sensor, measure the resistance from pin, F9, to pin, F10, on connector, D15840B, for the right Integrated Air Systems Controller (IASC) (WDM 21-51-22).

SUBTASK 21-51-51-700-003

(4) For the left mix manifold temperature sensor, measure the resistance from pin, F9, to pin, F10, on connector, D15838B, for the left Integrated Air Systems Controller (IASC) (WDM 21-51-12).

SUBTASK 21-51-51-700-004

(5) Write down the resistance in Ohms that you measure.

(a) For the mix manifold temperature sensors, find the temperature that is nearest to the temperature that you wrote down (Figure 501).

(b) Compare the permitted range of resistance for that temperature to the resistance you wrote down.

(c) If the resistance is out of range, replace the sensor (PAGEBLOCK 21-51-51/201).



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## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-51-51-420-005**

(1) Install the applicable Integrated Air Systems Controller (IASC) (TASK 21-61-22-400-801).

**SUBTASK 21-51-51-410-003**

(2) Do this task: Aft Cargo Compartment Forward Bulkhead Liner Installation, TASK 50-12-01-400-801.

**——— END OF TASK ———**



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| TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) | TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) |
|---|---|---|---|
| -40 (-40) | 43,030-45,210 | 95 (35) | 1,340-1,400 |
| -35 (-37.2) | 36,690-38,550 | 100 (37.7) | 1,210-1,270 |
| -30 (-34.4) | 31,360-32,960 | 105 (40.5) | 1,100-1,150 |
| -25 (-31.6) | 26,930-28,230 | 110 (43.3) | 997-1,140 |
| -20 (-28.8) | 23,140-24,260 | 115 (46.1) | 905-944 |
| -15 (-26.1) | 19,940-20,900 | 120 (48.8) | 822-859 |
| -10 (-23.3) | 17,220-18,050 | 125 (51.6) | 748-782 |
| -5 (-20.5) | 14,890-15,580 | 130 (54.4) | 682-713 |
| 0 (-17.7) | 12,950-13,550 | 135 (57.2) | 623-652 |
| 5 (-15) | 11,310-11,780 | 140 (60) | 568-598 |
| 10 (-12.2) | 9,870-10,290 | 145 (62.7) | 520-547 |
| 15 (-9.4) | 8,640-9,000 | 150 (65.5) | 477-502 |
| 20 (-6.6) | 7,520-7,900 | 155 (68.3) | 438-461 |
| 25 (-3.8) | 6,660-6,940 | 160 (71.1) | 413-434 |
| 30 (-1.1) | 5,870-6,120 | 165 (73.8) | 371-390 |
| 35 (1.6) | 5,180-5,400 | 170 (76.6) | 342-360 |
| 40 (4.4) | 4,580-4,770 | 175 (79.4) | 315-332 |
| 45 (7.2) | 4,060-4,230 | 180 (82.2) | 291-307 |
| 50 (10) | 3,600-3,750 | 185 (85) | 269-284 |
| 55 (12.7) | 3,200-3,340 | 190 (87.7) | 249-263 |
| 60 (15.5) | 2,850-2,980 | 195 (90.5) | 231-245 |
| 65 (18.3) | 2,550-2,660 | 200 (93.3) | 214-226 |
| 70 (21.1) | 2,293-2,390 | 205 (96.1) | 198-211 |
| 75 (23.8) | 2,040-2,130 | 210 (98.8) | 184-196 |
| 80 (26.6) | 1,830-1,920 | 215 (101.6) | 172-183 |
| 85 (29.4) | 1,650-1,720 | 220 (104.4) | 160-170 |
| 90 (32.2) | 1,480-1,550 | | |

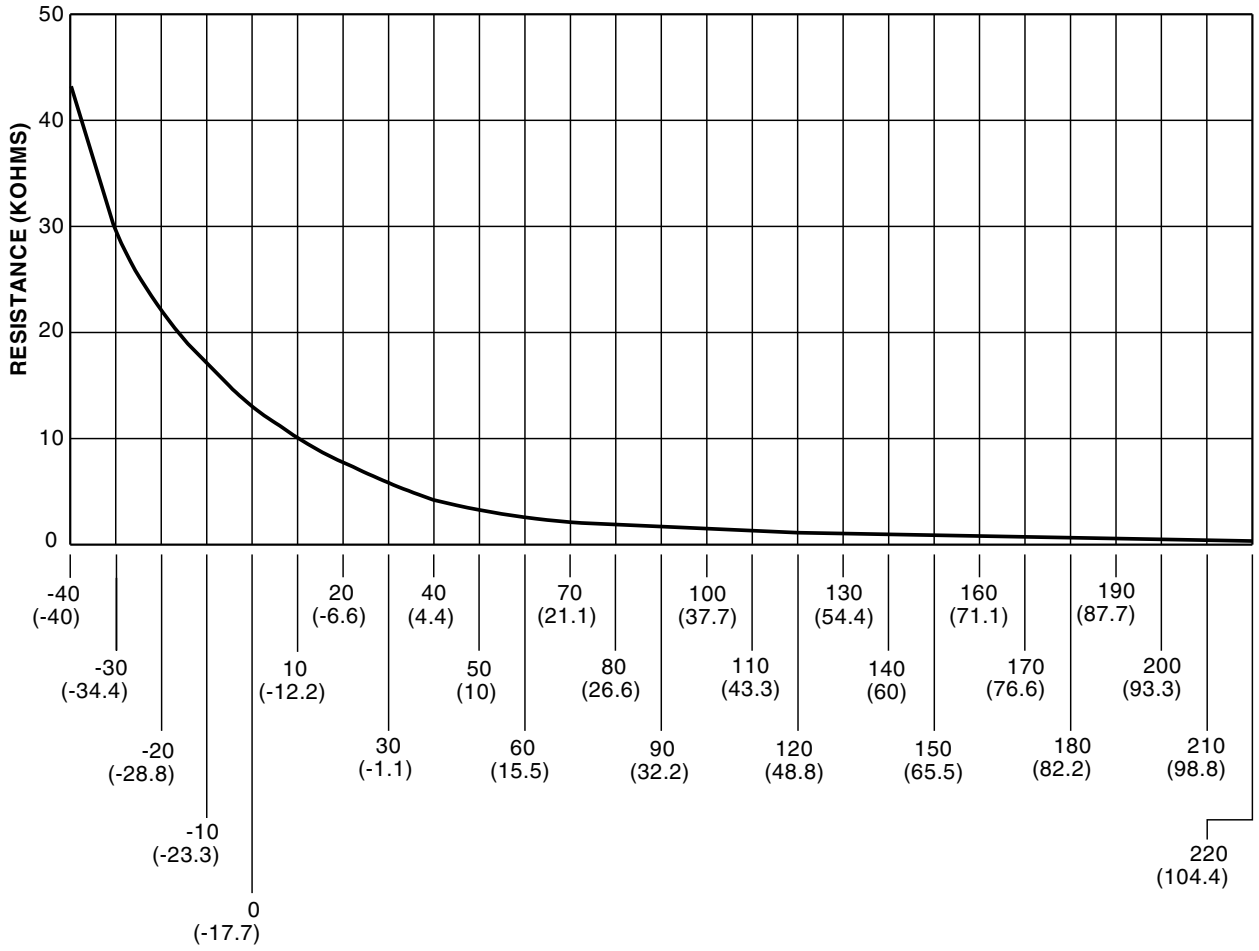
**RESISTANCE TABLE**

2411476 S00061527993_V1

**Mix Manifold Temperature Sensor - Temperature and Resistance Data**
**Figure 501/21-51-51-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**MIX MANIFOLD TEMPERATURE SENSOR
RESISTANCE VS TEMPERATURE GRAPH**

2411477 S00061527994_V1

**Mix Manifold Temperature Sensor - Temperature and Resistance Data
Figure 501/21-51-51-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## PACK TEMPERATURE SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the pack temperature sensor

(2) An installation of the pack temperature sensor.

(3) There is a pack temperature sensor installed on the left and the right cooling pack.

**TASK 21-51-52-000-801**

### 2. Pack Temperature Sensor Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-51-52-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-52-010-001**

(2) To remove the temperature sensor on the left cooling pack, do this task:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-52-010-002**

(3) To remove the temperature sensor on the right cooling pack, do this task:



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(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Pack Temperature Sensor Removal

SUBTASK 21-51-52-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector from the pack temperature sensor [1].

SUBTASK 21-51-52-020-002

(2) Remove and discard the MS20995C32 lockwire, G01048 from the pack temperature sensor [1].

SUBTASK 21-51-52-020-003

**CAUTION** USE TWO WRENCHES TO REMOVE THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the temperature sensor [1].

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature sensor [1].

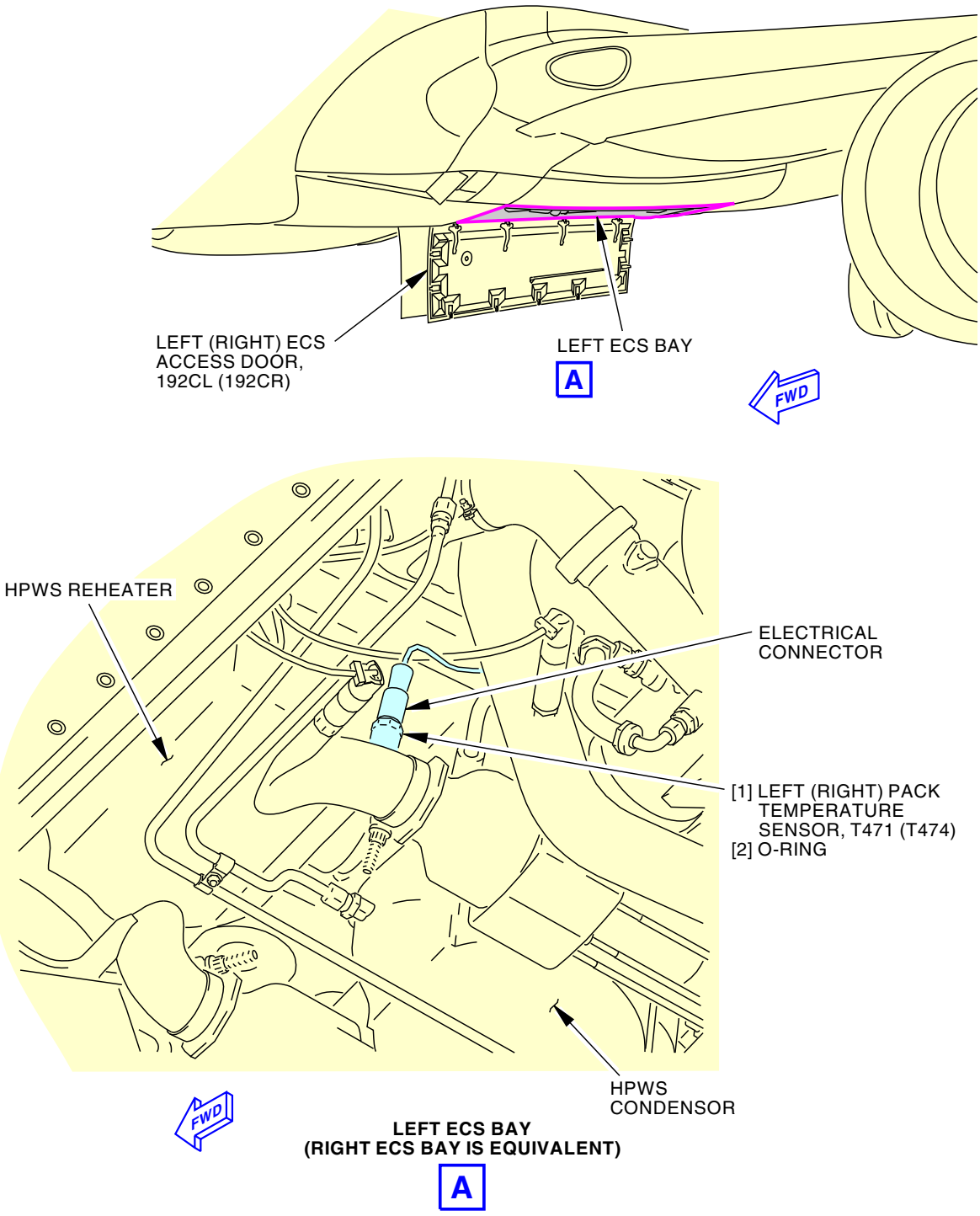
SUBTASK 21-51-52-020-004

(4) Remove and discard the o-ring [2] from the temperature sensor [1].

**——— END OF TASK ———**



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**Pack Temperature Sensor Installation**
**Figure 401/21-51-52-990-801**



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**TASK 21-51-52-400-801**

## 3. Pack Temperature Sensor Installation

(Figure 401)

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Sensor | 21-51-52-04-025 | SIA ALL |
| 2 | O-ring | 21-51-52-04-020 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

### E. Pack Temperature Sensor Installation

**SUBTASK 21-51-52-420-001**

(1) Install a new o-ring [2] on the temperature sensor [1].

**SUBTASK 21-51-52-160-001**

(2) Make sure the mating surfaces of the boss and the temperature sensor nut are clean.

**SUBTASK 21-51-52-640-001**

(3) Apply a thin layer of the Never-Seez NSBT compound, D00006 to the threads of the temperature sensor [1].

**SUBTASK 21-51-52-420-002**

**CAUTION**

USE TWO WRENCHES TO INSTALL THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(4) Use two wrenches to install the pack temperature sensor [1].

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature sensor [1].

**SUBTASK 21-51-52-420-003**

(5) Install a new MS20995C32 lockwire, G01048 on the temperature sensor [1].

**SUBTASK 21-51-52-420-004**

(6) Connect the electrical connector to the temperature sensor [1].

**SUBTASK 21-51-52-010-003**

(7) If the temperature sensor [1] on the left cooling pack was replaced, do these steps:



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(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-51-52-010-004

(8) If the temperature sensor [1] on the right cooling pack was replaced, do these steps:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-52-010-005

(1) If the temperature sensor [1] on the left cooling pack was replaced, do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-52-010-006

(2) If the temperature sensor [1] on the right cooling pack was replaced, do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

**——— END OF TASK ———**



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## PACK TEMPERATURE SENSOR - ADJUSTMENT/TEST

### 1. General

A. This procedure has this task:

(1) A test of the pack temperature sensors.

(2) The test consists of a resistance measurements to make sure that the sensor meets specifications.

B. There are two pack temperature sensors, T471 and T474.

**TASK 21-51-52-720-801**

### 2. Pack Temperature Sensor Test

#### A. References

| Reference | Title |
|---|---|
| 21-51-52 P/B 401 | PACK TEMPERATURE SENSOR - REMOVAL/INSTALLATION |
| 21-61-22-000-801 | Integrated Air Systems Controller (IASC) Removal (P/B 401) |
| 21-61-22-400-801 | Integrated Air Systems Controller (IASC) Installation (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| COM-3955 | Thermometer - Digital (Type K)<br>Part #: 51 2B Supplier: 89536<br>Opt Part #: 51 SERIES II Supplier: 89536 |

#### C. Preparation for the Resistance Test

**SUBTASK 21-51-52-864-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-52-020-005**

(2) To do a test of the left pack temperature sensor, remove the left IASC (TASK 21-61-22-000-801).



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SUBTASK 21-51-52-020-006

(3) To do a test of the right pack temperature sensor, remove the right IASC (TASK 21-61-22-000-801).

SUBTASK 21-51-52-800-001

(4) Allow the pack bay to cool until the pack bay interior has reached the outside ambient temperature.

## D. Sensor Resistance Check Procedure

SUBTASK 21-51-52-700-001

(1) Use a digital thermometer, COM-3955, or equivalent, to measure the temperature adjacent to the applicable pack temperature sensor in the pack bay.

(a) Record the temperature for later use.

SUBTASK 21-51-52-700-002

(2) Use the digital/analog multimeter, COM-1793, (preferred) to measure resistance between connector pins.

NOTE: An equivalent meter can be used as long as the digital multimeter minimizes self-heating of the sensor element. The instrument must limit the current through the sensor to less than 100 microamperes when set to the 10K ohms scale. If you use resistance measuring instruments without this current-limiting feature you will get an error in resistance value due to self-heating of the sensor element.

SUBTASK 21-51-52-700-003

(3) For the left pack temperature sensor, T471, make these resistance measurements:

(a) Measure the resistance from pin, J9, to pin, J10, on the electrical connector, D15838B, for the left Integrated Air Systems Controller (IASC) (WDM 21-51-12).

(b) Measure the resistance from pin, 16, to pin, 22, on the electrical connector, D15840C, for the right Integrated Air Systems Controller (IASC) (WDM 21-51-13).

SUBTASK 21-51-52-700-004

(4) For the right pack temperature sensor, T474, make these resistance measurements:

(a) Measure the resistance from pin, J9, to pin, J10, on the electrical connector, D15840B, for the right Integrated Air Systems Controller (IASC) (WDM 21-51-22).

(b) Measure the resistance from pin, 16, to pin, 22, on the electrical connector, D15838C, for the left Integrated Air Systems Controller (IASC) (WDM 21-51-23).

SUBTASK 21-51-52-700-005

(5) Make a record of the resistances for each sensor that you measured.

SUBTASK 21-51-52-700-006

(6) Find the temperature that is nearest to the temperature that you recorded (Figure 501).

SUBTASK 21-51-52-700-007

(7) Compare the serviceable range of resistance for that temperature to the resistance you recorded.

NOTE: The serviceable range of resistance is between the two parallel lines on the graph.

SUBTASK 21-51-52-960-001

(8) If the resistance is out of the serviceable range, replace the sensor (PAGEBLOCK 21-51-52/401).



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### E. Put the Airplane Back to Its Usual Condition

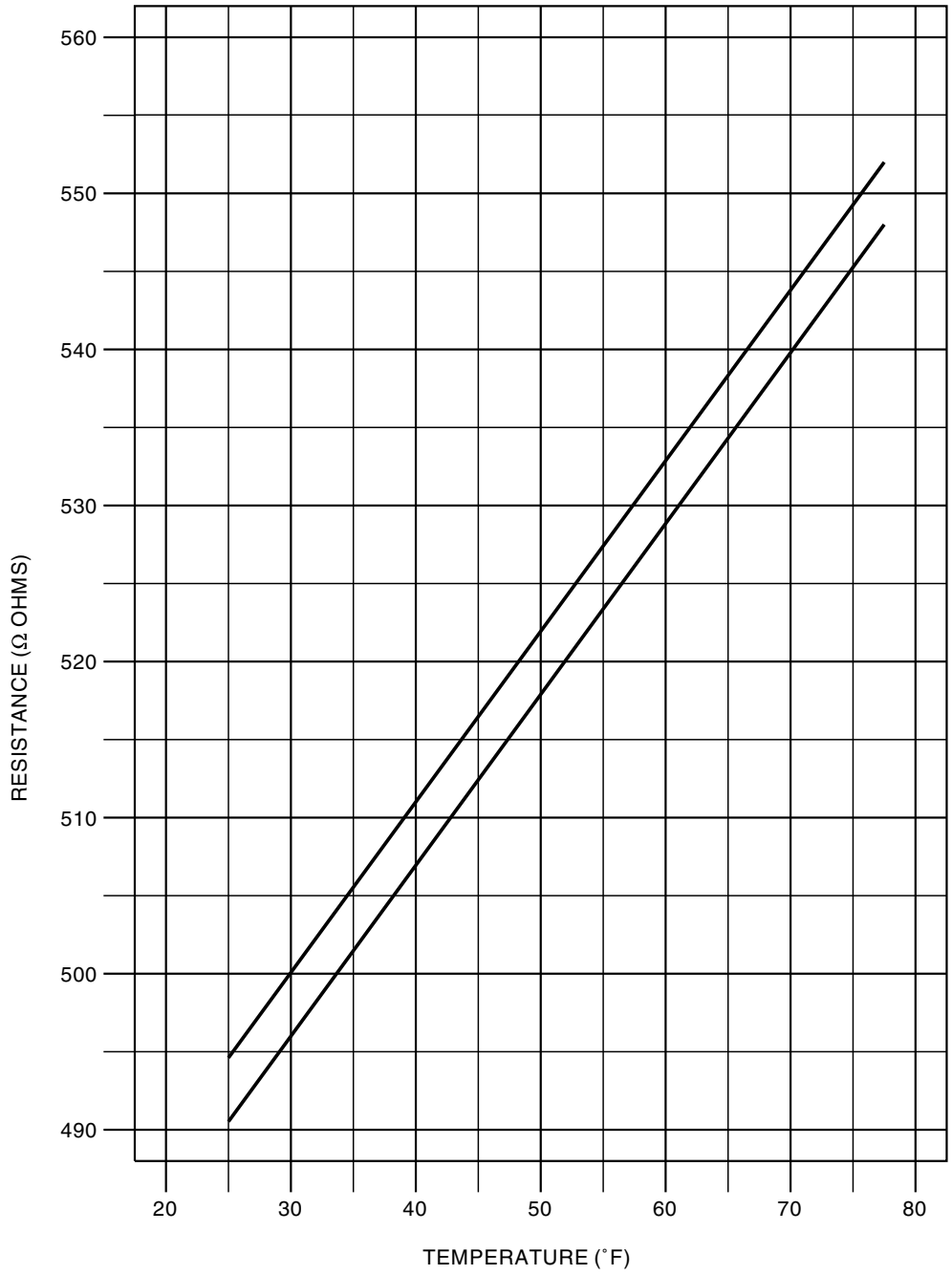
**SUBTASK 21-51-52-420-005**

(1) Install the applicable Integrated Air Systems Controller (IASC) (TASK 21-61-22-400-801).

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PACK TEMPERATURE SENSOR RESISTANCE VS TEMPERATURE GRAPH**

2411479 S00061528002_V1

**Pack Temperature Sensor Test**
**Figure 501/21-51-52-990-802**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## HEAT EXCHANGER TEMPERATURE SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the heat exchanger temperature sensor.

(2) An installation of the heat exchanger temperature sensor.

**TASK 21-51-53-000-801**

### 2. Heat Exchanger Temperature Sensor Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### D. Prepare for the Removal

**SUBTASK 21-51-53-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-53-010-001**

(2) For the heat exchanger temperature sensor [1] on the left cooling pack, do this task:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-53-010-002**

(3) For the heat exchanger temperature sensor [1] on the right cooling pack, do this task:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |



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(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(c) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## E. Temperature Sensor Removal

SUBTASK 21-51-53-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector [2] from the heat exchanger temperature sensor [1].

SUBTASK 21-51-53-020-002

(2) Remove and discard the safety cable from the heat exchanger temperature sensor [1].

SUBTASK 21-51-53-020-003

**CAUTION** USE TWO WRENCHES TO REMOVE THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the heat exchanger temperature sensor [1].

(a) Use one wrench to hold the boss and the other wrench to turn the heat exchanger temperature sensor [1].

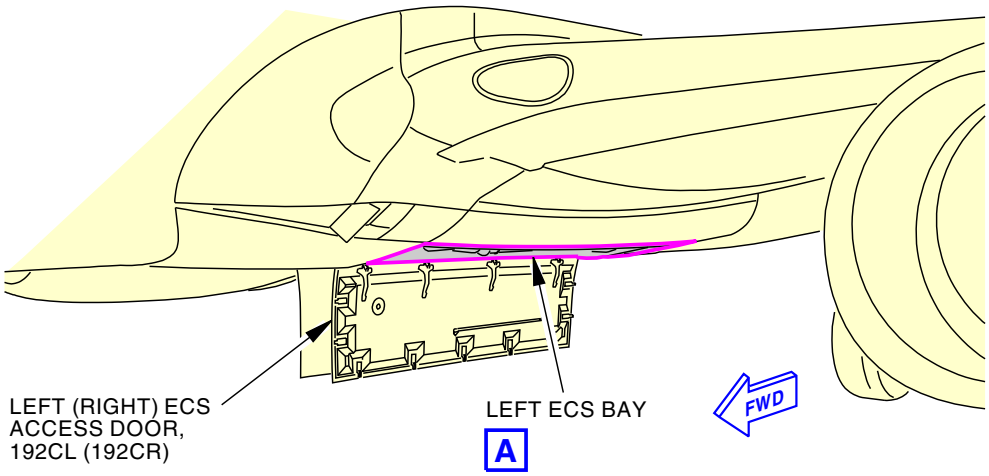
SUBTASK 21-51-53-020-004

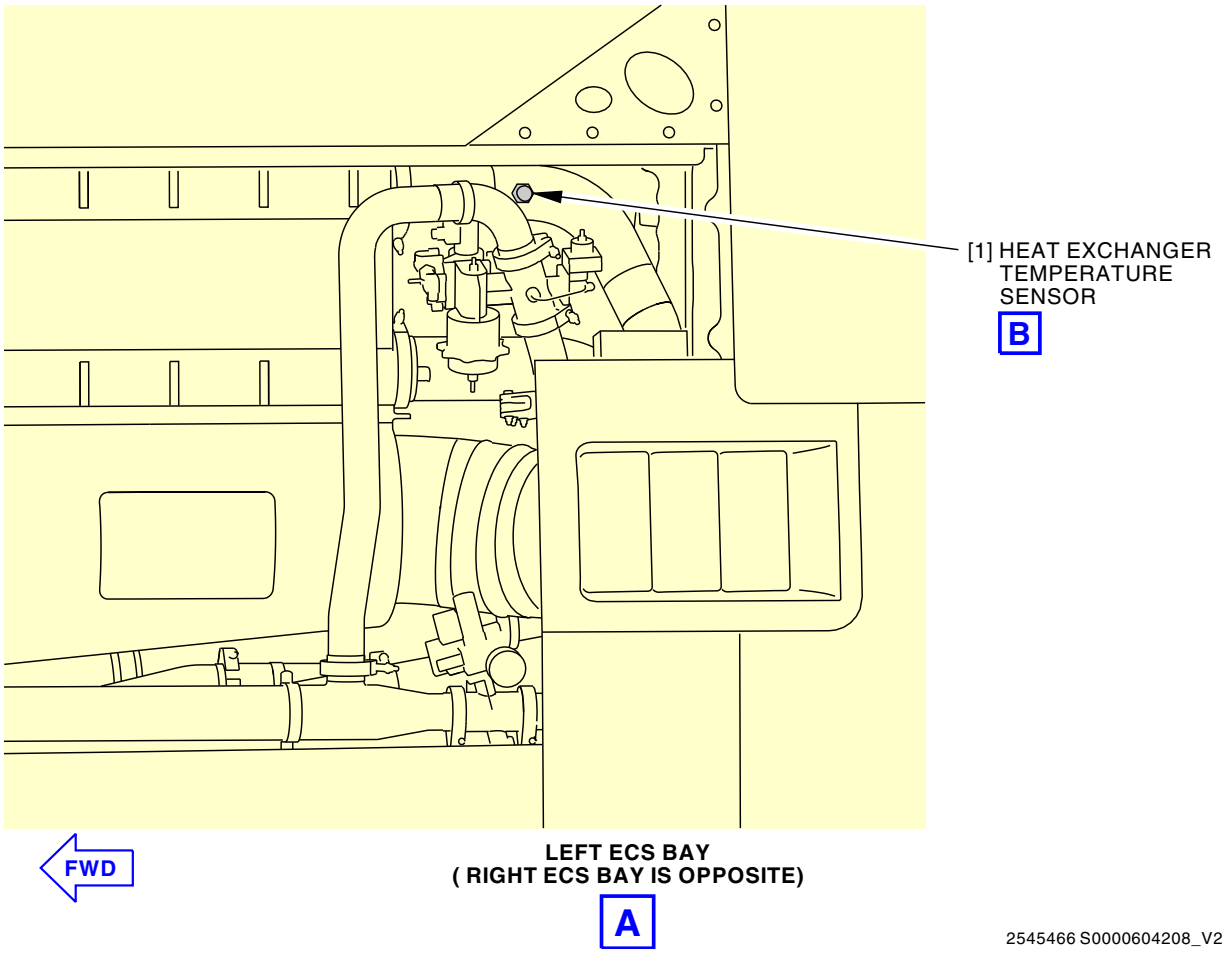
(4) Remove and discard the o-ring [3] from the heat exchanger temperature sensor [1].

**END OF TASK**



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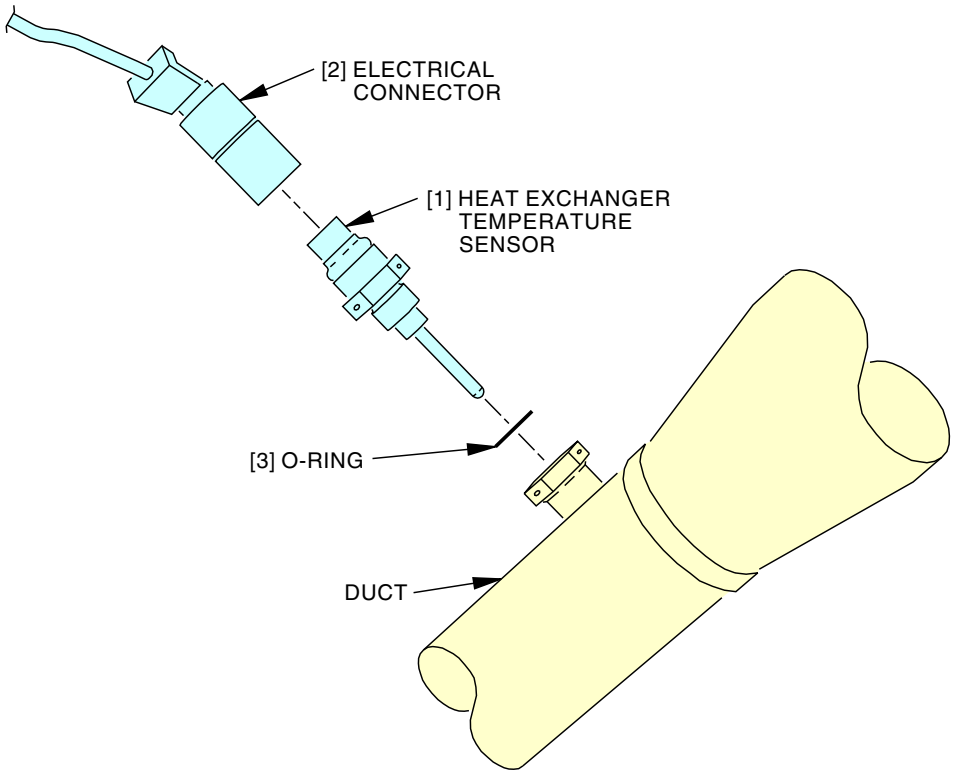




2545466 S0000604208_V2

**Heat Exchanger Temperature Sensor Installation**
**Figure 401/21-51-53-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**HEAT EXCHANGER TEMPERATURE SENSOR**

**B**

2545467 S0000604209_V1

**Heat Exchanger Temperature Sensor Installation**
**Figure 401/21-51-53-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-51-53-400-801**

## 3. Heat Exchanger Temperature Sensor Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 21-00-00-730-802 | Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test (P/B 501) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| D00504 | Grease - Petrolatum | VV-P-236 |
| G50375 | Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule) | BACC13AT3K, AMS 5689 |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Temperature Sensor Installation

**SUBTASK 21-51-53-640-001**

(1) Apply a light coat of grease, D00504 to a new o-ring [3].

**SUBTASK 21-51-53-640-002**

(2) Install the lubricated o-ring [3] on the heat exchanger temperature sensor [1].

**SUBTASK 21-51-53-160-001**

(3) Make sure that the mating surfaces of the boss and the temperature sensor nut are clean.

**SUBTASK 21-51-53-640-003**

(4) Apply a thin layer of the Never-Seez NSBT compound, D00006 to the threads of the heat exchanger temperature sensor [1].

**SUBTASK 21-51-53-420-001**

**CAUTION**

USE TWO WRENCHES TO INSTALL THE TEMPERATURE SENSOR FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE TEMPERATURE SENSOR, IT CAN CAUSE DAMAGE TO THE DUCT.

(5) Use two wrenches to install the heat exchanger temperature sensor [1].

(a) Use one wrench to hold the boss and the other wrench to turn the heat exchanger temperature sensor [1].



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(b) Tighten the heat exchanger temperature sensor [1] to 220 in-lb (25 N·m) to 230 in-lb (26 N·m).

SUBTASK 21-51-53-420-002

(6) Install a new safety cable kit, G50375 on the heat exchanger temperature sensor [1] (TASK 20-10-44-400-801).

SUBTASK 21-51-53-420-003

(7) Connect the electrical connector [2] to the heat exchanger temperature sensor [1].

SUBTASK 21-51-53-860-002

(8) For the left cooling pack, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 8 | C00555 | AIR CONDITIONING MISC LOADS LEFT |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-51-53-860-003

(9) For the right cooling pack, do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 8 | C01178 | AIR CONDITIONING MISC LOADS RIGHT |
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |

SUBTASK 21-51-53-740-001

(10) Do this ground test: Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test, TASK 21-00-00-730-802.

(a) When the test is completed, make sure that PASS shows adjacent to TEST CONDITION.

(b) If FAILED shows, then do the fault isolation procedure for the maintenance message.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-53-410-001

(1) If you replaced the temperature sensor for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-53-410-002

(2) If you replaced the temperature sensor for the right cooling pack, close these access panels in this sequence:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## PACK TEMPERATURE BULB - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the pack temperature bulb

(2) An installation of the pack temperature bulb.

(3) There is a pack temperature bulb installed on the left and the right cooling pack.

**TASK 21-51-60-000-801**

### 2. Pack Temperature Bulb Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-51-60-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-51-60-860-002**

(2) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

**SUBTASK 21-51-60-010-001**

(3) To get access to the temperature bulb on the left cooling pack, open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-51-60-010-002**

(4) To get access to the temperature bulb on the right cooling pack open these panels in this sequence:



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Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Pack Temperature Bulb Removal

SUBTASK 21-51-60-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector from the pack temperature bulb [1].

SUBTASK 21-51-60-020-002

(2) Remove and discard the MS20995C32 lockwire, G01048 from the overheat bulb [1].

SUBTASK 21-51-60-020-003

**CAUTION** USE TWO WRENCHES TO REMOVE THE PACK TEMPERATURE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE PACK TEMPERATURE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the temperature bulb [1].

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb [1].

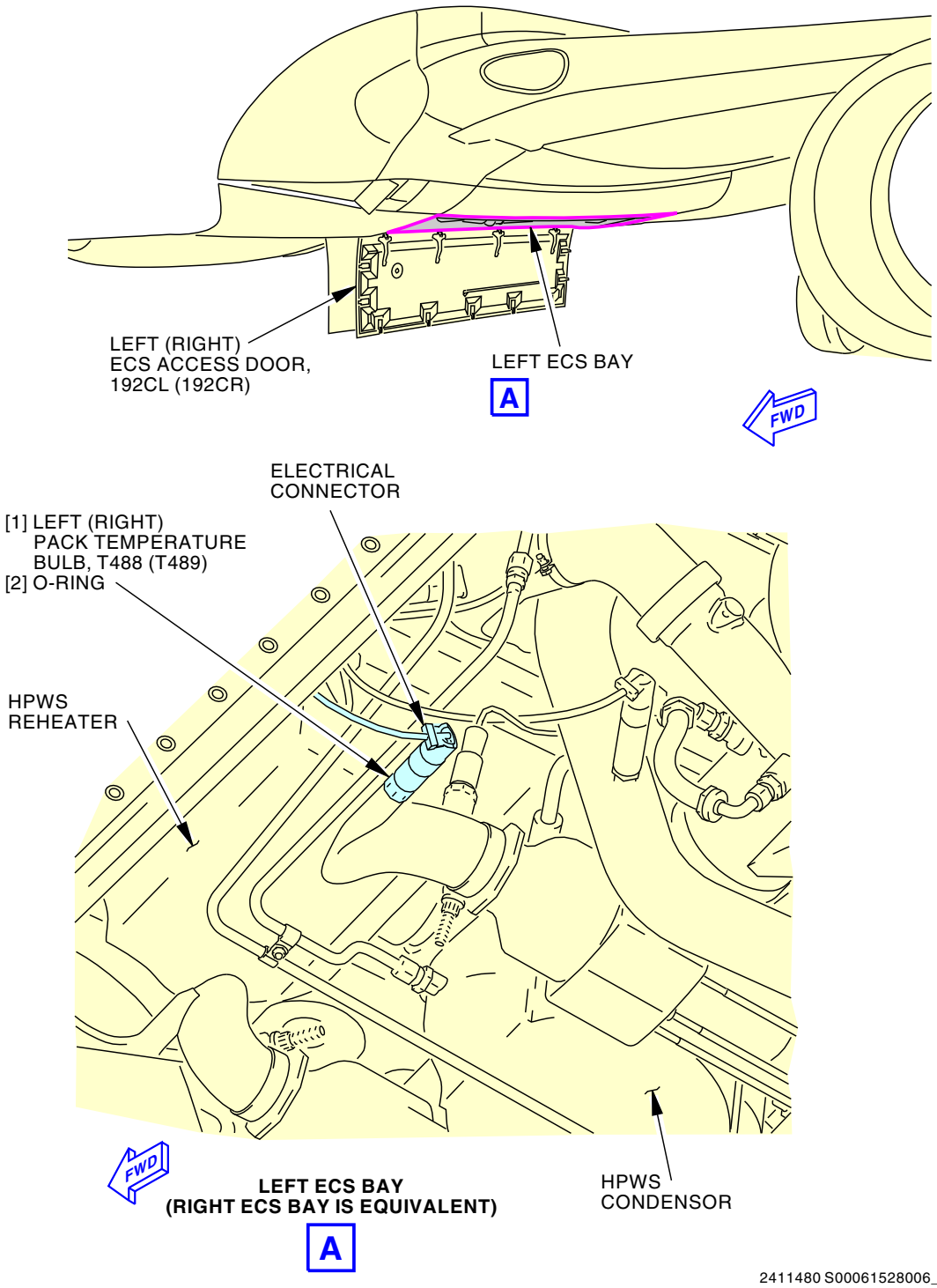
SUBTASK 21-51-60-020-004

(4) Remove and discard the o-ring [2] from the temperature bulb [1].

**END OF TASK**



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**Pack Temperature Bulb Installation**
**Figure 401/21-51-60-990-801**



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**TASK 21-51-60-400-801**

## 3. Pack Temperature Bulb Installation

(Figure 401)

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Bulb | 21-51-60-02-025 | SIA ALL |
| 2 | O-ring | 21-51-60-02-020 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Pack Temperature Bulb Installation

**SUBTASK 21-51-60-420-001**

(1) Install a new o-ring [2] on the temperature bulb [1].

**SUBTASK 21-51-60-160-001**

(2) Make sure that the mating surfaces of the boss and the temperature bulb nut are clean.

**SUBTASK 21-51-60-640-001**

(3) Apply a thin layer of the Never-Seez NSBT compound, D00006, to the threads of the temperature bulb [1].

**SUBTASK 21-51-60-420-002**

**CAUTION**

USE TWO WRENCHES TO INSTALL THE PACK TEMPERATURE BULB IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE PACK TEMPERATURE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

(4) Use two wrenches to install the pack temperature bulb [1].

(a) Use one wrench to hold the boss.

(b) Use the other wrench to turn the temperature bulb [1].

**SUBTASK 21-51-60-420-003**

(5) Install new MS20995C32 lockwire, G01048, on the temperature bulb [1].

**SUBTASK 21-51-60-420-004**

(6) Connect the electrical connector to the temperature bulb [1].



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## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-60-410-001

(1) If you replaced the temperature bulb for the left cooling pack, close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-51-60-410-002

(2) If you replaced the temperature bulb for the right cooling pack, close these panels in the specified sequence:

Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



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## AIR CONDITIONING MODULE - REMOVAL/INSTALLATION

### 1. General

A. The air conditioning module is located on the upper right corner of the P5 forward overhead panel in the flight deck.

B. This procedure has these tasks:

(1) A removal of the air conditioning module.

(2) An installation of the air conditioning module.

**TASK 21-51-65-000-801**

### 2. Air Conditioning Module Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**B. Procedure**

**SUBTASK 21-51-65-860-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-51-65-860-002**

(2) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |

**SUBTASK 21-51-65-010-001**

(3) Get access to the electrical connectors on the back of the P5-10 air conditioning module [1] on the P5 forward overhead panel:

(a) Loosen the 1/4-turn fasteners that hold the P5 forward overhead panel in position and let the panel rotate downward.

**SUBTASK 21-51-65-020-001**

(4) Remove the P5-10 air conditioning module [1] from the P5 forward overhead panel as follows:

(a) Disconnect the electrical connectors at the back of the module.

**WARNING** HOLD THE AIR CONDITIONING MODULE WHEN YOU LOOSEN THE 1/4-TURN FASTENERS. IF THE MODULE FALLS, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Hold the air conditioning module [1] in place and loosen the 1/4-turn fasteners that secure it to the P5 forward overhead panel.

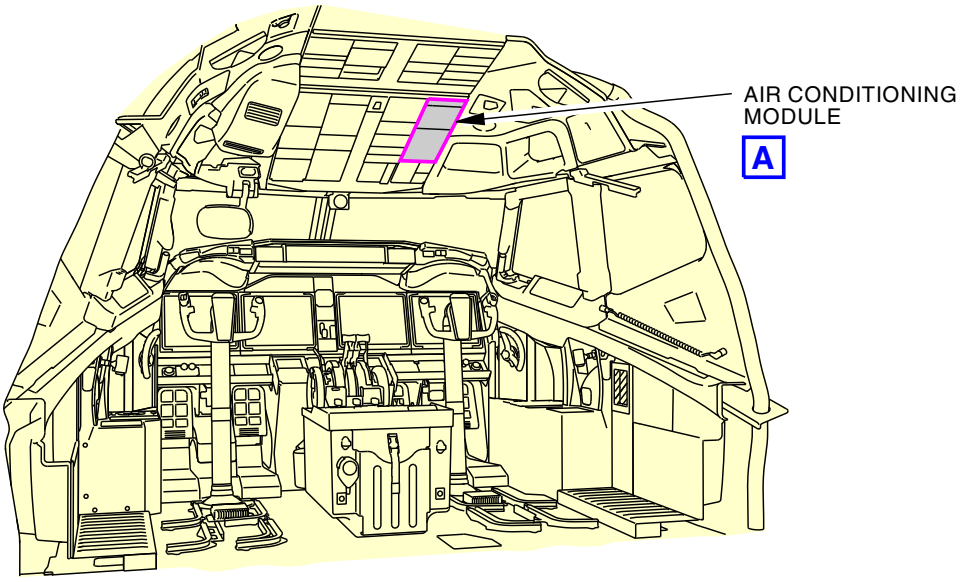

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(c) Remove the air conditioning module [1].

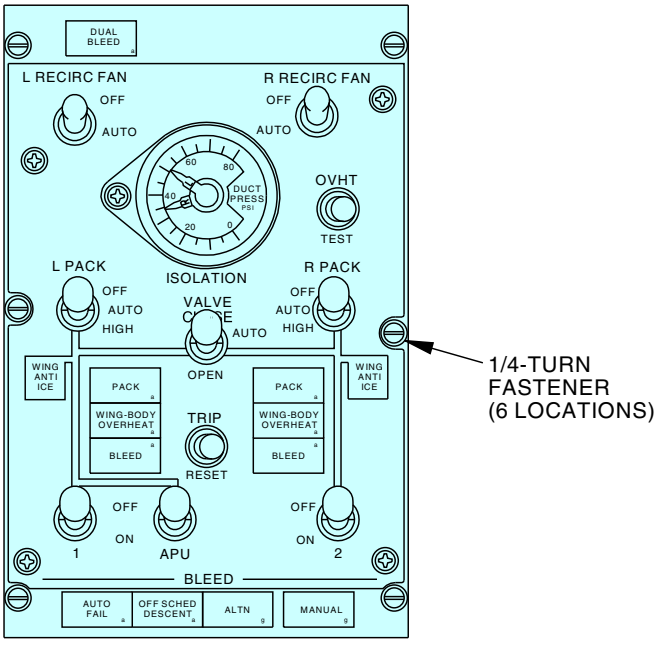
——— END OF TASK ———



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**FLIGHT COMPARTMENT**




**[1] AIR CONDITIONING MODULE**

**A**

2411481 S00061528011_V1

**Air Conditioning Module Installation**
**Figure 401/21-51-65-990-801**



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**TASK 21-51-65-400-801**

**3. Air Conditioning Module Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-25-00-710-801 | Recirculation System - Operational Test (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-3907 | Mirror - Dental |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Module | 21-51-65-01-050 | SIA ALL |
| | | 31-11-94-01-205 | SIA 001-014 |
| | | 31-11-94-02-205 | SIA 015-999 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

**F. Air Conditioning Module Installation**

**SUBTASK 21-51-65-010-002**

(1) If it has not already been done, lower the P5 forward overhead panel.

**SUBTASK 21-51-65-420-001**

(2) Install the P5-10 air conditioning module [1] into the P5 forward overhead panel as follows:

(a) Put the air conditioning module [1] into the P5 forward overhead panel and hold it in position.

(b) Turn the 1/4-turn fasteners on the air conditioning module [1] to secure it to the P5 forward overhead panel.

(c) Connect the two electrical connectors to the air conditioning module [1].

**SUBTASK 21-51-65-010-003**

(3) Lift the P5 forward overhead panel to the closed position and turn the 1/4-turn fasteners.



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SUBTASK 21-51-65-860-003

(4) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

SUBTASK 21-51-65-860-004

(5) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 3 | C01613 | AIR COND PACK CONT VALVES L ALT |
| D | 4 | C01614 | AIR COND PACK CONT VALVES R ALT |

## G. Air Conditioning Module Installation Test

SUBTASK 21-51-65-860-005

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-51-65-860-006

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-51-65-860-007

(3) Make sure that all circuit breakers for the air conditioning and the pneumatic systems are closed.

SUBTASK 21-51-65-860-008

(4) Make sure that all the circuit breakers for these systems are closed:

(a) Master caution

(b) Air/ground systems (nose gear and main gear)

(c) Indicator lights.

SUBTASK 21-51-65-860-009

(5) Make sure the L and R PACK switches on the P5-10 panel are set to OFF.

SUBTASK 21-51-65-710-001

(6) Set the LIGHTS switch on the P2-1 center instrument panel momentarily to the TEST position and make sure these lights come on and then go off:

(a) AUTO FAIL

(b) OFF SCHED DESCENT

(c) ALTN

(d) MANUAL

(e) L and R PACK

(f) L and R BLEED

(g) DUAL BLEED



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SUBTASK 21-51-65-710-002

(7) Do a test of the overheat indication system:

(a) Press the OVHT TEST button on the P5-10 panel.

(b) Make sure the WING-BODY OVERHEAT lights come on.

SUBTASK 21-51-65-710-003

(8) Do this task to do a test of the recirculation system, Recirculation System - Operational Test, TASK 21-25-00-710-801.

SUBTASK 21-51-65-710-004

(9) Do a test of the pneumatic system pressurization:

(a) Open the left access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

(b) Open the right access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

(c) Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

(d) Make sure the ISOLATION VALVE switch is in the CLOSED position.

(e) Position the APU BLEED switch to ON.

(f) Make sure there is pressure indication for the left pneumatic system.

(g) Position the L PACK switch to AUTO.

(h) Make sure the indication on the pressure gauge increases.

(i) Make sure the left pack flow control valve opens.

1) Use a dental mirror, STD-3907 if necessary to view the valve position.

(j) Position the L PACK switch to OFF.

(k) Position the ISOLATION VALVE switch to OPEN.

(l) Make sure there is pressure indication for the right pneumatic system.

(m) Position the R PACK switch to AUTO.

(n) Make sure the indication on the pressure gauge increases.

(o) Make sure the right pack flow control valve opens.

1) Use a dental mirror, STD-3907 if necessary to view the valve position.

(p) Set the R PACK switch to OFF.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-51-65-860-010

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-51-65-410-001

(2) Close the left access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



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SUBTASK 21-51-65-410-002

(3) Close the right access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

SUBTASK 21-51-65-410-003

(4) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

——— END OF TASK ———



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## ZONE TEMPERATURE CONTROL AND INDICATION - ADJUSTMENT/TEST

### 1. General

A. This procedure has these tasks:

(1) Cabin Temperature Control and Indication Test.

(2) Duct Overheat Switch - Operational Test.

**TASK 21-61-00-700-801**

### 2. Cabin Temperature Control and Indication - Operational Test

#### A. General

(1) This task does an operational test of the cabin temperature control and indication components.

#### B. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-1122 | Thermometer - Alcohol/Mercury (or equivalent meter meets task requirements) |

#### D. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

#### E. Procedure

**SUBTASK 21-61-00-710-001**

(1) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

**SUBTASK 21-61-00-860-002**

(2) Do these steps at the P5-17 Cabin Temperature Panel:

(a) Put the CONT CAB temperature selector to the full COLD position.

(b) Put the FWD CAB and AFT CAB temperature selectors to the AUTO (12:00) position.

(c) Let the pack operate for 1 to 3 minutes to let the output temperature become stable.

**SUBTASK 21-61-00-710-002**

(3) Do these steps to check temperature indication for the forward passenger cabin:

(a) Use a thermometer, STD-1122 to measure the ambient temperature in the forward passenger cabin near the cabin temperature sensor assembly.

(b) Put the AIR TEMP selector on the P5-17 Cabin Temperature Panel to the FWD PASS CABIN position.

(c) Make sure that the temperature shown on the indicator is approximately the same as the ambient temperature in the forward passenger cabin.

(d) Move the FWD CAB temperature selector to the fully WARM position.

(e) Make sure that the temperature indicator shows an increase in temperature.

(f) Move the FWD CAB temperature selector to the AUTO (12:00) position.

(g) Let the pack operate for 1 to 3 minutes to let the output temperature become stable.



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SUBTASK 21-61-00-710-003

(4) Do these steps to check temperature indication for the aft passenger cabin:

(a) Use a thermometer, STD-1122 to measure the ambient temperature in the aft passenger cabin near the cabin temperature sensor assembly.

(b) Put the AIR TEMP selector on the P5-17 Cabin Temperature Panel to the AFT PASS CABIN position.

(c) Make sure that the temperature shown on the indicator is approximately the same as the ambient temperature in the aft passenger cabin.

(d) Move the AFT CAB temperature selector to the fully WARM position.

(e) Make sure that the temperature indicator shows an increase in temperature.

(f) Move the AFT CAB temperature selector to the full COLD position.

(g) Let the pack operate for 1 to 3 minutes to let the output temperature become stable.

SUBTASK 21-61-00-710-004

(5) Do these steps to check temperature control for the control cabin:

(a) Put the CONT CABIN temperature selector to the AUTO (12:00) position.

(b) Let the pack operate for 1 to 3 minutes to let the output temperature become stable.

(c) Put the AIR TEMP selector on the P5-17 Cabin Temperature Panel to the SUPPLY DUCT CONT CAB position.

(d) Make a record of the temperature shown on the indicator.

(e) Move the CONT CAB temperature selector to the fully WARM position.

(f) Make sure that the temperature indicator shows an increase in temperature.

(g) Move the CONT CAB and AFT CAB temperature selectors to the AUTO (12:00) position.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-61-00-710-005

(1) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

**——— END OF TASK ———**

**TASK 21-61-00-700-802**

## 3. Duct Overheat Switch - Operational Test

**A. References**

| Reference | Title |
|---|---|
| 21-61-05-000-801 | Duct Overheat Switch Removal (P/B 401) |
| 21-61-05-400-801 | Duct Overheat Switch Installation (P/B 401) |

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-3924 | Tester - Thermo Switch, K-Type Thermocouple Switches<br>Part #: H394 SERIES Supplier: 98869<br>Part #: H394R Supplier: 98869<br>Opt Part #: H294 Supplier: 98869 |



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(Continued)

| Reference | Description |
|---|---|
| SPL-3952 | Kit - Heater Probes, TEMPCAL<br>Part #: BH24944-13 Supplier: 98869<br>Part #: BH24944-14 Supplier: 98869<br>Part #: BH24944-16 Supplier: 98869 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Preparation for the Operational Test**

SUBTASK 21-61-00-010-001

(1) To get access to the duct overheat switch for the control cabin, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-00-010-002

(2) To get access to the duct overheat switches for the passenger cabin, remove the applicable ceiling panel that is forward of the overwing escape hatches.

**F. Operational Test of the Control Cabin Duct Overheat Switch (Method I)**

SUBTASK 21-61-00-020-001

(1) Remove the duct overheat switch (TASK 21-61-05-000-801).

(a) Re-connect the electrical connector to the duct overheat switch.

SUBTASK 21-61-00-480-001

(2) Prepare the K-Type thermocouple switch tester, SPL-3924 and the TEMPCAL heater probe kit, SPL-3952 to test the overheat switch.

NOTE: Use the correct heater probe to test the overheat switch.

SUBTASK 21-61-00-710-006

**CAUTION**

DO NOT LET THE TEMPERATURE OF THE OVERHEAT SWITCH PROBE BECOME MORE THAN 200 DEGREES F (93 DEGREES C). THIS CAN CAUSE DAMAGE TO THE OVERHEAT SWITCH.

(3) Use the test equipment to increase the temperature of the overheat switch to 190°F (88°C).

SUBTASK 21-61-00-710-007

(4) Make sure that these lights come on when the temperature of the overheat switch probe gets to 190 ±10°F (88 ±6°C):

(a) ZONE TEMP light on the P5-17 panel

(b) MASTER CAUTION and AIR COND lights on the pilots' glareshield.


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SUBTASK 21-61-00-710-008

(5) Remove the heat from the overheat switch probe.

SUBTASK 21-61-00-710-009

(6) Let the overheat switch probe become cool.

NOTE: The reset temperature for the duct overheat switch is 150°F (66°C).

SUBTASK 21-61-00-710-010

(7) Push the TRIP RESET button on the P5-10 panel.

SUBTASK 21-61-00-710-011

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-61-00-710-012

(9) Make sure that the ZONE TEMP, MASTER CAUTION and AIR COND lights go off.

SUBTASK 21-61-00-420-001

(10) Install the duct overheat switch (TASK 21-61-05-400-801).

## G. Operational Test of the Control Cabin Duct Overheat Switch (Method II)

SUBTASK 21-61-00-020-002

(1) Remove the duct overheat switch (TASK 21-61-05-000-801).

SUBTASK 21-61-00-420-002

(2) Install a new or serviceable duct overheat switch (TASK 21-61-05-400-801).

NOTE: The duct overheat switch that was removed should be tested according to the vendor CMM before it is put back into service.

SUBTASK 21-61-00-020-003

(3) Remove the electrical connector from the duct overheat switch.

SUBTASK 21-61-00-480-002

(4) Connect a jumper wire between pin 1 and pin 2 of the electrical connector.

SUBTASK 21-61-00-210-001

(5) Make sure that these lights come on:

(a) ZONE TEMP light on the P5-17 panel.

(b) MASTER CAUTION and AIR COND lights on the pilots' glareshield.

SUBTASK 21-61-00-080-001

(6) Disconnect the jumper wire.

SUBTASK 21-61-00-860-005

(7) Push the TRIP RESET button on the P5-10 panel.

SUBTASK 21-61-00-860-006

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-61-00-210-002

(9) Make sure that the ZONE TEMP, MASTER CAUTION, and AIR COND lights go off.

SUBTASK 21-61-00-420-003

(10) Connect the electrical connector to the duct overheat switch.

## H. Operational Test of the Passenger Cabin Duct Overheat Switch (Method I)

SUBTASK 21-61-00-020-004

(1) Remove the forward passenger cabin duct overheat switch (TASK 21-61-05-000-801).



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(a) Re-connect the electrical connector to the duct overheat switch.

SUBTASK 21-61-00-480-003

(2) Prepare the K-Type thermocouple switch tester, SPL-3924 and the TEMPCAL heater probe kit, SPL-3952 to test the overheat switch.

NOTE: Use the correct heater probe to test overheat switch.

SUBTASK 21-61-00-710-013

**CAUTION**

DO NOT LET THE TEMPERATURE OF THE OVERHEAT SWITCH PROBE BECOME MORE THAN 200 DEGREES F (93 DEGREES C). THIS CAN CAUSE DAMAGE TO THE OVERHEAT SWITCH.

(3) Use the test equipment to increase the temperature of the overheat switch to 190°F (88°C).

SUBTASK 21-61-00-710-014

(4) Make sure that these lights come on when the temperature of the overheat switch probe gets to 190 ±10°F (88 ±6°C):

(a) ZONE TEMP light on the P5-17 panel

(b) MASTER CAUTION and AIR COND lights on the pilots' glareshield.

SUBTASK 21-61-00-710-015

(5) Remove the heat from the overheat switch probe.

SUBTASK 21-61-00-710-016

(6) Let the overheat switch probe become cool.

NOTE: The reset temperature for the duct overheat switch is 150°F (66°C).

SUBTASK 21-61-00-710-017

(7) Push the TRIP RESET button on the P5-10 panel.

SUBTASK 21-61-00-710-018

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-61-00-710-019

(9) Make sure that the ZONE TEMP, MASTER CAUTION and AIR COND lights go off.

SUBTASK 21-61-00-420-004

(10) Install the duct overheat switch (TASK 21-61-05-400-801).

SUBTASK 21-61-00-710-020

(11) Repeat the test for the aft passenger cabin duct overheat switch.

## I. Operational Test of the Passenger Cabin Duct Overheat Switch (Method II)

SUBTASK 21-61-00-020-005

(1) Remove the duct overheat switch (TASK 21-61-05-000-801).

SUBTASK 21-61-00-420-005

(2) Install a new or serviceable duct overheat switch (TASK 21-61-05-400-801).

NOTE: The duct overheat switch that was removed should be tested according to the vendor CMM before it is put back into service.

SUBTASK 21-61-00-020-006

(3) Remove the electrical connector from the duct overheat switch.

SUBTASK 21-61-00-480-004

(4) Connect a jumper wire between pin 1 and pin 2 of the electrical connector.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 21-61-00-210-003

(5) Make sure that these lights come on:

(a) ZONE TEMP light on the P5-17 panel.

(b) MASTER CAUTION and AIR COND lights on the pilots' glareshield.

SUBTASK 21-61-00-080-002

(6) Disconnect the jumper wire.

SUBTASK 21-61-00-860-007

(7) Push the TRIP RESET button on the P5-10 panel.

SUBTASK 21-61-00-860-008

(8) Push the MASTER CAUTION reset button on the P7 glareshield panel.

SUBTASK 21-61-00-210-004

(9) Make sure that the ZONE TEMP, MASTER CAUTION, and AIR COND lights go off.

SUBTASK 21-61-00-420-006

(10) Connect the electrical connector to the duct overheat switch.

SUBTASK 21-61-00-710-021

(11) Repeat the test for the aft passenger cabin duct overheat switch.

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-00-410-001

(1) Install the ceiling panels that you removed to do the test.

SUBTASK 21-61-00-410-002

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## DUCT TEMPERATURE LIMIT SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of these components:

(a) Primary control cabin duct temperature limit sensor

(b) Backup control cabin duct temperature limit sensor

(c) Forward passenger cabin duct temperature limit sensor

(d) Aft passenger cabin duct temperature limit sensor.

(2) An installation of these components:

(a) Primary control cabin duct temperature limit sensor

(b) Backup control cabin duct temperature limit sensor

(c) Forward passenger cabin duct temperature limit sensor

(d) Aft passenger cabin duct temperature limit sensor.

**TASK 21-61-04-000-801**

### 2. Duct Temperature Limit Sensor Removal

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-21-45-000-801 | Main Ceiling Panel - Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Prepare for the Removal**

**SUBTASK 21-61-04-860-001**

(1) Put these switches on the P5-10 Air Conditioning Panel to the positions that follow:

(a) Put the L PACK and R PACK switches to the OFF position.

(b) Put the BLEED 1, BLEED 2, and BLEED APU switches to the OFF position.

**SUBTASK 21-61-04-010-001**

(2) To get access to the temperature sensors for the control cabin, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-61-04-010-002**

(3) To get access to the temperature sensors for the passenger cabin, remove the applicable ceiling panel that is forward of the overwing escape hatches. To remove the panel, do this task: Main Ceiling Panel - Removal, TASK 25-21-45-000-801.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**E. Passenger Cabin Duct Temperature Limit Sensor Removal**

**SUBTASK 21-61-04-020-001**

(1) Disconnect the electrical connector [2] from the passenger cabin duct temperature limit sensor [1].

**SUBTASK 21-61-04-020-002**

(2) Remove the screws [3] from the passenger cabin duct temperature limit sensor [1].

**SUBTASK 21-61-04-020-003**

(3) Remove the passenger cabin duct temperature limit sensor [1].

**F. Control Cabin Duct Temperature Limit Sensor Removal**

**SUBTASK 21-61-04-020-004**

(1) Disconnect the electrical connector [22] from the control cabin duct temperature limit sensor [21].

**SUBTASK 21-61-04-020-005**

(2) Remove the screw [23] from the control cabin duct temperature limit sensor [21].

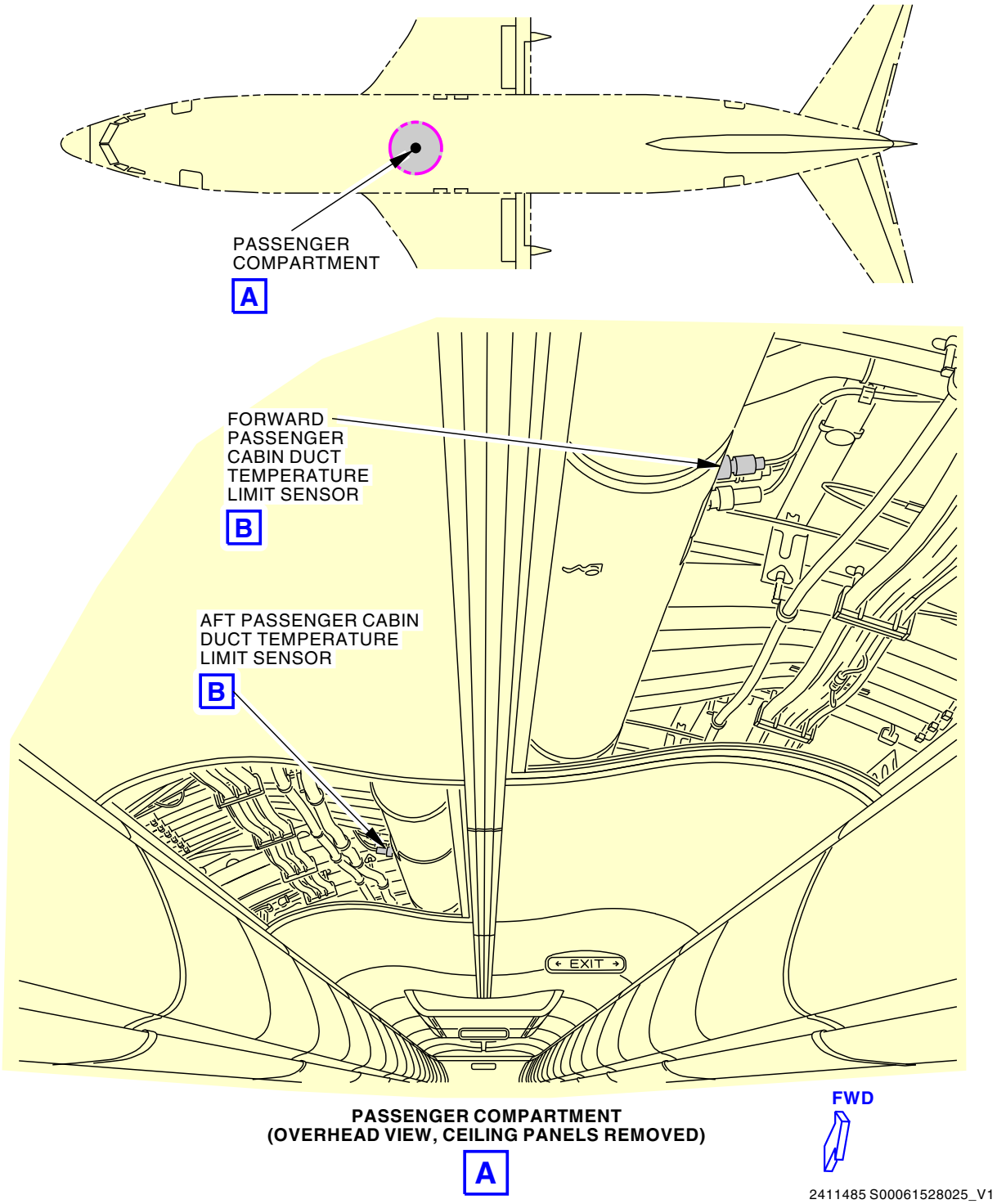
**SUBTASK 21-61-04-020-006**

(3) Remove the control cabin duct temperature limit sensor [21].

**——— END OF TASK ———**



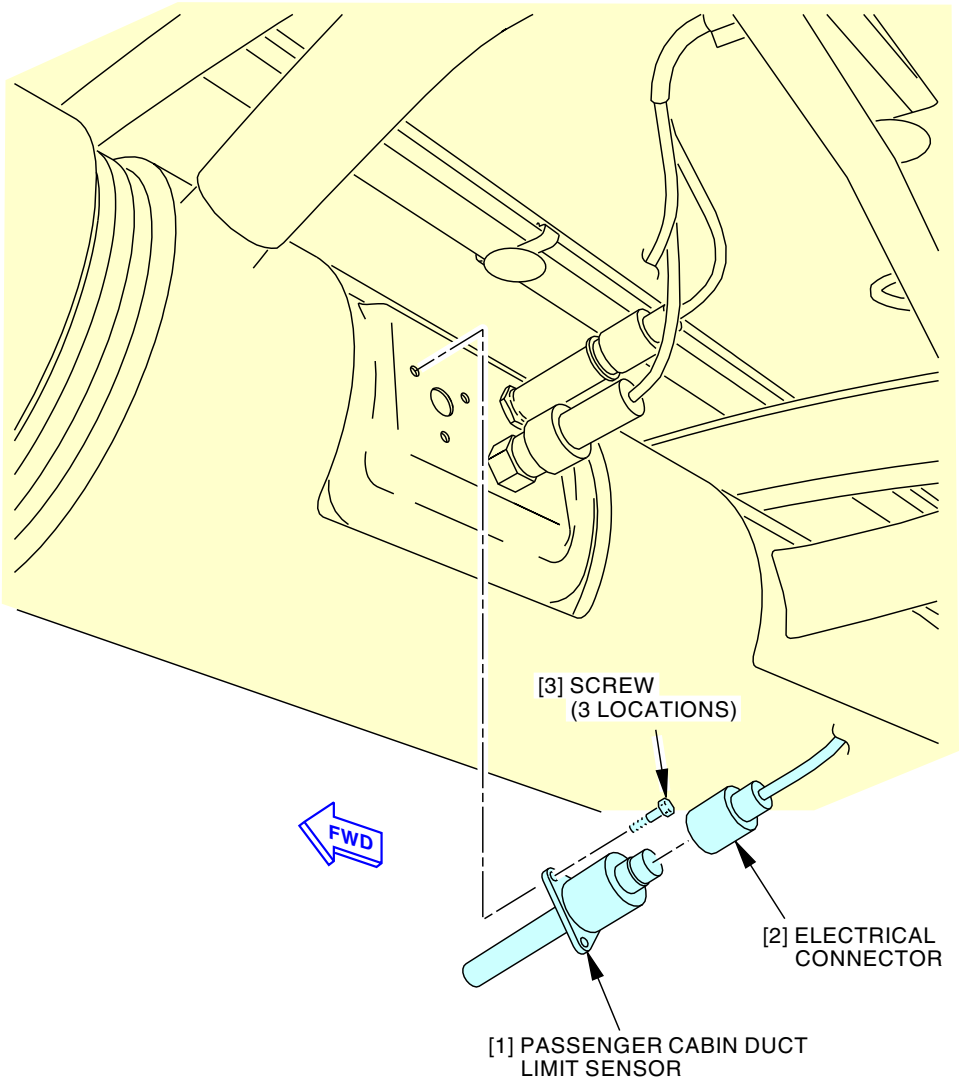
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Passenger Cabin Duct Temperature Limit Sensor Installation**
**Figure 401/21-61-04-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PASSENGER CABIN DUCT TEMPERATURE LIMIT SENSOR**
**(FORWARD CABIN SENSOR IS SHOWN, AFT CABIN SENSOR IS OPPOSITE)**

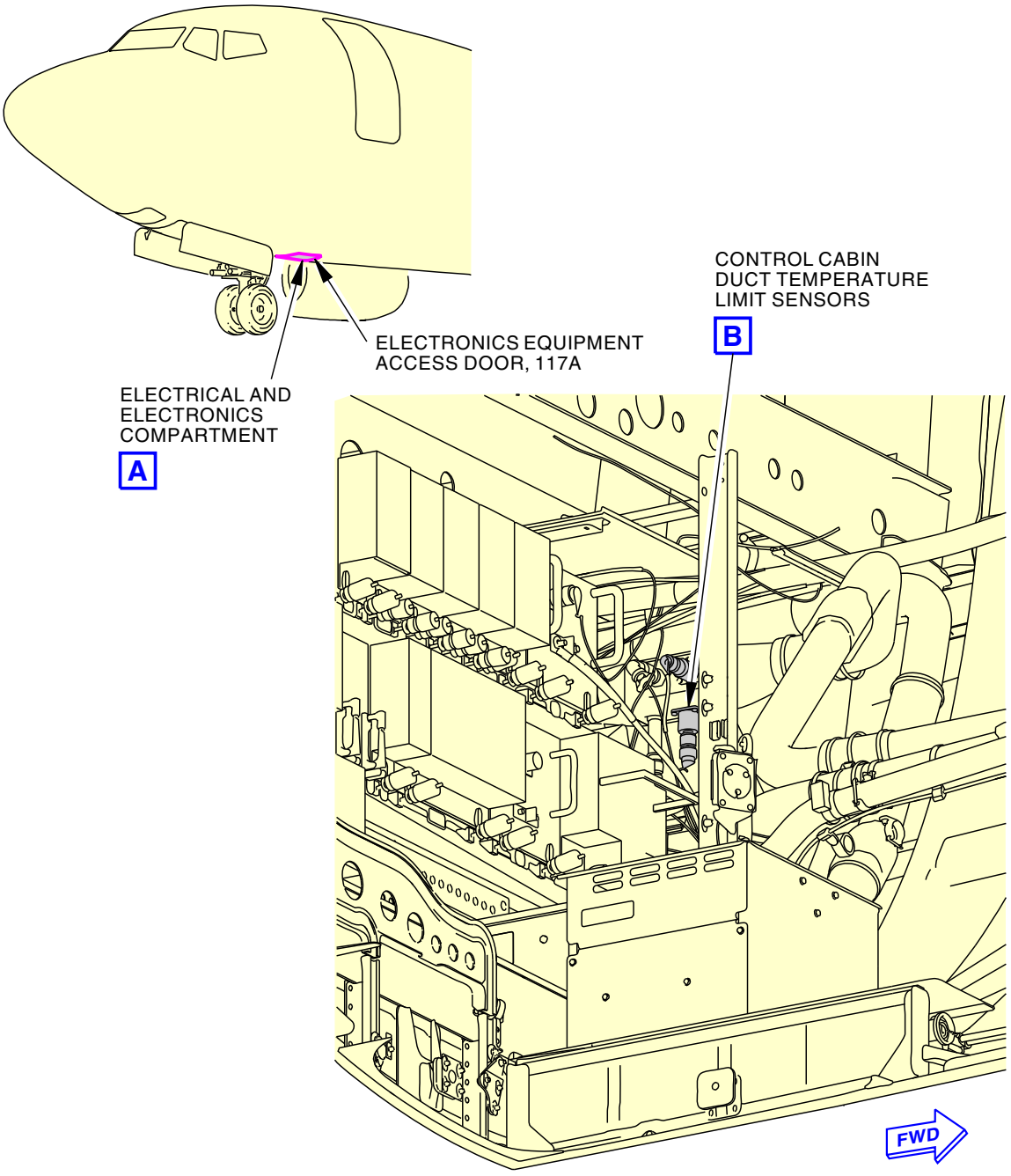
**B**

2411486 S00061528026_V1

**Passenger Cabin Duct Temperature Limit Sensor Installation**
**Figure 401/21-61-04-990-801 (Sheet 2 of 2)**



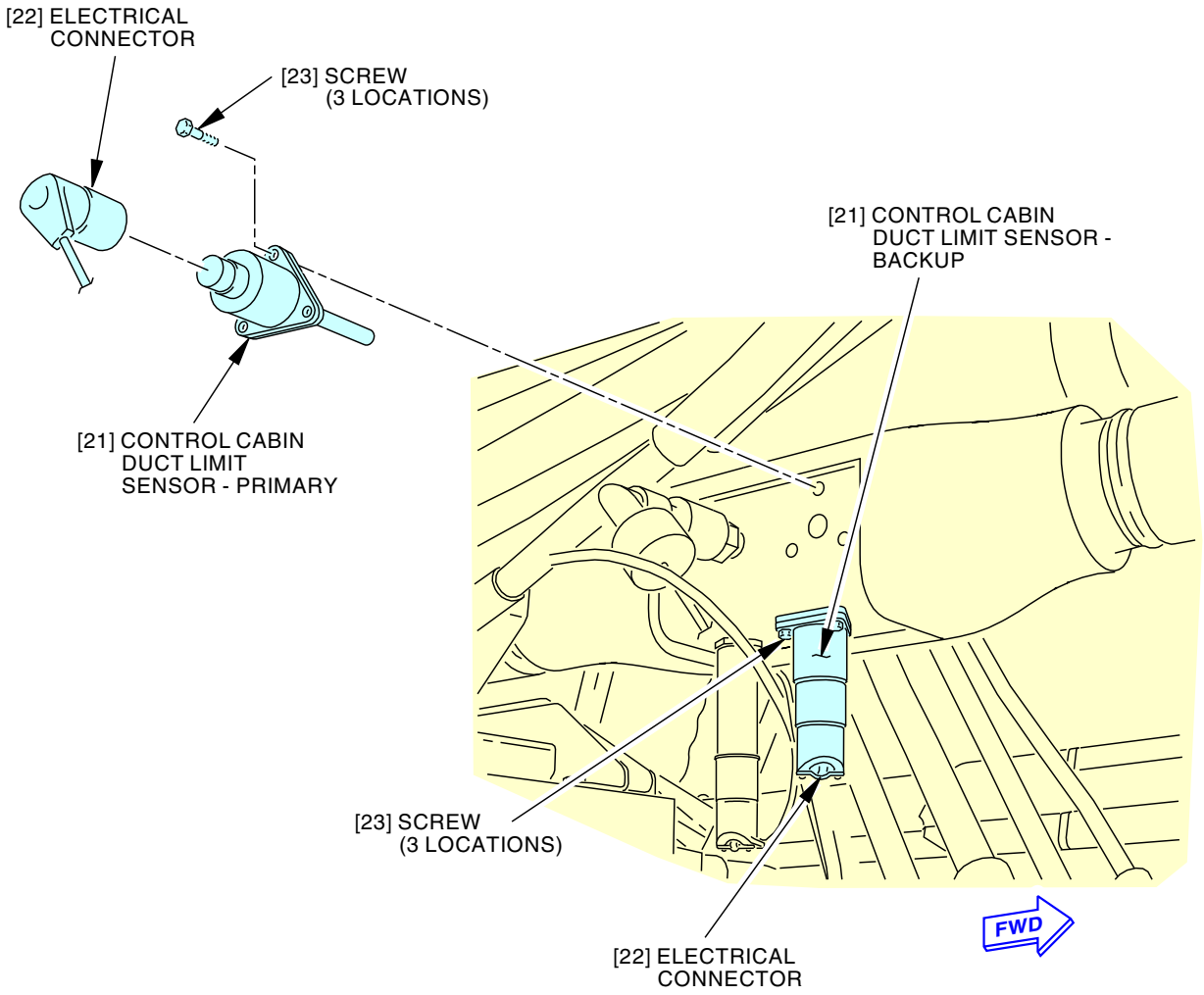
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Control Cabin Duct Temperature Limit Sensor Installation**
**Figure 402/21-61-04-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CONTROL CABIN DUCT TEMPERATURE LIMIT SENSORS**

**B**

2411488 S00061528028_V2

**Control Cabin Duct Temperature Limit Sensor Installation**
**Figure 402/21-61-04-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-04-400-801**

**3. Duct Temperature Limit Sensor Installation**

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-21-45-400-801 | Main Ceiling Panel - Installation (P/B 401) |

**B. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 21 | Control cabin duct temperature limit sensor | 21-61-04-04-020 | SIA ALL |

**C. Location Zones**

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Passenger Cabin Duct Temperature Limit Sensor Installation**

**SUBTASK 21-61-04-420-001**

(1) Put the passenger cabin duct temperature limit sensor [1] in its position on the duct.

**SUBTASK 21-61-04-420-002**

(2) Install the screws [3].

**SUBTASK 21-61-04-420-003**

(3) Connect the electrical connector [2] to the passenger cabin duct temperature limit sensor [1].

**F. Control Cabin Duct Temperature Limit Sensor Installation**

**SUBTASK 21-61-04-420-005**

(1) Put the control cabin duct temperature limit sensor [21] in its position on the duct.

**SUBTASK 21-61-04-420-006**

(2) Install the screws [23].

**SUBTASK 21-61-04-420-007**

(3) Connect the electrical connector [22] to the control cabin duct temperature limit sensor [21].

**G. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-61-04-010-003**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-61-04-010-004**

(2) If you replaced a temperature sensor for the passenger cabin, install the applicable ceiling panel. To install the panel, do this task: Main Ceiling Panel - Installation, TASK 25-21-45-400-801.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## DUCT TEMPERATURE LIMIT SENSOR - ADJUSTMENT/TEST

### 1. General

A. This procedure has this task:

(1) A test of the duct temperature limit sensors

B. There are four duct temperature limit sensors installed. There is one primary and one backup duct temperature limit sensor for the control cabin and one forward and one aft duct temperature limit sensor for the passenger cabin.

**TASK 21-61-04-000-802**

### 2. Duct Temperature Limit Sensor Test

(Figure 501, Figure 502, Figure 503, Figure 504)

#### A. References

| Reference | Title |
|---|---|
| 21-61-04 P/B 401 | DUCT TEMPERATURE LIMIT SENSOR - REMOVAL/INSTALLATION |
| 21-61-22-000-801 | Integrated Air Systems Controller (IASC) Removal (P/B 401) |
| 21-61-22-400-801 | Integrated Air Systems Controller (IASC) Installation (P/B 401) |
| WDM 21-61-11 | D000534452 |
| WDM 21-61-12 | D000534454 |
| WDM 21-61-13 | D000534453 |
| WDM 21-61-14 | D000534455 |

#### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| COM-3955 | Thermometer - Digital (Type K)<br>Part #: 51 2B Supplier: 89536<br>Opt Part #: 51 SERIES II Supplier: 89536 |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 240 | Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00 |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Prepare For The Resistance Test**

SUBTASK 21-61-04-860-002

(1) To get access to the temperature limit sensor for the passenger cabin, remove the applicable ceiling panels (Figure 501).

SUBTASK 21-61-04-010-005

(2) To get access to the temperature limit sensor for the control cabin, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-04-020-008

(3) To do a test of the aft passenger duct temperature sensor or the backup control cabin temperature sensor, remove the left integrated air systems controller (TASK 21-61-22-000-801).

SUBTASK 21-61-04-020-009

(4) To do a test of the forward passenger duct temperature sensor or the primary control cabin temperature sensor, remove the right integrated air systems controller (TASK 21-61-22-000-801).

SUBTASK 21-61-04-710-001

(5) Make sure the pack has been off for 20 minutes or until it has reached ambient temperature.

**F. Resistance Check Procedure**

SUBTASK 21-61-04-700-001

(1) Use a digital thermometer, COM-3955, or equivalent, to measure the temperature adjacent to the applicable duct temperature sensor.

(a) Write down the temperature.

SUBTASK 21-61-04-760-001

(2) Use a digital/analog multimeter, COM-1793, to measure resistance between the following pin connections.

NOTE: The digital multimeter must be specifically selected to minimize self-heating of the sensor element. The instrument must limit the current through the sensor to less than 100 microamperes. If you use resistance measuring instruments without this current-limiting feature you will get an error in resistance value due to self-heating of the sensor element.

SUBTASK 21-61-04-700-002

(3) For the primary control cabin duct temperature sensor, measure the resistance from pin E9 to pin E10 on connector, D15840B, for the right integrated air systems controller (WDM 21-61-11).



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SUBTASK 21-61-04-700-003

(4) For the forward passenger cabin duct temperature sensor, measure the resistance from pin B8 to pin B9 on connector, D15840B, for the right integrated air systems controller(WDM 21-61-13).

SUBTASK 21-61-04-700-004

(5) For the backup control cabin backup duct temperature sensor, measure the resistance between pin E9 and pin E10 on connector, D15838B, for the left integrated air systems controller (WDM 21-61-12).

SUBTASK 21-61-04-700-005

(6) For the aft passenger cabin duct temperature sensor, measure the resistance from pin B8 to pin B9 on connector, D15838B, for the left integrated air systems controller (WDM 21-61-14).

SUBTASK 21-61-04-700-006

(7) Write down the resistance in Ohms that you measure.

(a) For the duct temperature sensors for the control cabin or the passenger cabin, find the temperature that is nearest to the temperature that you wrote down (Figure 504 ).

(b) Compare the permitted range of resistance for that temperature to the resistance you wrote down.

(c) If the resistance is out of range, replace the sensor (PAGEBLOCK 21-61-04/401).

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-04-420-008

(1) Install the applicable integrated air systems controller (TASK 21-61-22-400-801).

SUBTASK 21-61-04-410-001

(2) Install the passenger cabin ceiling panels.

SUBTASK 21-61-04-410-002

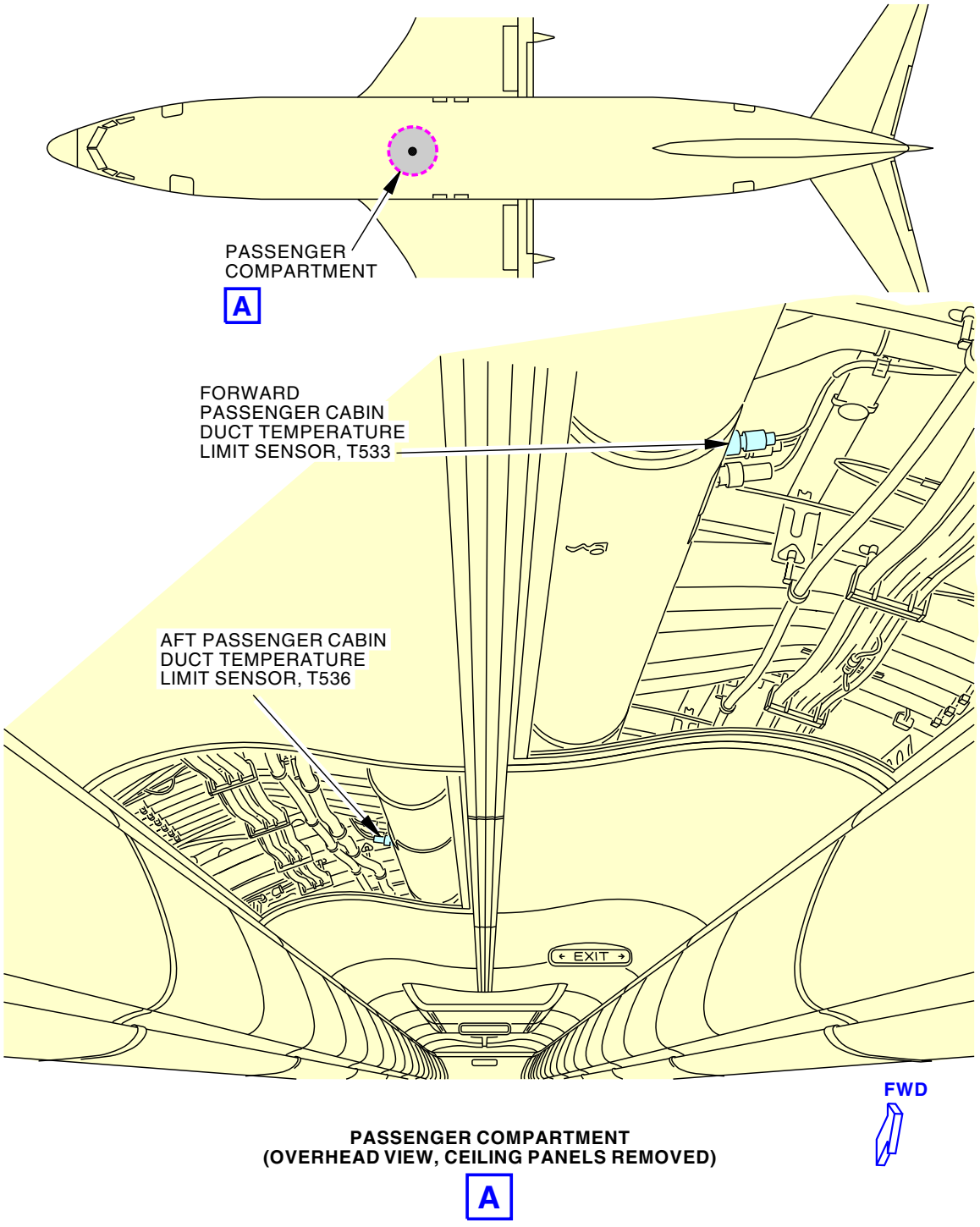
(3) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

END OF TASK



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PASSENGER COMPARTMENT**
**(OVERHEAD VIEW, CEILING PANELS REMOVED)**

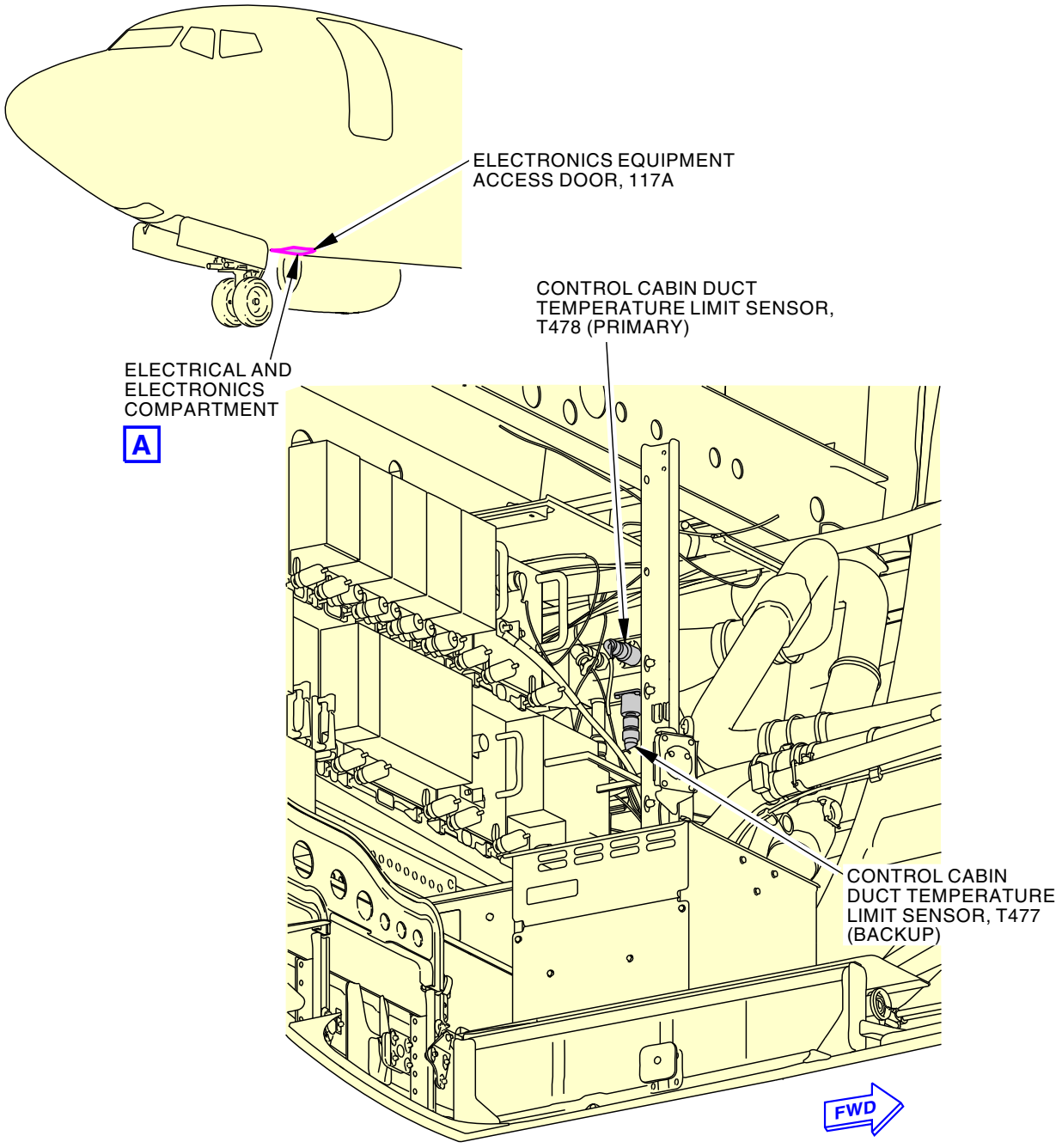
**A**

2411489 S00061528032_V1

**Passenger Cabin Duct Temperature Limit Sensor Location**
**Figure 501/21-61-04-990-803**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**ELECTRICAL AND ELECTRONICS COMPARTMENT (VIEW THROUGH ACCESS DOOR, 117A)**

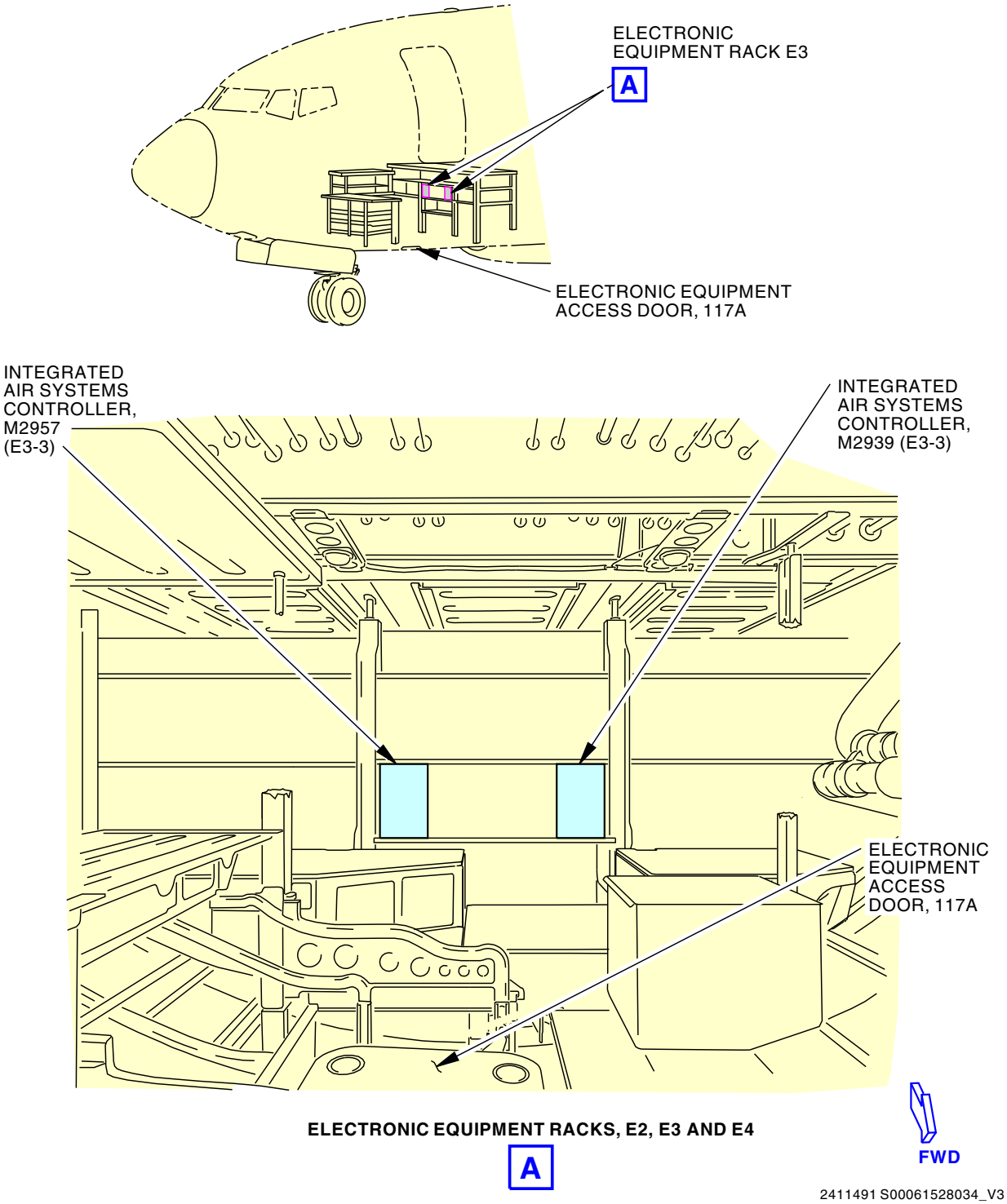
**A**

2411490 S00061528033_V1

**Control Cabin Duct Temperature Limit Sensor Location**
**Figure 502/21-61-04-990-804**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Integrated Air Systems Controller Location**
**Figure 503/21-61-04-990-805**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

| TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) | TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) |
|---|---|---|---|
| -40 (-40) | 37,260-51,890 | 65 (18.3) | 2,560-2,680 |
| -35 (-37.2) | 32,030-43,880 | 70 (21.1) | 2,300-2,390 |
| -30 (-34.4) | 27,610-37,220 | 75 (23.8) | 2,070-2,140 |
| -25 (-31.6) | 23,850-31,690 | 80 (26.6) | 1,860-1,920 |
| -20 (-28.8) | 20,680-27,030 | 85 (29.4) | 1,660-1,730 |
| -15 (-26.1) | 17,960-23,150 | 90 (32.2) | 1,490-1,570 |
| -10 (-23.3) | 15,640-19,870 | 95 (35) | 1,330-1,430 |
| -5 (-20.5) | 13,650-17,110 | 100 (37.7) | 1,200-1,300 |
| 0 (-17.7) | 11,960-14,750 | 105 (40.5) | 1,070-1,180 |
| 5 (-15) | 10,500-12,760 | 110 (43.3) | 974-1,080 |
| 10 (-12.2) | 9,230-11,070 | 115 (46.1) | 879-977 |
| 15 (-9.4) | 8,140-9,620 | 120 (48.8) | 795-893 |
| 20 (-6.6) | 7,190-8,380 | 125 (51.6) | 720-816 |
| 25 (-3.8) | 6,350-7,340 | 130 (54.4) | 653-747 |
| 30 (-1.1) | 5,800-6,175 | 135 (57.2) | 593-685 |
| 35 (1.6) | 5,125-5,425 | 140 (60) | 540-628 |
| 40 (4.4) | 4,460-4,950 | 145 (62.7) | 492-578 |
| 45 (7.2) | 3,980-4,360 | 150 (65.5) | 448-532 |
| 50 (10) | 3,560-3,850 | 155 (68.3) | 435-465 |
| 55 (12.7) | 3,190-3,400 | 160 (71.1) | 400-428 |
| 60 (15.5) | 2,860-3,020 | | |

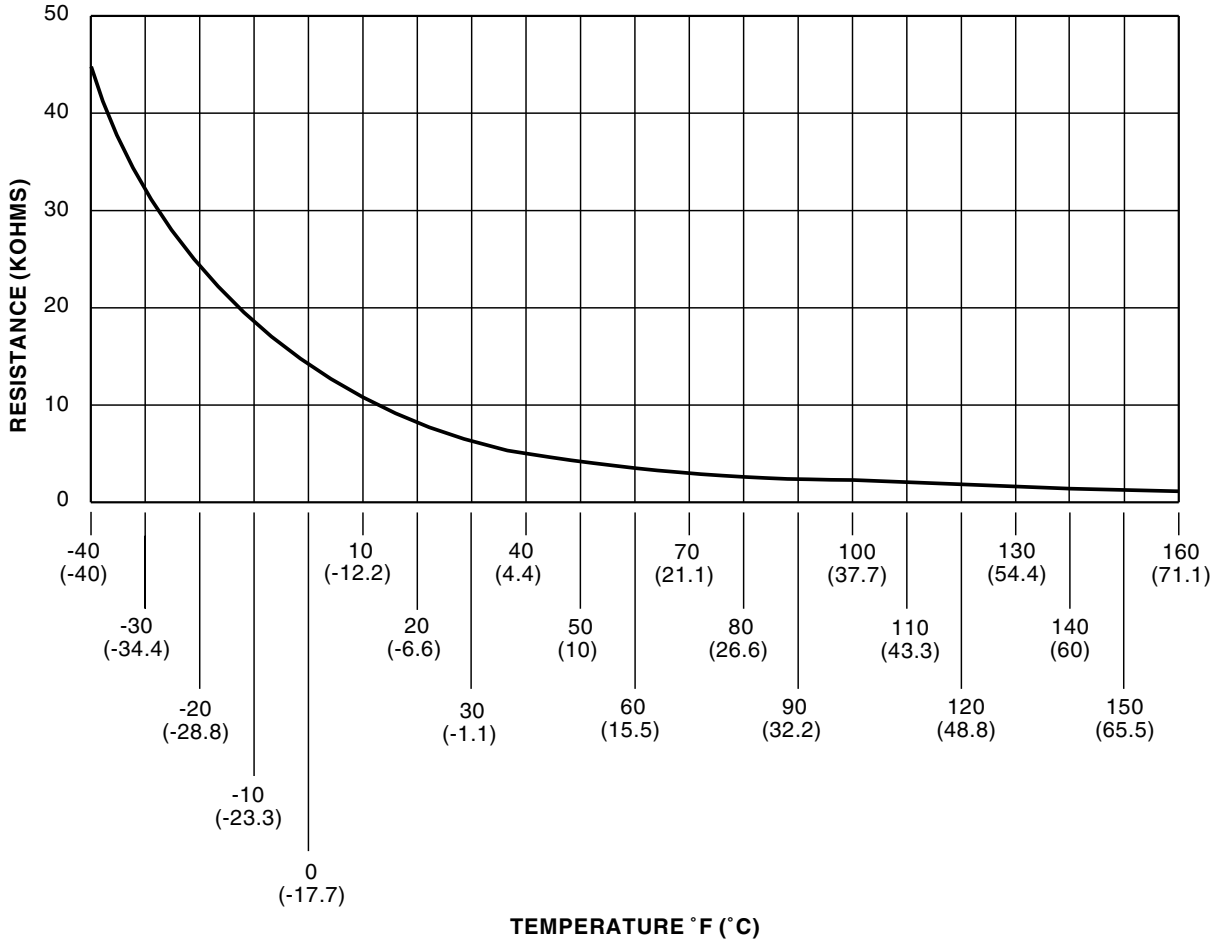
**DUCT TEMPERATURE SENSOR P/N 622878-2 (10-62091-14)**
**RESISTANCE VS TEMPERATURE TABLE**

2411492 S00061528035_V2

**Duct Temperature Sensor - Temperature and Resistance Data**
**Figure 504/21-61-04-990-806 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**DUCT TEMPERATURE SENSOR
RESISTANCE VS TEMPERATURE GRAPH**

2411493 S00061528036_V1

**Duct Temperature Sensor - Temperature and Resistance Data
Figure 504/21-61-04-990-806 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## DUCT OVERHEAT SWITCH - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the duct overheat switches for these zones:

(a) Control Cabin

(b) Forward Passenger Cabin

(c) Aft Passenger Cabin.

(2) An installation of the duct overheat switches for these zones:

(a) Control Cabin

**TASK 21-61-05-000-801**

### 2. Duct Overheat Switch Removal

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-21-45-000-801 | Main Ceiling Panel - Removal (P/B 401) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Prepare for the Removal**

SUBTASK 21-61-05-010-001

(1) To get access to the duct overheat switch for the control cabin, open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-05-010-002

(2) To get access to the passenger cabin duct overheat switches [1], remove the applicable ceiling panel that is forward of the overwing escape hatches (Main Ceiling Panel - Removal, TASK 25-21-45-000-801).

**E. Passenger Cabin Duct Overheat Switch Removal**

(Figure 401)

SUBTASK 21-61-05-020-002

(1) Disconnect the electrical connector [2] from the passenger cabin duct overheat switch [1].

SUBTASK 21-61-05-020-003

(2) Remove the passenger cabin duct overheat switch [1].

SUBTASK 21-61-05-020-004

(3) Remove and discard the packing [3] from the passenger cabin duct overheat switch [1].



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**F. Control Cabin Duct Overheat Switch Removal**

(Figure 402)

**SUBTASK 21-61-05-020-005**

(1) Disconnect the electrical connector [23] from the control cabin duct overheat switch [21].

**SUBTASK 21-61-05-020-006**

(2) Remove the control cabin duct overheat switch [21].

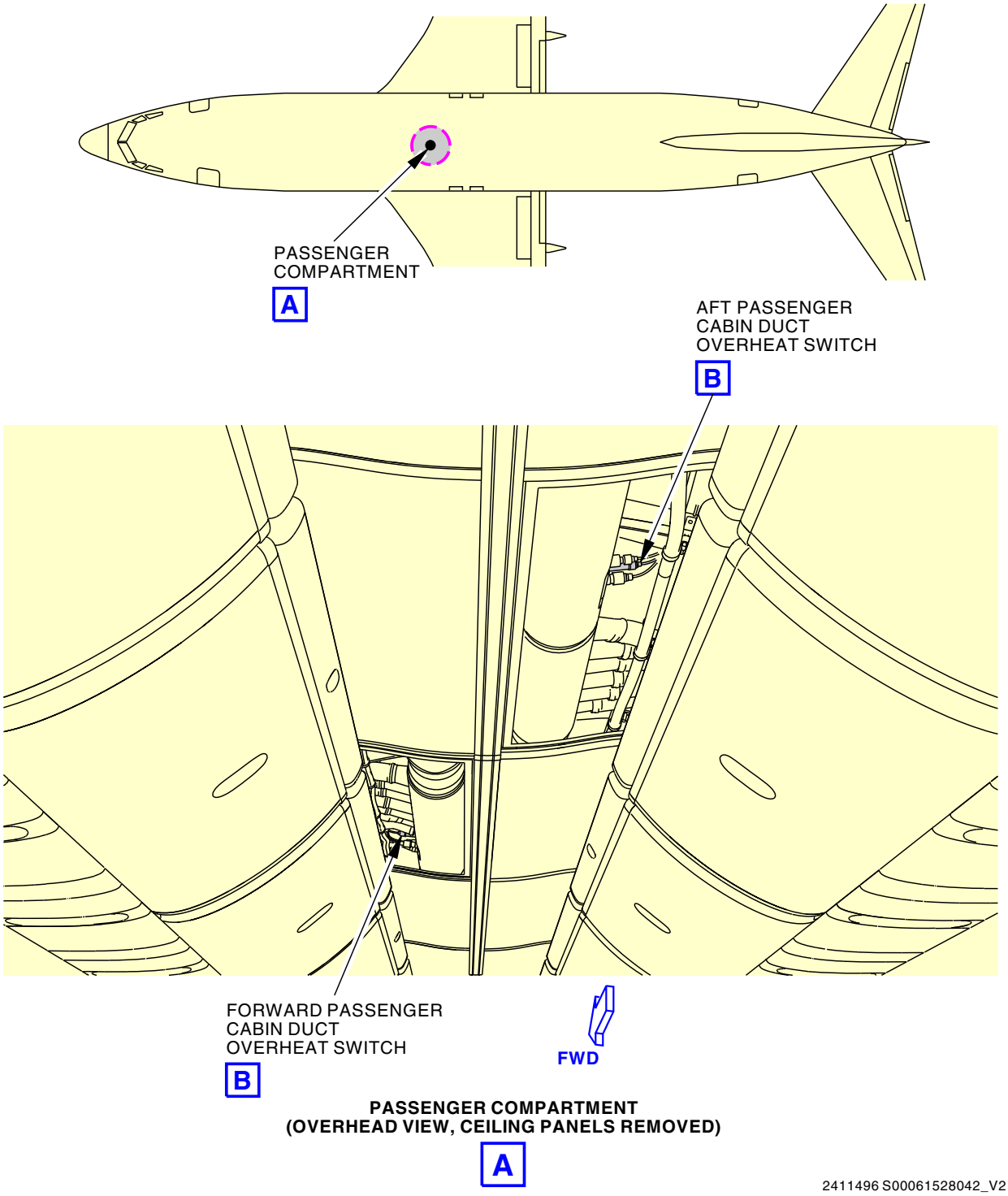
**SUBTASK 21-61-05-020-007**

(3) Remove and discard the packing [22] from the control cabin duct overheat switch [21].

**——— END OF TASK ———**



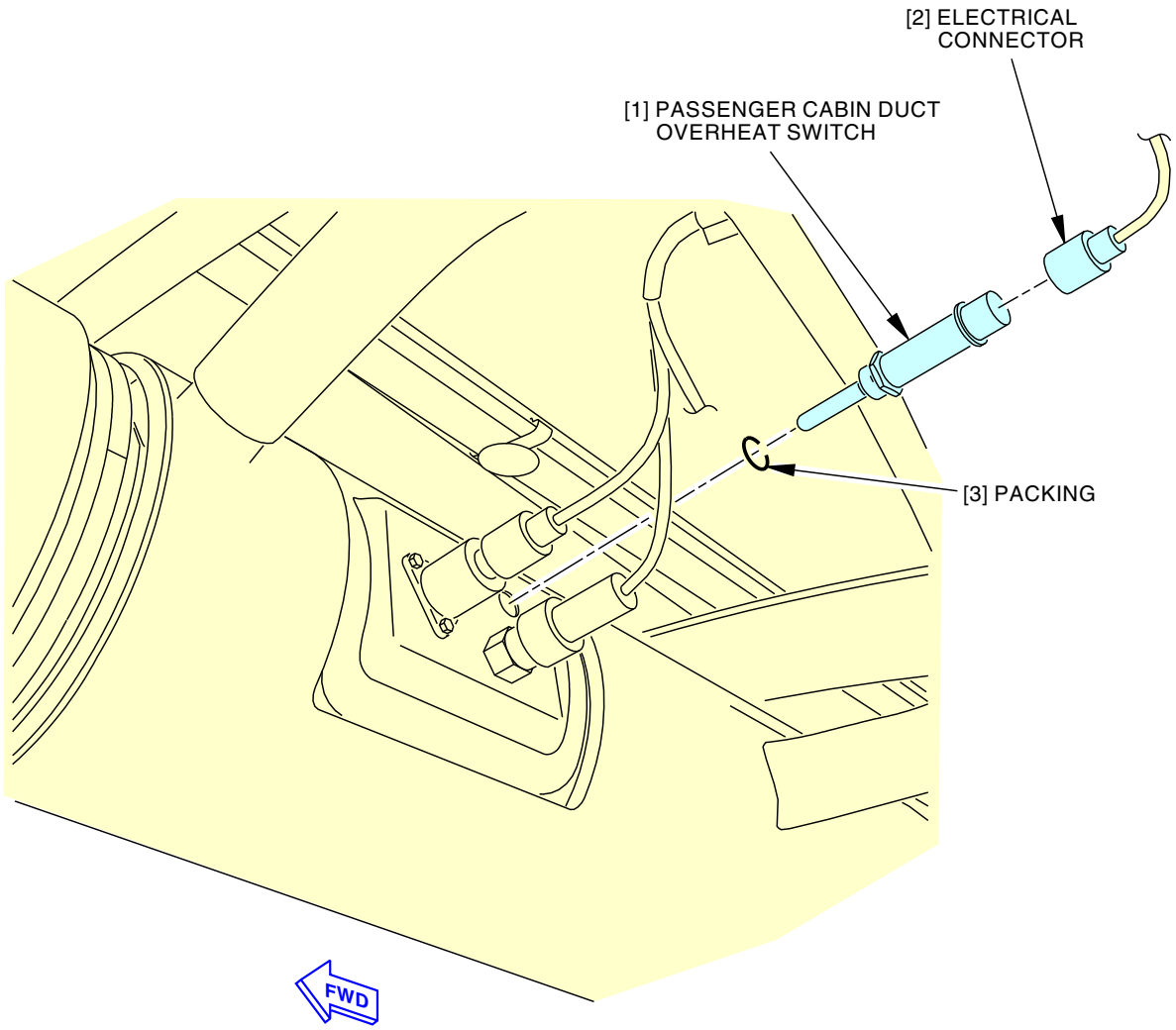
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Passenger Cabin Duct Overheat Switch Installation**
**Figure 401/21-61-05-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PASSENGER CABIN DUCT OVERHEAT SWITCH**
**(FORWARD CABIN SWITCH IS SHOWN, AFT CABIN SWITCH IS OPPOSITE)**

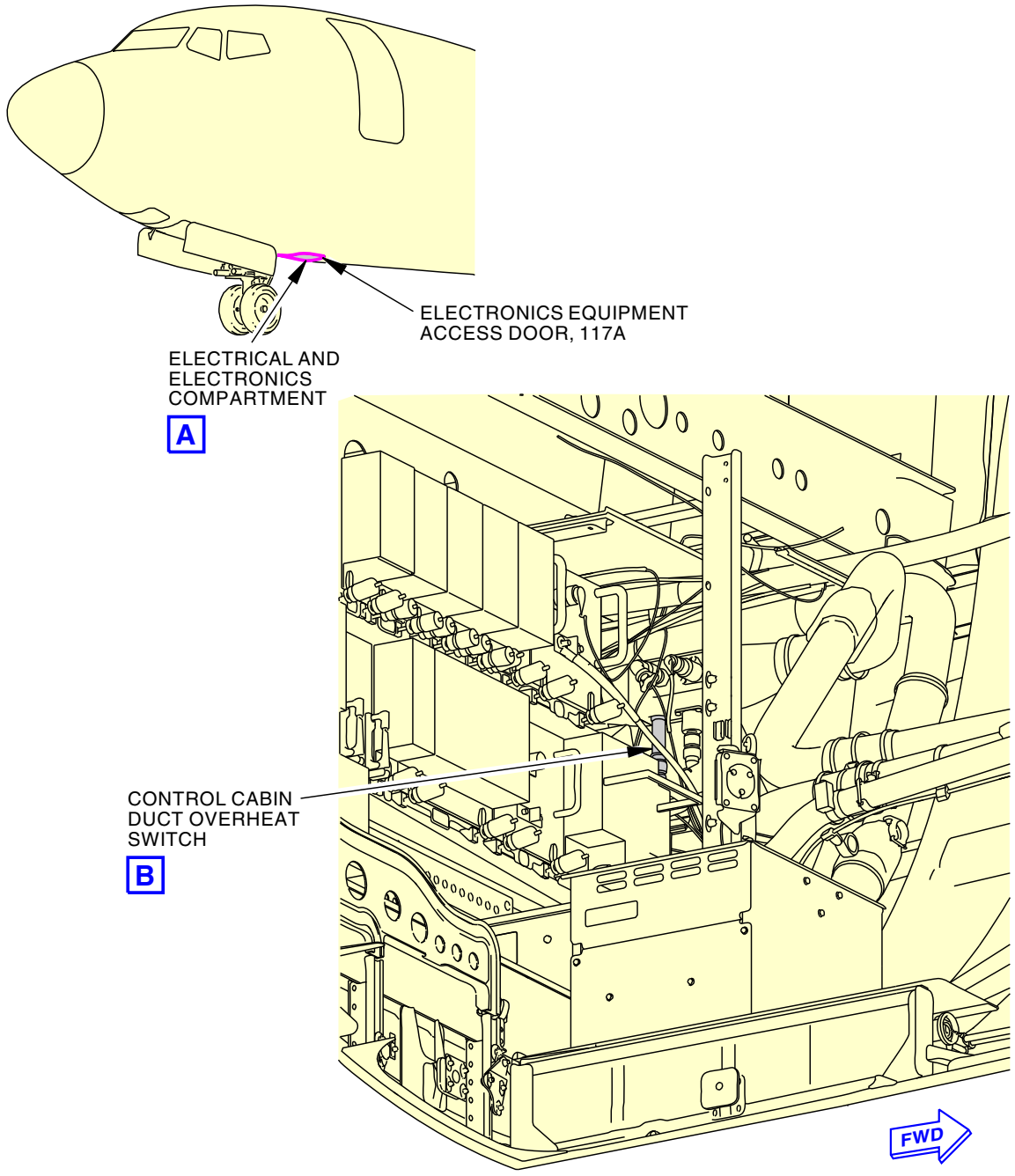
B

2411497 S00061528043_V1

**Passenger Cabin Duct Overheat Switch Installation**
**Figure 401/21-61-05-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**ELECTRICAL AND ELECTRONICS COMPARTMENT (VIEW THROUGH ACCESS DOOR, 117A)**

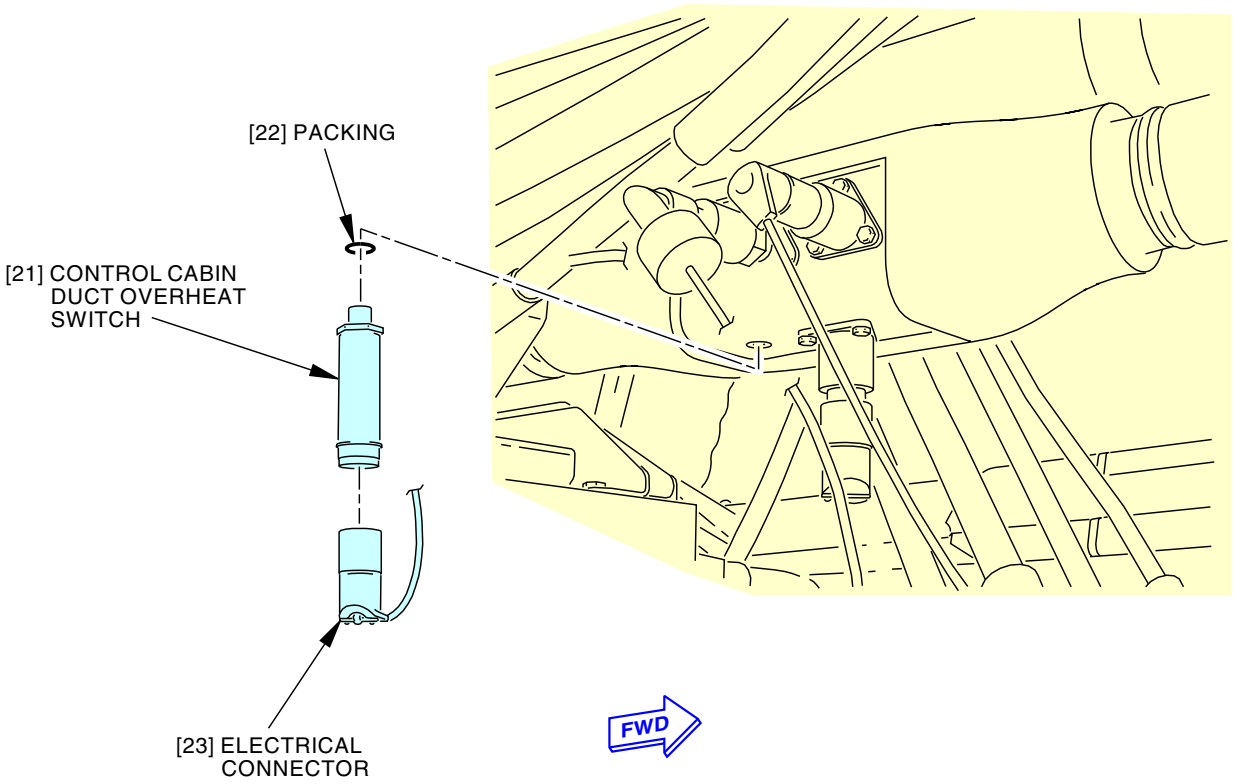
**A**

2411498 S00061528044_V1

**Control Cabin Duct Overheat Switch Installation**
**Figure 402/21-61-05-990-803 (Sheet 1 of 2)**



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**CONTROL CABIN DUCT OVERHEAT SWITCH**

**B**

2411499 S00061528045_V1

**Control Cabin Duct Overheat Switch Installation**
**Figure 402/21-61-05-990-803 (Sheet 2 of 2)**



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**TASK 21-61-05-400-801**

## 3. Duct Overheat Switch Installation

### A. References

| Reference | Title |
|---|---|
| 25-21-45-400-801 | Main Ceiling Panel - Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D50004 | Compound - Antiseize | BMS3-28 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 22 | Packing | 21-61-05-09-020 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Passenger Cabin Duct Overheat Switch Installation

(Figure 401)

**SUBTASK 21-61-05-420-001**

(1) When it is not supplied, install a new packing [3] on the passenger cabin duct overheat switch [1].

**SUBTASK 21-61-05-640-001**

(2) Put compound, D50004 on the threads of the passenger cabin duct overheat switch [1].

**SUBTASK 21-61-05-420-002**

(3) Do these steps to install the passenger cabin duct overheat switch [1]:

(a) Put the passenger cabin duct overheat switch [1] in its position in the duct.

(b) Tighten the passenger cabin duct overheat switch [1] until the packing [3] makes contact with the duct.

(c) Tighten the passenger cabin duct overheat switch [1] an additional 3/4 turn.

**SUBTASK 21-61-05-420-003**

(4) Connect the electrical connector [2] to the passenger cabin duct overheat switch [1].

### G. Control Cabin Duct Overheat Switch Installation

(Figure 402)

**SUBTASK 21-61-05-420-004**

(1) Install a new packing [22] on the control cabin duct overheat switch [21].

**SUBTASK 21-61-05-640-002**

(2) Put compound, D50004 on the threads of the control cabin duct overheat switch [21].

**SUBTASK 21-61-05-420-005**

(3) Do these steps to install the control cabin duct overheat switch [21]:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put the control cabin duct overheat switch [21] in its position in the duct.

(b) Tighten the control cabin duct overheat switch [21] until the packing [22] makes contact with the duct.

(c) Tighten the control cabin duct overheat switch [21] an additional 3/4 turn.

SUBTASK 21-61-05-420-006

(4) Connect the electrical connector [23] to the control cabin duct overheat switch [21].

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-05-010-003

(1) If you replaced the control cabin duct overheat switch [21], do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-05-010-004

(2) If you replaced a passenger cabin duct overheat switch [1], install the applicable ceiling panel (Main Ceiling Panel - Installation, TASK 25-21-45-400-801).

——— END OF TASK ———



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## CABIN TEMPERATURE SENSOR ASSEMBLY FILTER - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Cabin Temperature Sensor Assembly Filter Removal

(2) Cabin Temperature Sensor Assembly Filter Installation.

**TASK 21-61-06-000-801**

### 2. Cabin Temperature Sensor Assembly Filter Removal

(Figure 201, Figure 202)

NOTE: This procedure is a scheduled maintenance task.

#### A. Tools/Equipment

| Reference | Description |
|---|---|
| STD-6435 | Respirator - Particulate (Meets NIOSH 42 CFR 84 Class N95, EN149 Class FFP2, or Better) |
| STD-6437 | Goggles - Safety, Non Vented |
| STD-6439 | Coveralls - Hooded |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00039 | Cleaner - Brulin Formula 815MX | |
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00541 | Cleaner - General Purpose Household Detergent | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G00624 | Bag - Plastic, General Purpose | |
| G50140 | Gloves - Protective, Latex or Nitrile | |

#### C. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 211 | Flight Compartment - Left |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 232 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Right |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

#### D. Prepare for the Removal

**SUBTASK 21-61-06-860-001**

(1) Do this step for the removal of the filter [1] for the flight compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |



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SUBTASK 21-61-06-860-002

(2) Do the step that follows to remove the filter [21] for the forward passenger compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-06-860-003

(3) Do the step that follows to remove the filter [21] for the aft passenger compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

SUBTASK 21-61-06-010-001

(4) Find the filter for the flight compartment cabin temperature sensor assembly on the aft ceiling in the flight compartment (Figure 201).

SUBTASK 21-61-06-860-004

(5) Locate the filter for the passenger compartment directly above the passenger seats on the right side of the aisle (Figure 202).

SUBTASK 21-61-06-940-001

**WARNING**

PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES AND INJURIES TO PERSONS.

(6) Before you touch the cabin temperature sensor filter [1] or filter [21], put on the personal protective equipment listed below:

(a) hooded coveralls, STD-6439

(b) safety goggles, STD-6437

(c) particulate respirator, STD-6435

(d) protective gloves, G50140.

NOTE: Nitrile gloves are preferred when in contact with alcohol.

SUBTASK 21-61-06-500-001

(7) Select a plastic bag, G00624, larger than the filter(s) and tape suitable for sealing the bag closed.

## E. Flight Compartment Zone - Cabin Temperature Sensor Assembly Filter Removal

(Figure 201)

SUBTASK 21-61-06-020-001

(1) Do the step that follows to remove the filter [1] in the flight compartment:

(a) Remove the four screws [2] that attach the grille [3] to the aft ceiling in the flight compartment.

(b) Remove the grille [3] and filter [1].



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**WARNING** DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(c) If possible, slide the plastic bag, G00624, over the filter when removing the filter [1] from the grille [3] to minimize contamination.

(d) Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(e) Refer to the airline, local health, safety and regulatory procedures for the disposal of material.

## F. Passenger Compartment Zone - Cabin Temperature Sensor Assembly Filter Removal

(Figure 202)

**SUBTASK 21-61-06-020-002**

(1) Do the step that follows to remove the filter [21] in the passenger compartment:

**CAUTION** DO NOT APPLY TOO MUCH FORCE TO REMOVE THE GRILLE. THE GRILLE WILL COME OUT EASILY IF YOU PUSH ON THE TAB LIGHTLY WITH A TOOL OF THE CORRECT DIMENSION. TOO MUCH FORCE WILL CAUSE DAMAGE TO THE GRILLE OR THE PANEL.

(a) Put a metal rod with a blunt end, approximately 1/16 in. (1.6 mm) diameter, into one of the slots on the edge of the grille [22].

(b) Apply pressure to the rod end to release the tab that holds the grille [22] onto the ceiling panel.

(c) Remove the grille [22] and filter [21].

**WARNING** DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(d) If possible, slide the plastic bag, G00624, over the filter when removing the filter [21] from the grille [22] to minimize contamination.

(e) Seal the bag closed with tape.

**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(f) Refer to the airline, local health, safety and regulatory procedures for the disposal of material.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## G. Cabin Temperature Sensor Assembly Grille Cleaning

SUBTASK 21-61-06-110-003

(1) Prepare a cleaning solution of water and general purpose household detergent cleaner, B00541, or Brulin Formula 815MX cleaner, B00039.

(a) Follow the mixing instructions for the cleaner.

SUBTASK 21-61-06-110-004

(2) Clean the grille with the cleaning solution.

SUBTASK 21-61-06-100-005

(3) If the cleaning solution did not remove all dirt or contamination from the grille, then clean the grille with a cotton wiper, G00034, that is moist with alcohol, B00130.

SUBTASK 21-61-06-100-006

(4) Flush the grille with clean water until all of the cleaning solution or alcohol has been removed.

SUBTASK 21-61-06-100-007

(5) Dry the grille with cotton wiper, G00034.

## H. Post-Filter Removal Cleanup

SUBTASK 21-61-06-670-002

**WARNING** ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE. USE PROTECTION EQUIPMENT. MAKE SURE THAT YOU USE ISOPROPYL ALCOHOL IN AN AREA WITH AIRFLOW. IF YOU DO NOT OBEY, INJURY TO PERSONNEL CAN OCCUR.

(1) Disinfect the air grille [3] and air grilles [22] with a solution of 70% alcohol, B00130.

NOTE: Follow the manufacturer's instruction and refer to the local health authority guidance for required contact/dwell time.

(a) Use pre-moistened cotton wiper, G00034.

1) Make sure that the wiper is not over-saturated not to let the alcohol drips and soaks into crevices or porous surfaces.

SUBTASK 21-61-06-670-001

(2) Disinfect all tools used for filter replacement.

NOTE: Refer to the airline procedure and policies for the disinfecting of tools.

SUBTASK 21-61-06-020-005

**WARNING** DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(3) Remove the personal protective equipment, put them in a plastic bag, G00624, with any used wipers and seal the bag closed with tape.



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**WARNING** OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

(a) Discard the bag with the personal protective equipment.

NOTE: Refer to the airline, local health, safety and regulatory procedures for disposal of material.

**SUBTASK 21-61-06-110-005**

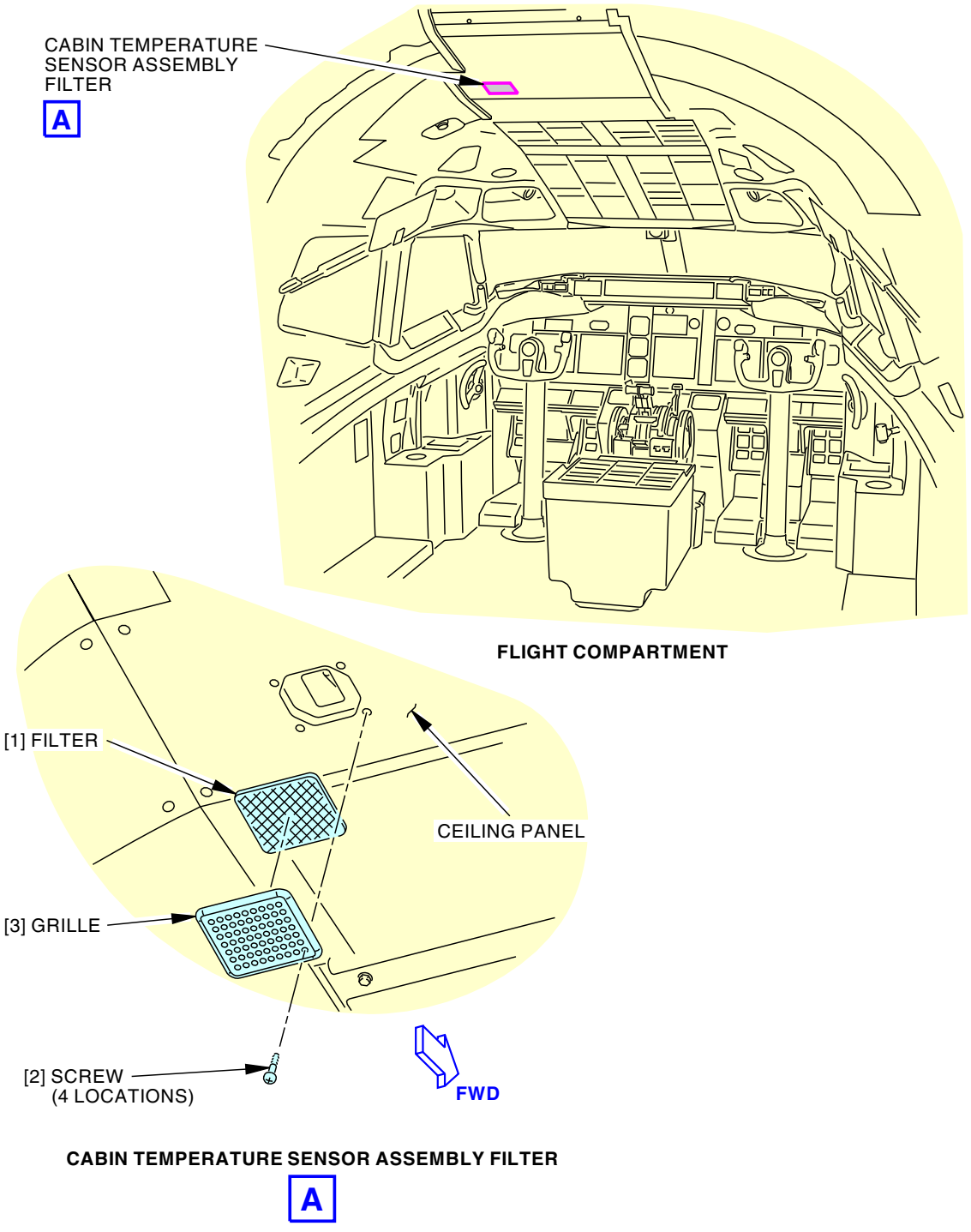
**WARNING** CLEAN YOUR HANDS WITH SOAP AND FLUSH WITH HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES TO PERSONS.

(4) Clean your hands with soap and running hot water.

**END OF TASK**



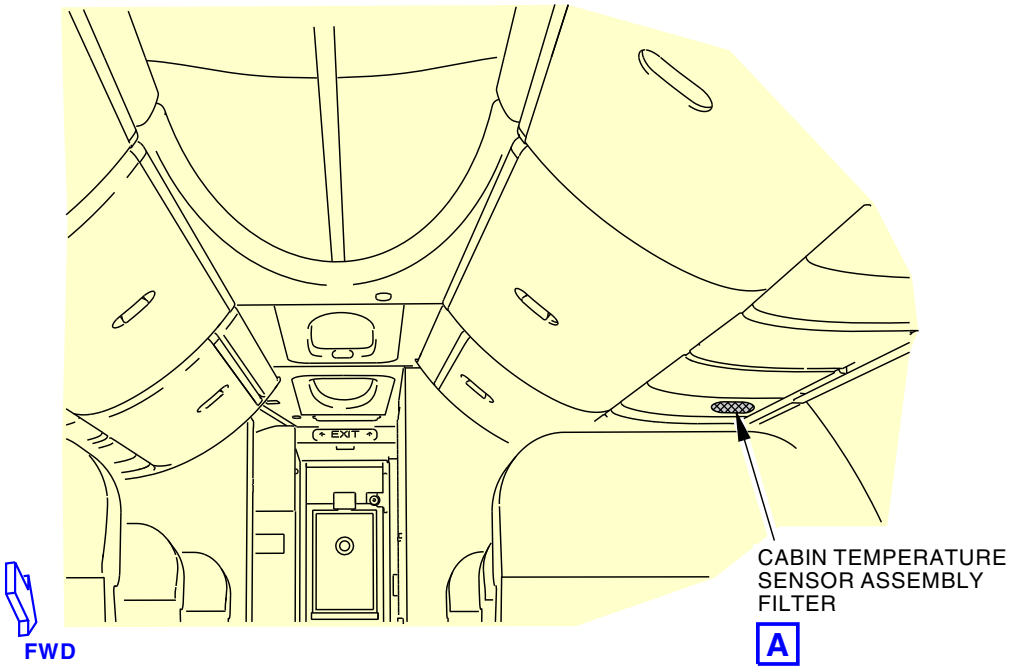
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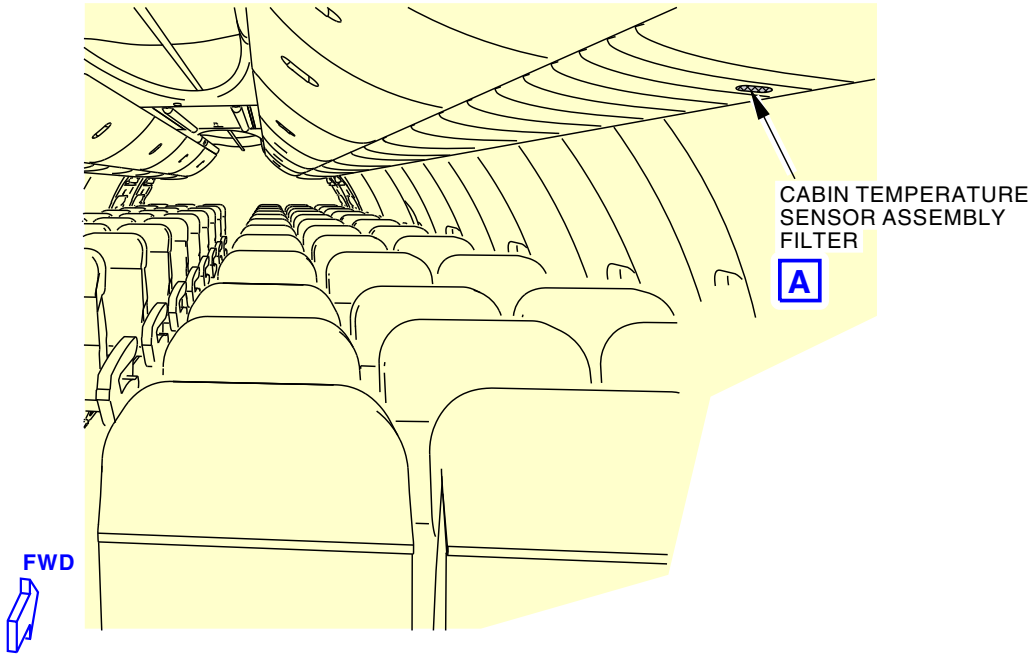

**Flight Compartment - Cabin Temperature Sensor Assembly Filter Installation**
**Figure 201/21-61-06-990-801**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FORWARD PASSENGER COMPARTMENT



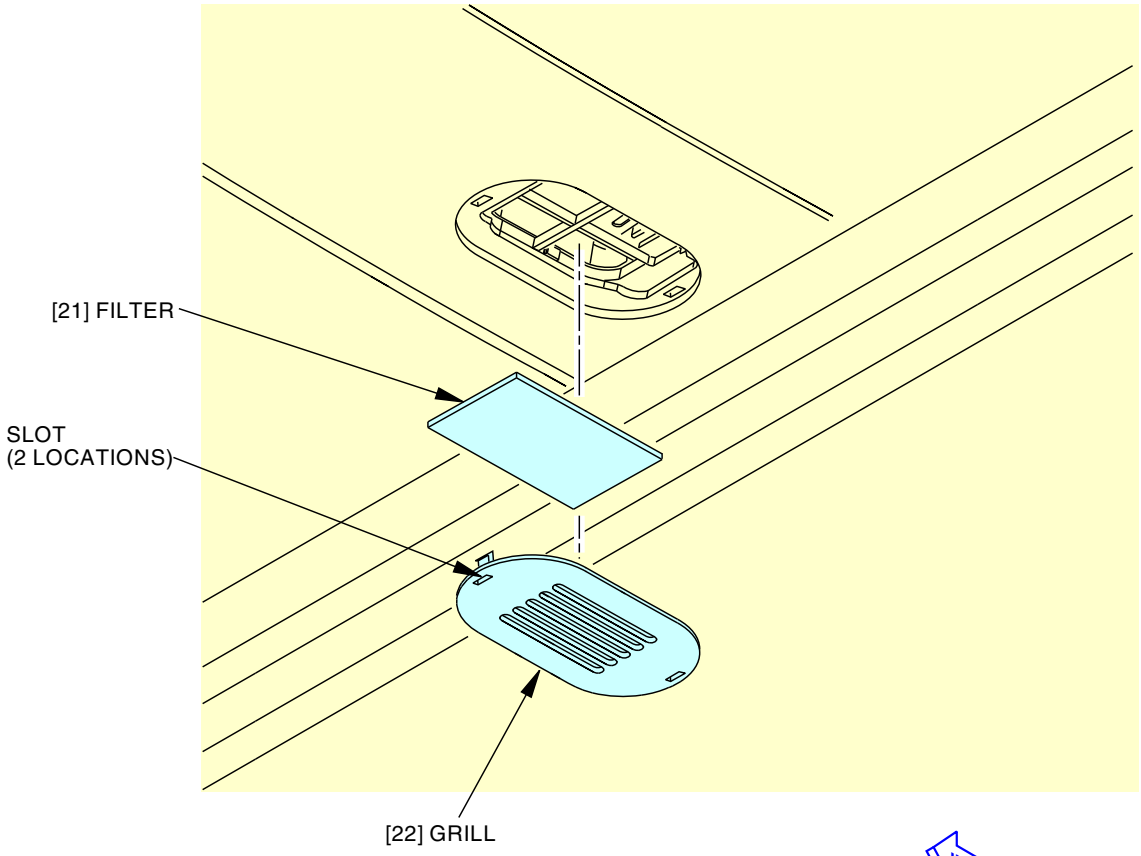

AFT PASSENGER COMPARTMENT

2411501 S00061528051_V2

**Cabin Temperature Sensor Assembly Filter Installation**
**Figure 202/21-61-06-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR ASSEMBLY FILTER
(EXAMPLE)**

A

2411502 S00061528052_V1

**Cabin Temperature Sensor Assembly Filter Installation
Figure 202/21-61-06-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-06-400-801**

## 3. Cabin Temperature Sensor Assembly Filter Installation

NOTE: This procedure is a scheduled maintenance task.

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G02472 | Filter - 3/16 inch, Porosity Grade 45 Ppi, Color-Gray, Flame Retardent Foam | |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Filter | 21-61-06-01-020 | SIA ALL |
| 21 | Filter | 21-61-06-02-005 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 211 | Flight Compartment - Left |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 232 | Forward Passenger Compartment - Forward Entry Door to STA 663.75 - Right |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

### D. Flight Compartment Zone - Cabin Temperature Sensor Assembly Filter Installation

(Figure 201)

**SUBTASK 21-61-06-350-002**

(1) If applicable, cut the new filter from the foam filter, G02472, the same size as the removed filter.

NOTE: Use brand new filter as a template because using bagged filter as a template may lead to incorrect dimension or risk contact with infectious material.

**SUBTASK 21-61-06-420-003**

(2) Do the steps that follow to install the filter [1] for the cabin temperature sensor assembly in the flight compartment:

(a) Put a new filter [1] in its position in the aft ceiling panel.

(b) Put the grille [3] in its position.

(c) Install the four screws [2] that attach grille [3] to the aft ceiling panel.

### E. Passenger Compartment Zone - Cabin Temperature Sensor Assembly Filter Installation

(Figure 202)

**SUBTASK 21-61-06-350-003**

(1) If applicable, cut the new filter from the foam filter, G02472, the same size as the removed filter.

NOTE: Use brand new filter as a template because using bagged filter as a template may lead to incorrect dimension or risk contact with infectious material.

**SUBTASK 21-61-06-420-004**

(2) Do the steps that follow to install the filter [21] for the temperature sensor assembly in the passenger compartment:

(a) Put a new filter [21] in its position in the assembly.

(b) Align index tabs on the grille [22] with the notches on the temperature sensor assembly.



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(c) Push the grille [22] into the temperature sensor assembly to engage the two tabs.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-61-06-860-005

(1) If you installed the filter [1] for the flight compartment zone, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-06-860-006

(2) If you installed the filter [21] for the forward passenger compartment zone, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-06-860-007

(3) If you installed the filter [21] for the aft passenger compartment zone, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

**——— END OF TASK ———**



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## CABIN TEMPERATURE SELECTOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Cabin temperature selector removal.

(2) Cabin temperature selector installation.

B. There are three cabin temperature selectors installed in the P5-17 Cabin Temperature Panel. The removal and installation procedure is the same for the three cabin temperature selectors.

C. The P5-17 Cabin Temperature Panel is found in the P5 Forward Overhead Panel.

**TASK 21-61-07-000-801**

### 2. Cabin Temperature Selector Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**B. Prepare for the Removal**

**SUBTASK 21-61-07-840-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-61-07-860-001**

(2) Put the L and R PACK switches on the P5-10 Air Conditioning Panel to the OFF position.

**C. Cabin Temperature Selector Removal**

**SUBTASK 21-61-07-010-001**

(1) Do these steps to get access to the electrical connectors [1] on the back of the cabin temperature panel [3]:

(a) Loosen the 1/4-turn fasteners that hold the aft end of the P5 forward overhead panel in place.

NOTE: The forward end of the P5 panel is hinged. The aft end of the P5 panel will rotate downward when the fasteners are loose.

(b) Release the safety latch and carefully lower the P5 forward overhead panel to the open position.

**SUBTASK 21-61-07-020-001**

(2) Do the steps that follow to remove the cabin temperature selector [2] from the cabin temperature panel [3] (P5-17):

(a) Disconnect the electrical connector [1] from the cabin temperature selector [2].

(b) Loosen the setscrews that hold the knob [6] to the cabin temperature selector [2].

(c) Remove the knob [6] from the cabin temperature selector [2].

(d) Remove the nut [5] and washer [4] from the cabin temperature selector [2].



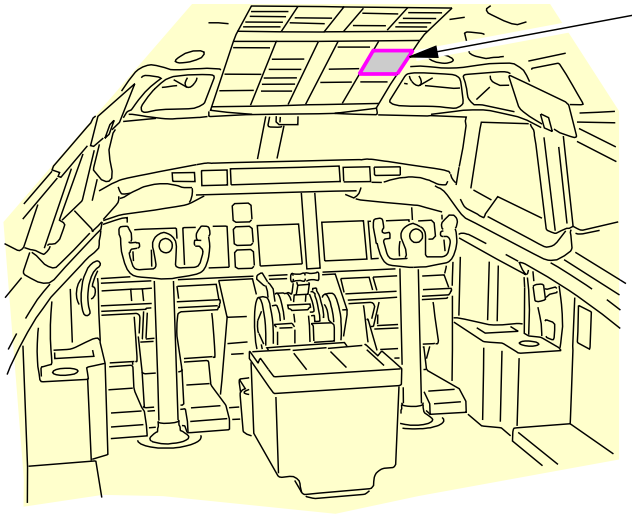
ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) Carefully pull the cabin temperature selector [2] out of the cabin temperature panel [3].

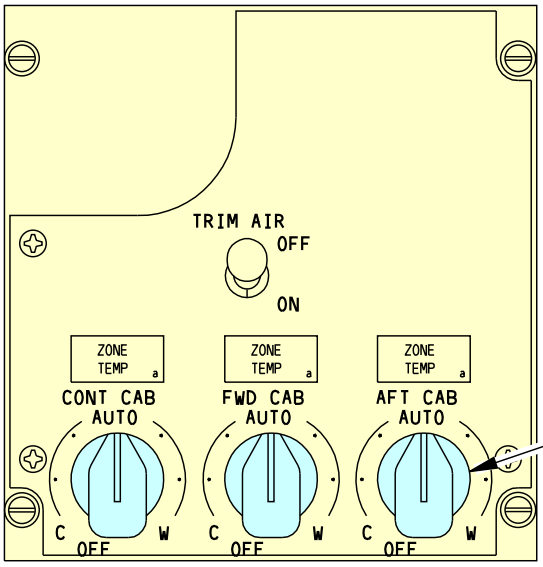
——— END OF TASK ———



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FLIGHT COMPARTMENT




CABIN TEMPERATURE PANEL
(EXAMPLE)

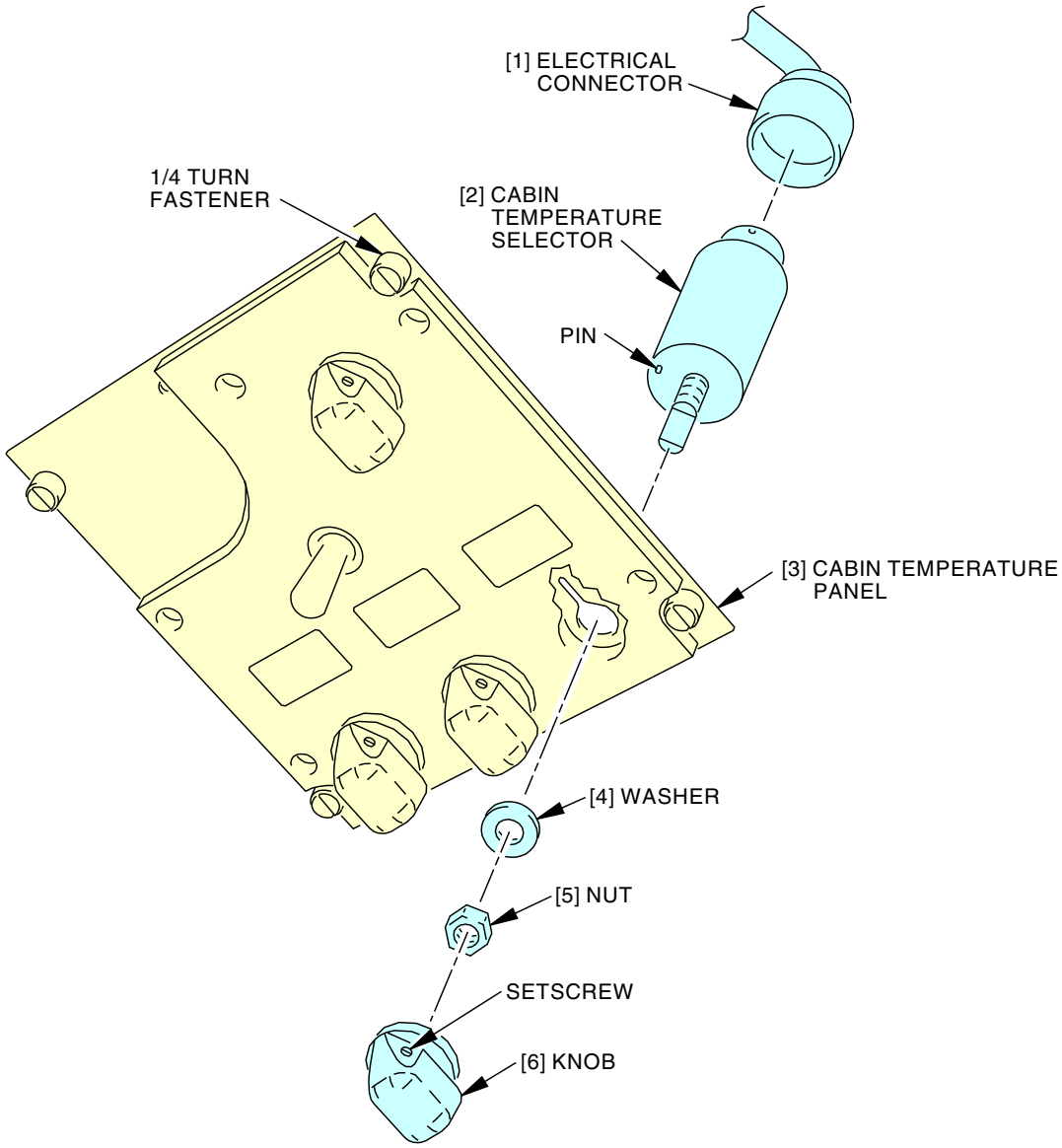
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2411503 S00061528058_V2

Cabin Temperature Selector Installation
Figure 401/21-61-07-990-801 (Sheet 1 of 2)



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SELECTOR (EXAMPLE)**

B

2411504 S00061528059_V2

**Cabin Temperature Selector Installation**
**Figure 401/21-61-07-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-07-400-801**

## 3. Cabin Temperature Selector Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### B. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

### C. Cabin Temperature Selector Installation

**SUBTASK 21-61-07-420-001**

(1) To install the cabin temperature selector [2] in the cabin temperature panel [3] (P5-17), do these steps:

(a) Carefully push the cabin temperature selector [2] into its position in the cabin temperature panel [3].

1) Make sure the pin on the front of the cabin temperature selector [2] is in the slot on the cabin temperature panel [3].

(b) Install the washer [4] and nut [5] on the cabin temperature selector [2].

(c) Put the knob [6] on the cabin temperature selector [2].

(d) Tighten the setscrews that hold the knob [6] to the cabin temperature selector [2].

(e) Connect the electrical connector [1] to the cabin temperature selector [2].

**SUBTASK 21-61-07-410-001**

(2) Carefully lift the P5 forward overhead panel to the closed position.

**SUBTASK 21-61-07-410-002**

(3) Tighten the 1/4-turn fasteners that hold the aft end of the P5 forward overhead panel in position.

### D. Cabin Temperature Selector Installation Test

**SUBTASK 21-61-07-840-002**

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |

**SUBTASK 21-61-07-860-002**

(2) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-61-07-860-003**

(3) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.



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SUBTASK 21-61-07-710-001

(4) Put the R PACK switch and the L PACK switch on the P5-10 Air Conditioning Panel in the AUTO position.

SUBTASK 21-61-07-710-002

(5) Put the TRIM AIR switch, on the P5-17 Cabin Temperature Panel, to the ON position.

SUBTASK 21-61-07-710-003

(6) Put the cabin temperature selector [2] in the AUTO position.

(a) Make sure that the airflow from the conditioned air outlets in the applicable cabin/zone becomes warm.

SUBTASK 21-61-07-710-004

(7) Put the cabin temperature selector [2] in the fully Cool position.

(a) Make sure that the airflow from the conditioned air outlets in the applicable cabin/zone becomes cool.

SUBTASK 21-61-07-710-005

(8) Hold the cabin temperature selector [2] in the fully Warm position.

(a) Make sure that the airflow from the conditioned air outlets in the applicable cabin/zone becomes warm.

SUBTASK 21-61-07-810-001

(9) If you find a problem with the cabin temperature selector [2], do the steps in the IFIM and do the applicable procedure(s) to correct the problem.

## E. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-07-710-006

(1) Put the cabin temperature selector [2] in the NORMAL position.

SUBTASK 21-61-07-860-004

(2) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

**——— END OF TASK ———**



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## TRIM AIR CHECK VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the trim air check valve [3].

(2) An installation of the trim air check valve [3].

(3) There is a trim air check valve [3] for each air conditioning pack. The trim air check valves [3] are installed in the aft inboard area of the ECS bays.

**TASK 21-61-09-000-801**

### 2. Trim Air Check Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-51-24-000-801 | Ram Air Ducts Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

**SUBTASK 21-61-09-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

**SUBTASK 21-61-09-010-001**

(2) To get access to the left trim air check valve, open this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-61-09-010-002**

(3) To get access to the right trim air check valve, open these doors in this sequence:

(a) Open this access door:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |



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(b) Open this access door:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

SUBTASK 21-61-09-860-002

(4) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-61-09-020-001

(5) To get access to the trim air check valve [3], remove the applicable ram air exhaust duct [5] (TASK 21-51-24-000-801), if it is necessary.

## F. Trim Air Check Valve Removal

SUBTASK 21-61-09-020-004

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

**CAUTION** MAKE SURE THAT YOU DO NOT BEND OR TWIST THE ADJACENT DUCTS. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(1) If necessary, to get more access to the trim air check valve [3], do these steps:

(a) Remove the duct assembly [9]:

1) Remove the two couplings [6].

2) Remove the coupling [14].

3) Remove the clamp [8].

4) Remove the duct assembly [9].

(b) Adjust the duct assembly [12]:

1) Remove the coupling [10].

2) Remove the clamp [11].

(c) Put protective covers or blanks on all open ends of the ducts and valves.

SUBTASK 21-61-09-020-002

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(2) To remove the trim air check valve [3], do these steps:

(a) Loosen the two clamps [4].



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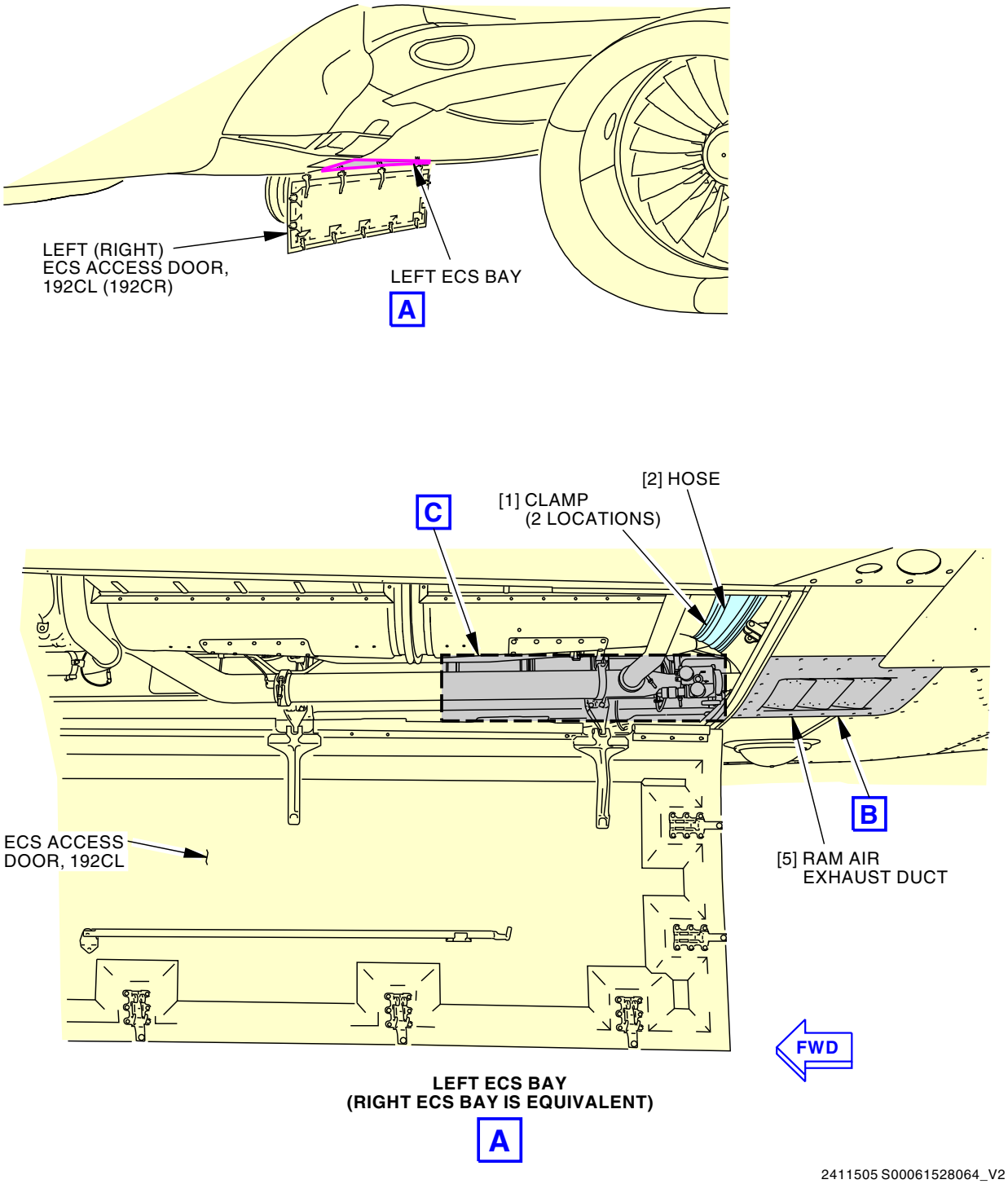
(b) Move the clamps [4] to the adjacent ducts.

(c) Remove the trim air check valve [3] from the ECS bay.

——— END OF TASK ———



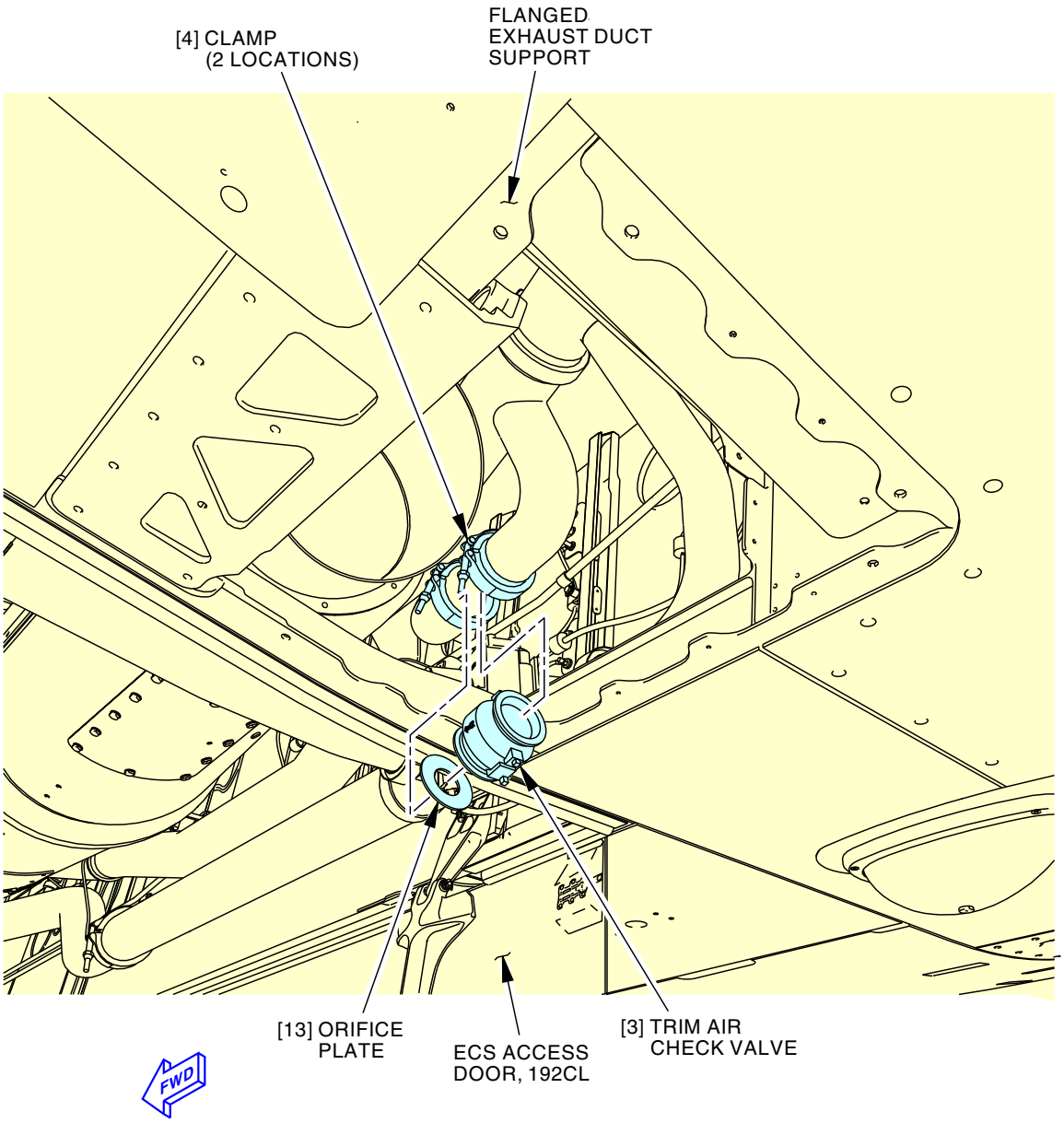
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Trim Air Check Valve Installation**
**Figure 401/21-61-09-990-801 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

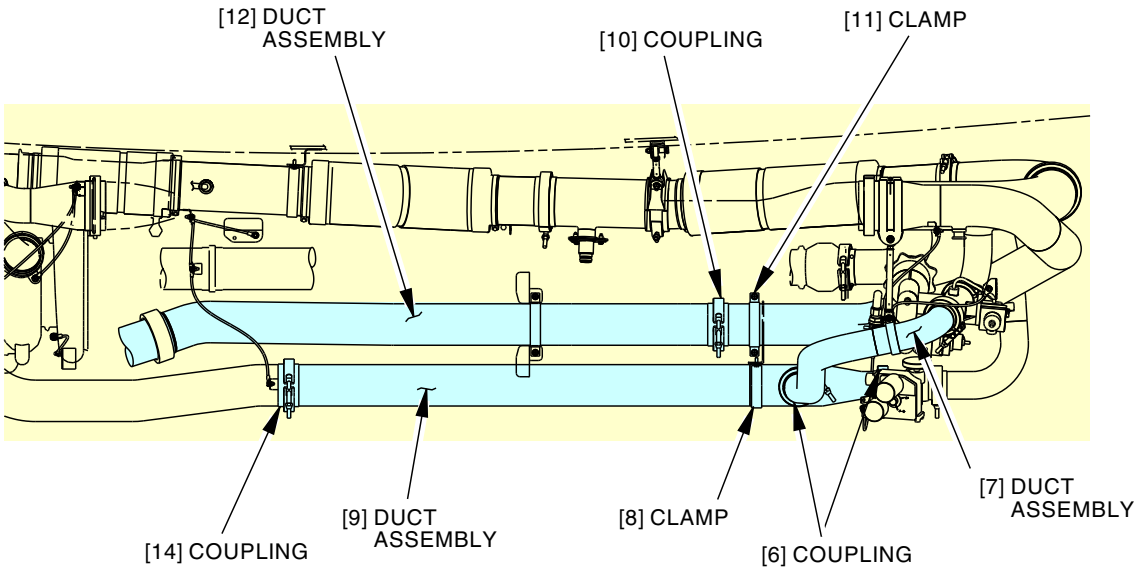



2411506 S00061528065_V2

**Trim Air Check Valve Installation**
**Figure 401/21-61-09-990-801 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**LEFT ECS BAY**
**(RIGHT ECS BAY IS EQUIVALENT)**

C

3018972 S0000791312_V1

**Trim Air Check Valve Installation**
**Figure 401/21-61-09-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-09-400-801**

**3. Trim Air Check Valve Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-51-24-400-801 | Ram Air Ducts Installation (P/B 401) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Trim Air Check Valve Installation**

**SUBTASK 21-61-09-420-001**

(1) To install the trim air check valve [3]:

(a) Make sure that the orifice plate [13] is bonded to the outlet side of the trim air check valve [3].

(b) Put the trim air check valve [3] in its position.

NOTE: Make sure the flow arrow on the trim air check valve [3] points in the forward direction.

(c) Move the clamp [4] to the duct connections.

(d) Torque the nut on the two clamps [4] to 55 in-lb (6.2 N·m) - 60 in-lb (6.8 N·m).

**SUBTASK 21-61-09-420-004**

**CAUTION**

MAKE SURE THAT YOU DO NOT BEND OR TWIST THE ADJACENT DUCTS. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(2) If necessary, install the duct assembly [12], do these steps:

(a) Remove any protective covers or blanks.

(b) Install the coupling [10] to the duct assembly [12] connection.

1) Torque the nut on the coupling [10] to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).

(c) Install the clamp [11].

**SUBTASK 21-61-09-420-005**

(3) If necessary, install duct assembly [9], do these steps:

(a) Remove any protective covers or blanks.



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(b) Put duct assembly [9] into its position.

(c) Install the clamp [8].

(d) Install the two couplings [6] to the duct assembly [9] connections.

(e) Install the coupling [14] to the duct assembly [9] connection.

(f) Torque the nut on the two couplings [6] to 55 in-lb (6.2 N·m) - 60 in-lb (6.8 N·m).

(g) Torque the nut on the coupling [14] to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).

SUBTASK 21-61-09-420-002

(4) Do the steps in this task to install the applicable ram air exhaust duct [5], if it is removed: Ram Air Ducts Installation, TASK 21-51-24-400-801.

## F. Trim Air Check Valve Leakage Check

SUBTASK 21-61-09-860-003

(1) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-61-09-860-004

(2) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the AUTO position and remove the DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the ON position and remove the DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the ON position and remove the DO NOT OPERATE tag, STD-858.

SUBTASK 21-61-09-790-001

(3) Do a soap bubble test of the duct joints at the trim air check valve [3] and the hose [2] to the ram air exhaust duct [5].

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.

**WARNING**

DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the applicable clamps [1] or clamps [4] as necessary.

3) Make sure the ducts are aligned at the joints.

4) Tighten the applicable clamps [1] or clamps [4].

5) Put the L PACK and R PACK switches to the AUTO position.

6) Make sure the leak has been repaired.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-09-010-003

(1) If you replaced the left trim air check valve, close this access door:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |



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SUBTASK 21-61-09-010-004

(2) If you replaced the right trim air check valve, close these doors in this sequence:

(a) Close this access door:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

(b) Close this access door:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

END OF TASK



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## TRIM AIR CHECK VALVE - INSPECTION/CHECK

### 1. General

A. This procedure has this task:

(1) An inspection of the trim air check valve.

**TASK 21-61-09-200-801**

### 2. Trim Air Check Valve Inspection

(Figure 601)

#### A. References

| Reference | Title |
|---|---|
| 21-61-09-000-801 | Trim Air Check Valve Removal (P/B 401) |
| 21-61-09-400-801 | Trim Air Check Valve Installation (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |

#### C. Prepare for the Inspection

**SUBTASK 21-61-09-010-005**

(1) Do this task: Trim Air Check Valve Removal, TASK 21-61-09-000-801.

#### D. Trim Air Check Valve Inspection

**SUBTASK 21-61-09-200-001**

(1) Inspect the trim air check valve for these defects:

(a) The valve body [1] has cracks or corrosion.

(b) The valve flappers [2] do not move freely.

(c) The valve flappers [2] do not touch the valve body equally.

(d) There are carbon particles at the valve flappers [2] and body interface.

(e) The valve flappers [2] are bent.

(f) The stop pin tube [3] has cracks or deterioration.

(g) If the trim air check valve has one or more of the defects, replace the trim air check valve.

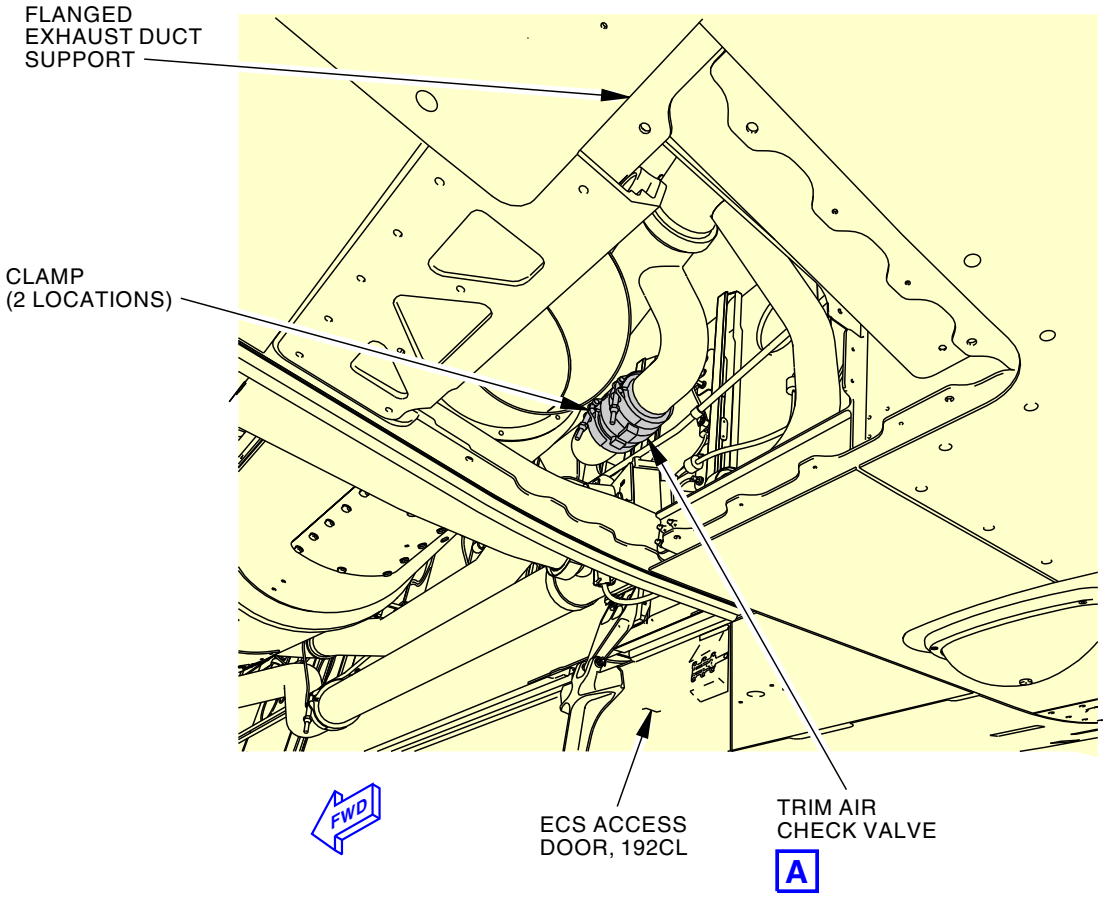
**SUBTASK 21-61-09-420-003**

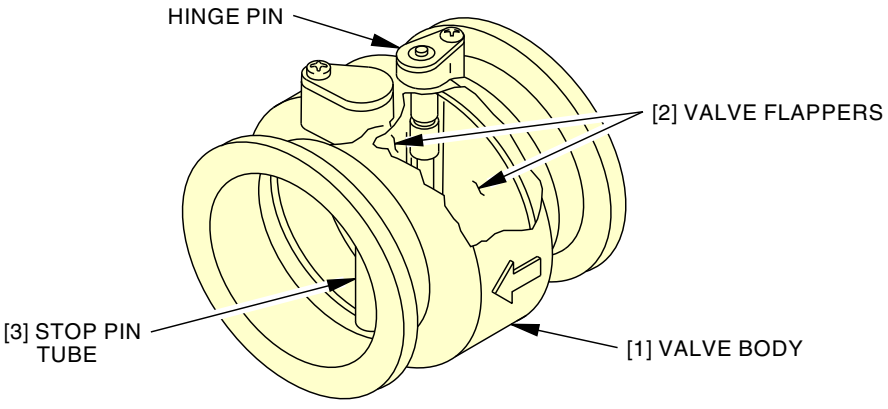
(2) Do this task: Trim Air Check Valve Installation, TASK 21-61-09-400-801.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**TRIM AIR CHECK VALVE**

**A**

2997140 S0000773653_V1

**Trim Air Check Valve Inspection**
**Figure 601/21-61-09-990-802**



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## CABIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Cabin Temperature Sensor Removal

(2) Cabin Temperature Sensor Cleaning

(3) Cabin Temperature Sensor Installation.

(4) There is a cabin temperature sensor for the flight compartment zone, the forward passenger compartment zone and the aft passenger compartment zone.

**TASK 21-61-10-000-801**

### 2. Cabin Temperature Sensor Removal

(Figure 201 or Figure 202)

#### A. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

#### B. Prepare for the Removal

**SUBTASK 21-61-10-020-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

#### C. Cabin Temperature Sensor Removal

**SUBTASK 21-61-10-860-001**

(1) To remove the cabin temperature sensor [1] in the flight compartment, do these steps (Figure 201 or Figure 202):

(a) Loosen the access panel on the aft ceiling lining in the flight compartment and let it hang on the straps.

NOTE: The access panel on the aft ceiling lining is held in position by hook and loop strips.

(b) Disconnect the electrical connector [7] from the sensor [1].

(c) Remove the two screws [2] and washers [3] that attach the sensor [1] to the housing [6].

(d) Remove the sensor [1].

**SUBTASK 21-61-10-860-002**

(2) To remove the cabin temperature sensor [35] for the passenger compartment zone, do these steps:

(a) Lower the cabin temperature sensor panel.



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1) Put a small Allen wrench or other applicable tool in the access holes to release the latches.
2) Partially lower the cabin temperature sensor panel and disconnect the lanyard.
3) Move the cabin temperature sensor panel to the fully lowered position.

(b) Disconnect the electrical connector [36] from the sensor [35].

(c) Remove the lockwire [42].

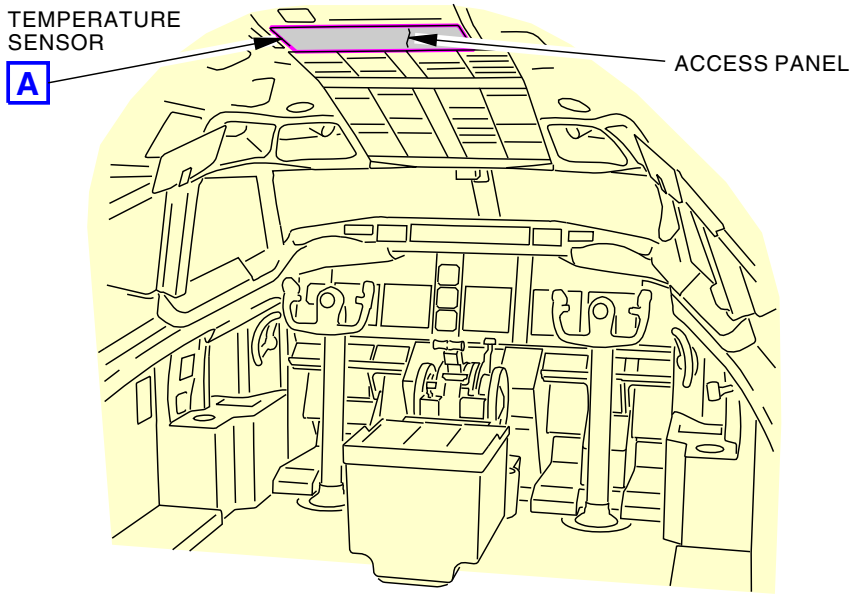
(d) Remove the screws [39] and washers [40].

(e) Remove the sensor [35] and gasket [41].

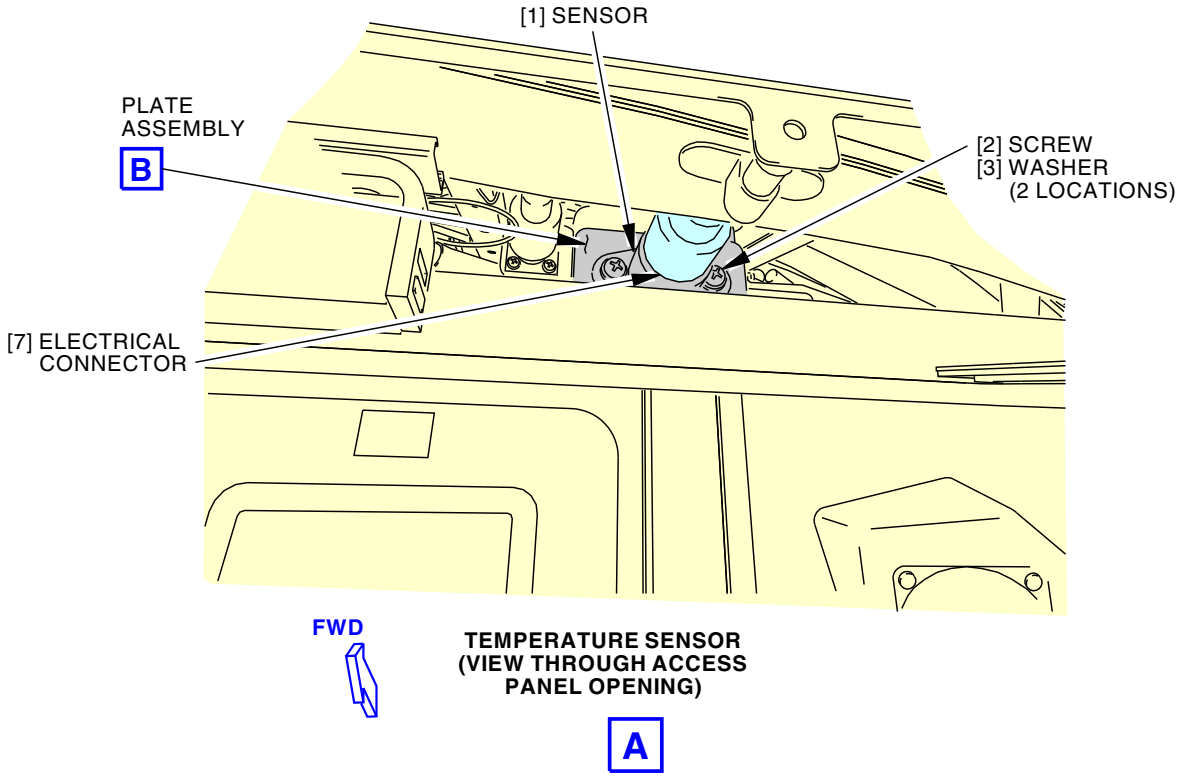
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**FLIGHT COMPARTMENT**




2411507 S00061528072_V1

**Flight Compartment - Cabin Temperature Sensor Installation**
**Figure 201/21-61-10-990-801 (Sheet 1 of 2)**



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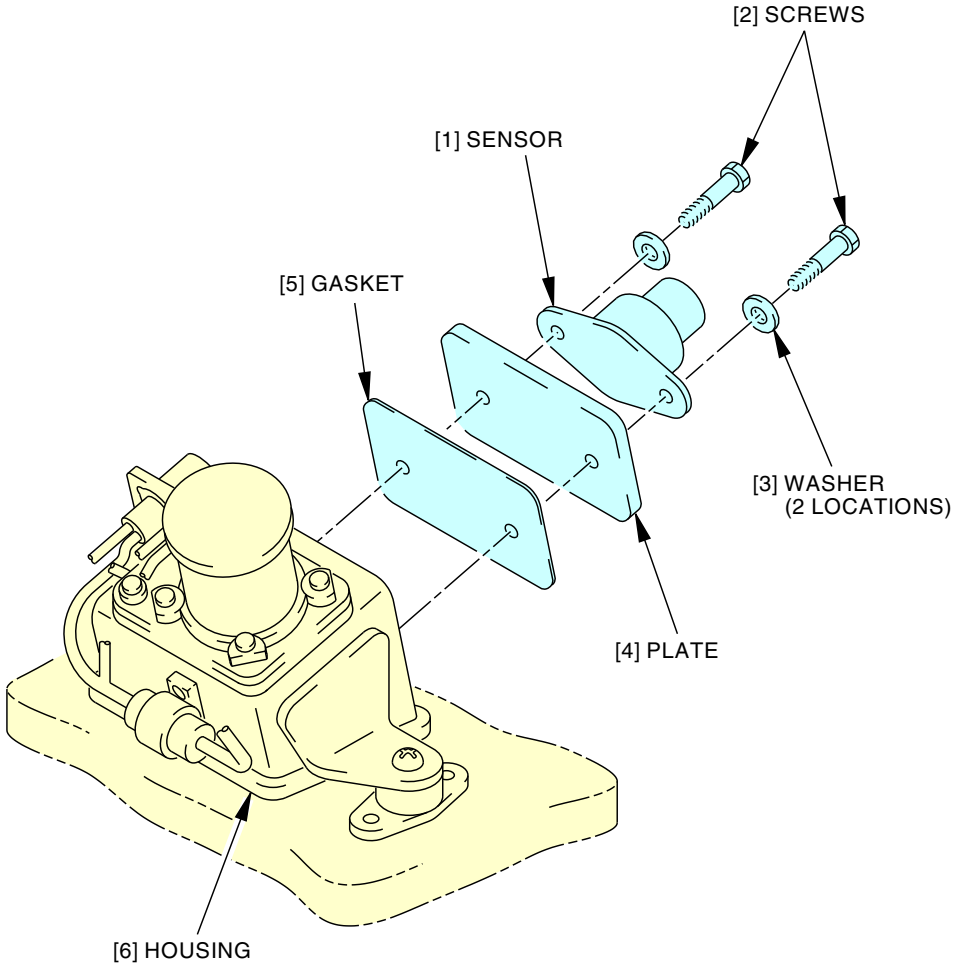



**PLATE ASSEMBLY**

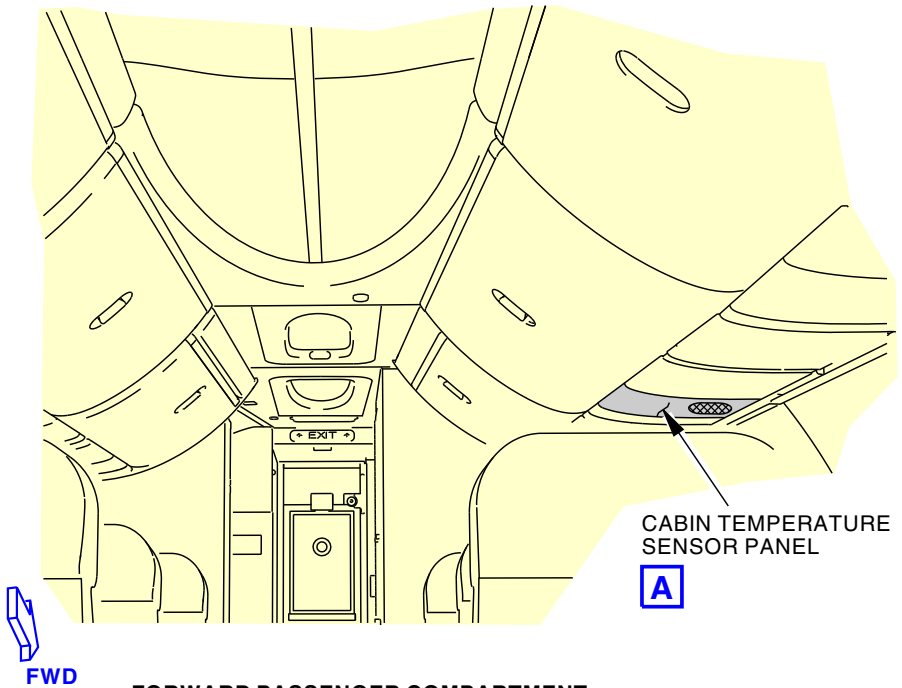
**B**

2411508 S00061528073_V1

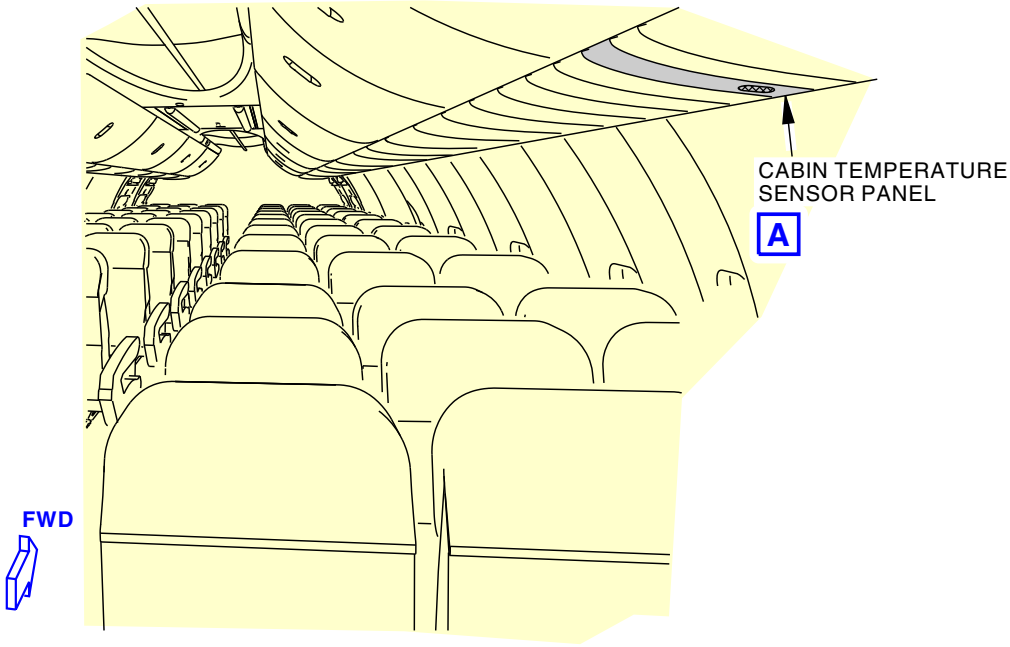
**Flight Compartment - Cabin Temperature Sensor Installation**
**Figure 201/21-61-10-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FORWARD PASSENGER COMPARTMENT



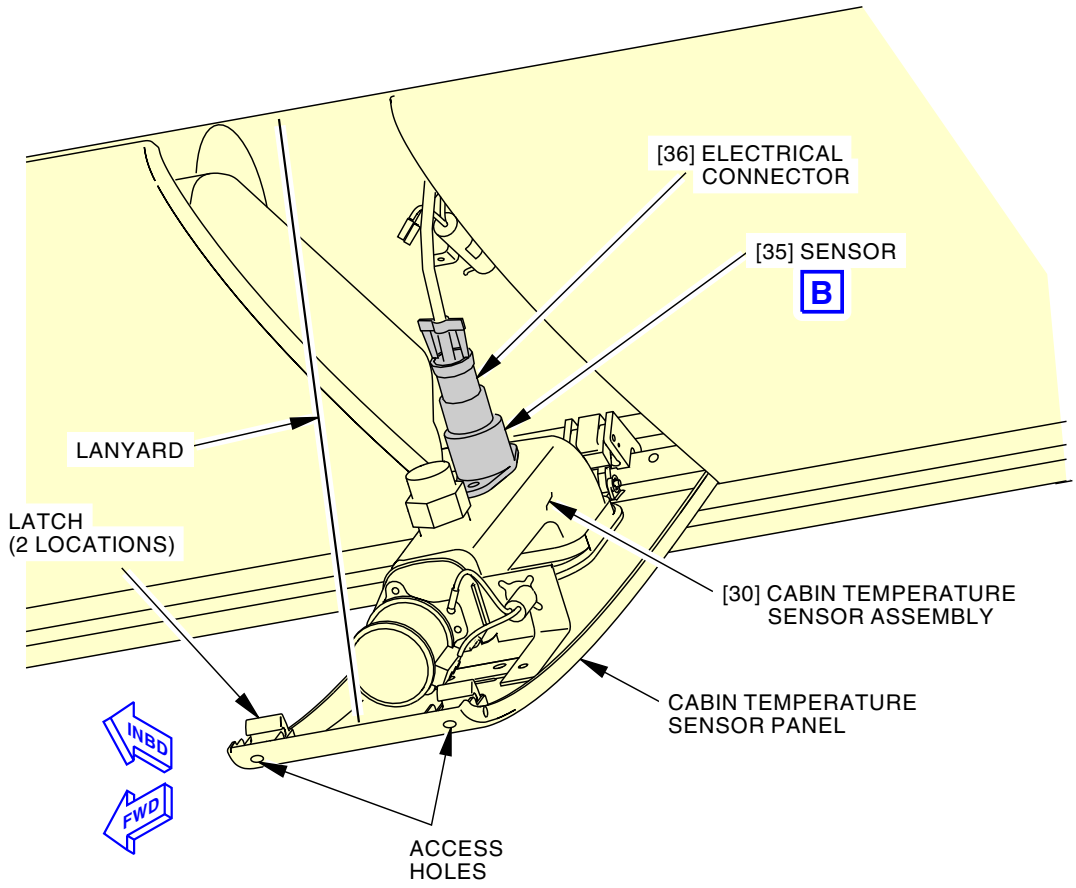

AFT PASSENGER COMPARTMENT

2411509 S00061528074_V1

**Passenger Compartment - Cabin Temperature Sensor Installation**
**Figure 202/21-61-10-990-802 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR PANEL (EXAMPLE)**

**A**

**NOTE:**

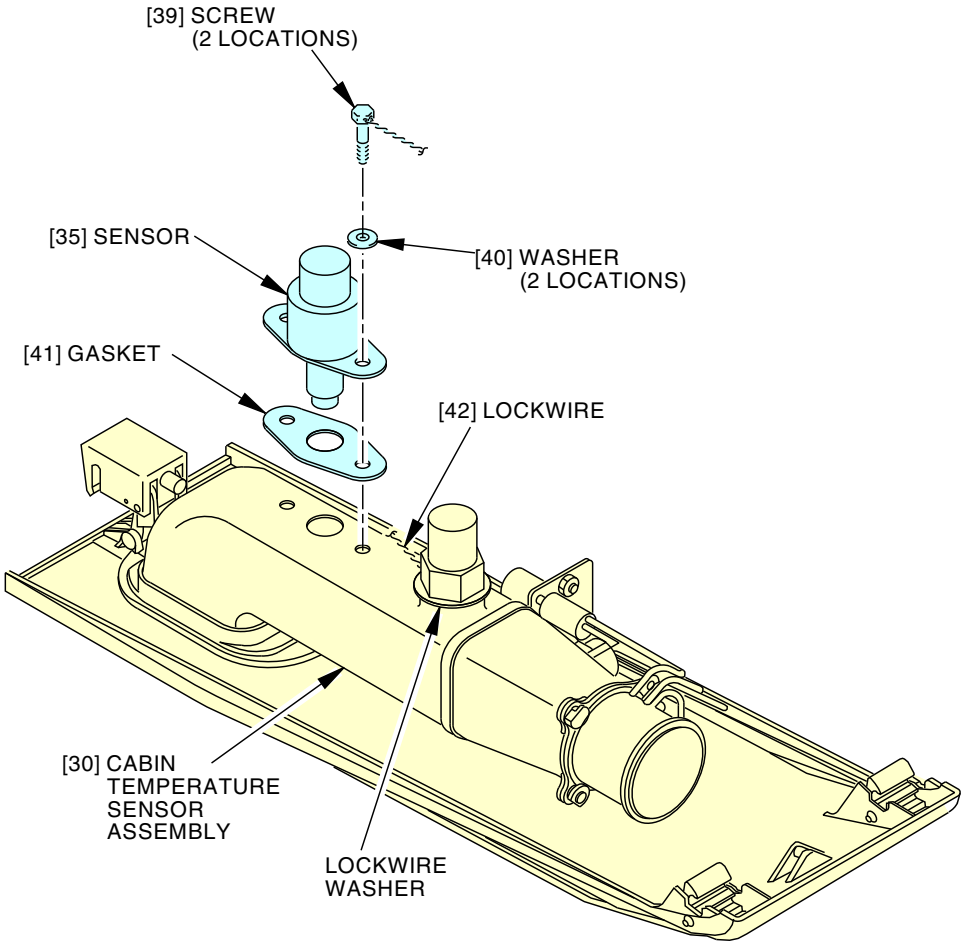
THE CABIN TEMPERATURE SENSOR PANEL IS SHOWN IN THE OPEN POSITION.

2411510 S00061528075_V2

**Passenger Compartment - Cabin Temperature Sensor Installation**
**Figure 202/21-61-10-990-802 (Sheet 2 of 3)**



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**SENSOR**
**(EXAMPLE)**

B

2411511 S00061528076_V2

**Passenger Compartment - Cabin Temperature Sensor Installation**
**Figure 202/21-61-10-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-10-100-801**

## 3. Cabin Temperature Sensor Cleaning

### A. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00039 | Cleaner - Brulin Formula 815MX | |
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00541 | Cleaner - General Purpose Household Detergent | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### B. Prepare for the Cabin Temperature Sensor Cleaning

**SUBTASK 21-61-10-020-002**

(1) Remove the temperature sensor for the flight compartment (TASK 21-61-10-000-801).

**SUBTASK 21-61-10-020-003**

(2) Remove the temperature sensors for the passenger compartment (TASK 21-61-10-000-801).

### C. Cabin Temperature Sensor Cleaning

**SUBTASK 21-61-10-100-001**

(1) Do these steps to clean the temperature sensor:

(a) Prepare a cleaning solution of water and general purpose household detergent cleaner, B00541, or Brulin Formula 815MX cleaner, B00039.

1) Follow the mixing instructions for the cleaner.

(b) Clean the temperature sensors with the cleaning solution and a cotton wiper, G00034.

(c) If the cleaning solution did not remove all dirt deposits or contamination from the sensor, then clean the temperature sensor with a cotton wiper, G00034, that is moist with alcohol, B00130.

(d) Flush the temperature sensor with clean water until all cleaning solution or alcohol, B00130, has been removed.

(e) Dry the temperature sensor with a clean cotton wiper, G00034.

### D. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-10-420-001**

(1) Install the temperature sensor for the flight compartment (TASK 21-61-10-400-801).

**SUBTASK 21-61-10-420-002**

(2) Install the temperature sensors for the passenger compartment (TASK 21-61-10-400-801).

**——— END OF TASK ———**

**TASK 21-61-10-400-801**

## 4. Cabin Temperature Sensor Installation

(Figure 201 or Figure 202)

### A. References

| Reference | Title |
|---|---|
| 46-13-02-700-804 | Present Leg Faults Check (P/B 201) |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

| Reference | Title |
|---|---|
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G01048 | Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter | NASM20995 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Cabin Temperature Sensor Installation**

SUBTASK 21-61-10-420-003

(1) To install the cabin temperature sensor [1] for the flight compartment, do these steps:

(a) Make sure that the gasket [5] and plate [4] are in position on the housing [6] of the temperature sensor assembly.

(b) Put the sensor [1] in its position on the temperature sensor assembly.

(c) Install the washers [3] and screws [2].

(d) Connect the electrical connector [7] to the sensor [1].

(e) To install the access panel, lift it to its closed position and make sure the hook and loop strips are fully engaged.

SUBTASK 21-61-10-420-004

(2) To install the cabin temperature sensor [35] for the passenger compartment, do these steps:

(a) Put the gasket [41] and sensor [35] in position on the cabin temperature sensor assembly [30].

(b) Install the washers [40] and screws [39].

(c) Install the lockwire [42] (MS20995C32 lockwire, G01048).

(d) Connect the electrical connector [36].

(e) Partially lift the panel for the cabin temperature sensor assembly [30] and install the lanyard.

(f) Lift the cabin temperature sensor panel for the cabin temperature sensor assembly [30] to its closed position.

SUBTASK 21-61-10-860-003

(3) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

### F. Cabin Temperature Sensor Installation Test

**SUBTASK 21-61-10-740-001**

(1) Look for maintenance messages that are related to the cabin temperature sensor, do this task: Present Leg Faults Check, TASK 46-13-02-700-804.

(a) Make sure that maintenance messages that are related to the temperature sensor are NOT ACTIVE.

(b) If the maintenance message is ACTIVE, then use the IFIM and do the applicable procedure(s) to repair the fault indicated by the maintenance message.

### G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-10-740-002**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## CABIN TEMPERATURE SENSOR - INSPECTION/CHECK

### 1. General

A. This procedure does an electrical resistance check of the cabin temperature sensors.

**TASK 21-61-10-200-801**

### 2. Cabin Temperature Sensor Resistance Check

(Figure 601, Figure 602, Figure 603)

#### A. General

(1) This procedure does a temperature versus electrical resistance check of the cabin temperature sensors to do a check for sensor drift.

#### B. References

| Reference | Title |
|---|---|
| 21-61-10-000-801 | Cabin Temperature Sensor Removal (P/B 201) |
| 21-61-10-400-801 | Cabin Temperature Sensor Installation (P/B 201) |
| 21-61-22-000-801 | Integrated Air Systems Controller (IASC) Removal (P/B 401) |
| 21-61-22-400-801 | Integrated Air Systems Controller (IASC) Installation (P/B 401) |
| WDM 21-61-11 | D000534452 |
| WDM 21-61-12 | D000534454 |
| WDM 21-61-13 | D000534453 |
| WDM 21-61-14 | D000534455 |

#### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| COM-3955 | Thermometer - Digital (Type K)<br>Part #: 51 2B Supplier: 89536<br>Opt Part #: 51 SERIES II Supplier: 89536 |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**D. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. Cabin Temperature Sensor Resistance Check**

SUBTASK 21-61-10-210-001

(1) Find the inlet grilles of the plenums that contain the cabin temperature sensors in the flight compartment and the forward and aft passenger compartment (Figure 601).

SUBTASK 21-61-10-970-001

(2) Use a digital thermometer, COM-3955, or equivalent, to measure the ambient temperature near the inlet grille of the cabin temperature sensors for the flight compartment and forward and aft passenger compartment.

SUBTASK 21-61-10-970-002

(3) Open this access door:

(Figure 602)

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-10-010-001

(4) To remove the left and right integrated air systems controller, do this task: Integrated Air Systems Controller (IASC) Removal, TASK 21-61-22-000-801.

SUBTASK 21-61-10-020-004

(5) Use a digital/analog multimeter, COM-1793, or equivalent, to measure the electrical resistance of the cabin temperature sensor at the electrical connector for the left or right integrated air systems controller (M2939 and M2957):

(a) Cabin temperature sensor for the flight compartment:

1) For the main element, measure the resistance across pin E11 and pin E12 of connector D15840B for the right integrated air systems controller (M2957) (WDM 21-61-11).

2) For the backup element, measure the resistance across pin E11 and pin E12 of connector D15838B for the left integrated air systems controller (M2939) (WDM 21-61-12).

(b) Cabin temperature sensor for the forward passenger compartment:

1) For the main element, measure the resistance across pin C8 and pin C9 of connector D15840B for the right integrated air systems controller (M2957) (WDM 21-61-13).

2) For the backup element, measure the resistance across pin 4 and pin 10 of connector D15838C for the left integrated air systems controller (M2939) (WDM 21-61-13).

(c) Cabin temperature sensor for the aft passenger compartment:



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1) For the main element, measure the resistance across pin C8 and pin C9 of connector D15838B for the left integrated air systems controller (M2939) (WDM 21-61-14).

2) For the backup element, measure the resistance across pin 4 and pin 10 of connector D15840C for the right integrated air systems controller (M2957 )(WDM 21-61-14).

**SUBTASK 21-61-10-210-002**

(6) Compare the measured resistance to the resistance given in Figure 603 for the ambient temperature measured at the inlet grille.

(a) If the measured resistance is out of range of the electrical resistance given in (Figure 603, replace the cabin temperature sensor.

Do these tasks:

- Cabin Temperature Sensor Removal, TASK 21-61-10-000-801,
- Cabin Temperature Sensor Installation, TASK 21-61-10-400-801.

## G. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-10-420-005**

(1) To install the left and right integrated air systems controllers, do this task: Integrated Air Systems Controller (IASC) Installation, TASK 21-61-22-400-801.

**SUBTASK 21-61-10-760-001**

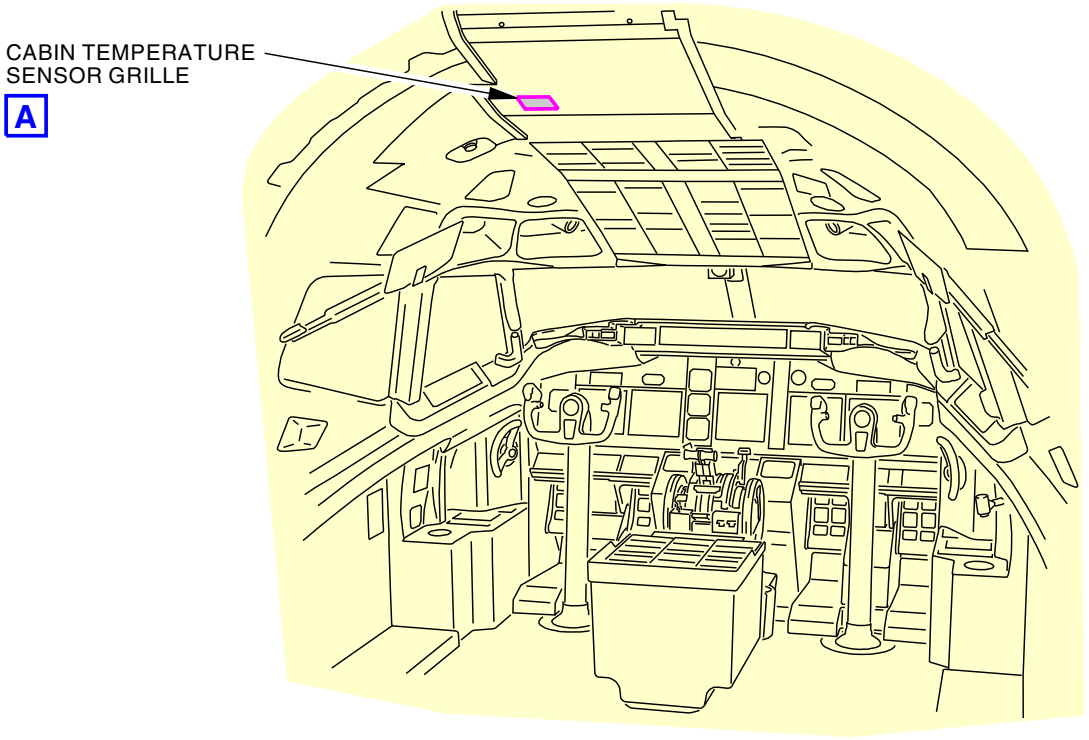
(2) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



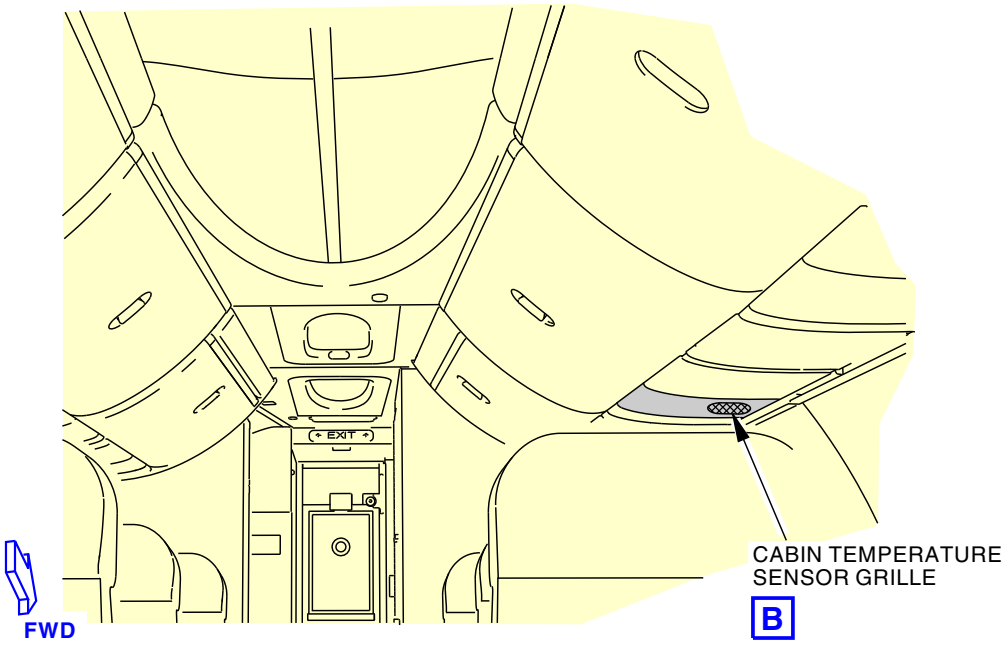
ECCN 9E991 BOEING PROPRIETARY - See title page for details



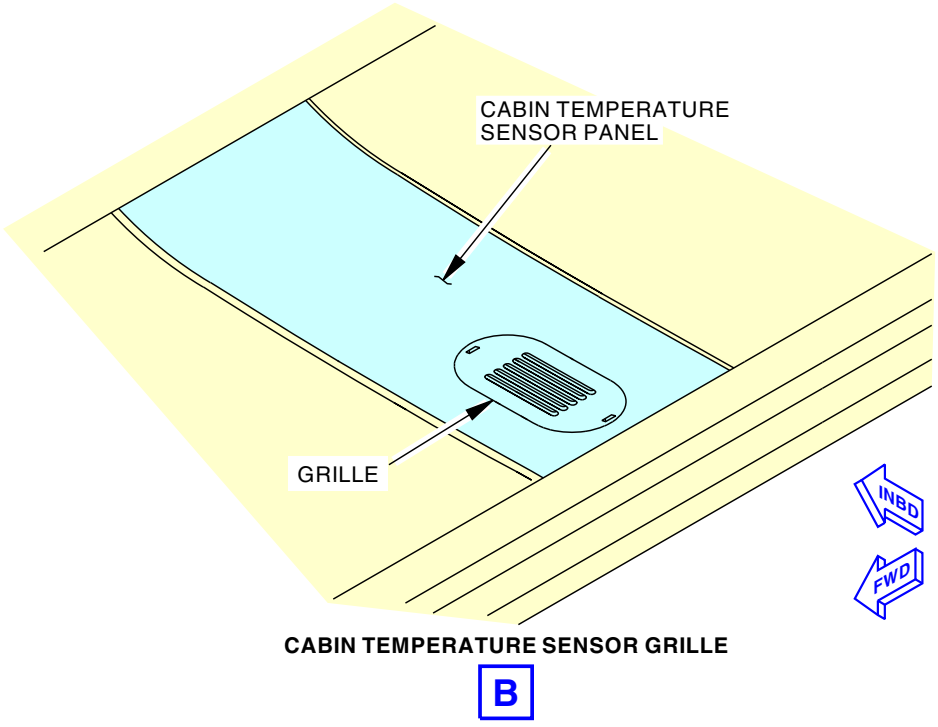

**Cabin Temperature Sensor Inspection**
**Figure 601/21-61-10-990-803 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**FORWARD PASSENGER COMPARTMENT**




**CABIN TEMPERATURE SENSOR GRILLE**

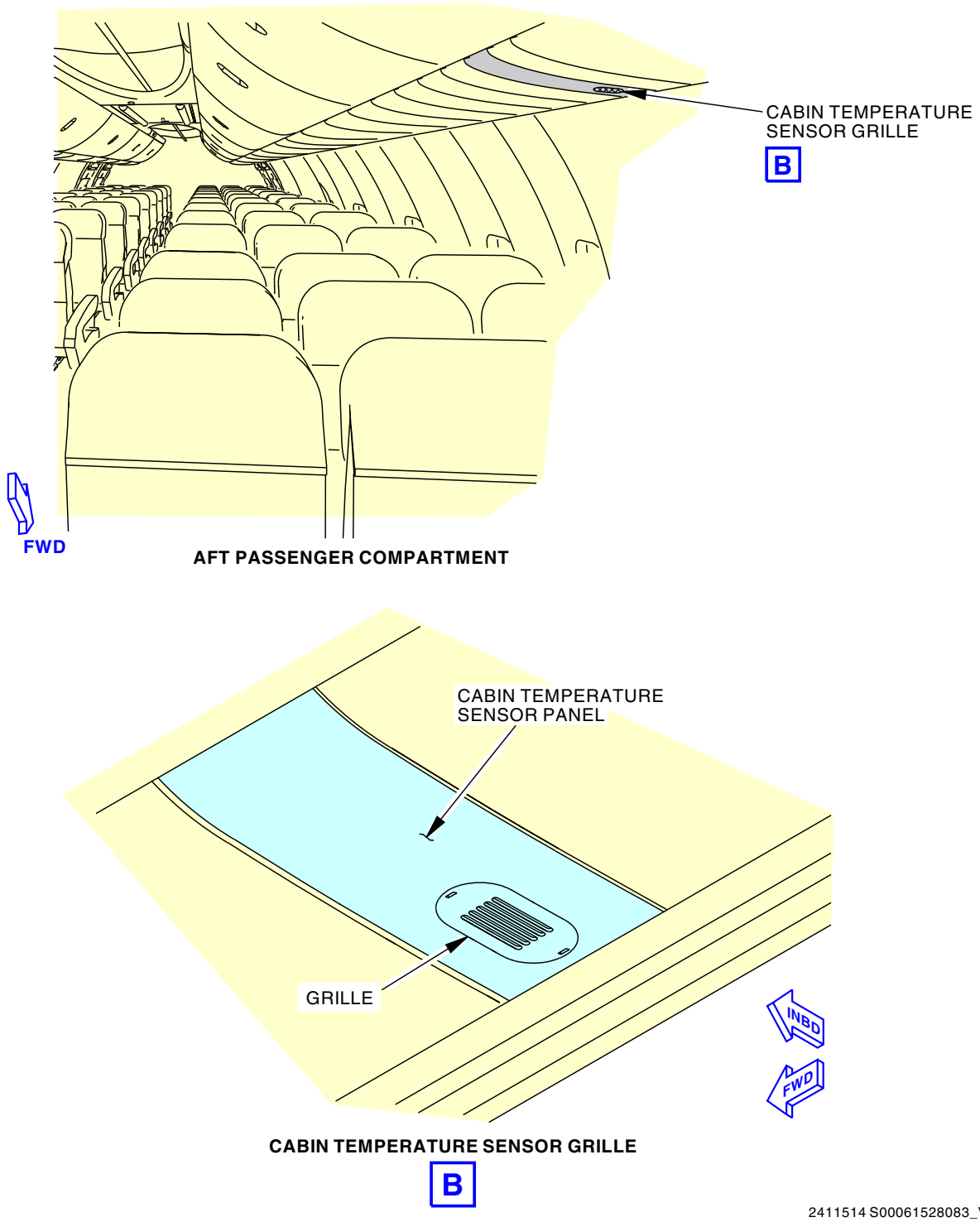
**B**

2411513 S00061528082_V1

**Cabin Temperature Sensor Inspection**
**Figure 601/21-61-10-990-803 (Sheet 2 of 3)**



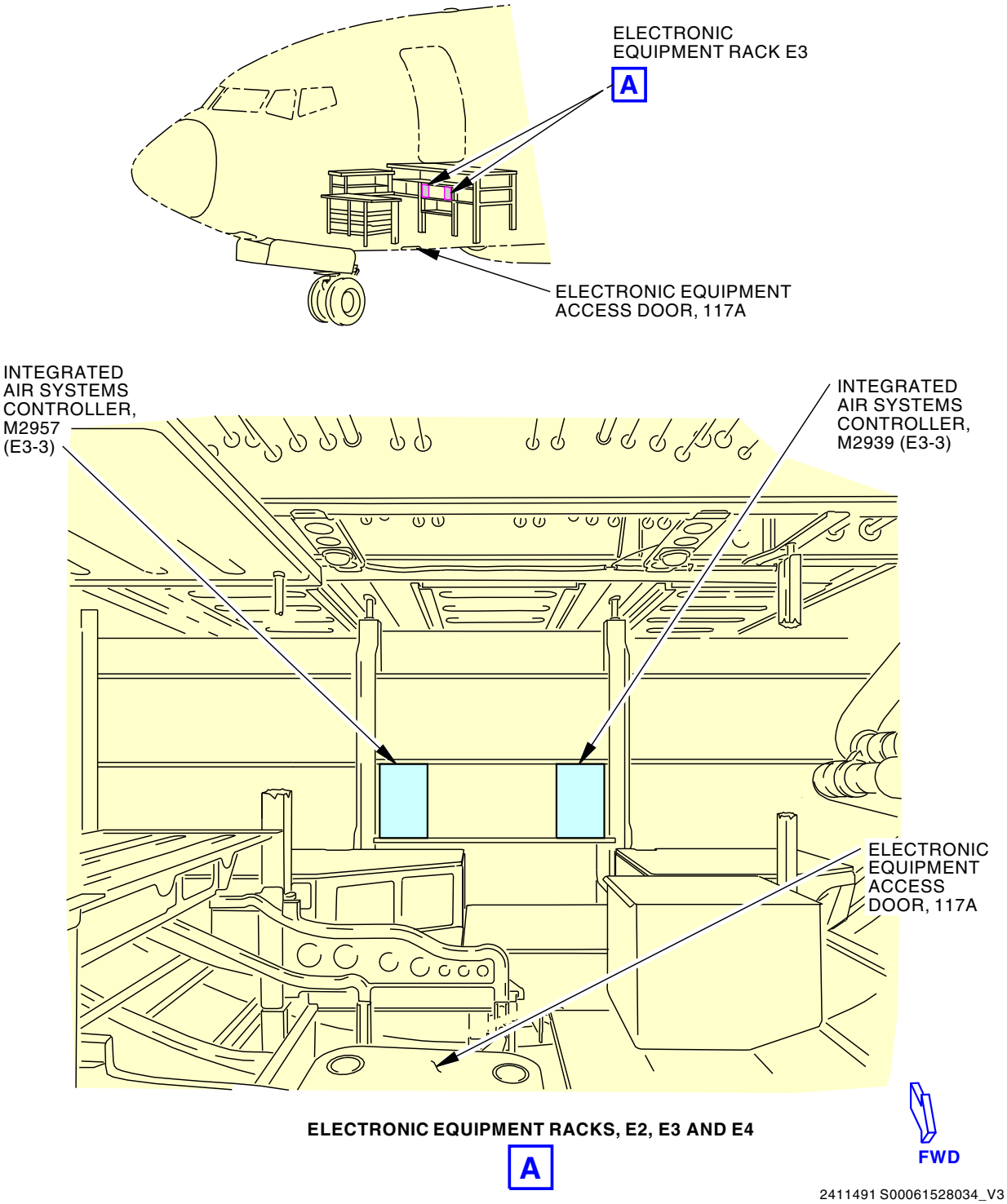
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Cabin Temperature Sensor Inspection**
**Figure 601/21-61-10-990-803 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Integrated Air Systems Controller Location]**
**Figure 602/21-61-10-990-804**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**MAIN ELEMENT**

| TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) | TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) |
|---|---|---|---|
| -40 (-40) | 87350-89130 | 55 (12.7) | 6470-6610 |
| -35 (-37.2) | 74480-76000 | 60 (15.5) | 5770-5900 |
| -30 (-34.4) | 63670-64970 | 65 (18.3) | 5150-5270 |
| -25 (-31.6) | 54600-55720 | 70 (21.1) | 4610-4710 |
| -20 (-28.8) | 46920-47880 | 75 (23.8) | 4130-4220 |
| -15 (-26.1) | 40430-41250 | 80 (26.6) | 3710-3790 |
| -10 (-23.3) | 34910-35630 | 85 (29.4) | 3330-3410 |
| -5 (-20.5) | 30160-30780 | 90 (32.2) | 3000-3070 |
| 0 (-17.7) | 26240-26780 | 95 (35) | 2710-2780 |
| 5 (-15) | 22850-23320 | 100 (37.7) | 2450-2510 |
| 10 (-12.2) | 19950-20370 | 105 (40.5) | 2220-2270 |
| 15 (-9.4) | 17460-17820 | 110 (43.3) | 2010-2060 |
| 20 (-6.6) | 15310-15630 | 115 (46.1) | 1830-1870 |
| 25 (-3.8) | 13460-13750 | 120 (48.8) | 1660-1700 |
| 30 (-1.1) | 11860-12110 | 125 (51.6) | 1510-1550 |
| 35 (1.6) | 10470-10690 | 130 (54.4) | 1380-1410 |
| 40 (4.4) | 9250-9450 | 135 (57.2) | 1260-1290 |
| 45 (7.2) | 8200-8380 | 140 (60) | 1150-1180 |
| 50 (10) | 7270-7430 | 145 (62.7) | 1050-1080 |

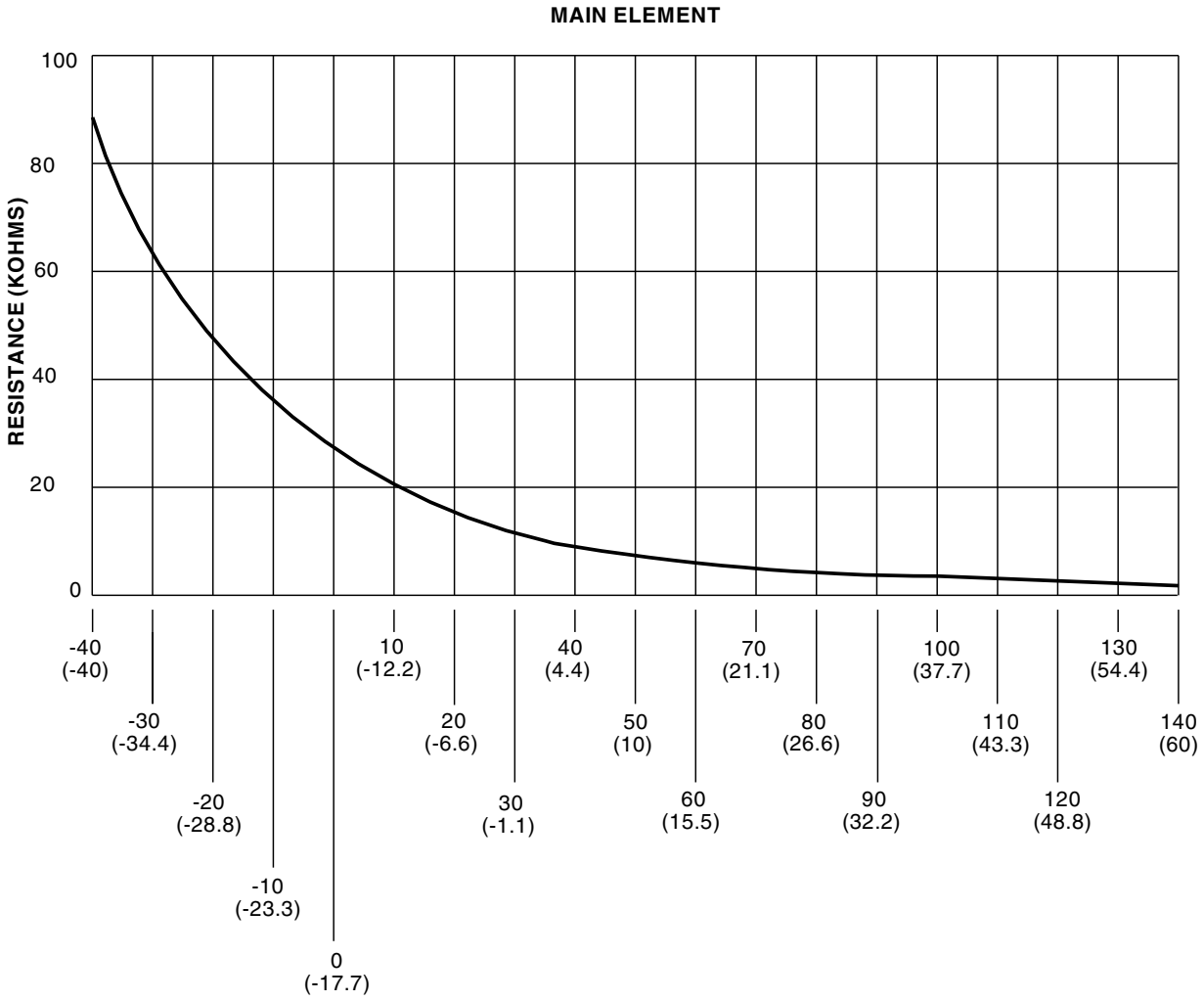
**CABIN TEMPERATURE SENSOR P/N 624018-1 (S210T130-21)**
**RESISTANCE VS TEMPERATURE TABLE**

2411516 S00061528085_V1

**Cabin Temperature Sensor - Temperature and Resistance Data**
**Figure 603/21-61-10-990-805 (Sheet 1 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR P/N 624018-1 (S210T130-21)**
**RESISTANCE VS TEMPERATURE GRAPH**

2411517 S00061528086_V1

**Cabin Temperature Sensor - Temperature and Resistance Data**
**Figure 603/21-61-10-990-805 (Sheet 2 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**BACKUP ELEMENT**

| TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) | TEMPERATURE ˚F (˚C) | RESISTANCE (OHMS) |
|---|---|---|---|
| -40 (-40) | 85850-90630 | 55 (12.7) | 6360-6720 |
| -35 (-37.2) | 73200-77280 | 60 (15.5) | 5670-5990 |
| -30 (-34.4) | 62580-66060 | 65 (18.3) | 5060-5350 |
| -25 (-31.6) | 53670-56650 | 70 (21.1) | 4530-4790 |
| -20 (-28.8) | 46120-48680 | 75 (23.8) | 4060-4290 |
| -15 (-26.1) | 39730-41950 | 80 (26.6) | 3640-3860 |
| -10 (-23.3) | 34310-36230 | 85 (29.4) | 3280-3470 |
| -5 (-20.5) | 29640-31300 | 90 (32.2) | 2950-3130 |
| 0 (-17.7) | 25790-27230 | 95 (35) | 2660-2820 |
| 5 (-15) | 22460-23720 | 100 (37.7) | 2410-2550 |
| 10 (-12.2) | 19610-20710 | 105 (40.5) | 2180-2310 |
| 15 (-9.4) | 17160-18120 | 110 (43.3) | 1980-2100 |
| 20 (-6.6) | 15050-15890 | 115 (46.1) | 1790-1900 |
| 25 (-3.8) | 13230-13980 | 120 (48.8) | 1630-1730 |
| 30 (-1.1) | 11660-12310 | 125 (51.6) | 1480-1580 |
| 35 (1.6) | 10290-10870 | 130 (54.4) | 1350-1440 |
| 40 (4.4) | 9090-9610 | 135 (57.2) | 1240-1310 |
| 45 (7.2) | 8060-8520 | 140 (60) | 1130-1200 |
| 50 (10) | 7150-7560 | 145 (62.7) | 1030-1100 |

**CABIN TEMPERATURE SENSOR P/N 624018-1 (S210T130-21)**
**RESISTANCE VS TEMPERATURE TABLE**

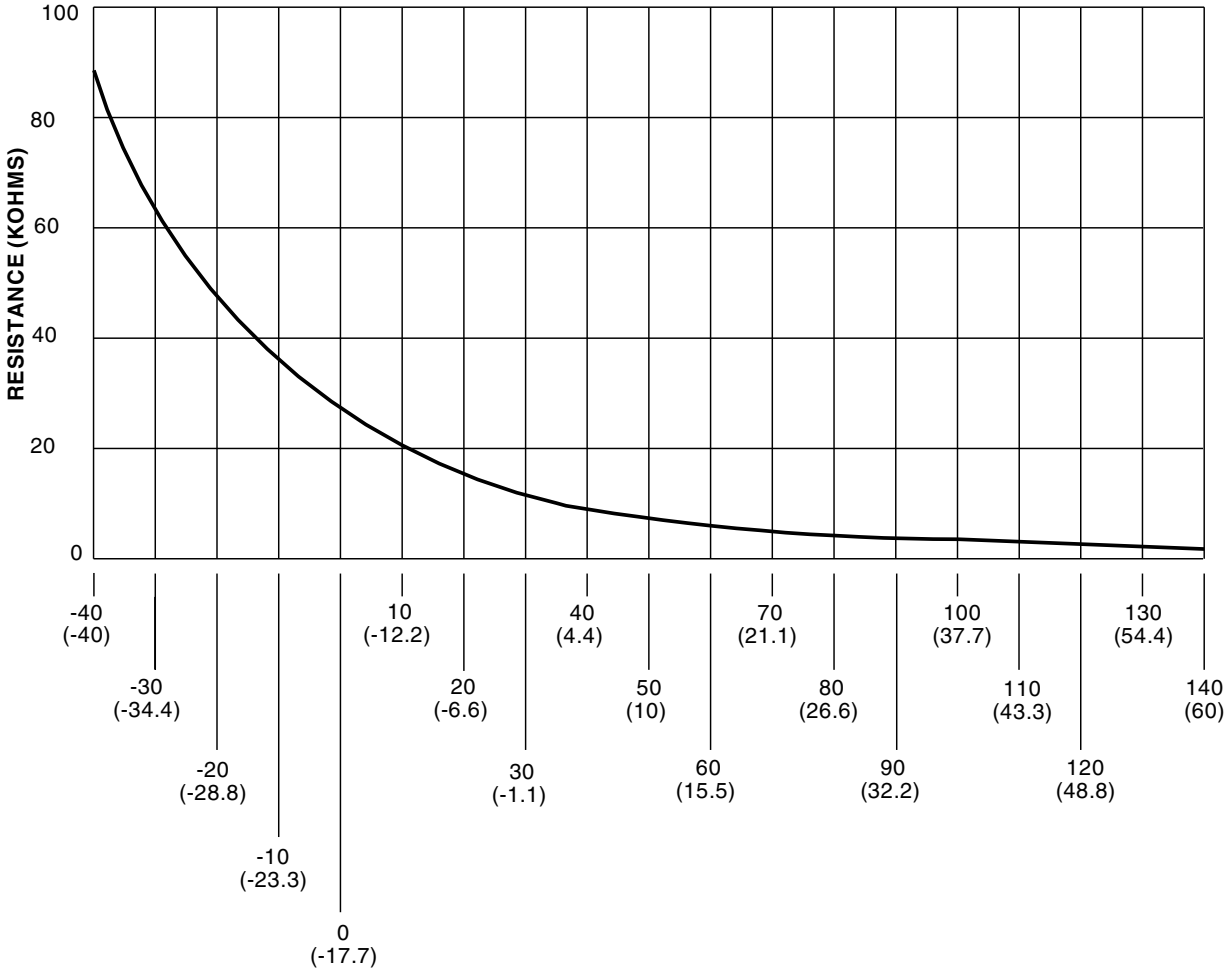
2411518 S00061528087_V1

**Cabin Temperature Sensor - Temperature and Resistance Data**
**Figure 603/21-61-10-990-805 (Sheet 3 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**BACKUP ELEMENT**




**CABIN TEMPERATURE SENSOR P/N 624018-1 (S210T130-21)**
**RESISTANCE VS TEMPERATURE GRAPH**

2411519 S00061528088_V1

**Cabin Temperature Sensor - Temperature and Resistance Data**
**Figure 603/21-61-10-990-805 (Sheet 4 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## CABIN TEMPERATURE SENSOR FAN - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the cabin temperature sensor fan

(2) An installation of the cabin temperature sensor fan.

B. There is a cabin temperature sensor fan for each of the three temperature control zones, the flight compartment, forward, and aft passenger compartment zones.

**TASK 21-61-11-000-801**

### 2. Cabin Temperature Sensor Fan Removal

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-11-21-000-803 | Flight Compartment Aft Ceiling Panel Removal (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00316 | Solvent - Aliphatic Naphtha (For Organic Coatings) | TT-N-95 Type I, ASTM D-3735 Type I |
| B50078 | Solvent - Aliphatic Naphtha (For Organic Coatings) | TT-N-95 Type I (Supersedes BMS3-2 Type I) |
| B50079 | Solvent - Aliphatic Naphtha (For Acrylic Plastics) | TT-N-95 Type II (Supersedes BMS3-2 Type II) |
| G50262 | Wiper - Cleaning | BMS15-5 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**D. Preparation for the Removal**

SUBTASK 21-61-11-860-001

(1) Do this step for the removal of the fan for the flight compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-11-860-002

(2) Do this step for the removal of the fan for the forward passenger compartment zone:



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-11-860-003

(3) Do this step for the removal of the fan for the aft passenger compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

## E. Flight Compartment Cabin Temperature Sensor Fan Removal

SUBTASK 21-61-11-020-001

(1) Do these steps to remove the fan [3] in the flight compartment (Figure 401):

(a) Lower the access panel on the forward end of the aft ceiling panel [7] in the flight compartment.

NOTE: The access panel is held in position with hook and loop strips. This panel will give the access to the electrical connectors on the cabin temperature sensor assembly.

(b) Disconnect the electrical connector [1] and electrical connector [2] from the cabin temperature sensor assembly.

(c) To remove the aft ceiling panel [7] in the flight compartment, do this task: Flight Compartment Aft Ceiling Panel Removal, TASK 25-11-21-000-803.

(d) Attach tags to each of the fan wires [4] to show its correct location for later installation.

(e) Remove the compound from the screws [5] with wiper, G50262, soaked in aliphatic naphtha, B50079, or aliphatic naphtha, B50078, or solvent, B00316.

(f) Remove the screws [5] and washers [6].

(g) Disconnect the fan wires [4] from the terminal board [13] on the fan [3].

1) Do not remove the ground wire from the metal flange [9].

(h) Remove the four clamps [10], washers [11], and screws [12] that attach the fan [3] to the cabin temperature sensor assembly.

(i) Remove the fan [3] from the cabin temperature sensor assembly.

## F. Passenger Compartment Cabin Temperature Sensor Fan Removal

SUBTASK 21-61-11-020-003

**CAUTION**

THE FAN, P/N 041510000, CONTAINS SENSITIVE BEARINGS AND YOU MUST HANDLE IT CAREFULLY. DAMAGE TO THE FAN CAN OCCUR IF THIS CAUTION IS NOT OBEYED.

(1) Remove the fan [14] in the passenger compartment as follows (Figure 402):

(a) Lower the cabin temperature sensor panel.

(b) Disconnect the electrical connector [15].

1) Remove the nuts [16], washers [17], and screws [18].



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the screws [19], washers [20], and clamps [21] that attach the fan [14] to the cabin temperature sensor assembly.

(d) Remove the fan [14] from the cabin temperature sensor assembly.

NOTE: Fan P/N 041510000 does not have a terminal board, fan includes the capacitor.

(e) Attach a tag to each fan wire [24] to show its correct location for later installation.

**CAUTION**

THE FAN, P/N 041510000, CONTAINS SENSITIVE BEARINGS AND YOU MUST HANDLE IT CAREFULLY. DAMAGE TO THE FAN CAN OCCUR IF THIS CAUTION IS NOT OBEYED.

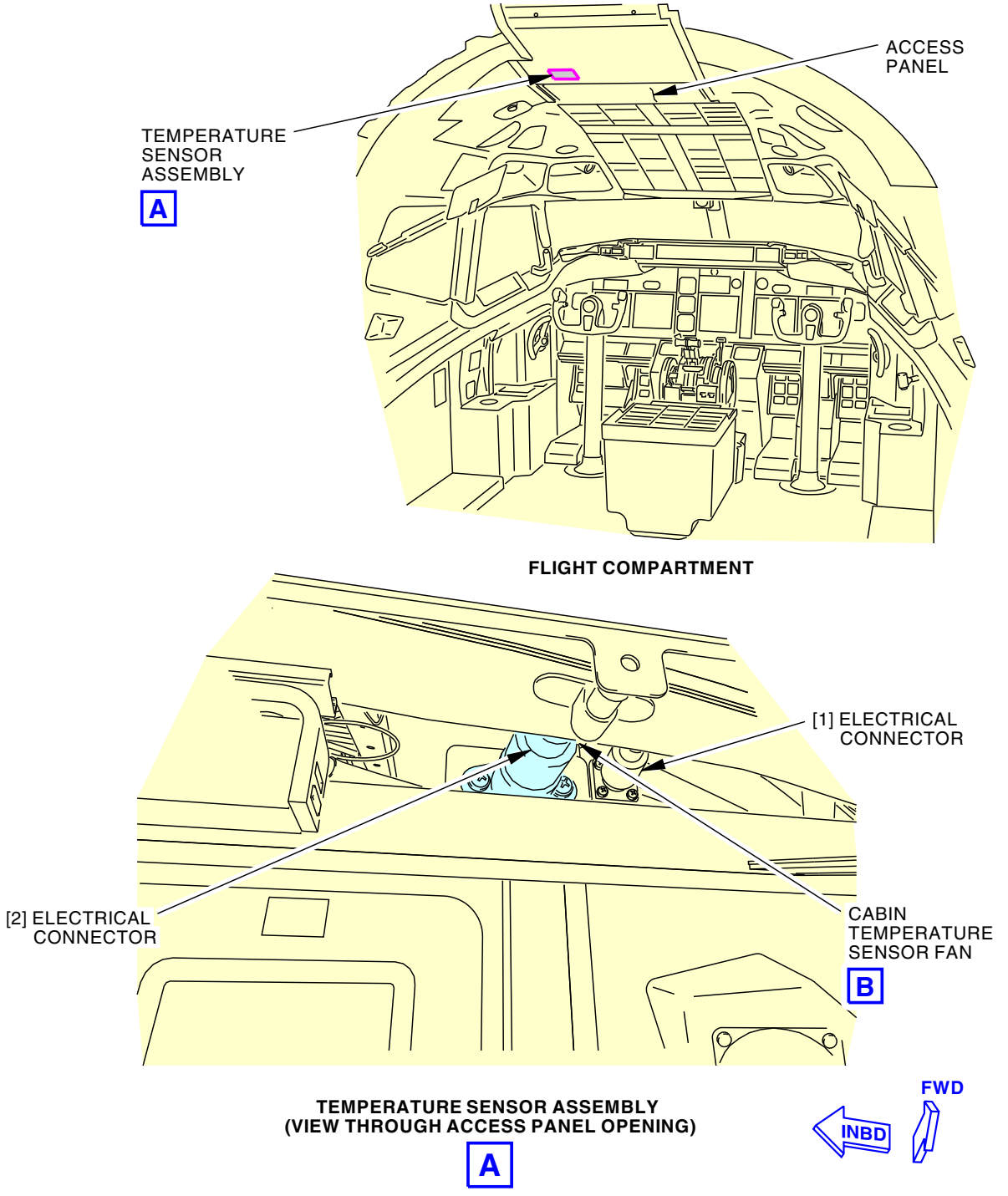
1) Remove the strap [22] from the capacitor [23] and bracket assembly.

2) Use an extraction tool to remove the contacts and fan wires [24] from the electrical connector [15].

**END OF TASK**



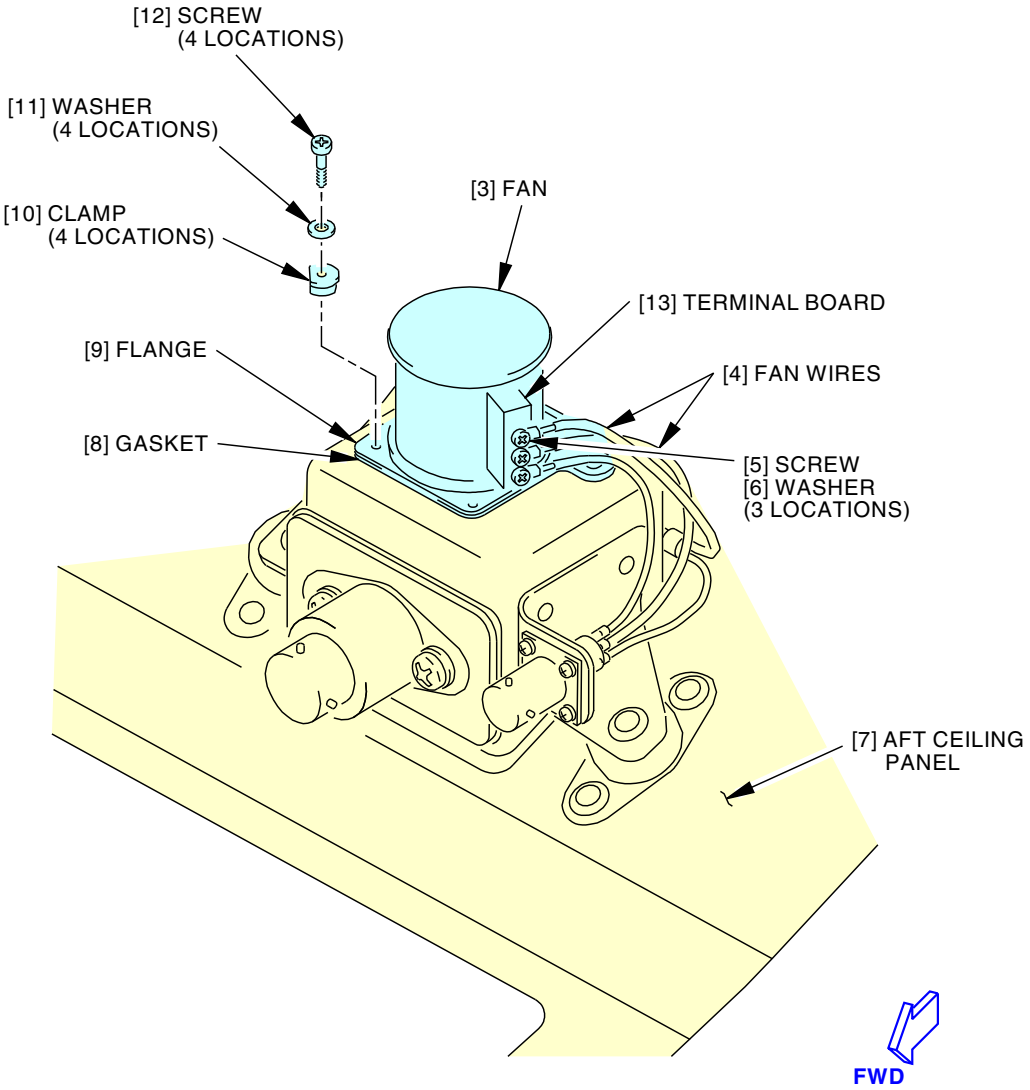
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Compartment Cabin Temperature Sensor Fan Installation**
**Figure 401/21-61-11-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR FAN**
**(EXAMPLE)**

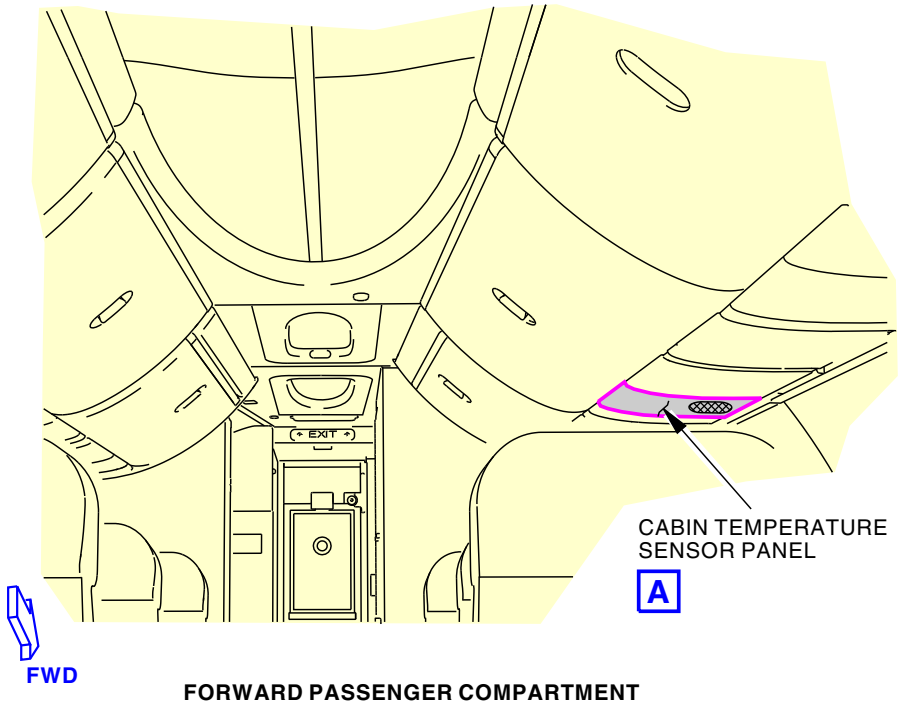
**B**

2411521 S00061528093_V2

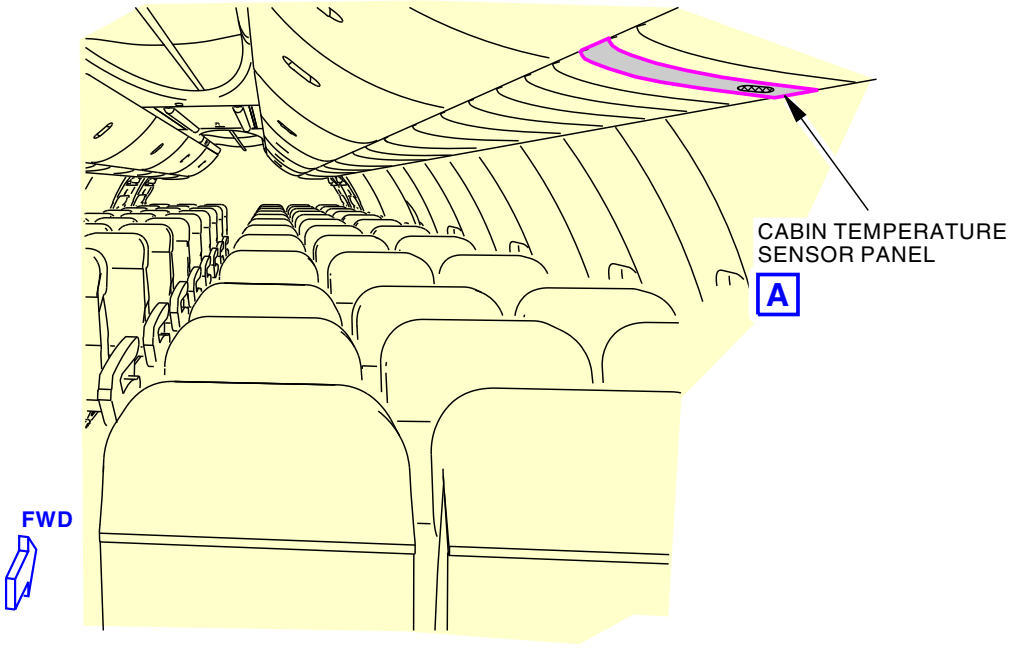
**Flight Compartment Cabin Temperature Sensor Fan Installation**
**Figure 401/21-61-11-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FORWARD PASSENGER COMPARTMENT



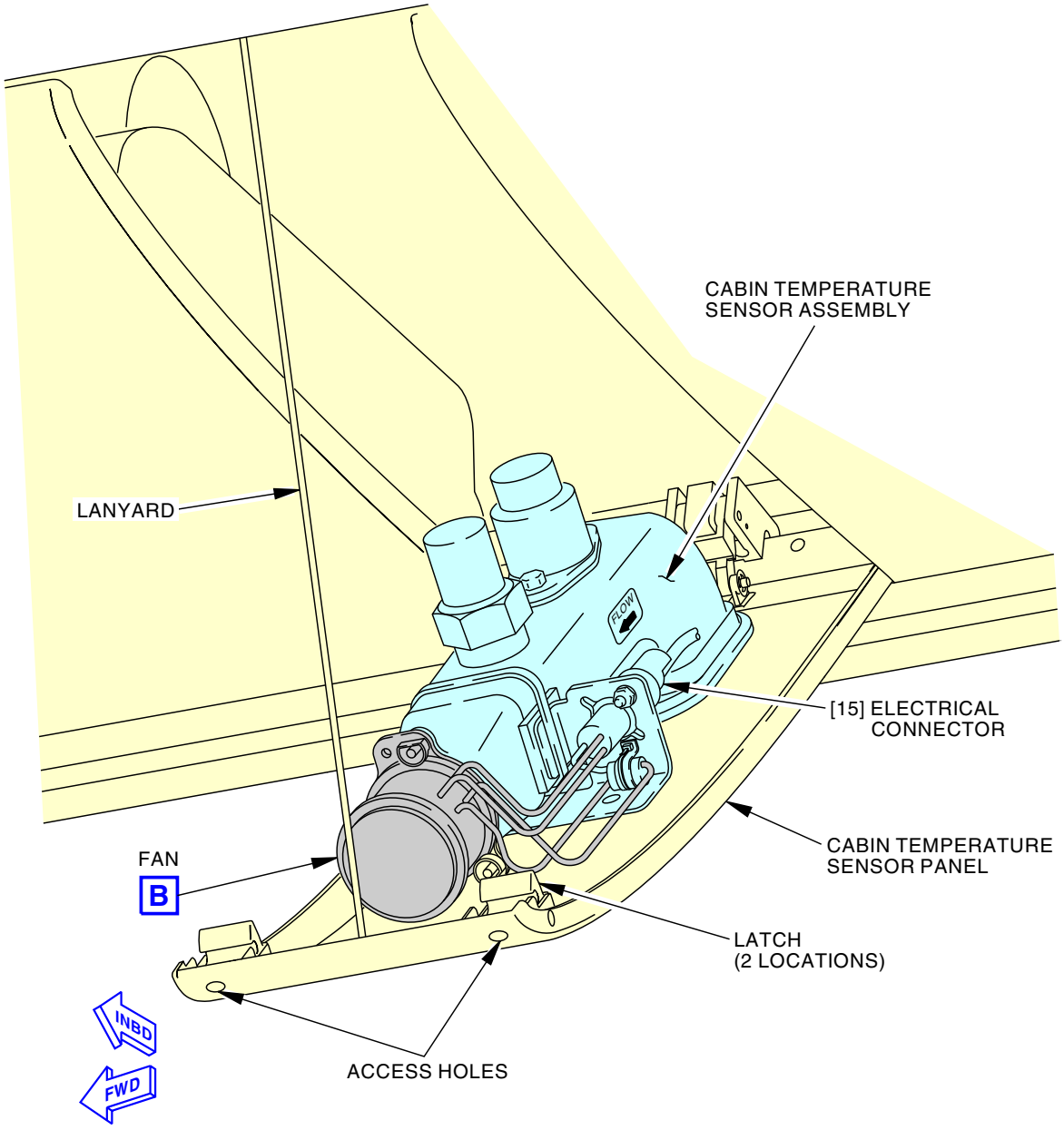

AFT PASSENGER COMPARTMENT

2794662 S0000637169_V1

**Passenger Cabin Temperature Sensor Fan Installation**
**Figure 402/21-61-11-990-803 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR PANEL (EXAMPLE)**

A

**NOTE:**

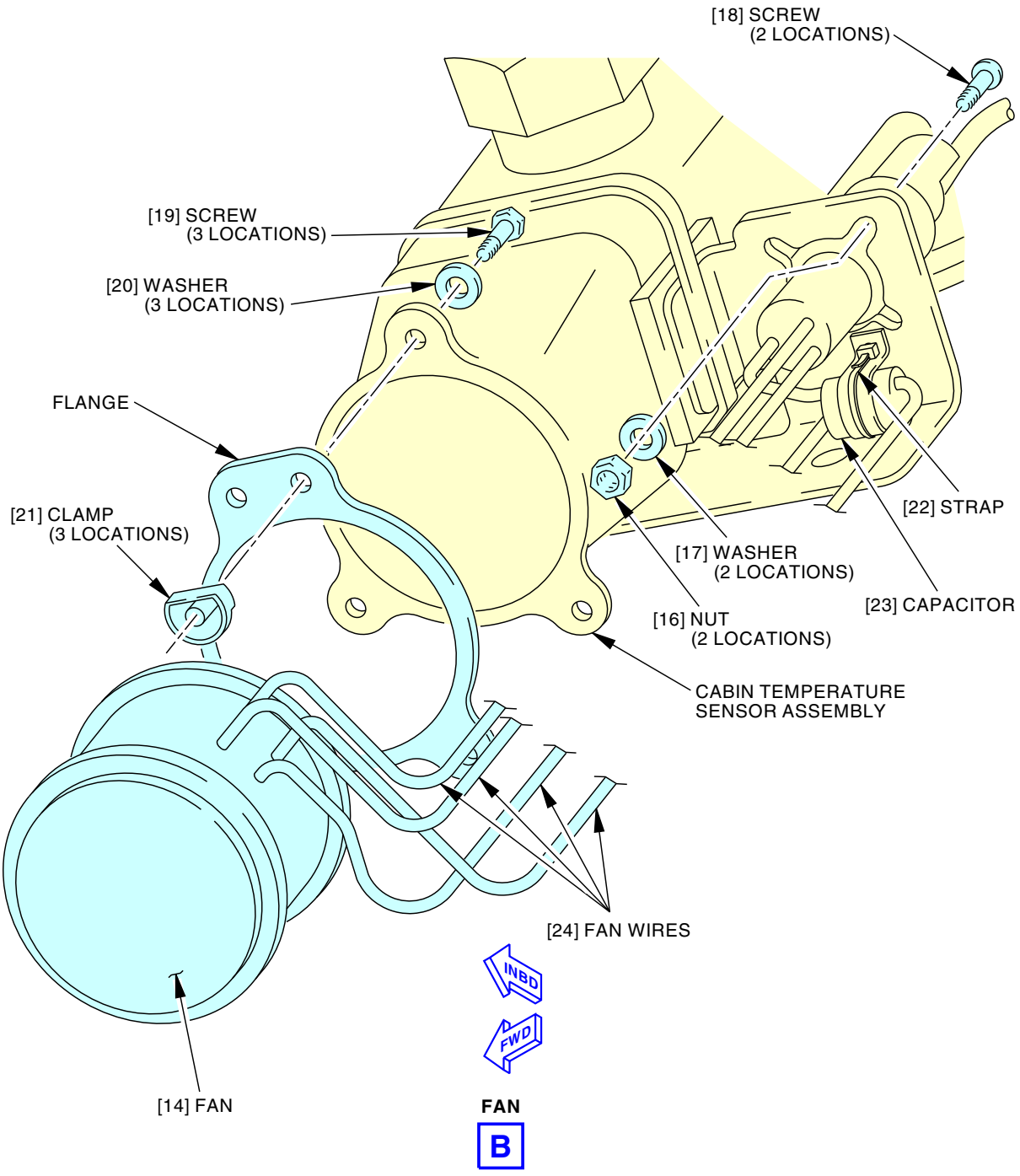
THE CABIN TEMPERATURE SENSOR PANEL IS SHOWN IN THE OPEN POSITION.

2794663 S0000637168_V2

**Passenger Cabin Temperature Sensor Fan Installation**
**Figure 402/21-61-11-990-803 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2794664 S0000637170_V2

**Passenger Cabin Temperature Sensor Fan Installation**
**Figure 402/21-61-11-990-803 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-11-400-801**

**3. Cabin Temperature Sensor Fan Installation**

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 25-11-21-400-803 | Flight Compartment Aft Ceiling Panel Installation (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| A50589 | Compound - Electrical Insulating Coating | BMS5-37 Type I Class B-2 |
| B00316 | Solvent - Aliphatic Naphtha (For Organic Coatings) | TT-N-95 Type I, ASTM D-3735 Type I |
| B50078 | Solvent - Aliphatic Naphtha (For Organic Coatings) | TT-N-95 Type I (Supersedes BMS3-2 Type I) |
| B50079 | Solvent - Aliphatic Naphtha (For Acrylic Plastics) | TT-N-95 Type II (Supersedes BMS3-2 Type II) |
| G50262 | Wiper - Cleaning | BMS15-5 |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 3 | Fan | 21-61-11-01-055 | SIA ALL |
| 14 | Fan | 21-61-11-50-010 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**E. Flight Compartment Cabin Temperature Sensor Fan Installation**

**SUBTASK 21-61-11-420-001**

(1) Do these steps to install the fan [3] in the flight compartment (Figure 401):

(a) Put the fan [3] in its position with the other components of the cabin temperature sensor assembly.

(b) Install the clamps [10], washers [11], and screws [12] to attach the fan [3] to the cabin temperature sensor assembly.

NOTE: The screws head direction can be with the 180 degrees turn. Cabin temperature sensor assembly part numbers P/N 213A6101-14 and P/N 213A6101-15 have fastener head outside the housing.

(c) Install the fan wires [4] on the fan terminal board [13] with the screws [5] and washers [6].

NOTE: Use the tags on the fan wires to put the fan wires in the correct locations.

1) Clean the mating surfaces on the terminal board [41] with wiper, G50262, soaked in aliphatic naphtha, B50079, or aliphatic naphtha, B50078, or solvent, B00316.

2) Wipe dry with wiper, G50262, before solvent evaporates.

a) If it is necessary repeat steps to completely remove contaminants.



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3) Coat 0.05 ±0.03 in. (1.3 ±0.8 mm) thick of compound, A50589, on fan wires [4].

NOTE: Coatings that are thinner than 0.04 in. (1.0 mm) are difficult to remove in-service and should be avoided.

(d) To install the aft ceiling panel [7] in the flight compartment, do this task: Flight Compartment Aft Ceiling Panel Installation, TASK 25-11-21-400-803.

(e) Connect the electrical connector [1] and electrical connector [2] to the cabin temperature sensor assembly.

(f) To install the access panel, lift it to its position and push firmly to make sure that the hook and loop strips are fully engaged.

## F. Passenger Compartment Cabin Temperature Sensor Fan Installation

SUBTASK 21-61-11-420-003

(1) Install the fan [14] in the passenger compartment as follows:

CAUTION: THE FAN, P/N 041510000, CONTAINS SENSITIVE BEARINGS AND YOU MUST HANDLE IT CAREFULLY. DAMAGE TO THE FAN CAN OCCUR IF THIS CAUTION IS NOT OBEYED.

(a) Put the fan [14] in its position with the other components of the cabin temperature sensor panel assembly.

1) Safety the capacitor [23] to the bracket assembly with strap [22].

a) Use the tags on the fan wires [24] to put the fan wire [24] in the correct locations.

NOTE: Fan P/N 041510000 does not have a terminal board. Fan includes the capacitor.

NOTE: The capacitor and contacts can be replaced with the supplier Component Maintenance Manual (CMM).

(b) Install the screws [19], washers [20], and clamps [21] to attach the fan [14] to the cabin temperature sensor assembly.

(c) Install the nuts [16], washers [17], and screws [18].

(d) Install the contacts in the electrical connector [15].

(e) Install the electrical connector [15].

(f) Partially lift the panel for the cabin temperature sensor and install the lanyard.

(g) Lift the panel for the cabin temperature sensor to its closed position.

## G. Sensor Fan Installation Test

SUBTASK 21-61-11-860-008

(1) Do this step for the fan in the flight compartment zone:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-11-860-009

(2) Do this step for the fan in the forward passenger compartment zone:



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(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

**SUBTASK 21-61-11-860-010**

(3) Do this step for the fan in the aft passenger compartment zone:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

**SUBTASK 21-61-11-710-002**

(4) Do this test:

(a) Hold a 3 in. (76 mm) by 4 in. (102 mm) sheet of lightweight paper over the air inlet grille of the cabin temperature sensor assembly.

1) Make sure that the fan holds the paper in its position.

2) Remove the paper.

**——— END OF TASK ———**



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## TRIM AIR DUCT PRESSURE SEAL - REMOVAL/INSTALLATION

### 1. General

A. This procedure has the following tasks:

(1) Trim Air Duct Pressure Seal Removal.

(2) Trim Air Duct Pressure Seal Installation.

B. The Trim Air Duct Pressure Seals and support rings are used to seal ECS (Environmental Control System) ducting penetration through the pressure bulkhead of the Airplane.

**TASK 21-61-12-000-801**

### 2. Trim Air Duct Pressure Seal Removal

(Figure 401)(Figure 402)

#### A. References

| Reference | Title |
|---|---|
| 21-61-21-000-801 | Zone Trim Air Modulating Valve Removal (P/B 401) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 821 | Forward Cargo Door |

#### D. Prepare for Removal

**SUBTASK 21-61-12-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806

**SUBTASK 21-61-12-860-002**

(2) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO-NOT-OPERATE tags.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO-NOT-OPERATE tags.

(c) Set the BLEED APU switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-61-12-860-003**

(3) Do this step on the P5-17 Cabin Temperature Panel (located on the P5 forward overhead panel):

(a) Set the TRIM AIR switch to the OFF position and attach a DO-NOT-OPERATE tag.

**SUBTASK 21-61-12-010-001**

(4) To get access to the trim air duct pressure seals [6] in the ECS pack bay, do these steps:



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(a) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |

## E. Trim Air Duct Pressure Seal Removal

SUBTASK 21-61-12-000-001

(1) To remove the trim air duct pressure seal [6], first remove the trim air modulating valve [1]: (TASK 21-61-21-000-801).

SUBTASK 21-61-12-020-004

(2) To remove trim air duct pressure seal [6], do these steps:

(a) Remove the 12 bolts [2], washers [3], and the two seal ring halvess [5], to disconnect the trim air duct pressure seal [6] from the pressure bulkhead.

NOTE: The 2 bolts at the 11 and 12 o'clock positions on the flight deck and aft zone pressure seals attach the duct overheat sensor to the pressure bulkhead. They are longer than the other bolts.

(b) Remove the clamp [7] from the trim air duct pressure seal [6].

(c) Remove the trim air duct pressure seal [6] from the trim air duct [8].

SUBTASK 21-61-12-020-005

(3) If it is necessary to remove the trim air duct [8] that penetrates through the pressure bulkhead, then do these steps: (Figure 402)

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

(b) Remove the aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

(c) Support the trim air duct [12].

(d) Remove the aft coupling [11] that connects trim air duct [12] to trim air duct [8] that penetrates the pressure bulkhead in the mix manifold bay.

(e) Remove trim air duct [8].

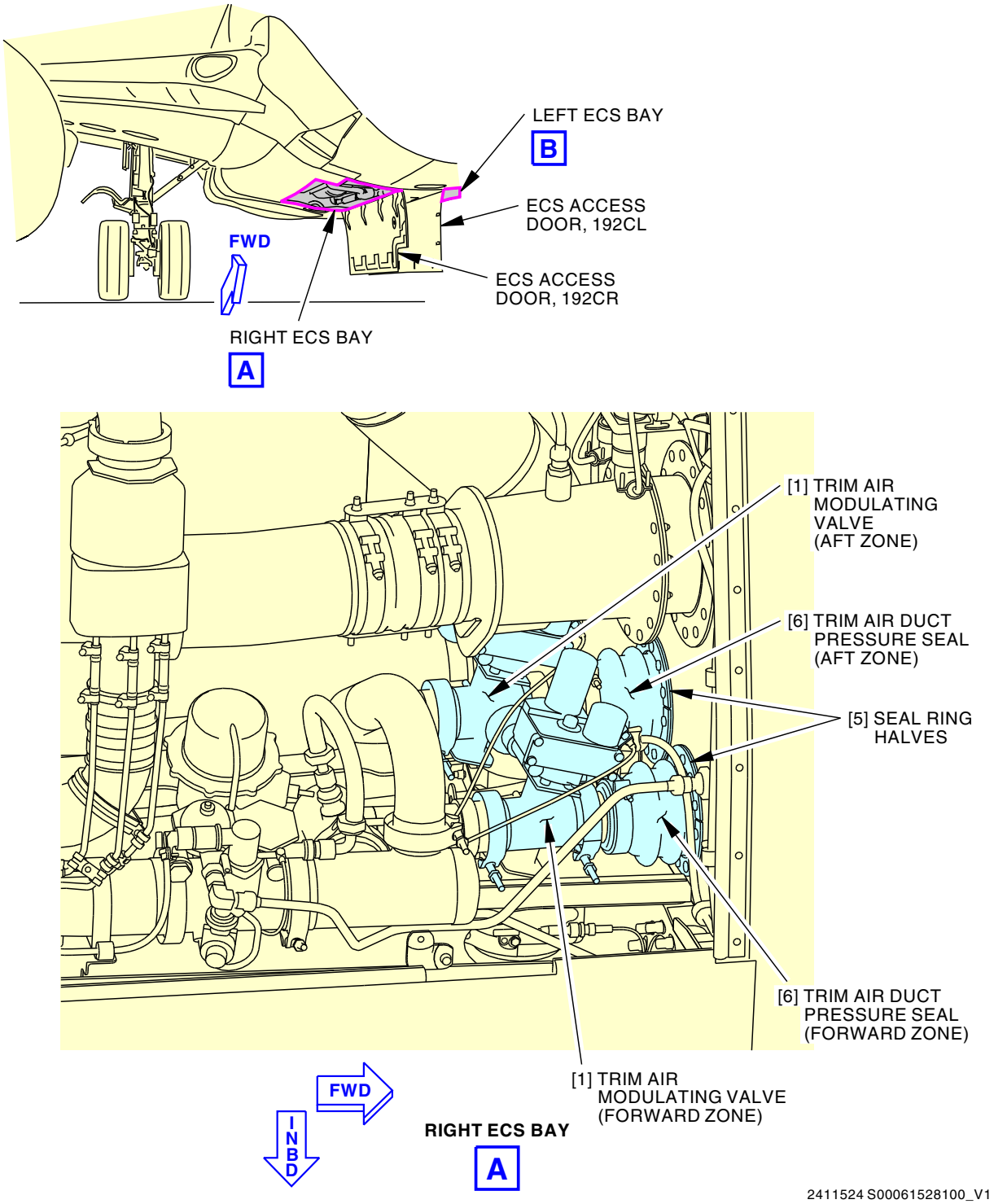
SUBTASK 21-61-12-420-001

(4) Install covers on all duct openings to keep out unwanted materials.

**——— END OF TASK ———**



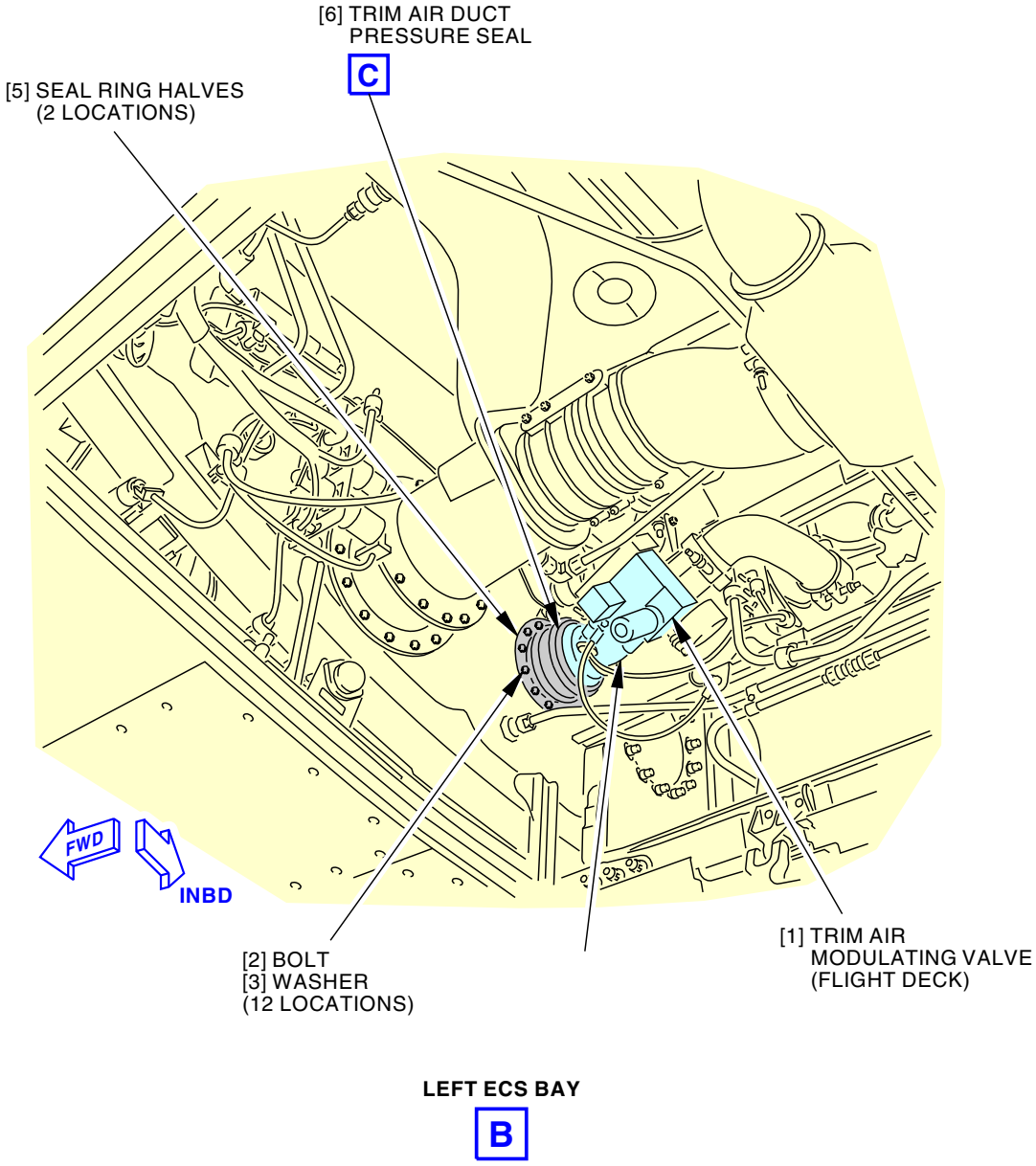
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**Trim Air Duct Pressure Seal Installation**
**Figure 401/21-61-12-990-801 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

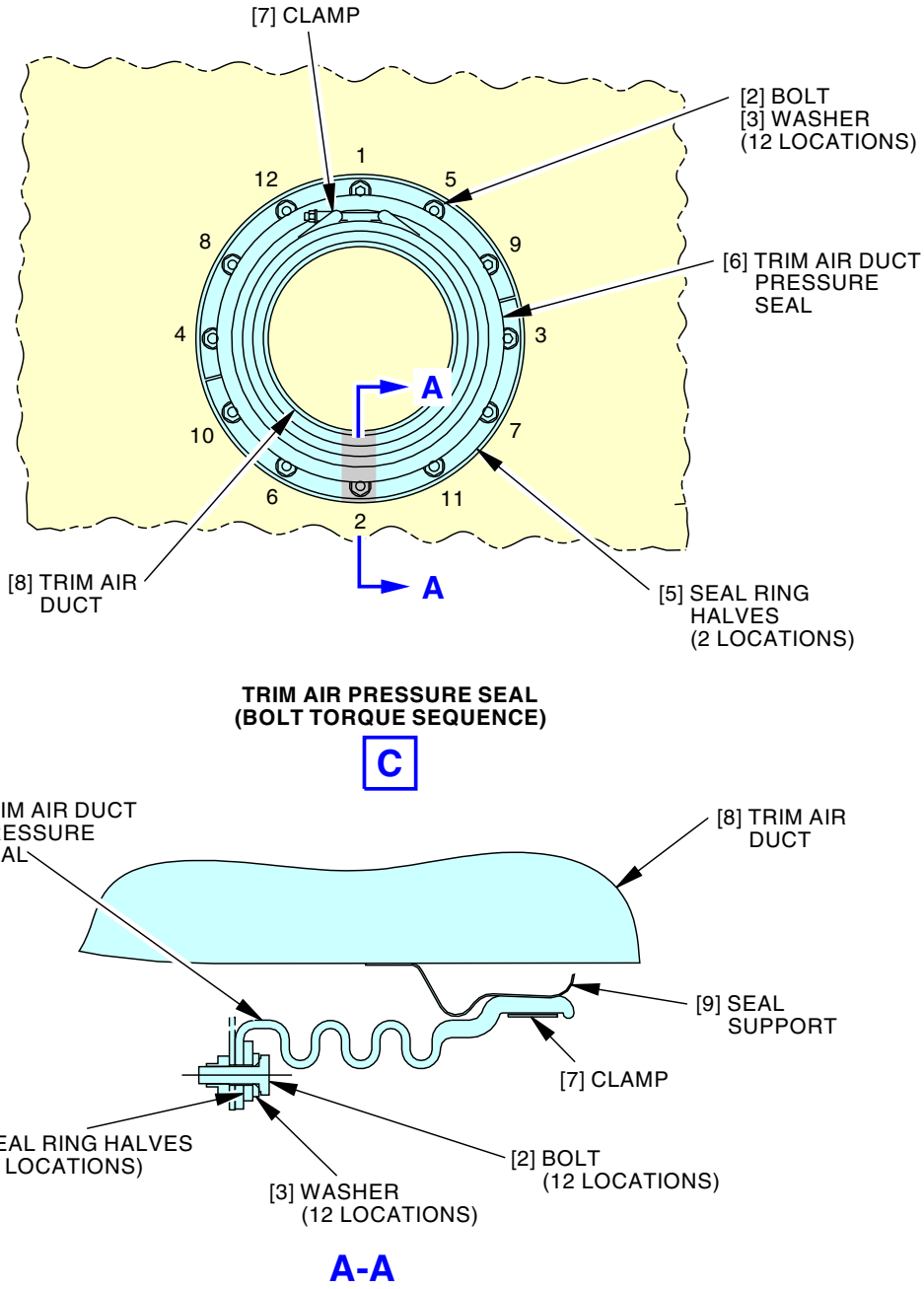



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**Trim Air Duct Pressure Seal Installation**
**Figure 401/21-61-12-990-801 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

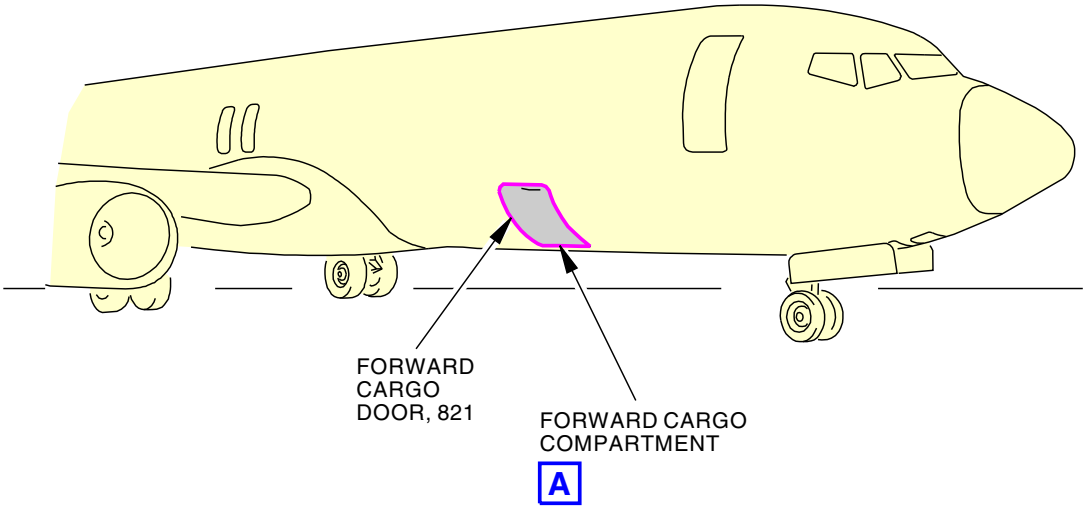


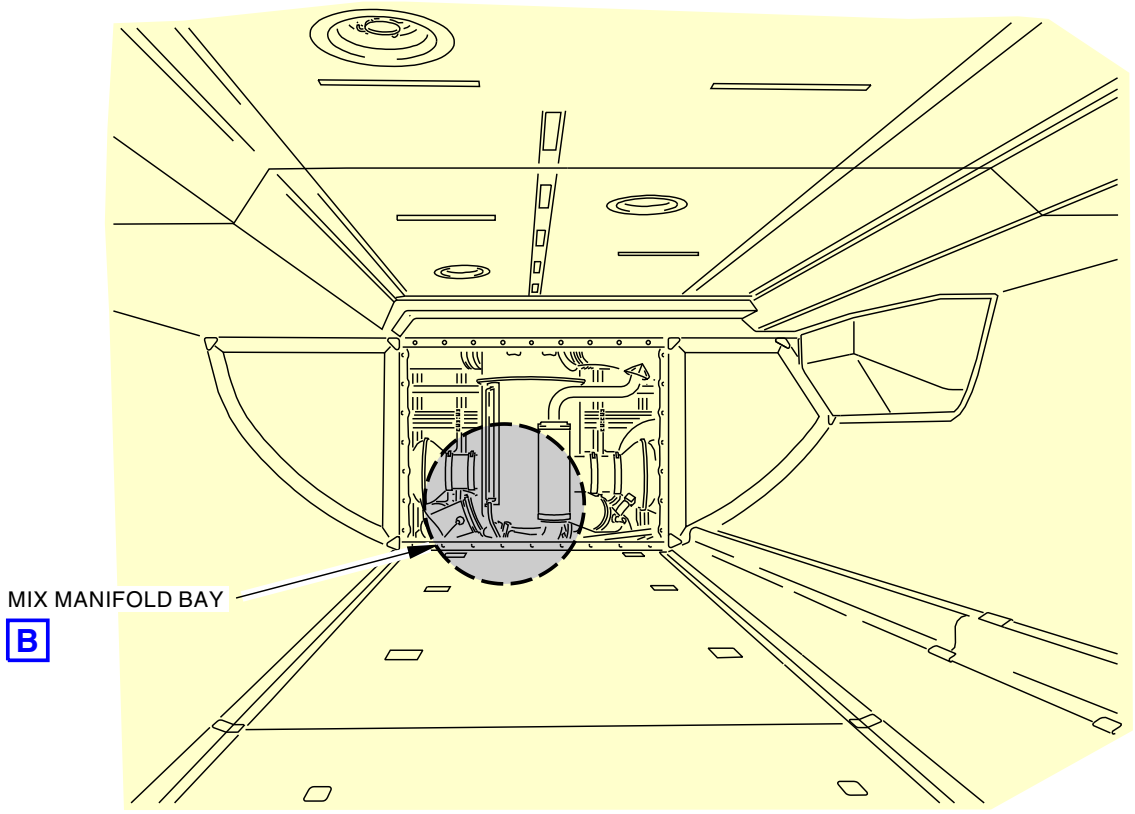

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**Trim Air Duct Pressure Seal Installation**
**Figure 401/21-61-12-990-801 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

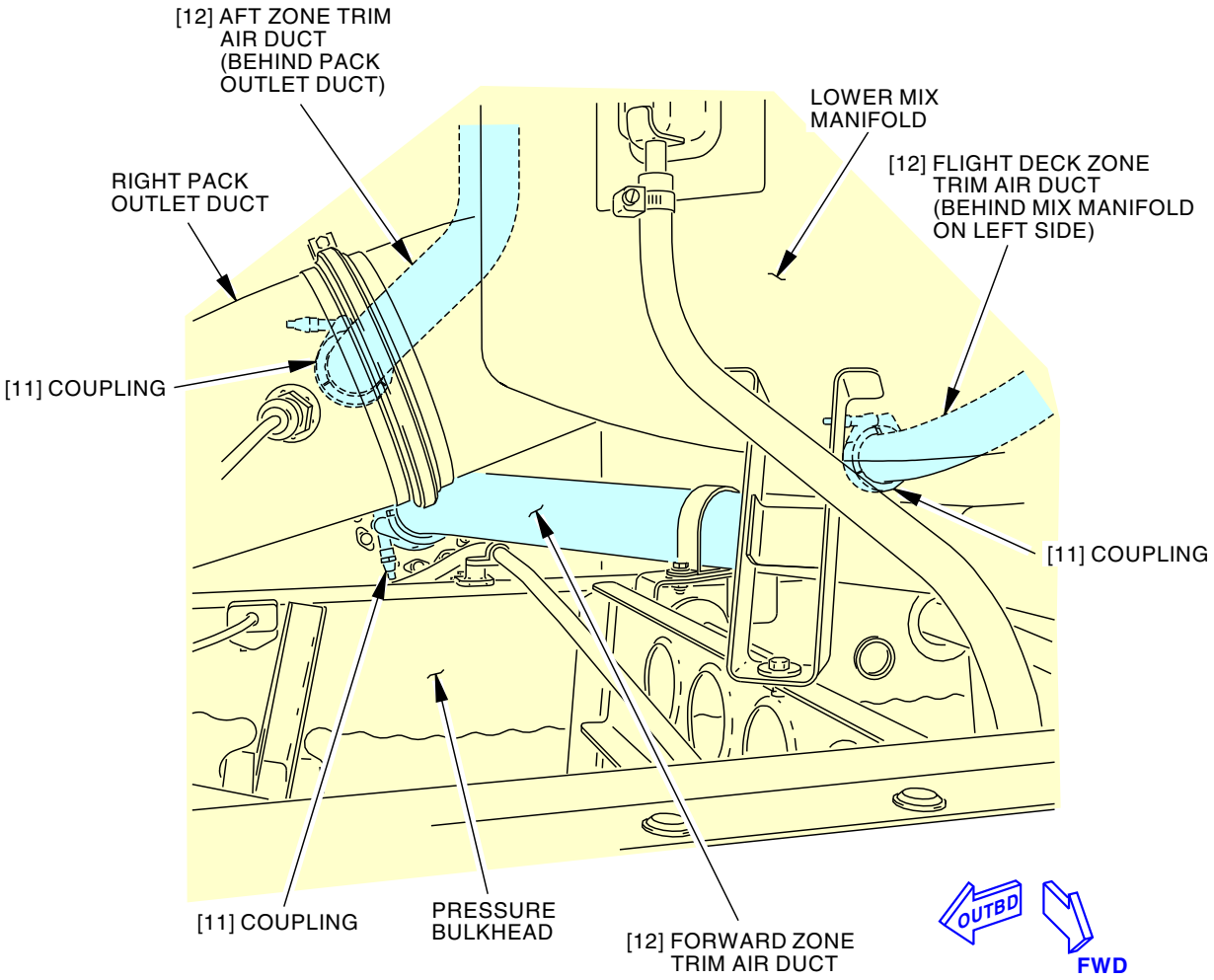



**Trim Air Duct Installation**
**Figure 402/21-61-12-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




2411528 S00061528104_V1

**Trim Air Duct Installation**
**Figure 402/21-61-12-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-12-400-801**

**3. Trim Air Duct Pressure Seal Installation**

(Figure 401, Figure 402)

**A. References**

| Reference | Title |
|---|---|
| 05-51-91-790-801 | Cabin Pressure Leak Test (P/B 201) |
| 21-00-00-800-803 | Supply Conditioned Air with a Cooling Pack (P/B 201) |
| 21-00-00-800-804 | Remove Conditioned Air Supplied by a Cooling Pack (P/B 201) |
| 21-61-21-400-801 | Zone Trim Air Modulating Valve Installation (P/B 401) |
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| 50-11-02-000-801 | Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401) |
| 50-11-02-400-801 | Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00083 | Solvent - VM&P Naphthas | TT-N-95 Type II, ASTM D-3735 Type III |
| D00010 | Compound - Thread Antiseize, High Temperature | MIL-PRF-907 |
| G00091 | Compound - Oxygen System Leak Detection - Snoop Leak Detector | MIL-PRF-25567 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 125 | Air Conditioning Distribution Bay - Left |
| 126 | Air Conditioning Distribution Bay - Right |
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 821 | Forward Cargo Door |

**E. Trim Air Duct Pressure Seal Installation**

**SUBTASK 21-61-12-630-001**

(1) Remove the covers from the duct openings and make sure there is no unwanted materials inside the duct.

**SUBTASK 21-61-12-420-002**

(2) If you removed the trim air duct [8] that penetrates through the pressure bulkhead, then do these steps to install it (Figure 401):

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |



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(b) Remove the aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

(c) Slide the trim air duct [8] through the pressure bulkhead hole.

(d) Support the trim air duct [8].

(e) Loosely install the coupling [11] in the mix manifold bay to connect the trim air duct [8] to trim air duct [12].

**SUBTASK 21-61-12-100-001**

(3) Use a clean wiper and solvent, B00083 to clean the pressure seal support [9] area on the trim air duct [8] that penetrates through the pressure bulkhead (Figure 401).

**SUBTASK 21-61-12-420-003**

(4) Slide the seal support [9] onto the trim air duct [8].

**SUBTASK 21-61-12-420-004**

(5) For installation of the trim air duct pressure seal [6], do these steps (Figure 401):

(a) Push the trim air duct pressure seal [6] to the mating surface of the pressure bulkhead.

(b) Apply compound, D00010 to the threads of the bolts [2].

(c) Install the two seal ring halvess [5] on the trim air duct pressure seal [6] with the 12 bolts [2] and washers [3].

NOTE: The 2 bolts at the 11 and 12 o'clock positions on the flight deck and aft zone pressure seals attach the duct overheat sensor to the pressure bulkhead. They are longer than the other bolts. The duct overheat sensor support bracket must be installed on top of the seal ring halves [5].

(d) Tighten the bolts [2] to 32.5 ±2.5 in-lb (3.7 ±0.3 N·m) in the sequence shown in Figure 401.

(e) Install the clamp [7] loosely on the trim air duct pressure seal [6].

(f) Do these steps to tighten the clamp [7]:

1) Turn the torque wrench to tighten the clamp [7]. Observe the torque needed to turn the nut on the clamp's T-bolt before the clamp becomes tight.

NOTE: The observed torque should be 2 to 15 inch-pounds (0.23-1.7 newton-meters). This torque is referred to as run-on torque.

2) Add the observed run-on torque to 20 ±2 in-lb (2.3 ±0.3 N·m). For example, if the run-on torque needed to turn the T-bolt nut was 10 in-lb (1 N·m), then the torque needed to tighten the clamp is 30 ±2 in-lb (3 ±1 N·m). This is the calculated torque needed to tighten the clamp.

3) Tighten the clamp [7] to the torque calculated in the previous step.

4) Wait a minimum of 2 hours, then retighten the clamp [7] to the torque calculated in the previous step.

**SUBTASK 21-61-12-420-005**

(6) Install the trim air modulating valve [1] (TASK 21-61-21-400-801).

**SUBTASK 21-61-12-420-006**

(7) Align the trim air duct [8] and trim air duct [12].

**SUBTASK 21-61-12-420-007**

(8) Tighten coupling [11] to 55 +5 / -0 in-lb (6 +1 / -0 N·m).



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## F. Trim Air Duct Leak Test

SUBTASK 21-61-12-860-004

(1) Do this step on the P5-17 Cabin Temperature Panel:

(a) Remove the DO-NOT-OPERATE tag from the TRIM AIR switch.

SUBTASK 21-61-12-860-005

(2) Do these steps on the P5-10 air conditioning panel:

(a) Remove the DO-NOT-OPERATE tags from the L and R PACK switches.

(b) Remove the DO-NOT-OPERATE tags from the BLEED 1 and 2 switches.

(c) Remove the DO-NOT-OPERATE tag from the BLEED APU switch.

SUBTASK 21-61-12-860-006

(3) Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

SUBTASK 21-61-12-860-007

(4) Do this task: Supply Conditioned Air with a Cooling Pack, TASK 21-00-00-800-803.

(a) Make sure the TRIM AIR switch is set to ON position.

SUBTASK 21-61-12-790-001

(5) Do a leak test:

(a) Apply a Snoop Leak Detector compound, G00091 to the trim air duct joint areas.

(b) Make sure there is no leakage at the trim air duct joint areas.

(c) If there is leakage, do these steps:

1) Do this task : Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

a) Make sure the TRIM AIR switch is set to OFF position.

2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

3) Loosen the couplings at the trim air duct joint areas.

4) Make sure the ducts are aligned at the joints.

5) Tighten the couplings to 55 +5 / -0 in-lb (6 +1 / -0 N·m).

6) Do the trim air leak test again.

## G. Cabin Pressure Leak Test

SUBTASK 21-61-12-790-002

(1) Do this task: Cabin Pressure Leak Test, TASK 05-51-91-790-801.

## H. Put the Airplane to its Usual Condition

SUBTASK 21-61-12-860-008

(1) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804

(a) Make sure the TRIM AIR switch is set to OFF position.

SUBTASK 21-61-12-860-009

(2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806

SUBTASK 21-61-12-410-001

(3) Install the aft bulkhead liner in the forward cargo compartment (TASK 50-11-02-400-801).



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SUBTASK 21-61-12-410-002

(4) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 821 | Forward Cargo Door |

——— END OF TASK ———



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## TEMPERATURE SENSOR ASSEMBLY DUCT/HOUSING - MAINTENANCE PRACTICES

### 1. General

A. This procedure has these tasks:

(1) Flight Compartment Temperature Sensor Assembly Housing Removal

(2) Flight Compartment Temperature Sensor Assembly Housing Installation

(3) Passenger Cabin Temperature Sensor Assembly Duct Removal

(4) Passenger Cabin Temperature Sensor Assembly Duct Installation

(5) Flight Compartment Temperature Sensor Assembly Housing Cleaning

(6) Passenger Cabin Temperature Sensor Assembly Duct Cleaning.

B. There is a temperature sensor assembly housing in the flight compartment temperature control zone.

C. There are two temperature sensor assembly ducts in the passenger cabin temperature control zone.

(1) In the forward passenger cabin temperature control zone.

(2) In the aft passenger cabin temperature control zone.

**TASK 21-61-14-000-801**

### 2. Flight Compartment Temperature Sensor Assembly Housing Removal

Figure 201

#### A. References

| Reference | Title |
|---|---|
| 25-11-21-000-803 | Flight Compartment Aft Ceiling Panel Removal (P/B 201) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

#### C. Prepare for the Removal

**SUBTASK 21-61-14-860-001**

(1) Do this step for the removal of the temperature sensor assembly housing:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

#### D. Temperature Sensor Assembly Housing Removal

**SUBTASK 21-61-14-010-001**

(1) Loosen the access panel on the aft ceiling lining in the flight compartment and let it hang on the straps.

NOTE: The access panel on the aft ceiling lining is held in position by hook and loop strips.

**SUBTASK 21-61-14-020-001**

(2) Disconnect the electrical connector [2] for the fan.

**SUBTASK 21-61-14-020-002**

(3) Disconnect the electrical connector [3] from the temperature sensor.



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SUBTASK 21-61-14-020-003

(4) Remove the aft ceiling panel [10] in the flight compartment. To remove the panel, do this task: Flight Compartment Aft Ceiling Panel Removal, TASK 25-11-21-000-803.

SUBTASK 21-61-14-020-004

(5) Remove the two screws [9] and the temperature sensor assembly housing [1] from the aft ceiling panel [10].

SUBTASK 21-61-14-020-005

(6) Remove the screws [11], washers [12], temperature sensor assembly [4] and the mounting plate [13] from the temperature sensor assembly housing [1].

SUBTASK 21-61-14-020-006

(7) Remove the screws [7], washers [6] and clamps [5] that attach the fan [8] to the temperature sensor assembly housing [1].

SUBTASK 21-61-14-010-002

(8) Move the fan [8] away from the opening in the temperature sensor assembly housing [1].

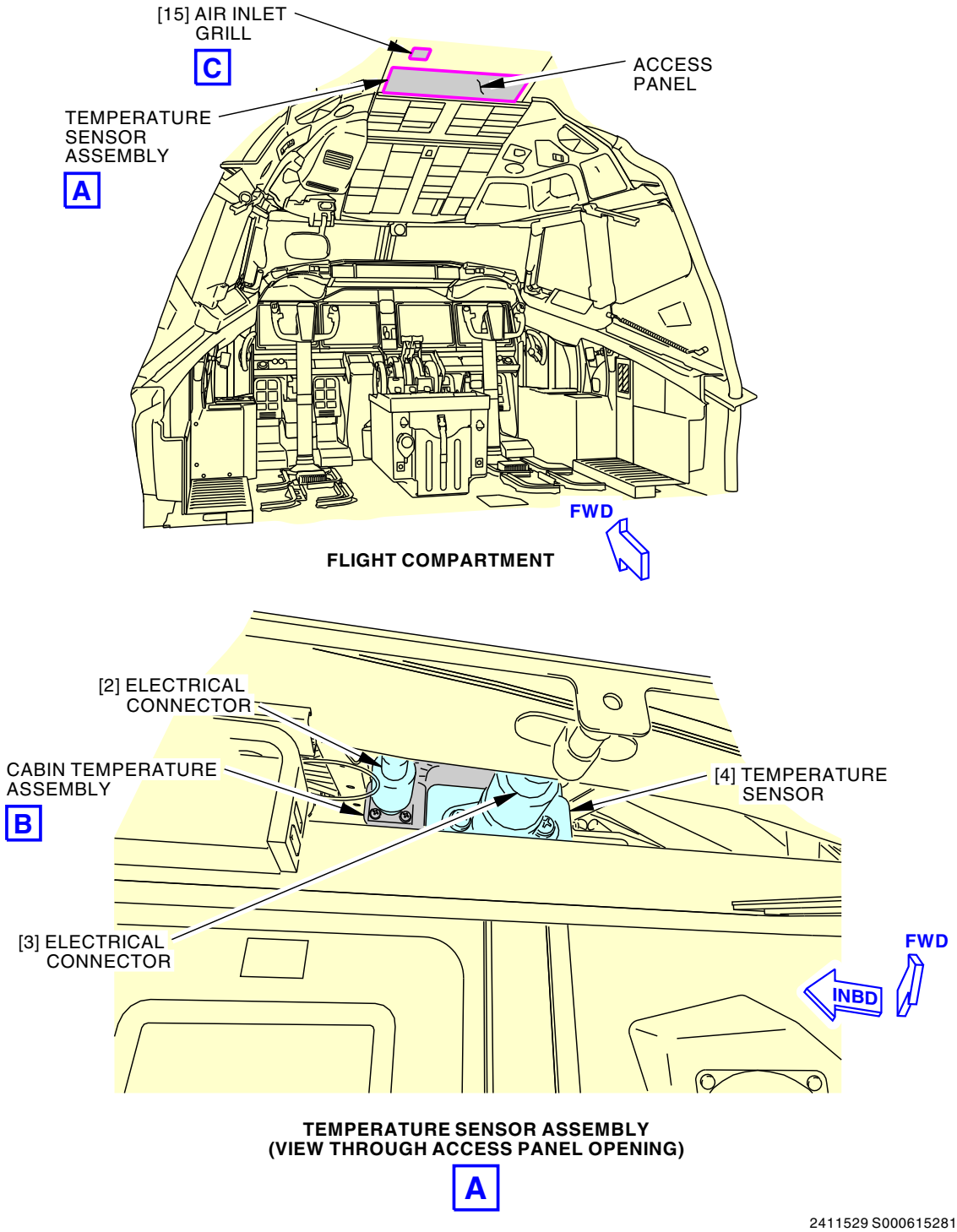
SUBTASK 21-61-14-000-001

(9) Remove the four screws [16] that attach the air inlet grill [15] and the temperature sensor assembly housing [1] to the aft ceiling panel [10].

**——— END OF TASK ———**



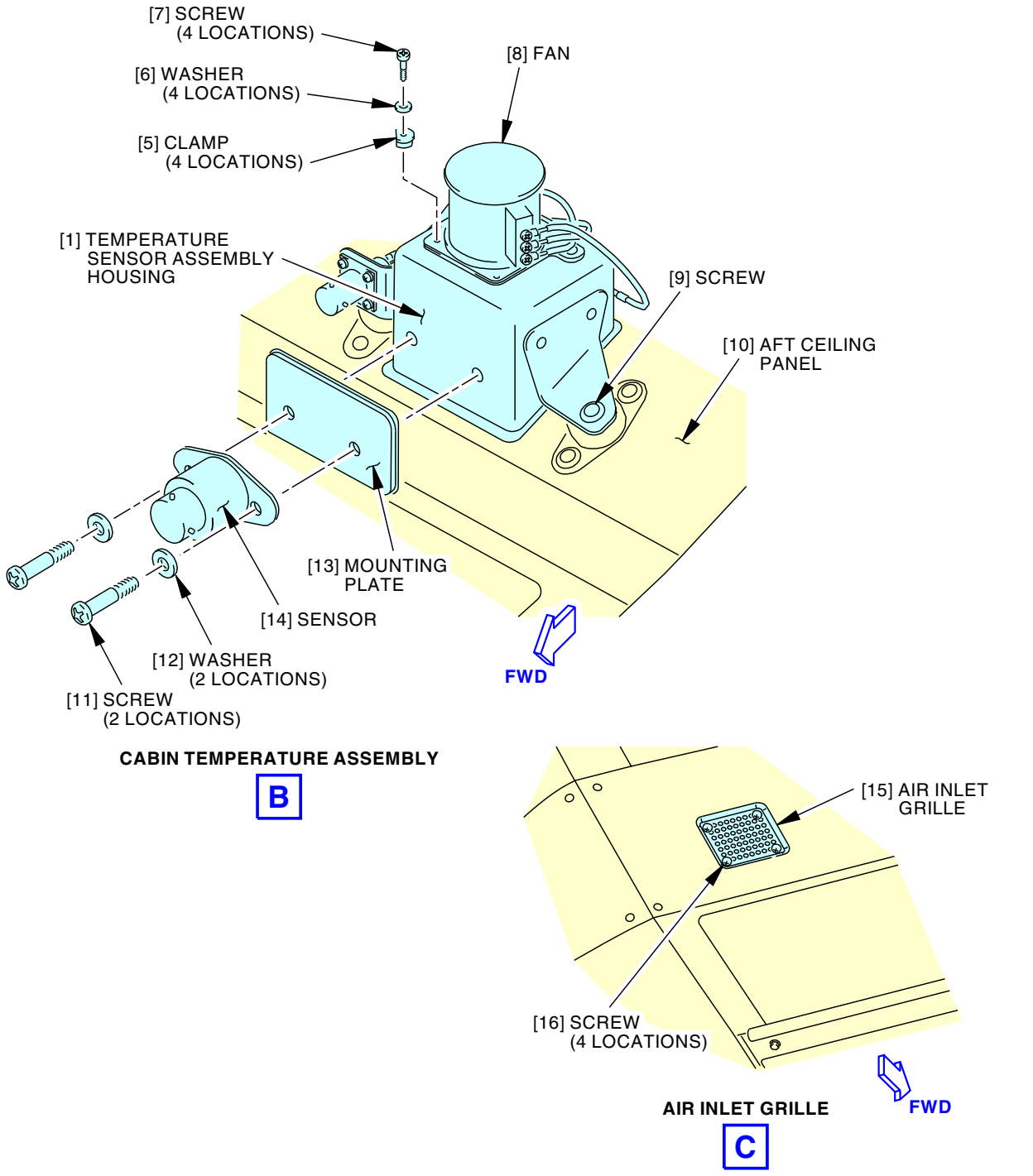
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Compartment Cabin Temperature Housing Installation**
**Figure 201/21-61-14-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Flight Compartment Cabin Temperature Housing Installation**
**Figure 201/21-61-14-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-14-400-801**

## 3. Flight Compartment Temperature Sensor Assembly Housing Installation

Figure 201

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-802 | Remove Electrical Power (P/B 201) |
| 25-11-21-400-803 | Flight Compartment Aft Ceiling Panel Installation (P/B 201) |
| 46-13-02-700-804 | Present Leg Faults Check (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### B. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

### C. Flight Compartment Temperature Sensor Assembly Housing Installation

**SUBTASK 21-61-14-420-001**

(1) Put the fan [8] in its position on the temperature sensor assembly housing [1].

(a) Install the four clamps [5], washers [6] and screws [7] to attach the fan [8] to the temperature sensor assembly housing [1].

**SUBTASK 21-61-14-420-002**

(2) Put the mounting plate [13] and the sensor [14] in their position on the temperature sensor assembly housing [1].

(a) Make sure that the foam gasket of the mounting plate assembly is not damaged.

(b) Install the two screws [11] and washers [12].

**SUBTASK 21-61-14-420-003**

(3) Install the temperature sensor assembly housing [1].

(a) Put the temperature sensor assembly housing [1] in its position on the aft ceiling panel [10].

(b) Install the two screws [9] to attach the temperature sensor assembly housing [1] to the aft ceiling panel [10].

**SUBTASK 21-61-14-420-017**

(4) Put the air inlet grill [15] in position on the aft ceiling panel [10].

(a) Install the four screws [16] to attach the air inlet grill [15] to the aft ceiling panel [10].

**SUBTASK 21-61-14-420-004**

(5) Install the aft ceiling panel [10] in the flight compartment. To install the panel, do this task: Flight Compartment Aft Ceiling Panel Installation, TASK 25-11-21-400-803.

**SUBTASK 21-61-14-420-005**

(6) Connect the electrical connector [3] to the sensor [14].

**SUBTASK 21-61-14-420-006**

(7) Connect the electrical connector [2] for the fan [8].

**SUBTASK 21-61-14-420-007**

(8) Install the access panel.

(a) Lift the panel to its position and push firmly to make sure that the hook and loop strips are fully engaged.



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**D. Flight Compartment Temperature Sensor Assembly Housing Installation Test**

SUBTASK 21-61-14-860-004

(1) Do this step for the installation of the fan:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-14-710-001

(2) Do this test of the fan operation:

(a) Hold a 3 inch by 4 inch sheet of lightweight paper over the air inlet grill [15]of the temperature sensor assembly housing [1].

1) Make sure that the fan holds the paper in its position.

2) Remove the paper.

SUBTASK 21-61-14-700-001

(3) Look for maintenance messages that are related to the cabin temperature sensor Present Leg Faults Check, TASK 46-13-02-700-804.

(a) Make sure that maintenance messages that are related to the temperature sensor are NOT ACTIVE.

(b) If a maintenance message is ACTIVE, then use the IFIM and do the applicable procedure(s) to repair the fault indicated by the maintenance message.

**E. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-61-14-860-005

(1) Remove electrical power from the airplane if it is not necessary. To remove electrical power, do this task: Remove Electrical Power, TASK 24-22-00-860-802.

**——— END OF TASK ———**

**TASK 21-61-14-000-802**

**4. Passenger Cabin Temperature Sensor Assembly Duct Removal**

(Figure 202)

**A. Location Zones**

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**B. Prepare for the Removal**

SUBTASK 21-61-14-860-002

(1) Do this step for the removal of the passenger cabin temperature assembly duct [61] for the forward passenger cabin zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |



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SUBTASK 21-61-14-860-003

(2) Do this step for the removal of the passenger cabin temperature assembly duct [61] for the aft passenger cabin zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

## C. Passenger Cabin Temperature Sensor Assembly Duct Removal

SUBTASK 21-61-14-010-004

(1) Lower the panel for the cabin temperature assembly duct [61].

(a) Put a small allen wrench or other applicable tool in the access holes to release the latches.

(b) Lower the panel and disconnect the lanyard.

(c) Move the panel to the fully lowered position.

SUBTASK 21-61-14-020-007

(2) Disconnect the electrical connector [30] for the fan [43].

SUBTASK 21-61-14-020-008

(3) Disconnect the electrical connector [33] for the temperature sensor [49].

SUBTASK 21-61-14-020-009

(4) Disconnect the electrical connector [32] for the temperature bulb [45].

SUBTASK 21-61-14-020-010

(5) Remove the nuts [64], washer [63], and screw [62].

SUBTASK 21-61-14-020-011

(6) Remove the three screws [39], washers [40], clamps [42], flange [41], and the fan [43] from the temperature assembly duct [61].

SUBTASK 21-61-14-020-012

(7) Remove the sensor [49] and the temperature bulb [45] from the temperature assembly duct [61]:

(a) Remove the lockwire [47].

(b) Remove the screw [46] and the washer [48].

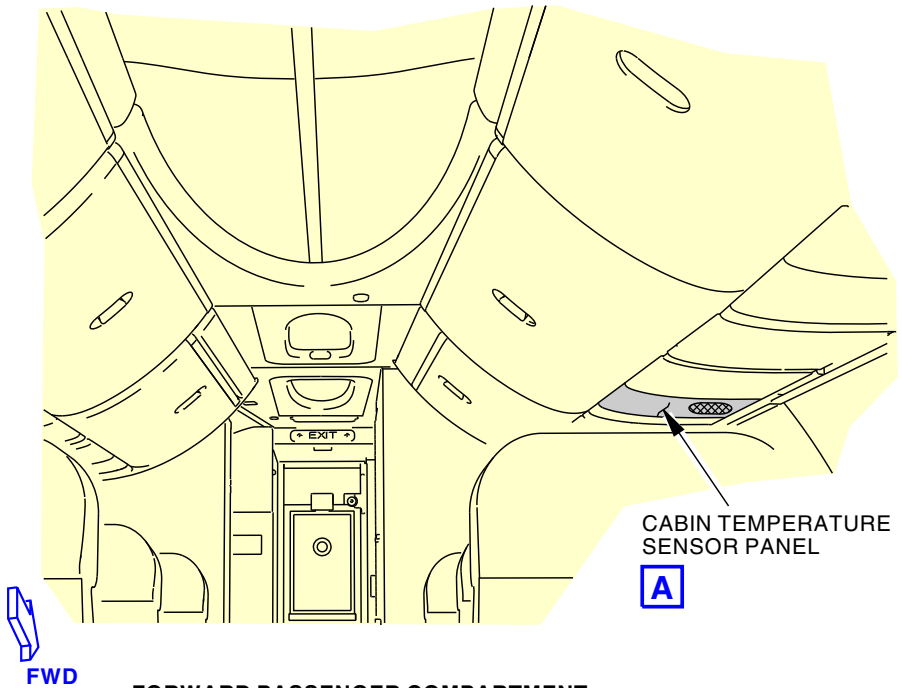
(c) Remove the sensor [49] and the gasket [50].

(d) Remove the temperature bulb [45] and the lockwire washer [44].

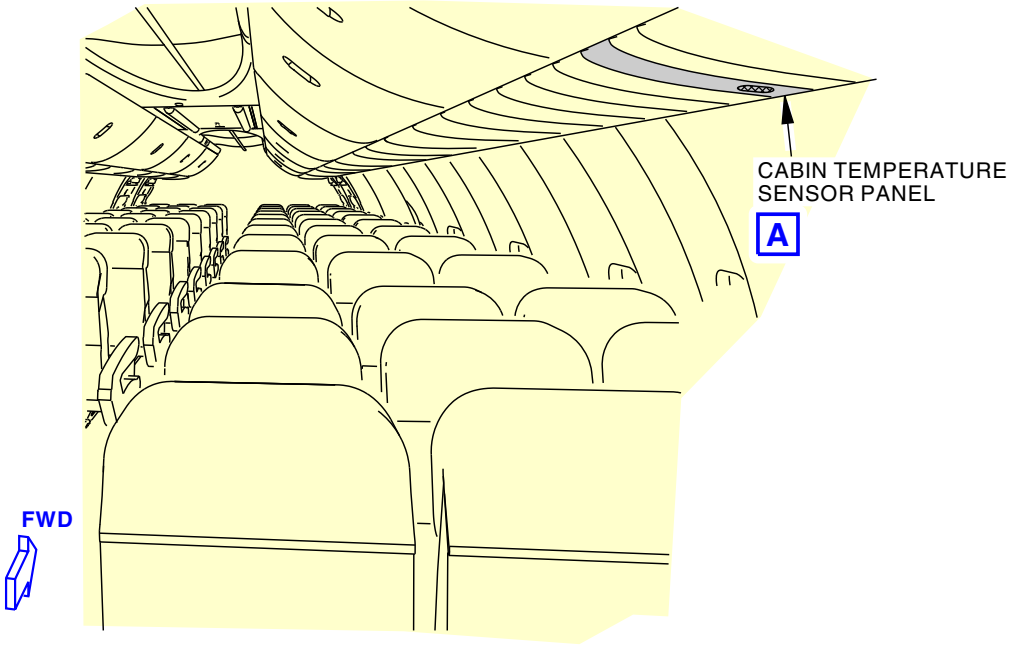
**——— END OF TASK ———**



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FORWARD PASSENGER COMPARTMENT



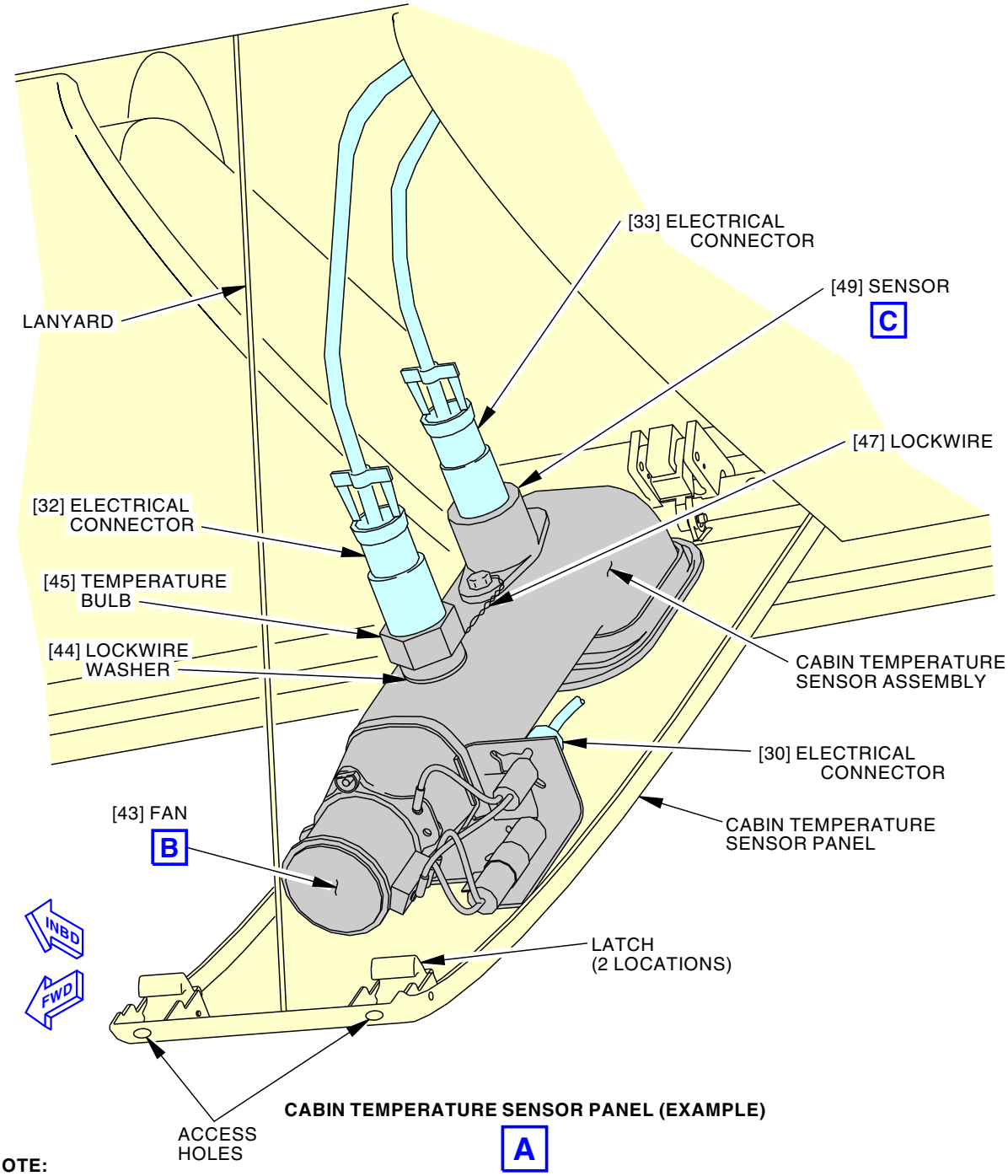

AFT PASSENGER COMPARTMENT

2411509 S00061528074_V1

**Passenger Compartment - Cabin Temperature Duct Installation**
**Figure 202/21-61-14-990-802 (Sheet 1 of 4)**



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**CABIN TEMPERATURE SENSOR PANEL (EXAMPLE)**

**NOTE:**

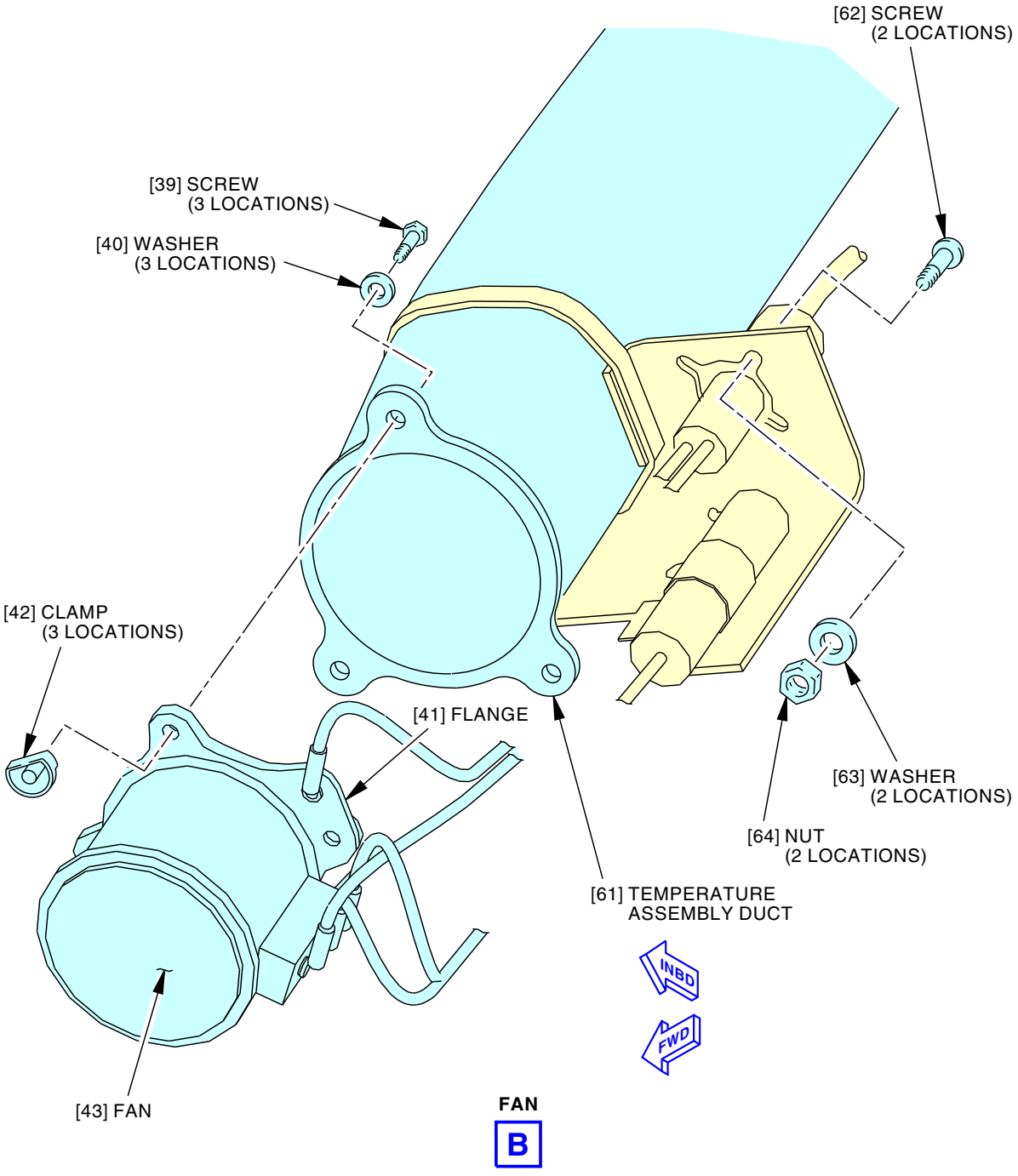
THE CABIN TEMPERATURE SENSOR PANEL IS SHOWN IN THE OPEN POSITION.

2411531 S00061528112_V2

**Passenger Compartment - Cabin Temperature Duct Installation**
**Figure 202/21-61-14-990-802 (Sheet 2 of 4)**



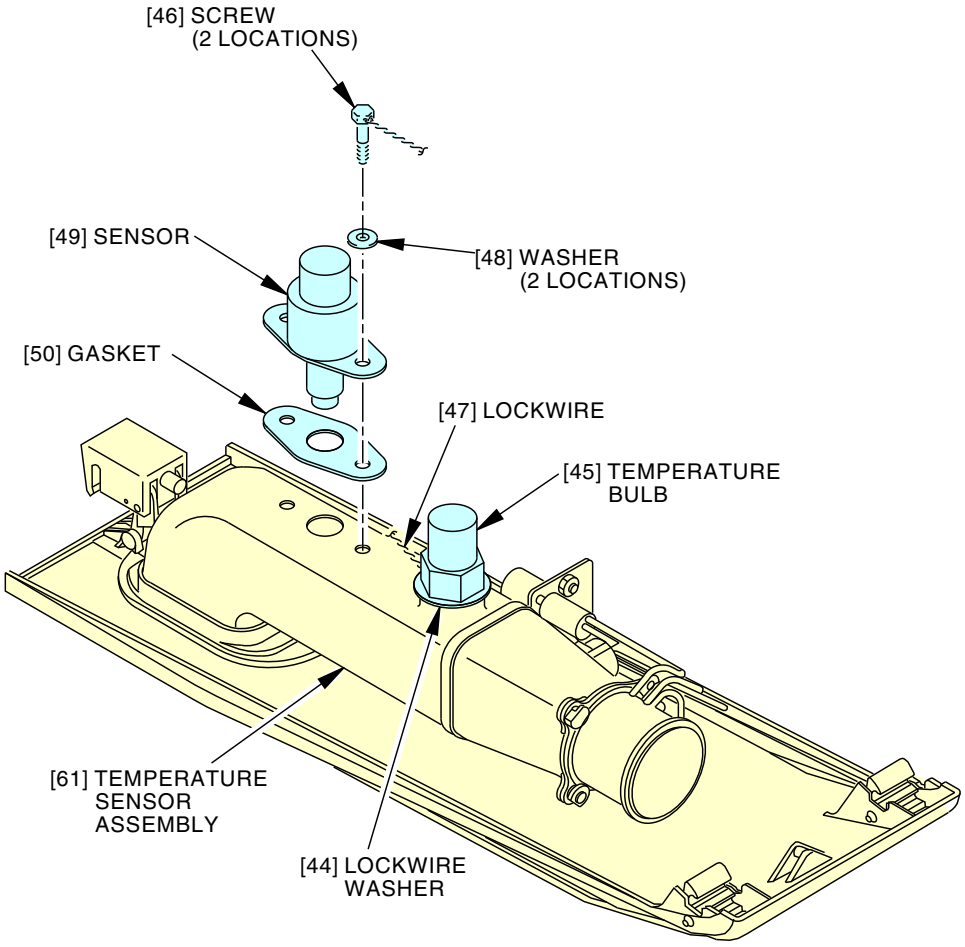
ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Passenger Compartment - Cabin Temperature Duct Installation**
**Figure 202/21-61-14-990-802 (Sheet 3 of 4)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**SENSOR**
**(EXAMPLE)**

C

2411533 S00061528114_V1

**Passenger Compartment - Cabin Temperature Duct Installation**
**Figure 202/21-61-14-990-802 (Sheet 4 of 4)**



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**TASK 21-61-14-400-802**

## 5. Passenger Cabin Temperature Sensor Assembly Duct Installation

Figure 202

### A. References

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |
| 46-13-02-700-804 | Present Leg Faults Check (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### B. Location Zones

| Zone | Area |
|---|---|
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

### C. Passenger Cabin Temperature Assembly Duct Installation

**SUBTASK 21-61-14-420-018**

(1) Do these steps to install the cabin temperature sensor fan [43]:

(a) Put the fan [43] and the flange [41] in their position with the other components of the temperature sensor assembly.

(b) Install the three clamps [42], washers [40] and screws [39] to attach the fan [43] to the temperature sensor assembly.

(c) Install the screws [62], washers [63], and nuts [64].

**SUBTASK 21-61-14-420-010**

(2) Put the gasket [50] and the sensor [49] in their position on the temperature assembly duct [61].

(a) Install the washers [48] and screws [46].

(b) Install the lockwire [47]. To install lockwire, do this task: Lockwire, Cotter Pins, and Lockrings - Installation, TASK 20-10-44-400-801.

**SUBTASK 21-61-14-420-009**

(3) To install the cabin temperature bulb [45], do these steps:

(a) Install the lockwire washer [44] and the temperature bulb [45] on the temperature sensor assembly.

(b) Install the lockwire [47]. To install lockwire, do this task: Lockwire, Cotter Pins, and Lockrings - Installation, TASK 20-10-44-400-801.

**SUBTASK 21-61-14-420-012**

(4) Connect the electrical connector [30] for the fan [43].

**SUBTASK 21-61-14-420-013**

(5) Connect the electrical connector [33] for the temperature sensor [49].

**SUBTASK 21-61-14-420-014**

(6) Connect the electrical connector [32] for the temperature bulb [45].

**SUBTASK 21-61-14-410-001**

(7) Partially lift the panel for the cabin temperature sensor and install the lanyard.

**SUBTASK 21-61-14-410-002**

(8) Lift the panel for the cabin temperature sensor to its closed position.



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**D. Passenger Cabin Temperature Sensor Assembly Duct Installation Test**

SUBTASK 21-61-14-860-006

(1) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-14-710-002

(2) Do this test of the fan operation:

(a) Hold a 3 inch by 4 inch sheet of lightweight paper over the air inlet grille of the temperature sensor assembly.

1) Make sure that the fan holds the paper in its position.

2) Remove the paper.

SUBTASK 21-61-14-700-002

(3) Look for maintenance messages that are related to the cabin temperature sensor Present Leg Faults Check, TASK 46-13-02-700-804.

(a) Make sure that maintenance messages that are related to the temperature sensor are NOT ACTIVE.

(b) If the maintenance message is ACTIVE, then use the IFIM and do the applicable procedure(s) to repair the fault indicated by the maintenance message.

SUBTASK 21-61-14-710-003

(4) Do this test of the cabin temperature bulb that was replaced:

(a) Use a thermometer and make a record of the ambient temperature in the passenger compartment.

(b) Put the AIR TEMP selector on the P5-17 temperature control panel to PASS CABIN.

(c) Make sure that the temperature record with the thermometer and the PASS CABIN TEMP gage indication are approximately the same.

**——— END OF TASK ———**

**TASK 21-61-14-100-801**

## 6. Flight Compartment Temperature Sensor Assembly Housing Cleaning

Figure 201

**A. References**

| Reference | Title |
|---|---|
| 21-61-10-100-801 | Cabin Temperature Sensor Cleaning (P/B 201) |

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00541 | Cleaner - General Purpose Household Detergent | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |



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**C. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

**D. Prepare for the Flight Compartment Temperature Sensor Assembly Housing Cleaning**

SUBTASK 21-61-14-020-013

(1) Remove the temperature sensor assembly housing [1] for the flight compartment. To remove the housing, do this task: Flight Compartment Temperature Sensor Assembly Housing Removal, TASK 21-61-14-000-801.

**E. Procedure**

SUBTASK 21-61-14-160-001

(1) Prepare a cleaning solution of warm water and general purpose household detergent cleaner, B00541.

(a) Follow the mixing instructions for the cleaner.

SUBTASK 21-61-14-160-002

(2) Clean the inner and external surfaces of the housing with a cotton wiper, G00034 that is moist with the cleaning solution.

SUBTASK 21-61-14-160-003

(3) If the cotton wiper, G00034 with the cleaning solution did not remove all dirt deposits or contamination, clean the housing with a cotton wiper, G00034 that is moist with alcohol, B00130.

SUBTASK 21-61-14-160-004

(4) Wipe the housing with a cotton wiper, G00034 that is moist with clean water until all of the cleaning solution or alcohol are removed.

SUBTASK 21-61-14-160-005

(5) Dry the housing with a dry, clean cotton wiper, G00034.

**F. Put the Airplane Back to Its Usual Condition**

SUBTASK 21-61-14-210-001

(1) Before the installation of the temperature sensor assembly housing [1], do these steps:

(a) Examine the sensor [14] for unwanted material.

(b) If unwanted material is found, clean the sensor: Cabin Temperature Sensor Cleaning, TASK 21-61-10-100-801.

SUBTASK 21-61-14-420-015

(2) Install the temperature sensor assembly housing [1], do this task: Passenger Cabin Temperature Sensor Assembly Duct Installation, TASK 21-61-14-400-802.

**——— END OF TASK ———**

**TASK 21-61-14-100-802**

## 7. Passenger Cabin Temperature Sensor Assembly Duct Cleaning

Figure 202

**A. References**

| Reference | Title |
|---|---|
| 21-61-10-100-801 | Cabin Temperature Sensor Cleaning (P/B 201) |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**B. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| B00541 | Cleaner - General Purpose Household Detergent | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

**C. Prepare for Cabin Temperature Assembly Duct Cleaning**

**SUBTASK 21-61-14-020-014**

(1) Remove the temperature sensor assembly duct. To remove the duct, do this task: Passenger Cabin Temperature Sensor Assembly Duct Removal, TASK 21-61-14-000-802.

**D. Procedure**

**SUBTASK 21-61-14-160-006**

(1) Prepare a cleaning solution of warm water and general purpose household detergent cleaner, B00541.

(a) Follow the mixing instructions for the cleaner.

**SUBTASK 21-61-14-160-007**

(2) Clean the inner and external surfaces of the duct with a cotton wiper, G00034 that is moist with the cleaning solution.

**SUBTASK 21-61-14-160-008**

(3) If the cotton wiper, G00034 with the cleaning solution did not remove all dirt deposits or contamination, clean the duct with a cotton wiper, G00034 that is moist with alcohol, B00130.

**SUBTASK 21-61-14-160-009**

(4) Wipe the duct with a cotton wiper, G00034 that is moist with clean water until all of the cleaning solution or alcohol are removed.

**SUBTASK 21-61-14-160-010**

(5) Dry the duct with a dry, clean cotton wiper, G00034.

**E. Put the Airplane Back to Its Usual Condition**

**SUBTASK 21-61-14-210-002**

(1) Before the installation of the temperature assembly duct in the passenger compartment, do the steps that follow:

(a) Examine the temperature sensor [49] for unwanted material.

(b) If unwanted material is found, clean the sensor [49]: Cabin Temperature Sensor Cleaning, TASK 21-61-10-100-801.

**SUBTASK 21-61-14-420-016**

(2) Install the cabin temperature assembly duct for the passenger compartment, do this task: Passenger Cabin Temperature Sensor Assembly Duct Installation, TASK 21-61-14-400-802.

**——— END OF TASK ———**



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## TEMPERATURE CONTROL MODULE - REMOVAL/INSTALLATION

### 1. General

A. The temperature control module is located on the upper right corner of the P5 forward overhead panel in the flight deck.

B. This procedure has these tasks:

(1) A removal of the temperature control module.

(2) An installation of the temperature control module.

**TASK 21-61-15-000-801**

### 2. Temperature Control Module Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**B. Temperature Control Module Removal**

SUBTASK 21-61-15-860-001

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 9 | C00329 | OVERHEAD 5V SECONDARY |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

SUBTASK 21-61-15-010-001

(2) Get access to the electrical connectors on the back of the P5-17 temperature control module [1] on the P5 forward overhead panel.

(a) Loosen the 1/4-turn fasteners that hold the P5 forward overhead panel in position and let the panel turn downward.

SUBTASK 21-61-15-020-001

(3) Remove the temperature control module [1] from the P5 forward overhead panel:

(a) Disconnect the electrical connectors at the back of the temperature control module [1].

**WARNING** HOLD THE TEMPERATURE CONTROL MODULE WHEN YOU LOOSEN THE 1/4-TURN FASTENERS. IF THE MODULE FALLS, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

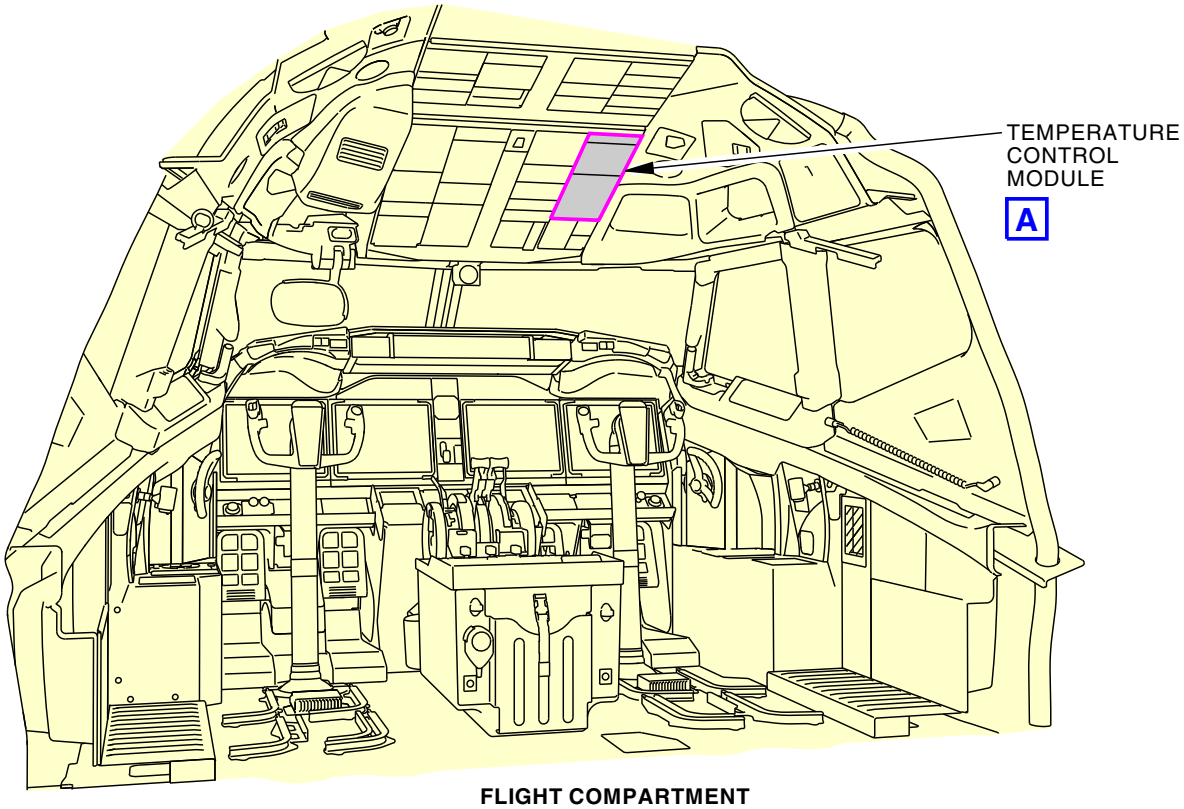
(b) Hold the temperature control module [1] in position and loosen the 1/4-turn fasteners that hold the temperature control module [1] to the P5 forward overhead panel.

(c) Remove the temperature control module [1].

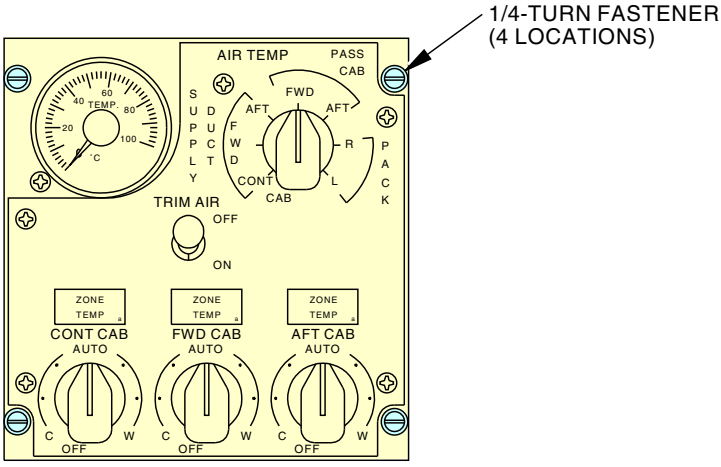
**END OF TASK**



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**FLIGHT COMPARTMENT**




**[1] TEMPERATURE CONTROL MODULE (TYPICAL)**

A

2411534 S00061528122_V2

**Temperature Control Module Installation**
**Figure 401/21-61-15-990-801**



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**TASK 21-61-15-400-801**

**3. Temperature Control Module Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-61-00-700-801 | Cabin Temperature Control and Indication - Operational Test (P/B 501) |
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Temperature Control Module Installation**

**SUBTASK 21-61-15-010-002**

(1) If necessary, lower the P5 forward overhead panel.

**SUBTASK 21-61-15-420-001**

(2) Install the P5-17 temperature control module [1] into the P5 forward overhead panel as follows:

(a) Put the temperature control module [1] into the P5 forward overhead panel and hold it in position.

(b) Turn the 1/4-turn fasteners on the temperature control module [1] to hold the module to the P5 forward overhead panel.

(c) Connect the two electrical connectors to the module.

**SUBTASK 21-61-15-010-003**

(3) Lift the P5 forward overhead panel to the closed position and turn the 1/4-turn fasteners.

**SUBTASK 21-61-15-860-002**

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 9 | C00329 | OVERHEAD 5V SECONDARY |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

**E. Temperature Control Module Test**

**SUBTASK 21-61-15-860-003**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.



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SUBTASK 21-61-15-860-004

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| F | 1 | C01273 | PRESSURIZATION CONTROL LCD LTG |
| F | 6 | C01269 | PRESSURIZATION CONTROL MANUAL |

SUBTASK 21-61-15-710-001

(3) Do this test of the temperature control module:

(a) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

(b) Do this task: Cabin Temperature Control and Indication - Operational Test, TASK 21-61-00-700-801.

## F. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-15-410-001

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**



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## ZONE TRIM AIR MODULATING VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the zone trim air modulating valve.

(2) An installation of the zone trim air modulating valve.

(3) There are three zone trim air modulating valves. Two of the zone trim air modulating valves are installed in the right air conditioning bay. One zone trim air modulating valve is installed in the left air conditioning bay.

**TASK 21-61-21-000-801**

### 2. Zone Trim Air Modulating Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

SUBTASK 21-61-21-860-001

(1) Make sure that the pneumatic power is off (TASK 36-00-00-860-806).

SUBTASK 21-61-21-860-002

(2) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach the DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach the DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position and attach the DO NOT OPERATE tag, STD-858.

(d) Set the L and R RECIRC FAN switches to the OFF position and attach the DO NOT OPERATE tags, STD-858.



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SUBTASK 21-61-21-860-003

(3) Do these steps on the P5-17 cabin temperature panel (located on the P5 forward overhead panel):

(a) Set the TRIM AIR switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

(b) Set the applicable cabin temperature selector (CONT CAB, FWD CAB, or AFT CAB) to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-61-21-860-004

(4) Do this step to remove the trim air modulating valve [1] for the control cabin:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-21-860-005

(5) Do this step to remove the trim air modulating valve [1] for the forward cabin:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-21-860-006

(6) Do this step to remove the trim air modulating valve [1] for the aft cabin:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

SUBTASK 21-61-21-010-001

(7) To get access to the control compartment trim air modulating valve [1], do this step:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-61-21-010-002

(8) To get access to the aft and forward passenger compartment trim air modulating valves [1], do these steps in this sequence:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Zone Trim Air Modulating Valve Removal

SUBTASK 21-61-21-020-001

(1) Disconnect the electrical connector [6] from the trim air modulating valve [1].



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SUBTASK 21-61-21-020-002

(2) Do these steps to remove the bonding jumper [2]:

(a) Remove the screw [3], washers [4], and nut [5] that hold the bonding jumper [2] to the trim air modulating valve [1].

(b) Move the bonding jumper [2] away from the valve.

SUBTASK 21-61-21-020-003

**WARNING**

DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

(3) Do these steps to remove the trim air modulating valve [1]:

(a) Loosen the clamps [7].

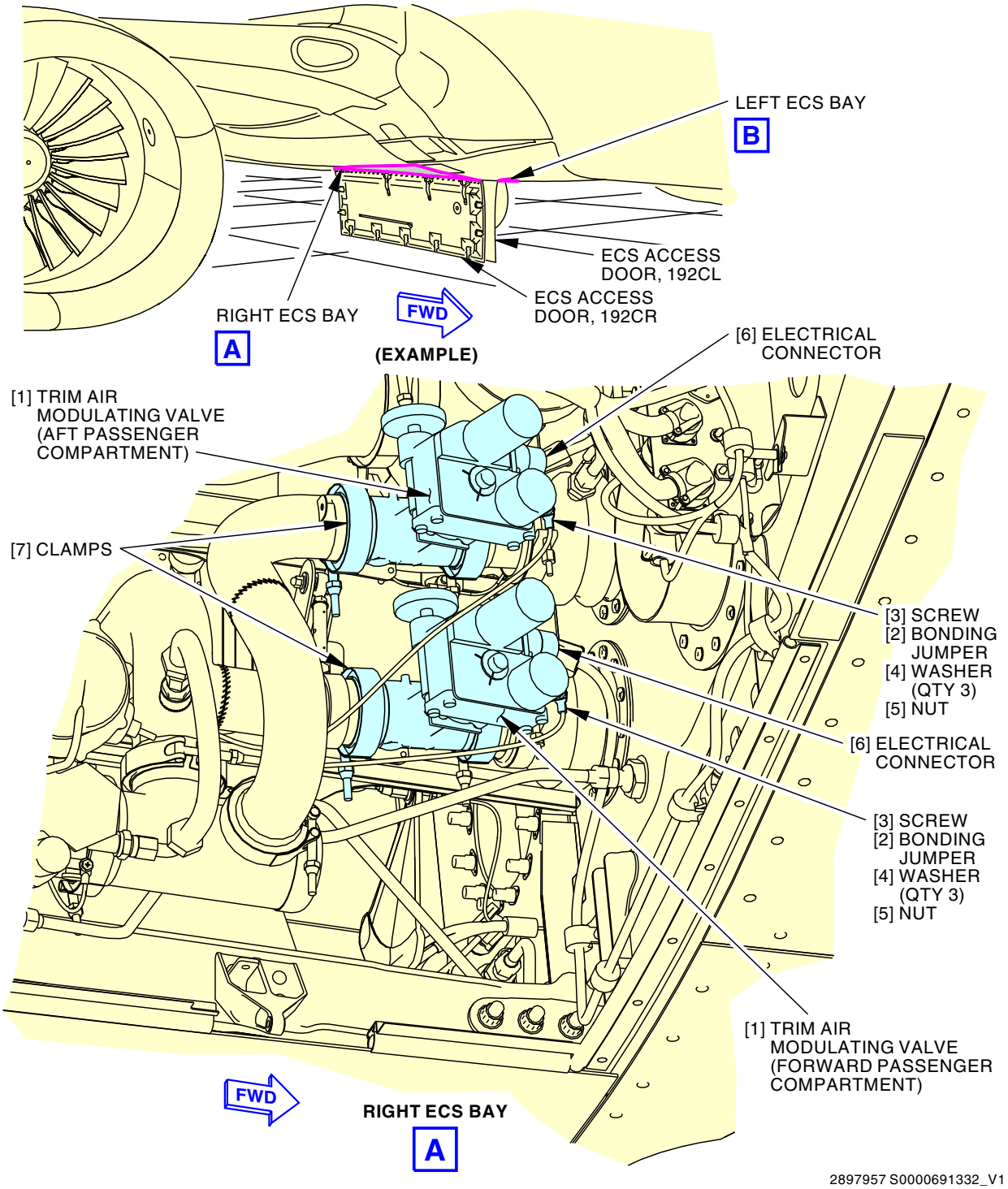
(b) Move the clamp [7] to the adjacent ducts.

(c) Remove the trim air modulating valve [1] from the ECS bay.

**END OF TASK**



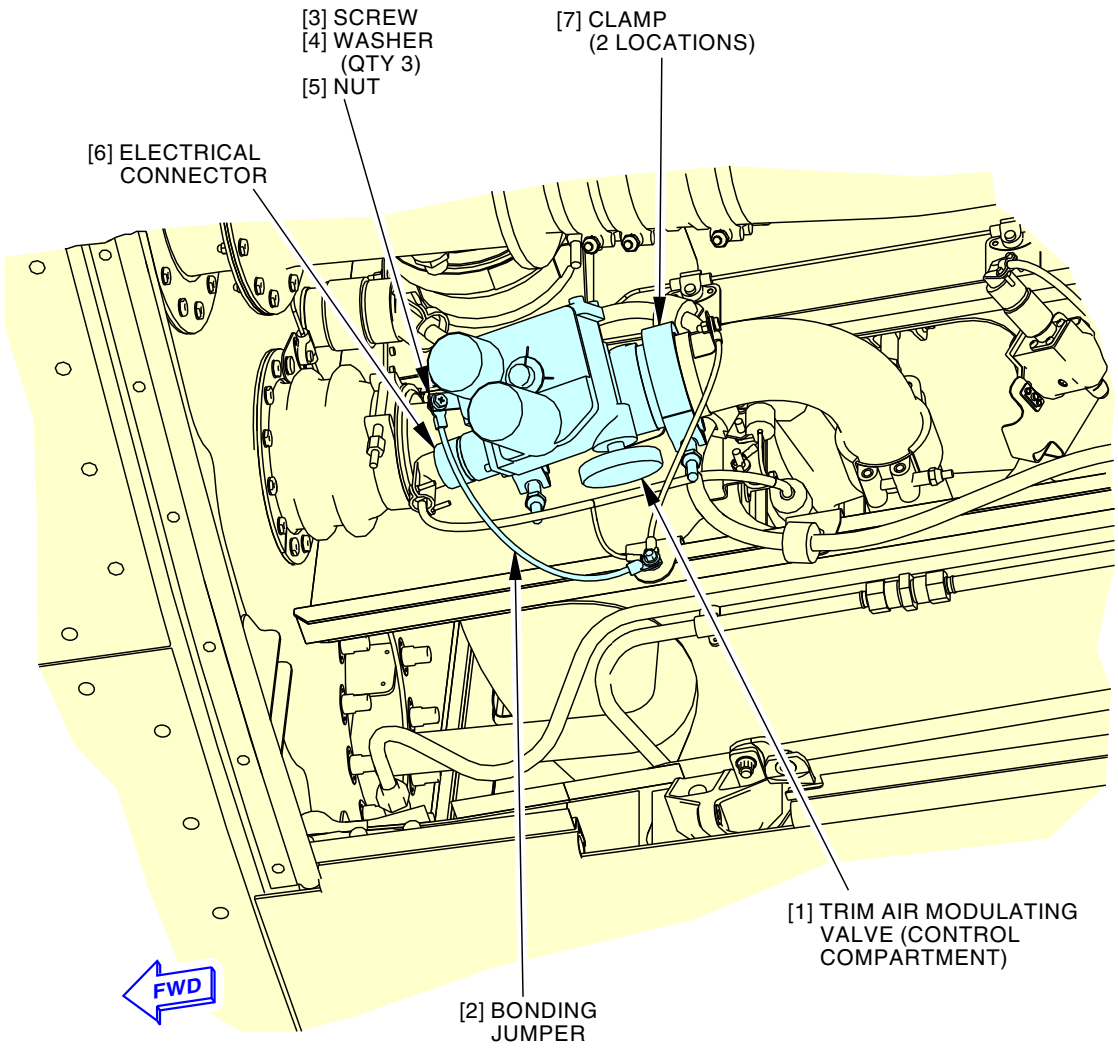
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**Zone Trim Air Modulating Valve Installation**
**Figure 401/21-61-21-990-801 (Sheet 1 of 2)**



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**Zone Trim Air Modulating Valve Installation**
**Figure 401/21-61-21-990-801 (Sheet 2 of 2)**



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**TASK 21-61-21-400-801**

## 3. Zone Trim Air Modulating Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |

### C. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### E. Zone Trim Air Modulating Valve Installation

**SUBTASK 21-61-21-420-001**

(1) Do these steps to install the trim air modulating valve [1]:

(a) Put the trim air modulating valve [1] in its position between the ducts.

1) Make sure that the flow arrow on the trim air modulating valve [1] points in the forward direction.

(b) Make sure that there is a minimum of 0.15 in. (3.81 mm) between the trim air modulating valve [1] and access door structure, tubes, and clamps.

(c) Move the clamps [7] to the duct connections.

(d) Tighten the clamps [7] to 55 +5 / -0 in-lb (6.2 +0.6 / -0.0 N·m).

**SUBTASK 21-61-21-420-002**

(2) Do these steps to install the bonding jumper [2]:

(a) Put the bonding jumper [2] in its position on the trim air modulating valve [1].



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(b) Install the screw [3], washer [4], and nut [5] that hold the bonding jumper [2] to the trim air modulating valve [1].

(c) Use a intrinsically safe approved bonding meter, COM-1550, to measure the bonding resistance between the trim air modulating valve [1] and bonding jumper [2] (SWPM 20-20-00).

1) Make sure that the bonding resistance is 0.0025 ohm (2.5 milliohms) or less.

SUBTASK 21-61-21-020-004

(3) Connect the electrical connector [6] to the trim air modulating valve [1].

## F. Zone Trim Air Modulating Valve Installation Test

SUBTASK 21-61-21-860-007

(1) If the trim air modulating valve [1] for the control cabin was replaced, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 3 | C01163 | A/C ZONE TEMP VALVE/FAN CONT FLT DECK |

SUBTASK 21-61-21-710-001

(2) Do the ground test for the right air conditioning system (TASK 21-00-00-730-801).

SUBTASK 21-61-21-860-008

(3) If the trim air modulating valve [1] for the forward cabin was replaced, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-21-710-002

(4) Do the ground test for the right air conditioning system (TASK 21-00-00-730-801).

SUBTASK 21-61-21-860-009

(5) If the trim air modulating valve [1] for the aft cabin was replaced, do this step:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

SUBTASK 21-61-21-710-003

(6) Do the ground test for the left air conditioning system (TASK 21-00-00-730-801).

SUBTASK 21-61-21-860-010

(7) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-61-21-860-011

(8) Do these steps on the P5-10 air conditioning panel:

(a) Set the L and R PACK switches to the AUTO position and remove the DO NOT OPERATE tags.

(b) Set the BLEED 1 and 2 switches to the ON position and remove the DO NOT OPERATE tags.

(c) Set the BLEED APU switch to the ON position and remove the DO NOT OPERATE tag.



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(d) Set the L and R RECIRC FAN switches to the AUTO position and remove the DO NOT OPERATE tags.

SUBTASK 21-61-21-860-012

(9) Do these steps on the P5-17 cabin temperature panel:

(a) Set the TRIM AIR switch to the ON position and remove the DO NOT OPERATE tag.

(b) Set the applicable cabin temperature selector (CONT CAB, FWD CAB, or AFT CAB) to the AUTO position and remove the DO NOT OPERATE tag.

SUBTASK 21-61-21-860-015

(10) Make sure that the trim air modulating valve [1] is open:

(a) If necessary, turn the applicable P5 temperature selector to a warmer position.

NOTE: It is necessary for the trim air modulating valve [1] to be in the open position when you do the soap bubble test.

SUBTASK 21-61-21-790-001

(11) Do a soap bubble test of the duct joints at the trim valve.

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. HOT DUCTS CAN CAUSE INJURIES TO PERSONNEL.

2) Loosen the clamps.

3) Make sure that the ducts are aligned at the joints.

4) Tighten the clamps.

5) Put the L PACK and R PACK switches to the AUTO position.

6) Make sure that the leak has been repaired.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-21-860-014

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-61-21-010-003

(2) If the trim air modulating valve [1] was replaced for the left pack, do this step:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-61-21-010-004

(3) If the trim air modulating valve [1] was replaced for the right pack, do these steps in this sequence:

(a) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |



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(b) Close this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

END OF TASK



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## INTEGRATED AIR SYSTEMS CONTROLLER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the integrated air systems controller.

(2) An installation of the integrated air systems controller.

**TASK 21-61-22-000-801**

### 2. Integrated Air Systems Controller (IASC) Removal

(Figure 401)

#### A. References

| Reference | Title |
|---|---|
| 20-10-07-000-801 | E/E Box Removal (P/B 401) |

#### B. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

#### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### D. Prepare for Removal

**SUBTASK 21-61-22-040-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 6 | C04035 | AIR COND BLEED AIR CONTROL PRIMARY LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 6 | C04036 | AIR COND BLEED AIR CONTROL PRIMARY RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| D | 5 | C04037 | AIR COND BLEED AIR CONTROL BACKUP LEFT |
| D | 6 | C04038 | AIR COND BLEED AIR CONTROL BACKUP RIGHT |

**SUBTASK 21-61-22-860-003**

(2) Open this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Integrated Air Systems Controller Removal

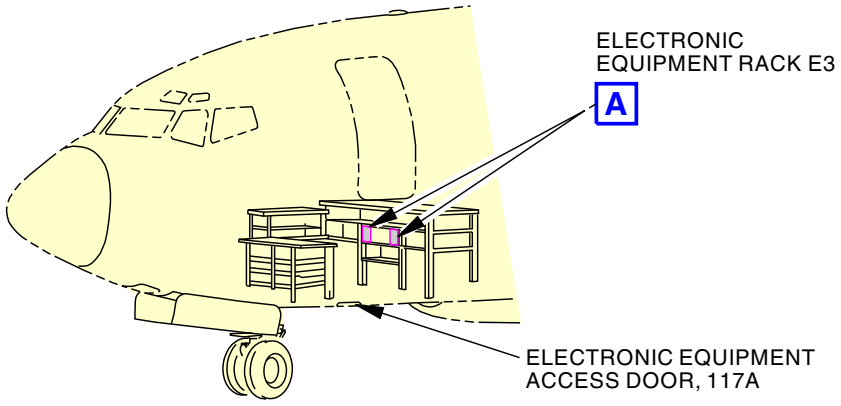
**SUBTASK 21-61-22-000-001**

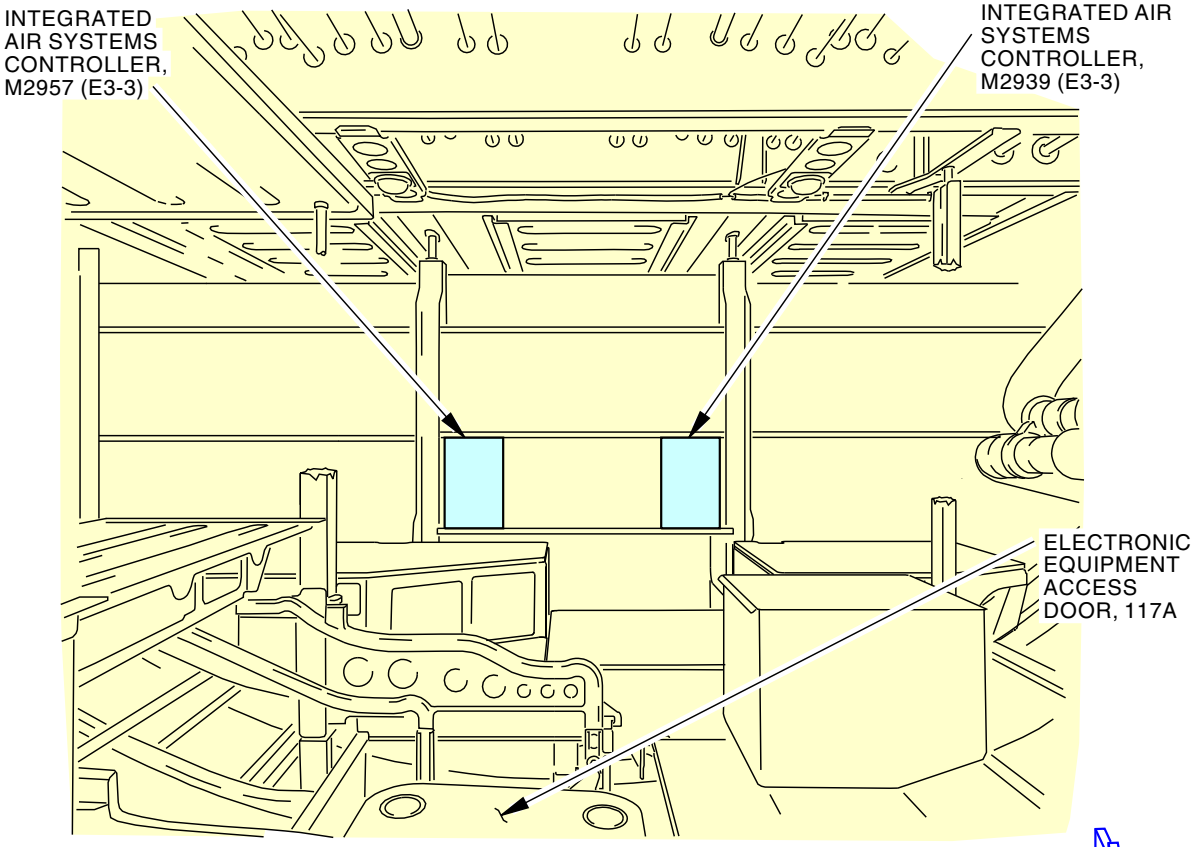
(1) Remove the integrated air systems controller [1] (TASK 20-10-07-000-801).

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Integrated Air Systems Controller Installation**
**Figure 401/21-61-22-990-801**



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**TASK 21-61-22-400-801**

**3. Integrated Air Systems Controller (IASC) Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-07-400-801 | E/E Box Installation (P/B 401) |
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 36-00-00-710-801 | Electrical LRU - Replacement Test (P/B 501) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |
| 221 | Passenger Compartment - Aft of Control Compartment to Forward Entry Door - Left |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**D. Integrated Air Systems Controller Installation**

**SUBTASK 21-61-22-860-004**

(1) Install the integrated air systems controller [1] (TASK 20-10-07-400-801).

**SUBTASK 21-61-22-860-009**

(2) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 6 | C04035 | AIR COND BLEED AIR CONTROL PRIMARY LEFT |
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |
| B | 6 | C04036 | AIR COND BLEED AIR CONTROL PRIMARY RIGHT |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |
| D | 5 | C04037 | AIR COND BLEED AIR CONTROL BACKUP LEFT |
| D | 6 | C04038 | AIR COND BLEED AIR CONTROL BACKUP RIGHT |

**E. Integrated Air Systems Controller Installation Test**

**SUBTASK 21-61-22-730-001**

(1) Do the applicable ground test in this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

**SUBTASK 21-61-22-710-001**

(2) Do both of these ground tests in this task: Electrical LRU - Replacement Test, TASK 36-00-00-710-801.

(a) 36 Pneumatics, LRU Replacement Test, Electrical LRU - Left.

(b) 36 Pneumatics, LRU Replacement Test, Electrical LRU - Right.



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## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-22-710-002**

(1) Close this access door:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-61-22-860-008**

(2) If all maintenance on the airplane is completed, set the GND TEST switch on the P61–4 panel to the NORM position.

**——— END OF TASK ———**



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## INLET PRESSURE SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the inlet pressure sensor.

(2) An installation of the inlet pressure sensor.

**TASK 21-61-23-000-801**

### 2. Inlet Pressure Sensor Removal

(Figure 401)

#### A. General

(1) This task includes the steps to remove the left and right pack inlet pressure sensors [5].

(2) The pack inlet pressure sensor [5] (PIPS) are installed on the center wing section of the wing front spar in the keel beam area.

#### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 129 | Keel Beam (Part) - Section 43 |
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-61-23-040-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806

**SUBTASK 21-61-23-040-002**

(2) Put the L PACK and R PACK switches on the P5-10 air conditioning panel in the OFF positions.

**SUBTASK 21-61-23-010-001**

(3) To remove the left pack inlet pressure sensor [5], open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |



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SUBTASK 21-61-23-040-003

(4) To remove the right pack inlet pressure sensor [5], open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |

SUBTASK 21-61-23-010-002

(5) To get access to the right pack inlet pressure sensor [5], open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-61-23-010-003

(6) To get access to the left pack inlet pressure sensor [5], open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

## F. Pack Inlet Pressure Sensor Removal

SUBTASK 21-61-23-020-001

**CAUTION** THIS EQUIPMENT IS SUSCEPTIBLE TO DAMAGE BY ELECTRICAL DISCHARGE. PROTECTIVE CAPS MUST STAY ON THE ELECTRICAL CONNECTION ENDS OF THE SENSOR UNTIL FINAL INSTALLATION.

(1) Disconnect the electrical connector [4] from the inlet pressure sensor [5].

(a) Install a protective cap on the electrical connector [4].

SUBTASK 21-61-23-020-002

(2) Disconnect the pressure sense line [6] from the inlet pressure sensor [5].

(a) Use a second wrench to hold the inlet pressure sensor [5] when you disconnect the pressure sense line [6].

SUBTASK 21-61-23-000-001

(3) Remove the screws [1] and washers [2] that secure the clamp [3] that attach the inlet pressure sensor [5] to the bracket on the front spar.

SUBTASK 21-61-23-000-002

(4) Remove the inlet pressure sensor [5].

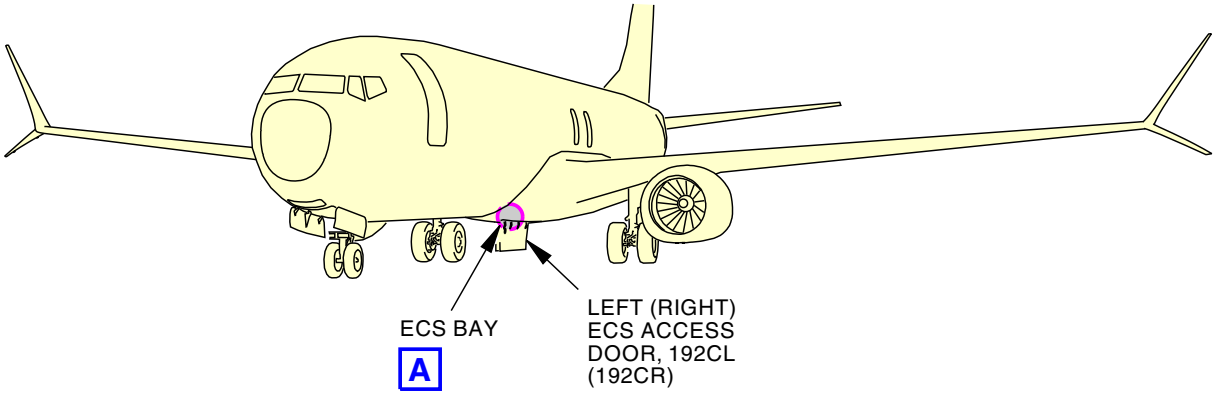
SUBTASK 21-61-23-420-001

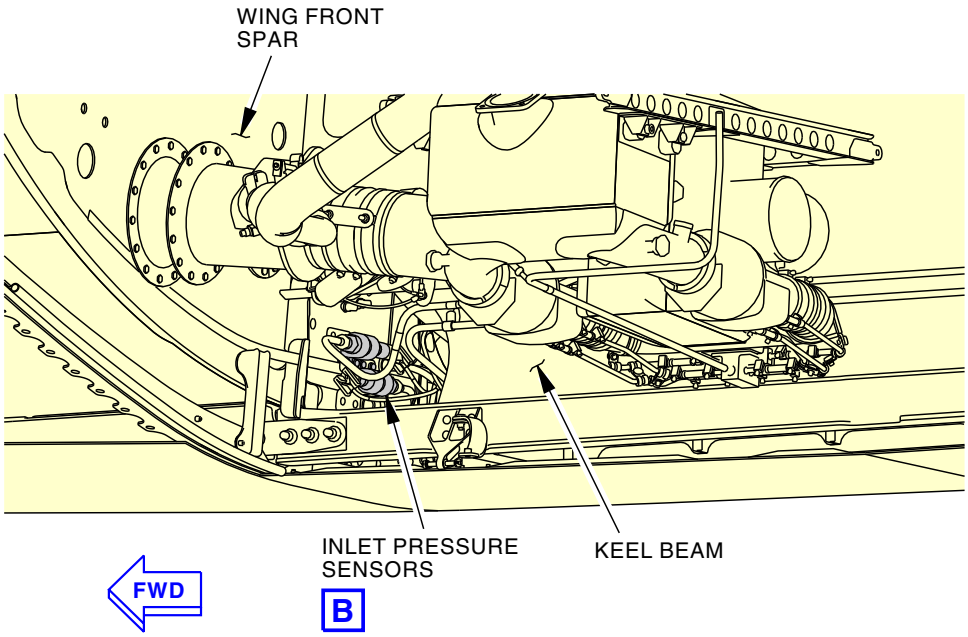
(5) Put a protective cap on the pressure sense line [6] to keep out unwanted material.

**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details



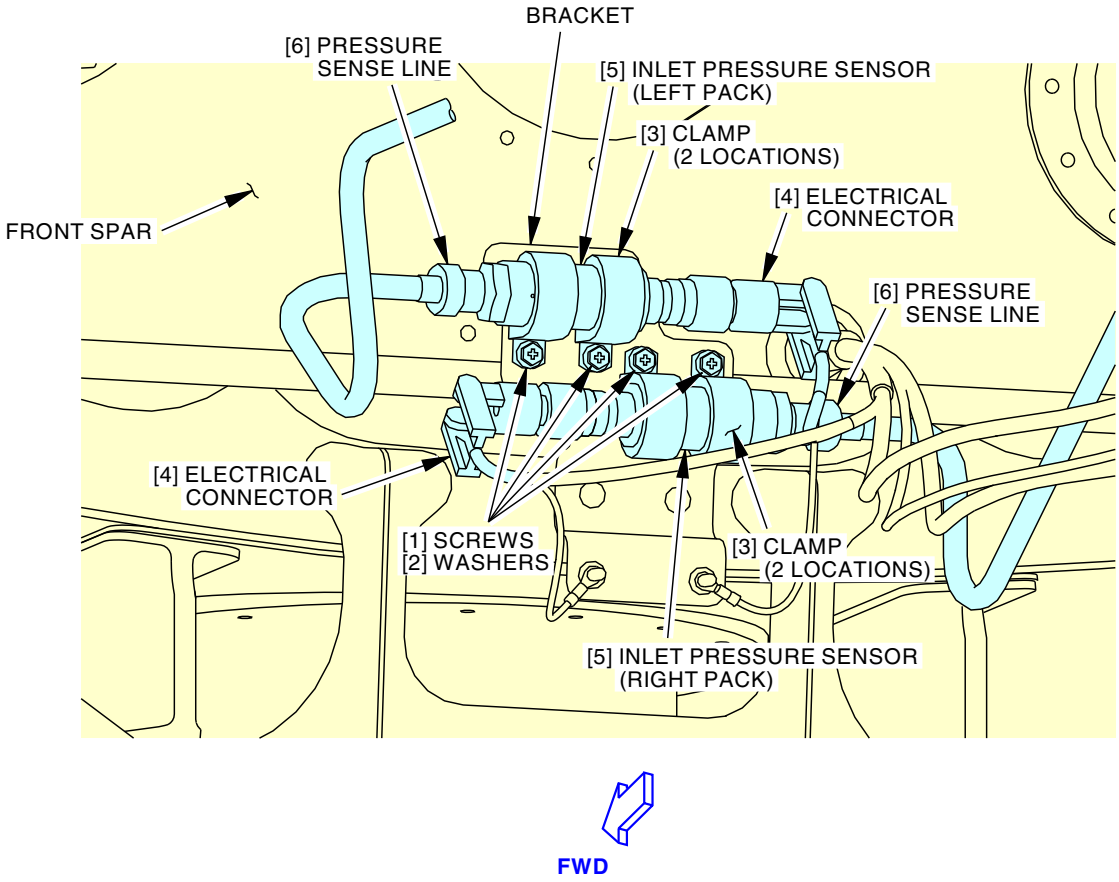




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**Inlet Pressure Sensor Installation**
**Figure 401/21-61-23-990-801 (Sheet 1 of 2)**



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**INLET PRESSURE SENSORS**

**B**

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**Inlet Pressure Sensor Installation**
**Figure 401/21-61-23-990-801 (Sheet 2 of 2)**



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**TASK 21-61-23-400-801**

## 3. Inlet Pressure Sensor Installation

(Figure 401)

### A. General

(1) This task includes the steps to install the left and right pack inlet pressure sensors [5] (PIPS).

### B. References

| Reference | Title |
|---|---|
| 20-60-07-910-802 | Inspection, Cleaning and Sealing of Electrical Connectors (P/B 201) |
| 21-00-00-730-801 | Air Conditioning, System Test, Air Conditioning IBIT (P/B 501) |
| 21-00-00-800-801 | Supply Conditioned Air to the Airplane (P/B 201) |
| 21-00-00-800-802 | Remove Conditioned Air from the Airplane (P/B 201) |
| 46-13-02-700-805 | Existing Faults Check (P/B 201) |
| IFIM and do the applicable procedure(s) | Interactive Fault Isolation Manual |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G50135 | Leak Detector - Liquid, Non-Corrosive Soap Compound | MIL-PRF-25567 |
| G50136 | Compound - Corrosion Inhibiting, Non-drying Paste | BMS3-38 |

### D. Location Zones

| Zone | Area |
|---|---|
| 129 | Keel Beam (Part) - Section 43 |
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### F. Prepare for the Installation

**SUBTASK 21-61-23-000-003**

(1) Remove the protective cap from the pressure sense line [6].

### G. Pack Inlet Pressure Sensor Installation

**SUBTASK 21-61-23-980-001**

(1) Put the two clamps [3] on the inlet pressure sensor [5].

**SUBTASK 21-61-23-980-002**

(2) Position the inlet pressure sensor [5] with the clamps [3] on the bracket so that the pressure sense line [6] can be easily connected to the inlet pressure sensor [5].



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(a) Make sure that you make the correct connections.

NOTE: The left and right inlet pressure sensors [5] can be connected to the opposite pack wiring.

SUBTASK 21-61-23-420-002

(3) Install the screws [1] and washers [2] to attach the clamp [3] to the bracket.

SUBTASK 21-61-23-420-003

(4) Connect the pressure sense line [6] to the inlet pressure sensor [5] as follows:

(a) Align the pressure sense line [6] with the inlet pressure sensor [5].

(b) Apply corrosion inhibiting material, G50136 to the threads on the inlet pressure sensor [5].

(c) Connect the pressure sense line [6] to the inlet pressure sensor [5]:

1) Use a second wrench on the inlet pressure sensor [5] when you tighten the pressure sense line [6].

SUBTASK 21-61-23-000-004

(5) Remove the protective cap from the electrical connector of the inlet pressure sensor [5].

SUBTASK 21-61-23-420-004

(6) Connect the electrical connector [4] to the inlet pressure sensor [5] (Inspection, Cleaning and Sealing of Electrical Connectors, TASK 20-60-07-910-802).

## H. Pack Inlet Pressure Sensor Installation Test

SUBTASK 21-61-23-440-001

(1) Close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |

SUBTASK 21-61-23-720-001

(2) If both inlet pressure sensors [5] have been disconnected and reconnected, then do a check that the electrical connectors [4] are correctly installed:

(a) Look for maintenance message 21-55230 “LEFT AIR CONDITIONING PACK INLET PRESSURE SENSOR IS OUT OF RANGE” and 21-55231 “RIGHT AIR CONDITIONING PACK INLET PRESSURE SENSOR IS OUT OF RANGE” (Existing Faults Check, TASK 46-13-02-700-805).

1) Make sure that the maintenance message is NOT ACTIVE or that the message does not show.

2) If the maintenance message is ACTIVE, then use the IFIM and do the applicable procedure(s) to repair the fault indicated by the maintenance message.

(b) Disconnect the electrical connector [4] for the right pack inlet pressure sensor [5].

NOTE: The right PIPS electrical connector [4] is most easily connected through the left pack bay door. The right PIPS is connected to the pneumatic pressure sense line [6] that goes to the right pack.

1) Look for maintenance message 21-55231 “RIGHT AIR CONDITIONING PACK INLET PRESSURE SENSOR IS OUT OF RANGE” (Existing Faults Check, TASK 46-13-02-700-805).

a) Make sure that the maintenance message is ACTIVE.



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b) If maintenance message 21-55231 is not active and maintenance message 21-55230 “LEFT AIR CONDITIONING PACK INLET PRESSURE SENSOR IS OUT OF RANGE” is ACTIVE, then connect the electrical connectors to the correct sensors.

<1> Disconnect the electrical connector [4] on the left inlet pressure sensor [5] and connect that electrical connector [4] to the right inlet pressure sensor [5].

<2> Connect the electrical connector [4] to the left inlet pressure sensor [5].

c) Reconnect the electrical connector [4] to the right pack inlet pressure sensor [5].

d) Make sure that the maintenance message is NOT ACTIVE or that the message does not show.

NOTE: You have verified that the electrical connectors [4] are connected to the correct sensors.

**SUBTASK 21-61-23-730-001**

(3) Do this task: Air Conditioning, System Test, Air Conditioning IBIT, TASK 21-00-00-730-801.

**SUBTASK 21-61-23-440-002**

(4) Supply conditioned air to the airplane (TASK 21-00-00-800-801).

**SUBTASK 21-61-23-700-001**

(5) Use leak detector, G50135 to do a leak check at the pressure sense line [6] connection.

(a) Repair leaks that show.

**SUBTASK 21-61-23-100-001**

(6) Use a clean cotton wiper, G00034, to remove the remaining leak detector.

## I. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-23-040-004**

(1) Remove conditioned air from the airplane (TASK 21-00-00-800-802).

**SUBTASK 21-61-23-410-001**

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

**SUBTASK 21-61-23-410-002**

(3) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**END OF TASK**



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## PACK PRESSURE SENSOR SENSE LINE - CLEANING/PAINTING

### 1. General

A. This procedure has this task:

(1) A Cleaning of the Pack Inlet Pressure Sensor Sense Line.

B. This procedure provides instructions to clean the left pack pressure sensor, right pack pressure sensor and sense lines.

**TASK 21-61-23-100-801**

### 2. Pack Inlet Pressure Sensor Sense Line Cleaning

(Figure 701)

#### A. References

| Reference | Title |
|---|---|
| 21-61-23-000-801 | Inlet Pressure Sensor Removal (P/B 401) |
| 21-61-23-400-801 | Inlet Pressure Sensor Installation (P/B 401) |

#### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G02314 | Air - Compressed, Breathing | BB-A-1034 Source I Grade A |
| G50256 | Water, Regular | |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |

#### D. Prepare for the Cleaning

**SUBTASK 21-61-23-000-005**

(1) Remove the pack pressure sensors [5].

(a) Do this task: Inlet Pressure Sensor Removal, TASK 21-61-23-000-801.

**SUBTASK 21-61-23-000-006**

(2) Remove the sense line [6] as follows:

(a) Remove the clamps [7].

1) Remove the screw [8] and washers [9] that secure each clamp [7] to the structure.

2) Remove the clamps [7].

(b) Disconnect the sense line [6] from the duct connector [10] as follows:

1) Use a second wrench to hold the duct connector [10] when you disconnect the sense line [6].

(c) Remove the sense line [6].

**SUBTASK 21-61-23-000-007**

(3) Remove the sense line [12] and sense line [18] as follows:

(a) Remove the clamp [15] and clamps [21].

1) Remove the screw [13], washer [14], screw [19], and washer [20] that secure clamp [15] and each clamp [21] to the structure.

2) Remove the clamp [15] and clamps [21].



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(b) Disconnect the sense line [18] from the duct connector [10] as follows:

1) Use a second wrench to hold the duct connector [10] when you disconnect the sense line [18].

(c) Remove the sense line [12] and sense line [18].

(d) If it is necessary, disconnect the nut [17] from the union [16] to disconnect sense line [18] from sense line [12].

## E. Cleaning Procedure

**SUBTASK 21-61-23-100-002**

(1) If it is necessary, remove any ice buildup in the pack pressure sensors [5].

**SUBTASK 21-61-23-100-003**

(2) If it is necessary, remove any ice buildup in the sense line with warm water, G50256.

**SUBTASK 21-61-23-100-004**

(3) Blow air, G02314, through the sense line weep hole [11] with compressed air.

(a) Make sure that there is no debris, dirt or unwanted materials in the sense line.

## F. Put the Airplane Back to Its Usual Condition

**SUBTASK 21-61-23-400-002**

(1) Install the sense line [6] as follows:

(a) Connect the sense line [6] to the duct connector [10] as follows:

1) Use a second wrench to hold duct connector [10] when you tighten the sense line [6].

2) Tighten the B-nut on the sense line [6] to 170 ±10 in-lb (19 ±1 N·m).

(b) Install the clamps [7].

1) Install the clamps [7] with the screws [8] and washers [9].

**SUBTASK 21-61-23-400-003**

(2) Install the sense line [12] and sense line [18] as follows:

(a) If it was disconnected, reconnect the nut [17] to the union [16].

(b) Connect the sense line [18] to the duct connector [10] as follows:

1) Use a second wrench to hold duct connector [10] when you tighten the sense line [18].

2) Tighten the B-nut on the sense line [18] to 170 ±10 in-lb (19 ±1 N·m).

(c) Install the clamp [15] and clamps [21].

1) Install the clamp [15] with the screw [13], washer [14].

2) Install the clamps [21] with the screw [19], and washer [20].

**SUBTASK 21-61-23-400-001**

(3) Install the pack pressure sensors [5].

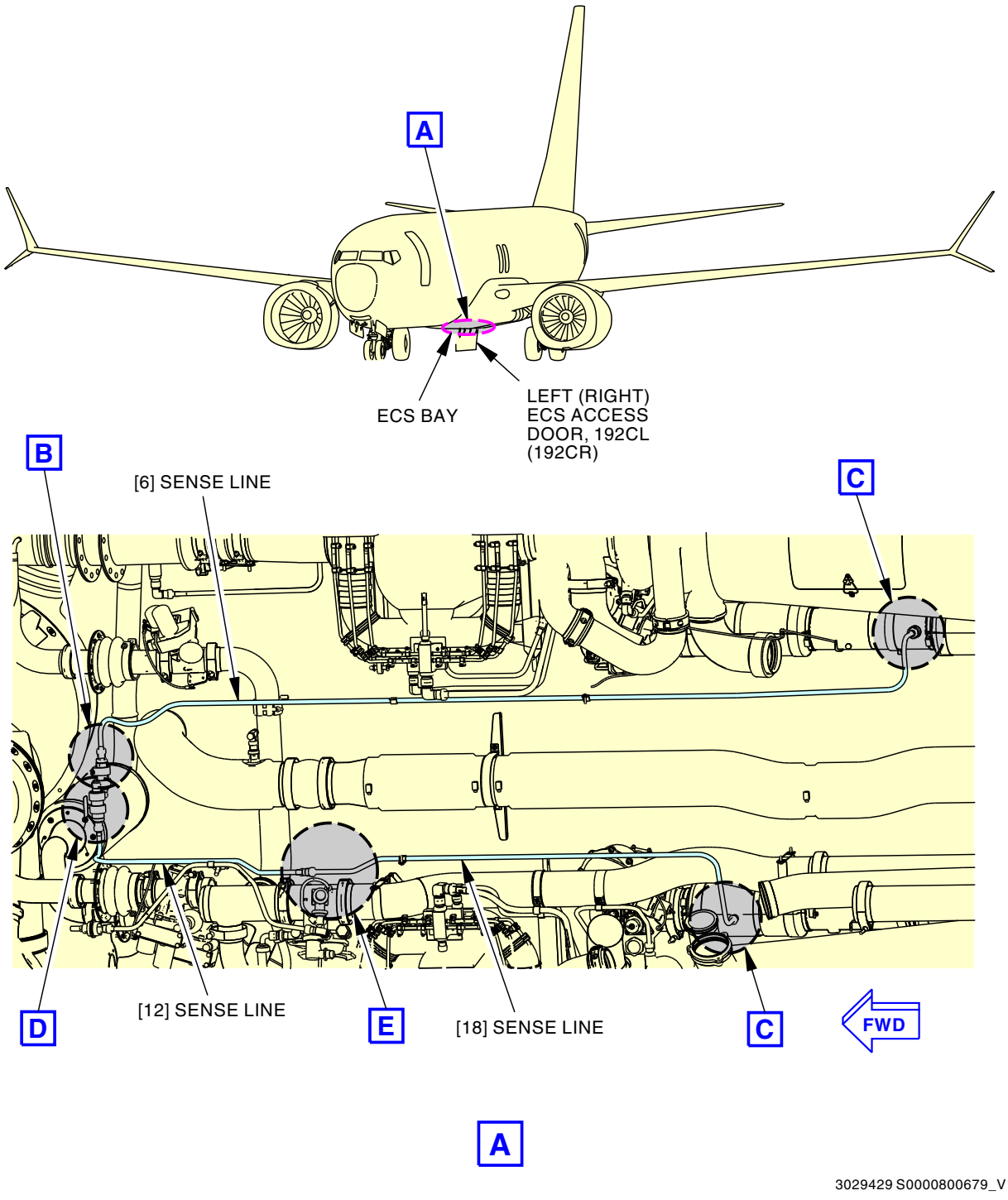
(a) Do this task: Inlet Pressure Sensor Installation, TASK 21-61-23-400-801.

(b) Tighten the B-nuts on the sense line [6] and sense line [12] to 90 in-lb (10 N·m) - 100 in-lb (11 N·m).

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

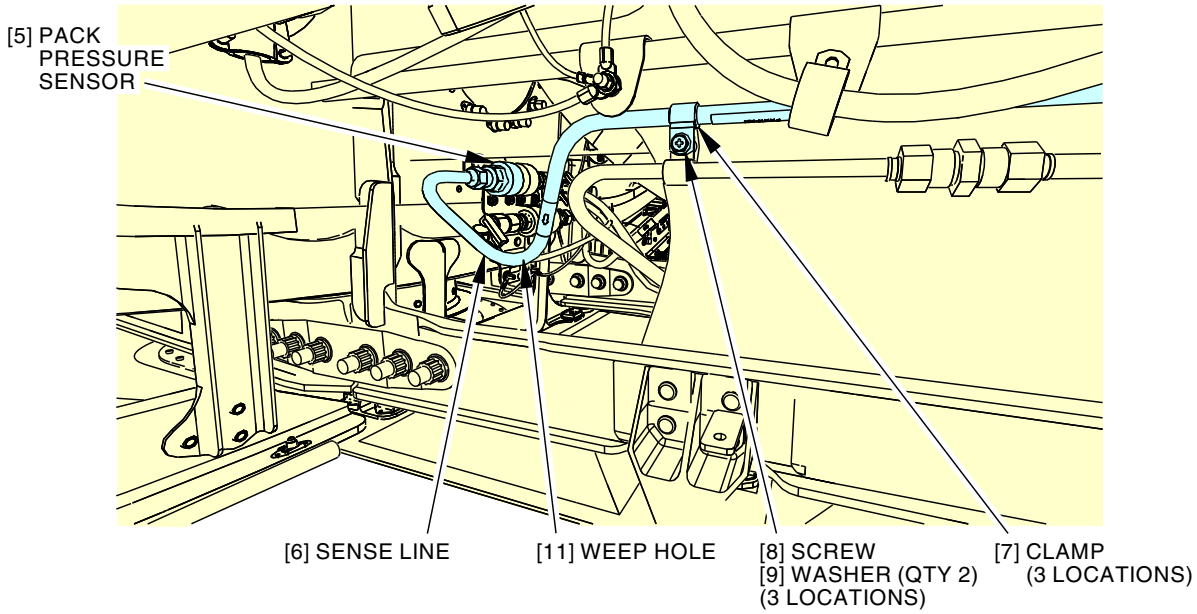



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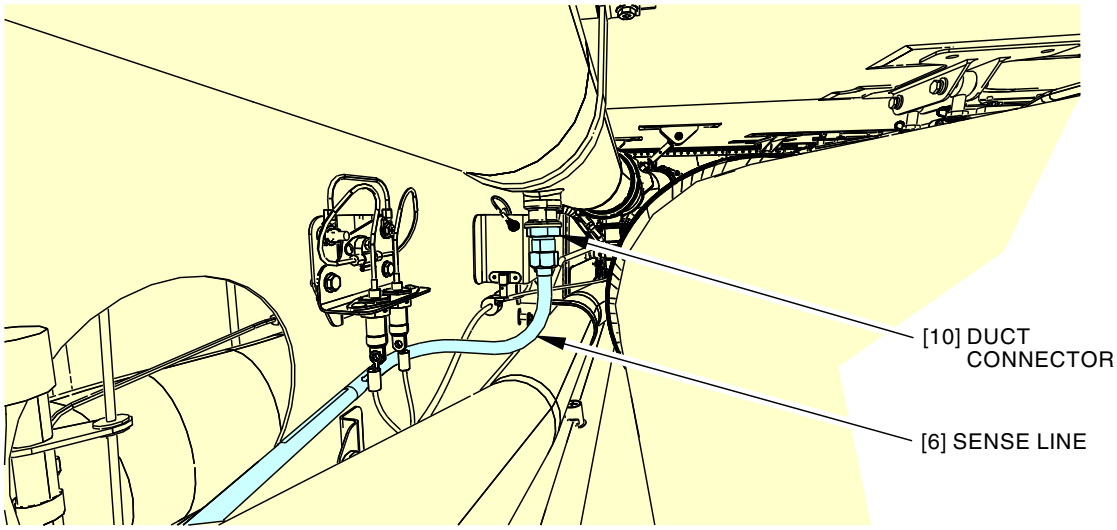
**Pack Inlet Pressure Sensor Sense Line Cleaning**
**Figure 701/21-61-23-990-802 (Sheet 1 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




B




**(EXAMPLE)**

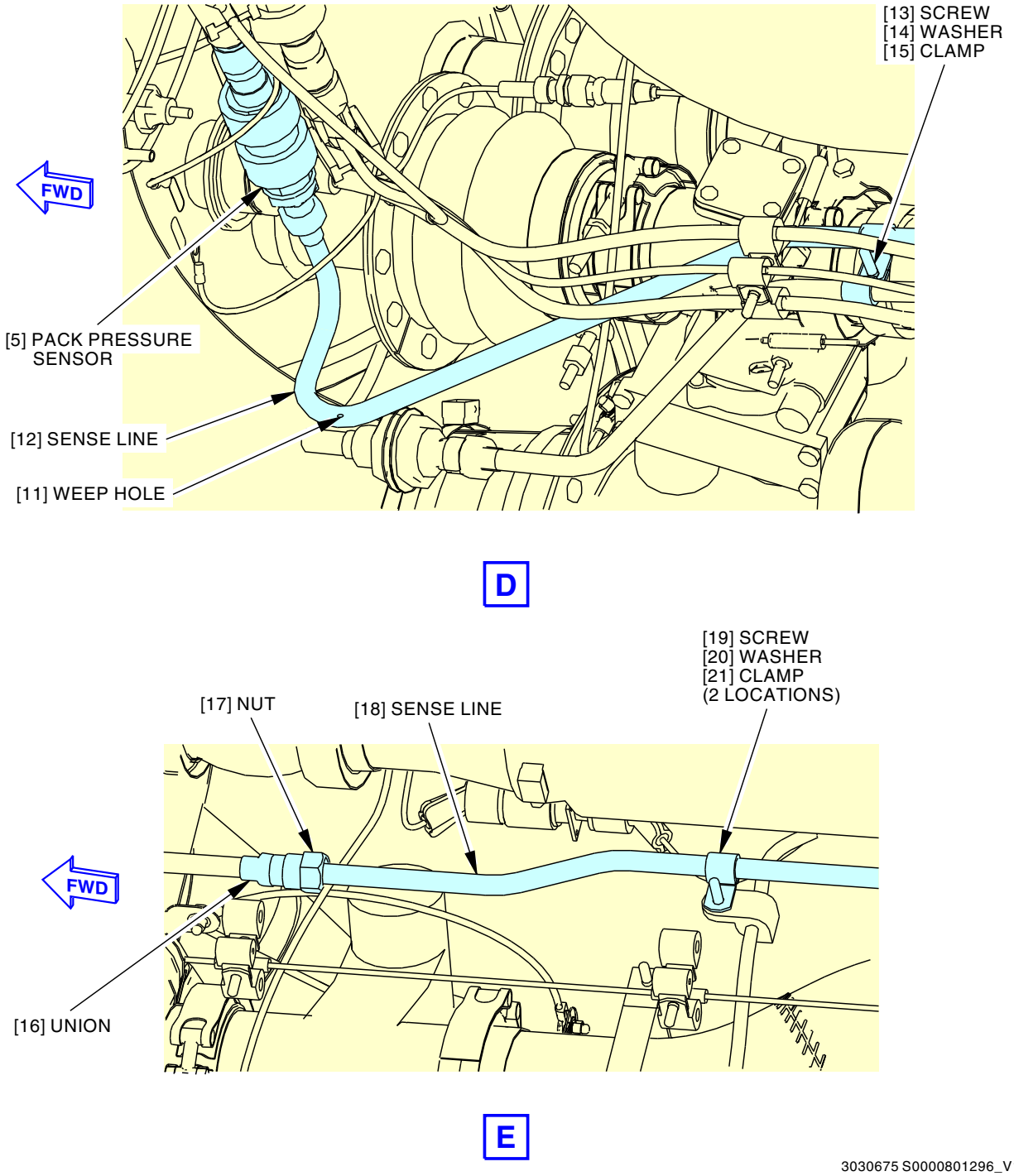
C

3029430 S0000800680_V1

**Pack Inlet Pressure Sensor Sense Line Cleaning**
**Figure 701/21-61-23-990-802 (Sheet 2 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Pack Inlet Pressure Sensor Sense Line Cleaning**
**Figure 701/21-61-23-990-802 (Sheet 3 of 3)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## FLOW SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) A removal of the flow sensor.

(2) An installation of the flow sensor.

**TASK 21-61-24-000-801**

### 2. Flow Sensor Removal

(Figure 401)

#### A. General

(1) This task includes the steps to remove the left and right pack flow sensors.

(2) The pack flow sensor is located in the duct that goes to the pack and trim air system. It is between the keel beam and the primary heat exchanger.

#### B. References

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

#### E. Prepare for the Removal

**SUBTASK 21-61-24-860-001**

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806

**SUBTASK 21-61-24-040-001**

(2) To remove the left pack flow sensor [1], do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

**SUBTASK 21-61-24-040-002**

(3) To remove the right pack flow sensor [1], do this step:

(a) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |



ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

SUBTASK 21-61-24-010-001

(4) To get access to the left pack flow sensor [1], do this step:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-61-24-010-002

(5) To get access to the right pack flow sensor [1], do this step:

(a) Open these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

## F. Pack Flow Sensor Removal

SUBTASK 21-61-24-000-002

(1) Disconnect the electrical connector [2] from the flow sensor [1].

SUBTASK 21-61-24-000-003

(2) Remove the three screws [3] and washers [4].

SUBTASK 21-61-24-000-004

(3) Remove the flow sensor [1].

(a) Discard the o-ring [5].

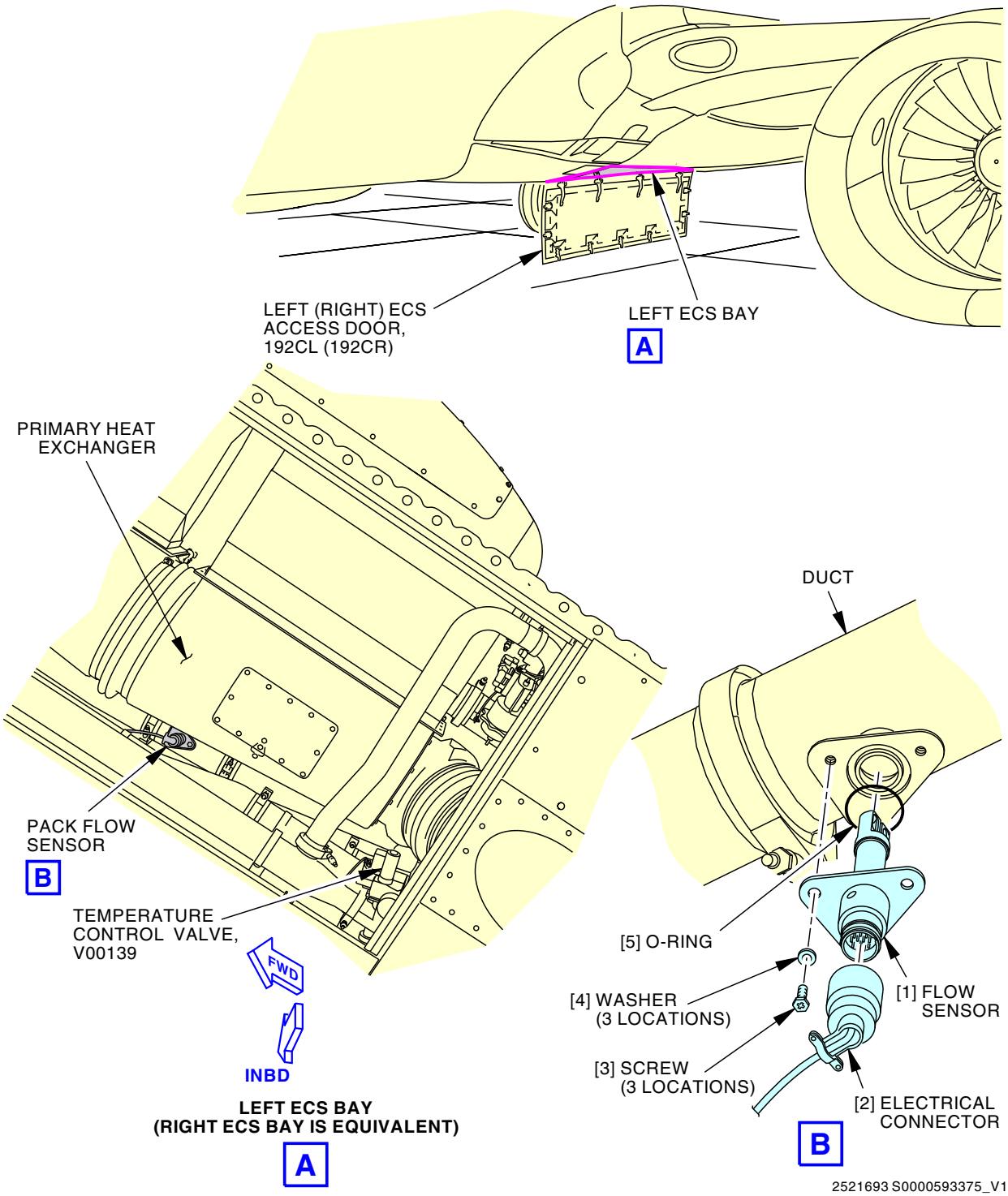
SUBTASK 21-61-24-860-002

(4) Install a cover over the opening in the duct to keep out unwanted material.

**——— END OF TASK ———**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**Pack Flow Sensor Installation**
**Figure 401/21-61-24-990-801**



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**TASK 21-61-24-400-801**

## 3. Flow Sensor Installation

(Figure 401)

### A. General

(1) This task includes the steps to install the left and right pack flow sensor.

### B. References

| Reference | Title |
|---|---|
| 21-00-00-730-802 | Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test (P/B 501) |
| SWPM 20-20-00 | ELECTRICAL BONDING PROCESSES |

### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00065 | Alcohol - Denatured, Ethyl (Ethanol) | AMS 3002 (Supersedes O-A-396) |
| B50073 | Alcohol - Isopropyl | ASTM D 770 |
| D00504 | Grease - Petrolatum | VV-P-236 |
| G50262 | Wiper - Cleaning | BMS15-5 |

### E. Location Zones

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 212 | Flight Compartment - Right |

### F. Access Panels

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### G. Prepare for the Installation

**SUBTASK 21-61-24-000-001**

(1) Remove the cover from the flow sensor [1] opening in the duct.



ECCN 9E991 BOEING PROPRIETARY - See title page for details

## H. Pack Flow Sensor Installation

SUBTASK 21-61-24-100-001

(1) Do these steps to clean the faying surfaces of the flow sensor [1] and the duct boss:

(a) Clean the surfaces of the flow sensor [1] and the duct boss using wiper, G50262 that are soaked with alcohol, B00065 or alcohol, B50073.

(b) Remove all of the alcohol with a clean wiper, G50262.

SUBTASK 21-61-24-640-001

(2) Lubricate a new o-ring [5] with grease, D00504.

SUBTASK 21-61-24-400-001

(3) Install the new o-ring [5] on the flow sensor [1].

SUBTASK 21-61-24-400-002

(4) Position the flow sensor [1] on the boss on the duct.

SUBTASK 21-61-24-400-003

(5) Install the three screws [3] and washers [4] to attach the flow sensor [1] to the boss.

(a) Tighten screws [3] to 30 ±1 in-lb (3.4 ±0.1 N·m).

SUBTASK 21-61-24-700-001

(6) Use an intrinsically safe approved bonding meter, COM-1550, to do a check of the electrical bond resistance between the flow sensor [1] and the boss (SWPM 20-20-00).

(a) Make sure the resistance is not more than 0.001 ohm (1.0 milliohm).

SUBTASK 21-61-24-420-001

(7) Connect the electrical connector [2] to the flow sensor [1].

SUBTASK 21-61-24-410-003

(8) For the left pack flow sensor [1] do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 9 | C01158 | AIR CONDITIONING PACK CONTROL LEFT DC |
| A | 11 | C01159 | AIR CONDITIONING PACK CONTROL LEFT AC |

SUBTASK 21-61-24-410-004

(9) For the right pack flow sensor [1] do this step:

(a) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 9 | C01161 | AIR CONDITIONING PACK CONT RIGHT DC |
| B | 11 | C01162 | AIR CONDITIONING PACK CONT RIGHT AC |

## I. Pack Flow Sensor Installation Test

SUBTASK 21-61-24-730-001

(1) Do this task: Air Conditioning, System Test, Air Conditioning IBIT with Flow Sensor Test, TASK 21-00-00-730-802.



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## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-24-410-001

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 192CL | ECS Access Door |

SUBTASK 21-61-24-410-002

(2) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

——— END OF TASK ———



ECCN 9E991 BOEING PROPRIETARY - See title page for details

# DUCT TEMPERATURE BULB - REMOVAL/INSTALLATION

## 1. General

A. This procedure has these tasks:

(1) A removal of the control cabin duct temperature bulb.

(2) A removal of the passenger cabin duct temperature bulbs.

(3) An installation of the control cabin duct temperature bulb.

(4) An installation of the passenger duct temperature bulbs.

(5) There is a duct temperature bulb installed for each of the three cabin temperature zones.

**TASK 21-61-30-000-801**

## 2. Duct Temperature Bulb Removal

(Figure 401, Figure 402)

### A. References

| Reference | Title |
|---|---|
| 25-21-45-000-801 | Main Ceiling Panel - Removal (P/B 401) |

### B. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### C. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### D. Prepare for the Removal

**SUBTASK 21-61-30-860-001**

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

**SUBTASK 21-61-30-010-001**

(2) To get access the control cabin duct temperature sensor open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**SUBTASK 21-61-30-010-002**

(3) To get access the passenger cabin duct temperature sensors remove the applicable ceiling panel that is forward of the overwing escape hatches. To remove the panel, do this task: Main Ceiling Panel - Removal, TASK 25-21-45-000-801.

### E. Passenger Cabin Duct Temperature Bulb Removal

**SUBTASK 21-61-30-020-001**

(1) Disconnect the electrical connector [1] from the passenger cabin duct temperature bulb [2].

**SUBTASK 21-61-30-020-002**

(2) Remove the passenger cabin duct temperature bulb [2].



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SUBTASK 21-61-30-020-003

(3) Remove and discard the O-ring [3] from the passenger cabin duct temperature bulb [2].

**F. Control Cabin Duct Temperature Bulb Removal**

SUBTASK 21-61-30-020-004

(1) Disconnect the electrical connector [22] from the control cabin duct temperature bulb [21].

SUBTASK 21-61-30-020-005

(2) Remove the control cabin duct temperature bulb [21].

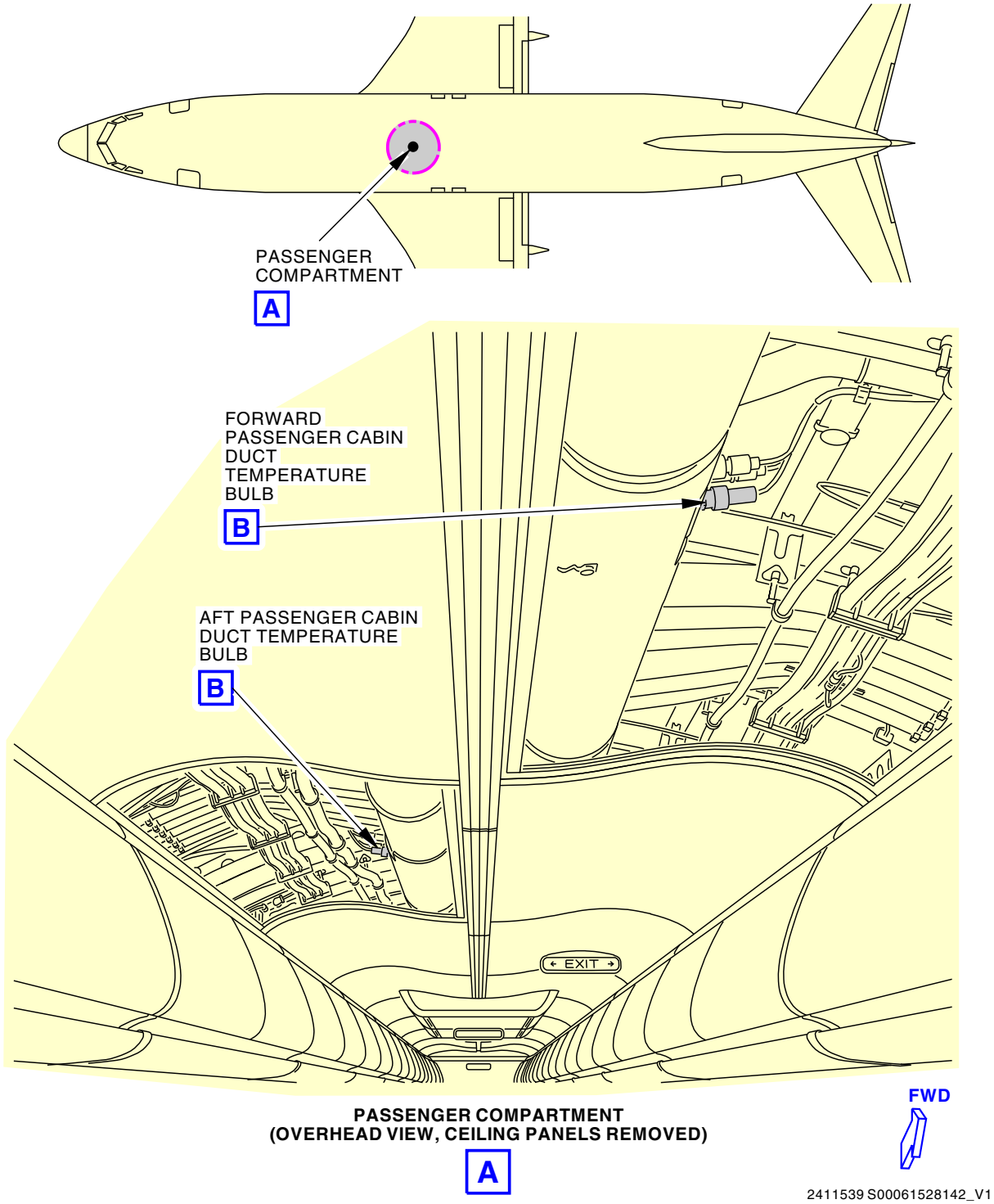
SUBTASK 21-61-30-020-006

(3) Remove and discard the O-ring [23] from the control cabin duct temperature bulb [21].

——— END OF TASK ———



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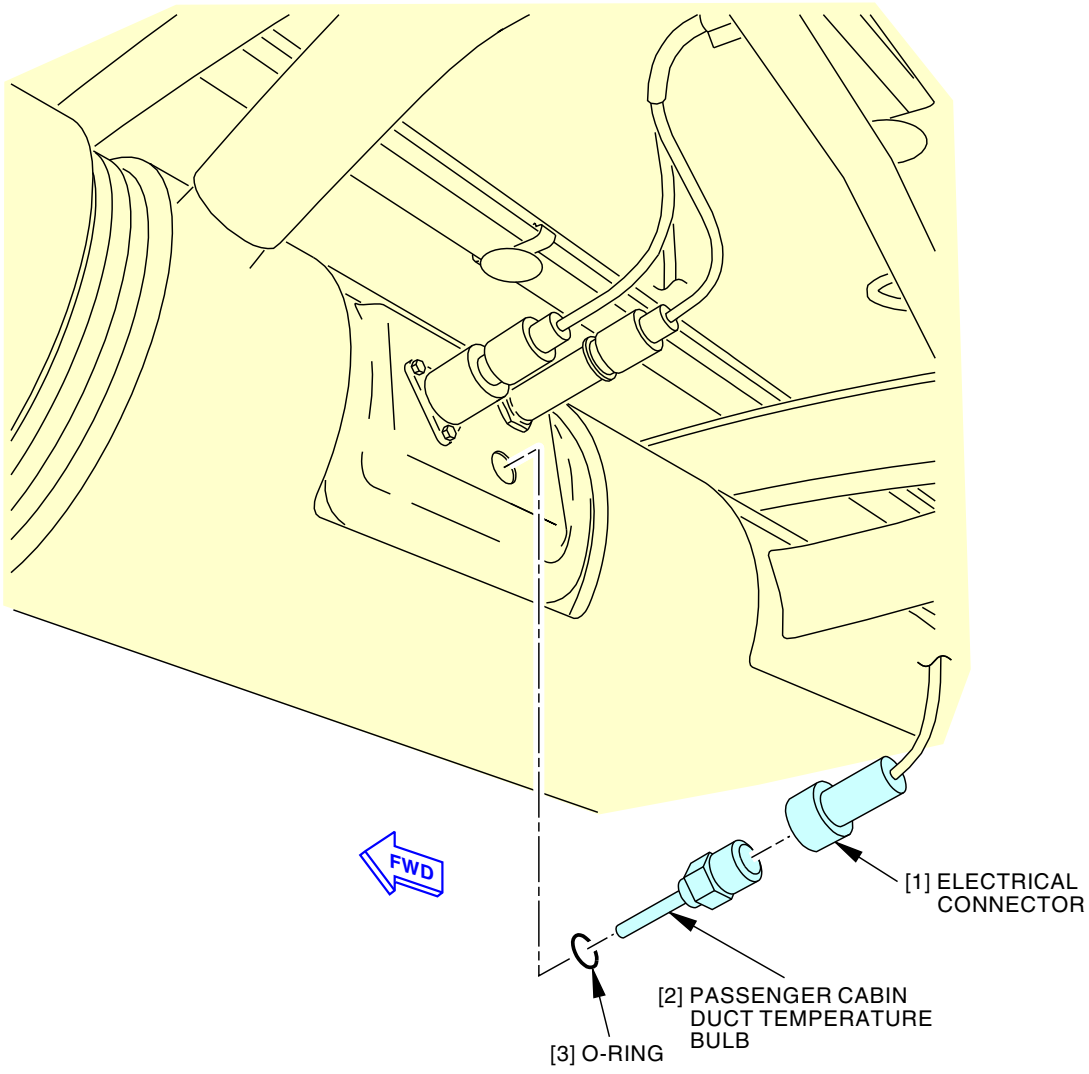

**PASSENGER COMPARTMENT**
**(OVERHEAD VIEW, CEILING PANELS REMOVED)**

**A**

**Passenger Cabin Duct Temperature Bulb Installation**
**Figure 401/21-61-30-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**PASSENGER CABIN DUCT TEMPERATURE BULB**
**(FORWARD CABIN BULB IS SHOWN, AFT CABIN BULB IS OPPOSITE)**

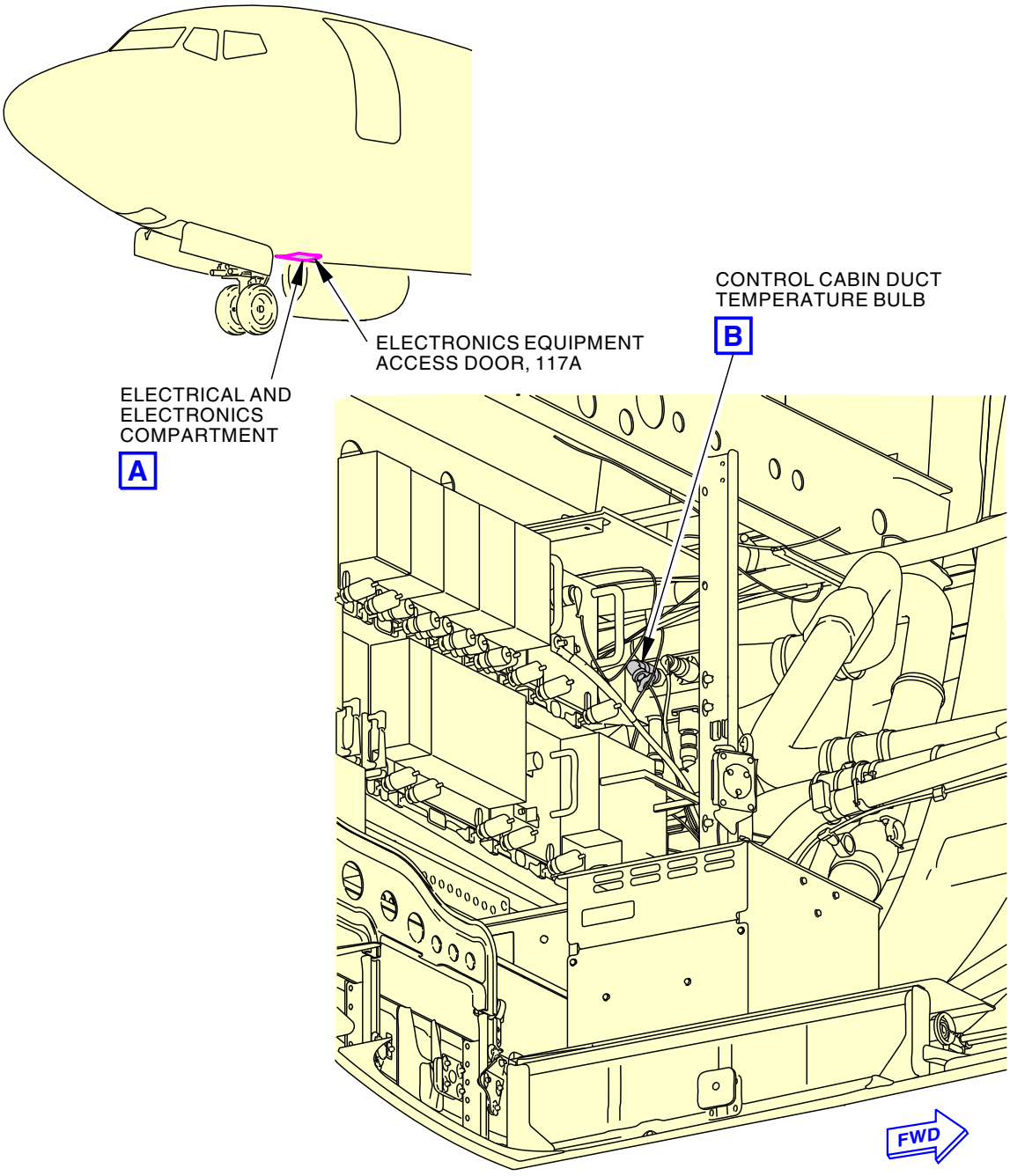
B

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**Passenger Cabin Duct Temperature Bulb Installation**
**Figure 401/21-61-30-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**ELECTRICAL AND ELECTRONICS COMPARTMENT (VIEW THROUGH ACCESS DOOR, 117A)**

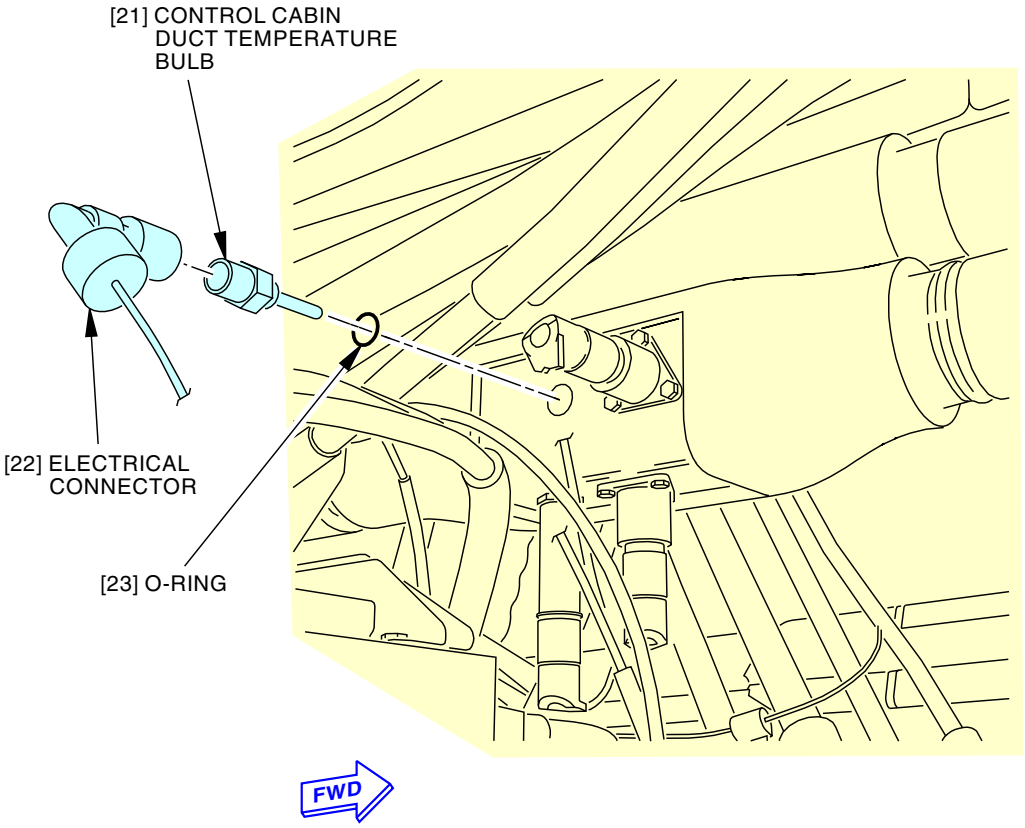
**A**

2411541 S00061528144_V1

**Control Cabin Duct Temperature Bulb Installation**
**Figure 402/21-61-30-990-802 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CONTROL CABIN DUCT TEMPERATURE BULB**

**B**

2411542 S00061528145_V1

**Control Cabin Duct Temperature Bulb Installation**
**Figure 402/21-61-30-990-802 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-30-400-801**

## 3. Duct Temperature Bulb Installation

(Figure 401, Figure 402)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |
| 25-21-45-400-801 | Main Ceiling Panel - Installation (P/B 401) |

### B. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D50004 | Compound - Antiseize | BMS3-28 |

### C. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Passenger cabin duct temperature bulb | 21-61-30-04-015 | SIA ALL |
| | | 21-61-30-09-005 | SIA ALL |
| | | 21-61-30-11-010 | SIA ALL |
| 3 | O-ring | 21-61-30-09-010 | SIA ALL |
| | | 21-61-30-11-015 | SIA ALL |
| 21 | Control cabin duct temperature bulb | 21-61-30-04-015 | SIA ALL |

### D. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### E. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

### F. Passenger Cabin Duct Temperature Bulb Installation

**SUBTASK 21-61-30-020-007**

(1) Remove the copper gasket, if installed, from the new passenger cabin duct temperature bulb [2].

**SUBTASK 21-61-30-420-001**

(2) Install a new O-ring [3] on the passenger cabin duct temperature bulb [2].

**SUBTASK 21-61-30-640-001**

(3) Put compound, D50004 on the threads of the passenger cabin duct temperature bulb [2].

**SUBTASK 21-61-30-420-002**

(4) Do these steps to install the passenger cabin duct temperature bulb [2]:

(a) Put the passenger cabin duct temperature bulb [2] in its position in the duct.

(b) Tighten the passenger cabin duct temperature bulb [2] until the O-ring [3] touches the duct.

(c) Tighten the duct temperature passenger cabin duct temperature bulb [2] 3/4 turn more.



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SUBTASK 21-61-30-420-003

(5) Connect the electrical connector [1] to the passenger cabin duct temperature bulb [2].

## G. Control Cabin Duct Temperature Bulb Installation

SUBTASK 21-61-30-020-008

(1) Remove the copper gasket, if installed, from the new control cabin duct temperature bulb [21].

SUBTASK 21-61-30-420-004

(2) Install a new O-ring [23] on the control cabin duct temperature bulb [21].

SUBTASK 21-61-30-640-002

(3) Put compound, D50004 on the threads of the control cabin duct temperature bulb [21].

SUBTASK 21-61-30-420-005

(4) Do these steps to install the control cabin duct temperature bulb [21]:

(a) Put the control cabin duct temperature bulb [21] in its position in the duct.

(b) Tighten the control cabin duct temperature bulb [21] until the O-ring [23] touches the duct.

(c) Tighten the control cabin duct temperature bulb [21] an additional 3/4 turn.

SUBTASK 21-61-30-420-006

(5) Connect the electrical connector [22] to the control cabin duct temperature bulb [21].

## H. Do a Test of the Duct Temperature Bulb

SUBTASK 21-61-30-860-002

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 21-61-30-860-003

(2) Close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

SUBTASK 21-61-30-860-004

(3) Put the AIR TEMP selector on the temperature control module on the overhead P5 panel to the SUPPLY DUCT position for the applicable zone.

SUBTASK 21-61-30-710-001

(4) Use a thermometer to find the temperature of the applicable zone air in the cabin.

SUBTASK 21-61-30-710-002

(5) Make sure the temperature shown on the indicator on the P5 panel is approximately the same as the temperature recorded in the cabin.

## I. Put the Airplane Back to Its Usual Condition

SUBTASK 21-61-30-010-003

(1) If the control cabin duct temperature sensor was replaced close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 21-61-30-010-004

(2) Install the ceiling panel if a passenger cabin duct temperature bulb was replaced. To install the panel, do this task: Main Ceiling Panel - Installation, TASK 25-21-45-400-801.

**END OF TASK**



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## CABIN TEMPERATURE BULB - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Cabin Temperature Bulb Removal

(2) Cabin Temperature Bulb Installation.

(3) There is a cabin temperature bulb for each of the forward and aft passenger compartment zones.

**TASK 21-61-31-000-801**

### 2. Cabin Temperature Bulb Removal

(Figure 401)

#### A. Location Zones

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

#### B. Preparation for the Removal

**SUBTASK 21-61-31-860-001**

(1) Do this step for the removal of the temperature bulb for the forward passenger cabin zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

**SUBTASK 21-61-31-860-002**

(2) Do this step for the removal of the temperature bulb for the aft passenger compartment zone:

(a) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

#### C. Cabin Temperature Bulb Removal

(Figure 401)

**SUBTASK 21-61-31-010-001**

(1) Lower the cabin temperature sensor panel.

(a) Put a small allen wrench or other applicable tool in the access holes to release the latches.

(b) Lower the panel and disconnect the lanyard.

(c) Move the panel to the fully lowered position.

**SUBTASK 21-61-31-020-001**

(2) To remove the cabin temperature bulb [18] from the panel, do these steps:

(a) Disconnect the electrical connector [10] from the temperature bulb [18].

(b) Remove the lockwire [19].



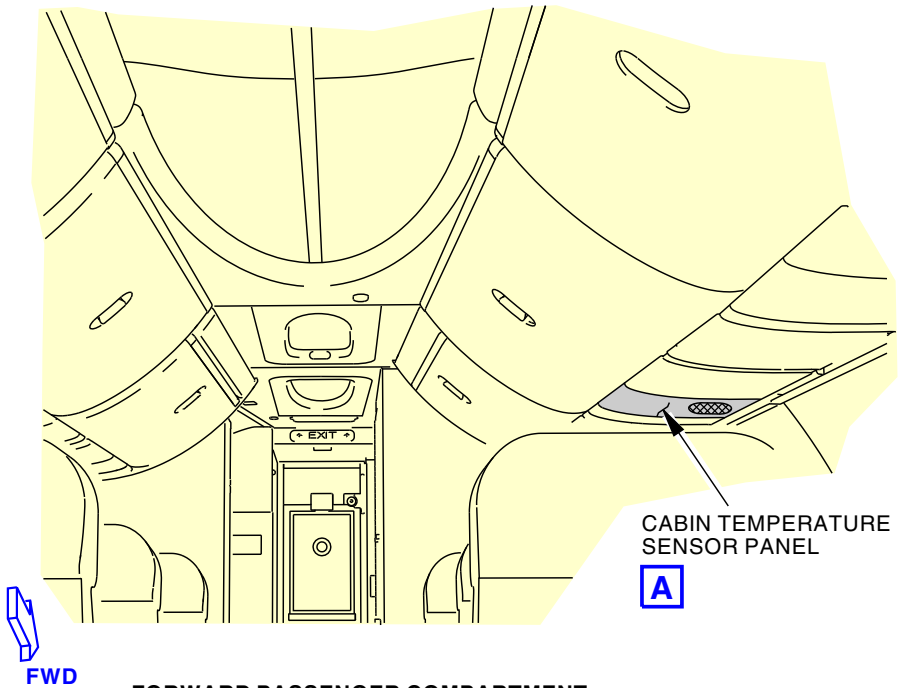
ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the temperature bulb [18] and the lockwire washer [20].

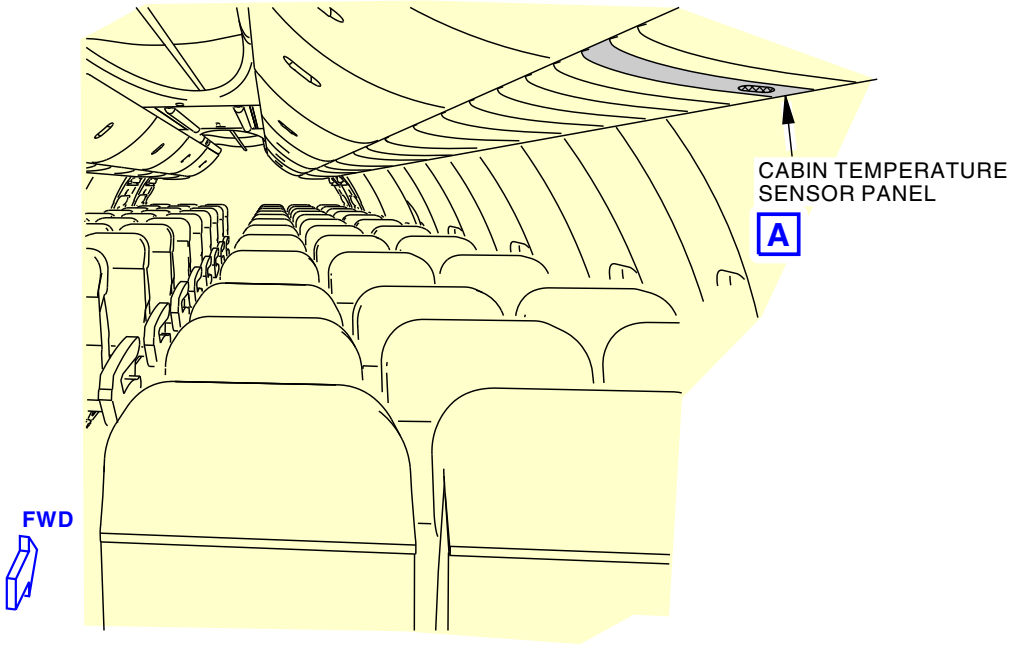
——— END OF TASK ———



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FORWARD PASSENGER COMPARTMENT



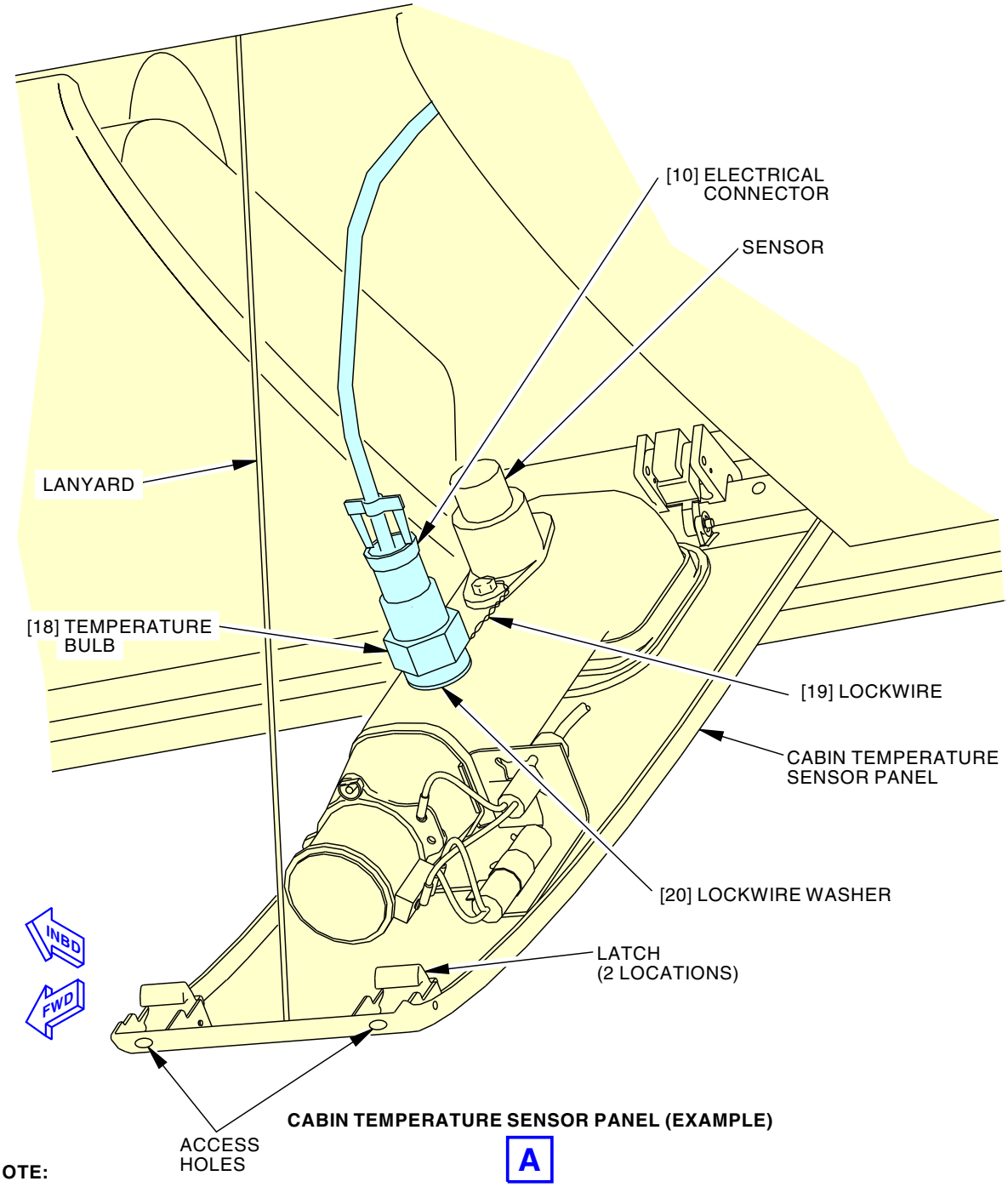

AFT PASSENGER COMPARTMENT

2411509 S00061528074_V1

**Cabin Temperature Bulb Installation**
**Figure 401/21-61-31-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE SENSOR PANEL (EXAMPLE)**

A

**NOTE:**

THE CABIN TEMPERATURE SENSOR PANEL IS SHOWN IN THE OPEN POSITION.

2411543 S00061528150_V2

**Cabin Temperature Bulb Installation**
**Figure 401/21-61-31-990-801 (Sheet 2 of 2)**



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**TASK 21-61-31-400-801**

**3. Cabin Temperature Bulb Installation**

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 20-10-44-400-801 | Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-1122 | Thermometer - Alcohol/Mercury (or equivalent meter meets task requirements) |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 18 | Temperature bulb | 21-61-10-02-105 | SIA ALL |
| | | 21-61-30-04-015 | SIA ALL |
| | | 21-61-30-09-005 | SIA ALL |
| | | 21-61-30-11-010 | SIA ALL |

**D. Location Zones**

| Zone | Area |
|---|---|
| 210 | Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |
| 242 | Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Right |

**E. Cabin Temperature Bulb Installation**

SUBTASK 21-61-31-420-001

(1) To install the cabin temperature bulb [18] for the passenger compartment, do these steps:

(a) Install the lockwire washer [20] and the temperature bulb [18] on the temperature sensor assembly.

(b) Install the lockwire [19] (TASK 20-10-44-400-801).

(c) Install the electrical connector [10].

(d) Partially lift the panel for the cabin temperature bulb and install the lanyard.

(e) Lift the panel for the cabin temperature bulb to its closed position.

SUBTASK 21-61-31-860-004

(2) Do this step for the installation of the cabin temperature bulb [18] for the forward passenger compartment zone:

(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| B | 2 | C01167 | A/C ZONE TEMP VALVE/FAN CONT FWD PASS |

SUBTASK 21-61-31-860-005

(3) Do this step for the installation of the cabin temperature bulb [18] for the aft passenger compartment zone:



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(a) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 3 | C01170 | A/C ZONE TEMP VALVE/FAN CONT AFT PASS |

**F. Cabin Temperature Bulb Installation Test**

**SUBTASK 21-61-31-740-001**

(1) Do this test of the cabin temperature bulb [18] that was replaced:

(a) Use a thermometer, STD-1122, and make a record of the ambient temperature in the passenger compartment.

(b) Put the AIR TEMP selector on the P5-17 temperature control panel to PASS CABIN.

(c) Make sure that the temperature record with the thermometer, STD-1122, and the PASS CABIN TEMP gauge indication are approximately the same.

**——— END OF TASK ———**



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## CABIN TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Cabin temperature indicator removal

(2) Cabin temperature indicator installation.

B. The cabin temperature indicator is installed in the P5-17 Cabin Temperature Panel.

C. The P5-17 Cabin Temperature Panel is installed in the P5 Forward Overhead Panel.

**TASK 21-61-32-000-801**

### 2. Cabin Temperature Indicator Removal

(Figure 401)

**A. Location Zones**

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

**B. Prepare for the Removal**

**SUBTASK 21-61-32-860-001**

(1) Open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 9 | C00329 | OVERHEAD 5V SECONDARY |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

**SUBTASK 21-61-32-010-001**

(2) Do these steps to get access to the electrical connector [3] on the back of the P5-17 cabin temperature module:

(a) Loosen the 1/4-turn fasteners that hold the aft end of the P5 forward overhead panel in the closed position.

NOTE: The forward end of the P5 panel is hinged. The aft end of the P5 panel will turn downward when the fasteners are loose.

(b) Release the safety latch and carefully lower the P5 forward overhead panel to the open position.

**C. Cabin Temperature Indicator Removal**

**SUBTASK 21-61-32-020-001**

(1) Do these steps to remove cabin temperature indicator [1] from the P5-17 module:

(a) Turn the clamp tension screw [4] in the counterclockwise direction to loosen the clamp that holds the indicator to the cabin temperature panel [2].

1) Do not remove the clamp tension screw [4].

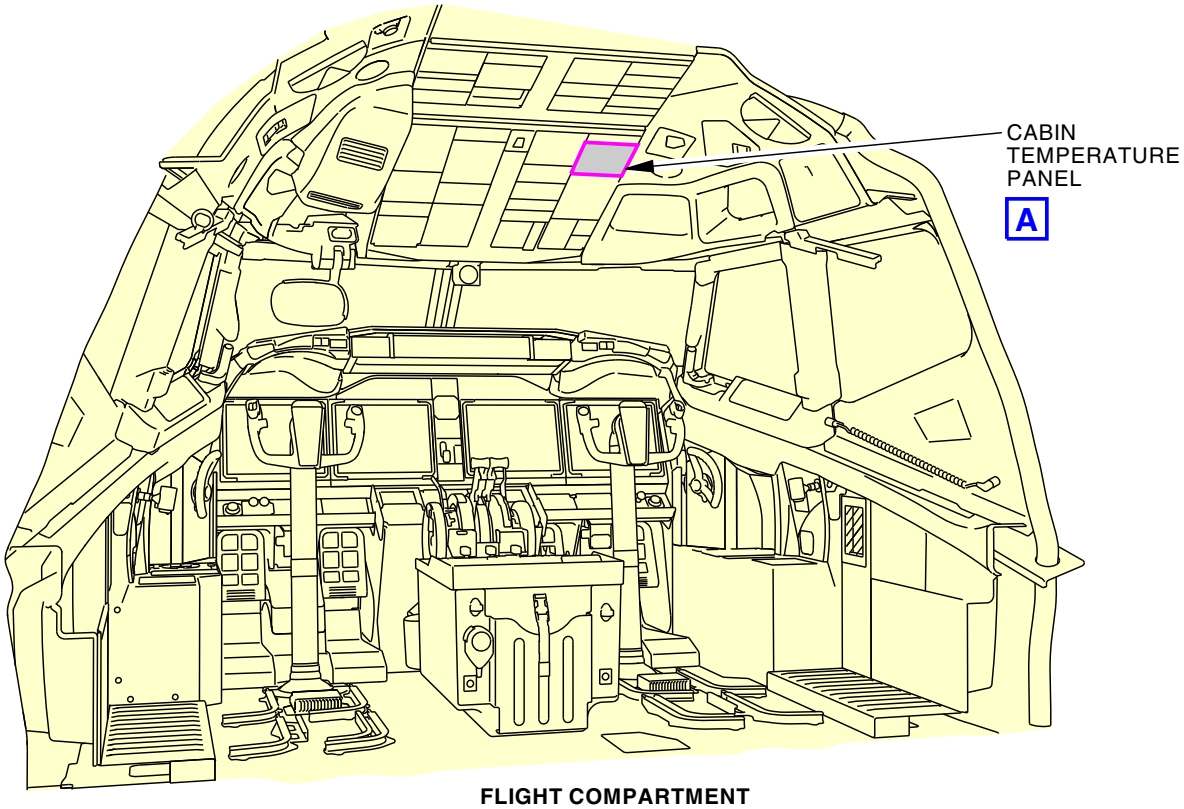
(b) Carefully pull the cabin temperature indicator [1] out of the cabin temperature panel [2].

(c) Disconnect the electrical connector [3] from the cabin temperature indicator [1].

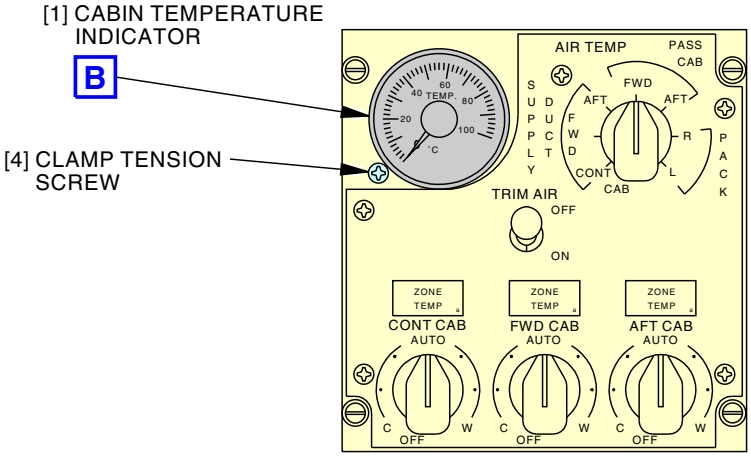
**END OF TASK**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




FLIGHT COMPARTMENT




CABIN TEMPERATURE PANEL

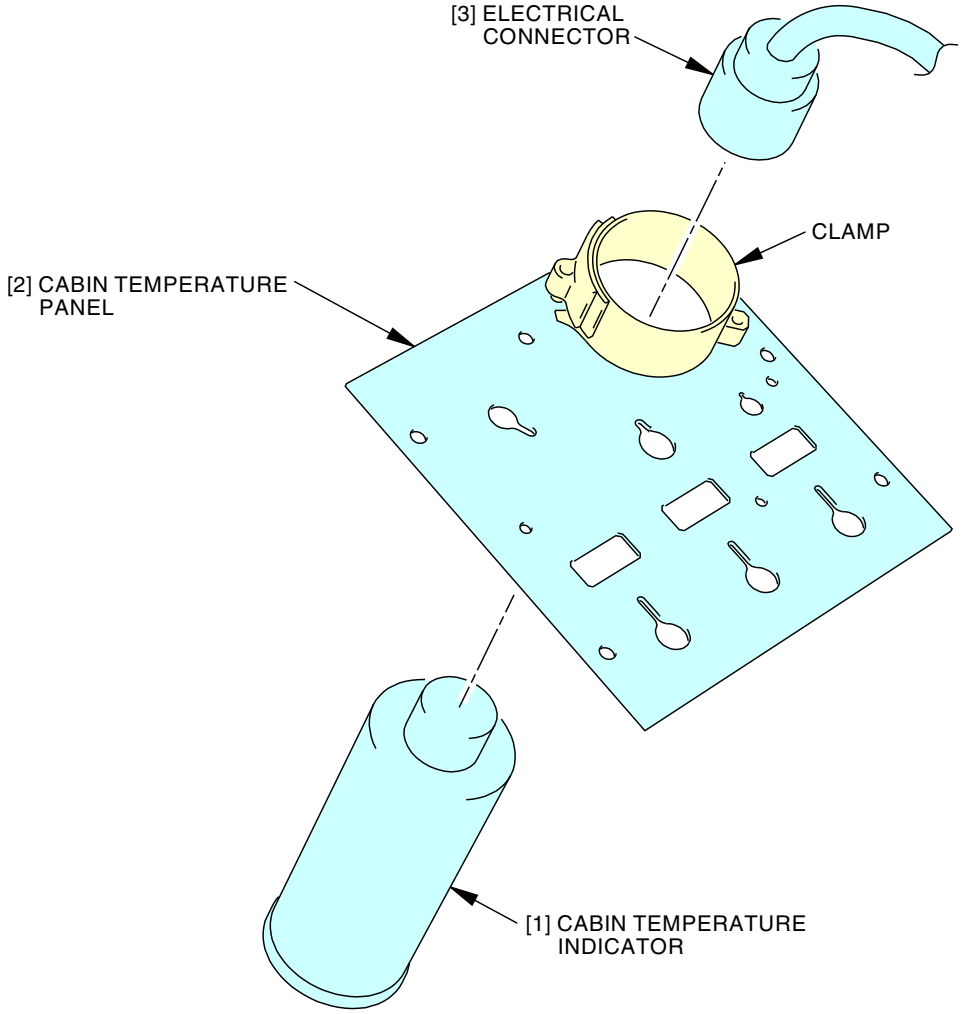
A

2411544 S00061528155_V2

**Cabin Temperature Indicator Installation**
**Figure 401/21-61-32-990-801 (Sheet 1 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details




**CABIN TEMPERATURE INDICATOR (EXAMPLE)**

B

2411545 S00061528156_V2

**Cabin Temperature Indicator Installation**
**Figure 401/21-61-32-990-801 (Sheet 2 of 2)**



ECCN 9E991 BOEING PROPRIETARY - See title page for details

**TASK 21-61-32-400-801**

## 3. Cabin Temperature Indicator Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 24-22-00-860-801 | Supply Electrical Power (P/B 201) |

### B. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Cabin temperature indicator | 21-51-65-01-050 | SIA ALL |

### C. Location Zones

| Zone | Area |
|---|---|
| 212 | Flight Compartment - Right |

### D. Cabin Temperature Indicator Installation

**SUBTASK 21-61-32-420-001**

(1) Do these steps to install the cabin temperature indicator [1] in the cabin temperature panel [2]:

(a) Connect the electrical connector [3] to the cabin temperature indicator [1].

(b) Carefully push the cabin temperature indicator [1] into its position in the cabin temperature panel [2].

(c) Tighten the clamp tension screw [4] to 6.5 ±1.5 in-lb (0.7 ±0.2 N·m).

1) Hold the cabin temperature indicator [1] against the cabin temperature panel [2] while you tighten the clamp tension screw [4].

**SUBTASK 21-61-32-410-001**

(2) Carefully lift the P5 forward overhead panel to the closed position.

**SUBTASK 21-61-32-410-002**

(3) Tighten the 1/4-turn fasteners that hold the aft end of the P5 forward overhead panel in the closed position.

**SUBTASK 21-61-32-860-002**

(4) Remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-3**

| Row | Col | Number | Name |
|---|---|---|---|
| E | 9 | C00329 | OVERHEAD 5V SECONDARY |

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 8 | C00076 | AIR CONDITIONING TEMP IND |

### E. Cabin Temperature Indicator Test

**SUBTASK 21-61-32-860-003**

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

**SUBTASK 21-61-32-710-001**

(2) Put the AIR TEMP switch on the P5-17 panel in the FWD PASS CABIN position.



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SUBTASK 21-61-32-710-002

(3) Hold a thermometer near the inlet of the forward passenger cabin temperature sensor assembly for one minute.

SUBTASK 21-61-32-970-001

(4) Make a note of the temperature that shows on the thermometer.

SUBTASK 21-61-32-710-003

(5) Make sure that the cabin temperature indicator shows the same temperature as the thermometer.

——— END OF TASK ———



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## TRIM AIR PRESSURE REGULATION AND SHUTOFF CONTROL - ADJUSTMENT/TEST

### 1. General

A. This procedure has one task. The task is an operational test of the trim air pressure regulating and shutoff valve.

**TASK 21-62-00-710-801**

### 2. Trim Air Pressure Regulating and Shutoff Valve - Operational Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-803 | Supply Pressure to the Pneumatic System with the APU (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |

**C. Trim Air Pressure Regulating and Shutoff Valve Operational Test**

**SUBTASK 21-62-00-860-001**

(1) Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

**SUBTASK 21-62-00-860-002**

(2) Make sure that these circuit breakers are closed:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 5 | C00263 | AIR CONDITIONING PACK CONT VALVES R |
| C | 6 | C00262 | AIR CONDITIONING PACK CONT VALVES L |
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

**SUBTASK 21-62-00-860-003**

(3) Do these steps on the P5-10 air conditioning panel:

(a) Set the L RECIRC switch to the AUTO position.

(b) Set the R RECIRC switch to the AUTO position.

(c) Set the L PACK switch to the AUTO position.

(d) Set the R PACK switch to the OFF position.

(e) Set the BLEED APU switch to the ON position.

(f) Set the BLEED 1 switch to the OFF position.

(g) Set the BLEED 2 switch to the OFF position.

(h) Set the ISOLATION VALVE switch to the OPEN position.

**SUBTASK 21-62-00-860-004**

(4) Do these steps on the P5-17 cabin temperature panel:

(a) Set the TRIM AIR switch to the OFF position.



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(b) Set the AIR TEMP selector to the L PACK position.

(c) Set the CONT CAB selector to the full WARM position.

(d) Set the FWD CAB selector to the full WARM position.

(e) Set the AFT CAB selector to the full WARM position.

SUBTASK 21-62-00-860-005

(5) Operate the pack for 3 to 5 minutes to let the output temperature become stable.

SUBTASK 21-62-00-970-001

(6) Make a record of the temperature shown on the AIR TEMP gage (P5-17 panel) for the L PACK.

SUBTASK 21-62-00-860-006

(7) Do these steps on the P5-17 cabin temperature panel:

(a) Set the CONT CAB selector to the full COLD position.

(b) Set the FWD CAB selector to the full COLD position.

(c) Set the AFT CAB selector to the full COLD position.

SUBTASK 21-62-00-970-002

(8) Make sure the temperature shown on the AIR TEMP gage (P5-17 panel) for the L PACK decreases.

SUBTASK 21-62-00-860-007

(9) Set the TRIM AIR switch to the ON position.

SUBTASK 21-62-00-860-008

(10) Operate the pack for 3 to 5 minutes to let the output temperature become stable.

SUBTASK 21-62-00-970-003

(11) Make a record of the temperature shown on the AIR TEMP gage for the L PACK.

SUBTASK 21-62-00-860-009

(12) Set the AIR TEMP selector to the FWD SUPPLY DUCT position.

SUBTASK 21-62-00-970-004

(13) Make a record of the temperature shown on the AIR TEMP gage for the FWD SUPPLY DUCT.

SUBTASK 21-62-00-860-010

(14) Move the FWD CAB temperature selector to the full WARM position.

SUBTASK 21-62-00-970-005

(15) Make sure the temperature shown on the AIR TEMP gage for the FWD SUPPLY DUCT increases.

SUBTASK 21-62-00-860-011

(16) Move the AIR TEMP selector to the L PACK position.

SUBTASK 21-62-00-970-006

(17) Make sure the L PACK temperature stays approximately the same.

## D. Put the Airplane Back to Its Usual Condition

SUBTASK 21-62-00-860-012

(1) Do these steps on the P5-10 air conditioning panel:

(a) Set the L and R PACK switches to the OFF position.

(b) Set the BLEED APU switch to the OFF position, and BLEED 1 and BLEED 2 switches to the ON position.



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SUBTASK 21-62-00-860-013

(2) Do these steps on the P5-17 cabin temperature panel:

(a) Set the TRIM AIR switch to the ON position.

(b) Set the CONT CAB selector to the AUTO position.

(c) Set the FWD CAB selector to the AUTO position.

(d) Set the AFT CAB selector to the AUTO position.

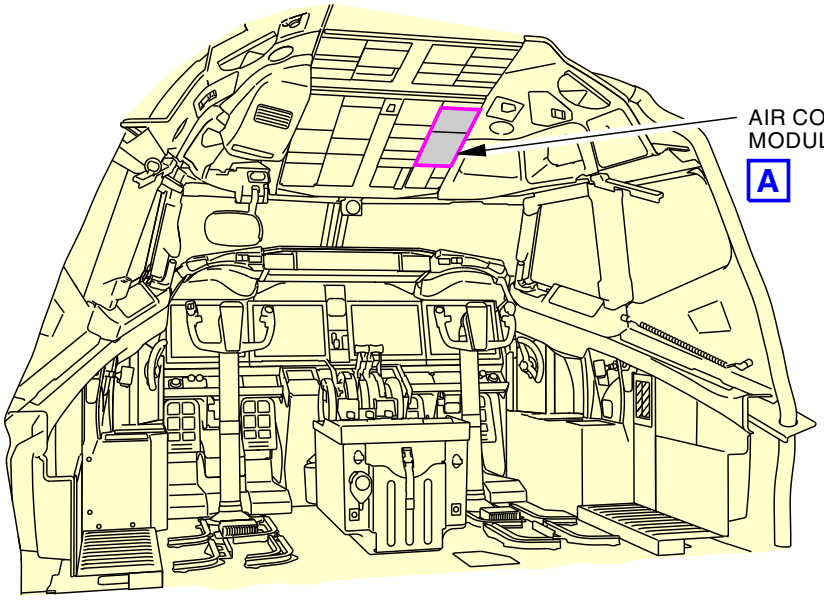
SUBTASK 21-62-00-860-014

(3) Remove pneumatic power if it is not necessary (TASK 36-00-00-860-806).

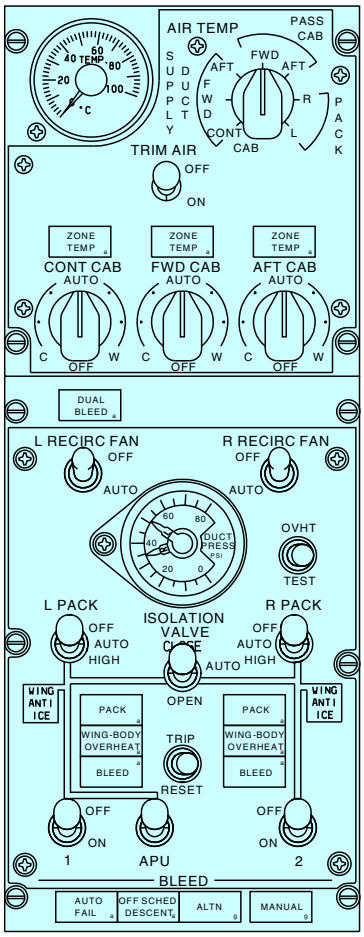
**END OF TASK**



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FLIGHT COMPARTMENT




AIR CONDITIONING MODULE

A

2411231 S00061527313_V2

**Trim Air Pressure Regulation and Shutoff Control Test**
**Figure 501/21-62-00-990-801**



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## TRIM AIR PRESSURE REGULATING AND SHUTOFF VALVE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has these tasks:

(1) Trim Air Pressure Regulating and Shutoff Valve Removal

(2) Trim Air Pressure Regulating and Shutoff Valve Installation.

B. The trim air pressure regulating and shutoff valve is installed in the forward, inboard area of the right air conditioning bay.

**TASK 21-62-01-000-801**

### 2. Trim Air Pressure Regulating and Shutoff Valve Removal

(Figure 401)

**A. References**

| Reference | Title |
|---|---|
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

**B. Tools/Equipment**

| Reference | Description |
|---|---|
| STD-858 | Tag - DO NOT OPERATE |

**C. Location Zones**

| Zone | Area |
|---|---|
| 192 | Lower Wing-To-Body Fairing - Under Wing Box |
| 211 | Flight Compartment - Left |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

**E. Prepare for the Removal**

SUBTASK 21-62-01-860-001

(1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 21-62-01-860-002

(2) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

SUBTASK 21-62-01-860-003

(3) Do these steps on the P5-10 air conditioning panel (located on the P5 forward overhead panel):

(a) Set the L and R PACK switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the OFF position and attach DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.



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SUBTASK 21-62-01-860-004

(4) Do these steps on the P5-17 Cabin Temperature Panel (located on the P5 forward overhead panel):

(a) Set the CONT CAB, FWD CAB, and AFT CAB selectors to the OFF position and attach DO NOT OPERATE tags, STD-858.

(b) Set the TRIM AIR switch to the OFF position and attach a DO NOT OPERATE tag, STD-858.

SUBTASK 21-62-01-010-001

(5) To get access to the trim air pressure regulating and shutoff valve [1], open these access panels in the specified sequence:

(a) Open this access panel:

| Number | Name/Location |
|---|---|
| 192DR | ECS High Pressure Access Door |

(b) Open this access panel:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |

## F. Trim Air Pressure Regulating and Shutoff Valve Removal

SUBTASK 21-62-01-020-001

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(1) Disconnect the electrical connector [3] from the trim air pressure regulating and shutoff valve [1].

SUBTASK 21-62-01-020-002

(2) Do these steps to remove the bonding jumper:

(a) Remove the screw [8], washers [5], and nut [4] that attach the bonding jumper to the valve.

(b) Move the bonding jumper away from the trim air pressure regulating and shutoff valve [1].

SUBTASK 21-62-01-020-003

(3) Do these steps to remove the sense line:

(a) If you decide to replace the sense line, make a record of which end of the sense line goes to the valve and which end goes to the ducting.

NOTE: The end fittings on the sense line are not always the same.

(b) Loosen the B-nut and disconnect the sense line from the union [6].

(c) Remove the union [6] from the trim air pressure regulating and shutoff valve [1].

(d) Remove and discard the packings [7].

SUBTASK 21-62-01-020-004

(4) Do these steps to remove the hose assembly:

(a) Loosen the B-nut to disconnect the hose assembly from the trim air pressure regulating and shutoff valve [1].

(b) Remove the union [6] from the trim air pressure regulating and shutoff valve [1].



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(c) Remove and discard the packing [7].

SUBTASK 21-62-01-020-005

**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

(5) To remove the trim air pressure regulating and shutoff valve [1], do these steps:

(a) Loosen the two clamps [2].

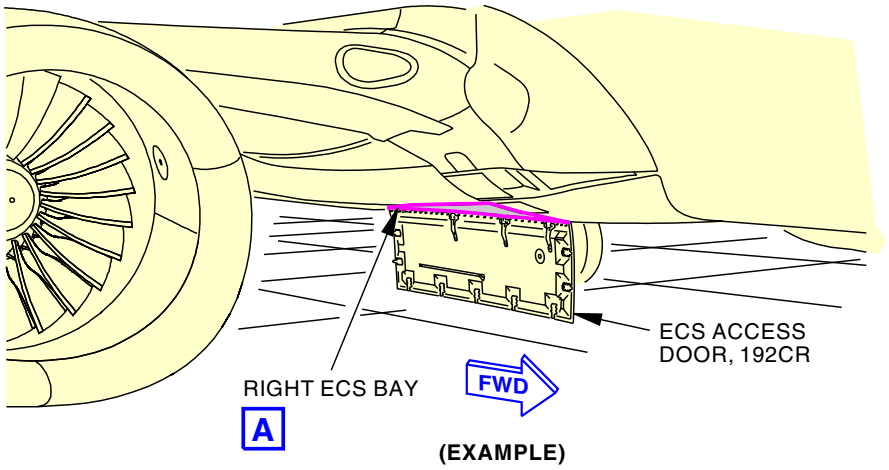
(b) Move the clamps [2] to the adjacent ducts.

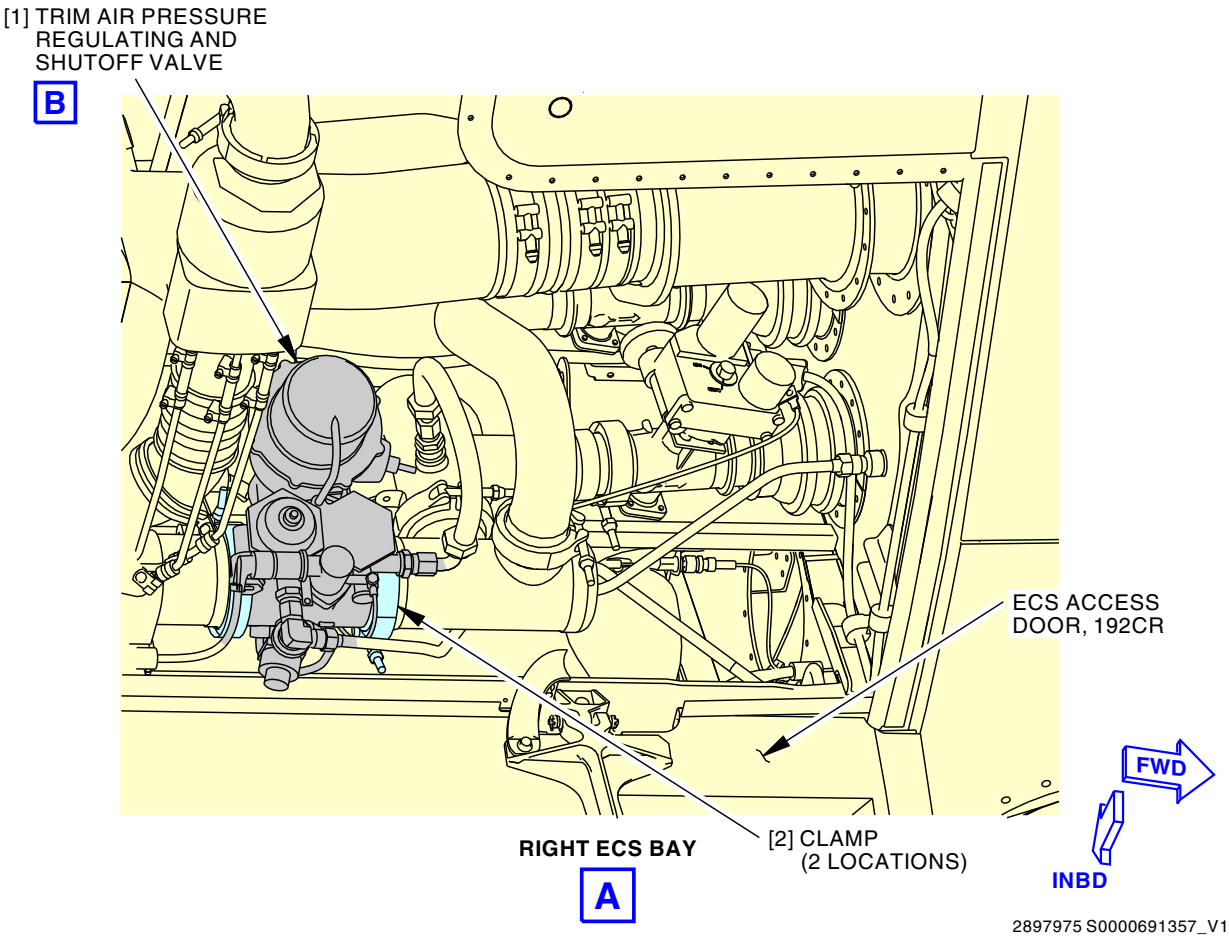
(c) Remove the trim air pressure regulating and shutoff valve [1] from the ECS bay.

——— END OF TASK ———



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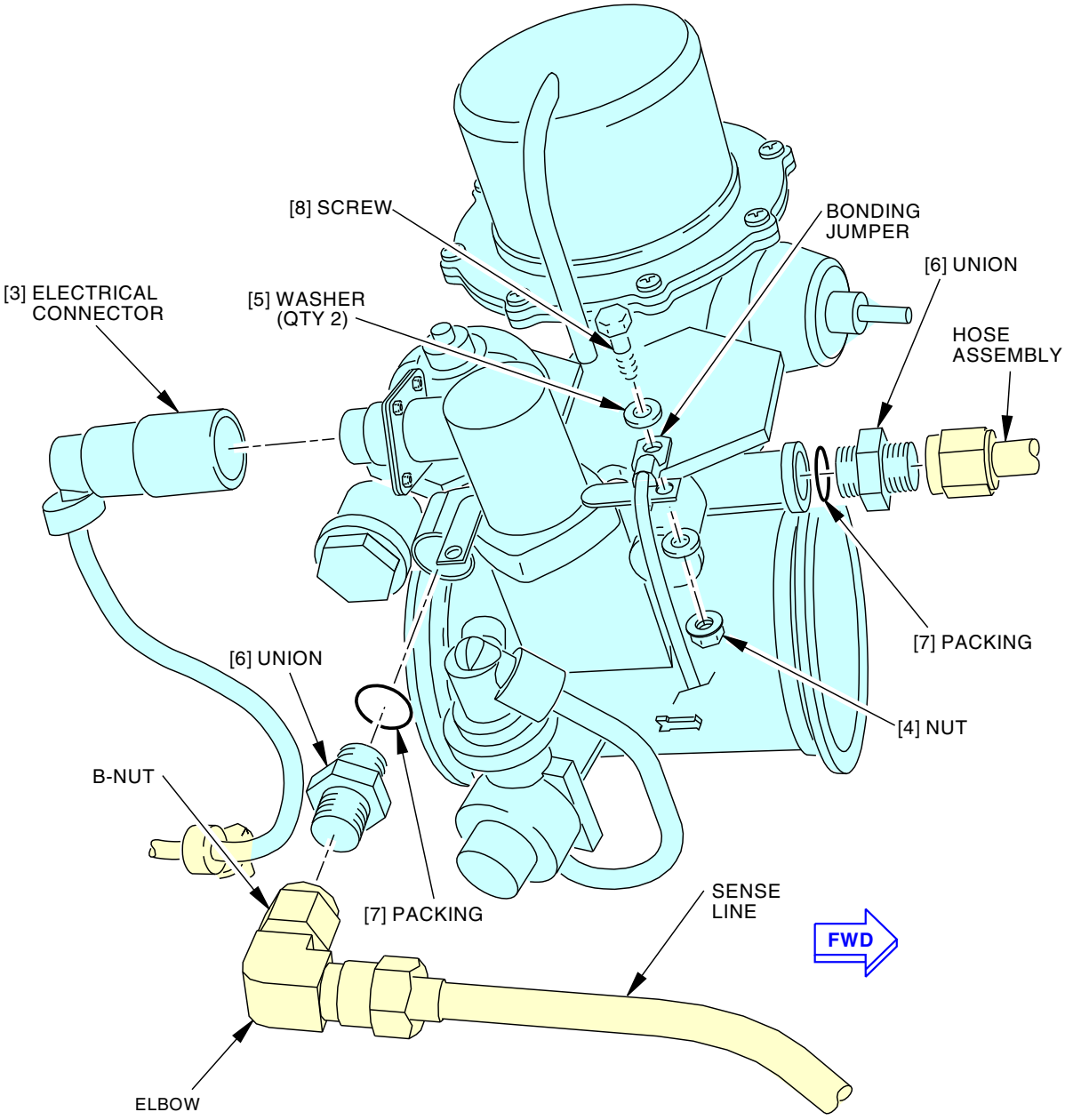



**Trim Air Pressure Regulating and Shutoff Valve Installation**
**Figure 401/21-62-01-990-801 (Sheet 1 of 2)**



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**TRIM AIR PRESSURE REGULATING AND SHUTOFF VALVE**

**B**

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**Trim Air Pressure Regulating and Shutoff Valve Installation**
**Figure 401/21-62-01-990-801 (Sheet 2 of 2)**



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**TASK 21-62-01-400-801**

## 3. Trim Air Pressure Regulating and Shutoff Valve Installation

(Figure 401)

### A. References

| Reference | Title |
|---|---|
| 36-00-00-860-801 | Supply Pressure to the Pneumatic System (Selection) (P/B 201) |
| 36-00-00-860-806 | Remove Pressure from the Pneumatic System (P/B 201) |

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1550 | Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550).<br>Part #: 620LK Supplier: 1CRL2<br>Part #: M1 Supplier: 3AD17<br>Part #: M1B Supplier: 3AD17<br>Part #: T477W (C15292) Supplier: 06659 |
| STD-858 | Tag - DO NOT OPERATE |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00006 | Compound - Antiseize Pure Nickel Special - Never-Seez NSBT | |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Trim air pressure regulating and shutoff valve | 21-62-01-01-010 | SIA ALL |
| 7 | Packing | 21-62-01-01-095 | SIA ALL |

### E. Location Zones

| Zone | Area |
|---|---|
| 120 | Subzone - Body Station 396 to Body Station 540 |
| 230 | Subzone - Passenger Compartment - Body Station 360.00 to 663.75 |

### F. Access Panels

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

### G. Trim Air Pressure Regulating and Shutoff Valve Installation

**SUBTASK 21-62-01-420-001**

(1) To install the trim air pressure regulating and shutoff valve [1], do these steps:

(a) Put the trim air pressure regulating and shutoff valve [1] in its position between the ducts.

1) Make sure the flow arrow on the valve points in the forward direction.



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(b) Rotate the trim air pressure regulating and shutoff valve [1] to make sure that there is a minimum distance of 0.75 in. (1.90 cm) between the trim air pressure regulating and shutoff valve [1] and the bottom of the keel beam.

1) Make sure that there is a minimum clearance of 0.15 in. (0.38 cm) between the structure, tubes and clamps [2].

(c) Loosely install the clamps [2].

**SUBTASK 21-62-01-420-002**

(2) To install the sense line on the trim air pressure regulating and shutoff valve [1], do these steps:

(a) Install a new packing [7] on the union [6].

(b) Apply a thin layer of Never-Seez NSBT compound, D00006, to the threads of the union [6].

(c) Install the union [6] on the trim air pressure regulating and shutoff valve [1].

(d) Install the sense line on the union [6]:

1) Make sure that you install the same end of the sense line to the trim air pressure regulating and shutoff valve [1] as you noted during the removal.

NOTE: Some sense lines have different end fittings.

**SUBTASK 21-62-01-020-006**

(3) Do these steps to install the hose assembly:

(a) Install a new packing [7] on the union [6].

(b) Apply a thin layer of Never-Seez NSBT compound, D00006, to the threads of the union [6].

(c) Install the union [6] on the trim air pressure regulating and shutoff valve [1].

(d) Install the hose assembly on the union [6].

**SUBTASK 21-62-01-020-007**

(4) Do these steps to install the bonding jumper:

(a) Put the bonding jumper in its position on the trim air pressure regulating and shutoff valve [1].

(b) Install the screw [8], washer [5], and nut [4] that hold the bonding jumper to the trim air pressure regulating and shutoff valve [1].

(c) With an intrinsically safe approved bonding meter, COM-1550, make sure that the bonding resistance between the trim air pressure regulating and shutoff valve [1] and the bonding jumper is a maximum of 0.0025 ohm (2.5 milliohms).

**SUBTASK 21-62-01-020-008**

(5) Install the electrical connector [3] on the trim air pressure regulating and shutoff valve [1].

**SUBTASK 21-62-01-420-003**

(6) Torque the clamps [2] to 60 in-lb (6.8 N·m) - 65 in-lb (7.3 N·m).



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## H. Trim Air Pressure Regulating and Shutoff Valve Test

SUBTASK 21-62-01-860-005

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-4**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01172 | AIR CONDITIONING TRIM AIR PRESS |

SUBTASK 21-62-01-860-006

(2) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 21-62-01-860-007

(3) Do these steps on the P5-10 air conditioning panel:

(a) Set the L and R PACK switches to the AUTO position and remove the DO NOT OPERATE tags, STD-858.

(b) Set the BLEED 1 and 2 switches to the ON position and remove the DO NOT OPERATE tags, STD-858.

(c) Set the BLEED APU switch to the ON position and remove the DO NOT OPERATE tag, STD-858.

SUBTASK 21-62-01-860-008

(4) Do these steps on the P5-17 Cabin Temperature Panel:

(a) Set the TRIM AIR switch to the ON position and remove the DO NOT OPERATE tag, STD-858.

(b) Set the CONT CAB selector to the fully WARM position and remove the DO NOT OPERATE tag, STD-858.

(c) Set the FWD CAB selector to the fully COLD position and remove the DO NOT OPERATE tag, STD-858.

(d) Set the AFT CAB selector to the fully COLD position and remove the DO NOT OPERATE tag, STD-858.

SUBTASK 21-62-01-860-009

(5) Operate the pack for a minute to let the output temperature become stable.

SUBTASK 21-62-01-860-010

(6) Do these steps on the P5-17 Cabin Temperature Panel:

(a) Set AIR TEMP selector to the each of the three SUPPLY DUCT positions (AFT, FWD and CONT CAB)

(b) Make a record of the temperature shown on the indicator for each of the three SUPPLY DUCT positions.

(c) Make sure the supply duct temperature for the CONT CAB is higher than the supply duct temperatures for the FWD and the AFT.

## I. Trim Air Pressure Regulating and Shutoff Valve Leakage Test

SUBTASK 21-62-01-790-001

(1) Do a soap bubble test of the duct joints at the trim air pressure regulating and shutoff valve [1].

NOTE: No air leakage is permitted.

(a) If there is leakage, do these steps:

1) Put the L PACK and R PACK switches to the OFF position.



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**WARNING** DO NOT TOUCH THE COOLING PACK DUCTS WHEN THEY ARE HOT. THE COOLING PACK DUCTS CAN BE HOT AND CAN CAUSE INJURY TO PERSONS.

2) Loosen the clamps [2].
3) Make sure the ducts are aligned at the joints.
4) Tighten the clamp [2].
5) Put the L PACK and R PACK switches to the AUTO position.
6) Make sure the leak is repaired.

## J. Put the Airplane Back to Its Usual Condition

SUBTASK 21-62-01-010-002

(1) Close these access panels:

| Number | Name/Location |
|---|---|
| 192CR | ECS Access Door |
| 192DR | ECS High Pressure Access Door |

SUBTASK 21-62-01-860-011

(2) Remove pneumatic power if it is not necessary (TASK 36-00-00-860-806).

——— END OF TASK ———



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