CHAPTER

78

EXHAUST

(LEAP-1B ENGINES)

BOEING

737-7/8/8200/9/10
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 78
EXHAUST

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1 thru 9	Sep 15/2023	
10	BLANK	
78-CONTENTS		
1	Jan 15/2023	
O 2	Sep 15/2023	
O 3	Sep 15/2023	
4	Jan 15/2022	
O 5	Sep 15/2023	
6	May 15/2023	
O 7	Sep 15/2023	
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10	Sep 15/2021	
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12	Sep 15/2021	
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R 902	Sep 15/2023	
R 903	Sep 15/2023	
R 904	Sep 15/2023	C
R 905	Sep 15/2023	C
R 906	Sep 15/2023	
R 907	Sep 15/2023	
R 908	Sep 15/2023	C
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O 231	Sep 15/2023	
O 232	Sep 15/2023	
O 233	Sep 15/2023	

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

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O 236	Sep 15/2023	
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506	Sep 15/2021	

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706	Sep 15/2021	
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411	Jan 15/2023	

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R 405	Sep 15/2023	
R 406	Sep 15/2023	
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404	Jan 15/2023	
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O 412	Sep 15/2023	
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O 416	Sep 15/2023	
78-31-04		
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Subject/Page	Date	COC
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O 407	Sep 15/2023	
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408	Sep 15/2021	

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406	Sep 15/2021	

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602	Sep 15/2021	
603	Sep 15/2021	
604	Sep 15/2021	
605	Sep 15/2021	
606	BLANK	
78-31-24		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
78-34-01		
401	Jan 15/2023	
402	Jan 15/2023	
403	Jan 15/2023	
404	Sep 15/2021	
405	Jan 15/2023	
406	May 15/2023	
407	May 15/2023	
408	May 15/2023	
409	Sep 15/2021	
410	Sep 15/2021	
78-34-03		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	

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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 15/2021	
413	Sep 15/2021	
414	Sep 15/2021	
415	Sep 15/2021	
416	BLANK	
78-34-03		
501	May 15/2023	
502	Sep 15/2022	
503	Sep 15/2022	
504	Sep 15/2022	
505	Sep 15/2021	
506	Sep 15/2021	
507	Sep 15/2021	
508	Sep 15/2021	
78-34-04		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
405	Sep 15/2021	
R 406	Sep 15/2023	
407	May 15/2023	
R 408	Sep 15/2023	
R 409	Sep 15/2023	
R 410	Sep 15/2023	
O 411	Sep 15/2023	
412	BLANK	

Subject/Page	Date	COC
78-34-04		
501	Sep 15/2021	
502	May 15/2023	
503	Sep 15/2021	
504	Sep 15/2021	
505	Sep 15/2021	
506	May 15/2023	
507	Sep 15/2021	
508	May 15/2022	
509	Sep 15/2021	
510	Sep 15/2021	
78-34-05		
401	Sep 15/2021	
402	BLANK	
78-34-07		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
R 405	Sep 15/2023	
R 406	Sep 15/2023	
78-34-08		
401	Sep 15/2021	
402	Jan 15/2023	
403	Jan 15/2023	
404	Jan 15/2023	
405	Jan 15/2023	
406	Jan 15/2023	
407	Jan 15/2023	
408	Jan 15/2023	
78-34-09		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	BLANK	
78-34-09		
601	Sep 15/2021	
602	Sep 15/2021	

Subject/Page	Date	COC
78-34-10		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
405	Sep 15/2021	
406	Jan 15/2022	
407	Sep 15/2021	
408	Sep 15/2021	
78-34-10		
501	May 15/2022	
502	May 15/2022	
503	May 15/2022	
504	Sep 15/2021	
505	Sep 15/2021	
506	May 15/2023	
507	Sep 15/2021	
508	Sep 15/2021	
78-34-10		
601	Sep 15/2021	
602	Sep 15/2021	
603	Sep 15/2021	
604	Sep 15/2021	
605	Sep 15/2021	
606	BLANK	
78-34-11		
401	May 15/2023	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
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406	May 15/2023	
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78-36-02		
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405	Sep 15/2021							
406	Sep 15/2021							
407	Sep 15/2021							
408	BLANK							
78-36-02								
501	Sep 15/2022							
502	Jan 15/2023							
503	Sep 15/2021							
504	Sep 15/2021							
505	Sep 15/2021							
506	May 15/2022							
507	Sep 15/2021							
508	Sep 15/2021							

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737-7/8/8200/9/10
AIRCRAFT MAINTENANCE MANUAL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
EXHAUST - DDG MAINTENANCE PROCEDURES	78-00-00		901	SIA ALL
DDG 78-31-01 Thrust Reversers Inoperative - Preparation TASK 78-00-00-040-801-G00			901	SIA ALL
DDG 78-31-01 Thrust Reversers Inoperative - Restoration TASK 78-00-00-440-801-G00			908	SIA ALL
TURBINE EXHAUST SYSTEM - INSPECTION/CHECK	78-11-00		601	SIA ALL
Labyrinth Seals Inspection TASK 78-11-00-210-801-G00			601	SIA ALL
Primary Nozzle Assembly and Primary Plug Assembly Inspection TASK 78-11-00-210-802-G00			604	SIA ALL
PRIMARY NOZZLE ASSEMBLY - REMOVAL/INSTALLATION	78-11-01	2	401	SIA ALL
Primary Nozzle Assembly Removal TASK 78-11-01-000-801-G00		2	401	SIA ALL
Primary Nozzle Assembly Installation TASK 78-11-01-400-801-G00		2	408	SIA ALL
PRIMARY PLUG ASSEMBLY - REMOVAL/INSTALLATION	78-11-02	2	401	SIA ALL
Primary Plug Assembly Removal TASK 78-11-02-000-801-G00		2	401	SIA ALL
Primary Plug Assembly Installation TASK 78-11-02-400-801-G00		2	408	SIA ALL
CENTER VENT TUBE EXTENSION - REMOVAL/INSTALLATION	78-11-03		401	SIA ALL
Center Vent Tube Extension Removal TASK 78-11-03-000-801-G00			401	SIA ALL
Center Vent Tube Extension Installation TASK 78-11-03-400-801-G00			406	SIA ALL
CENTER VENT TUBE - INSPECTION/CHECK	78-11-03		601	SIA ALL
Center Vent Tube Extension (CVTE) Inspection TASK 78-11-03-210-801-G00			601	SIA ALL

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THRUST REVERSER SYSTEM - MAINTENANCE PRACTICES	78-31-00		201	SIA ALL
Open the Thrust Reverser (Selection) TASK 78-31-00-010-801-G00			201	SIA ALL
Close the Thrust Reverser (Selection) TASK 78-31-00-010-802-G00			201	SIA ALL
Open the Thrust Reverser (Hydraulic Pump Procedure) TASK 78-31-00-000-801-G00			202	SIA ALL
Close the Thrust Reverser (Hydraulic Pump Procedure) TASK 78-31-00-410-801-G00			213	SIA ALL
Open the Thrust Reverser (Sling Procedure) TASK 78-31-00-010-803-G00			217	SIA ALL
Close the Thrust Reverser (Sling Procedure) TASK 78-31-00-410-802-G00			220	SIA ALL
Thrust Reverser Operation - Extend (Selection) TASK 78-31-00-980-801-G00			223	SIA ALL
Thrust Reverser Operation - Retract (Selection) TASK 78-31-00-980-802-G00			224	SIA ALL
Thrust Reverser Operation - Extend (Manual Procedure) TASK 78-31-00-980-803-G00			224	SIA ALL
Thrust Reverser Operation - Retract (Manual Procedure) TASK 78-31-00-980-804-G00			231	SIA ALL
Thrust Reverser Operation - Extend (Power Procedure) TASK 78-31-00-980-805-G00			235	SIA ALL
Thrust Reverser Operation - Retract (Power Procedure) TASK 78-31-00-980-806-G00			241	SIA ALL
Thrust Reverser Deactivation For Ground Maintenance TASK 78-31-00-040-801-G00			245	SIA ALL

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Thrust Reverser Activation After Ground Maintenance TASK 78-31-00-440-801-G00			250	SIA ALL
THRUST REVERSER SYSTEM - ADJUSTMENT/TEST	78-31-00		501	SIA ALL
Thrust Reverser Operational Test (Selection) TASK 78-31-00-700-801-G00			501	SIA ALL
Thrust Reverser System Normal Operational Test TASK 78-31-00-700-802-G00			501	SIA ALL
Thrust Reverser Operational Test (Standby Hydraulic System) TASK 78-31-00-700-803-G00			510	SIA ALL
Thrust Reverser Locks Operational Test TASK 78-31-00-700-804-G00			520	SIA ALL
Thrust Reverser Proximity Sensors Operational Test TASK 78-31-00-700-805-G00			532	SIA ALL
Thrust Reverser Annunciator Lights Operational Test TASK 78-31-00-700-806-G00			538	SIA ALL
Scheduled Maintenance Task for EEC Faults - Reverser Sensor TASK 78-31-00-700-807-G00			540	SIA ALL
THRUST REVERSER - REMOVAL/INSTALLATION	78-31-01		401	SIA ALL
Thrust Reverser Removal TASK 78-31-01-000-801-G00			401	SIA ALL
Thrust Reverser Installation TASK 78-31-01-400-801-G00			429	SIA ALL
THRUST REVERSER - ADJUSTMENT/TEST	78-31-01		501	SIA ALL
Thrust Reverser Adjustment TASK 78-31-01-820-801-G00			501	SIA ALL
THRUST REVERSER - INSPECTION/CHECK	78-31-01		601	SIA ALL
Thrust Reverser Fan Duct Wall Inspection TASK 78-31-01-200-801-G00			601	SIA ALL

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Thrust Reverser Cowl Hinge Inspection TASK 78-31-01-211-801-G00			605	SIA ALL
Pre-Cooler Kiss Seal Inspection TASK 78-31-01-211-802-G00			609	SIA ALL
Thrust Reverser Inner and Outer V-Blade Inspection TASK 78-31-01-211-803-G00			614	SIA ALL
Thrust Reverser Outer V-Blade Seal Inspection TASK 78-31-01-211-804-G00			620	SIA ALL
Thrust Reverser Outer V-Blade Inspection TASK 78-31-01-211-805-G00			623	SIA ALL
Thrust Reverser Fire Seal Inspection TASK 78-31-01-211-806-G00			626	SIA ALL
Thrust Reverser Rigging Check TASK 78-31-01-280-801-G00			630	SIA ALL
Composite Inner Wall Inspection TASK 78-31-01-211-807-G00			634	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
Composite Inner Wall Inlet and Exhaust Ports TASK 78-31-01-210-801-G00			636	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
THRUST REVERSER- CLEANING/PAINTING	78-31-01		701	SIA ALL
Thrust Reverser Witness Mark Installation TASK 78-31-01-370-801-G00			701	SIA ALL
Thrust Reverser Acoustic Surfaces Cleaning TASK 78-31-01-160-801-G00			705	SIA ALL
THRUST REVERSER - REPAIRS	78-31-01		801	SIA ALL
Thrust Reverser Hinge Beam Fire Wall Replacement TASK 78-31-01-960-801-G00			801	SIA ALL
Blocker Door Support Assembly Replacement TASK 78-31-01-960-802-G00			806	SIA ALL
Through Stud Replacement TASK 78-31-01-960-803-G00			809	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
TRANSLATING SLEEVE - REMOVAL/INSTALLATION	78-31-02		401	SIA ALL
Translating Sleeve Removal TASK 78-31-02-000-801-G00			401	SIA ALL

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Translating Sleeve Installation TASK 78-31-02-400-801-G00			412	SIA ALL
TRANSLATING SLEEVE - INSPECTION/CHECK	78-31-02		601	SIA ALL
Translating Sleeve Inspection TASK 78-31-02-200-801-G00			601	SIA ALL
Main Slider and Auxiliary Slider Inspection TASK 78-31-02-200-802-G00			606	SIA ALL
Engine Thrust Reverser Hinge Beam and Latch Beam Primary Track and Translating Sleeve Primary Slider General Visual Inspection for Wear with the Thrust Reverser Deployed TASK 78-31-02-210-801-G00			608	SIA ALL
Thrust Reverser Actuator Attach Fitting Visual Inspection TASK 78-31-02-200-803-G00			610	SIA ALL
Thrust Reverser Actuator Attach Fitting Detailed Inspection TASK 78-31-02-200-804-G00			614	SIA ALL
Engine Thrust Reverser Hinge Beam and Latch Beam Secondary Track and Translating Sleeve Secondary Slider General Visual Inspection for Wear with the Thrust Reverser Deployed TASK 78-31-02-210-802-G00			620	SIA ALL
THRUST REVERSER HYDRAULIC ACTUATORS - REMOVAL/INSTALLATION	78-31-03		401	SIA ALL
Thrust Reverser Hydraulic Actuator Removal (Selection) TASK 78-31-03-000-801-G00			401	SIA ALL
Thrust Reverser Hydraulic Actuator Installation (Selection) TASK 78-31-03-400-801-G00			401	SIA ALL
Upper Locking Hydraulic Actuator Removal TASK 78-31-03-000-802-G00			401	SIA ALL
Upper Locking Hydraulic Actuator Installation TASK 78-31-03-400-802-G00			417	SIA ALL
Middle Locking Hydraulic Actuator Removal TASK 78-31-03-000-803-G00			423	SIA ALL

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Middle Locking Hydraulic Actuator Installation TASK 78-31-03-400-803-G00			439	SIA ALL
Lower Hydraulic Actuator Removal TASK 78-31-03-000-804-G00			444	SIA ALL
Lower Hydraulic Actuator Installation TASK 78-31-03-400-804-G00			457	SIA ALL
THRUST REVERSER HYDRAULIC ACTUATORS - INSPECTION/CHECK	78-31-03		601	SIA ALL
Thrust Reverser Hydraulic Actuator Rod End Inspection TASK 78-31-03-610-801-G00			601	SIA ALL
THRUST REVERSER HYDRAULIC ACTUATORS - REPAIRS	78-31-03		801	SIA ALL
Manual Unlock Handle Assembly Replacement TASK 78-31-03-300-801-G00			801	SIA ALL
SYNC SHAFT - REMOVAL/INSTALLATION	78-31-04		401	SIA ALL
Sync Shaft Removal TASK 78-31-04-000-801-G00			401	SIA ALL
Sync Shaft Installation TASK 78-31-04-400-801-G00			411	SIA ALL
SYNC SHAFT - INSPECTION/CHECK	78-31-04		601	SIA ALL
Sync Shaft Inspection TASK 78-31-04-200-801-G00			601	SIA ALL
CASCADES - REMOVAL/INSTALLATION	78-31-05		401	SIA ALL
Cascade Removal TASK 78-31-05-000-801-G00			401	SIA ALL
Cascade Installation TASK 78-31-05-400-801-G00			405	SIA ALL
CASCADE - INSPECTION/CHECK	78-31-05		601	SIA ALL
Thrust Reverser Cascade Segments Inspection TASK 78-31-05-200-801-G00			601	SIA ALL
BLOCKER DOORS - REMOVAL/INSTALLATION	78-31-06		401	SIA ALL
Blocker Door Removal TASK 78-31-06-000-801-G00			401	SIA ALL

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BLOCKER DOORS - INSPECTION/CHECK	78-31-06		601	SIA ALL
Blocker Door Visual Inspection TASK 78-31-06-200-801-G00			601	SIA ALL
Blocker Door Hinge Attachments and Bearings Inspection TASK 78-31-06-211-801-G00			608	SIA ALL
BLOCKER DOOR DRAG LINKS - MAINTENANCE PRACTICES	78-31-07		201	SIA ALL
Drag Link Spherical Bearing Removal and Inspection TASK 78-31-07-900-801-G00			201	SIA ALL
BLOCKER DOOR DRAG LINKS - REMOVAL/INSTALLATION	78-31-07		401	SIA ALL
Blocker Door Drag Link Removal TASK 78-31-07-000-801-G00			401	SIA ALL
Blocker Door Drag Link Installation TASK 78-31-07-400-801-G00			407	SIA ALL
THRUST REVERSER OPENING ACTUATOR - MAINTENANCE PRACTICES	78-31-08		201	SIA ALL
Fill and Bleed Procedure TASK 78-31-08-870-801-G00			201	SIA ALL
THRUST REVERSER OPENING ACTUATOR - REMOVAL/INSTALLATION	78-31-08		401	SIA ALL
Thrust Reverser Opening Actuator Removal TASK 78-31-08-000-801-G00			401	SIA ALL
Thrust Reverser Opening Actuator Installation TASK 78-31-08-400-801-G00			406	SIA ALL
KRUEGER FLAP DEFLECTOR AND PLUG - REMOVAL/INSTALLATION	78-31-09		401	SIA ALL
Krueger Flap Deflector Removal TASK 78-31-09-010-801-G00			401	SIA ALL
Krueger Flap Deflector Installation TASK 78-31-09-420-801-G00			405	SIA ALL

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Krueger Flap Deflector Inspection TASK 78-31-09-200-801-G00			601	SIA ALL
RUBSTRIP - REMOVAL/INSTALLATION	78-31-10		401	SIA ALL
Rubstrip Removal TASK 78-31-10-000-801-G00			401	SIA ALL
Rubstrip Installation TASK 78-31-10-400-801-G00			412	SIA ALL
TENSION LATCHES - REMOVAL/INSTALLATION	78-31-11		401	SIA ALL
Tension Latch Removal TASK 78-31-11-000-801-G00			401	SIA ALL
Tension Latch Installation TASK 78-31-11-400-801-G00			407	SIA ALL
TENSION LATCHES - ADJUSTMENT/TEST	78-31-11		501	SIA ALL
Latches Adjustment TASK 78-31-11-820-801-G00			501	SIA ALL
FIRE SEAL - REMOVAL/INSTALLATION	78-31-12		401	SIA ALL
Fire Seal Removal TASK 78-31-12-000-801-G00			401	SIA ALL
Fire Seal Installation TASK 78-31-12-400-801-G00			420	SIA ALL
FIRE SEAL - INSPECTION/CHECK	78-31-12		601	SIA ALL
Fire Seal Inspection (Visual Check) TASK 78-31-12-200-801-G00			601	SIA ALL
Fire Seal Inspection (Detailed) TASK 78-31-12-200-802-G00			603	SIA ALL
Fire Seal Compression Check TASK 78-31-12-800-801-G00			609	SIA ALL
FIRE SEAL - REPAIR	78-31-12		801	SIA ALL
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Insulation Blankets - Removal TASK 78-31-13-000-801-G00			401	SIA ALL
Insulation Blankets - Installation TASK 78-31-13-400-801-G00			411	SIA ALL
INSULATION BLANKET - INSPECTION/CHECK	78-31-13		601	SIA ALL
Insulation Blankets Inspection TASK 78-31-13-200-802-G00			601	SIA ALL
Insulation Blanket Seal Inspection TASK 78-31-13-211-801-G00			609	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
INSULATION BLANKET - REPAIRS	78-31-13		801	SIA ALL
Insulation Blanket Repair TASK 78-31-13-300-801-G00			801	SIA ALL
PRECOOLER INLET DUCT GUIDE VANE - REMOVAL/INSTALLATION	78-31-14		401	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
Pre-cooler Inlet Duct Guide Vane Removal TASK 78-31-14-000-801-G00			401	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
Pre-cooler Inlet Duct Guide Vane Installation TASK 78-31-14-400-801-G00			406	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
PRECOOLER INLET DUCT SEAL	78-31-15		401	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
Pre-cooler Inlet Duct Seal - Removal TASK 78-31-15-000-801-G00			401	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
Pre-cooler Inlet Duct Seal - Installation TASK 78-31-15-400-801-G00			405	SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL
PRESSURE RELIEF DOOR - REMOVAL/INSTALLATION	78-31-16		401	SIA ALL
Pressure Relief Door Removal TASK 78-31-16-000-801-G00			401	SIA ALL
Pressure Relief Door Installation TASK 78-31-16-400-801-G00			407	SIA ALL
BULLNOSE SEAL - REMOVAL/INSTALLATION	78-31-23		401	SIA ALL
Bullnose Seal Removal TASK 78-31-23-000-801-G00			401	SIA ALL

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BULLNOSE SEAL - INSPECTION/CHECK	78-31-23		601	SIA ALL
Bullnose Seal Inspection TASK 78-31-23-200-801-G00			601	SIA ALL
BLOCKER DOOR AERO SEAL - REMOVAL/INSTALLATION	78-31-24		401	SIA ALL
Blocker Door Aero Seal Removal TASK 78-31-24-000-801-G00			401	SIA ALL
Blocker Door Aero Seal Installation TASK 78-31-24-400-801-G00			404	SIA ALL
THRUST REVERSER CONTROL VALVE MODULE - REMOVAL/INSTALLATION	78-34-01		401	SIA ALL
Control Valve Module Removal TASK 78-34-01-000-801-G00			401	SIA ALL
Control Valve Module Installation TASK 78-34-01-400-801-G00			406	SIA ALL
THRUST REVERSER SLEEVE LOCK PROXIMITY SENSOR - REMOVAL/INSTALLATION	78-34-03		401	SIA ALL
Thrust Reverser Sleeve Lock Proximity Sensor Removal TASK 78-34-03-000-801-G00			401	SIA ALL
Thrust Reverser Sleeve Lock Proximity Sensor Installation TASK 78-34-03-400-801-G00			412	SIA ALL
THRUST REVERSER SLEEVE LOCK PROXIMITY SENSOR - ADJUSTMENT/TEST	78-34-03		501	SIA ALL
Sleeve Lock Proximity Sensor Adjustment and Test TASK 78-34-03-800-801-G00			501	SIA ALL
THRUST REVERSER CONTROL SWITCH - REMOVAL/INSTALLATION	78-34-04		401	SIA ALL
Control Switch Removal TASK 78-34-04-000-801-G00			401	SIA ALL
Control Switch Installation TASK 78-34-04-400-801-G00			407	SIA ALL

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THRUST REVERSER ARM, STOW AND SYNC LOCK SWITCHES - REMOVAL/INSTALLATION	78-34-05		401	SIA ALL
Thrust Reverser Arm, Stow and Sync Lock Switches Removal TASK 78-34-05-000-801-G00			401	SIA ALL
VOLUMETRIC HYDRAULIC FUSES - REMOVAL/INSTALLATION	78-34-07		401	SIA ALL
Standby System Volumetric Hydraulic Fuse Removal TASK 78-34-07-000-802-G00			401	SIA ALL
Standby System Volumetric Hydraulic Fuse Installation TASK 78-34-07-400-802-G00			405	SIA ALL
THRUST REVERSER SHUTTLE VALVE - REMOVAL/INSTALLATION	78-34-08		401	SIA ALL
Thrust Reverser Shuttle Valve Removal TASK 78-34-08-000-801-G00			401	SIA ALL
Thrust Reverser Shuttle Valve Installation TASK 78-34-08-400-801-G00			407	SIA ALL
THRUST REVERSER CONTROL SWITCH ACTUATION SPRING - REMOVAL/INSTALLATION	78-34-09		401	SIA ALL
Actuation Spring Removal TASK 78-34-09-000-801-G00			401	SIA ALL
Actuation Spring Installation TASK 78-34-09-400-801-G00			403	SIA ALL
THRUST REVERSER CONTROL SWITCH ACTUATION SPRING - INSPECTION/CHECK	78-34-09		601	SIA ALL
Actuation Spring Free Angle Check TASK 78-34-09-200-801-G00			601	SIA ALL

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CHAPTER 78
EXHAUST

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
THRUST REVERSER SYNC LOCK - REMOVAL/INSTALLATION	78-34-10		401	SIA ALL
Thrust Reverser Sync Lock Removal TASK 78-34-10-000-801-G00			401	SIA ALL
Thrust Reverser Sync Lock Installation TASK 78-34-10-400-801-G00			406	SIA ALL
THRUST REVERSER SYNC LOCK - ADJUSTMENT/TEST	78-34-10		501	SIA ALL
Sync Lock Manual Integrity Test When Hydraulic Power Is Not Available TASK 78-34-10-700-801-G00			501	SIA ALL
Sync Lock Manual Integrity Test When Hydraulic Power Is Available TASK 78-34-10-700-802-G00			507	SIA ALL
THRUST REVERSER SYNC LOCK - INSPECTION/CHECK	78-34-10		601	SIA ALL
Sync Lock Control Relay Hot Short Protection Check TASK 78-34-10-710-801-G00			601	SIA ALL
STOW HYDRAULIC PRESSURE SWITCH - REMOVAL/INSTALLATION	78-34-11		401	SIA ALL
Stow Hydraulic Pressure Switch Removal TASK 78-34-11-000-801-G00			401	SIA ALL
Stow Hydraulic Pressure Switch Installation TASK 78-34-11-400-801-G00			406	SIA ALL
LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT) - REMOVAL/INSTALLATION	78-36-02		401	SIA ALL
LVDT Removal TASK 78-36-02-000-801-G00			401	SIA ALL
LVDT Installation TASK 78-36-02-400-801-G00			405	SIA ALL
LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT) - ADJUSTMENT/TEST	78-36-02		501	SIA ALL
Linear Variable Differential Transformer (LVDT) - Adjustment TASK 78-36-02-820-801-G00			501	SIA ALL

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EXHAUST - DDG MAINTENANCE PROCEDURES

1. General

A. This procedure has maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Guide (DDG). These tasks are used to 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. This procedure has these tasks:

(1) DDG 78-31-01 Thrust Reversers Inoperative - Preparation

(2) DDG 78-31-01 Thrust Reversers Inoperative - Restoration.

TASK 78-00-00-040-801-G00

2. DDG 78-31-01 Thrust Reversers Inoperative - Preparation

(Figure 901)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one thrust reverser inoperative.

(2) There are two methods you can use to prepare the airplane for flight with the thrust reverser inoperative:

(a) Use Method 1 when you are able to deploy and stow the thrust reverser with hydraulic power.

(b) Use Method 2 when you are not able to deploy and stow the thrust reverser with hydraulic power.

(3) These are the conditions for this task:

NOTE: These conditions are applicable to Method 1 and Method 2.

(a) One thrust reverser may be inoperative provided the inoperative thrust reverser is secured in the forward thrust position.

(b) On the P5 aft overhead panel:

1) The REVERSER LIMITED indication light for the inoperative thrust reverser can be illuminated.

2) The REVERSER LIMITED indication light for the operational thrust reverser must not be illuminated.

(c) Make sure that the two sync locks on the inoperative thrust reverser are in the locked position.

(d) Install the deactivation pins in the left and right thrust reverser sleeves of the inoperative thrust reverser.

(e) Make sure that the applicable thrust reverser sleeve position indications on the EPCS maintenance data page are correct.

(f) Lockwire the reverse thrust lever for the inoperative thrust reverser to the applicable forward thrust lever with MS20995C32 lockwire, G01048.

(g) Attach a REVERSER INOP tag to the applicable reverse thrust lever.

(h) Attach an INOP placard on the applicable REVERSER LIMITED indication light.

(i) Open the applicable circuit breakers and attach lock collars.

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B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-34-10-700-801-G00	Sync Lock Manual Integrity Test When Hydraulic Power Is Not Available (P/B 501)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. 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

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare the Airplane for Dispatch with One Thrust Reverser Inoperative - Method 1

SUBTASK 78-00-00-040-003-G00

(1) If you are able to deploy and stow the thrust reverser with hydraulic power, do the steps that follow to prepare the airplane for dispatch with one thrust reverser inoperative:

(a) Do this task: Test No. 38 - Thrust Reverser Cycle Special Functions, TASK 71-00-00-700-816-G00.

NOTE: This task will permit ground operation of the thrust reverser.

WARNING

MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Move the applicable reverse thrust lever up and aft to fully deploy the thrust reverser.

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(c) For the left engine, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(d) For the right engine, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

(e) Move the applicable reverse thrust lever down and forward to the stow position.

1) Make sure that the thrust reverser sleeves do not move to the stowed position.

NOTE: This is the indication that the sync locks are in the locked position.

CAUTION

MAKE SURE THAT YOU PUT THE THRUST REVERSER LEVER TO THE DEPLOY POSITION BEFORE YOU CLOSE THE CIRCUIT BREAKERS. IF YOU DO NOT PUT THE THRUST REVERSER LEVER TO THE DEPLOY POSITION, YOU CAN CAUSE DAMAGE THE SYNC LOCK UNIT.

(f) Move the applicable reverse thrust lever up and aft to the deploy position.

(g) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(h) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

(i) Move the applicable reverse thrust lever down and forward to move the thrust reverser to the fully stowed position.

(j) After you stow the thrust reverser, select the STOP FUNCTION to complete the special function (TASK 46-13-02-860-802).

NOTE: The EEC MAINT POWER function on the MISC SYSTEM CTRLS page on the Multi Function Display (MFD) will remain in TEST. Electronic Engine Control (EEC) power is necessary for the steps that follow.

(k) Erase the thrust reverser related MAX Display System (MDS) status messages that are currently displayed.

NOTE: It is acceptable for the T/R related faults to appear again.

(l) Make sure that the thrust reverser sleeve indications on the EPCS maintenance data page are correct as follows:

1) Get access to the EPCS maintenance data page (TASK 71-00-00-970-801-G00).

2) On EPCS page 1, make sure that the T/R SLEEVE L and T/R SLEEVE R indications on the applicable engine show 0.0 ± 4.0.

(m) Lockwire the reverse thrust lever for the inoperative thrust reverser to the applicable forward thrust lever with MS20995C32 lockwire, G01048.

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(n) Install a REVERSER INOP tag on the reverse thrust lever for the inoperative thrust reverser.

(o) Install an INOP placard on the applicable REVERSER LIMITED indication light on the P5 aft overhead panel.

(p) For the left engine, open these circuit breakers and install safety locks:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(q) For the right engine, open these circuit breakers and install safety locks:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

(r) Install the 315A6258 deactivation pins [1] in the left and right thrust reverser sleeves on the applicable engine:

SIA SIA SIA NOTE: The two deactivation pins [1] are contained in a storage bag in the storage area under the First Observer's Seat. You must install one deactivation pin [1] in each of the thrust reverser sleeves.

SIA SIA 1) Get the two deactivation pins [1] that are in a storage bag in the storage area under the First Observer's Seat.

2) Put Never-Seez NSBT compound, D00006, on the threads of the deactivation pins [1].

3) Install one deactivation pin [1] in the right thrust reverser sleeve and one deactivation pin [1] in the left thrust reverser sleeve.

a) Make sure that the deactivation pins [1] go through the deactivation pin holes and into the deactivation fitting on the thrust reverser torque box.

b) Tighten the deactivation pins [1] to 160 ±5 in-lb (18 ±1 N·m).

NOTE: When installed correctly, the gap between the head of the deactivation pin and outer cowl is approximately 0.4 in. (10.2 mm).

(s) Do a check of the MAINT light, on the P5 aft overhead panel, and ENGINE CONTROL light, on the engine control panel.

1) If the MAINT light or the ENGINE CONTROL light is on, do a check on the Onboard Maintenance Function (OMF) for recent EEC faults.

2) Go to the IFIM and do the applicable procedure(s).

SUBTASK 78-00-00-860-006-G00

(2) Set the applicable EEC MAINT POWER function on the MISC SYSTEM CTRLS page, on the MFD, to NORM (TASK 73-21-00-800-801-G00).

F. Prepare the Airplane for Dispatch with One Thrust Reverser Inoperative - Method 2

SUBTASK 78-00-00-040-001-G00

(1) Prepare the airplane for dispatch with one thrust reverser inoperative as follows:

NOTE: You will do the steps that follow if you are not able to operate the thrust reverser.

(a) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

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(b) Make sure that the sync locks on the left and right thrust reverser halves are in the locked position (TASK 78-34-10-700-801-G00).

(c) Do the steps that follow to make sure that the thrust reverser sleeve indications on the EPCS maintenance data page are correct:

1) Get access to the EPCS maintenance data page.

2) On EPCS page 1, make sure that the T/R SLEEVE L and T/R SLEEVE R indications on the applicable engine show 0.0 ± 4.0.

(d) Lockwire the reverse thrust lever for the inoperative thrust reverser to the applicable forward thrust lever with MS20995C32 lockwire, G01048.

(e) Install a REVERSER INOP tag on the reverse thrust lever for the inoperative thrust reverser.

(f) Install an INOP placard on the applicable REVERSER LIMITED indication light on the P5 aft overhead panel.

(g) For the left engine, open these circuit breakers and install safety locks:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(h) For the right engine, open these circuit breakers and install safety locks:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

(i) Do these steps to install the deactivation pins [1] on the thrust reverser sleeves:

1) Install the deactivation pin [1] in the left and right thrust reverser sleeves on the applicable engine as follows:

SIA

NOTE: The two deactivation pins [1] are contained in a storage bag in the storage area under the First Observer's Seat. You must install one deactivation pin [1] in each of the thrust reverser sleeves.

SIA
SIA
SIA

a) Get the two deactivation pins [1] that are in a storage bag in the storage area under the First Observer's Seat.

SIA
SIA

b) Put Never-Seez NSBT compound, D00006, on the threads of the two deactivation pins [1].

c) Install one deactivation pin [1] in the right thrust reverser sleeve and one deactivation pin [1] in the left thrust reverser sleeve.

<1> Make sure that the deactivation pins [1] go through the deactivation pin holes and into the deactivation fitting on the thrust reverser torque box.

<2> Tighten the deactivation pins [1] to 160 ±5 in-lb (18 ±1 N·m).

NOTE: When installed correctly, the gap between the head of the deactivation pin and outer cowl is approximately 0.4 in. (10.2 mm).

(j) Pressurize the applicable hydraulic system (TASK 29-11-00-860-801).

(k) Make sure that the actuator lock handles on either the upper or middle locking actuator of both thrust reverser halves is in the locked position.

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(l) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(m) Do a check of the MAINT light, on the P5 aft overhead panel, and ENGINE CONTROL light, on the engine control panel.

1) If the MAINT light or the ENGINE CONTROL light is on, do a check on the OMF for recent EEC faults.

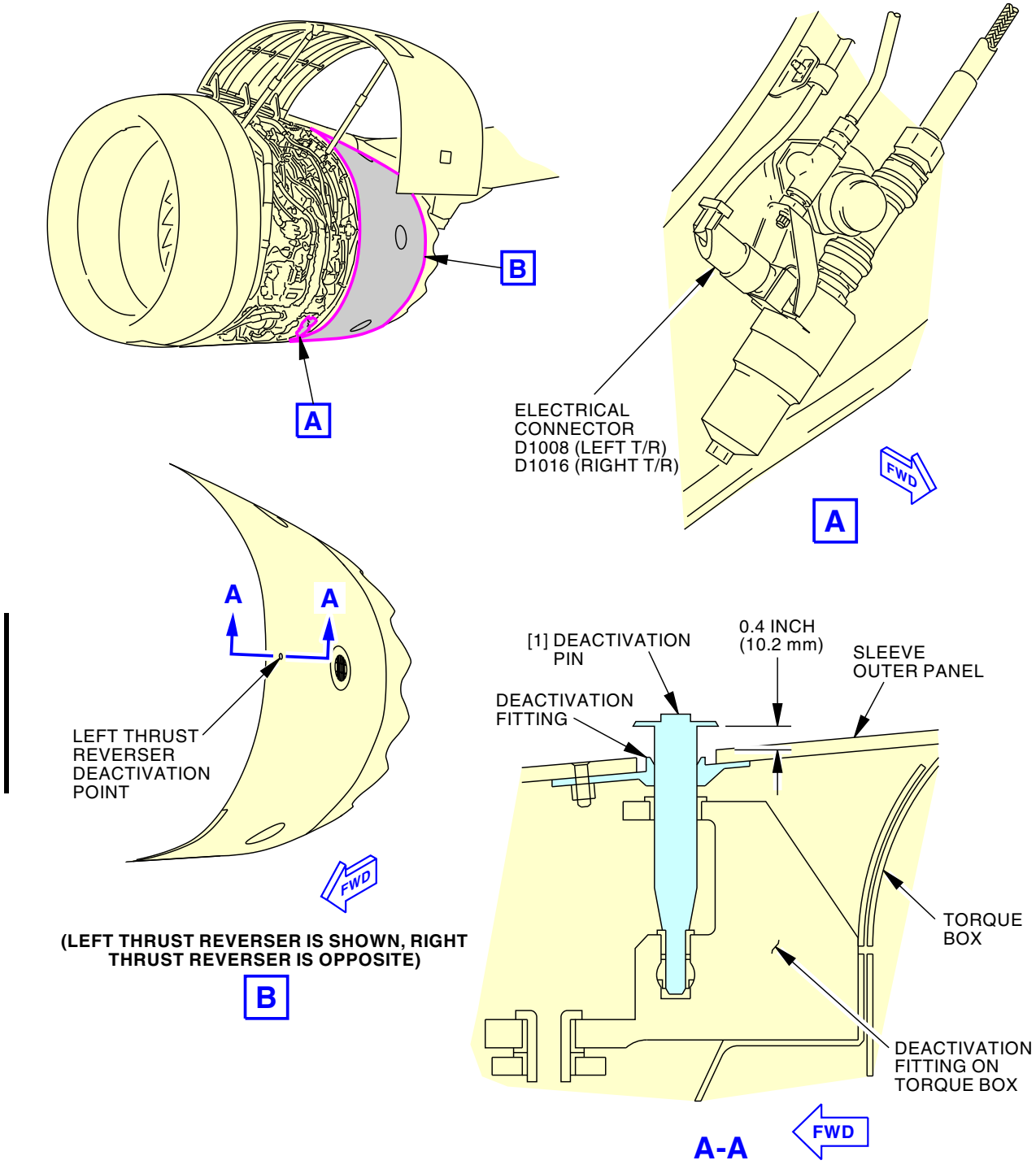
2) Go to the IFIM and do the applicable procedure(s).

SUBTASK 78-00-00-810-002-G00

(2) 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 ———

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Thrust Reverser Sleeve Deactivation
Figure 901/78-00-00-990-801-G00

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TASK 78-00-00-440-801-G00

3. DDG 78-31-01 Thrust Reversers Inoperative - Restoration

(Figure 901)

A. General

(1) This task puts the airplane back to its usual condition after operation with an inoperative thrust reverser.

B. References

Reference	Title
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Procedure

SUBTASK 78-00-00-440-001-G00

(1) Remove the 315A6258 deactivation pins [1] from the left and right thrust reverser sleeves on the applicable engine:

NOTE: You must remove the deactivation pins from each of the thrust reverser sleeves.

SIA (a) Put the deactivation pins [1] in the storage bag in the storage area under the First
SIA Observer's Seat and stow on the airplane.

SUBTASK 78-00-00-860-003-G00

(2) For the left engine, remove the safety locks and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For the right engine, remove the safety locks and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-00-00-860-004-G00

(3) Remove the lockwire and REVERSER INOP tag from the applicable reverse thrust lever.

SUBTASK 78-00-00-860-005-G00

(4) Remove the INOP placard from the REVERSER LIMITED light, on the P5 aft overhead panel.

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E. MAINT Light Status Message

SUBTASK 78-00-00-750-001-G00

(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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TURBINE EXHAUST SYSTEM - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has these tasks:

(1) A visual check of the labyrinth seals on the primary nozzle that are on the aft cowl panels on the left and right thrust reversers.

(2) A visual check of the primary nozzle and plug for damage.

TASK 78-11-00-210-801-G00

2. Labyrinth Seals Inspection

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions for a visual check of the labyrinth seals that are on the primary nozzle.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Prepare for the Inspection

SUBTASK 78-11-00-010-001-G00

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

D. Labyrinth Seals Inspection

SUBTASK 78-11-00-900-001-G00

(1) Do a check for missing bolts, nuts, and washers that attach the labyrinth seal to the primary nozzle assembly.

(a) Missing bolts, nuts, and washers are not permitted.

(b) Replace the missing components.

SUBTASK 78-11-00-210-001-G00

(2) Do a visual check of the labyrinth seals on the primary nozzle for damage:

(a) Cracks, nicks, gouges, scratches, holes or punctures.

1) If you find damage, refer to the structural repair manual for the permitted limits.

2) If you find damage that is more than the limits, replace the labyrinth seals.

NOTE: Report to Boeing via Service Request when the seals are replaced.

SUBTASK 78-11-00-210-002-G00

(3) Do a visual check for missing labyrinth seals:

(a) If you find missing labyrinth seals, replace the labyrinth seals.

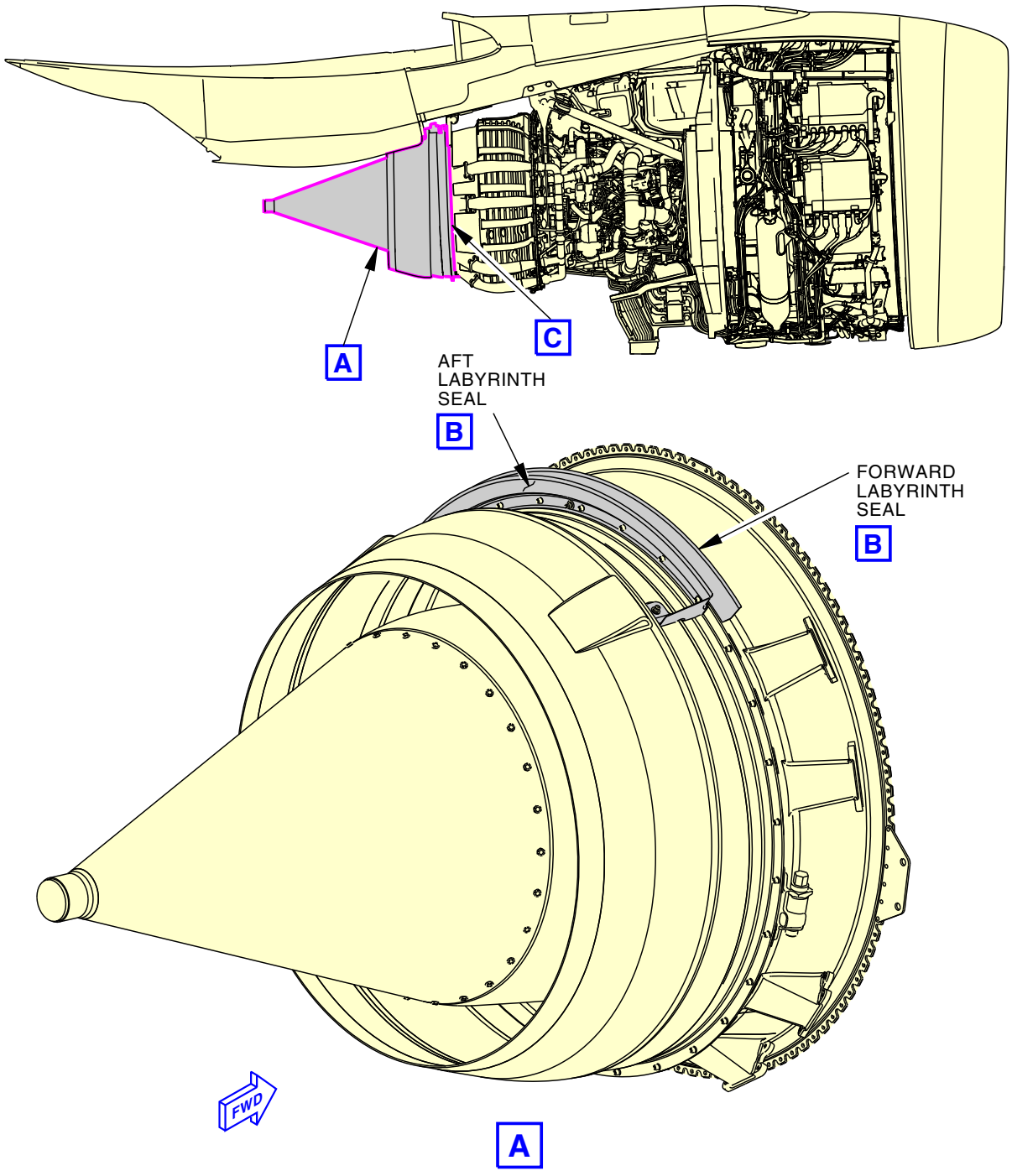
E. Put the Airplane Back to Its Usual Condition

SUBTASK 78-11-00-410-001-G00

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

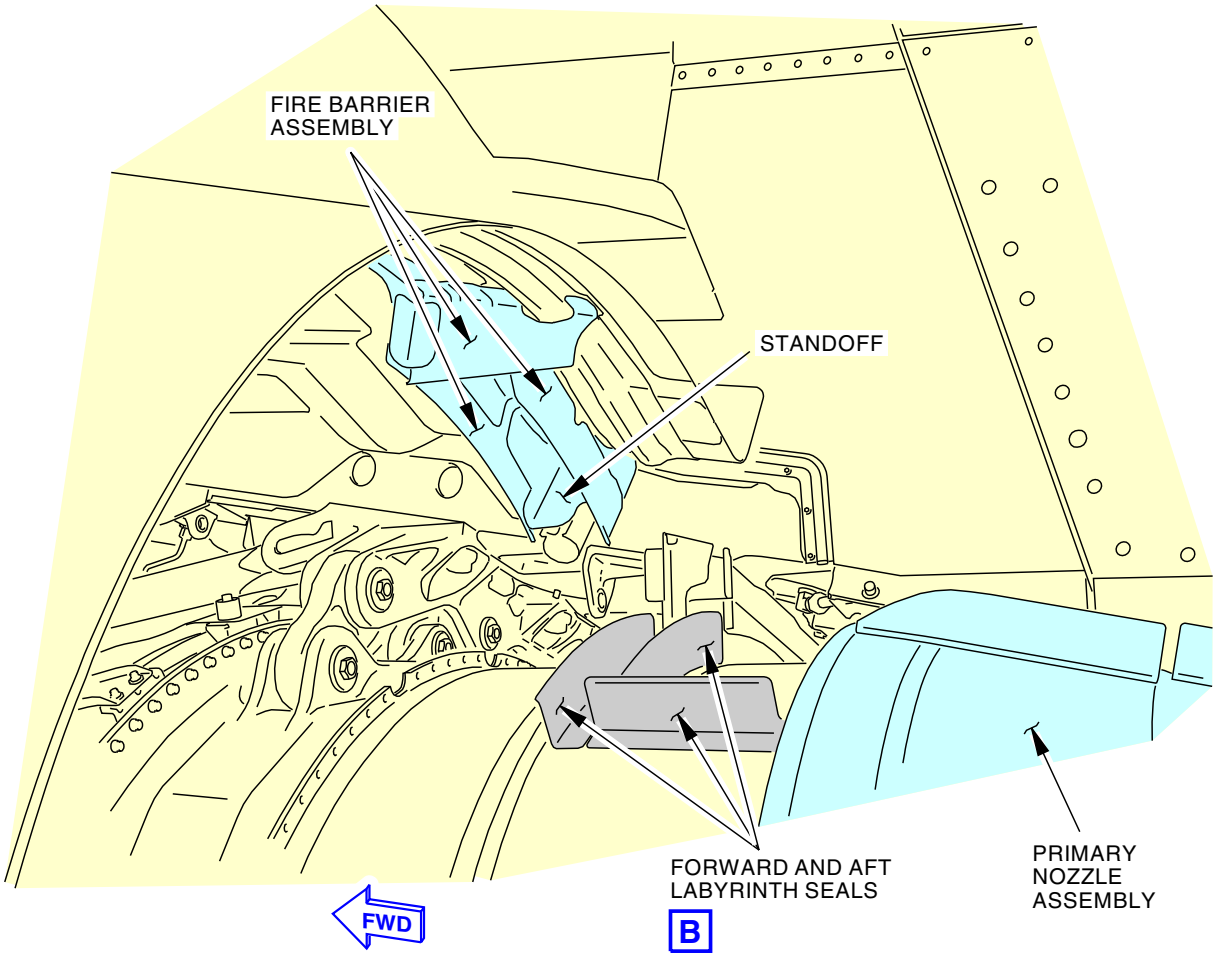
END OF TASK

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Labyrinth Seals Inspection
Figure 601/78-11-00-990-804-G00 (Sheet 1 of 2)

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Labyrinth Seals Inspection
Figure 601/78-11-00-990-804-G00 (Sheet 2 of 2)

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TASK 78-11-00-210-802-G00

3. Primary Nozzle Assembly and Primary Plug Assembly Inspection

(Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions on how to examine the primary nozzle and plug assemblies.

B. References

Reference	Title
78-11-01-000-801-G00	Primary Nozzle Assembly Removal (P/B 401)
78-11-01-400-801-G00	Primary Nozzle Assembly Installation (P/B 401)
78-11-02-000-801-G00	Primary Plug Assembly Removal (P/B 401)
78-11-02-400-801-G00	Primary Plug Assembly Installation (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Nozzle side rubstrip	78-11-01-02-110	SIA ALL

E. Prepare for the Inspection

SUBTASK 78-11-00-860-004-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-11-00-010-005-G00

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

F. Primary Nozzle Assembly and Primary Plug Assembly Inspection

SUBTASK 78-11-00-210-005-G00

(1) Do a visual check of the primary nozzle assembly and primary plug assembly for damage as follows:

NOTE: The gap between the plug assembly and the Center Vent Tube Extension (CVTE) averages 0.0200 in. (0.5080 mm). The CVTE may contact the plug assembly. This is permitted.

(a) Nicks, gouges, scratches, cracks, dents, holes or punctures.

1) If you find nicks, gouges, scratches, cracks or dents, refer to THE BOEING COMPANY 737-MAX SRM 54-40-02 for the permitted limits and repair procedures.

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2) For the primary nozzle assembly, if you find holes or punctures, replace the primary nozzle (TASK 78-11-01-000-801-G00 and TASK 78-11-01-400-801-G00).

SIA 015-999; SIA 001-014 POST SB 737-78-1101

a) Remove and replace the nozzle side rubstrip [1] when 30% or less of the original material thickness remains.

NOTE: Wearing of the fastener heads are unacceptable.

SIA ALL

3) For the primary plug assembly, if you find holes or punctures, replace the primary plug (TASK 78-11-02-000-801-G00 and TASK 78-11-02-400-801-G00).

SUBTASK 78-11-00-210-006-G00

(2) Do a visual check for loose or missing bolts that hold the primary nozzle assembly and primary plug assembly in its position as follows

(a) Loose or missing bolts are not permitted.

1) For the primary nozzle assembly, replace and tighten the bolts (TASK 78-11-01-400-801-G00).

2) For the primary plug assembly, replace and tighten the bolts (TASK 78-11-02-400-801-G00).

G. Put the Airplane Back to its Usual Condition

SUBTASK 78-11-00-010-006-G00

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-11-00-860-005-G00

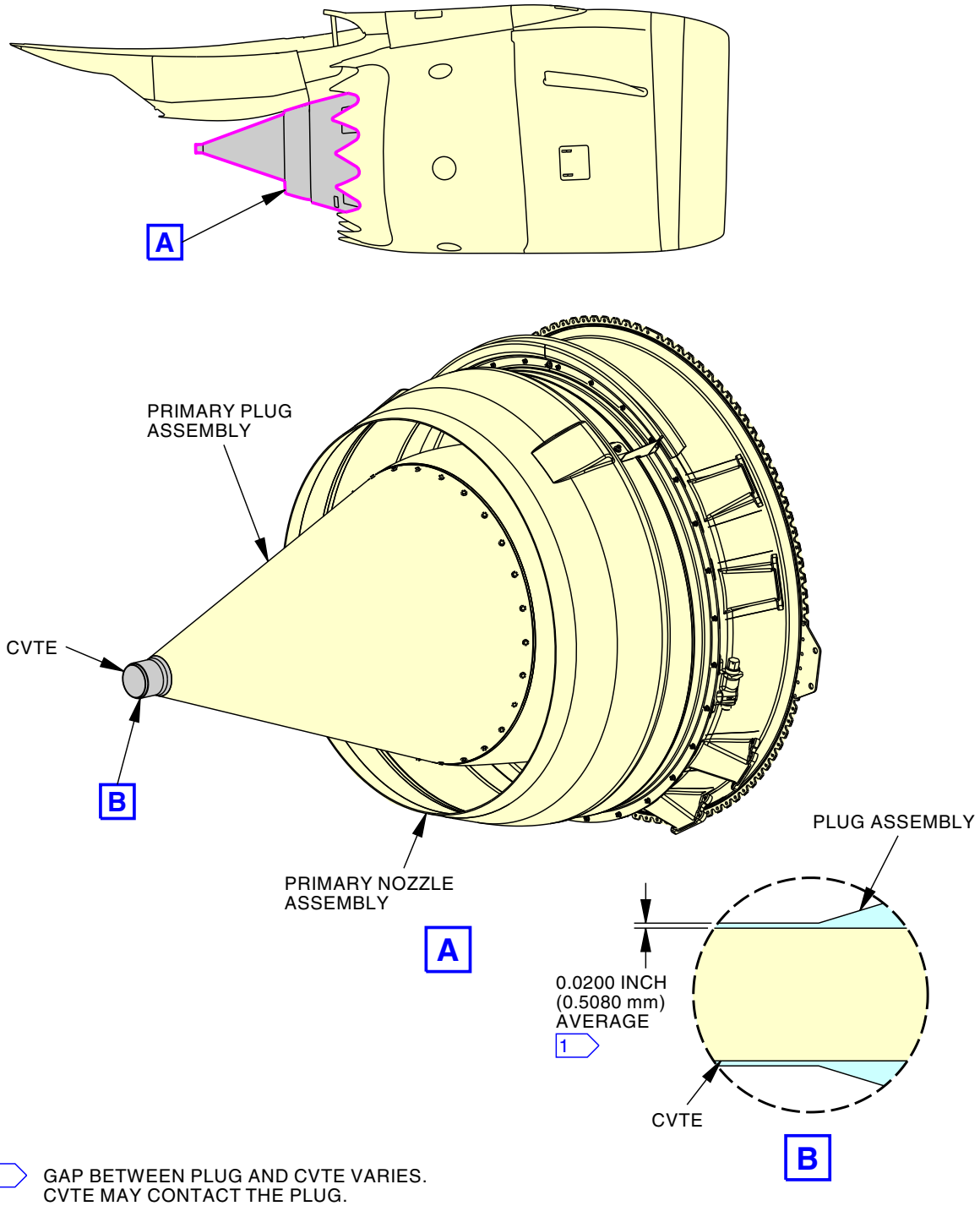
(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

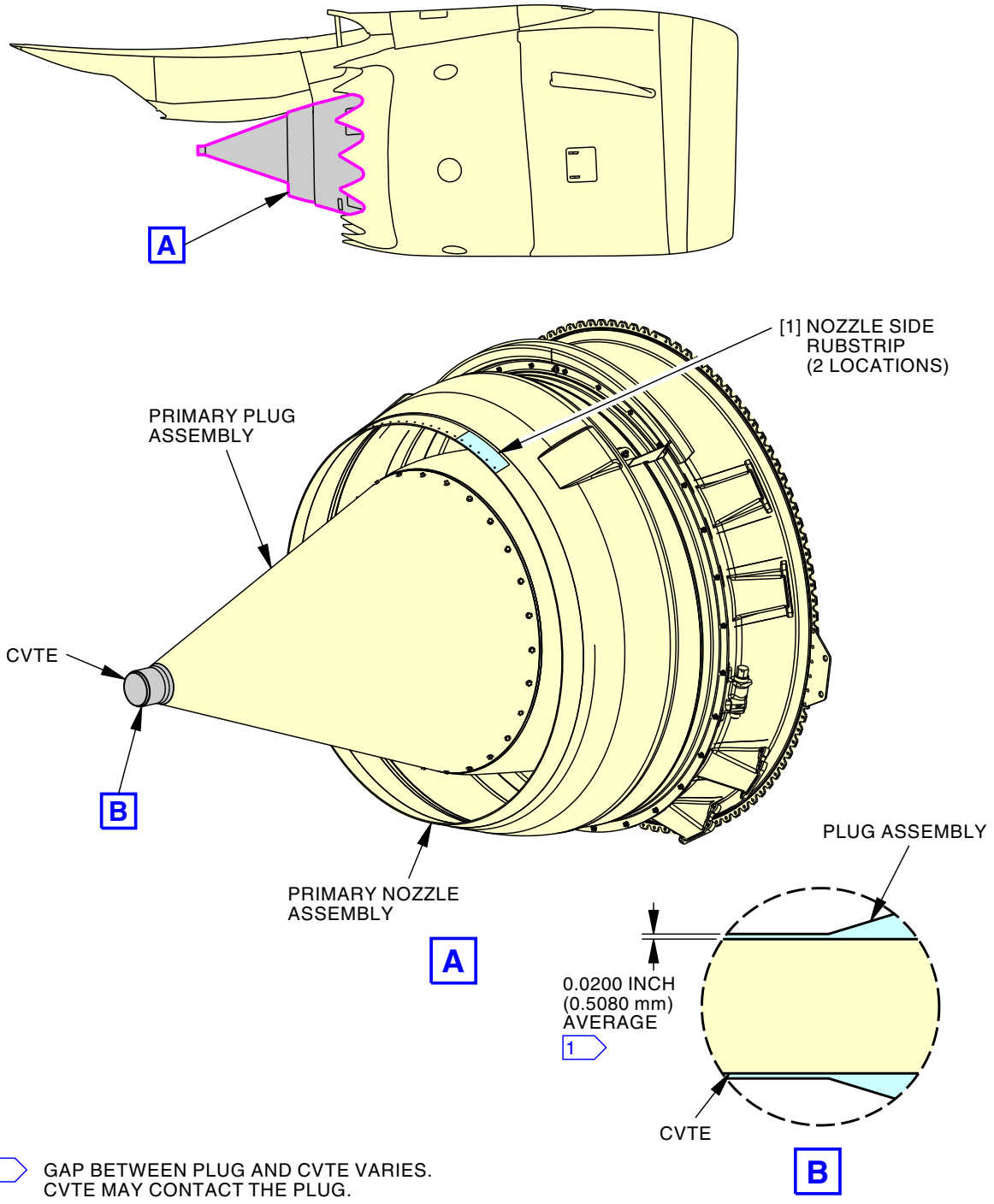
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Primary Nozzle Assembly and Primary Plug Assembly Inspection
Figure 602/78-11-00-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 GAP BETWEEN PLUG AND CVTE VARIES. CVTE MAY CONTACT THE PLUG.

2355122 S00061516587_V4

Primary Nozzle Assembly and Primary Plug Assembly Inspection
Figure 602/78-11-00-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRIMARY NOZZLE ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the primary nozzle assembly

(2) An installation of the primary nozzle assembly.

TASK 78-11-01-000-801-G00

2. Primary Nozzle Assembly Removal

(Figure 401 and Figure 402)

A. General

(1) This task gives the instructions on how to remove the primary nozzle assembly.

(2) The primary nozzle is on the aft end of the power plant and attached to the turbine rear frame outer flange.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (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-1568	Jack - Hydraulic, General Low Profile Part #: B67563 Supplier: 36251 Part #: HW93718 Supplier: 28047 Opt Part #: W93718 Supplier: 36251
SPL-2419	Equipment - Handling, Primary Exhaust Sleeve and Plug Part #: C78009-88 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-11-01-040-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-11-01-010-001-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Primary Nozzle Assembly Removal

SUBTASK 78-11-01-020-001-G00

WARNING BE CAREFUL WHEN YOU DO WORK ON THE ENGINE PARTS AFTER THE ENGINE IS STOPPED. THE ENGINE PARTS CAN STAY HOT FOR ALMOST ONE HOUR. DO NOT TOUCH HOT PARTS WITHOUT APPLICABLE GLOVES. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Remove the primary nozzle [12], forward labyrinth seal [17], and duct vent valve [18] as follows:

(a) Attach the jack adapter from the equipment, SPL-2419, to the low profile hydraulic jack, COM-1568.

(b) Attach the jack adapter to the primary nozzle [12] with the straps.

CAUTION MAKE SURE TO ATTACH THE STRAPS ALONG THE CONTINUOUS SURFACE OF THE PRIMARY NOZZLE ONLY. DO NOT ATTACH THE STRAPS ACROSS THE COMPONENTS ON TOP OF THE PRIMARY NOZZLE. IF YOU DO NOT OBEY, DAMAGE TO THE PRIMARY NOZZLE CAN OCCUR.

(c) Make sure that the jack supports the weight of the primary primary nozzle [12].

(d) Remove the two bolts [13], two countersunk washers [14], two flat washers [15], two nuts [16], and duct vent valve [18].

(e) Remove the two bolts [1], two countersunk washers [2], two flat washers [3], and two nuts [4] from two holes, one at each end of the forward labyrinth seal [17].

(f) Remove the six bolts [5], six countersunk washers [6], and six nuts [7] from the top 6 holes of the primary nozzle [12].

CAUTION BE CAREFUL WHEN YOU REMOVE/TOUCH THE FORWARD LABYRINTH SEAL. IF YOU DO NOT OBEY, DAMAGE TO THE FORWARD LABYRINTH SEAL CAN OCCUR.

(g) Remove the forward labyrinth seal [17].

(h) Remove the remaining 20 bolts [8], 20 countersunk washers [9], 20 flat washers [10], and 20 nuts [11] from the lower 20 holes of the primary nozzle [12].

(i) Move the primary nozzle [12] slightly aft to disengage the alignment pin from the turbine rear frame.

SUBTASK 78-11-01-020-002-G00

CAUTION LOWER THE PRIMARY NOZZLE UNTIL THE AFT LABYRINTH SEALS ARE DISENGAGED. IF YOU DO NOT LOWER THE NOZZLE SUFFICIENTLY, DAMAGE TO THE AFT LABYRINTH SEALS CAN OCCUR. IF YOU LOWER THE PRIMARY NOZZLE TOO MUCH, DAMAGE TO THE PRIMARY PLUG ASSEMBLY CAN OCCUR.

(2) Lower the primary nozzle [12] until the two labyrinth seals are disengaged.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-11-01-020-003-G00

(3) Move the primary nozzle [12] aft until it is clear of the primary plug assembly.

SUBTASK 78-11-01-020-004-G00

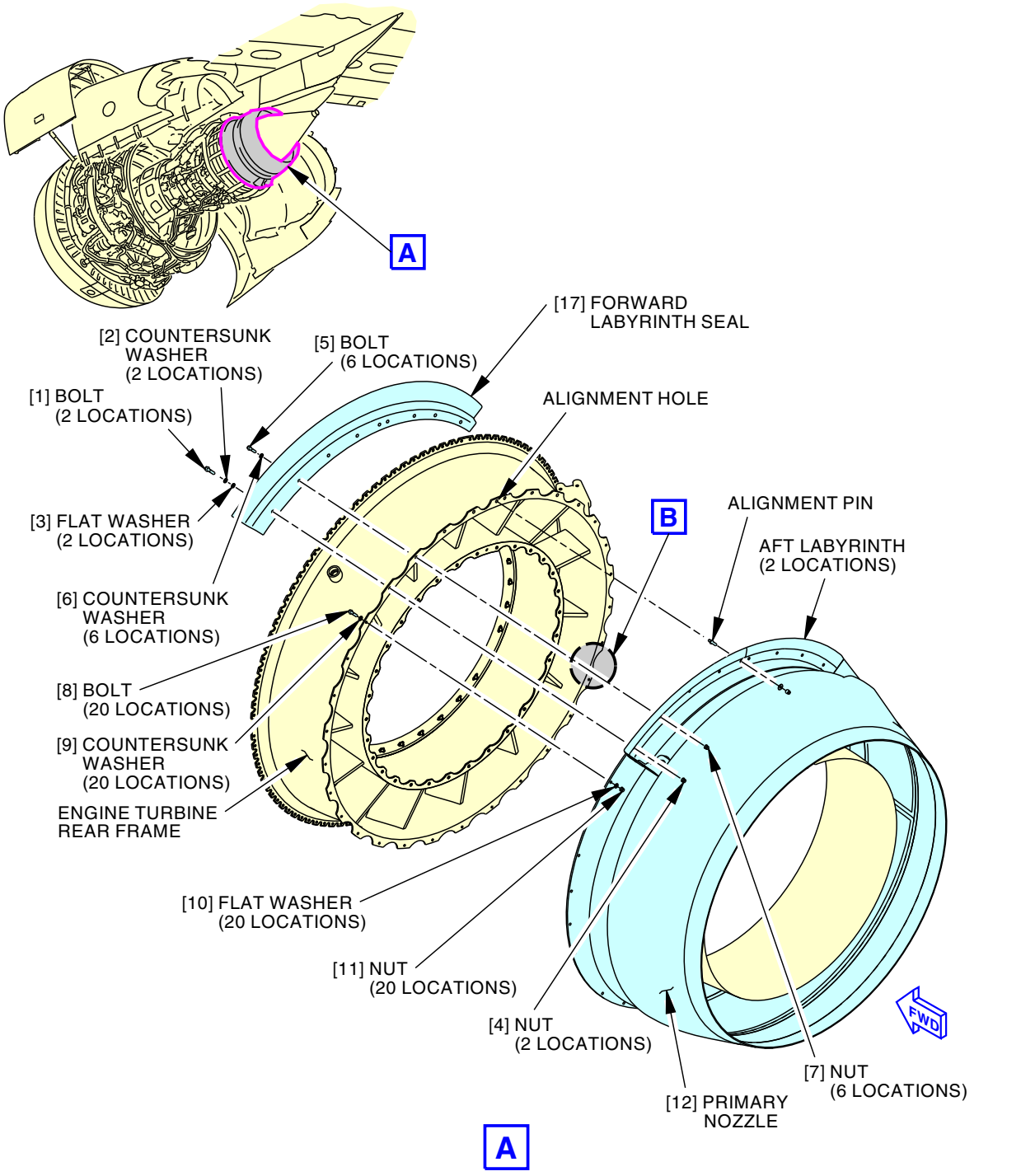
WARNING

GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(4) Remove the primary nozzle [12] from the jack adapter.

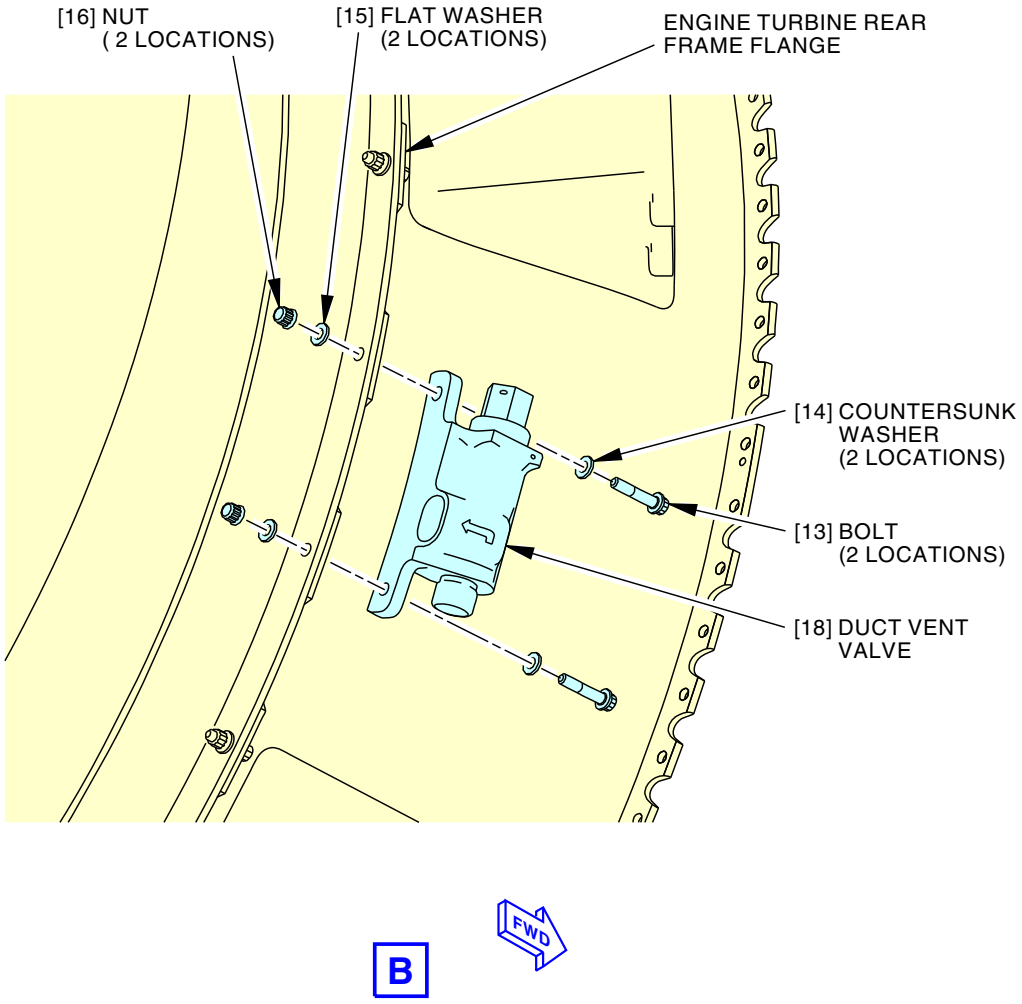
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



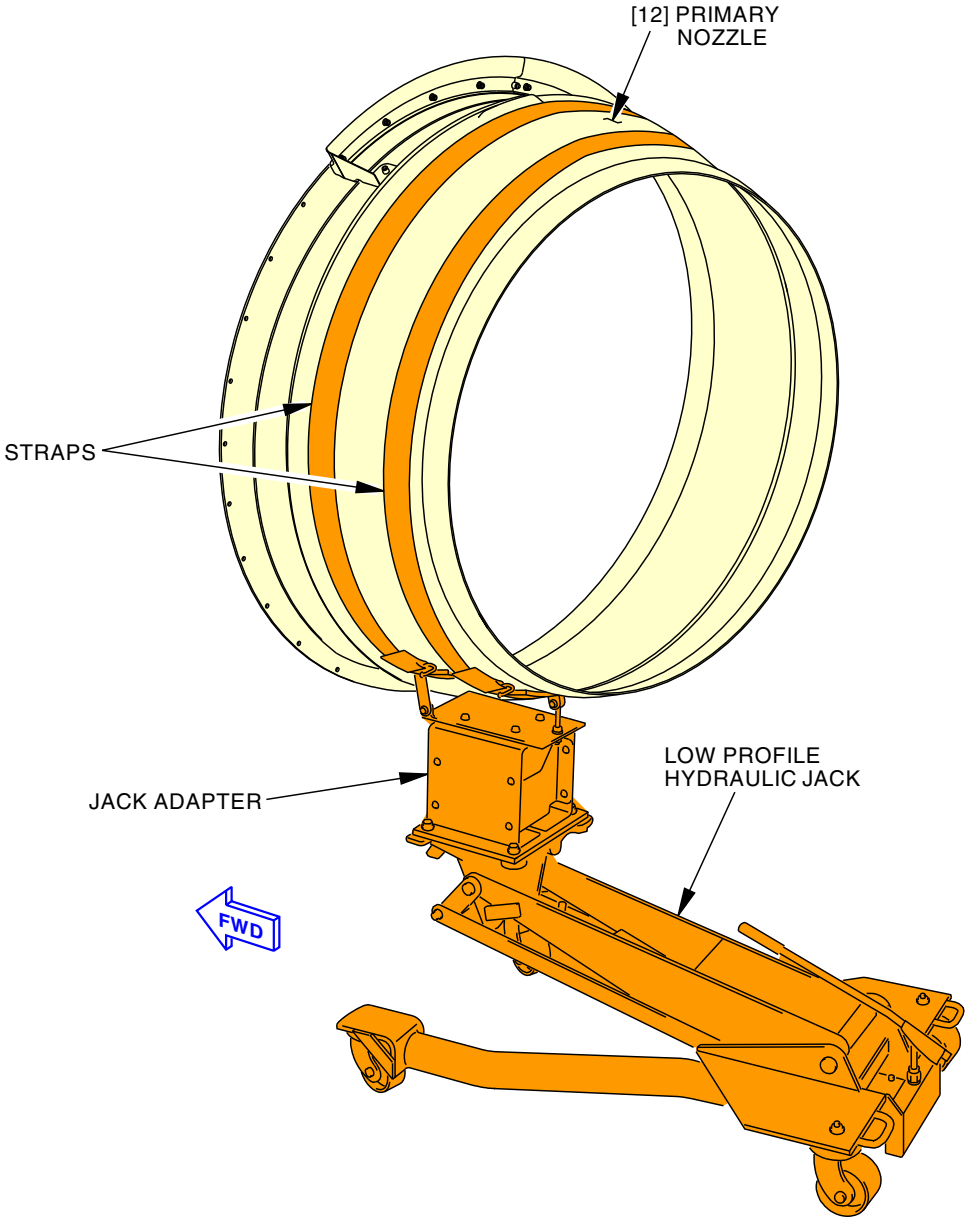
Primary Nozzle Assembly Installation
Figure 401/78-11-01-990-804-G02 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Primary Nozzle Assembly Installation
Figure 401/78-11-01-990-804-G02 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Primary Nozzle Assembly Handling Equipment
Figure 402/78-11-01-990-805-G02

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-11-01-400-801-G00

3. Primary Nozzle Assembly Installation

(Figure 401 and Figure 402)

A. General

(1) This gives the instructions on how to install the primary nozzle assembly.

NOTE: The total acoustic panel blockage for the engine installation must be recalculated when components are changed per SRM SUBJECT 54-00-01.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
SRM 54-00-01	NACELLES/PYLONS - GENERAL

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-1568	Jack - Hydraulic, General Low Profile Part #: B67563 Supplier: 36251 Part #: HW93718 Supplier: 28047 Opt Part #: W93718 Supplier: 36251
SPL-2419	Equipment - Handling, Primary Exhaust Sleeve and Plug Part #: C78009-88 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
12	Primary nozzle	78-11-01-02-055	SIA 001-014
		78-11-01-02-057	SIA ALL

F. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

H. Primary Nozzle Assembly Installation

SUBTASK 78-11-01-480-002-G02

(1) Attach the jack adapter from the equipment, SPL-2419, to the low profile hydraulic jack, COM-1568.

SUBTASK 78-11-01-480-003-G02

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(2) Put the primary nozzle [12] on the jack adapter as follows:

(a) Make sure to orient the primary nozzle [12] with the alignment pin near the 12 o'clock position so that it can align with the alignment hole on the engine turbine rear frame flange.

NOTE: The alignment hole is the larger of the two holes in the widest flange near the 12:00 o'clock position.

CAUTION MAKE SURE TO ATTACH THE STRAPS ALONG THE CONTINUOUS SURFACE OF THE PRIMARY NOZZLE ONLY. DO NOT ATTACH THE STRAPS ACROSS THE COMPONENTS ON TOP OF THE PRIMARY NOZZLE. IF YOU DO NOT OBEY, DAMAGE TO THE PRIMARY NOZZLE CAN OCCUR.

(b) Attach the primary nozzle [12] to the jack adapter with the straps.

SUBTASK 78-11-01-980-001-G02

CAUTION MAKE SURE THAT YOU LIFT THE PRIMARY NOZZLE UNTIL THE PRIMARY NOZZLE CLEARS THE PRIMARY PLUG ASSEMBLY. IF YOU LIFT THE PRIMARY NOZZLE TOO MUCH, DAMAGE TO THE AFT LABYRINTH SEALS CAN OCCUR. IF YOU DO NOT LIFT THE PRIMARY NOZZLE SUFFICIENTLY, DAMAGE TO THE PRIMARY PLUG ASSEMBLY CAN OCCUR.

(3) Lift and move forward the primary nozzle [12].

SUBTASK 78-11-01-820-001-G00

(4) Align the primary nozzle [12] to the engine as follows:

(a) Make sure that the primary nozzle [12] is oriented with the alignment pin at the 12 o'clock position.

(b) Make sure that the alignment pin on the primary nozzle [12] engages with the alignment hole on the engine turbine rear frame flange.

SUBTASK 78-11-01-420-002-G02

(5) Attach the primary nozzle [12], forward labyrinth seal [17], and duct vent valve [18] to the turbine rear frame flange as follows:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the countersunk washers under the bolt heads have countersinks oriented towards the head of the bolts.

(b) Loosely install the two bolts [1], two countersunk washers [2], two flat washers [3], and two nuts [4] into two holes, one at each end of the forward labyrinth seal.

NOTE: Countersunk washers and flat washers are located under bolt.

1) Locate the flat washers [3] on flat surface.

2) Make sure that the edges of the flat washers [3] do not interfere with labyrinth bend radius.

NOTE: Fasteners are required to protrude a minimum of 1.5 threads beyond the top of the nut.

NOTE: It is acceptable to apply Never-Seez NSBT compound, D00006, to threads.

(c) Loosely install the six bolts [5], six countersunk washers [6], and six nuts [7] at the top of the primary nozzle [12].

NOTE: The top 6 hole locations do not have a flat washer under the nut.

NOTE: Fasteners are required to protrude a minimum of 1.5 threads beyond the top of the nut.

NOTE: It is acceptable to apply Never-Seez NSBT compound, D00006, to threads.

(d) Loosely install the 20 bolts [8], 20 countersunk washers [9], 20 flat washers [10], and 20 nuts [11].

NOTE: The 20 hole locations use countersunk washers under the bolt and flat washers under the nut.

NOTE: It is acceptable to apply Never-Seez NSBT compound, D00006, to threads.

(e) Loosely install the duct vent valve [18], two bolts [13], two countersunk washers [14], two flat washers [15], and two nuts [16].

NOTE: The 2 hole locations use countersunk washers under the bolt and flat washers under the nut.

NOTE: It is acceptable to apply Never-Seez NSBT compound, D00006, to threads.

(f) Tighten the nuts [11] at the 3 o'clock, 9 o'clock, and 6 o'clock locations, and nut [7] at the 12 o'clock location in that sequence until they are snug and there is no gap between the engine turbine rear frame flange and primary nozzle [12].

NOTE: A minimum of one fastener must be snug fit at each position. Starting point clocking is optional.

(g) Tighten the remaining 17 nuts [11], two nuts [16], two nuts [4], and five nuts [7] until they are snug.

(h) Sequentially tighten nuts at the 3 o'clock, 9 o'clock, 6 o'clock, and 12 o'clock locations in that sequence to final torque.

(i) Sequentially tighten all remaining nuts to final torque.

(j) Make sure that torque of the nut [11] at the 3 o'clock position required torque range.

(k) If the torque is within the required torque range, no further action is required.

(l) If the torque is not within the required torque range, re-tighten the nuts [4], nuts [7], nuts [11], and nuts [16] as required until all fasteners reach the required torque range.

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SUBTASK 78-11-01-080-001-G02

(6) Remove the primary exhaust sleeve and plug equipment, SPL-2419, from the primary nozzle [12] as follows:

(a) Remove the straps that attach the jack adapter to the primary nozzle [12].

(b) Lower and remove the low profile hydraulic jack, COM-1568, from the primary nozzle [12].

(c) Remove the jack adapter from the low profile hydraulic jack, COM-1568.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-11-01-410-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-11-01-440-001-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRIMARY PLUG ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Removal of the primary plug assembly.

(2) Installation of the primary plug assembly.

TASK 78-11-02-000-801-G00

2. Primary Plug Assembly Removal

(Figure 401, Figure 402)

A. General

(1) This task is the removal of the primary plug assembly.

(2) The primary plug assembly has two separate pieces: the forward plug and aft plug.

(3) The primary plug assembly is referred to as the forward plug and aft plug in this task.

(4) The primary plug assembly is installed on the aft end of the power plant, attached to the turbine rear frame inner flange.

(5) To get access to the forward plug, you must remove the exhaust nozzle assembly.

B. References

Reference	Title
78-11-01-000-801-G00	Primary Nozzle Assembly Removal (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (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-1568	Jack - Hydraulic, General Low Profile Part #: B67563 Supplier: 36251 Part #: HW93718 Supplier: 28047 Opt Part #: W93718 Supplier: 36251
SPL-2419	Equipment - Handling, Primary Exhaust Sleeve and Plug Part #: C78009-88 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
D00600 [CP2162]	Oil - Penetrating - Liquid Wrench	

E. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Removal

SUBTASK 78-11-02-860-001-G00

(1) For engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-11-02-860-002-G00

(2) For engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-11-02-010-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open the thrust reverser (TASK 78-31-00-010-801-G00).

SUBTASK 78-11-02-010-002-G00

(4) If it is necessary to get access to the forward plug [1], remove the primary nozzle assembly (TASK 78-11-01-000-801-G00).

G. Primary Plug Assembly Removal

SUBTASK 78-11-02-020-001-G00

(1) Do these steps to remove the aft plug [3]:

(a) Remove the bolts [2].

1) Make sure that the aft plug [3] is fully supported before you remove the last bolt [2].

NOTE: The aft plug weighs approximately 10.0 lb (4.5 kg).

(b) Remove the aft plug [3].

SUBTASK 78-11-02-480-001-G00

(2) Use the exhaust sleeve and plug removal equipment, SPL-2419, to remove the forward plug [1].

(a) Attach the jack adapter to the low profile hydraulic jack, COM-1568 (or equivalent).

(b) Attach the jack adapter to the forward plug [1] with the straps.

SIA ALL; AIRPLANES WITH TRV SPACER

SUBTASK 78-11-02-020-003-G02

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(3) Remove the forward plug [1]:

(a) Apply Liquid Wrench oil, D00600 [CP2162], to the nuts [9], bolts [8], and washers [5].

(b) Remove the nuts [9], bolts [8], and washers [5].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH TRV SPACER (Continued)

1) Make sure that the forward plug [1] is fully supported before you remove the last bolt [8].

NOTE: The forward plug weighs approximately 61 lb (28 kg).

(c) Move the forward plug [1] aft until the alignment pin at the top of the forward plug [1] is clear of the spacer flange, and lower the forward plug [1].

SIA ALL; AIRPLANES WITHOUT TRV SPACER

SUBTASK 78-11-02-020-002-G00

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(4) Remove the forward plug [1]:

(a) Apply Liquid Wrench oil, D00600 [CP2162], to the nuts [6], bolts [4], washers [5], and washers [7].

(b) Remove the nuts [6], washers [7], bolts [4], and washers [5].

1) Make sure that the forward plug [1] is fully supported before you remove the last bolt [4].

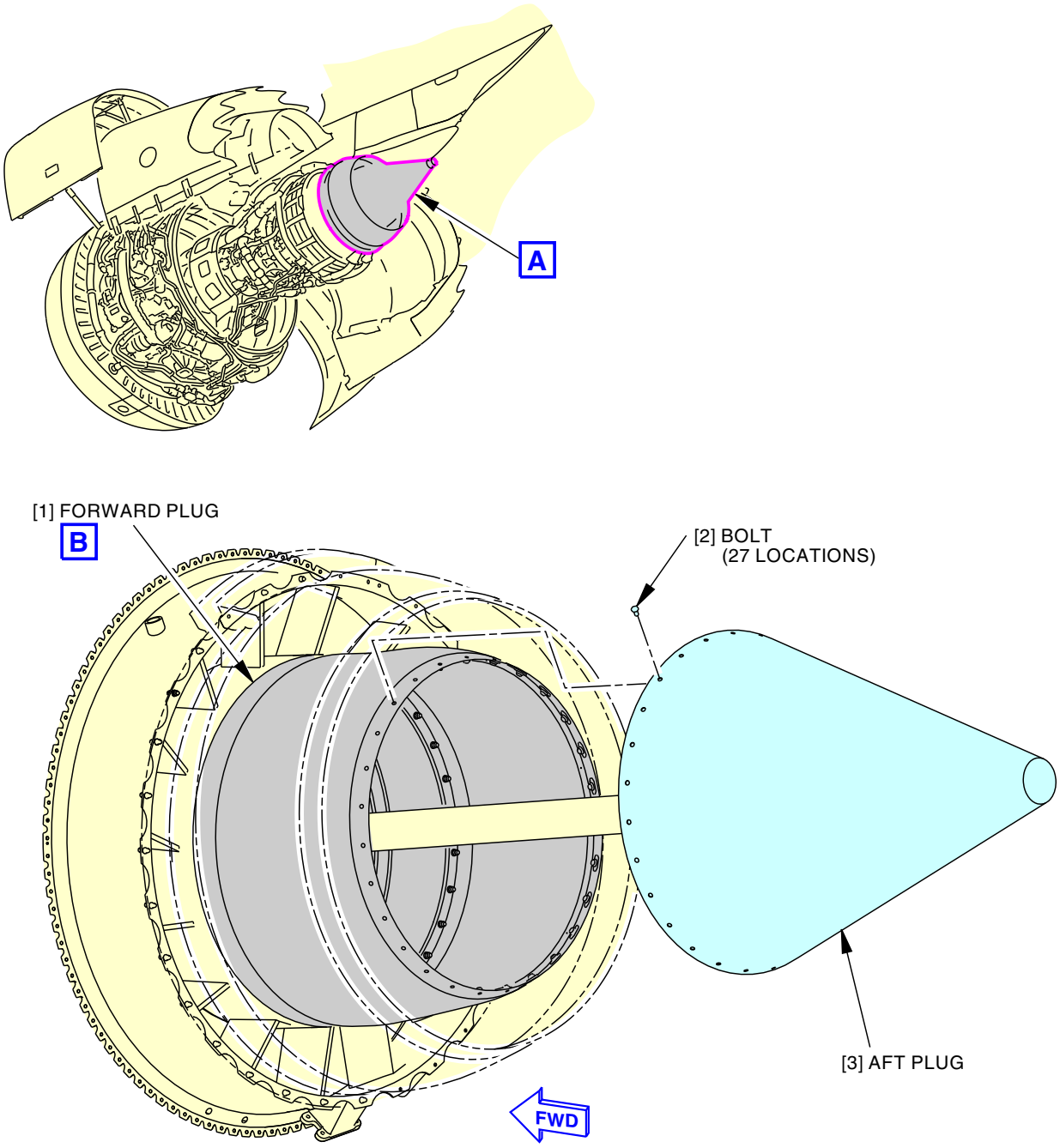
NOTE: The forward plug weighs approximately 61 lb (28 kg).

(c) Move the forward plug [1] aft until the alignment pin at the top of the forward plug [1] is clear of the turbine rear frame flange, and lower the forward plug [1].

SIA ALL

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

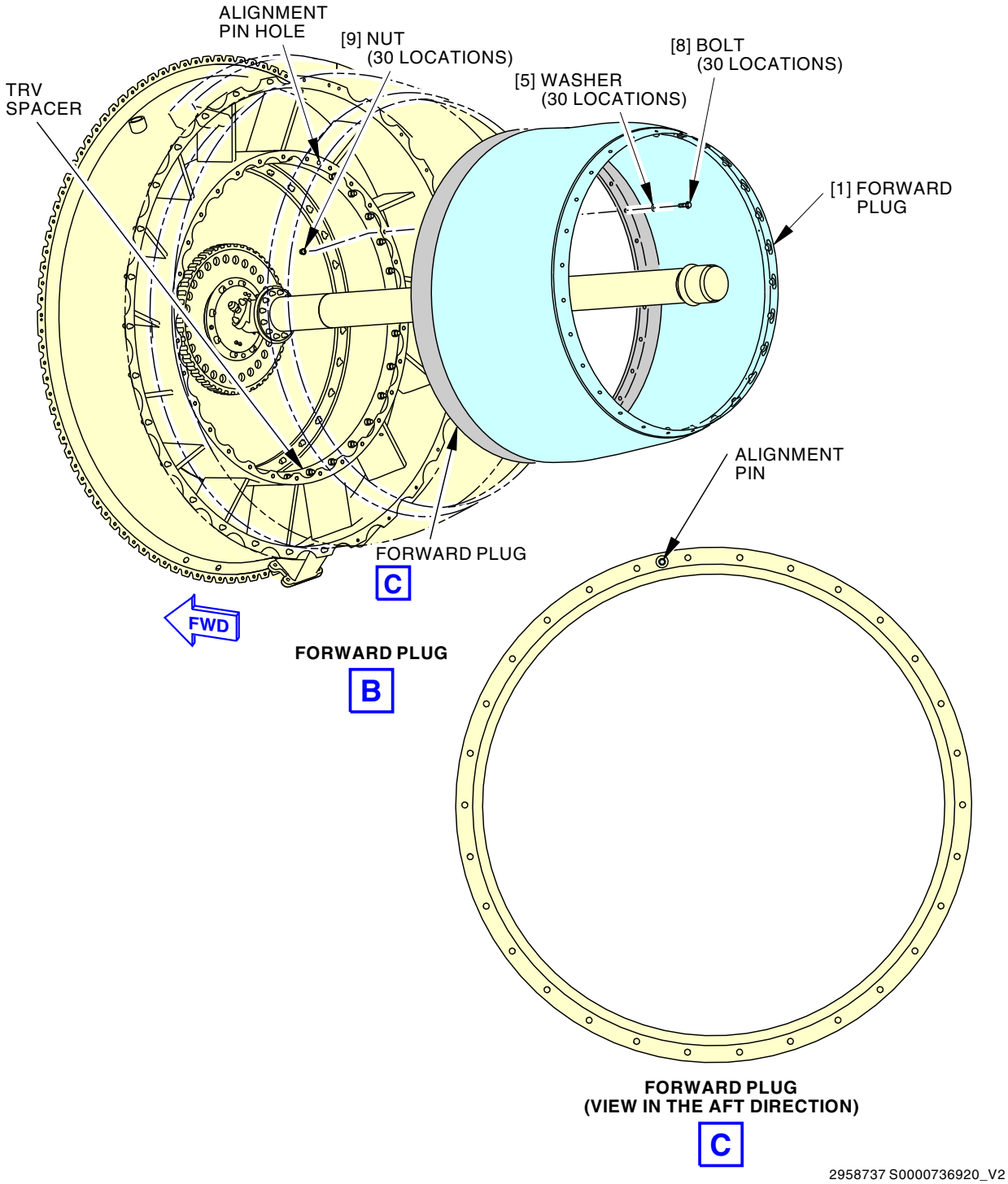


NOTE: SHOWN WITH PRIMARY NOZZLE ASSEMBLY REMOVED.

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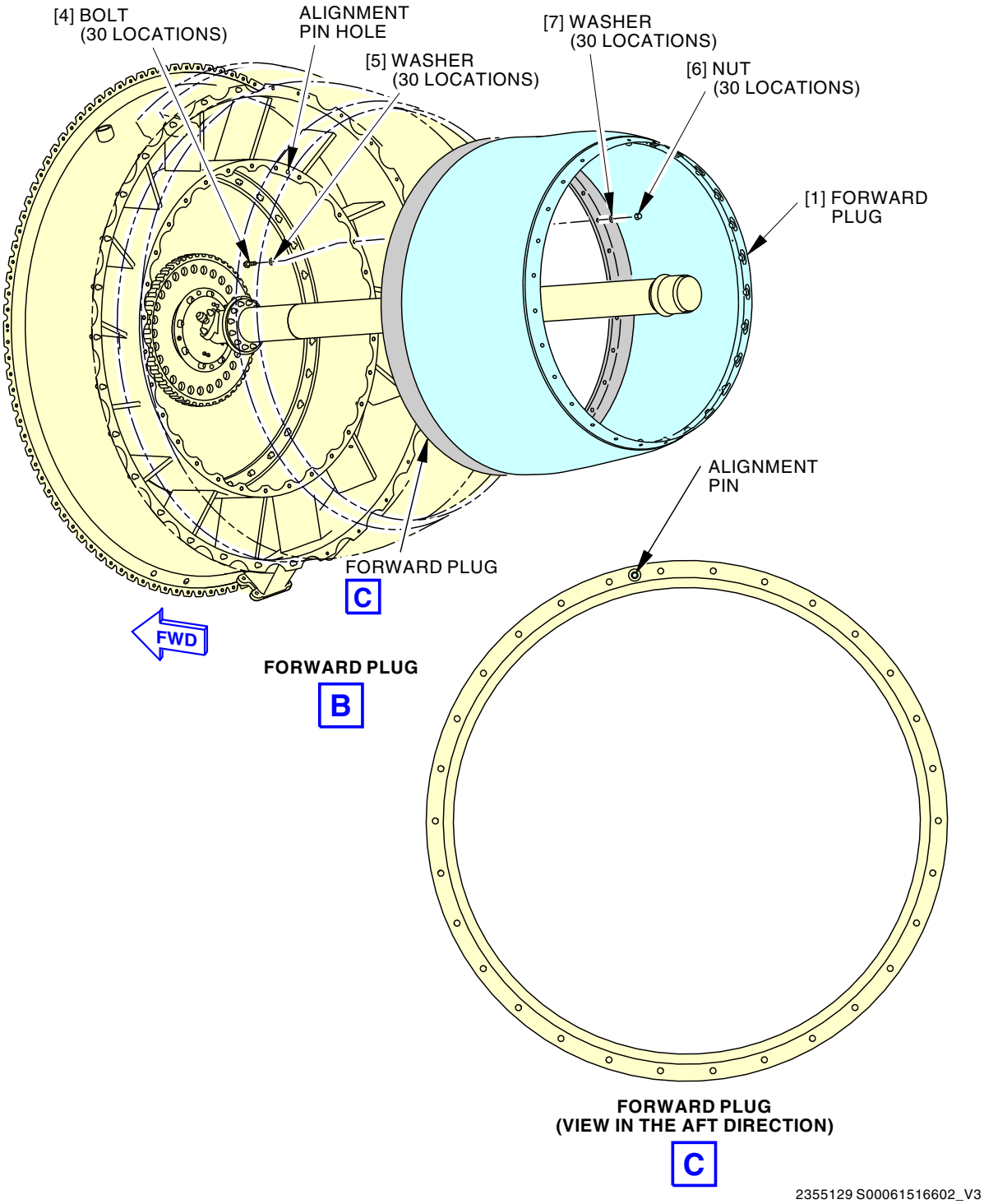
Primary Plug Assembly Installation
Figure 401/78-11-02-990-806-G02 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



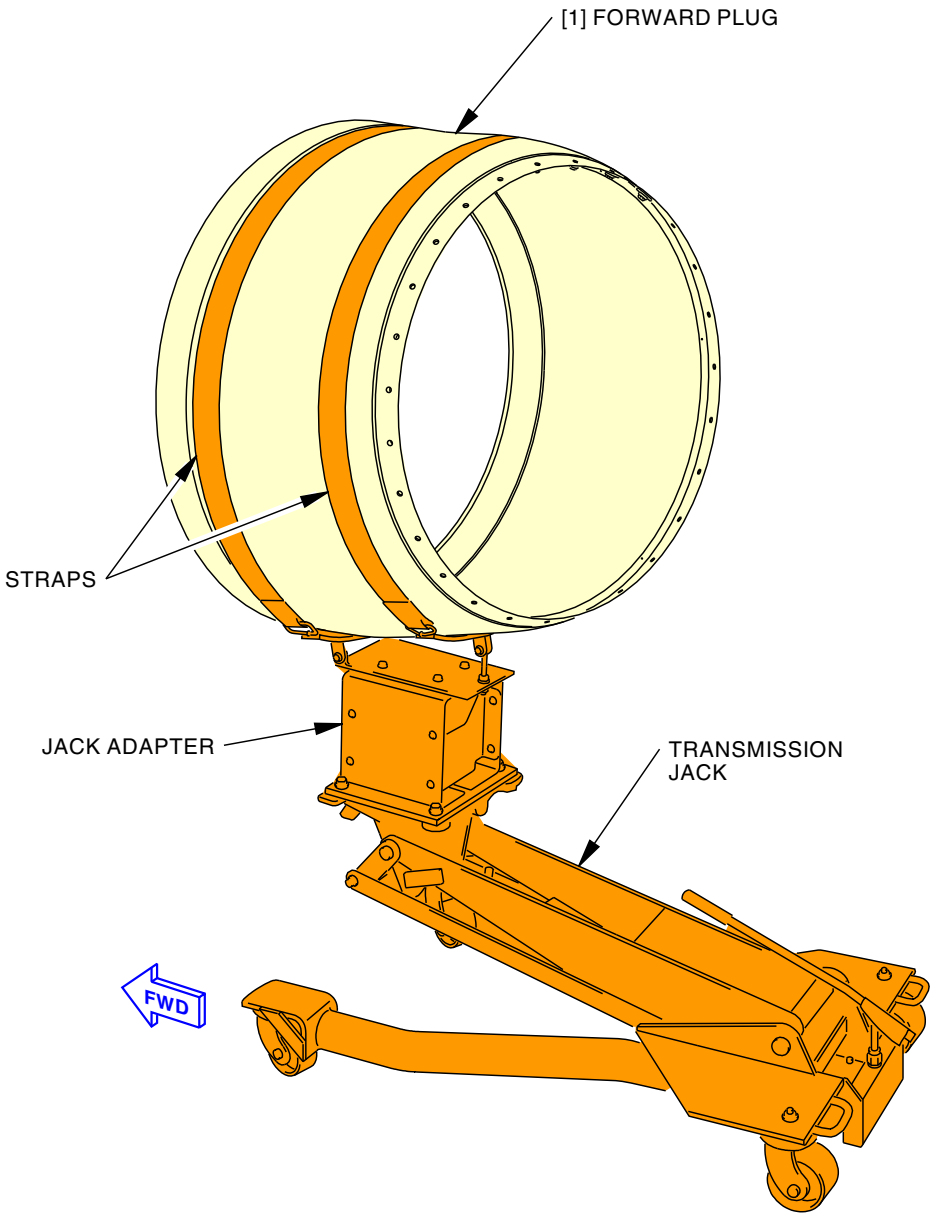
Primary Plug Assembly Installation
Figure 401/78-11-02-990-806-G02 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Primary Plug Assembly Installation
Figure 401/78-11-02-990-806-G02 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355130 S00061516603_V2

Primary Plug Assembly Handling Equipment
Figure 402/78-11-02-990-807-G02

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-11-02-400-801-G00

3. Primary Plug Assembly Installation

(Figure 401, Figure 402)

A. General

(1) This task is the installation of the primary plug assembly.

NOTE: The total acoustic panel blockage for the engine installation must be recalculated when components are changed per SRM SUBJECT 54-00-01.

(a) The primary plug assembly is attached to the inner flange of the engine turbine rear frame, at the aft end of the power plant.

(b) The primary plug assembly has two separate pieces: the forward plug and aft plug.

B. References

Reference	Title
78-11-01-400-801-G00	Primary Nozzle Assembly Installation (P/B 401)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
SRM 54-00-01	NACELLES/PYLONS - GENERAL

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-1568	Jack - Hydraulic, General Low Profile Part #: B67563 Supplier: 36251 Part #: HW93718 Supplier: 28047 Opt Part #: W93718 Supplier: 36251
SPL-2419	Equipment - Handling, Primary Exhaust Sleeve and Plug Part #: C78009-88 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Forward plug	78-11-02-01-040	SIA ALL
3	Aft plug	78-11-02-01-040	SIA ALL

F. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

G. Primary Plug Assembly Installation

SUBTASK 78-11-02-210-001-G00

(1) Make sure that the forward plug [1] and aft plug [3] flange surfaces are clean and free of contamination.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) If it is necessary, clean the surfaces with solvent, B00062.

SUBTASK 78-11-02-480-002-G00

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(2) Use the primary exhaust sleeve and plug equipment, SPL-2419, to install the forward plug [1].

NOTE: The forward plug weighs approximately 61.0 lb (27.7 kg).

(a) Attach the jack adapter to the low profile hydraulic jack, COM-1568, or equivalent.

(b) Put the forward plug [1] on the jack adapter.

1) Make sure to orient the forward plug [1] so that the alignment pin will align with the alignment hole on the inner flange of the turbine rear frame.

(c) Attach the forward plug [1] to the jack adapter with the straps.

SIA ALL PRE SB 737-CFM-LEAP-1B-72-0075

SUBTASK 78-11-02-420-001-G00

(3) Install the forward plug [1].

(a) Lift the forward plug [1] and move it into its position on the turbine rear frame.

1) Make sure that the forward plug [1] is securely supported before you lift it.

2) Align the alignment pin with the alignment hole in the inner flange of the turbine rear frame or spacer.

(b) Loosely install all the bolts [8], washers [5], and nuts [9].

(c) Starting at the 3 o'clock position, tighten the bolts [8] at the 3, 9, 6, and 12 o'clock positions in that sequence until they are snug.

(d) Tighten the remaining bolts [8] until they are snug.

(e) Starting at the 3 o'clock position, tighten the bolts [8] at the 3, 9, 6, and 12 o'clock positions to 170 ±5 in-lb (19 ±1 N·m).

(f) Tighten the remaining bolts [8] to 170 ±5 in-lb (19 ±1 N·m).

(g) Make sure that the bolt [8] at the 3 o'clock position is still tightened to 170 ±5 in-lb (19 ±1 N·m).

1) If the bolt [8] at the 3 o'clock position is tightened to less than 170 ±5 in-lb (19 ±1 N·m), do this step:

a) Retighten the bolts [8] to 170 ±5 in-lb (19 ±1 N·m), in the same sequence described above, until you find a bolt [8] that has held its torque.

SIA ALL POST SB 737-CFM-LEAP-1B-72-0075

SUBTASK 78-11-02-420-003-G02

(4) Install the forward plug [1].

(a) Lift the forward plug [1] and move it into its position on the turbine rear frame.

1) Make sure that the forward plug [1] is securely supported before you lift it.

2) Align the alignment pin with the alignment hole in the inner flange of the turbine rear frame or spacer.

(b) Loosely install all the bolts [4], washers [5], washers [7], and nuts [6].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL POST SB 737-CFM-LEAP-1B-72-0075 (Continued)

(c) Starting at the 3 o'clock position, tighten the nuts [6] at the 3, 9, 6, and 12 o'clock positions in that sequence until they are snug.

(d) Tighten the remaining nuts [6] until they are snug.

(e) Starting at the 3 o'clock position, tighten the nuts [6] at the 3, 9, 6, and 12 o'clock positions to 170 ±5 in-lb (19 ±1 N·m).

(f) Tighten the remaining nuts [6] to 170 ±5 in-lb (19 ±1 N·m).

(g) Make sure that the nut [6] at the 3 o'clock position is still tightened to 170 ±5 in-lb (19 ±1 N·m).

1) If the nut [6] at the 3 o'clock position is tightened to less than 170 ±5 in-lb (19 ±1 N·m), do this step:

a) Retighten the nuts [6] to 170 ±5 in-lb (19 ±1 N·m), in the same sequence described above, until you find a nut [6] that has held its torque.

SIA ALL

SUBTASK 78-11-02-000-001-G02

(5) Remove the primary exhaust sleeve and plug equipment, SPL-2419, from the forward plug [1].

(a) Remove the straps that attach the jack adapter to the forward plug [1].

(b) Lower and remove low profile hydraulic jack, COM-1568, from the forward plug [1].

(c) Remove the jack adapter from the low profile hydraulic jack, COM-1568.

SUBTASK 78-11-02-420-002-G00

(6) Install the aft plug [3]:

NOTE: When the aft plug is installed, there may be contact between the center vent tube extension and the inner radius of the aft plug. This is an acceptable condition.

(a) Apply Never-Seez NSBT compound, D00006, to the threads of the 27 bolts [2].

(b) Move the aft plug [3] forward and over the attach flange of the forward plug [1].

(c) Install the 27 bolts [2] to attach the aft plug [3]:

1) Loosely install all the bolts [2].

2) Starting at the 3 o'clock position, tighten the bolts [2] at the 3, 9, 6, and 12 o'clock positions in that sequence until they are snug,

3) Tighten the remaining bolts [2] until they are snug.

4) Starting at the 3 o'clock position, tighten the bolts [2] at the 3, 9, 6, and 12 o'clock positions to 180 ±5 in-lb (20 ±1 N·m).

5) Tighten the remaining bolts [2] to 180 ±5 in-lb (20 ±1 N·m).

6) Make sure that the bolt [2] at the 3 o'clock position is still tightened to 180 ±5 in-lb (20 ±1 N·m).

a) If the bolt [2] at the 3 o'clock position is tightened to less than 180 ±5 in-lb (20 ±1 N·m), do this step:

<1> Retighten the bolts [2] to 180 ±5 in-lb (20 ±1 N·m), in the same sequence described above, until you find a bolt [2] that has held its torque.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-11-02-210-002-G00

(7) Do a visual check of the gap between the center vent tube extension and the inner radius of the aft plug [3].

(a) It is acceptable for the gap between the center vent tube and the aft plug [3] to vary around the radius of the center vent tube.

(b) It is acceptable for the center vent tube to make contact with the inner radius of the aft plug [3].

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-11-02-410-001-G00

(1) If the primary nozzle assembly was removed, install the nozzle (TASK 78-11-01-400-801-G00).

SUBTASK 78-11-02-410-002-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the thrust rverser (TASK 78-31-00-010-802-G00).

SUBTASK 78-11-02-440-001-G00

(3) For engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-11-02-440-002-G00

(4) For engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CENTER VENT TUBE EXTENSION - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Center vent tube extension removal

(2) Center vent tube extension installation.

TASK 78-11-03-000-801-G00

2. Center Vent Tube Extension Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the center vent tube extension.

(2) The center vent tube extension is referred to as the vent tube in this task.

(3) The vent tube is two separate pieces, the mixer and the outer tube.

(a) The mixer is installed inside the outer tube.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-11-02-000-801-G00	Primary Plug Assembly Removal (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-11-03-040-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-11-03-010-001-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-11-03-000-001-G00

(3) Do this task: Primary Plug Assembly Removal, TASK 78-11-02-000-801-G00.

G. Center Vent Tube Extension Removal

SUBTASK 78-11-03-000-002-G00

(1) Remove the vent tube as follows:

(a) Remove the 12 bolts [1], 12 washers [2], 12 washers [8] and 12 nuts [7] that attach the mixer [5] and outer tube [6] to the turbine rear frame flange [3].

1) Make sure that you support the vent tube before you remove the last bolt [1].

NOTE: The vent tube weighs approximately 10.0 lb (4.5 kg).

(b) Remove the mixer [5] and outer tube [6].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the gasket [4].

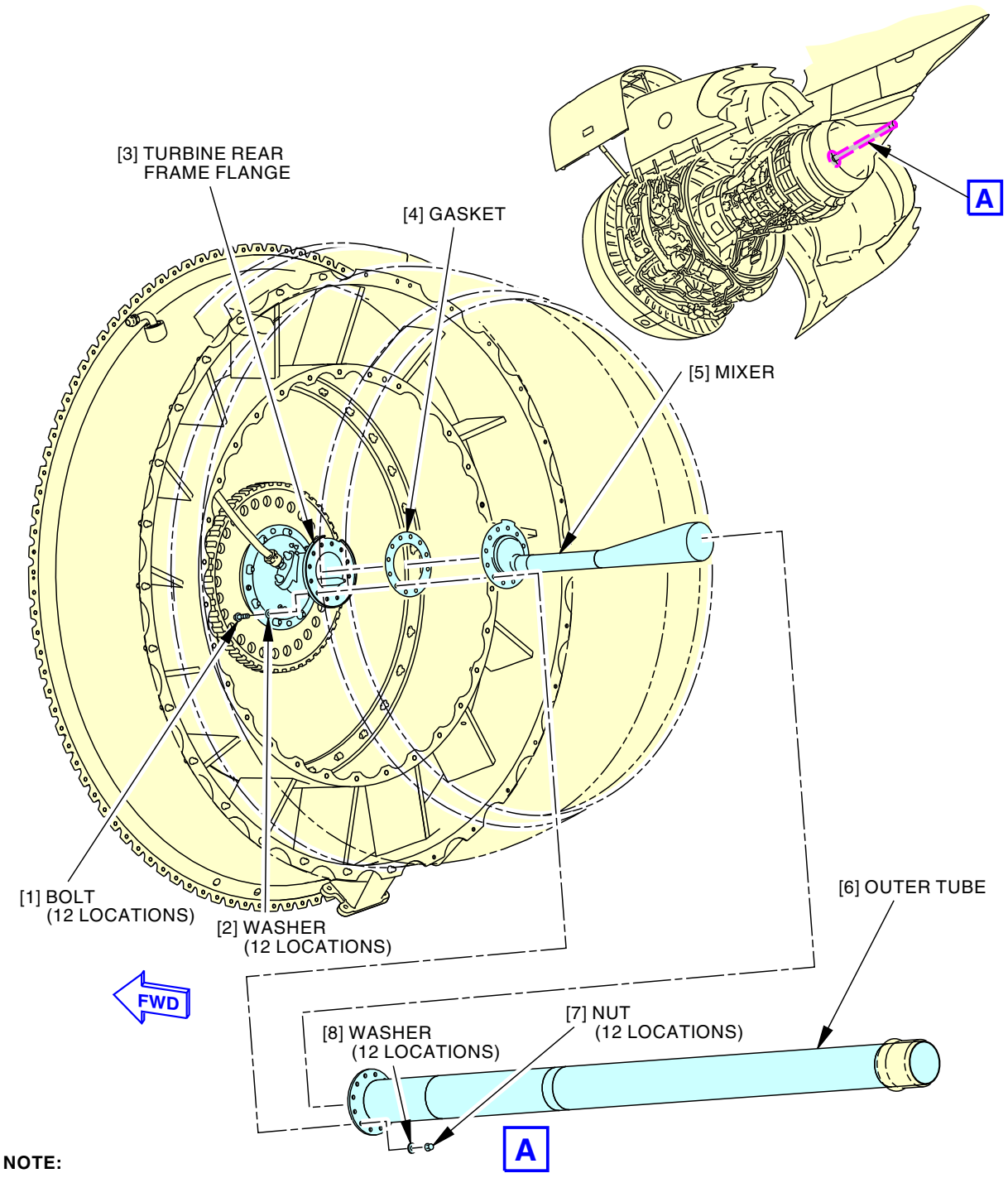
(d) Examine the gasket [4].

1) If there is damage to the gasket [4], discard it.

2) If there is no damage to the gasket [4], use it for the installation.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



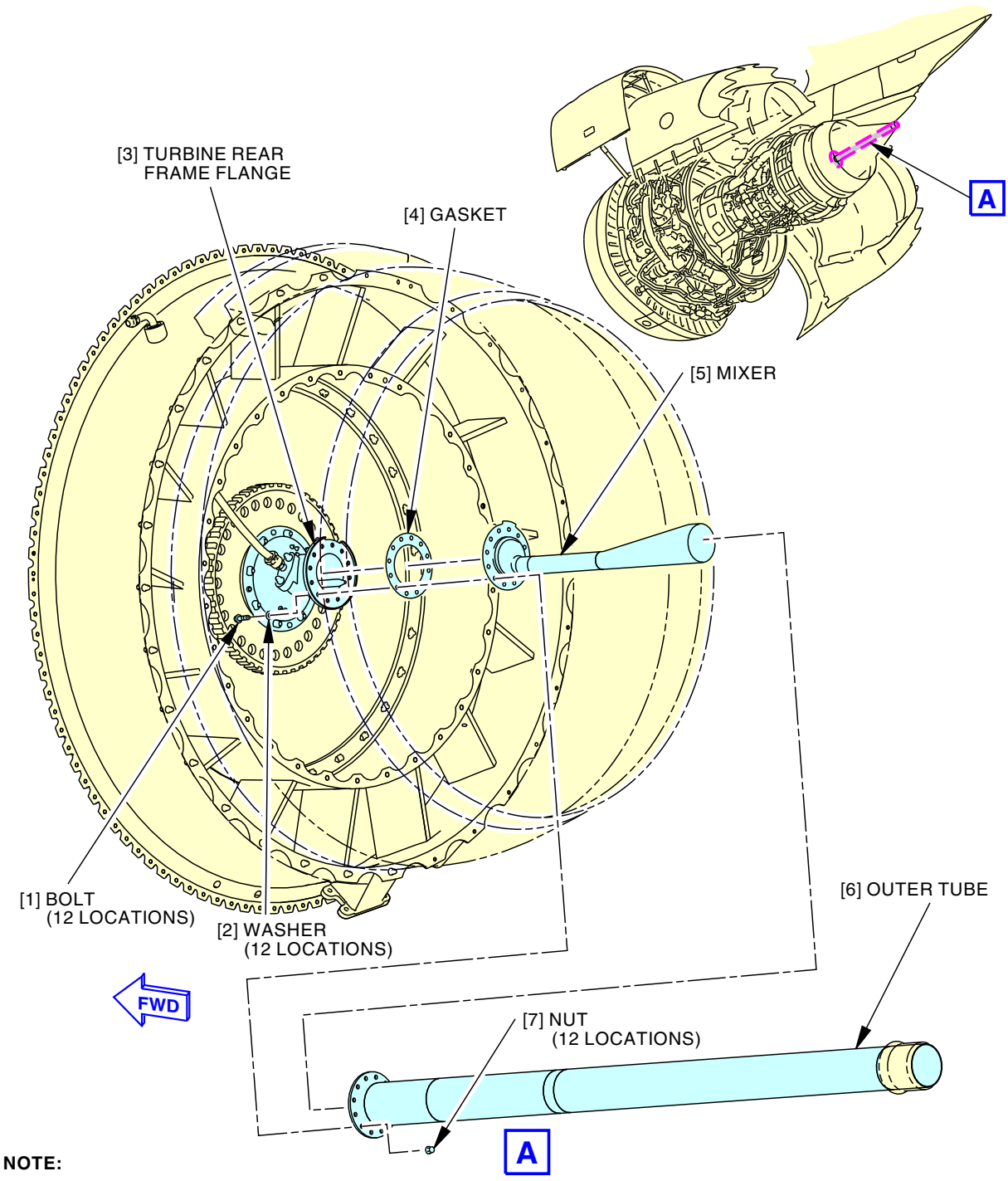
NOTE:

SHOWN WITH PRIMARY NOZZLE ASSEMBLY REMOVED.

2459340 S0000570283_V3

Center Vent Tube Extension
Figure 401/78-11-03-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:
SHOWN WITH PRIMARY NOZZLE ASSEMBLY REMOVED.

3001510 S0000777599_V1

Center Vent Tube Extension
Figure 401/78-11-03-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-11-03-400-801-G00

3. Center Vent Tube Extension Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the center vent tube extension.

(2) The center vent tube extension is referred to as the vent tube in this task.

(3) The vent tube is two separate pieces, the mixer and the outer tube.

(a) The mixer is installed inside the outer tube.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-11-02-400-801-G00	Primary Plug Assembly Installation (P/B 401)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
D50237	Compound - Antiseize, Pure Nickel Special - Never Seez NSBT	BAC5008

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Gasket	78-11-03-01-040	SIA ALL
5	Mixer	78-11-03-01-035	SIA ALL
6	Outer tube	78-11-03-01-030	SIA ALL

F. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Center Vent Tube Extension Installation

SUBTASK 78-11-03-160-001-G00

(1) Make sure that the turbine rear frame flange [3] and the flange surfaces of the mixer [5] and outer tube [6] are clean and free of contamination.

(a) If it is necessary, clean the surfaces with solvent, B00062.

SUBTASK 78-11-03-400-001-G00

(2) If it is necessary, install the mixer [5] inside the outer tube [6].

(a) Install the outer tube [6] in a position so that the part marking is oriented on the side for visibility.

NOTE: The outer tube [6] does not have a clocking feature.

SUBTASK 78-11-03-400-002-G00

(3) Install the vent tube as follows:

(a) Install the gasket [4] onto the turbine rear frame flange [3].

(b) Lift the vent tube into its position on the turbine rear frame flange [3].

(c) Make sure that the alignment tab on the vent tube flange is at the top.

(d) Lubricate the 12 bolts [1] with Never Seez NSBT, D50237.

NOTE: It is optional to lubricate the 12 bolts [1] with Never Seez NSBT, D50237.

(e) Loosely install the 12 bolts [1], washers [2], 12 washers [8] and nuts [7].

(f) Tighten the nuts [7] at the 3, 6, 9, and 12:00 o'clock locations in that sequence until they are snug and there is no gap between the turbine rear frame flange [3] and the vent tube flange.

(g) Tighten the nuts [7] at the remaining 8 locations until they are snug.

(h) If the 12 bolts [1] was lubricated, do these steps:

1) Tighten the nuts [7] at the 3, 6, 9, and 12 o'clock positions to 65 +2 / -0 in-lb (7 +1 / -0 N·m).

2) Tighten the nuts [7] at the remaining 8 locations to 65 +2 / -0 in-lb (7 +1 / -0 N·m).

3) Make sure that the nut [7] at the 3 o'clock position is still tighten to 65 +2 / -0 in-lb (7 +1 / -0 N·m).

a) If the nut [7] at the 3:00 o'clock position is not tight at 65 +2 / -0 in-lb (7 +1 / -0 N·m), do these steps:

<1> Tighten the nut [7] to 65 +2 / -0 in-lb (7 +1 / -0 N·m).

<2> Continue to tighten the remaining nuts [7] in the sequence used above until you find a nut [7] that is in the specified torque range.

(i) If the 12 bolts [1] was not lubricated, do these steps:

1) Tighten the nuts [7] at the 3, 6, 9, and 12 o'clock positions to 85 +2 / -0 in-lb (10 +1 / -0 N·m).

2) Tighten the nuts [7] at the remaining 8 locations to 85 +2 / -0 in-lb (10 +1 / -0 N·m).

3) Make sure that the nut [7] at the 3 o'clock position is still tighten to 85 +2 / -0 in-lb (10 +1 / -0 N·m).

a) If the nut [7] at the 3:00 o'clock position is not tight at 85 +2 / -0 in-lb (10 +1 / -0 N·m), do these steps:

<1> Tighten the nut [7] to 85 +2 / -0 in-lb (10 +1 / -0 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

<2> Continue to tighten the remaining nuts [7] in the sequence used above until you find a nut [7] that is in the specified torque range.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-11-03-400-003-G00

(1) Do this task: Primary Plug Assembly Installation, TASK 78-11-02-400-801-G00.

SUBTASK 78-11-03-410-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-11-03-440-001-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CENTER VENT TUBE - INSPECTION/CHECK

1. General

A. This procedure has this task:

(1) Center Vent Tube Extension (CVTE) Inspection

TASK 78-11-03-210-801-G00

2. Center Vent Tube Extension (CVTE) Inspection

(Figure 601)

A. General

(1) The Center Vent Tube Extension (CVTE) and mixer assemblies are used to vent the engine A-sump. The vent flow from the engine A-sump includes a mixture of air and engine oil.

(2) It is normal to see oil puddles and coked oil in the CVTE and mixer assemblies. Coked oil that decreases the CVTE and mixer cross-sectional areas up to 24% will have a negligible impact on the vent performance for the engine A-sump.

(3) This task gives instructions to examine the CVTE and mixer for the coking condition.

B. References

Reference	Title
78-11-03-000-801-G00	Center Vent Tube Extension Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
417	Engine 1 - Primary Exhaust Nozzle and Plug
427	Engine 2 - Primary Exhaust Nozzle and Plug

E. D. Prepare for the Inspection

SUBTASK 78-11-03-480-001-G00

(1) Do these steps to make sure that the ENGINE START switch and START LEVER switch are not operated:

(a) On the P5 overhead panel, make sure that the applicable ENGINE START switch is in the OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) On the P10 control stand, make sure that the applicable START LEVER switch is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

F. Center Vent Tube Extension (CVTE) Inspection

SUBTASK 78-11-03-210-001-G00

(1) Do a visual check of the CVTE and mixer by looking in the aft end of the CVTE.

(a) Oil puddles in the CVTE are normal and no further maintenance is required if the engine oil consumption remains within Aircraft Maintenance Manual (AMM) limits.

(b) Coking in the CVTE and mixer assemblies are normal if the remaining unobstructed diameter in the area of the coking is in the following limits:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) The mixer has a minimum inner diameter of 1.0 in. (25.4 mm) that remains unobstructed in the area of the coking.

NOTE: The smallest cross-sectional area of the mixer has a nominal inner diameter of 1.181 in. (30.0 mm) when there is no coking present.

2) The CVTE has a minimum inner diameter (ID) of 2.5 in. (63.5 mm) that remains unobstructed in the area of the coking.

NOTE: The cross-sectional area at the aft end of the CVTE has a nominal inner diameter of 3.0 in. (76.2 mm) when there is no coking present.

(c) If coking in the CVTE or mixer is out of these limits, remove the CVTE and mixer (TASK 78-11-03-000-801-G00).

NOTE: The CVTE and mixer removal is necessary so they can be cleaned in the shop.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-11-03-080-001-G00

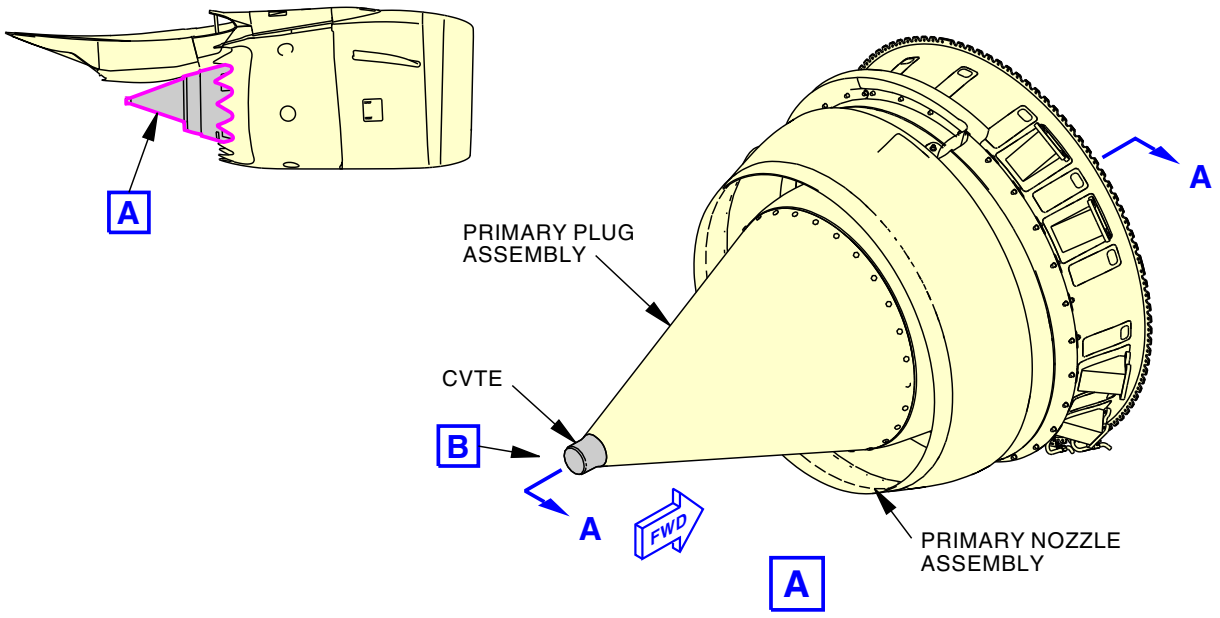
(1) Do these steps to remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch and START LEVER switch:

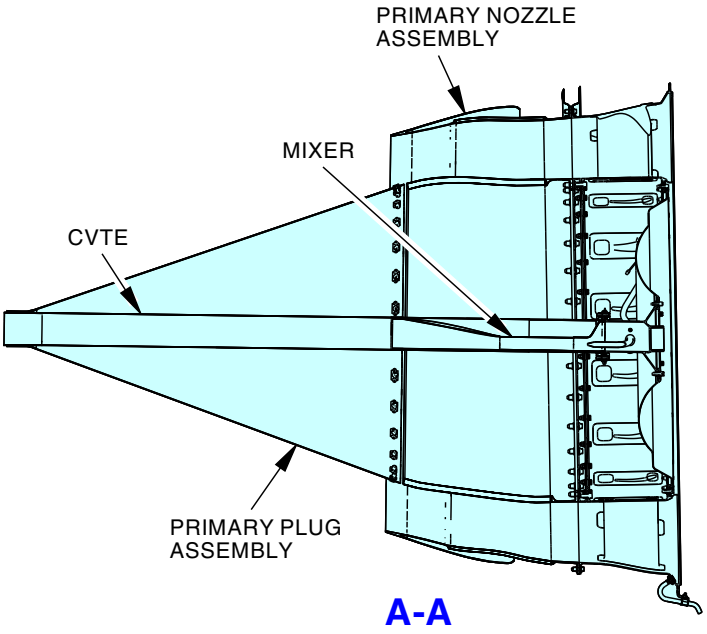
(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

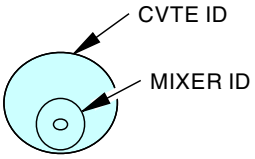
(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details







ICNLEAP1B781103D5882800002A00101

2907719 S0000696697_V1

Center Vent Tube Extension (CVTE) - Inspection
Figure 601/78-11-03-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER SYSTEM - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks to operate the thrust reverser system:

(1) Open the thrust reverser (Selection).

(2) Close the thrust reverser (Selection).

(3) Open the thrust reverser (Hydraulic Pump Procedure).

(4) Close the thrust reverser (Hydraulic Pump Procedure).

(5) Open the thrust reverser (Sling Procedure).

(6) Close the thrust reverser (Sling Procedure).

(7) Thrust Reverser Operation - Extend (Selection).

(8) Thrust Reverser Operation - Retract (Selection).

(9) Thrust Reverser Operation - Extend (Power Procedure).

(10) Thrust Reverser Operation - Retract (Power Procedure).

(11) Thrust Reverser Operation - Extend (Manual Procedure).

(12) Thrust Reverser Operation - Retract (Manual Procedure).

(13) Thrust Reverser Deactivation for Ground Maintenance.

(14) Thrust Reverser Activation after Ground Maintenance.

TASK 78-31-00-010-801-G00

2. Open the Thrust Reverser (Selection)

A. General

(1) This procedure gives the mechanics the task selection for opening the thrust reverser.

B. Open the Thrust Reverser (Selection)

SUBTASK 78-31-00-010-001-G00

(1) Do one of these tasks to open the applicable thrust reverser:

(a) Do this task: Open the Thrust Reverser (Hydraulic Pump Procedure), TASK 78-31-00-000-801-G00.

(b) Do this task: Open the Thrust Reverser (Sling Procedure), TASK 78-31-00-010-803-G00.

——— END OF TASK ———

TASK 78-31-00-010-802-G00

3. Close the Thrust Reverser (Selection)

A. General

(1) This procedure gives the mechanics the task selection for closing the thrust reverser.

B. Close the Thrust Reverser (Selection)

SUBTASK 78-31-00-010-002-G00

(1) Do one of these tasks to close the applicable thrust reverser:

(a) Do this task: Close the Thrust Reverser (Hydraulic Pump Procedure), TASK 78-31-00-410-801-G00.

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(b) Do this task: Close the Thrust Reverser (Sling Procedure), TASK 78-31-00-410-802-G00.

——— END OF TASK ———

TASK 78-31-00-000-801-G00

4. Open the Thrust Reverser (Hydraulic Pump Procedure)

(Figure 201, Figure 202, Figure 203)

A. General

(1) This task gives the instructions to open the thrust reverser with a hydraulic pump.

(2) This is applicable for the left or right thrust reverser on the applicable engine.

(3) The left and right fan cowl panels must be opened fully to the 61-degree open position.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
54-51-06-000-801	Thrust Reverser Cross Tie Rod Lanyard Removal (P/B 401)
54-51-06-400-801	Thrust Reverser Cross Tie Rod Lanyard Installation (P/B 401)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (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-2417	Pump - Hand, Cowl Opening Part #: A78019-29 Supplier: 81205 Part #: B54001-53 Supplier: 81205 Part #: C78005-60 Supplier: 81205 Opt Part #: A78019-27 Supplier: 81205 Opt Part #: C78005-26 Supplier: 81205 Opt Part #: C78005-53 Supplier: 81205
SPL-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
521AB	Outboard Leading Edge Blowout Door - Slat Station 20
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621AB	Outboard Leading Edge Blowout Door - Slat Station 20
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

G. Preparation

SUBTASK 78-31-00-860-241-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-860-143-G00

WARNING RETRACT THE LEADING EDGE FLAPS AND SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE LEFT OR THE RIGHT THRUST REVERSER ON AN ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-00-040-009-G00

(3) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-00-040-010-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-00-010-018-G00

CAUTION IF FAN COWLS ARE INSTALLED, MAKE SURE THAT LEFT AND RIGHT FAN COWLS ARE IN THE FULL OPEN POSITION. MAKE SURE THAT THE SPRING DOOR OPENING-SYSTEM (SDOS) AND HOLD OPEN RODS (HOR) ARE LOCKED IN THEIR POSITION. IF YOU DO NOT, STRUCTURAL DAMAGE TO THE FAN COWL AND THRUST REVERSER CAN OCCUR.

(5) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-144-G00

(6) Make sure that these access panels are closed:

Number	Name/Location
521AB	Outboard Leading Edge Blowout Door - Slat Station 20
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621AB	Outboard Leading Edge Blowout Door - Slat Station 20
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

H. Thrust Reverser Open (Hydraulic Pump Procedure)

SUBTASK 78-31-00-010-003-G00

WARNING DO NOT OPEN OR CLOSE THE THRUST REVERSER IN HIGH WINDS OR SUDDEN-STRONG-WINDS CONDITIONS. MAKE SURE THAT THE CONSTANT WINDS OR SUDDEN WINDS ARE LESS THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BETWEEN THE ENGINE AND THE THRUST REVERSER WITHOUT THE ACTUATOR SAFETY LOCK INSTALLED. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BELOW OR NEAR THE THRUST REVERSER WHILE YOU OPEN OR CLOSE THE THRUST REVERSER. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT EXTEND THE THRUST REVERSER SLEEVES WHILE THE THRUST REVERSER HALVES ARE OPEN. THIS WILL CAUSE DAMAGE TO THE THRUST REVERSER SLEEVES.

(1) Do these steps to open the thrust reverser:

(a) Disengage the three latches at the bottom of the aft cowls.

1) Disengage the latch No. 8 and latch No. 9 before the latch No. 7.

(b) Disengage the six latches along the bottom centerline of the thrust reverser.

1) Disengage the latches in sequence from latch No. 6 to latch No. 1.

(c) Remove the dust cap from the inlet fitting on the opening actuator and from the cowl opening hand pump, SPL-2417.

NOTE: If available, it is recommended to use C78005-60. This will help to prevent damage to the thrust reverser equipment.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Make sure that the cowl opening hand pump, SPL-2417, has sufficient capacity of oil, D00071, or oil, D00068, per cowl opening hand pump, SPL-2417, placard to be able to fully open the thrust reverser.

NOTE: If the cowl opening hand pump does not have sufficient oil, it may not be possible to fully open thrust reversers, especially if the same hand pump is used to open more than one thrust reverser.

(e) Close the return valve on the hand pump.

(f) Connect the hand pump hose to the inlet fitting on the opening actuator.

WARNING

MAKE SURE THAT THE PUMP HOSE FITTING DOES NOT CONTACT THE THRUST-REVERSER CENTER LOCKING-ACTUATOR. THE CONTACT COULD CAUSE DAMAGE TO THE ACTUATOR OR THE HOSE FITTING. THIS COULD CAUSE THE THRUST REVERSER SUDDENLY CLOSES DUE TO THE FAST LOSS OF FLUID FROM THE OPENING ACTUATOR THROUGH THE BROKEN FITTING. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

MAKE SURE THAT THE FILTER ON THE HAND PUMP HOSE DOES NOT INTERFERE WITH THE MOVING THRUST REVERSER. THE FILTER CAN TURN ON THE END OF THE HAND PUMP HOSE AND CAUSE DAMAGE TO THE EQUIPMENT.

(g) Hold the filter on the hand pump hose forward at approximately a 45° angle to prevent contact with the center locking actuator as the thrust reverser opens.

1) If the engine has MDOS-GSE hose support, route the hand pump hose at the hose support (Figure 203).

NOTE: The MDOS-GSE hose support is near the top of the oil tank on the RH side of the engine, and on the top of the AGB on the LH side of the engine. The MDOS-GSE hose supports are on airplanes beginning with Line Number 7200. The supports can be installed on engines which were delivered on airplanes prior to Line Number 7200 per Boeing SB 737-78-1095.

(h) Pump oil into the opening actuator with the cowl opening hand pump, SPL-2417, to lift the thrust reverser.

(i) Look for these indications that indicates the thrust reverser is in the full open position and the opening actuator is locked:

1) Listen for the click sound of the lock collar.

2) Make sure that the word LOCKED shows on the bottom of the extended piston.

(j) Install the actuator safety lock assembly, SPL-14551, on the extended piston rod.

NOTE: The part number of the actuator safety lock is C78035-1. The part number (C78035-1) is for the set of two actuator safety locks.

(k) Open the return valve on the hand pump to let the weight of the thrust reverser be held by the locked opening actuator.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING

MAKE SURE THAT THE RETURN VALVE ON THE HAND PUMP IS CLOSED WHEN THE THRUST REVERSER IS HELD BY THE LOCKED OPENING ACTUATOR. IF THE RETURN VALVE IS LEFT OPEN, THE ENGINE OIL CAN CONTINUE TO DRAIN OUT OF THE ACTUATOR INTO THE HAND PUMP. DECREASED ENGINE OIL CAN PERMIT THE THRUST REVERSER TO CLOSE QUICKLY DURING SUBSEQUENT OPERATIONS TO CLOSE THE THRUST REVERSER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(l) Immediately close the return valve on the hand pump after the thrust reverser weight rests the locked opening actuator.

WARNING

BE CAREFUL WHEN THE HAND PUMP HOSE IS DISCONNECTED FROM THE OPENING ACTUATOR. A SPRAY OF OIL CAN COME FROM THE HOSE. ENGINE OIL IS POISONOUS AND CAN CAUSE INJURY TO PERSONS.

(m) If it is necessary to disconnect the hand pump, install dust caps on the inlet fitting on the opening actuator and the hand pump hose.

SIA ALL; AIRPLANES WITH LANYARD

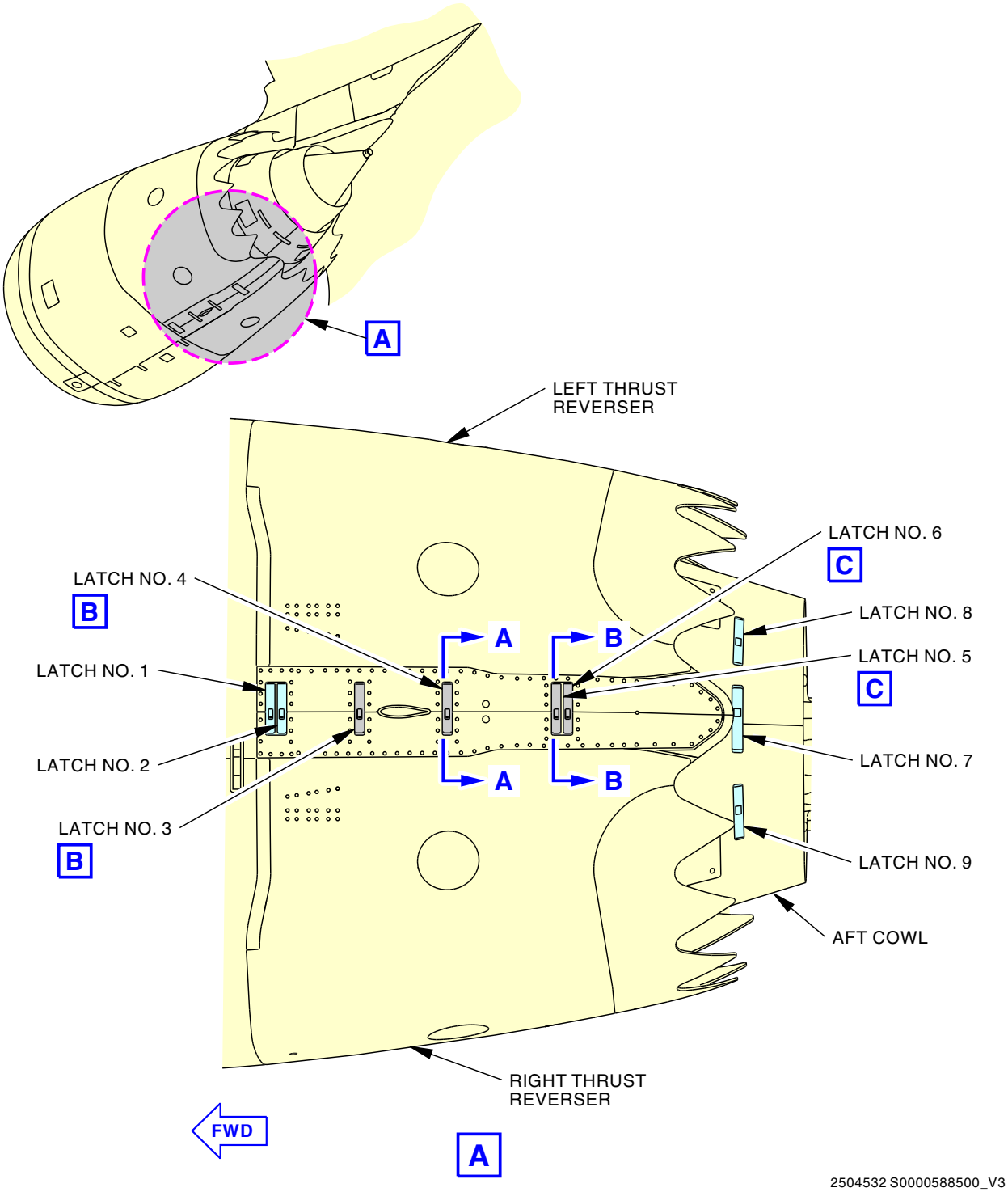
(n) Examine the cross tie rod lanyard for damage.

1) If the lanyard is damaged or broken, replace it (TASK 54-51-06-000-801 and TASK 54-51-06-400-801).

SIA ALL

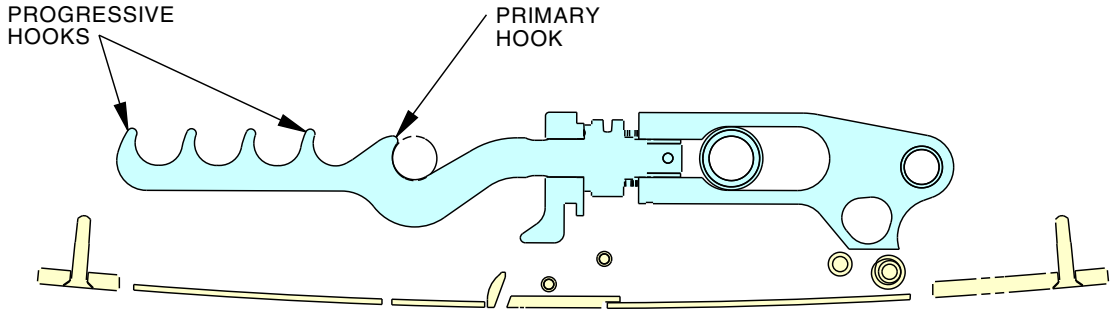
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Latch Release
Figure 201/78-31-00-990-801-G00 (Sheet 1 of 2)

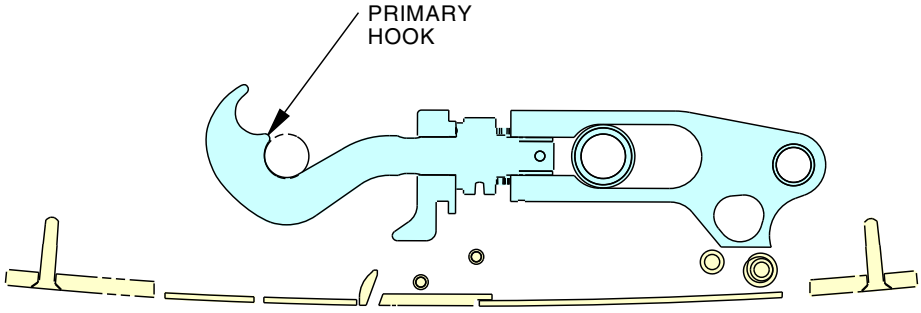
ECCN 9E991 BOEING PROPRIETARY - See title page for details



LATCH NO. 3 & 4

A-A

B



LATCH NO. 5 & 6

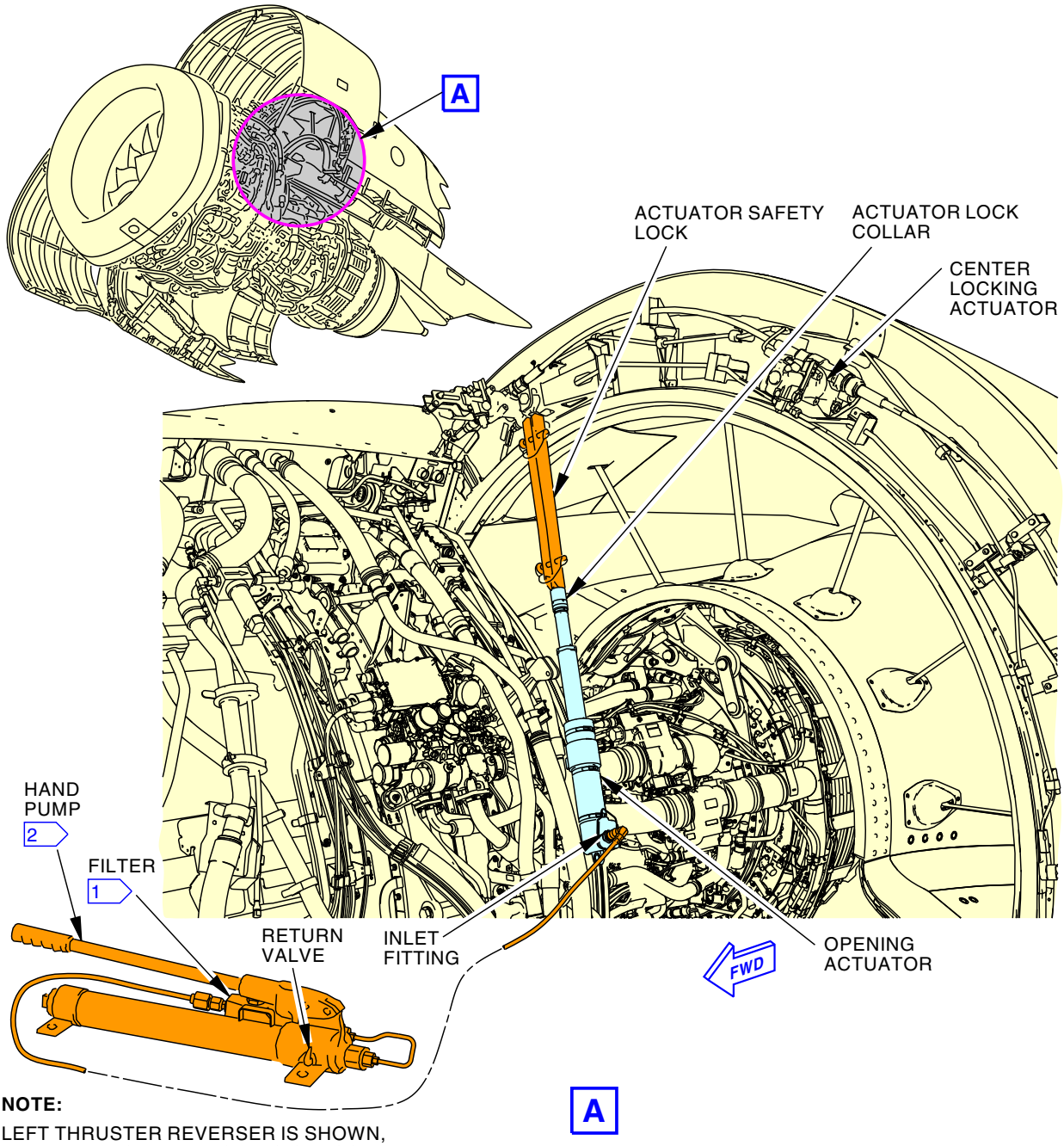
B-B

C

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Thrust Reverser Latch Release
Figure 201/78-31-00-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

LEFT THRUSTER REVERSER IS SHOWN, RIGHT THRUST REVERSER IS OPPOSITE.

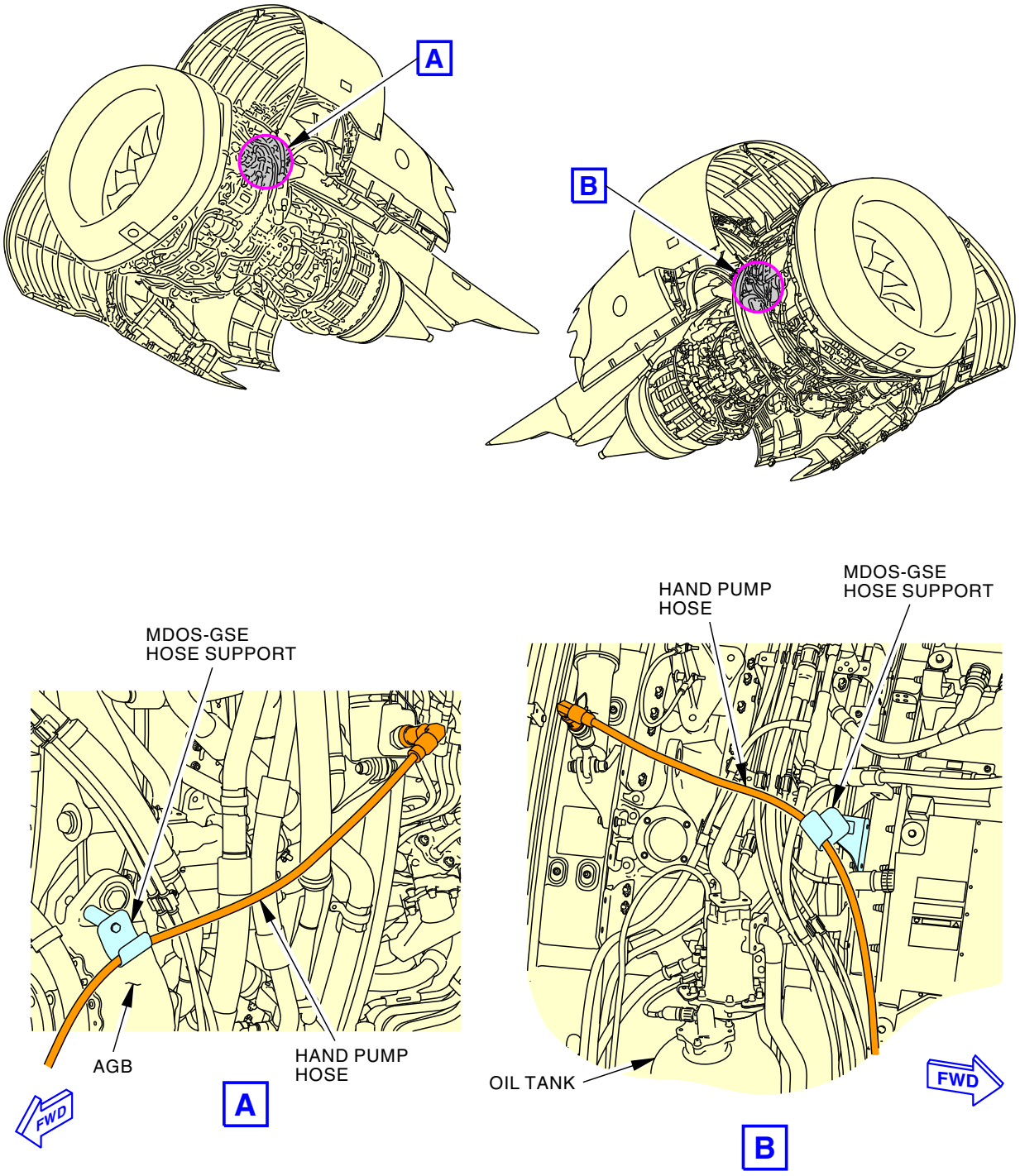
1 HOLD THE FILTER ON THE HAND PUMP HOSE FORWARD AT APPROXIMATELY A 45 DEGREE ANGLE TO PREVENT CONTACT WITH THE CENTER LOCKING ACTUATOR AS THE THRUST REVERSER OPENS OR CLOSES.

2 C78005-60 IS SHOWN.

2355133 S00061516613_V4

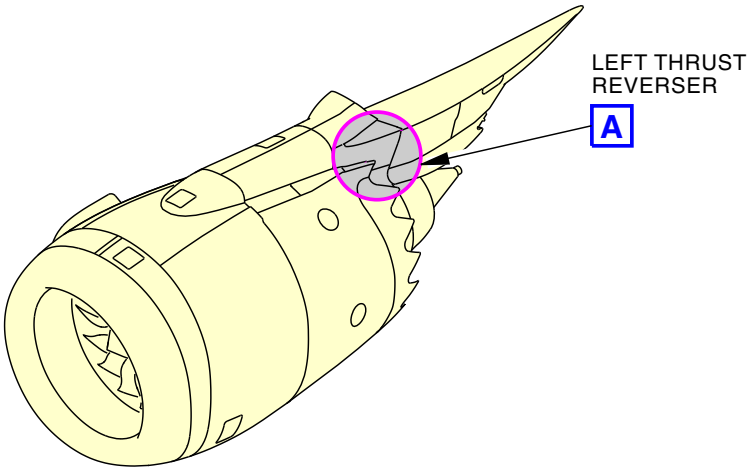
Thrust Reverser Actuator Safety Lock and Hand Pump
Figure 202/78-31-00-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

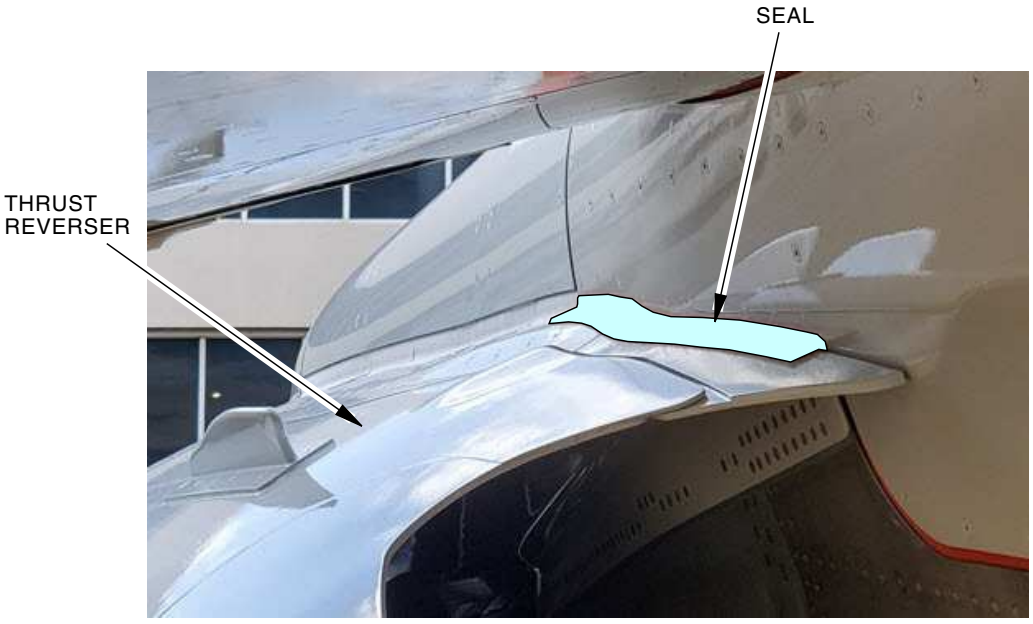


MDOS-GSE Hose Support
Figure 203/78-31-00-990-821-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT STRUT
(RIGHT STRUT IS OPPOSITE)



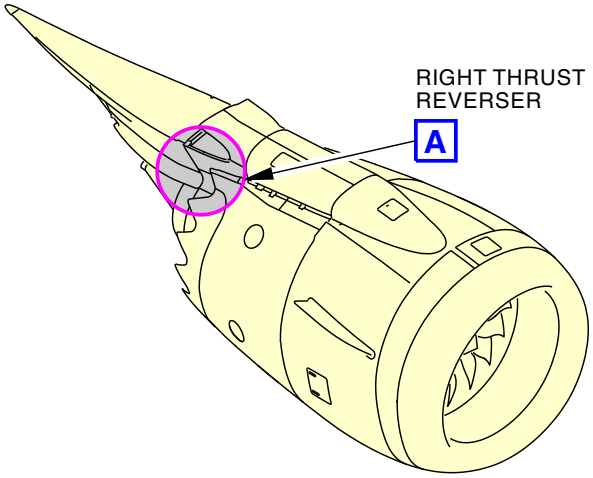
LEFT THRUST REVERSER
(RIGHT THRUST REVERSER IS ALMOST THE SAME)

A

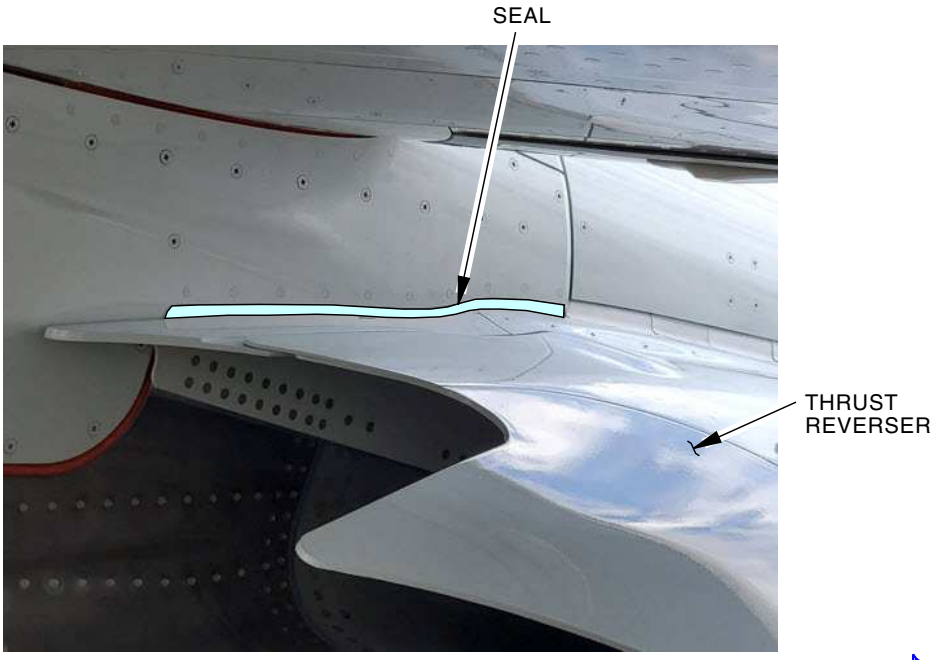
2998470 S0000774587_V1

Thrust Reverser Seal
Figure 204/78-31-00-990-822-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT STRUT
(LEFT STRUT IS OPPOSITE)



RIGHT THRUST REVERSER
(LEFT THRUST REVERSER IS ALMOST THE SAME)

A

2998472 S0000774588_V1

Thrust Reverser Seal
Figure 204/78-31-00-990-822-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-410-801-G00

5. Close the Thrust Reverser (Hydraulic Pump Procedure)

(Figure 201, Figure 202, and Figure 204)

A. General

(1) This task gives the instructions to close the thrust reverser with a hydraulic pump.

(2) This is applicable for the left or right thrust reverser on the applicable engine.

(3) The left and right fan cowl panels must be opened fully to the 61-degree open position.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-08-870-801-G00	Fill and Bleed Procedure (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-2417	Pump - Hand, Cowl Opening Part #: A78019-29 Supplier: 81205 Part #: B54001-53 Supplier: 81205 Part #: C78005-60 Supplier: 81205 Opt Part #: A78019-27 Supplier: 81205 Opt Part #: C78005-26 Supplier: 81205 Opt Part #: C78005-53 Supplier: 81205
SPL-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Thrust Reverser Closure (Hydraulic Pump Procedure)

SUBTASK 78-31-00-410-001-G00

WARNING DO NOT OPEN OR CLOSE THE THRUST REVERSER IN HIGH WINDS OR SUDDEN-STRONG-WINDS CONDITIONS. MAKE SURE THAT THE CONSTANT WINDS OR SUDDEN WINDS ARE LESS THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BETWEEN THE ENGINE AND THE THRUST REVERSER WITHOUT THE ACTUATOR SAFETY LOCK INSTALLED. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BELOW OR NEAR THE THRUST REVERSER WHILE YOU OPEN OR CLOSE THE THRUST REVERSER. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT THE AREA BETWEEN THE THRUST REVERSER AND THE TURBINE EXHAUST SLEEVE FIRESEALS AND THE ENGINE IS CLEAR OF ALL OBJECTS. THIS WILL PREVENT DAMAGE TO THE EQUIPMENT WHEN YOU CLOSE THE THRUST REVERSER.

CAUTION MAKE SURE THAT THE LATCH RING V-BLADE GOES INTO THE ENGINE V-GROOVE WHEN YOU CLOSE THE THRUST REVERSER. DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(1) Do these steps to close the thrust reverser:

(a) Remove the dust caps from the inlet fitting on the opening actuator and from the cowl opening hand pump, SPL-2417.

NOTE: If available, it is recommended to use C78005-60. This will help to prevent damage to the thrust reverser equipment.

(b) Make sure that the cowl opening hand pump, SPL-2417, is not full of oil but has sufficient capacity of oil, D00071, or oil, D00068, per cowl opening hand pump, SPL-2417, placard to be able to lower the thrust reverser.

NOTE: The hand pump cannot be completely empty or completely full of oil, D00071, or oil, D00068. Some oil must be in the hand pump to relieve the load on the opening actuator locks. A full hand pump will not permit oil to flow from the opening actuator and thrust reverser will not fully close.

1) If it is possible, use the same hand pump was used to open the thrust reverser.

NOTE: If the same hand pump was used to open the thrust reverser is also used to close the thrust reverser, the hand pump oil level will be acceptable.

(c) Make sure that the return valve on the hand pump is closed.

(d) Connect the cowl opening hand pump, SPL-2417, hose to the inlet fitting on the opening actuator.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION MAKE SURE THAT THE FILTER ON THE HAND PUMP HOSE DOES NOT INTERFERE WITH THE MOVING THRUST REVERSER. THE FILTER CAN TURN ON THE END OF THE HAND PUMP HOSE AND CAUSE DAMAGE TO THE EQUIPMENT.

(e) Hold the filter on the hand pump hose forward at approximately a 45° angle to prevent contact with the center locking actuator as the thrust reverser closes.

WARNING MAKE SURE YOU USE THE HAND PUMP TO EXTEND THE OPENING ACTUATOR AND LIFT THE WEIGHT OF THE THRUST REVERSER OFF THE ACTUATOR LOCK. IF YOU DO NOT USE THE HAND PUMP, AIR OR A VACUUM COULD GET INTO THE OPENING ACTUATOR. THIS COULD CAUSE THE THRUST REVERSER TO CLOSE QUICKLY WHEN THE ACTUATOR LOCK COLLAR IS DISENGAGED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT OPEN THE RETURN VALVE ON THE HAND PUMP UNTIL YOU REMOVE THE SAFETY LOCK AND DISENGAGE THE ACTUATOR LOCK COLLAR. THIS WILL PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(f) With the return valve closed on the hand pump, operate the hand pump to remove the load from the opening actuator locks.

(g) Remove the actuator safety lock assembly, SPL-14551, from the extended piston rod.

NOTE: The part number of the actuator safety lock is C78035-1. The part number (C78035-1) is for the set of two actuator safety locks.

(h) Push up on the actuator lock collar to disengage the lock.

1) If the hand pump cannot sufficiently open the thrust reverser to unlock the opening actuator, install the opening actuator safety lock assembly, SPL-14551, on the extended piston rod and service the hand pump with oil, D00071, or oil, D00068, per cowl opening hand pump, SPL-2417, placard.

NOTE: Do not fully fill the hand pump with oil.

(i) Make sure that the v-blade on the thrust reverser and v-groove on the fan case are aligned and fully engaged.

WARNING DO THE ACTUATOR FILL AND BLEED PROCEDURE IF THE OPENING ACTUATOR RETRACTS TOO QUICKLY FOR MORE THAN THE LIMIT. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(j) Open the return valve on the hand pump and lower the thrust reverser.

NOTE: The opening actuator has a controlled rate at that it should retract. Usually the actuator piston rod will initially move quickly a small amount, less than 0.5 in. (12.7 mm).

1) If the opening actuator retracts quickly for more than 0.5 in. (12.7 mm), do this task: TASK 78-31-08-870-801-G00.

2) If the thrust reverser will not fully close, do these steps:

a) Do this task: Open the Thrust Reverser (Hydraulic Pump Procedure), TASK 78-31-00-000-801-G00.

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b) Drain but not fully drain the oil from the cowl opening hand pump, SPL-2417.

c) Return to the step in this task that has instructions to close the thrust reverser.

d) After the thrust reverser is closed, make sure that the cowl opening hand pump, SPL-2417, with oil, D00071, or oil, D00068, are fully serviced per the hand pump placard.

(k) Close the return valve on the hand pump.

(l) Disconnect the hand pump hose from the opening actuator.

(m) Install dust caps on the inlet fitting on the opening actuator and the hand pump hose.

(n) Do the steps that follow to engage the latches along the bottom centerline of the thrust reverser:

1) Engage the first progressive hook on latch No. 4 and close the latch.

2) Engage the first progressive hook on latch No. 3 and close the latch.

NOTE: Latch No. 4 will drop open.

3) Engage the next progressive hook on latch No. 4 and close the latch.

NOTE: Latch No. 3 will drop open.

4) Alternate between closing latch No. 3 and latch No. 4 on the next progressive hooks until both latches are engaged on the progressive hook nearest the primary hook.

5) Engage the progressive hook on latch No. 5 and close the latch.

6) Engage the primary hook on latch No. 3 and close the latch.

7) Engage the primary hook on latch No. 4 and close the latch.

8) Engage the primary hook on latch No. 5 and close the latch.

9) Engage the primary hook on latch No. 6 and close the latch.

10) Close latch No. 1 and latch No. 2.

11) Close latch No. 7.

12) Close latch No. 8 and latch No. 9.

SIA 001-012

(o) Make sure that the aft end of the seal at the upper aft end of the thrust reverser is not pinched (Figure 204).

NOTE: The aft end of the seal immediately above the serrated aft edge.

1) If the seal is pinched, use a flexible plastic squeegee to carefully pull it up into its position.

SIA 013-999

(p) Make sure that the seal sits inside of the thrust reverser (Figure 204).

SIA ALL

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-001-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1

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(Continued)

Number	Name/Location
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-440-001-G00

(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-00-440-002-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-00-860-243-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 78-31-00-010-803-G00

6. Open the Thrust Reverser (Sling Procedure)

(Figure 201 and Figure 202)

A. General

(1) This task gives the instructions to open the left or right thrust reverser on the applicable engine if the opening actuator cannot be used.

(2) It is recommended that the Hand Pump Procedure be used. Use the Sling Procedure only if the opening actuator is not operational or the hand pump is not available.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
54-51-06-000-801	Thrust Reverser Cross Tie Rod Lanyard Removal (P/B 401)
54-51-06-400-801	Thrust Reverser Cross Tie Rod Lanyard Installation (P/B 401)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (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-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
SPL-14554	Sling - Opening, LEAP-1B Thrust Reverser Part #: C78031-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

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D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
521AB	Outboard Leading Edge Blowout Door - Slat Station 20
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621AB	Outboard Leading Edge Blowout Door - Slat Station 20
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

E. Preparation

SUBTASK 78-31-00-860-242-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-040-001-G00

WARNING RETRACT THE LEADING EDGE FLAPS AND SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE LEFT OR THE RIGHT THRUST REVERSER ON AN ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-00-040-002-G00

(3) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-00-040-003-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-00-860-245-G00

CAUTION IF FAN COWLS ARE INSTALLED, MAKE SURE THAT LEFT AND RIGHT FAN COWLS ARE IN THE FULL OPEN POSITION. MAKE SURE THAT THE SPRING DOOR OPENING-SYSTEM (SDOS) AND HOLD OPEN RODS (HOR) ARE LOCKED IN THEIR POSITION. IF YOU DO NOT, STRUCTURAL DAMAGE TO THE FAN COWL AND THRUST REVERSER CAN OCCUR.

(5) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

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(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-003-G00

(6) Make sure that these access panels are closed:

Number	Name/Location
521AB	Outboard Leading Edge Blowout Door - Slat Station 20
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621AB	Outboard Leading Edge Blowout Door - Slat Station 20
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

F. Thrust Reverser Open (Sling Procedure)

SUBTASK 78-31-00-010-004-G00

WARNING DO NOT OPEN OR CLOSE THE THRUST REVERSER IN HIGH WINDS OR SUDDEN-STRONG-WINDS CONDITIONS. MAKE SURE THAT THE CONSTANT WINDS OR SUDDEN WINDS ARE LESS THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BETWEEN THE ENGINE AND THE THRUST REVERSER WITHOUT THE ACTUATOR SAFETY LOCK INSTALLED. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BELOW OR NEAR THE THRUST REVERSER WHILE YOU OPEN OR CLOSE THE THRUST REVERSER. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT EXTEND THE THRUST REVERSER SLEEVES WHILE THE THRUST REVERSER HALVES ARE OPEN. THIS WILL CAUSE DAMAGE TO THE THRUST REVERSER SLEEVES.

(1) Do these steps to open the thrust reverser:

(a) Disengage the three latches at the bottom of the aft cowls.

1) Disengage the latch No. 8 and latch No. 9 before the latch No. 7.

(b) Disengage the six latches along the bottom centerline of the thrust reverser.

1) Disengage the latches in sequence from latch No. 6 to latch No. 1.

(c) Attach the opening sling, SPL-14554, to the thrust reverser.

WARNING BE CAREFUL WHEN YOU OPEN OR CLOSE THE THRUST REVERSER, THE THRUST REVERSER IS HEAVY. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

WARNING: DO NOT OPEN THE THRUST REVERSER TOO QUICKLY. THIS CAN CAUSE A VACUUM WHICH WILL HAVE AN EFFECT ON THE NORMAL OPERATION (SNUBBING ACTION) OF THE OPENING ACTUATOR. WHEN THE ACTUATOR LOCK IS DISENGAGED FOR THE CLOSE PROCEDURE, THE THRUST REVERSER CAN CLOSE SUDDENLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Slowly lift the thrust reverser with the sling to the fully open position.

NOTE: The thrust reverser weighs approximately 800 lb (363 kg).

(e) Look for these indications that the thrust reverser is in the fully open position and opening actuator is locked:

1) Listen for the click sound of the lock collar.

2) Make sure that the word LOCKED shows on the bottom of the extended piston.

(f) Install the actuator safety lock assembly, SPL-14551, on the extended piston rod.

NOTE: The part number of the actuator safety lock is C78035-1. The part number (C78035-1) is for the set of two actuator safety locks.

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(g) Examine the cross tie rod lanyard for damage.

1) If the lanyard is damaged or broken, replace it (TASK 54-51-06-000-801 and TASK 54-51-06-400-801).

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——— END OF TASK ———

TASK 78-31-00-410-802-G00

7. Close the Thrust Reverser (Sling Procedure)

(Figure 201, Figure 202, and Figure 204)

A. General

(1) This task gives the instructions to close the left or right thrust reverser on the applicable engine if the opening actuator cannot be used.

(2) It is recommended that the Hand Pump Procedure be used. Use the Sling Procedure if the opening actuator is not operational or hand pump is not available.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (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-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205

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(Continued)

Reference	Description
SPL-14554	Sling - Opening, LEAP-1B Thrust Reverser Part #: C78031-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Thrust Reverser Closure (Sling Procedure)

SUBTASK 78-31-00-410-002-G00

WARNING MAKE SURE THAT YOU USE A STABLE FORCE (A MINIMUM OF TWO PERSONS AT THE FORWARD END) TO HOLD UP THE THRUST REVERSER BEFORE YOU DISENGAGE THE ACTUATOR LOCKS. THERE COULD BE AIR OR A VACUUM IN THE ACTUATOR WHICH CAN DECREASE THE SNUBBING ACTION OF THE OPENING ACTUATOR. THE THRUST REVERSER CAN CLOSE QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING DO THE ACTUATOR FILL AND BLEED PROCEDURE IF THE OPENING ACTUATOR RETRACTS TOO QUICKLY FOR MORE THAN THE LIMIT. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT OPEN OR CLOSE THE THRUST REVERSER IN HIGH WINDS OR SUDDEN-STRONG-WINDS CONDITIONS. MAKE SURE THAT THE CONSTANT WINDS OR SUDDEN WINDS ARE LESS THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING BE CAREFUL WHEN YOU OPEN OR CLOSE THE THRUST REVERSER, THE THRUST REVERSER IS HEAVY. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BETWEEN THE ENGINE AND THE THRUST REVERSER WITHOUT THE ACTUATOR SAFETY LOCK INSTALLED. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO BELOW OR NEAR THE THRUST REVERSER WHILE YOU OPEN OR CLOSE THE THRUST REVERSER. IF THE THRUST REVERSER SUDDENLY CLOSES, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

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(WARNING PRECEDES)

CAUTION MAKE SURE THAT THE LATCH RING V-BLADE GOES INTO THE ENGINE V-GROOVE WHEN YOU CLOSE THE THRUST REVERSER. DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(1) Do these steps to close the thrust reverser:

NOTE: The thrust reverser weighs approximately 800 lb (363 kg).

(a) Lift the thrust reverser a small amount to remove the load from the opening actuator.

(b) Remove the actuator safety lock assembly, SPL-14551, from the extended piston rod.

(c) Push up on the actuator lock collar to disengage the lock.

(d) Slowly close the thrust reverser.

(e) Make sure that the v-blade on the thrust reverser and v-groove on the fan case are aligned and fully engaged.

(f) Do these steps to engage the latches along the bottom centerline of the thrust reverser:

1) Engage the first progressive hook on latch No. 4 and close the latch.

2) Engage the first progressive hook on latch No. 3 and close the latch.

NOTE: Latch No. 4 will drop open.

3) Engage the next progressive hook on latch No. 4 and close the latch.

NOTE: Latch No. 3 will drop open.

4) Alternate between closing latch No. 3 and latch No. 4 on the next progressive hooks until both latches are engaged on the progressive hook nearest the primary hook.

5) Engage the progressive hook on latch No. 5 and close the latch.

6) Engage the primary hook on latch No. 3 and close the latch.

7) Engage the primary hook on latch No. 4 and close the latch.

8) Engage the primary hook on latch No. 5 and close the latch.

9) Engage the primary hook on latch No. 6 and close the latch.

10) Close latch No. 1 and latch No. 2.

11) Close latch No. 7.

12) Close latch No. 8 and latch No. 9.

SIA 001-012

(g) Make sure that the aft end of the seal at the upper aft end of the thrust reverser is not pinched (Figure 204).

NOTE: The aft end of the seal immediately above the serrated aft edge.

1) If the seal is pinched, use a flexible plastic squeegee to carefully pull it up into its position.

SIA 013-999

(h) Make sure that the seal sits inside of the thrust reverser (Figure 204).

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SUBTASK 78-31-00-080-009-G00

(2) Remove the opening sling, SPL-14554, from the thrust reverser cowl.

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F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-137-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-440-003-G00

(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-00-440-004-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-00-860-244-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 78-31-00-980-801-G00

8. Thrust Reverser Operation - Extend (Selection)

A. General

(1) This task gives the mechanic a selection of applicable tasks for thrust reverser extend operation.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Thrust Reverser Operation - Extend (Selection)

SUBTASK 78-31-00-860-013-G00

(1) Do one of these tasks to extend the thrust reverser:

(a) Do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

(b) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00.

——— END OF TASK ———

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TASK 78-31-00-980-802-G00

9. Thrust Reverser Operation - Retract (Selection)

A. General

(1) This task gives the mechanic a selection of applicable tasks for thrust reverser retract operation.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Thrust Reverser Operation - Retract (Selection)

SUBTASK 78-31-00-860-014-G00

(1) Do one of these tasks to retract the thrust reverser:

(a) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00.

——— END OF TASK ———

TASK 78-31-00-980-803-G00

10. Thrust Reverser Operation - Extend (Manual Procedure)

(Figure 205, Figure 206)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to manually extend the left or right thrust reverser sleeve.

(2) To engage the manual drive shaft in the sync lock, the lock release pin in the 3/8-inch square opening at the end of the sync lock must be pushed in.

(3) The sync lock is on the lower hydraulic actuator torque box.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (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-18641	Drive Socket - TRAS, Manual Drive (Fully Depressed) Part #: C78040-10 Supplier: 88277 Opt Part #: C78040-1 Supplier: 88277
STD-858	Tag - DO NOT OPERATE
STD-997	Wrench - Speed, 3/8 Inch Square Drive
STD-6760	Wrench - Standard, 5/8 inch (15.875 mm)
STD-6839	Wrench - Torque (0-150 in-lbs) with Dial Indicator or Digital Readout

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D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

F. Prepare for the Thrust Reverser Operation

SUBTASK 78-31-00-860-136-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-040-006-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-00-010-015-G00

(3) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-247-G00

(4) For Engine 1, make sure that these circuit breakers are open and safety tags are installed:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

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SUBTASK 78-31-00-860-248-G00

(5) For Engine 1, make sure that these circuit breakers are open and safety tags are installed:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

G. Thrust Reverser Operation - Extend (Manual Procedure)

SUBTASK 78-31-00-980-001-G00

WARNING MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION STOP THE MANUAL EXTENSION IF THE THRUST REVERSER EXTENDS AT AN ANGLE. THIS IS AN INDICATION THAT THERE ARE SYNC SHAFTS THAT ARE BROKEN OR NOT INSTALLED. IF YOU CONTINUE, DAMAGE TO THE EQUIPMENT CAN OCCUR.

CAUTION DO NOT USE AN EXTENSION BAR OR OTHER TOOL TO MOVE THE UNLOCK HANDLE. IF YOU USE AN EXTENSION BAR OR OTHER TOOLS, DAMAGE TO THE UNLOCK HANDLE OR ACTUATOR CAN OCCUR.

CAUTION MAKE SURE THAT THE THRUST REVERSER SLEEVE DOES NOT HIT THE WING IF THE THRUST REVERSER IS IN THE 45-DEGREE OPEN POSITION. DO NOT EXTEND THE INBOARD SLEEVE MORE THAN 10 INCHES. DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Do these steps to release the locks on the locking actuators:

(a) Move the manual unlock lever on each locking actuator forward.

(b) Hold the manual unlock lever in the forward position as you push the detent pin in.

(c) Release the manual unlock lever.

SUBTASK 78-31-00-980-002-G00

CAUTION DO NOT HIT THE END OF THE SYNC LOCK OR THE 3/8 INCH DRIVE WRENCH TO PUSH THE LOCK RELEASE PIN. DAMAGE TO THE SYNC LOCK CAN OCCUR.

(2) Unlock the sync lock and engage the manual drive:

(a) If using standard hand tools:

1) Put a standard wrench, STD-6760, or equivalent open end wrench on the hex nut at the end of the sync lock.

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2) Put a torque wrench (0-150 in-lbs), STD-6839, or equivalent into the 3/8 inch square opening.

NOTE: Use a dial indicator torque wrench to make sure that you do not go over the 50 in-lb (6 N·m) limit.

NOTE: The wrench will go into the opening approximately 0.30 in. (7.62 mm).

3) Apply continuous pressure on the lock release pin with the square drive ratchet.

4) Slowly move the open end wrench a small amount in one or opposite direction until the lock release pin goes in.

(b) If using fully depressed drive socket, SPL-18641:

1) Put a 3/8 inch square drive speed wrench, STD-997, or equivalent into the 3/8 inch square opening in the fully depressed drive socket, SPL-18641.

NOTE: Use a dial indicator torque wrench to make sure that you do not go over the 50 in-lb (6 N·m) limit.

2) Mate the fully depressed drive socket, SPL-18641, with the 5/8 inch hex nut on the end of the sync lock.

3) Apply pressure until the lock release pin goes in.

a) Move the fully depressed drive socket, SPL-18641, a small amount, in one direction and then the other, to help the lock release pin go in.

NOTE: The 3/8 drive wrench will go into the opening approximately 0.30 in. (7.62 mm).

SUBTASK 78-31-00-860-015-G00

CAUTION

MAKE SURE THAT YOU APPLY CONTINUOUS PRESSURE ON THE SQUARE-DRIVE WRENCH. THIS WILL KEEP THE LOCK RELEASE PIN IN AND THE MANUAL DRIVE FULLY ENGAGED. IF YOU DO NOT, DAMAGE TO THE SYNC LOCK CAN OCCUR.

(3) Turn the torque wrench (0-150 in-lbs), STD-6839 with a 6 in. (15 cm) extension to manually extend the thrust reverser sleeve as follows:

NOTE: The sleeve will be in the fully extended position when the override clutch on the manual drive slips.

(a) Turn the torque wrench (0-150 in-lbs), STD-6839 no more than 50 in-lb (6 N·m) counter-clockwise to extend the left thrust reverser sleeve.

(b) Turn the torque wrench (0-150 in-lbs), STD-6839 no more than 50 in-lb (6 N·m) clockwise to extend the right thrust reverser sleeve.

(c) If the inboard thrust reverser sleeve is in the 45-degree open position, do these steps:

1) Make sure that the leading edge flaps are completely retracted.

2) Monitor the position of the thrust reverser sleeve as you extend it to make sure that it does not touch the wing.

3) Manually extend the thrust reverser sleeve 10.0 in. (254.0 mm) or less from the forward edge of the torque box.

(d) If the outboard thrust reverser sleeve is in the 45-degree open position, make sure that there is no interference with the wing.

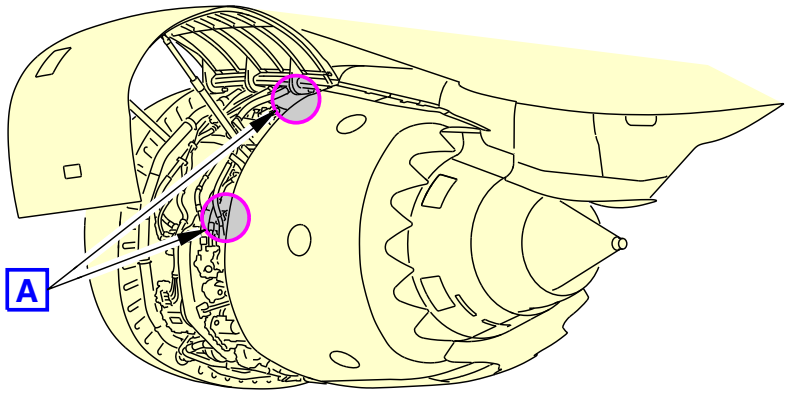
ECCN 9E991 BOEING PROPRIETARY - See title page for details

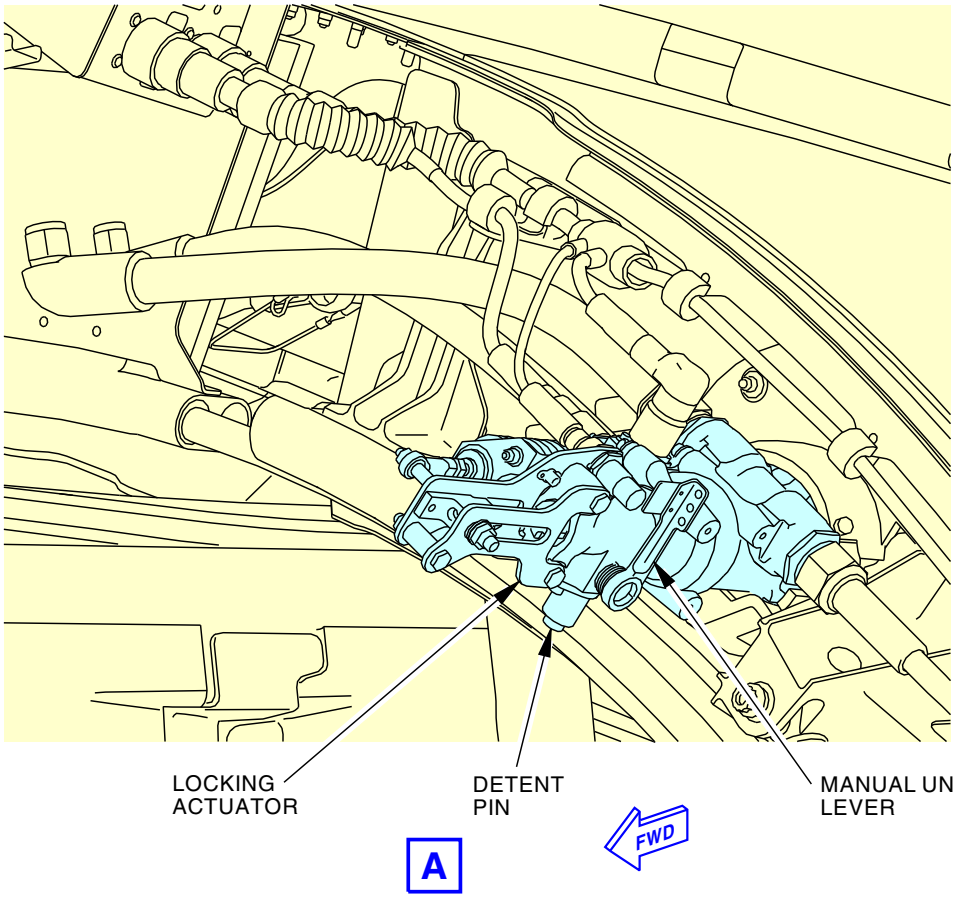
SUBTASK 78-31-00-080-008-G00

(4) Remove the torque wrench (0-150 in-lbs), STD-6839 and the extension from the sync lock.

——— END OF TASK ———

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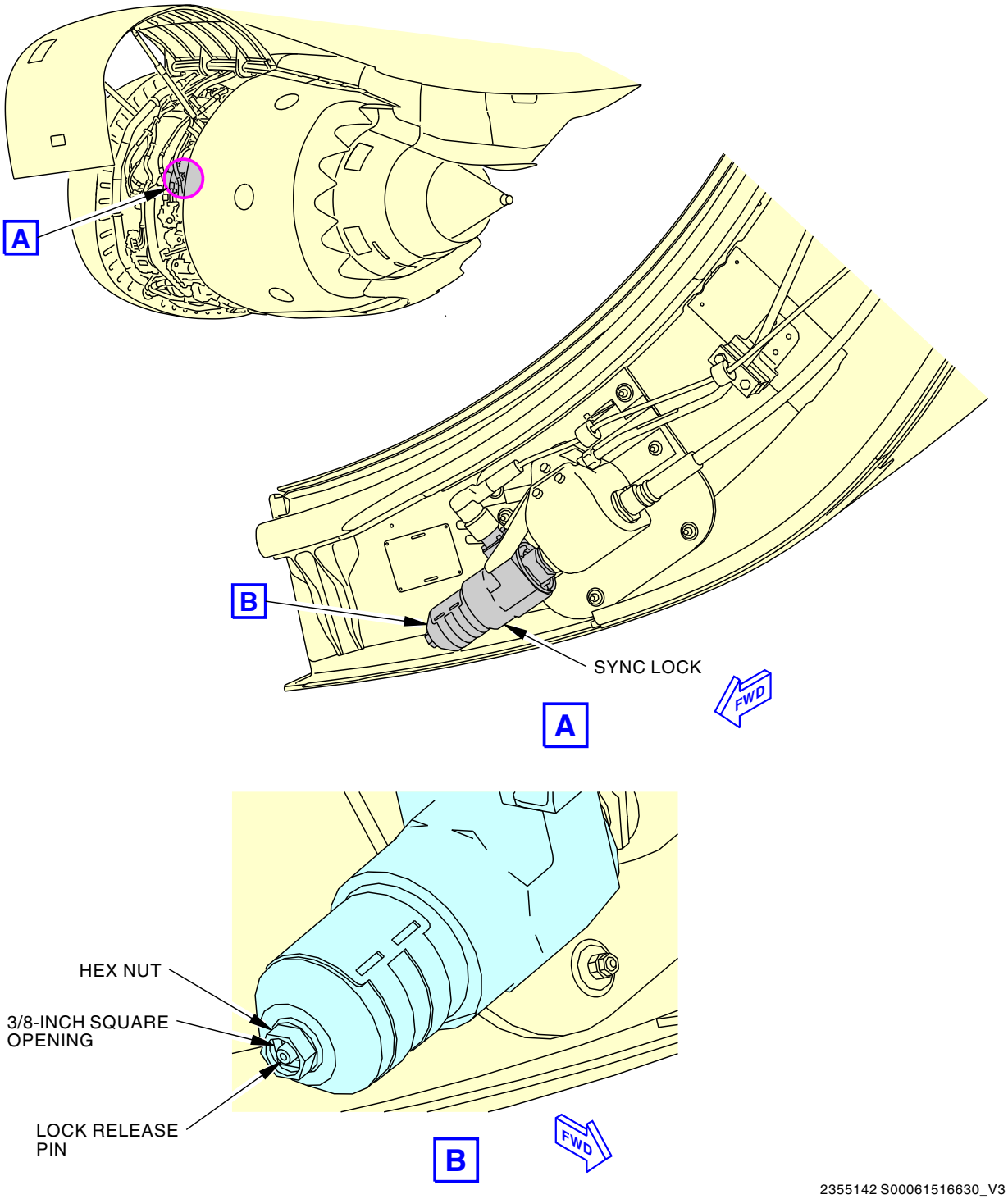
NOTE:

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE.

2355141 S00061516629_V3

Manual Unlock of the Locking Actuator
Figure 205/78-31-00-990-808-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Sync Lock Manual Drive
Figure 206/78-31-00-990-809-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-980-804-G00

11. Thrust Reverser Operation - Retract (Manual Procedure)

(Figure 205 and Figure 206)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to manually retract the left or right thrust reverser sleeve on an engine.

(2) To engage the manual drive shaft in the sync lock, the lock release pin in the 3/8-inch square opening at the end of the sync lock must be pushed in.

(3) The sync lock is on the lower hydraulic actuator on the torque box.

(4) Hydraulic power can be necessary to completely retract and lock the thrust reverser.

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (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-2418	Lockpin - Equipment, Thrust Reverser Actuator Module Lockout Part #: C78004-1 Supplier: 81205
SPL-18641	Drive Socket - TRAS, Manual Drive (Fully Depressed) Part #: C78040-10 Supplier: 88277 Opt Part #: C78040-1 Supplier: 88277
STD-858	Tag - DO NOT OPERATE
STD-997	Wrench - Speed, 3/8 Inch Square Drive
STD-6760	Wrench - Standard, 5/8 inch (15.875 mm)
STD-6839	Wrench - Torque (0-150 in-lbs) with Dial Indicator or Digital Readout

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Prepare for the Procedure

SUBTASK 78-31-00-860-016-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-040-011-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-00-010-016-G00

(3) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

F. Thrust Reverser Operation - Retract (Manual Procedure)

SUBTASK 78-31-00-980-003-G00

WARNING KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE AREA AROUND THE THRUST REVERSERS. THE THRUST REVERSERS EXTEND AND RETRACT QUICKLY. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT APPLY MORE THAN 50 INCH-POUNDS OF TORQUE TO EXTEND OR RETRACT THE THRUST REVERSER. IF YOU DO, DAMAGE TO THE SYNC LOCK CAN OCCUR.

CAUTION DO NOT HIT THE END OF THE SYNC LOCK OR THE 3/8 INCH DRIVE WRENCH TO PUSH THE LOCK RELEASE PIN. DAMAGE TO THE SYNC LOCK CAN OCCUR.

(1) Unlock the sync lock and engage the manual drive as follows:

NOTE: To completely retract and lock the thrust reverser, it can be necessary to use hydraulic power. You can use a wrench to partially retract the thrust reverser; however if the locking actuator does not lock, hydraulic power will be necessary to completely retract and lock the thrust reverser.

(a) If using standard hand tools:

1) Put a standard wrench, STD-6760, or equivalent open end wrench on the hex nut at the end of the sync lock.

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2) Put a torque wrench (0-150 in-lbs), STD-6839, or equivalent into the 3/8 inch square opening.

NOTE: Use a dial indicator torque wrench to make sure that you do not go over the 50 in-lb (6 N·m) limit.

NOTE: The wrench will go into the opening approximately 0.30 in. (7.62 mm).

3) Apply continuous pressure on the lock release pin with the square drive ratchet.

4) Slowly move the open end wrench a small amount in one or opposite direction until the lock release pin goes in.

(b) If using fully depressed drive socket, SPL-18641:

1) Put a 3/8 inch square drive speed wrench, STD-997, or equivalent into the 3/8 inch square opening in the fully depressed drive socket, SPL-18641.

NOTE: Use a dial indicator torque wrench to make sure that you do not go over the 50 in-lb (6 N·m) limit.

2) Mate the fully depressed drive socket, SPL-18641, with the 5/8 inch hex nut on the end of the sync lock.

3) Apply pressure until the lock release pin goes in.

a) Move the fully depressed drive socket, SPL-18641, a small amount, in one direction and then the other, to help the lock release pin go in.

NOTE: The 3/8 drive wrench will go into the opening approximately 0.30 in. (7.62 mm).

SUBTASK 78-31-00-980-004-G00

CAUTION

MAKE SURE THAT YOU APPLY CONTINUOUS PRESSURE ON THE SQUARE-DRIVE WRENCH. THIS WILL KEEP THE LOCK RELEASE PIN IN AND THE MANUAL DRIVE FULLY ENGAGED. IF YOU DO NOT, DAMAGE TO THE SYNC LOCK CAN OCCUR.

(2) Turn the torque wrench (0-150 in-lbs), STD-6839 with a 6 in. (15 cm) extension to manually retract the thrust reverser sleeve as follows:

NOTE: The sleeve will be at the manual track limit when the override clutch on the manual drive slips. If the locking actuator has not locked at this time, hydraulic power will be necessary to completely retract and lock the thrust reverser.

(a) Turn the torque wrench (0-150 in-lbs), STD-6839 no more than 50 in-lb (6 N·m) clockwise to retract the left thrust reverser sleeve.

(b) Turn the torque wrench (0-150 in-lbs), STD-6839 no more than 50 in-lb (6 N·m) counter-clockwise to retract the right thrust reverser sleeve.

SUBTASK 78-31-00-080-007-G00

(3) Remove the torque wrench (0-150 in-lbs), STD-6839 and the extension from the sync lock.

SUBTASK 78-31-00-860-017-G00

WARNING

KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE AREA AROUND THE THRUST REVERSERS. THE THRUST REVERSERS EXTEND AND RETRACT QUICKLY. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

CAUTION DO NOT USE HYDRAULIC POWER TO RETRACT THE THRUST REVERSER IF IT IS OPEN. MONITOR THE POSITION OF THE THRUST REVERSER SLEEVE WHILE YOU MANUALLY RETRACT IT. MAKE SURE THAT THE SLEEVE DOES NOT HIT THE WING. IF IT DOES, DAMAGE CAN OCCUR.

CAUTION MAKE SURE TO EXAMINE THE SYNC LOCK IF ELECTRICAL POWER GOES WHEN THE THRUST REVERSER IS IN OPERATION. DAMAGE TO THE SYNC LOCKS CAN OCCUR.

(4) If it is necessary to use hydraulic power to fully retract the thrust reverser, do these steps:

NOTE: The steps that follow are necessary to unlock the sync locks and subsequently operate the thrust reverser. If the locking actuator is locked, these steps are not necessary, continue to the step for the check of the REVERSER LIMITED light on the engine control panel.

(a) Make sure that the thrust reverser is closed and latched (TASK 78-31-00-010-802-G00).

(b) Pressurize the applicable hydraulic system (TASK 29-11-00-860-801).

NOTE: For Engine 1, pressurize system A. For Engine 2, pressurize system B.

NOTE: Do not remove the hydraulic power prematurely. If you do, it can cause the REVERSER LIMITED and the HYD ISO VALVE SENSOR faults to come on. The hydraulic isolation valve is spring loaded to the closed position. If you remove the hydraulic power, the spring can close the valve. The HYD ISO VALVE SENSOR fault will show if the valve closes while the thrust reverser is extended.

(c) For engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT

(d) For engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

(e) Move the reverse thrust lever up and aft to the extended (deployed) position.

NOTE: The reverse thrust lever must be in the extended (deployed) position to unlock the sync locks.

(f) Do this task: Test No. 38 - Thrust Reverser Cycle Special Functions, TASK 71-00-00-700-816-G00.

1) Make sure that the sleeve position match with the reverse thrust lever before you start the thrust reverser special function.

2) Make sure that the thrust reverser is deployed at least 3.0 in. (76.2 mm) before you start the thrust reverser special function with the reverse thrust levers in deployed position.

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(g) Remove the lockpin, SPL-2418 from the manual shutoff valve handle on the control valve module.

NOTE: When you remove the lock the lockpin, SPL-2418, the thrust reverser will continue to extend under hydraulic power when the thrust reverser special function is started.

1) Make sure that the manual shutoff valve handle moves counterclockwise to the vertical position.

(h) Move the applicable reverse thrust lever down and forward to retract (stow) the thrust reverser.

(i) Make sure that the applicable REVERSER LIMITED light in the flight compartment is off.

1) If the REVERSER LIMITED light is on, do the applicable fault isolation task in the FIM.

(j) Depressurize the applicable hydraulic system (TASK 29-11-00-860-805).

SUBTASK 78-31-00-200-001-G00

(5) If the locking actuator is locked and hydraulic power is not necessary, do these steps:

(a) Make sure that the applicable REVERSER LIMITED light in the flight compartment is off.

1) If the REVERSER LIMITED light is on, do the applicable fault isolation task in the FIM..

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-410-007-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-440-007-G00

(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-00-860-018-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

TASK 78-31-00-980-805-G00

12. Thrust Reverser Operation - Extend (Power Procedure)

A. General

(1) This task gives the instructions to extend the thrust reverser sleeves on the applicable engine with the use of the airplane hydraulic system.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-700-804-G00	Thrust Reverser Locks Operational Test (P/B 501)

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-1614	Headset - Microphone Part #: 12506G-05 Supplier: 71483 Part #: 12508G-34 Supplier: 71483 Part #: 12515G-12 Supplier: 71483 Opt Part #: 460A Supplier: 79687 Opt Part #: 462A Supplier: 79687 Opt Part #: H3310 Supplier: 71483 Opt Part #: H3312 Supplier: 71483
SPL-2418	Lockpin - Equipment, Thrust Reverser Actuator Module Lockout Part #: C78004-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Procedure

SUBTASK 78-31-00-210-002-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-860-138-G00

(2) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

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F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-151-G00

(3) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-167-G00

(4) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-153-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-154-G00

(6) For engine 1, make sure that these circuit breakers are close.

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-00-860-155-G00

(7) For engine 2, make sure that these circuit breakers are close.

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-210-003-G00

(8) Make sure that the applicable thrust reverser is closed (TASK 78-31-00-010-802-G00).

SUBTASK 78-31-00-860-156-G00

(9) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

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(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-31-00-860-149-G00

(10) Select the applicable EEC MAINT POWER to TEST on the MISC SYSTEMS CTRLS page on the MFD (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER to TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-31-00-860-157-G00

(11) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 78-31-00-860-158-G00

(12) Set the applicable thrust lever to idle.

SUBTASK 78-31-00-210-005-G00

(13) Make sure that the applicable reverse thrust lever is in the stow position.

SUBTASK 78-31-00-080-005-G00

(14) If it is necessary, remove the lockpin, SPL-2418 from the control valve module (TASK 78-31-00-440-801-G00).

SUBTASK 78-31-00-940-001-G00

(15) Use a microphone headset, COM-1614, for communication between the person on the ground and the person in the flight compartment.

SUBTASK 78-31-00-860-159-G00

CAUTION

DO NOT OPERATE THE THRUST REVERSER WITH HYDRAULIC POWER IF ELECTRICAL POWER CAN STOP MOMENTARILY. THE SYNC LOCKS ARE SET TO GO TO THE LOCKED POSITION BY A SPRING WHEN ELECTRICAL POWER IS OFF. IF THE ELECTRICAL POWER STOPS WHEN THE THRUST REVERSER IS IN OPERATION, DAMAGE CAN OCCUR.

(16) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

NOTE: For engine 1, pressurize system A. For engine 2, pressurize system B.

F. Thrust Reverser Operation - Extend (Power Procedure)

SUBTASK 78-31-00-860-160-G00

(1) Make these selections on the MFD main function menu:

(a) ONBOARD MAINTENANCE

(b) OTHER FUNCTIONS

(c) SPECIAL FUNCTIONS

(d) 71-80 Left Engine or 71-80 Right Engine

(e) Thrust Reverser Cycle

(f) CONTINUE.

SUBTASK 78-31-00-860-161-G00

(2) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the thrust reverser may not extend.

(a) CONTINUE

(b) START FUNCTION

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SUBTASK 78-31-00-860-162-G00

WARNING KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE AREA AROUND THE THRUST REVERSERS. THE THRUST REVERSERS EXTEND AND RETRACT QUICKLY. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Extend the applicable thrust reverser as follows:

CAUTION DO NOT OPERATE THE THRUST REVERSER WITH HYDRAULIC POWER IF ELECTRICAL POWER CAN STOP MOMENTARILY. THE SYNC LOCKS ARE SET TO GO TO THE LOCKED POSITION BY A SPRING WHEN ELECTRICAL POWER IS OFF. IF THE ELECTRICAL POWER STOPS WHEN THE THRUST REVERSER IS IN OPERATION, DAMAGE CAN OCCUR.

(a) Move the applicable reverse thrust lever up and aft to the extend position.

NOTE: If electrical power goes off when the thrust reverser is in operation, the sync lock can shear. Make sure that you do a thrust reverser locks operational test to check for damage to the sync locks (TASK 78-31-00-700-804-G00).

(b) Make sure that the green REV indication shows when the thrust reverser is fully deployed.

SUBTASK 78-31-00-860-187-G00

(4) If it is necessary to retract the thrust reverser to satisfy a step in a separate procedure, do this step:

(a) Wait a minimum of 20 seconds before you move the applicable reverse thrust lever forward and down to the retract (stow) position.

NOTE: This will make sure that the system has sufficient time to detect faults.

SUBTASK 78-31-00-860-163-G00

(5) Select the STOP FUNCTION on the MFD.

SUBTASK 78-31-00-280-001-G00

(6) Do a check of the REVERSER LIMITED light on engine control panel and for TR related status messages.

(a) If the REVERSER LIMITED Light is on, do the applicable IFIM procedure for the thrust reverser system.

(b) If a TR related status message is shown, do the applicable IFIM procedure for the thrust reverser system if it is necessary.

SUBTASK 78-31-00-860-164-G00

(7) Set the applicable EEC MAINT POWER to NORM on the MISC SYSTEM CTRLS page (TASK 73-21-00-800-801-G00)

SUBTASK 78-31-00-860-165-G00

(8) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-31-00-040-012-G00

(9) If it is necessary, do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

NOTE: Deactivation is not necessary if there is no requirement to leave the TR levers in the deployed position.

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SUBTASK 78-31-00-860-188-G00

(10) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

SUBTASK 78-31-00-860-168-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-181-G00

(12) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 78-31-00-860-182-G00

(13) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-183-G00

(14) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-184-G00

(15) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-980-806-G00

13. Thrust Reverser Operation - Retract (Power Procedure)

A. General

(1) This task gives the instructions to retract the thrust reverser sleeves on the applicable engine with the use of the airplane hydraulic system.

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-700-804-G00	Thrust Reverser Locks Operational Test (P/B 501)

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-1614	Headset - Microphone Part #: 12506G-05 Supplier: 71483 Part #: 12508G-34 Supplier: 71483 Part #: 12515G-12 Supplier: 71483 Opt Part #: 460A Supplier: 79687 Opt Part #: 462A Supplier: 79687 Opt Part #: H3310 Supplier: 71483 Opt Part #: H3312 Supplier: 71483
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Procedure

SUBTASK 78-31-00-860-029-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-169-G00

(2) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-170-G00

(3) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-171-G00

(4) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-172-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-221-G00

(6) For engine 1, make sure that these circuit breakers are close.

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-00-860-224-G00

(7) For engine 2, make sure that these circuit breakers are close.

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-860-173-G00

(8) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-31-00-860-174-G00

(9) Select the applicable EEC MAINT POWER to TEST on the MISC SYSTEMS CTRLS page on the MFD (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER to TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-31-00-860-175-G00

(10) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 78-31-00-860-176-G00

(11) Set the applicable thrust lever to idle.

SUBTASK 78-31-00-940-002-G00

(12) Use a microphone headset, COM-1614, for communication between the person on the ground and the person in the flight compartment.

SUBTASK 78-31-00-440-008-G00

(13) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-00-860-031-G00

CAUTION

DO NOT RETRACT THE THRUST REVERSER SLEEVE IF THE THRUST REVERSER IS OPEN. DAMAGE TO THE THRUST REVERSER AND ADJACENT STRUCTURES CAN OCCUR.

(14) Make sure that the thrust reverser is closed and latched (TASK 78-31-00-010-802-G00).

SUBTASK 78-31-00-860-177-G00

(15) Move the applicable reverse thrust lever up and aft to the extend position if necessary.

NOTE: This ensures that the thrust reversers do not move inadvertently to retract.

SUBTASK 78-31-00-860-032-G00

(16) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

NOTE: For engine 1, pressurize system A. For engine 2, pressurize system B.

F. Thrust Reverser Operation - Retract (Power Procedure)

SUBTASK 78-31-00-860-222-G00

(1) Make these selections on the MFD main function menu:

(a) ONBOARD MAINTENANCE

(b) OTHER FUNCTIONS

(c) SPECIAL FUNCTIONS

(d) 71-80 Left Engine or 71-80 Right Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) Thrust Reverser Cycle

(f) CONTINUE.

SUBTASK 78-31-00-860-223-G00

(2) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the thrust reverser may not extend.

(a) CONTINUE

(b) START FUNCTION

SUBTASK 78-31-00-710-003-G00

WARNING

KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE AREA AROUND THE THRUST REVERSERS. THE THRUST REVERSERS EXTEND AND RETRACT QUICKLY. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Retract the applicable thrust reverser as follows:

CAUTION

DO NOT OPERATE THE THRUST REVERSER WITH HYDRAULIC POWER IF ELECTRICAL POWER CAN STOP MOMENTARILY. THE SYNC LOCKS ARE SET TO GO TO THE LOCKED POSITION BY A SPRING WHEN ELECTRICAL POWER IS OFF. IF THE ELECTRICAL POWER STOPS WHEN THE THRUST REVERSER IS IN OPERATION, DAMAGE CAN OCCUR.

(a) Move the applicable reverse thrust lever forward and down to the retract (stow) position.

NOTE: If electrical power goes off when the thrust reverser is in operation, the sync lock can shear. Make sure that you do a thrust reverser locks operational test to check for damage to the sync locks (TASK 78-31-00-700-804-G00).

(b) If it is necessary to cycle the thrust reverser, do this step:

1) Wait a minimum of 20 seconds before you move the reverse thrust lever between the extend and retract cycle.

NOTE: This will make sure that the system has sufficient time to detect faults.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-185-G00

(1) Select the STOP FUNCTION on the MFD.

SUBTASK 78-31-00-210-007-G00

(2) Do a check of the REVERSER LIMITED light on engine control panel and for TR related status messages.

(a) If the REVERSER LIMITED Light is on, do the applicable IFIM procedure for the thrust reverser system.

(b) If a TR related status message is shown, do the applicable IFIM procedure for the thrust reverser system if it is necessary.

SUBTASK 78-31-00-860-186-G00

(3) Set the applicable EEC MAINT POWER to NORM on the MISC SYSTEM CTRLS page (TASK 73-21-00-800-801-G00)

SUBTASK 78-31-00-860-233-G00

(4) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-034-G00

(5) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 78-31-00-860-178-G00

(6) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-179-G00

(7) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-180-G00

(8) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

——— END OF TASK ———

TASK 78-31-00-040-801-G00

14. Thrust Reverser Deactivation For Ground Maintenance

(Figure 207)

A. General

(1) This task prevents the accidental operation of the thrust reversers on an applicable engine.

(2) To isolate the thrust reverser hydraulic system from the airplane hydraulic system, a lockpin [1] is installed in the manual isolation valve handle [2] and into the control valve module [3].

SIA (3) The thrust reverser lockpins [1] are contained in a storage bag in the storage area under the
SIA First Observer's Seat.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(4) Use this task for ground maintenance only. Do not use this task to deactivate the thrust reversers for a flight dispatch.

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)

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-2418	Lockpin - Equipment, Thrust Reverser Actuator Module Lockout Part #: C78004-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Procedure

SUBTASK 78-31-00-040-007-G00

WARNING USE THIS PROCEDURE FOR GROUND MAINTENANCE ONLY. THE THRUST REVERSER CAN ACCIDENTALLY EXTEND IF YOU USE THIS PROCEDURE TO DO A DEACTIVATION OF THE THRUST REVERSER FOR FLIGHT DISPATCH.

(1) Make sure that the applicable thrust lever is in the idle position.

(a) Attach a DO NOT OPERATE tag, STD-858.

SUBTASK 78-31-00-040-008-G00

(2) Make sure that the applicable reverse thrust lever is forward and down in the retract (stow) position.

(a) Attach a DO NOT OPERATE tag, STD-858.

SUBTASK 78-31-00-860-035-G00

(3) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-036-G00

(4) For Engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-080-006-G00

(5) Do these steps to install the lockpin, SPL-2418, kit:

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NOTE: The thrust reverser lockpins P/N 315A6258-1/315A6258-2 and P/N C78004-2 [1] are contained in a storage bag in the storage area under the First Observer's Seat.

NOTE: For Engine 1, the control valve module is on the left side of the keel beam [4] in the main gear wheel well.

NOTE: For Engine 2, the control valve module is on the right side of the keel beam [4] in the main gear wheel well.

(a) Turn the manual isolation valve handle [2] clockwise to align the lockpin holes in the manual isolation valve handle [2] and the control valve module [3].

(b) Install the lockpin [1].

1) Make sure that the lockpin [1] is pushed fully in and engages the control valve module [3].

2) Make sure that the “remove before flight” streamer can be seen from the outside of the airplane.

F. Thrust Reverser Deactivation - Tryout

NOTE: This tryout is to make sure that the thrust reverser is in a zero energy state.

SUBTASK 78-31-00-780-001-G00

(1) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

SUBTASK 78-31-00-860-145-G00

WARNING

KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE APPLICABLE THRUST REVERSER. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE THRUST REVERSER RETRACTS.

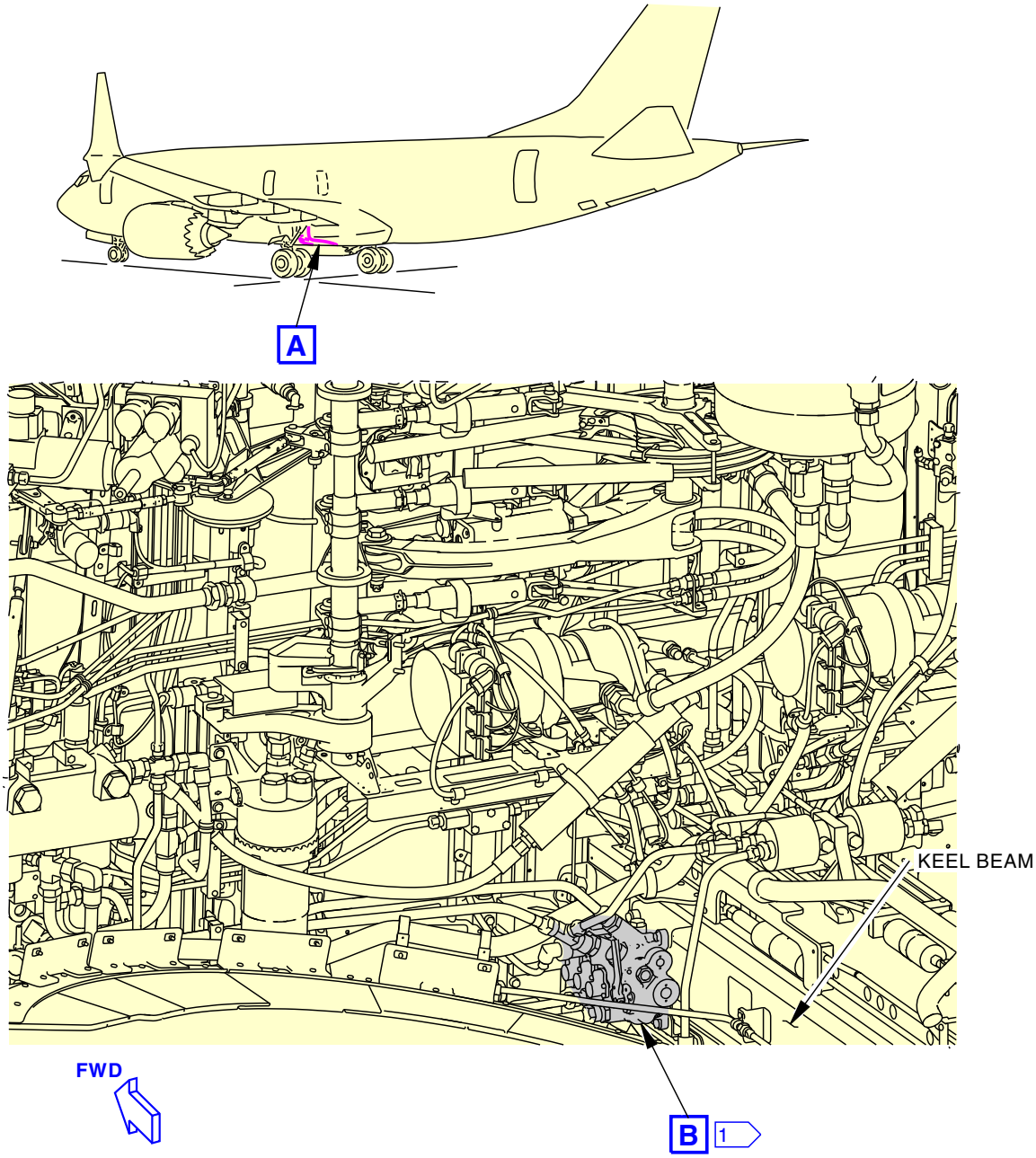
(2) Do this task: Test No. 38 - Thrust Reverser Cycle Special Functions, TASK 71-00-00-700-816-G00

(a) Make sure that the thrust reverser does not move to the extended position when commanded.

NOTE: The ENG X REVERSER status message will be displayed on the MDS, the MAINT light and the REVERSER LIMITED light on the aft P5 overhead panel will illuminate when EEC MAINT POWER function on the MISC SYSTEM CTRLS page is placed in the TEST position.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

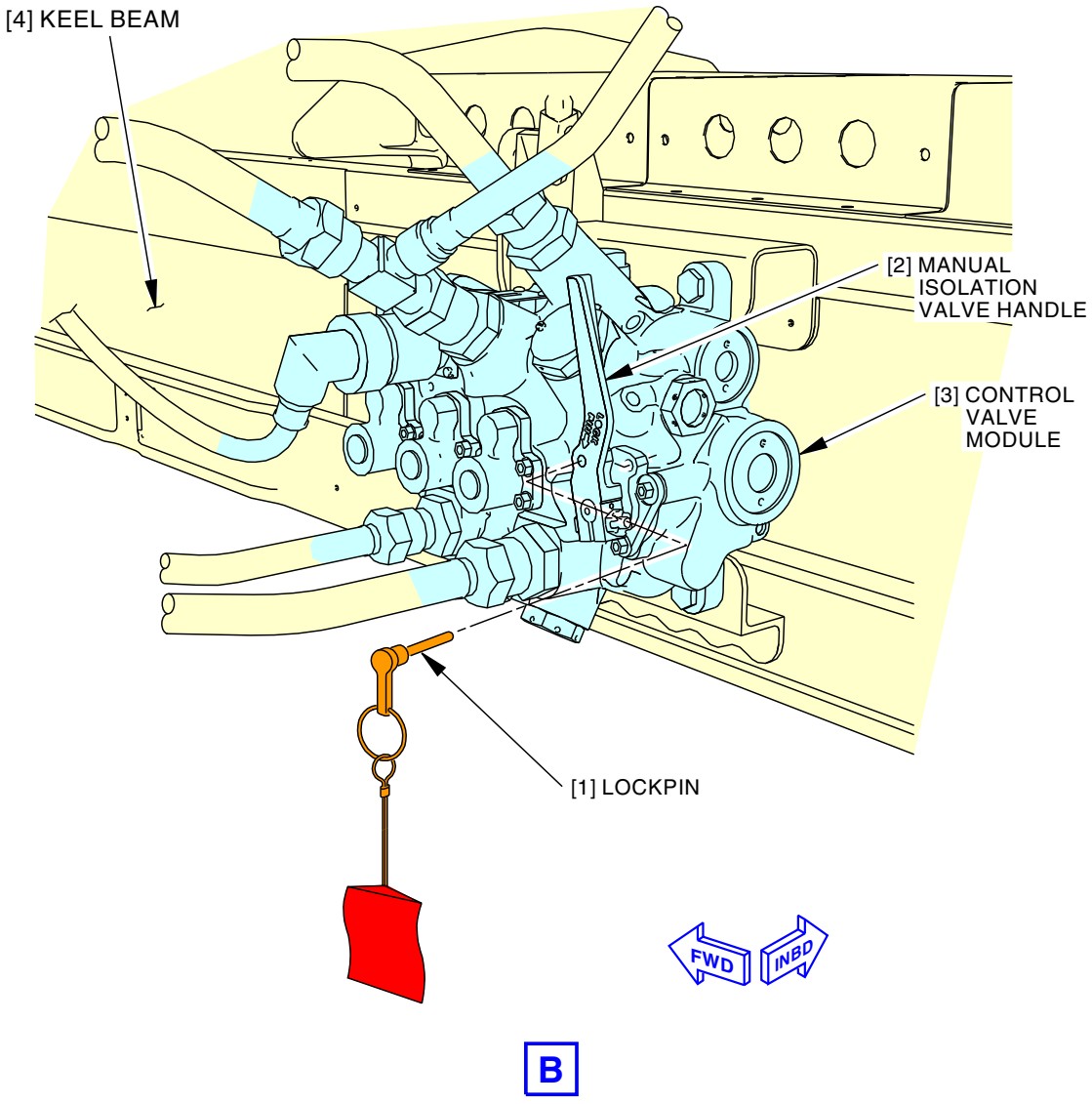


1 ENGINE 1 CONTROL VALVE MODULE IS SHOWN, ENGINE 2 CONTROL VALVE IS ON THE RIGHT SIDE OF THE KEEL BEAM.

2355143 S00061516635_V1

Thrust Reverser Control Valve Module
Figure 207/78-31-00-990-810-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Control Valve Module
Figure 207/78-31-00-990-810-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-440-801-G00

15. Thrust Reverser Activation After Ground Maintenance

(Figure 207)

A. References

Reference	Title
31-65-00-750-801	Fault Interrogation for a Maintenance Message (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-2418	Lockpin - Equipment, Thrust Reverser Actuator Module Lockout Part #: C78004-1 Supplier: 81205

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

D. Procedure

SUBTASK 78-31-00-860-037-G00

(1) For engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-00-860-038-G00

(2) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-440-009-G00

WARNING

BEFORE YOU REMOVE THE LOCKPIN FROM THE CONTROL VALVE MODULE, MAKE SURE THAT THE POSITION OF THE REVERSE THRUST LEVER AGREES WITH THE POSITION OF THE THRUST REVERSER SLEEVES. IF THE POSITION OF THE REVERSE THRUST LEVER DOES NOT AGREE WITH THE POSITION OF THE THRUST REVERSER SLEEVES, THE THRUST REVERSER SLEEVES COULD EXTEND OR RETRACT WHEN THE HYDRAULIC SYSTEM IS ACTIVATED. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Unless you are given other instructions, make sure that the position of the reverse thrust lever agrees with the position of the thrust reverser sleeves.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove the lockpin, SPL-2418, kit:

1) Remove the lockpin [1] from the applicable manual isolation valve handle [2] on the control valve module [3].

(b) Make sure that the manual isolation valve handle [2] moves counterclockwise to the vertical position.

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(c) Put the lockpin [1] back in the storage bag in the storage area under the First Observer's Seat.

SUBTASK 78-31-00-860-039-G00

(4) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-00-860-040-G00

(5) For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-860-041-G00

(6) Remove the DO-NOT-OPERATE tag from the thrust lever.

SUBTASK 78-31-00-860-042-G00

(7) Remove the DO-NOT-OPERATE tag from the reverse thrust lever.

NOTE: If the EEC is powered when the ENGINE 1 (2) THRUST REVERSER CONT circuit breaker is open, a status message will be set (i.e., ENG 1 REVERSER). Refer to Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801 to unlatch messages.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has these tasks:

(1) Thrust Reverser Operational Test (Selection)

(2) Thrust Reverser System Normal Operation Test

(3) Thrust Reverser Operation Test (Standby Hydraulic System)

(4) Thrust Reverser Locks Operational Test

(5) Thrust Reverser Proximity Sensors Operational Test

(6) Thrust Reverser Annunciator Lights Operational Test

(7) Scheduled Maintenance Task for EEC Faults - Reverser Sensor.

TASK 78-31-00-700-801-G00

2. Thrust Reverser Operational Test (Selection)

A. General

(1) This task is for the selection of the operational test for the thrust reverser system.

B. Procedure

SUBTASK 78-31-00-710-004-G00

(1) Do one of these tasks to do the operational test of the thrust reverser:

(a) Do this task: Thrust Reverser System Normal Operational Test, TASK 78-31-00-700-802-G00.

(b) Do this task: Thrust Reverser Operational Test (Standby Hydraulic System), TASK 78-31-00-700-803-G00.

(c) Do this task: Thrust Reverser Locks Operational Test, TASK 78-31-00-700-804-G00.

(d) Do this task: Thrust Reverser Proximity Sensors Operational Test, TASK 78-31-00-700-805-G00.

——— END OF TASK ———

TASK 78-31-00-700-802-G00

3. Thrust Reverser System Normal Operational Test

(Figure 501)

A. General

(1) This task gives the instructions to do a test of the thrust reverser system for correct operation.

(2) The movements of the thrust lever should be slow, deliberate and smooth whenever possible.

(3) Two persons are necessary for this task, one in the flight deck and one at the engine thrust reversers.

(4) This task is the same for engines 1-2 thrust reversers.

(5) Thrust reverser faults may be inhibited or show “NOT ACTIVE” when the Thrust Reverser Cycle SPECIAL FUNCTION is stopped. Make sure that you verify and follow the operational test instructions closely.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
46-13-00-480-801	Maintenance Laptop Connection (P/B 201)
46-13-02-700-805	Existing Faults Check (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (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-1614	Headset - Microphone Part #: 12506G-05 Supplier: 71483 Part #: 12508G-34 Supplier: 71483 Part #: 12515G-12 Supplier: 71483 Opt Part #: 460A Supplier: 79687 Opt Part #: 462A Supplier: 79687 Opt Part #: H3310 Supplier: 71483 Opt Part #: H3312 Supplier: 71483
SPL-11321	Device - Universal Maintenance (UMD) Part #: G45004-3 Supplier: 81205 Part #: G45004-31 Supplier: 81205 Opt Part #: G45003-3 Supplier: 81205 Opt Part #: G45004-1 Supplier: 81205
STD-858	Tag - DO NOT OPERATE
STD-1139	Timer - stopwatch, accurate to within 1 second

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Prepare for the Test

SUBTASK 78-31-00-860-043-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-860-044-G00

(2) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-045-G00

(3) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-046-G00

(4) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-047-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-480-003-G00

(6) Do these steps to use the universal maintenance device, SPL-11321, to get access to the existing faults function:

(a) Connect the universal maintenance device, SPL-11321 (TASK 46-13-00-480-801).

(b) Use the universal maintenance device, SPL-11321, to get access to the ONS maintenance browser.

NOTE: The maintenance device is required to view ACTIVE faults during Thrust Reverser Cycle SPECIAL FUNCTION.

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SUBTASK 78-31-00-860-048-G00

(7) Make sure that the applicable thrust reverser is closed.

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-31-00-860-049-G00

WARNING DO NOT OPERATE THE ENGINE IN REVERSE THRUST WHILE THE FAN COWL PANELS ARE OPEN. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Make sure that the applicable fan cowl panels are closed and latched (TASK 71-11-04-410-801-G00).

SUBTASK 78-31-00-860-050-G00

(9) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-31-00-860-239-G00

(10) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-31-00-860-238-G00

(11) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

(a) Use the DUAL MODE function on the MFD while the Thrust Reverser Cycle SPECIAL FUNCTION is in operation.

NOTE: The DUAL MODE lets the two screens monitor the EPCS pages while the Thrust Reverser Cycle SPECIAL FUNCTION is in operation.

SUBTASK 78-31-00-860-053-G00

(12) Set the applicable thrust lever to idle.

SUBTASK 78-31-00-860-054-G00

(13) Make sure that the applicable reverse thrust lever is in the stow position.

SUBTASK 78-31-00-860-240-G00

(14) Select MAINT CTRL PGS and then LATCHED MESSAGE ERASE. If the status message shows on the ERASABLE STATUS MESSAGES display, then do this step:

(a) Select ERASE to remove the message from the status display.

SUBTASK 78-31-00-860-056-G00

(15) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

F. Thrust Reverser System Normal Operational Test

SUBTASK 78-31-00-710-005-G00

(1) Use the Multi-Function Display (MFD) screen to do the test of the applicable thrust reverser cycle (TASK 71-00-00-700-816-G00):

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE

2) OTHER FUNCTIONS

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3) SPECIAL FUNCTIONS

4) 71-80 Left Engine or 71-80 Right Engine

5) Thrust Reverser Cycle

6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE

2) START FUNCTION.

(c) Do these steps to test of the thrust reverser deploy operation:

CAUTION

OBEY THESE PRECAUTIONS. IF YOU IGNORE THESE PRECAUTIONS, DAMAGE TO EQUIPMENT WILL OCCUR.

1) Make sure that there is a microphone headset, COM-1614, for communication between the person on the ground and the person at the flight deck.

2) Use a stopwatch, STD-1139, to record the time period (in seconds).

NOTE: Record the number of seconds for the amber REV indicator on the Center Display Panel (CDP) to appear and then change to a green REV indication as the thrust reverser deploys

WARNING

MAKE SURE THAT PERSONNEL STAY AWAY FROM THE THRUST REVERSER WHEN YOU MOVE THE CONTROLS. THE THRUST REVERSER CAN MOVE VERY QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL.

3) Move the applicable reverse thrust lever up to the deploy position.

NOTE: The two sleeve halves of each thrust reverser are independent of one another. The two sleeves do not have to move in sync.

4) Make sure that the duration time of the amber REV indication is less than three seconds.

5) Make sure that the green REV indication shows when the thrust reverser is fully deployed.

6) Select the EPCS page 1 from the Maintenance Data Pages on the MFD.

7) Make sure that the EPCS page 1 shows T/R SLEEVE L and T/R SLEEVE R from 95.0 to 105.0 percent.

NOTE: Wait for a minimum of 20 seconds to let the maintenance messages to become active and trigger the status messages and flight deck lights.

8) Make sure that the Reverser Limited light on the aft overhead P5 panel is off.

NOTE: The Reverser Limited light will turn on if there are T/R related maintenance messages for ATA chapter 78.

9) If the Reverser Limited light is on, use the maintenance device to view "ACTIVE" faults when Thrust Reverser is Deployed as follows:

a) Do this task: Existing Faults Check, TASK 46-13-02-700-805.

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b) If there are thrust reverser related status faults or SMT messages are LATCHED during the check, do this task: (Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801).

(d) Do these steps to test the thrust reverser stow operation:

1) Use a stopwatch, STD-1139, to record the duration (in seconds) that the amber REV indication shows.

WARNING MAKE SURE THAT PERSONNEL STAY AWAY FROM THE THRUST REVERSER WHEN YOU MOVE THE CONTROLS. THE THRUST REVERSER CAN MOVE VERY QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL.

2) Move the applicable reverse thrust lever to the stow position.

NOTE: The two sleeve halves of each thrust reverser are independent of one another. The two sleeves do not have to move in sync.

3) Make sure that the time for the thrust reverser to stow is less than five seconds.

4) Make sure that the REV indication does not show on the CDP when the thrust reverser is fully stowed.

5) Select the EPCS page 1 from the Maintenance Data Pages on the MFD.

6) Make sure that the EPCS page 1 shows T/R SLEEVE L and T/R SLEEVE R from -4.0 to +4.0 percent.

NOTE: Wait for a minimum of 20 seconds to let the maintenance messages to become active and trigger the status messages and flight deck lights.

7) Make sure that the Reverser Limited light on the aft overhead P5 panel is off.

NOTE: The Reverser Limited light will turn on if there are T/R related maintenance messages for ATA chapter 78.

8) If the Reverser Limited light is on, use the maintenance device to view "ACTIVE" faults as follows:

a) Do this task: Existing Faults Check, TASK 46-13-02-700-805.

b) If there are thrust reverser related status faults or SMT messages are LATCHED during the check, do this task: (Fault Interrogation for a Maintenance Message, TASK 31-65-00-750-801).

(e) Extend and retract the thrust reverser five more times.

NOTE: You do not have to check the T/R sleeve percentage on the EPCS page.

1) Make sure that the thrust reverser operates smoothly.

2) Wait 10 seconds before you move the reverse thrust lever between the deploy and stow cycle.

(f) After you deployed and stowed the thrust reversers, select the STOP FUNCTION to complete the test.

(g) Make sure that there are no thrust reverser related status or SMT messages.

NOTE: Thrust reverser maintenance messages may show "NOT ACTIVE" when you stop the Thrust Reverser Cycle SPECIAL FUNCTION.

1) If new thrust reverser related status faults or SMT messages are LATCHED during the check, do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

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(h) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(i) Examine the thrust reverser area for hydraulic fluid leaks.

Table 501/78-31-00-993-802-G00

Normal Operation Limits	Dispatch Limits to Avoid Delay
8 drops per minute (stopped or in operation)	30 drops per minute (stopped or in operation)

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-057-G00

(1) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-31-00-860-058-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 78-31-00-860-059-G00

(3) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

SUBTASK 78-31-00-860-060-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-061-G00

(5) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-062-G00

(6) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-063-G00

(7) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-231-G00

(8) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-064-G00

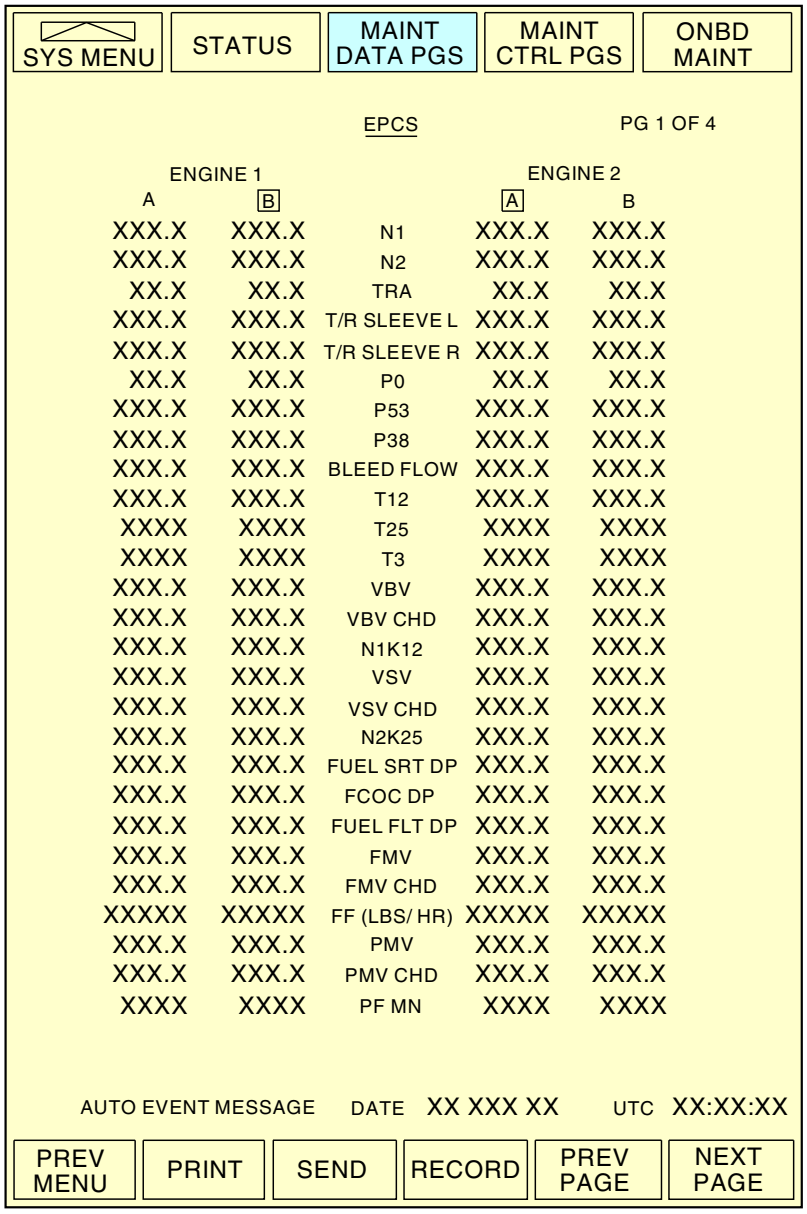
(9) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

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EPCS Page 1 Status Display
Figure 501/78-31-00-990-818-G00

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TASK 78-31-00-700-803-G00

4. Thrust Reverser Operational Test (Standby Hydraulic System)

(Figure 502 and Figure 503)

A. General

(1) This task gives the instructions to do a test of the thrust reverser system for correct operation.

(2) The movements of the thrust lever should be slow, deliberate and smooth whenever possible.

(3) Two persons are necessary to do this task, one in the flight deck and one at the engine thrust reversers.

(4) This task is the same for Engine 1 and Engine 2 thrust reversers.

(5) For Engine 1, when you use the standby hydraulic system, you must connect the return line from hydraulic reservoir A to a hydraulic bench or hydrant, or drain the hydraulic system A reservoir. When the test is completed, fill hydraulic reservoir B. The hydraulic fluid that is used to extend (deploy) the thrust reverser is supplied from the standby hydraulic reservoir and the standby reservoir fills from reservoir B. When the thrust reverser retracts (stows), the hydraulic fluid returns to hydraulic reservoir A.

(6) For Engine 2, when you use the standby hydraulic system, it is not necessary to drain hydraulic reservoir B. The standby hydraulic system fills from reservoir B and returns to reservoir B.

B. References

Reference	Title
12-12-00-610-801	Hydraulic Reservoir Servicing (P/B 301)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
46-13-02-700-806	Fault History Check (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (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-1614	Headset - Microphone Part #: 12506G-05 Supplier: 71483 Part #: 12508G-34 Supplier: 71483 Part #: 12515G-12 Supplier: 71483 Opt Part #: 460A Supplier: 79687 Opt Part #: 462A Supplier: 79687 Opt Part #: H3310 Supplier: 71483 Opt Part #: H3312 Supplier: 71483
STD-858	Tag - DO NOT OPERATE
STD-1139	Timer - stopwatch, accurate to within 1 second

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D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Prepare for the Test

SUBTASK 78-31-00-860-065-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-860-066-G00

(2) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-067-G00

(3) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-068-G00

(4) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

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SUBTASK 78-31-00-860-069-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-070-G00

(6) Make sure that the applicable thrust reverser is closed and latched.

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-31-00-860-071-G00

WARNING DO NOT OPERATE THE ENGINE IN REVERSE THRUST WHILE THE FAN COWL PANELS ARE OPEN. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Make sure that the applicable fan cowl panels are closed and latched.

(a) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-00-860-072-G00

(8) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button, on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob, on the P9 MFD control panel.

SUBTASK 78-31-00-860-073-G00

(9) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-31-00-860-074-G00

(10) Set the GND TEST switch, on the P61-4 maintenance BITE panel, to the ENABLE position.

SUBTASK 78-31-00-860-075-G00

(11) Set the applicable thrust lever to idle.

SUBTASK 78-31-00-860-076-G00

(12) Make sure that the applicable reverse thrust lever is in the stow position.

SUBTASK 78-31-00-860-078-G00

(13) Make sure that the LE STANDBY DRIVE SHUTOFF VALVE is in the No. 1 position.

SUBTASK 78-31-00-860-139-G00

(14) For the Engine 1 thrust reverser, do these steps:

(a) For hydraulic system A, do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

(b) For system A reservoir, do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

(c) To prevent the leakage of hydraulic fluid when you do the test, connect the system A return line at the system A reservoir to a hydraulic bench or hydrant.

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(d) An alternate task to prevent the leakage of hydraulic fluid, is to use the sampling valve to drain the system A reservoir.

NOTE: The reservoir hydraulic level will show on the flight compartment HYDRAULIC gage, on the P9 MFD control panel.

1) If you drain the system A reservoir to the REFILL level, you can operate the thrust reverser for one cycle.

2) If you drain the system A reservoir to the HALF FULL level, you can operate the thrust reverser for three cycles.

SUBTASK 78-31-00-860-080-G00

WARNING

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(15) Do these steps to supply hydraulic power for the standby system:

(a) For the Engine 1 thrust reverser, move the FLT CONTROL switch A to the STBY RUD position or the ALTERNATE FLAPS switch to the ARM position.

NOTE: These switches are, on the P5 overhead flight control panel.

(b) For the Engine 2 thrust reverser, move the FLT CONTROL switch B to the STBY RUD position or the ALTERNATE FLAPS switch to the ARM position.

NOTE: These switches are, on the P5 overhead flight control panel.

F. Thrust Reverser Operational Test (Standby Hydraulic System)

SUBTASK 78-31-00-710-006-G00

(1) Use the Multi-Function Display (MFD) screen to do the test of the applicable thrust reverser cycle (TASK 71-00-00-700-816-G00):

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Left Engine or 71-80 Right Engine
5) Thrust Reverser Cycle
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

(c) Do these steps to test of the thrust reverser deploy operation:

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CAUTION

OBEY THESE PRECAUTIONS. IF YOU IGNORE THESE PRECAUTIONS, DAMAGE TO EQUIPMENT WILL OCCUR.

1) Make sure that there is a microphone headset, COM-1614, for communication between the person on the ground and the person at the flight deck.
2) Use a stopwatch, STD-1139, to record the time period (in seconds) for the amber REV indicator on the Center Display Panel (CDP) to appear and then change to a green REV indication as the thrust reverser deploys.

WARNING

MAKE SURE THAT PERSONNEL STAY AWAY FROM THE THRUST REVERSER WHEN YOU MOVE THE CONTROLS. THE THRUST REVERSER CAN MOVE VERY QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL.

3) Move the applicable reverse thrust lever up to the deploy position.

   NOTE: The two sleeve halves of each thrust reverser are independent of one another. The two sleeves do not have to move in sync.

4) Make sure that the duration time of the amber REV indication is less than five seconds.
5) Make sure that the green REV indication appears when the thrust reverser is fully deployed.
6) Select the STOP FUNCTION on the MFD.

   NOTE: Wait at least 20 seconds to allow faults to trigger before you exit the special function.

   NOTE: If you use the maintenance laptop to monitor the faults, you do not have to exit the thrust reverser special function.

7) Select the EPCS page 1 from the Maintenance Data Pages on the MFD.
8) Make sure that the EPCS page 1 shows T/R SLEEVE L and T/R SLEEVE R from 95.0 to 105.0 percent.
9) Make sure that no MDS T/R status messages are shown, except for green REV.

   NOTE: Wait for a minimum of 20 seconds to let the maintenance messages to become active and trigger the status messages and flight deck lights.

10) Make sure that the Reverser Limited light, on the P5 aft overhead panel, is off.

    NOTE: The Reverser Limited light will turn on if there are T/R related maintenance messages for ATA chapter 78.

11) If there are thrust reverser related MDS messages, do these steps:
    a) Erase the thrust reverser related MDS status messages that are currently shown and make sure that they do not appear again.
    b) If the MDS status message can not be erased then continue to the steps below to check for the maintenance messages.
    c) If not already done, select the STOP FUNCTION on the MFD.

       NOTE: If you use the maintenance laptop to monitor the faults, you do not have to exit the thrust reverser special function.

    d) Do this task: Fault History Check, TASK 46-13-02-700-806.

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(d) Start the T/R cycle special function (TASK 71-00-00-700-816-G00).

(e) Do the steps that follow to do a test of the thrust reverser stow operation:

1) Use a stopwatch, STD-1139, to record the duration (in seconds) that the amber REV indication shows.

WARNING MAKE SURE THAT PERSONNEL STAY AWAY FROM THE THRUST REVERSER WHEN YOU MOVE THE CONTROLS. THE THRUST REVERSER CAN MOVE VERY QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL.

2) Move the applicable reverse thrust lever to the stow position.

NOTE: The two sleeve halves of each thrust reverser are independent of one another. The two sleeves do not have to move in sync.

3) Make sure that the time for the thrust reverser to stow is less than nine seconds.

4) Make sure that the REV indication does not show on the CDP when the thrust reverser is fully stowed.

5) Select the STOP FUNCTION on the MFD.

NOTE: If you use the maintenance laptop to monitor the faults, you do not have to exit the thrust reverser special function.

6) Select the EPCS page 1 from the Maintenance Data Pages on the MFD.

7) Make sure that the EPCS page 1 shows T/R SLEEVE L and T/R SLEEVE R from -4.0 to +4.0 percent.

8) Make sure that no MDS T/R status messages are shown.

NOTE: Wait for a minimum of 20 seconds to let the maintenance messages to become active and trigger the status messages and flight deck lights.

9) Make sure that the Reverser Limited light, on the P5 aft overhead panel, is off.

NOTE: The Reverser Limited light will turn on if there are T/R related maintenance messages for ATA chapter 78.

10) If there are thrust reverser related MDS messages, do these steps:

a) Erase the thrust reverser related MDS status messages that are currently shown and make sure that they do not appear again.

b) If the MDS status message can not be erased then continue to the steps below to check for the maintenance messages.

c) If not already done, select the STOP FUNCTION on the MFD.

NOTE: If you use the maintenance laptop to monitor the faults, you do not have to exit the thrust reverser special function.

d) Do this task: Fault History Check, TASK 46-13-02-700-806.

(f) Start the T/R cycle special function (TASK 71-00-00-700-816-G00).

(g) Move the applicable reverse thrust lever to the deploy position.

(h) Move the applicable reverse thrust lever to the stow position.

(i) Extend and retract the thrust reverser five times.

NOTE: You do not have to check the T/R sleeve percentage on the EPCS page.

1) Make sure that the thrust reverser operates smoothly.

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2) Wait 10 seconds before you move the reverse thrust lever between the deploy and stow cycle.

(j) After you deployed and stowed the thrust reversers, select the STOP FUNCTION to complete the test.

(k) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(l) Examine the thrust reverser area for hydraulic fluid leaks.

Table 502/78-31-00-993-803-G00

Normal Operation Limits	Dispatch Limits to Avoid Delay
8 drops per minute (stopped or in operation)	30 drops per minute (stopped or in operation)

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-082-G00

(1) Do these steps to remove hydraulic power for the standby system:

(a) For the Engine 1 thrust reverser, move the FLT CONTROL switch A to the OFF position or the ALTERNATE FLAPS switch to the OFF position.

(b) For the Engine 2 thrust reverser, move the FLT CONTROL switch B to the OFF position or the ALTERNATE FLAPS switch to the OFF position.

SUBTASK 78-31-00-860-141-G00

(2) If system A or B return was connected to a hydraulic bench or hydrant, re-connect the return line to the system A or B reservoir.

SUBTASK 78-31-00-860-142-G00

(3) Do a check of the system A and B hydraulic reservoir gages.

(a) To fill the hydraulic reservoirs, do this task: Hydraulic Reservoir Servicing, TASK 12-12-00-610-801.

SUBTASK 78-31-00-860-083-G00

(4) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 78-31-00-860-084-G00

(5) Set the GND TEST switch, on the P61-4 maintenance BITE panel, to the NORM position.

SUBTASK 78-31-00-860-085-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-086-G00

(7) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-087-G00

(8) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-088-G00

(9) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-232-G00

(10) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-089-G00

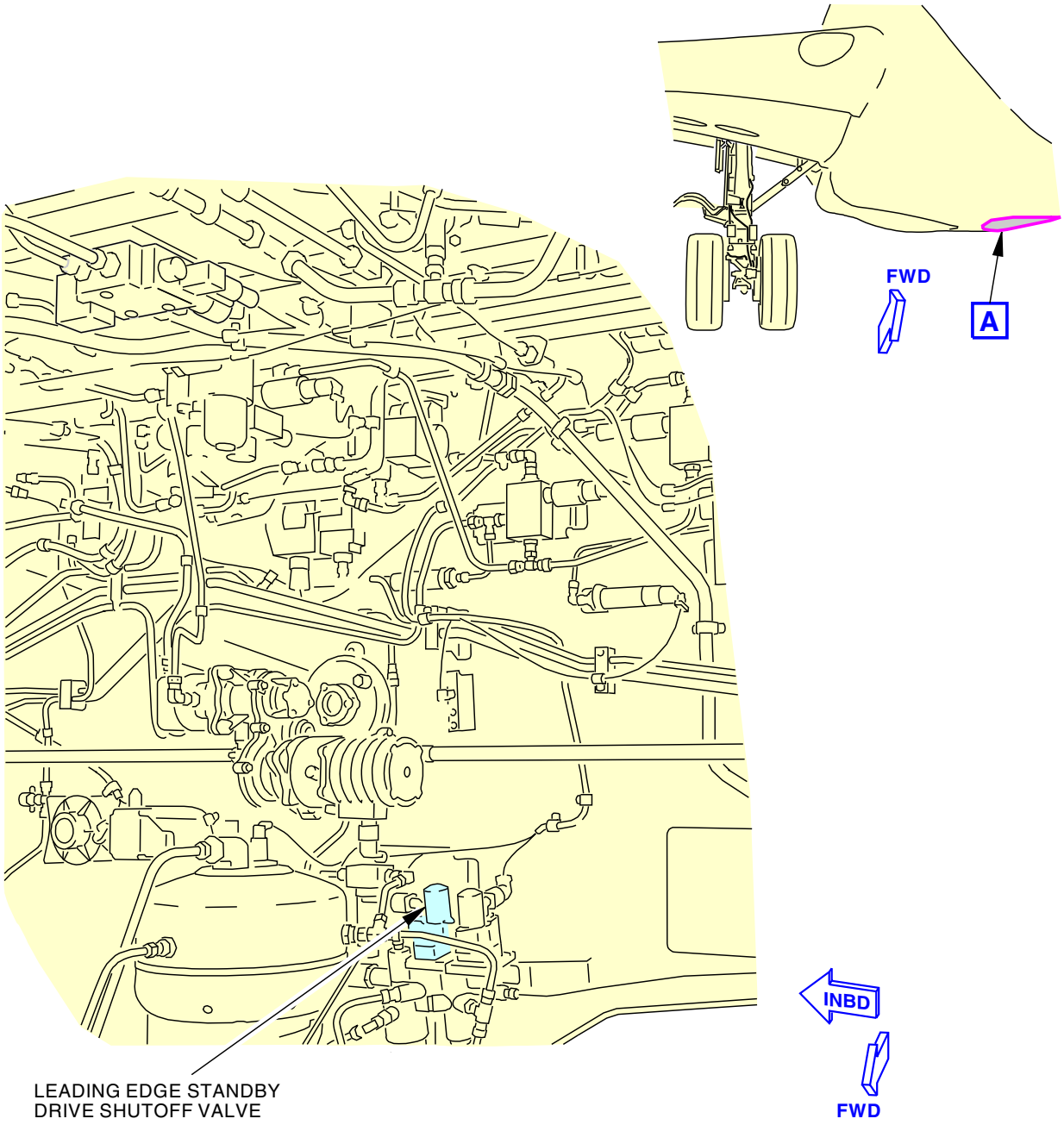
(11) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



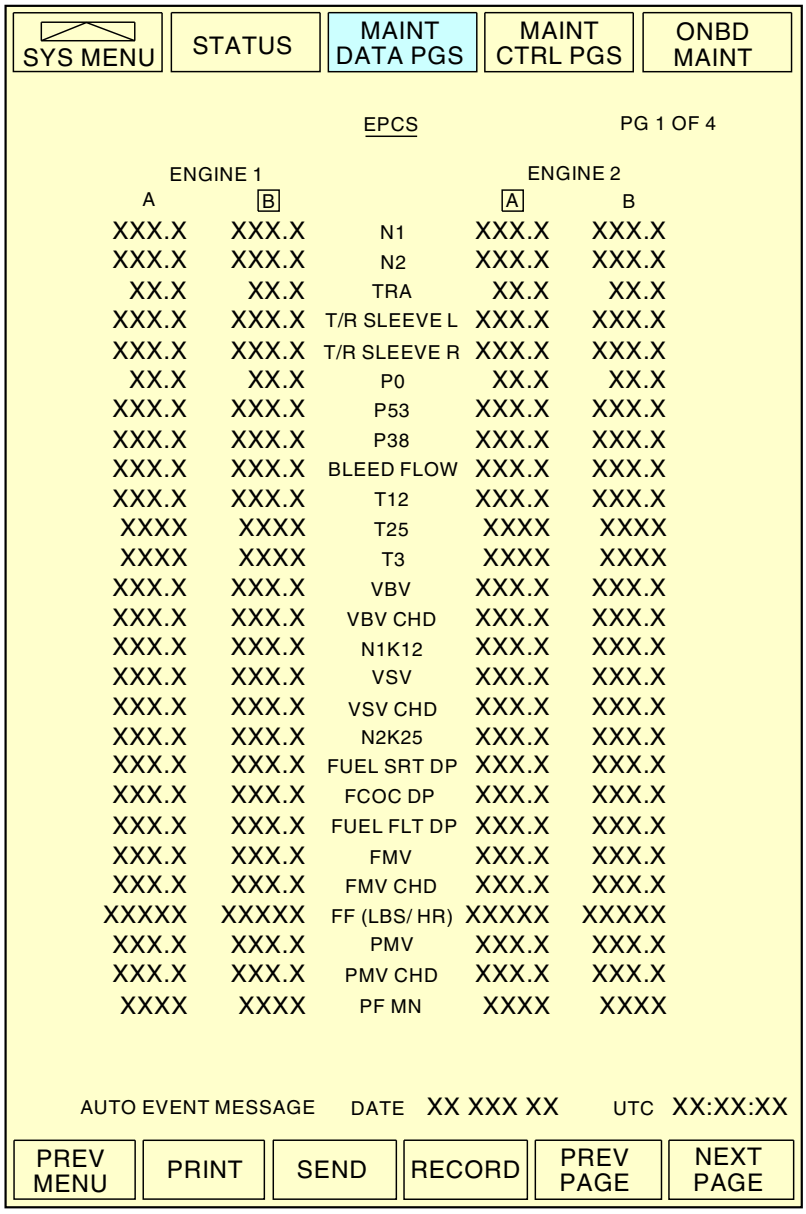
**LEADING EDGE STANDBY DRIVE SHUTOFF VALVE
(MAIN LANDING GEAR WHEEL WELL)**

A

2547816 S0000606262_V1

**Leading Edge Standby Drive Shutoff Valve
Figure 502/78-31-00-990-819-G00**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354207 S00061514972_V2

EPCS Page 1 Status Display
Figure 503/78-31-00-990-820-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-700-804-G00

5. Thrust Reverser Locks Operational Test

(Figure 504, Figure 505, and Figure 506)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task makes sure that the thrust reverser locks are serviceable.

(2) There is one actuator lock on the upper actuator of each thrust reverser half.

(3) There is one actuator lock on the center actuator of each thrust reverser half.

(4) To make sure that an actuator lock is serviceable: try to manually extend the thrust reverser sleeve with one actuator lock released and the sync lock released.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (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-2418	Lockpin - Equipment, Thrust Reverser Actuator Module Lockout Part #: C78004-1 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High
STD-858	Tag - DO NOT OPERATE
STD-6839	Wrench - Torque (0-150 in-lbs) with Dial Indicator or Digital Readout

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

F. Prepare for the Operational Test

SUBTASK 78-31-00-860-090-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-00-860-091-G00

(2) Make sure that the applicable forward thrust lever is in the idle position.

SUBTASK 78-31-00-860-092-G00

(3) Make sure that the applicable reverse thrust lever is in the fully forward and down position.

SUBTASK 78-31-00-860-093-G00

(4) Attach DO NOT OPERATE tags, STD-858, to the applicable thrust levers.

SUBTASK 78-31-00-860-094-G00

(5) Open these circuit breakers for the applicable engine and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-860-095-G00

(6) If it is necessary, use a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660, or engine and strut access platform, STD-653, to get access to the work area.

SUBTASK 78-31-00-860-097-G00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO PREVENT THRUST REVERSER MOVEMENT. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Do these tasks in this sequence to prevent the hydraulic operation of the thrust reverser (Figure 504):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Install the lockpin, SPL-2418, with the red streamer, into the isolation valve handle and the hole on the control valve body.

SIA
SIA
SIA

NOTE: The thrust reverser lockpins P/N 315A6258-1/315A6258-2 and P/N C78004-2 are contained in a storage bag in the storage area under the First Observer's Seat.

NOTE: For Engine 1, the control valve module is on the left side of the keel beam in the main gear wheel well.

NOTE: For Engine 2, the control valve module is on the right side of the keel beam in the main gear wheel well.

1) Turn the manual shutoff valve handle clockwise to align the lockpin hole in the manual shutoff valve handle with the hole on the control valve body.

2) Install the lock pin through the hole on the isolation valve handle and the control valve body.

SUBTASK 78-31-00-860-098-G00

CAUTION

RETRACT THE LEADING EDGE FLAPS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE FLAPS. DAMAGE WILL OCCUR.

(8) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-00-860-099-G00

WARNING

DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE FLAPS. THE ACCIDENTAL MOVEMENT OF THE FLAPS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(9) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-00-860-100-G00

(10) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

G. Thrust Reverser Locks Operational Test

SUBTASK 78-31-00-710-007-G00

WARNING

MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

CAUTION STOP THE MANUAL EXTENSION IF THE THRUST REVERSER EXTENDS AT AN ANGLE. THIS IS AN INDICATION THAT THERE ARE SYNC SHAFTS THAT ARE BROKEN OR NOT INSTALLED. IF YOU CONTINUE, DAMAGE TO THE EQUIPMENT CAN OCCUR.

CAUTION DO NOT USE AN EXTENSION BAR OR OTHER TOOL TO MOVE THE UNLOCK HANDLE. IF YOU USE AN EXTENSION BAR OR OTHER TOOLS, DAMAGE TO THE UNLOCK HANDLE OR ACTUATOR CAN OCCUR.

CAUTION MAKE SURE THAT THE THRUST REVERSER SLEEVE DOES NOT HIT THE WING IF THE THRUST REVERSER IS IN THE 45-DEGREE OPEN POSITION. DO NOT EXTEND THE INBOARD SLEEVE MORE THAN 10 INCHES. DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Do these steps to release the locks on the applicable thrust reverser upper and center actuators (Figure 505):

(a) Move the manual unlock handle on the thrust reverser upper actuator forward to the unlock position.

NOTE: The manual unlock handle moves forward approximately 30 degree.

(b) Hold the manual unlock handle in the forward position as you push the detent pin in.

(c) Release the manual unlock handle.

SUBTASK 78-31-00-710-008-G00

CAUTION DO NOT HIT THE END OF THE SYNC LOCK OR THE 3/8 INCH DRIVE WRENCH TO PUSH THE LOCK RELEASE PIN. DAMAGE TO THE SYNC LOCK CAN OCCUR.

(2) Unlock the sync lock and engage the manual drive:

(a) Put an open end wrench on the hex nut at end of the sync lock.

(b) Put a torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (15 cm) extension into the 3/8-inch square opening.

NOTE: Use a dial indicator wrench to make sure that you do not go over the 50 in-lb (6 N·m) limit.

NOTE: The wrench will go into the opening approximately 0.30 in. (7.62 mm).

(c) Apply continuous inward pressure on the lock release pin with the torque wrench (0-150 in-lbs), STD-6839, and 6 in. (15 cm) extension.

(d) Slowly move the open end wrench a small amount at a time in one or opposite direction until the lock release pin goes in.

SUBTASK 78-31-00-710-009-G00

CAUTION MAKE SURE THAT YOU APPLY CONTINUOUS PRESSURE ON THE SQUARE-DRIVE WRENCH. THIS WILL KEEP THE LOCK RELEASE PIN IN AND THE MANUAL DRIVE FULLY ENGAGED. IF YOU DO NOT, DAMAGE TO THE SYNC LOCK CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(CAUTION PRECEDES)

CAUTION

DO NOT APPLY MORE THAN 50 INCH-POUNDS OF TORQUE TO EXTEND OR RETRACT THE THRUST REVERSER. IF YOU DO, DAMAGE TO THE SYNC LOCK CAN OCCUR.

(3) Manually extend (deploy) the thrust reverser sleeve:

(a) Turn the torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (15 cm) extension as follows:

NOTE: The sleeve will be in the fully extended position when the override clutch on the manual drive slips.

1) Turn the torque wrench (0-150 in-lbs), STD-6839, in the counterclockwise direction to 50 in-lb (6 N·m) or less to extend the left thrust reverser sleeve.

2) Turn the torque wrench (0-150 in-lbs), STD-6839, in the clockwise direction to 50 in-lb (6 N·m) or less to extend the right thrust reverser sleeve.

(b) Make sure that the thrust reverser sleeve operates smoothly.

NOTE: It can be necessary to operate the manual drive unit on the other side of the thrust reverser to fully extend the sleeves.

SUBTASK 78-31-00-710-012-G00

CAUTION

MAKE SURE THAT YOU APPLY CONTINUOUS PRESSURE ON THE SQUARE-DRIVE WRENCH. THIS WILL KEEP THE LOCK RELEASE PIN IN AND THE MANUAL DRIVE FULLY ENGAGED. IF YOU DO NOT, DAMAGE TO THE SYNC LOCK CAN OCCUR.

(4) Manually retract (stow) the thrust reverser sleeve:

(a) Turn the torque wrench (0-150 in-lbs), STD-6839 with a 6 in. (15 cm) extension as follows:

NOTE: The sleeve will be at the manual track limit when the override clutch on the manual drive slips. If the locking actuator has not locked at this time, hydraulic power will be necessary to completely retract and lock the thrust reverser.

1) Turn the torque wrench (0-150 in-lbs), STD-6839 clockwise to not more than 50 in-lb (6 N·m) to retract the left thrust reverser sleeve.

2) Turn the torque wrench (0-150 in-lbs), STD-6839 counterclockwise to not more than 50 in-lb (6 N·m) to retract the right thrust reverser sleeve.

(b) Make sure that the thrust reverser sleeve operates smoothly.

(c) Turn the manual drive unit until the thrust reverser sleeve are fully retracted and the manual unlock handle on the upper actuator and center actuator snap to the locked position.

1) Make sure that the manual unlock handle on the upper actuator and center actuator move back to the normal, locked position.

SUBTASK 78-31-00-710-013-G00

(5) Do a check of the lock on the applicable thrust reverser upper actuator:

(a) Make sure that the manual unlock handle on the applicable thrust reverser upper actuator is in the lock position.

(b) Make sure that the manual unlock handle on the applicable thrust reverser center actuator is in the unlock position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Move the manual unlock handle on the applicable thrust reverser center actuator forward to the unlock position.

NOTE: The manual unlock handle moves forward approximately 30 degree.

a) Hold the manual unlock handle in the forward position as you push the detent pin in.

b) Release the manual unlock handle.

WARNING KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE AREA THAT IS AFT OF THE APPLICABLE THRUST REVERSER. IF YOU IGNORE THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE THRUST REVERSER EXTENDS.

CAUTION DO NOT EXTEND THE THRUST REVERSER SLEEVE IF THE THRUST REVERSER IS OPEN. DAMAGE TO THE THRUST REVERSER AND ADJACENT STRUCTURES CAN OCCUR.

(c) Try to extend the thrust reverser sleeve manually.

1) Turn the torque wrench (0-150 in-lbs), STD-6839, in the counterclockwise direction to 50 in-lb (6 N·m) or less to extend the left thrust reverser sleeve.

2) Turn the torque wrench (0-150 in-lbs), STD-6839, in the clockwise direction to 50 in-lb (6 N·m) or less to extend the right thrust reverser sleeve.

3) Make sure that the thrust reverser sleeve does not extend (deploy).

SUBTASK 78-31-00-710-014-G00

(6) Do a check of the lock on the applicable thrust reverser center actuator:

(a) Make sure that the manual unlock handle on the applicable thrust reverser center actuator is in the lock position.

(b) Make sure that the manual unlock handle on the applicable thrust reverser upper actuator is in the unlock position.

1) Move the manual unlock handle on the applicable thrust reverser upper actuator forward to the unlock position.

NOTE: The manual unlock handle moves forward approximately 30 degree.

a) Hold the manual unlock handle in the forward position as you push the detent pin in.

b) Release the manual unlock handle.

WARNING KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE AREA THAT IS AFT OF THE APPLICABLE THRUST REVERSER. IF YOU IGNORE THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE THRUST REVERSER EXTENDS.

CAUTION DO NOT EXTEND THE THRUST REVERSER SLEEVE IF THE THRUST REVERSER IS OPEN. DAMAGE TO THE THRUST REVERSER AND ADJACENT STRUCTURES CAN OCCUR.

(c) Try to extend the thrust reverser sleeve manually.

1) Turn the torque wrench (0-150 in-lbs), STD-6839, in the counterclockwise direction to 50 in-lb (6 N·m) or less to extend the left thrust reverser sleeve.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Turn the torque wrench (0-150 in-lbs), STD-6839, in the clockwise direction to 50 in-lb (6 N·m) or less to extend the right thrust reverser sleeve.

3) Make sure that the thrust reverser sleeve does not extend (deploy).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-101-G00

(1) Do the steps that follow to engage all locks:

NOTE: To completely retract and lock the thrust reverser, it can be necessary to use hydraulic power. You can use a wrench to partially retract the thrust reverser; however if the locking actuator does not lock, hydraulic power will be necessary to completely retract and lock the thrust reverser (TASK 78-31-00-980-802-G00).

(a) Make sure that the manual lock handle on the applicable thrust reverser center actuator is in the lock position.

1) Move the manual unlock handle to the locked position.

(b) Make sure that the manual lock handle on the applicable thrust reverser upper actuator is in the lock position.

1) Move the manual unlock handle to the locked position.

(c) If the upper actuator does not return to the locked position, do these steps:

1) Unlock the center actuator.

2) Insert a torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (152 mm) extension into the manual drive unit and turn the manual drive unit in the retract (stow) direction until the upper actuator locks.

3) Lock the center actuator.

(d) Remove the torque wrench (0-150 in-lbs), STD-6839, and the 6 in. (152 mm) extension from the manual drive unit in the sync lock.

1) Make sure the lock pin moves out to the usual position.

2) If the sync lock does not return the locked position, it may be necessary to insert a torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (152 mm) extension into the manual drive unit and turn the manual drive unit until the sync lock locks.

SUBTASK 78-31-00-860-102-G00

(2) Do the steps that follow to activate the hydraulic isolation valve:

(a) Remove the lock pin from the hole on the isolation valve handle and the control valve body.

(b) Make sure that the manual shutoff handle moves counterclockwise to the vertical position.

SIA (c) Store the lockpin and the red streamer in the storage bag in the storage area under the
SIA First Observer's Seat.

SUBTASK 78-31-00-860-104-G00

(3) If it was used, remove the 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660, or engine and strut access platform, STD-653, from the work area.

SUBTASK 78-31-00-860-105-G00

(4) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-00-860-106-G00

(5) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-00-860-107-G00

(6) Remove the DO NOT OPERATE tags, STD-858, from the thrust levers.

SUBTASK 78-31-00-860-108-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-00-860-109-G00

(8) Make sure that the reverse thrust levers are in the fully forward and down position.

SUBTASK 78-31-00-860-110-G00

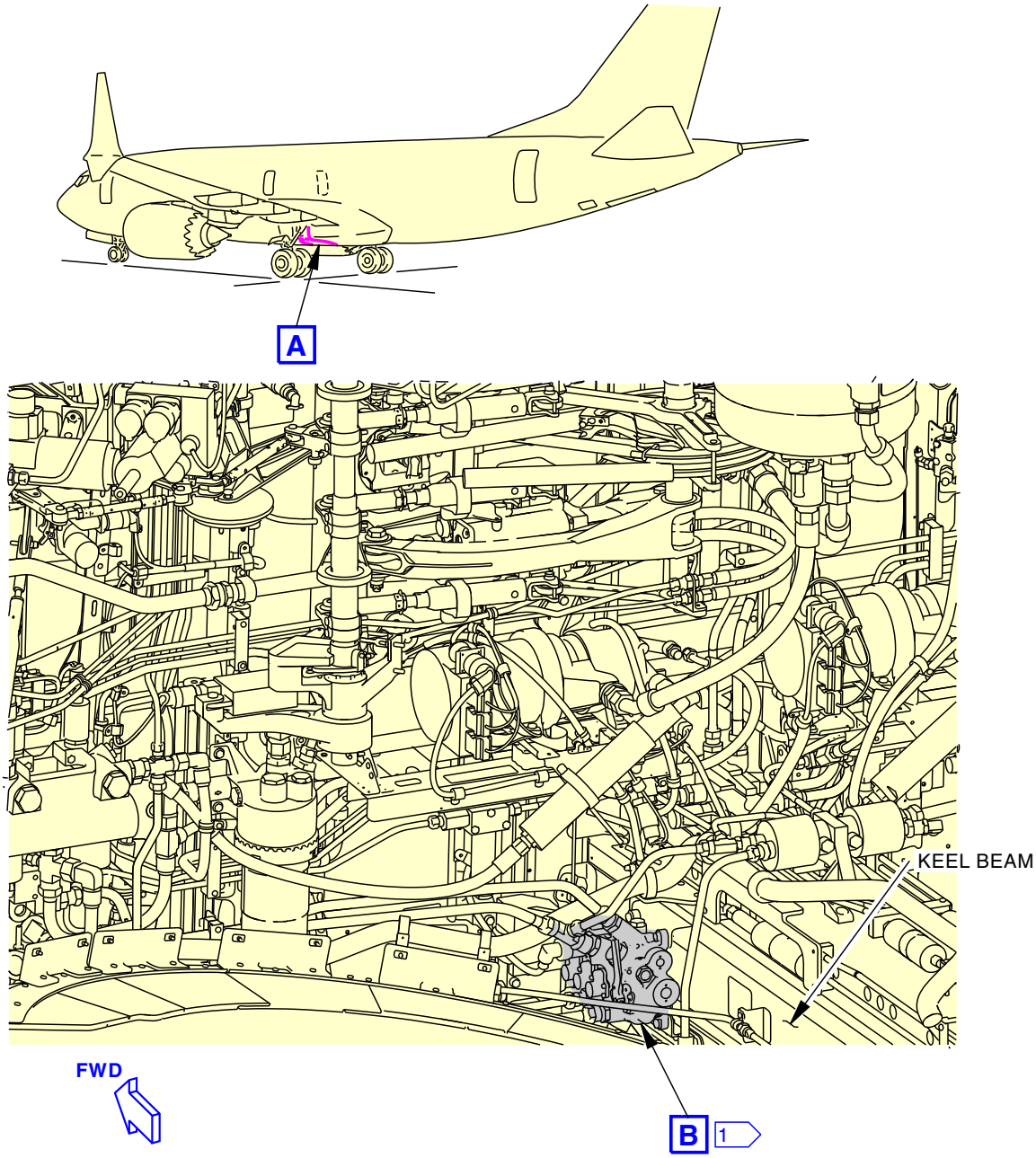
(9) Make sure that the forward thrust levers are in the idle position.

SUBTASK 78-31-00-710-016-G00

(10) Do this task: Thrust Reverser System Normal Operational Test, TASK 78-31-00-700-802-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

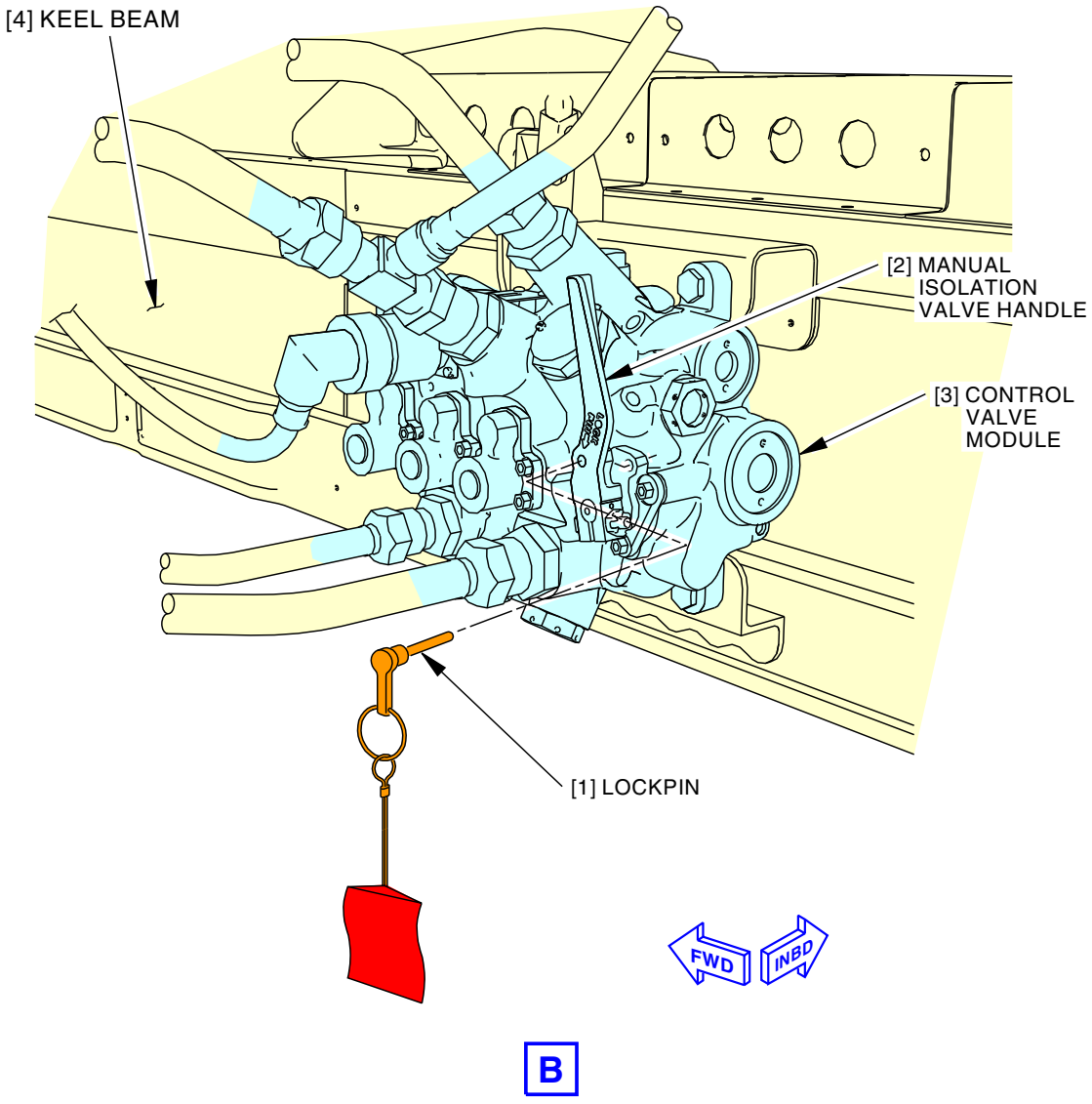


1 ENGINE 1 CONTROL VALVE MODULE IS SHOWN, ENGINE 2 CONTROL VALVE IS ON THE RIGHT SIDE OF THE KEEL BEAM.

2355143 S00061516635_V1

Thrust Reverser Control Valve Module
Figure 504/78-31-00-990-814-G00 (Sheet 1 of 2)

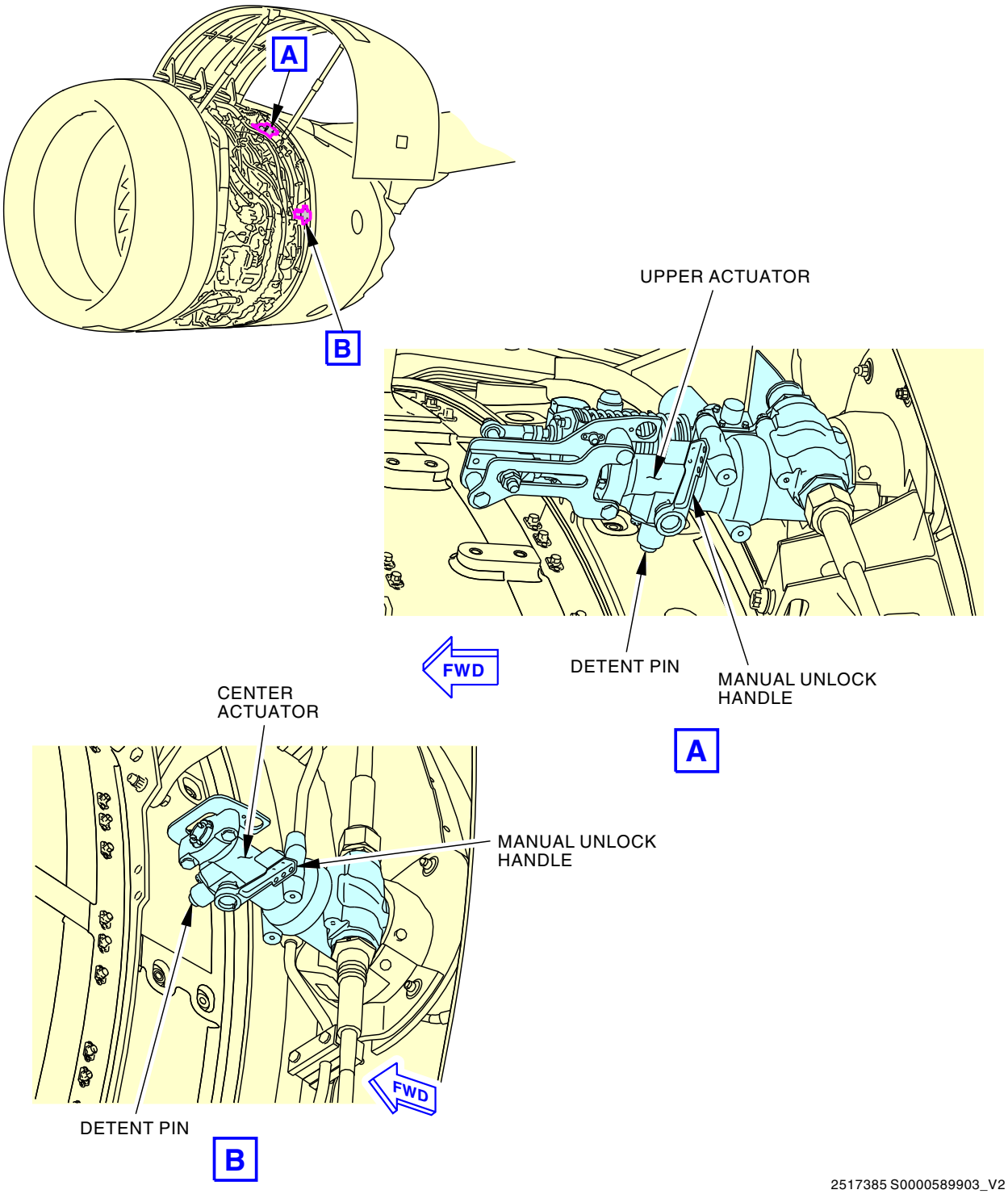
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355144 S00061516636_V1

Thrust Reverser Control Valve Module
Figure 504/78-31-00-990-814-G00 (Sheet 2 of 2)

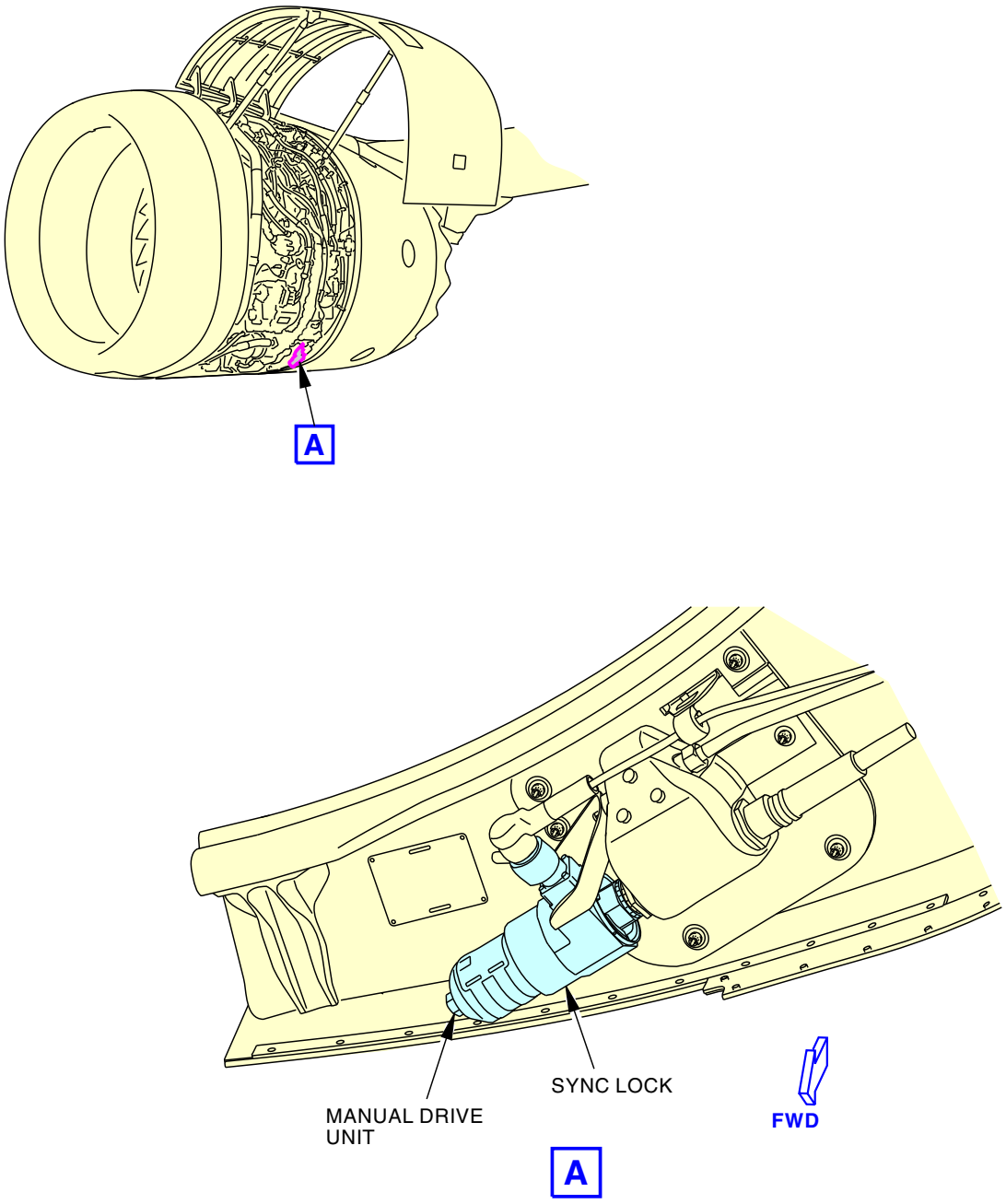
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2517385 S0000589903_V2

Thrust Reverser Hydraulic Actuator Lock
Figure 505/78-31-00-990-815-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2517395 S0000589910_V1

Thrust Reverser Manual Drive Unit
Figure 506/78-31-00-990-816-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-700-805-G00

6. Thrust Reverser Proximity Sensors Operational Test

(Figure 507)

A. General

(1) This task gives the instructions to do a test of all of the thrust reverser proximity sensors for each engine. The hydraulic isolation valve pressure switch is also tested.

(a) Left sleeve, upper actuator proximity sensor

(b) Left sleeve, center actuator proximity sensor

(c) Aft Strut, Hydraulic Isolation Valve (HIV) pressure switch

(d) Right sleeve, upper actuator proximity sensor

(e) Right sleeve, center actuator proximity sensor.

(2) You must extend and retract the thrust reversers (one engine at a time) while you monitor the MFD.

(3) Make sure that the bit values for the proximity sensors and pressure switch are correct for the applicable thrust reverser position.

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Operational Test

SUBTASK 78-31-00-860-112-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

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SUBTASK 78-31-00-860-113-G00

(2) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-114-G00

(3) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-115-G00

(4) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-116-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-117-G00

(6) Make sure that the applicable thrust reverser is closed (TASK 78-31-00-010-802-G00).

SUBTASK 78-31-00-860-118-G00

WARNING DO NOT OPERATE THE ENGINE IN REVERSE THRUST WHILE THE FAN COWL PANELS ARE OPEN. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Make sure that the applicable fan cowl panels are closed and latched (TASK 71-11-04-410-801-G00).

SUBTASK 78-31-00-860-119-G00

(8) Select the left or right Multi-Function Display (MFD).

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(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-31-00-860-120-G00

(9) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-31-00-860-121-G00

(10) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 78-31-00-860-122-G00

(11) Make sure that the forward thrust levers are in the idle position.

SUBTASK 78-31-00-860-123-G00

(12) Make sure that the reverse thrust levers are in the fully forward and down position.

SUBTASK 78-31-00-860-125-G00

WARNING

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(13) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

(a) For engine 1, pressurize hydraulic system A.

(b) For engine 2, pressurize hydraulic system B.

F. Thrust Reverser Proximity Sensors Operational Test

SUBTASK 78-31-00-710-015-G00

(1) Use the Multi-Function Display (MFD) screen to do the test of the applicable thrust reverser cycle (TASK 71-00-00-700-816-G00):

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Left Engine or 71-80 Right Engine
5) Thrust Reverser Cycle
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING MAKE SURE THAT PERSONNEL STAY AWAY FROM THE THRUST REVERSER WHEN YOU MOVE THE CONTROLS. THE THRUST REVERSER CAN MOVE VERY QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL.

(c) Do the steps that follow to do a test of the proximity sensors:

1) Select the EPCS page 4 from the Maintenance Data Pages on the Multi-Function Display (MFD).

2) Move the applicable reverse thrust lever up to the extend (deploy) position.

a) Compare the EPCS page 4, status 2 display with the Table 503 to make sure that the bit values shown are correct.

3) Move the applicable reverse thrust lever to the retract (stow) position.

a) Compare the EPCS page 4, status 2 display with the Table 503 to make sure that the bit values shown are correct.

4) If you do not get the correct bit values, look at the status message on the MFD for thrust reverser proximity sensor messages (TASK 31-65-00-750-801).

Table 503/78-31-00-993-801-G00 Thrust Reverser Sensor Bit Values

Sensor Location	Bit No.	T/R Extended Bit Values	T/R Retracted Bit Values
Upper Actuator (Left Sleeve)*[1]	14	0 (Target Near)	1 (Target Far)
Center Actuator (Left Sleeve)*[1]	13	0 (Target Near)	1 (Target Far)
Hydraulic Isolation Valve (Aft Strut) and HIV Pressure Switch	4	1 (OPEN)	0 (CLOSE)
Upper Actuator (Right Sleeve)*[2]	16	0 (Target Near)	1 (Target Far)
Center Actuator (Right Sleeve)*[2]	15	0 (Target Near)	1 (Target Far)

*[1] Channel A transmits left sleeve data and HIV pressure switch.

*[2] Channel B transmits right sleeve data.

(d) After you deployed and stowed the thrust reversers, select the STOP FUNCTION to complete the test.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-126-G00

(1) Put the applicable HYD PUMPS A ENG 1 or HYD PUMPS B ENG 2 switch to the OFF position.

SUBTASK 78-31-00-860-127-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 78-31-00-860-128-G00

(3) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

SUBTASK 78-31-00-860-129-G00

(4) Make sure that the reverse thrust levers are in the fully forward and down position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-130-G00

(5) Make sure that the forward thrust levers are in the idle position.

SUBTASK 78-31-00-860-131-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-31-00-860-132-G00

(7) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-31-00-860-133-G00

(8) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-31-00-860-134-G00

(9) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-31-00-860-135-G00

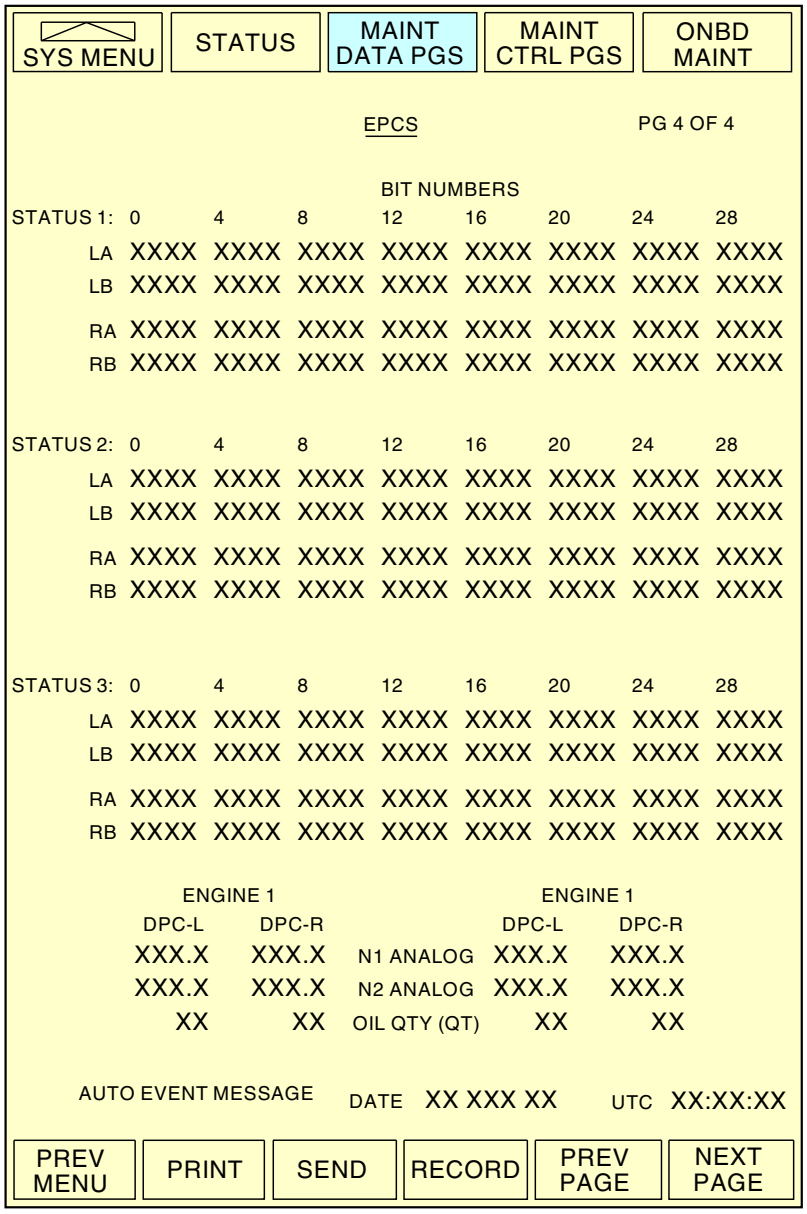
(10) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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EPCS Page 4 Status Display
Figure 507/78-31-00-990-817-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-00-700-806-G00

7. Thrust Reverser Annunciator Lights Operational Test

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to do a check of the wiring between the Display Processing Computer (DPC) and the REVERSER LIMITED, REVERSER COMMAND and REVERSER AIR/GRD lights in the P5 pilots aft overhead panel.

B. References

Reference	Title
31-65-00-860-801	Miscellaneous System Controls (MSC) Page Function (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)

C. Location Zones

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

D. Prepare for the Test

SUBTASK 78-31-00-860-189-G00

(1) Set the GND TEST switch to the ENABLE position.

SUBTASK 78-31-00-860-201-G00

(2) Set the ENG 1 (ENG 2) EEC MAINT POWER, on the MAX Display System (MDS) Multi Function Display (MFD), to the TEST mode (TASK 31-65-00-860-801).

NOTE: This test is written for engine 1. The test is the same for engine 2, except as noted by the data in parenthesis. Use the data in parenthesis to do the test for engine 2.

SUBTASK 78-31-00-860-191-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C04023	DISPLAY DPC 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	10	C04022	DISPLAY DPC 1 HOLDUP

SUBTASK 78-31-00-860-192-G00

(4) On the MDS MFD, go to the 70-80 Left (Right) Engine display in the SPECIAL FUNCTIONS (TASK 46-13-02-860-802).

(a) Select the Lamp Check Out to do a test on Channel A.

SUBTASK 78-31-00-860-193-G00

(5) Make sure that the REVERSER AIR/GRD light, REVERSER COMMAND light, and Engine 1 (2) REVERSER LIMITED light, on the P5 panel, come on.

NOTE: If the annunciator lights come on, there is wire continuity between the DPC2 and the annunciator lights through Channel A.

SUBTASK 78-31-00-860-225-G00

(6) Select CONTINUE to do a test on Channel B.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-750-001-G00

(7) Make sure that the REVERSER AIR/GRD light, REVERSER COMMAND light, and Engine 1 (2) REVERSER LIMITED light, on the P5 panel, come on.

NOTE: If the annunciator lights come on, there is wire continuity between the DPC2 and the annunciator lights through Channel B.

SUBTASK 78-31-00-860-194-G00

(8) Close the Lamp Check Out function.

SUBTASK 78-31-00-860-195-G00

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

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	10	C04022	DISPLAY DPC 1 HOLDUP

SUBTASK 78-31-00-860-227-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C04023	DISPLAY DPC 1 PRI

NOTE: If you do not close these circuit breakers in this sequence, the DPC will not operate correctly.

SUBTASK 78-31-00-700-001-G00

(11) Wait a minimum of 45 seconds for DPC 1 to power up.

SUBTASK 78-31-00-860-196-G00

(12) Open these circuit breakers:

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C04024	DISPLAY DPC 2 HOLDUP
D	11	C04025	DISPLAY DPC 2 PRI

SUBTASK 78-31-00-860-198-G00

(13) On the MDS MFD, go to the 71-80 Left (Right) Engine display in the SPECIAL FUNCTIONS (TASK 46-13-02-860-802).

(a) Select the Lamp Check Out to do a test on Channel A.

SUBTASK 78-31-00-860-199-G00

(14) Make sure that the REVERSER AIR/GRD light, REVERSER COMMAND light, and Engine 1 (2) REVERSER LIMITED light, on the P5 panel, come on.

NOTE: If the annunciator lights comes on, there is wire continuity between the DPC1 and the annunciator lights through Channel A.

SUBTASK 78-31-00-860-226-G00

(15) Select CONTINUE to do a test on Channel B.

SUBTASK 78-31-00-750-002-G00

(16) Make sure that the REVERSER AIR/GRD light, REVERSER COMMAND light, and Engine 1 (2) REVERSER LIMITED light, on the P5 panel, comes on.

NOTE: If the annunciator lights come on, there is wire continuity between the DPC1 and the annunciator lights through Channel B.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Close the Lamp Check Out function.

SUBTASK 78-31-00-860-200-G00

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

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C04024	DISPLAY DPC 2 HOLDUP

SUBTASK 78-31-00-860-228-G00

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

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	11	C04025	DISPLAY DPC 2 PRI

NOTE: If you do not close these circuit breakers in this sequence, the DPC will not operate correctly.

SUBTASK 78-31-00-700-002-G00

(19) Wait a minimum of 45 seconds for DPC 2 to power up.

SUBTASK 78-31-00-860-246-G00

(20) Set the ENG 1 (ENG2) EEC MAINT POWER, on the MDS MFD, to the NORM mode (TASK 31-65-00-860-801).

SUBTASK 78-31-00-860-202-G00

(21) Set the GND TEST switch to the NORM position.

——— END OF TASK ———

TASK 78-31-00-700-807-G00

8. Scheduled Maintenance Task for EEC Faults - Reverser Sensor

A. General

(1) This task gives the instructions to interrogate the scheduled maintenance task (SMT) message ENG 1/2 REVERSER SENSOR faults.

B. References

Reference	Title
05-00-00-750-801	Scheduled Maintenance Task (SMT) - Repair Time Limits (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (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

D. Prepare for the Fault Interrogation

SUBTASK 78-31-00-860-203-G00

(1) Make sure that the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-00-860-204-G00

(2) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-31-00-860-207-G00

(3) Make sure that the thrust levers are at the idle and down position.

SUBTASK 78-31-00-860-205-G00

(4) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 78-31-00-860-208-G00

(5) Make sure that there is no other MDS maintenance test function is active.

SUBTASK 78-31-00-860-209-G00

(6) Set the applicable ENGINE CONTROL switch to ON.

E. Scheduled Maintenance Task for ENG 1/2 REVERSER SENSOR Faults

SUBTASK 78-31-00-860-210-G00

(1) Use the Multi-Function Display (MFD) screen to find if the scheduled maintenance task exists.

(a) Select MAINT CTRL PGS on the Multi-Function Display (MFD).

(b) Select LATCHED MESSAGE ERASE

SUBTASK 78-31-00-810-001-G00

(2) If ENG 1/2 REVERSER SENSOR exists, do one of the steps that follow:

(a) Go to the IFIM and do the applicable procedure(s) to correct the fault.

(b) Continue operation with the fault provided the fault is corrected within remaining deferral period described in this task: Scheduled Maintenance Task (SMT) - Repair Time Limits, TASK 05-00-00-750-801..

NOTE: To help with the future maintenance plan to correct the fault, you may want to use the IFIM to determine and record the maintenance message(s) correlated to the ENG 1/2 REVERSER SENSOR SMT message.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-00-860-229-G00

(1) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Thrust Reverser Removal

(2) Thrust Reverser Installation.

TASK 78-31-01-000-801-G00

2. Thrust Reverser Removal

A. General

(1) This task gives the instructions to remove the left or right thrust reverser half.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
71-11-04-000-801-G00	Fan Cowl Panels Removal (P/B 401)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-09-010-801-G00	Krueger Flap Deflector Removal (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-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205
SPL-14549	Equipment - Sling, Thrust Reverser, LEAP-1B Engine Part #: C78032-1 Supplier: 81205
SPL-14555	Dolly - Engine Thrust Reverser Transportation, LEAP-1B Engine Part #: C78036-1 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-858	Tag - DO NOT OPERATE
STD-1095	Crane - Lift, 2000 lb Capacity, 30 Foot Height
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)
STD-12395	Load Cell Equipment

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. 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)
G50625	Strap - Plastic, Adjustable, Self-locking, 14.40 Inches (365.76 mm) Long	BACS38K3

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

G. Prepare for the Removal

SUBTASK 78-31-01-040-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-001-G00

CAUTION

DO NOT LIFT OR MOVE THE THRUST REVERSER WITH CAUTION: LESS THAN THREE CASCADE SEGMENTS INSTALLED. MAKE SURE THAT THERE IS NO MORE THAN TWO ADJACENT CASCADE SEGMENTS NOT INSTALLED. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(2) Do not lift or move the thrust reverser if there are less than three cascade segments installed.

(a) Make sure that there are no more than two adjacent cascade segments not installed.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-002-G00

(3) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-003-G00

(4) For Engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK

SUBTASK 78-31-01-860-004-G00

WARNING REVERSER THAT IS NEAR THE LEADING EDGE FLAPS AND SLATS OR BEFORE YOU DO WORK ON THE THRUST REVERSER. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT YOU FULLY RETRACT THE LEADING EDGE FLAPS AND SLATS. IF YOU DO NOT FULLY RETRACT THE LEADING EDGE FLAPS AND SLATS, THEN YOU CAN NOT REMOVE THE THRUST REVERSER CORRECTLY.

(5) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-01-040-002-G00

(6) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-01-040-003-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(7) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-01-860-005-G00

(8) Deactivate the applicable hydraulic system (TASK 29-11-00-860-805).

(a) For Engine 1, remove power from hydraulic system A.

(b) For Engine 2, remove power from hydraulic system B.

SUBTASK 78-31-01-860-006-G00

(9) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-31-01-010-001-G00

(10) It is recommended to remove the applicable fan cowl panel (TASK 71-11-04-000-801-G00).

NOTE: If you remove the fan cowl panel, there will be more room to move the thrust reverser during the removal and the fan cowl panel will not get damaged.

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SUBTASK 78-31-01-010-002-G00

(11) If you did not remove the applicable fan cowl panel, do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) Open the fan cowl fully to the 61 degree position.

SUBTASK 78-31-01-030-001-G00

(12) If the replacement thrust reverser does not have the Krueger flap deflectors installed, remove the Krueger flap deflectors from the thrust reverser that you will remove (TASK 78-31-09-010-801-G00).

NOTE: The Krueger flap deflectors are installed only on the inboard translating sleeve.

SUBTASK 78-31-01-010-003-G00

(13) Remove the applicable access panels (Figure 401).

(a) If you are removing the inboard thrust reverser on Engine 1, remove these access panels:

Number	Name/Location
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1

1) Remove 13 bolts [8] to remove the inboard forward hinge fairing [9].
2) Remove 12 bolts [1] to remove the inboard aft hinge fairing [2].
3) Keep the bolts together in a cloth bag for the installation.

(b) If you are removing the outboard thrust reverser on Engine 1, remove these access panels:

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1

1) Remove 13 bolts [7] to remove the outboard forward hinge fairing [6].
2) Remove 12 bolts [4] to remove the outboard aft hinge fairing [3].
3) Keep the bolts together in a cloth bag for the installation.

(c) If you are removing the inboard thrust reverser on Engine 2, remove these access panels:

Number	Name/Location
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2

1) Remove 13 bolts [7] to remove the outboard forward hinge fairing [6].
2) Remove 12 bolts [4] to remove the outboard aft hinge fairing [3].
3) Keep the bolts together in a cloth bag for the installation.

(d) If you are removing the outboard thrust reverser on Engine 2, remove these access panels:

Number	Name/Location
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

1) Remove 13 bolts [8] to remove the inboard forward hinge fairing [9].
2) Remove 12 bolts [1] to remove the inboard aft hinge fairing [2].

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3) Keep the bolts together in a cloth bag for the installation.

H. Thrust Reverser Removal

SUBTASK 78-31-01-010-012-G00

(1) Disconnect the aft cowl cross tie rod [113] from the deflection limiting strap [112] on the applicable thrust reverser half (Figure 402).

(a) Open the applicable thrust reverser half (TASK 78-31-00-010-801-G00).

SIA ALL; AIRPLANES WITHOUT LANYARD

(b) Remove the nut [110], bolt [115], bushing [111], and bushing [114] that attach the aft cowl cross tie rod [113] to the deflection limiting strap [112].

SIA ALL; AIRPLANES WITH LANYARD

(c) Remove the nut [110], lanyard [118], washer [117], bolt [115], bushing [111], and bushing [114] that attach the aft cowl cross tie rod [113] to the deflection limiting strap [112].

SIA ALL

(d) Lower the applicable thrust reverser half into the closed position (TASK 78-31-00-010-802-G00).

1) Do not latch the thrust reverser closed.

SUBTASK 78-31-01-020-005-G00

(2) Disconnect the upper end of the thrust reverser opening actuator [75] from the thrust reverser (Figure 403).

(a) Remove the bolt [76], washer [77], bushing [71], barrel nut [74], and retainer [73] that attach the upper end of the opening actuator [75] to the thrust reverser torque box fitting [72].

CAUTION

MAKE SURE THAT YOU SAFETY THE ACTUATOR TO THE ENGINE WITH THE STRAP. IF YOU DO NOT SAFETY THE ACTUATOR, IT CAN FALL AND CAUSE DAMAGE TO THE ENGINE.

(b) Secure the upper end of the opening actuator [75] to the engine with an adjustable plastic strap, G50625.

SUBTASK 78-31-01-020-006-G00

(3) Disconnect the electrical bonding strap [86] from the thrust reverser (Figure 408).

(a) Use a wrench to hold the ground stud [85] to prevent the ground stud [85] from turning when you remove the nut [87].

(b) Remove the nut [87] and washer [91] that attach the bonding strap terminal to the ground stud [85].

(c) Remove the bonding strap [86] from the ground stud [85], and re-install the nut [87] and washer [91] onto the ground stud [85].

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SUBTASK 78-31-01-010-005-G00

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTIONS ARE NOT DIRTY BEFORE YOU CONNECT OR DISCONNECT THEM. SOLID OR LIQUID CONTAMINATION OF THE ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

(4) Disconnect the electrical connector [24] and electrical connector [27] from the strut receptacle [25] and strut receptacle [26] (Figure 404).

(a) For the left thrust reverser [5], disconnect the electrical connector [27] and electrical connector [24], D30002 and D30008.

(b) For the right thrust reverser [10], disconnect the electrical connector [27] and electrical connector [24], D30006 and D30010.

(c) Install protective caps on the electrical connectors and strut receptacles.

SUBTASK 78-31-01-020-007-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT LET HYDRAULIC FLUID GET ON EQUIPMENT. IF HYDRAULIC FLUID GETS ON EQUIPMENT, IMMEDIATELY CLEAN IT FROM THE EQUIPMENT. HYDRAULIC FLUID CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE WRENCH TO HOLD THE NIPPLE FITTING. USE THE OTHER WRENCH TO LOOSEN THE COUPLING NUT. IF THE NIPPLE FITTING TURNS, DAMAGE CAN OCCUR.

(5) Drain the hydraulic fluid from the hydraulic lines (Figure 404, Figure 405).

NOTE: To decrease hydraulic fluid spray when the coupling nuts are loosened, wrap a cotton wiper, G00034, around the wrench, nut and hydraulic line.

(a) Wrap a cotton wiper, G00034, around the electrical connector [124] on the sync lock [123] receptacle on the lower actuator [122].

NOTE: The cloth will catch the hydraulic fluid and prevent contamination of the electrical connector.

(b) Put a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110, below the lower actuator [122] to collect hydraulic fluid.

(c) Disconnect the coupling nut on the lower sync shaft and tubing [121] at the upper port of the lower actuator [122].

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(d) Disconnect the coupling nut on the lower hydraulic retract line [120] at the upper port of the lower actuator [122].

(e) Let the hydraulic fluid drain into the container.

(f) Disconnect the extend line flexhose [23] and retract line flexhose [22] from the strut fitting.

(g) Install a hydraulic fitting plug or wrap a cotton wiper, G00034, around the extend line flexhose [23] and retract line flexhose [22] coupling nuts to catch residual hydraulic fluid that will drain from the system.

(h) Re-connect the coupling nut for the lower sync shaft and tubing [121] to the lower actuator [122].

1) Torque the coupling nut to 900 ±45 in-lb (102 ±5 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

(i) Re-connect the coupling nut for the lower hydraulic retract line [120] to the lower actuator [122].

1) Torque the coupling nut to 270 ±13 in-lb (30.5 ±1.5 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 270 ±13 in-lb (30.5 ±1.5 N·m).

(j) Install protective caps on the open ports of the upper locking actuator [21].

SUBTASK 78-31-01-480-001-G00

(6) Install the upper assembly from the thrust reverser sling equipment, SPL-14549, onto the thrust reverser.

(a) Put the forward hinge fitting assembly [51] and aft hinge fitting assembly [54] onto the hinge beam [52] (Figure 406, Figure 408).

1) Put the forward hinge fitting assembly [51] into its position on the hinge beam [52] at the forward attach point marked "GSE HOIST POINT".

2) Install the lockpins [53] to attach the forward hinge fitting assembly [51] onto the hinge beam [52].

3) Install the retention pins [55] in the end of the lockpins [53].

4) Remove the aft lockpins [93] at hinge number 4.

5) Put the aft hinge fitting assembly [54] into its position on the hinge beam [52] at the aft attach point marked "GSE HOIST POINT".

6) Install the lockpins [53] to attach the aft hinge fitting assembly [54] onto the hinge beam [52].

7) Install the retention pins [55] in the end of the lockpins [53].

(b) Put the forward and aft latch fitting assemblies [67] onto the latch beam (View C, Figure 406).

1) Remove the 4 screws from the locations that are marked "GSE" on the latch beam fairing.

2) Put the forward latch fitting assembly [67] into its position on the latch beam.

3) Install the bolts [65] and washers [66] to attach the forward latch fitting assembly [67] onto the latch beam.

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a) It is optional to use nylon or other non-metallic washers [68] between the latch fitting assemblies [67] and the thrust reverser to protect the paint.

4) Put the aft latch fitting assembly [67] into its position on the latch beam.

5) Install the bolts [65] and washers [66] to attach the aft latch fitting assembly [67] onto the latch beam.

a) It is optional to use nylon or other non-metallic washers [68] between the latch fitting assembly [67] and the thrust reverser to protect the paint.

6) Torque the four bolts [65] to 40 ±10 in-lb (4.5 ±1.1 N·m).

SUBTASK 78-31-01-480-002-G00

(7) If you will use an overhead crane to remove the thrust reverser, attach the thrust reverser sling equipment, SPL-14549, to the overhead crane (Figure 406).

(a) Attach the C-beam assembly [36] to the strongback assembly [35] with the collar [42], lockpin [41] and retention pin [43].

NOTE: The C-beam is attached in the correct position for the applicable thrust reverser when the 'FWD' arrow points in the forward direction.

WARNING

DO NOT USE A FORCE MORE THAN 1050 LB (476 KG) TO LIFT THE THRUST REVERSER. IF YOU USE A FORCE MORE THAN 1050 LB (476 KG), YOU CAN BREAK PINS. IF YOU DO NOT OBEY, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Attach the load cell [38] (load cell, STD-12395) to the triangle lift plate [31] and the master link [39].

1) Make sure that the length of the electrical cable from the load cell [38] to the handheld display has a minimum of 20 ft (6 m).

2) Use the load cell [38] to make sure that the force used when lifting the sling assembly and the thrust reverser is not more than 1050 lb (476 kg).

NOTE: The weight of the sling assembly is approximately 240 lb (109 kg). The weight of the thrust reverser is approximately 800 lb (363 kg).

(c) Connect the master link to the 30 foot height (2000 lb capacity) lift crane, STD-1095.

WARNING

MAKE SURE THAT YOU INSTALL THE HOIST HOOK OPENING WITH THE CLIP POINTED TO THE TRIANGLE LIFT PLATE. MONITOR THE HOOK TURN WHEN YOU OPERATE THE CHAIN HOIST. IF YOU DO NOT OBEY, THE THRUST REVERSER CAN FALL. IF YOU DO NOT FOLLOW INSTRUCTIONS, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Attach the hand chain hoist [37] to the triangle lift plate [31] and to the C-beam assembly [36].

(e) Attach the web sling [32] to the triangle lift plate [31] and to the strongback assembly [35] using the forward web shackle [33].

(f) Attach the upper assembly [45] to the top fitting on the strongback assembly [35] with the lockpin [46] and the retention pin [47].

NOTE: The upper assembly interfaces with the hinge fittings.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(g) Attach the lower assembly [44] to the bottom fitting on the strongback assembly [35] with the lockpin [62] and the retention pin [61].

NOTE: The lower assembly interfaces with the latch fittings.

SUBTASK 78-31-01-480-003-G00

(8) If you will use a boom hoist to remove the thrust reverser, attach the boom hoist, SPL-2430, to the thrust reverser sling equipment, SPL-14549 (Figure 407).

(a) Attach the boom hoist [104] to the strongback assembly [35] handling flange with the two lockpins [101] and retention pins [103].

(b) Attach the upper assembly [45] to the top fitting on the strongback assembly [35] with the lockpin [46] and the retention pin [47].

NOTE: The upper assembly interfaces with the hinge fittings.

(c) Attach the lower assembly [44] to the bottom fitting on the strongback assembly [35] with the lockpin [62] and the retention pin [61].

NOTE: The lower assembly interfaces with the latch fittings.

SUBTASK 78-31-01-480-004-G00

WARNING THE TOOL WEIGHS APPROXIMATELY 240 POUNDS (109 KG), MAKE SURE THAT THE TOOL IS CORRECTLY ATTACHED TO THE OVERHEAD CRANE. IF YOU DO NOT OBEY THIS INSTRUCTION, THE TOOL CAN FALL AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT ATTACH THE HOIST ASSEMBLY TO THE THRUST REVERSER SLEEVE. STRUCTURAL DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(9) Attach the thrust reverser sling equipment, SPL-14549, to the thrust reverser (Figure 406, Figure 407).

(a) If you are using the overhead crane, put a protective mat, STD-585, on the leading edge of the wing to prevent damage to the surface.

NOTE: When the tool is put into position and attached to the thrust reverser the chain may make contact with the leading edge of the wing.

(b) Align the thrust reverser sling equipment, SPL-14549, to the thrust reverser with the overhead crane or the boom hoist.

(c) Position the thrust reverser sling equipment, SPL-14549, so that the flanges on the lower assembly [44] are correctly engaged with the forward latch fitting assembly [67] and aft latch fitting assembly [67].

(d) Attach the lower assembly [44] to the thrust reverser with the lockpins [64] and the retention pins [63].

(e) Position the thrust reverser sling equipment, SPL-14549, so that the clevises on the upper assembly [45] are correctly engaged with the forward hinge fitting assembly [51] and the aft hinge fitting assembly [54].

(f) Attach the upper assembly [45] to the forward hinge fitting assembly [51] and the aft hinge fitting assembly [54] with the lockpins [56] and the retention pins [55].

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SUBTASK 78-31-01-020-008-G00

WARNING THE THRUST REVERSER WEIGHS APPROXIMATELY 800 POUNDS (363 KG), MAKE SURE THAT THE WEIGHT OF THE THRUST REVERSER IS HELD BY THE TOOL. IF YOU DO NOT OBEY THIS INSTRUCTION, THE THRUST REVERSER CAN FALL AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(10) Remove the thrust reverser half (Figure 408).

(a) Rotate the thrust reverser half with the thrust reverser sling equipment, SPL-14549, to get access to and to remove the load from the hinge beam bolts [83] and lockpins [93].

NOTE: At the approximate eight degree open position, the V-band disengages from the V-groove.

(b) Remove the forward lockpin [93] at hinge number 1.

(c) Remove the nuts [81] from the forward and aft hinge bolts [83].

(d) Install the thread protectors [82] on the forward and aft hinge bolt [83].

NOTE: The thread protectors are part of the GSE equipment and are in the storage box with the GSE thrust reverser sling equipment, SPL-14549.

(e) If necessary, adjust the thrust reverser sling equipment, SPL-14549, to remove the load from the bolts [83].

(f) Remove the hinge bolts [83].

WARNING MAKE SURE THAT YOU INSTALL THE HOIST HOOK OPENING WITH THE CLIP POINTED TO THE TRIANGLE LIFT PLATE. MONITOR THE HOOK TURN WHEN YOU OPERATE THE CHAIN HOIST. IF YOU DO NOT OBEY, THE THRUST REVERSER CAN FALL. IF YOU DO NOT FOLLOW INSTRUCTIONS, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT USE A FORCE MORE THAN 1050 LB (476 KG) TO LIFT THE THRUST REVERSER. IF YOU USE A FORCE MORE THAN 1050 LB (476 KG), YOU CAN BREAK PINS. IF YOU DO NOT OBEY, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT YOU MONITOR THE THRUST REVERSER POSITION WHEN YOU MOVE IT AWAY FROM THE STRUT AND ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION, THE THRUST REVERSER CAN HIT THE ADJACENT STRUCTURES AND DAMAGE CAN OCCUR.

(g) Remove the thrust reverser half.

NOTE: The weight of the sling assembly is approximately 240 lb (109 kg). The weight of the thrust reverser is approximately 800 lb (363 kg). Total weight is not more than 1050 lb (476 kg).

1) Make sure that the load cell [38] handheld display electrical cable does not get twisted or tangled up.

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CAUTION

MAKE SURE THAT YOU MONITOR THE POSITION OF THE LATCH HANDLES ON THE LEFT THRUST REVERSER. THE LATCH HANDLES CAN CATCH ON THE SUPPORT EQUIPMENT. IF THE LATCH HANDLES CATCH ON THE SUPPORT EQUIPMENT, DAMAGE TO THE LATCHES CAN OCCUR.

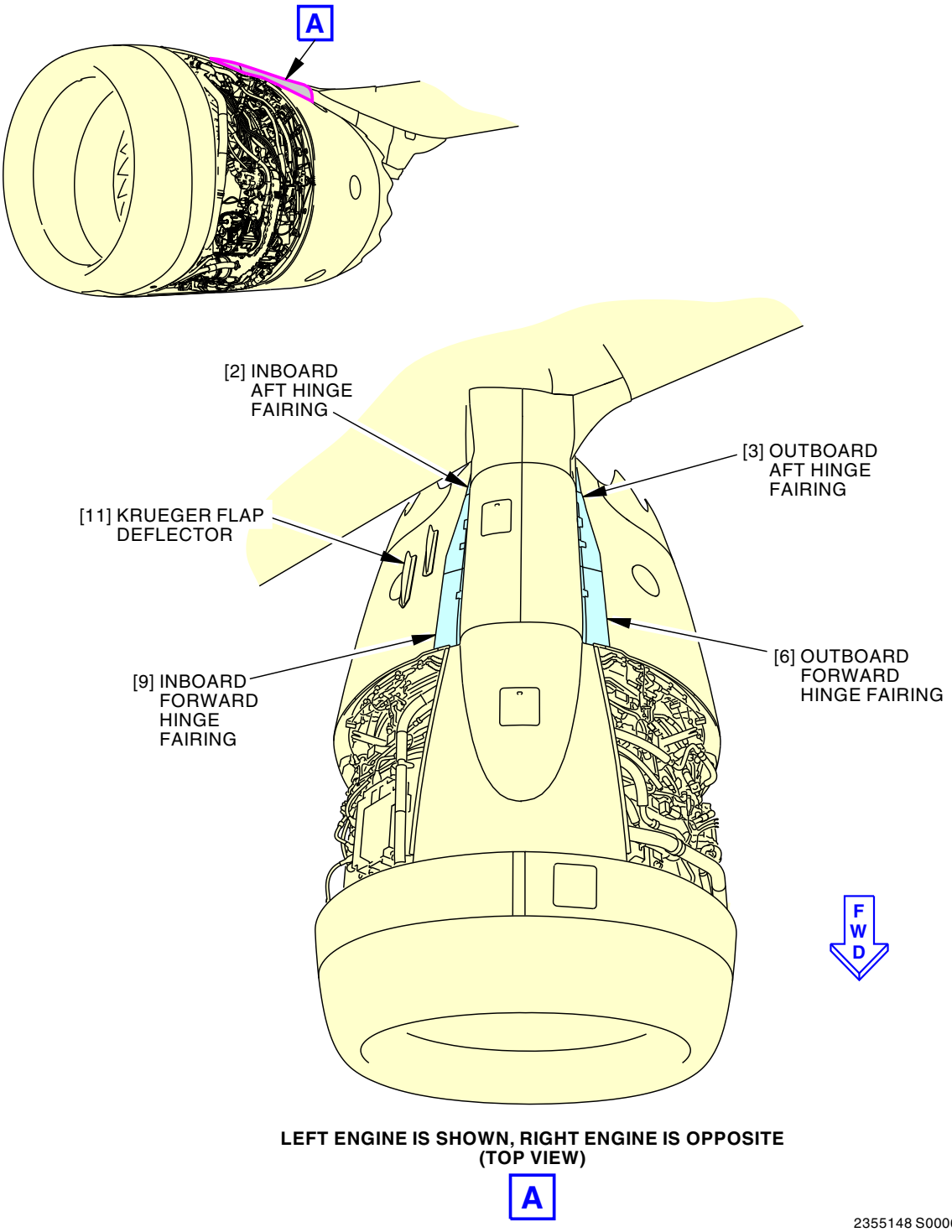
(h) Put the thrust reverser on the dolly, SPL-14555, or on a suitable pallet and dunnage.

SUBTASK 78-31-01-860-061-G00

(11) If it is necessary, remove the thrust reverser sling equipment, SPL-14549, from the thrust reverser and remove the boom hoist, SPL-2430, from the thrust reverser sling equipment, SPL-14549 (TASK 78-31-01-400-801-G00).

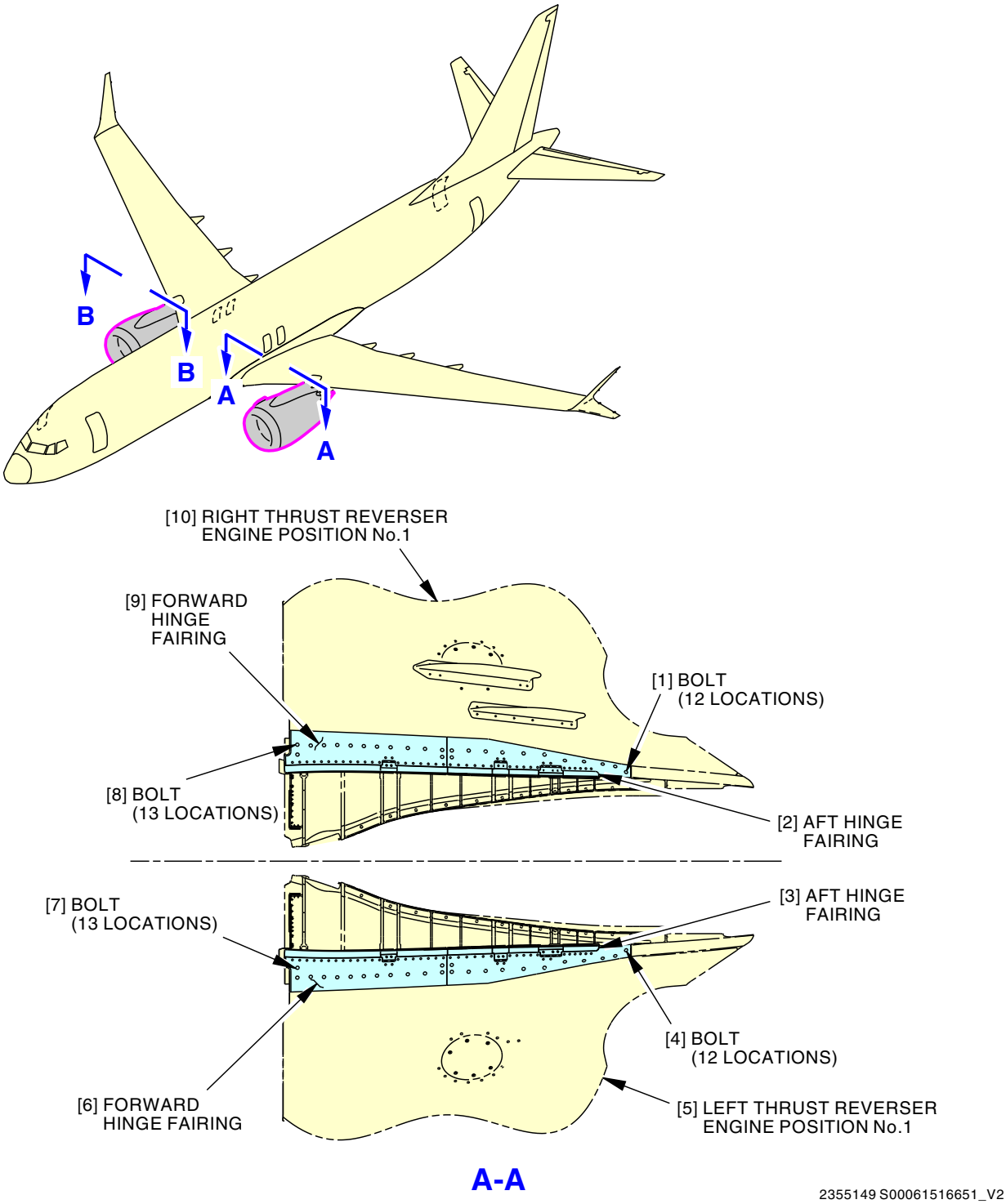
——— END OF TASK ———

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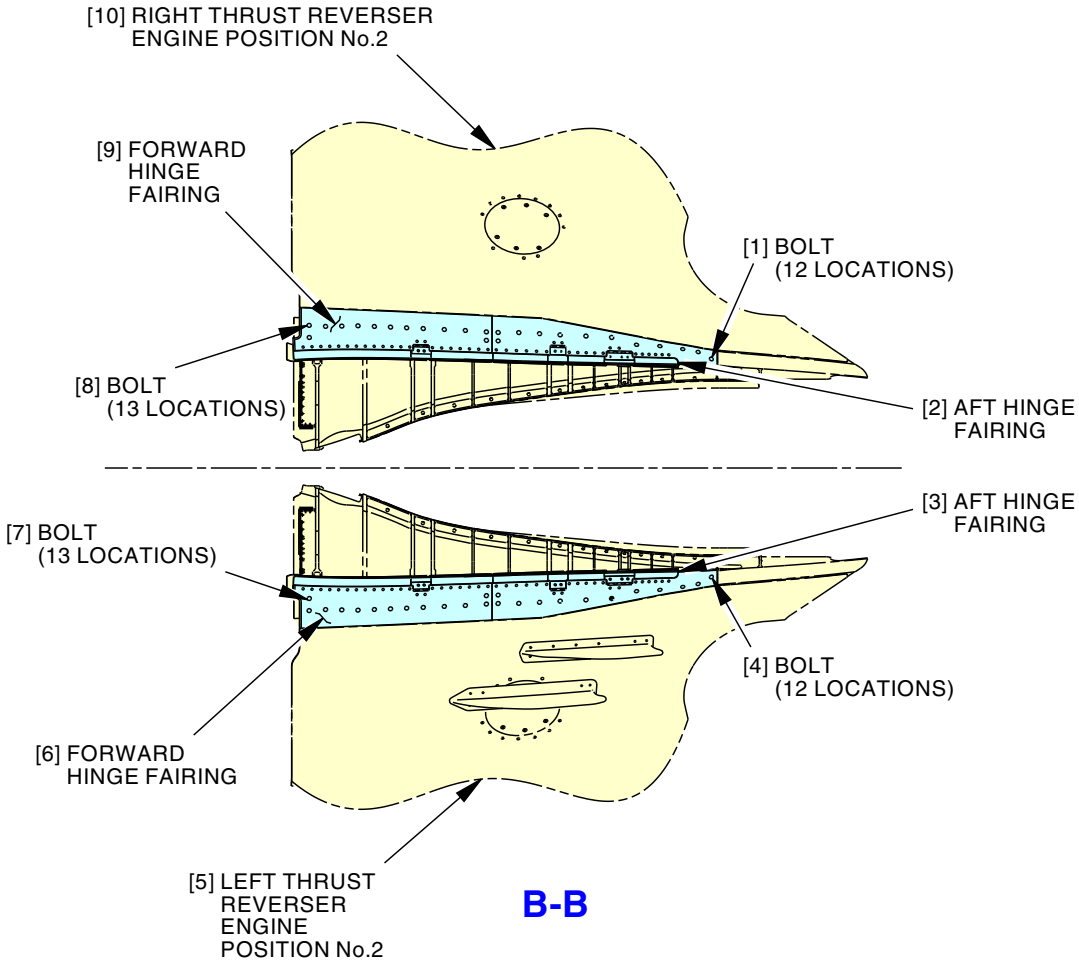
Thrust Reverser Hinge Fairing Installation
Figure 401/78-31-01-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Hinge Fairing Installation
Figure 401/78-31-01-990-801-G00 (Sheet 2 of 3)

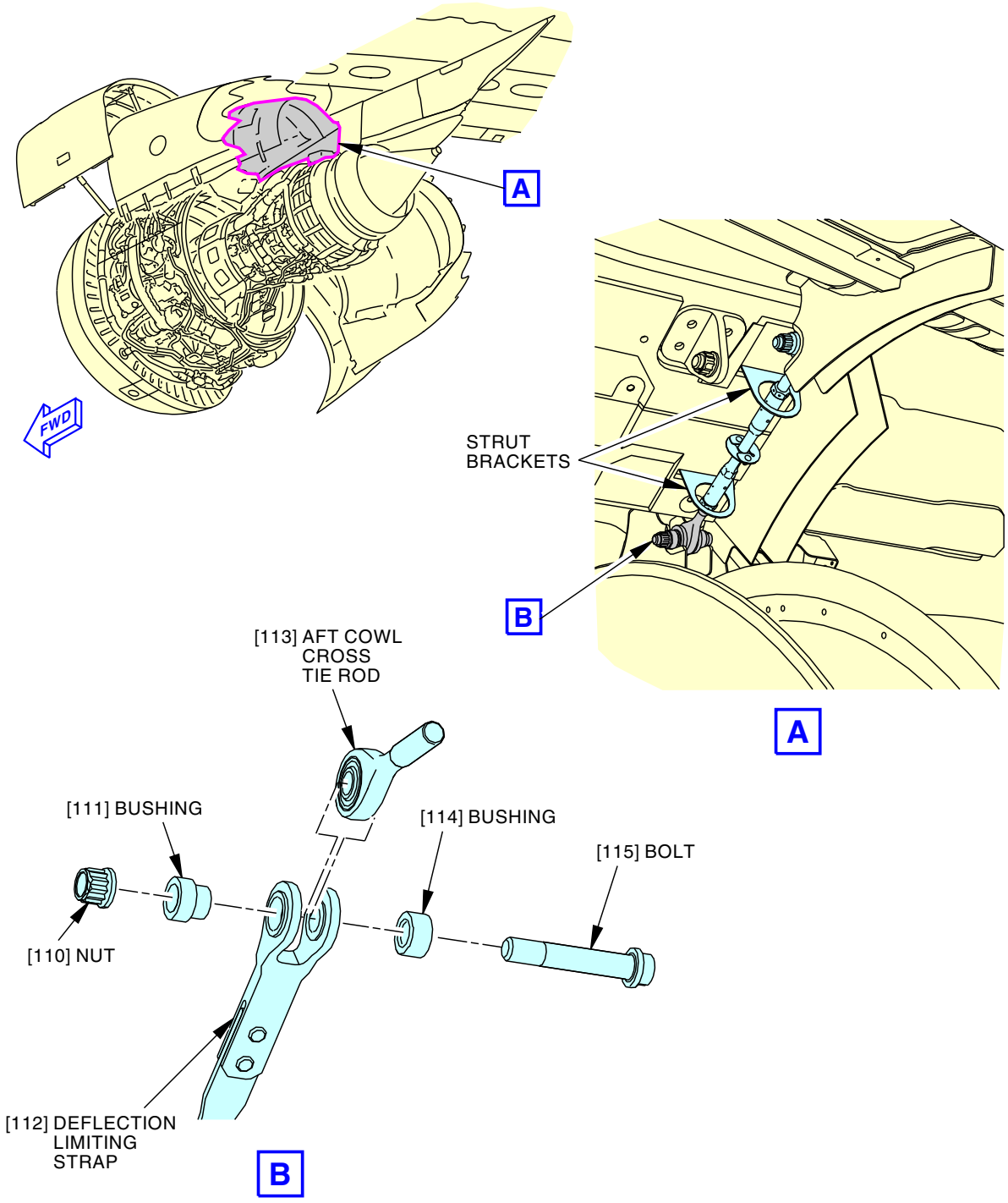
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355150 S00061516652_V2

Thrust Reverser Hinge Fairing Installation
Figure 401/78-31-01-990-801-G00 (Sheet 3 of 3)

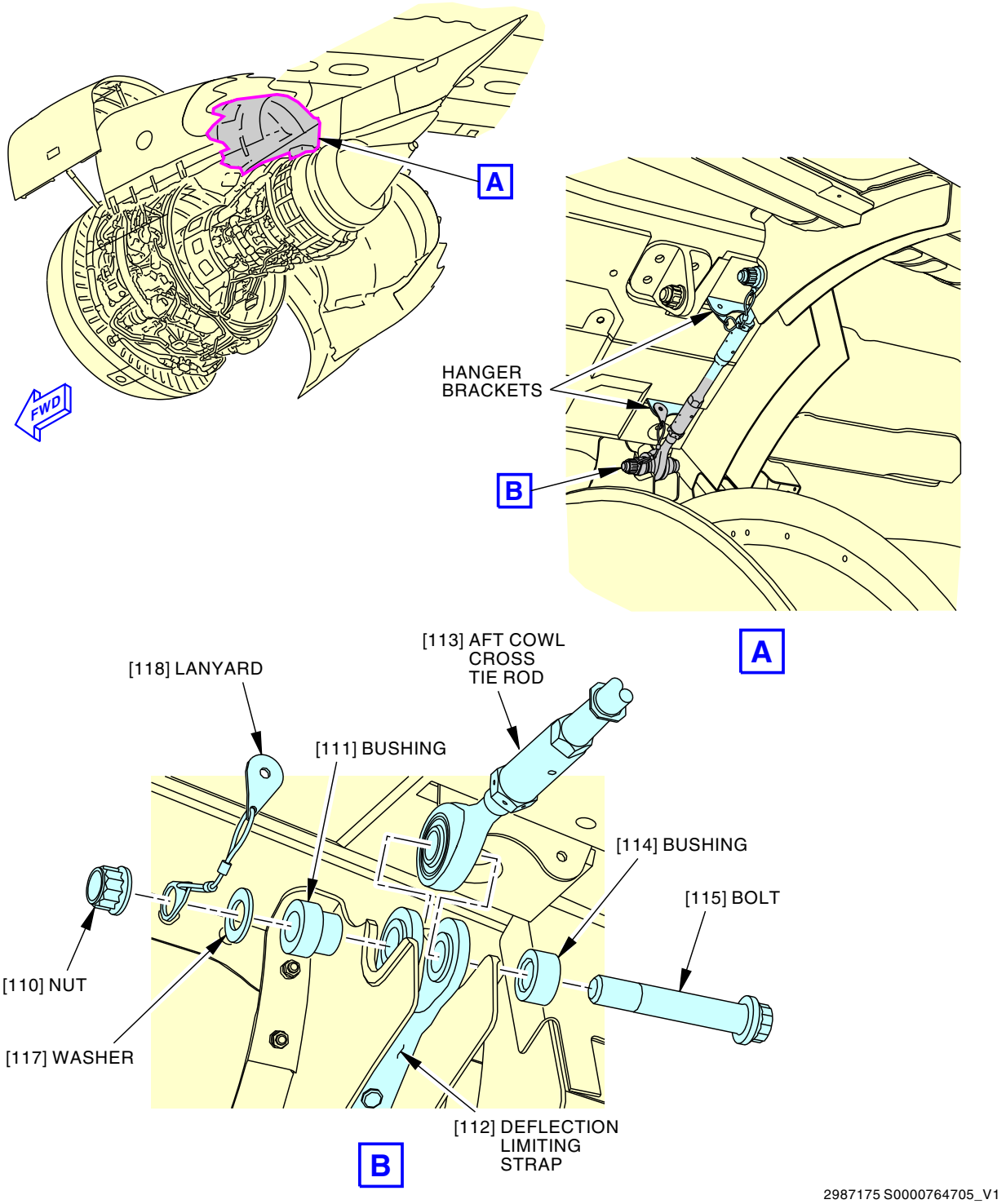
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2471530 S0000578815_V2

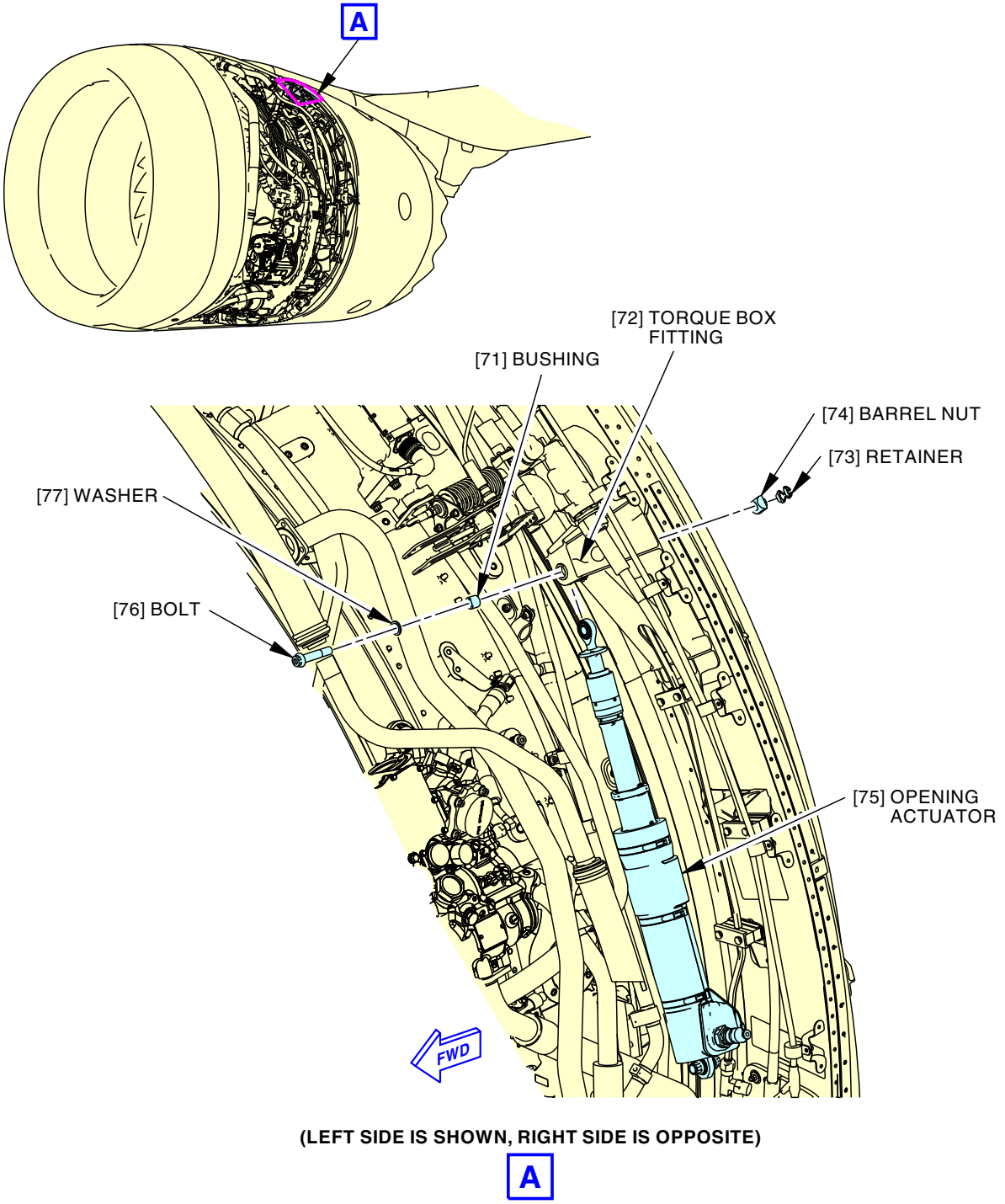
Thrust Reverser Cross Tie Rod Installation
Figure 402/78-31-01-990-814-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Cross Tie Rod Installation
Figure 402/78-31-01-990-814-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



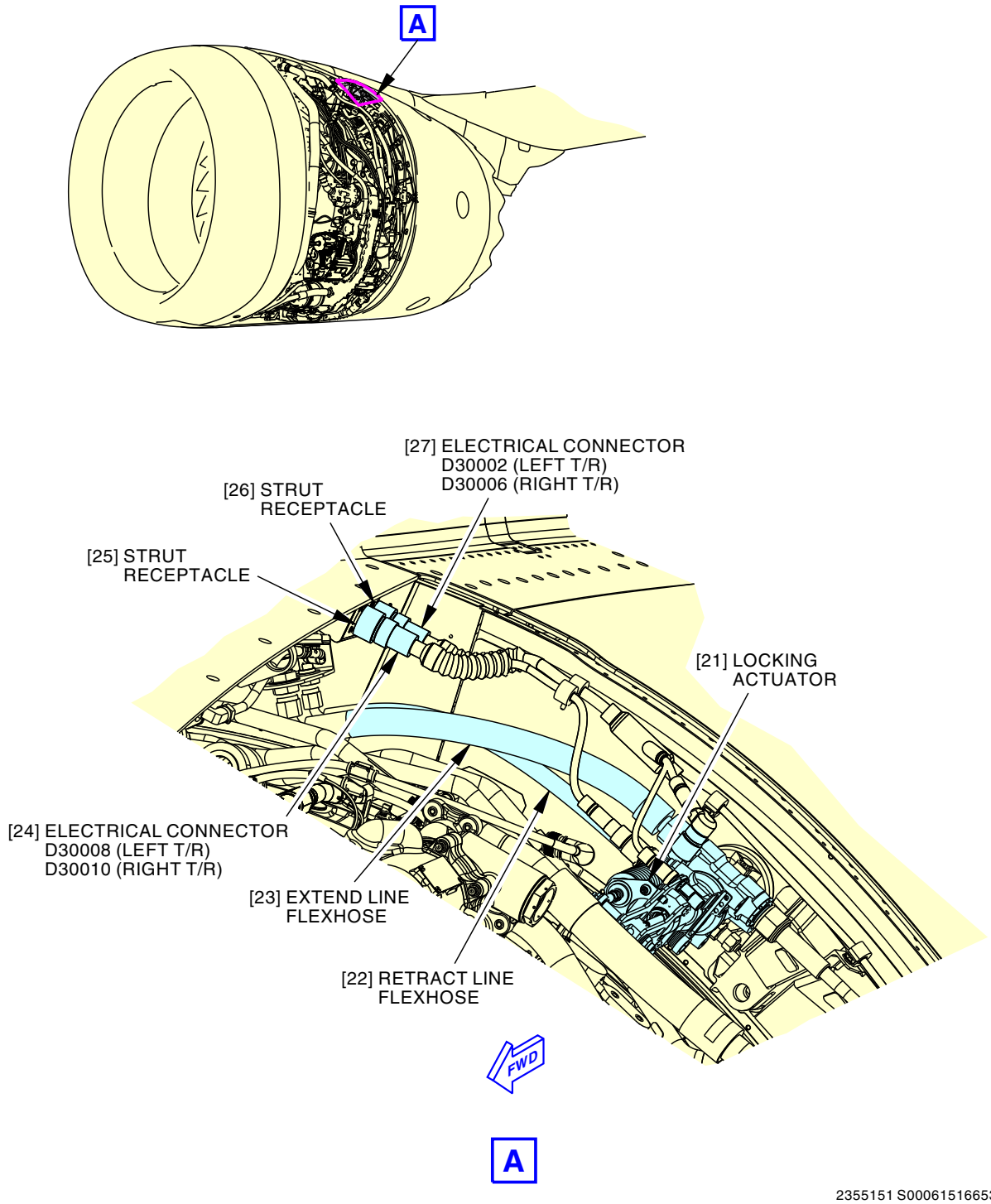
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

A

2355160 S00061516662_V4

Thrust Reverser Opening Actuator Disconnect
Figure 403/78-31-01-990-815-G00

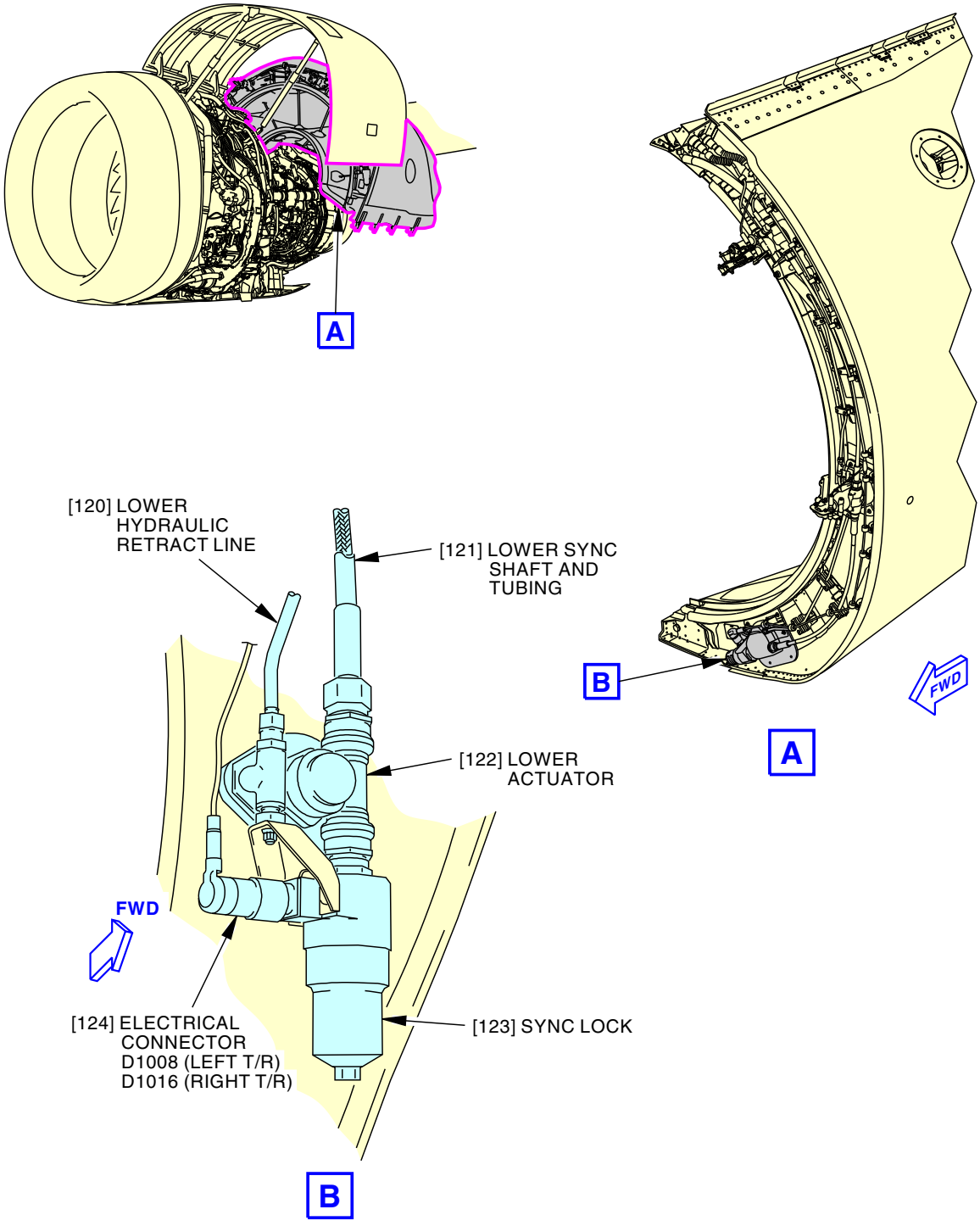
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355151 S00061516653_V1

Hydraulic and Electric Connections
Figure 404/78-31-01-990-802-G00

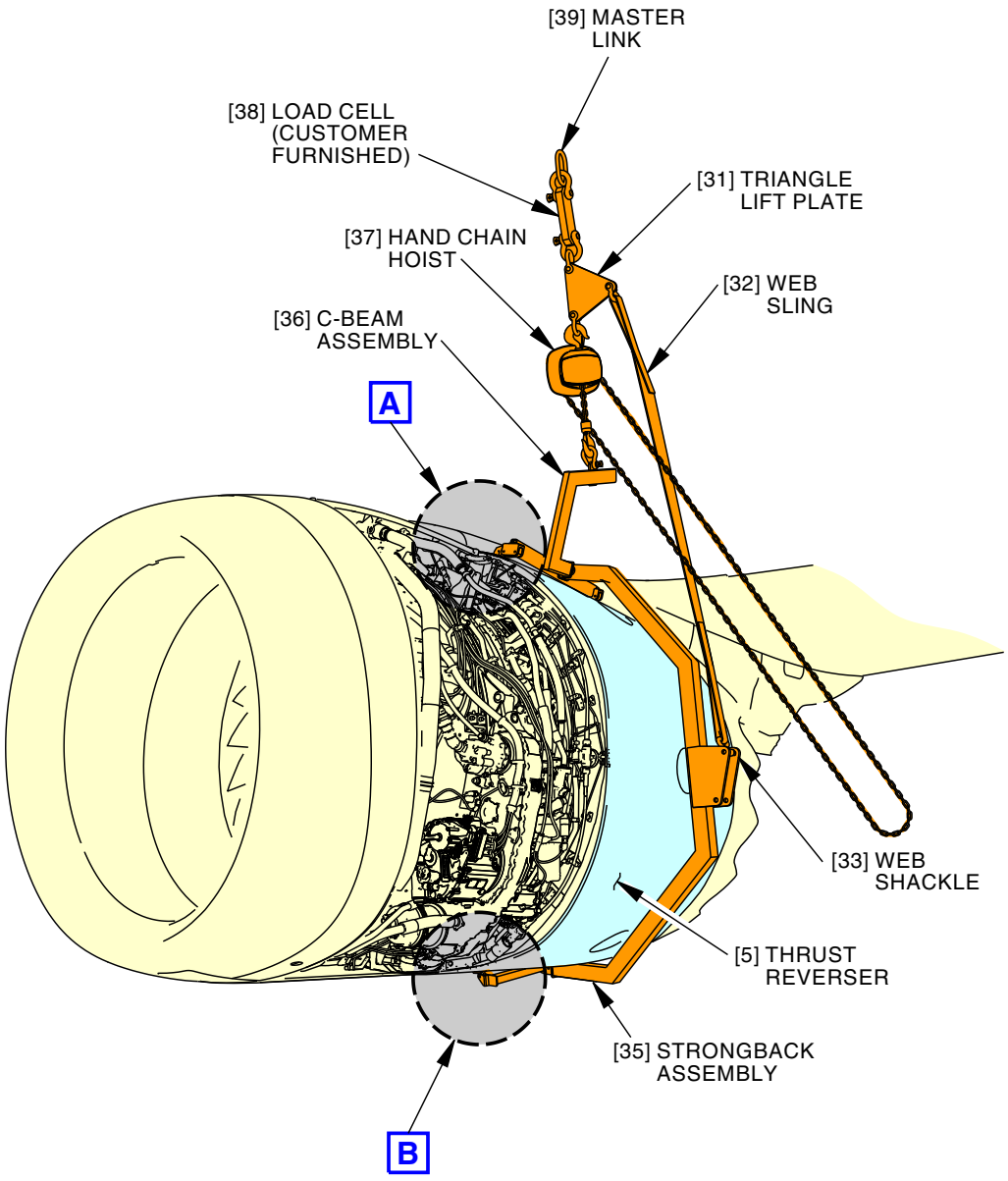
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2480896 S0000582402_V1

Thrust Reverser Lower Hydraulic Actuator
Figure 405/78-31-01-990-816-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

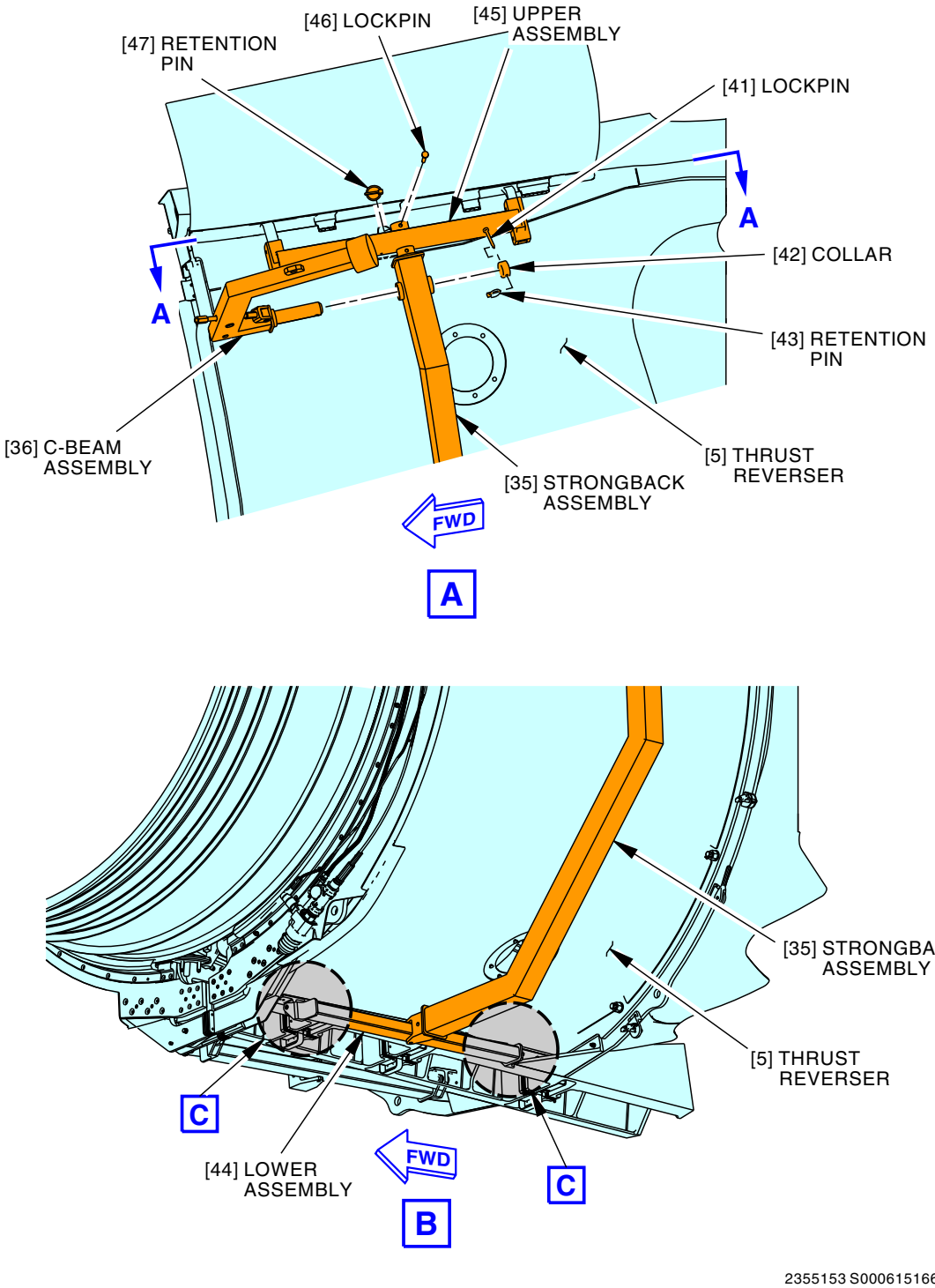


SLING ASSEMBLY WITH OVERHEAD CRANE

2355152 S00061516654_V2

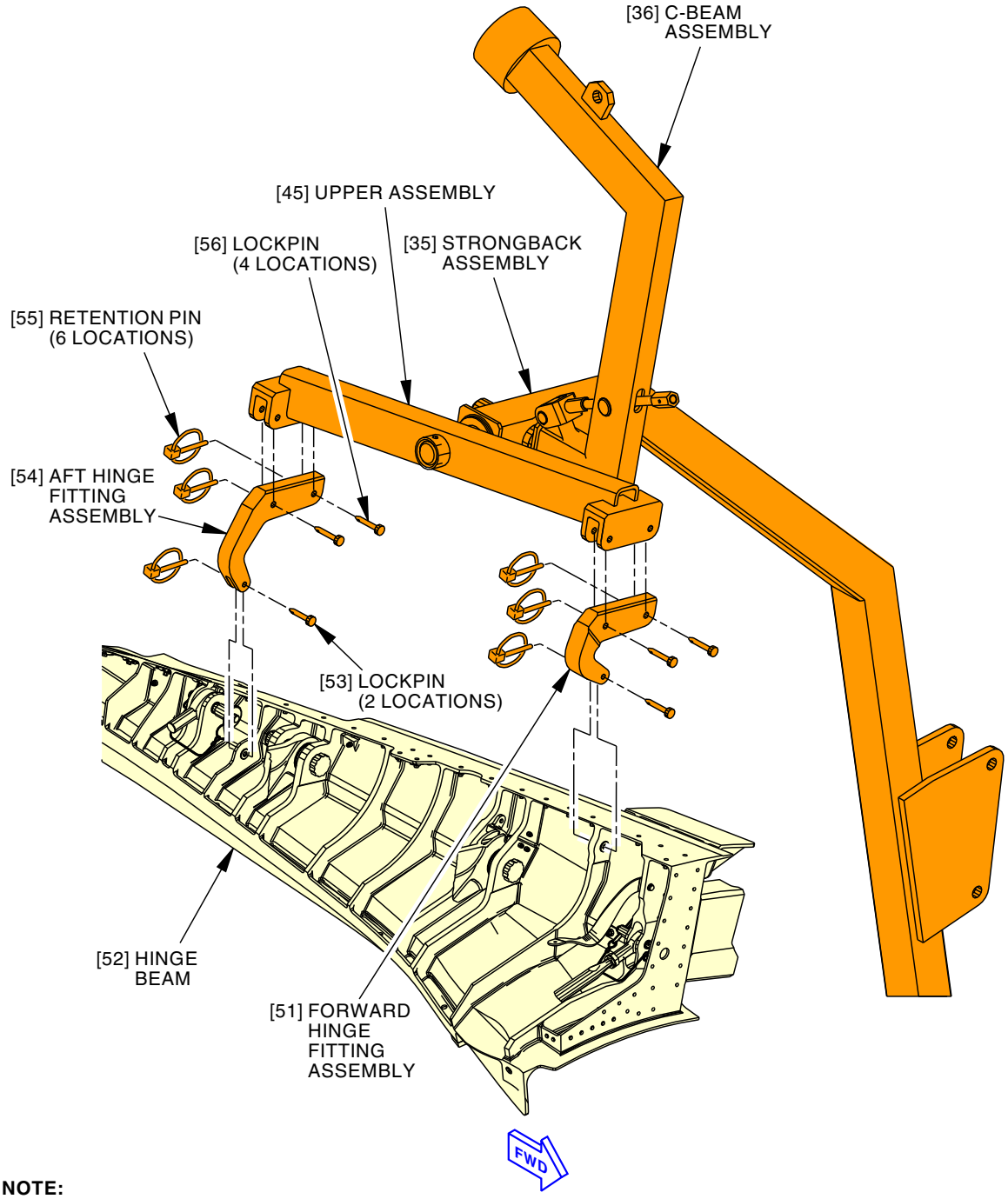
Thrust Reverser (Sling Assembly with Overhead Crane) Installation
Figure 406/78-31-01-990-803-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser (Sling Assembly with Overhead Crane) Installation
Figure 406/78-31-01-990-803-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



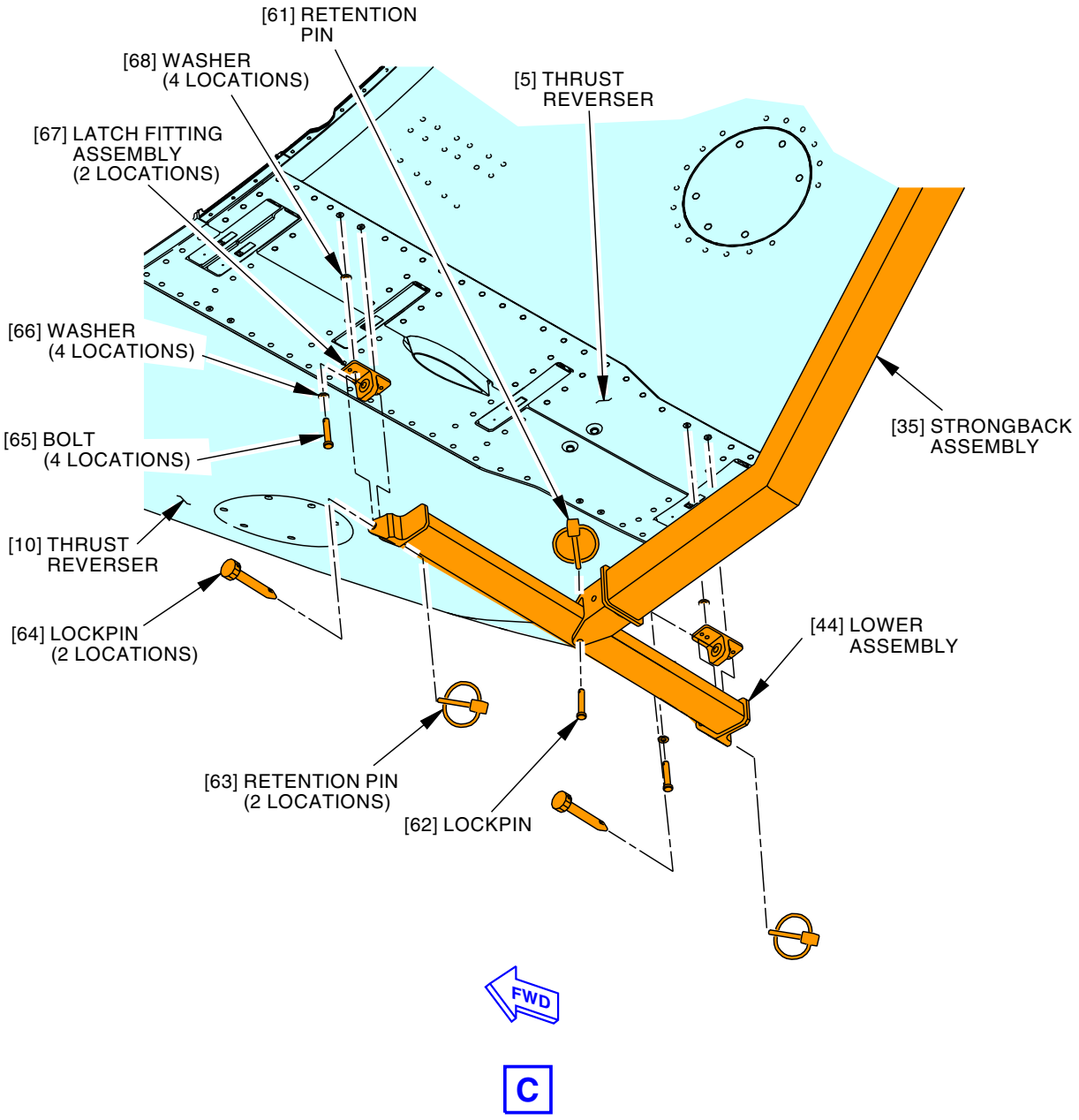
NOTE:

SOME THRUST REVERSER COMPONENTS NOT SHOWN.

2355154 S00061516656_V2

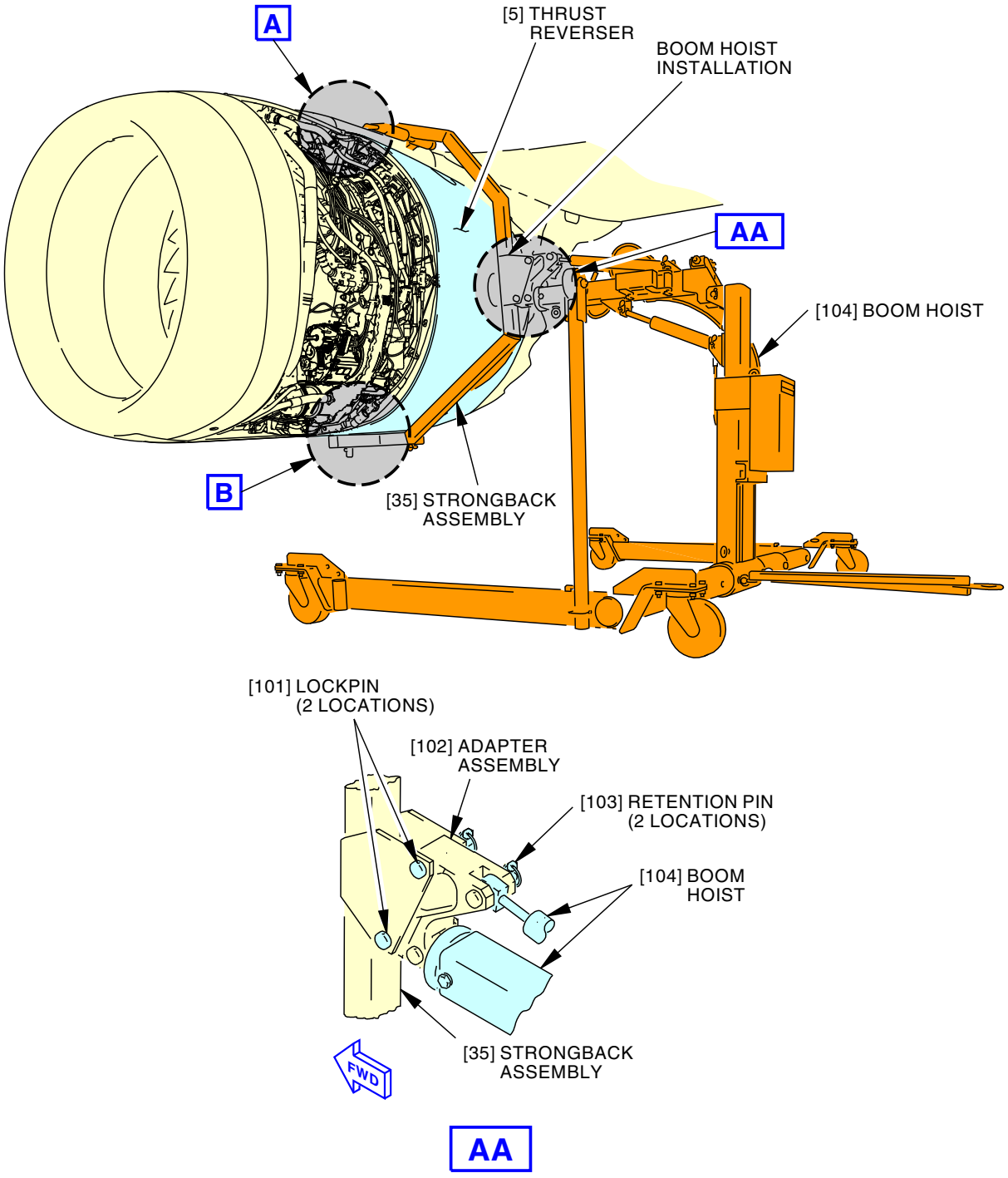
Thrust Reverser (Sling Assembly with Overhead Crane) Installation
Figure 406/78-31-01-990-803-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser (Sling Assembly with Overhead Crane) Installation
Figure 406/78-31-01-990-803-G00 (Sheet 4 of 4)

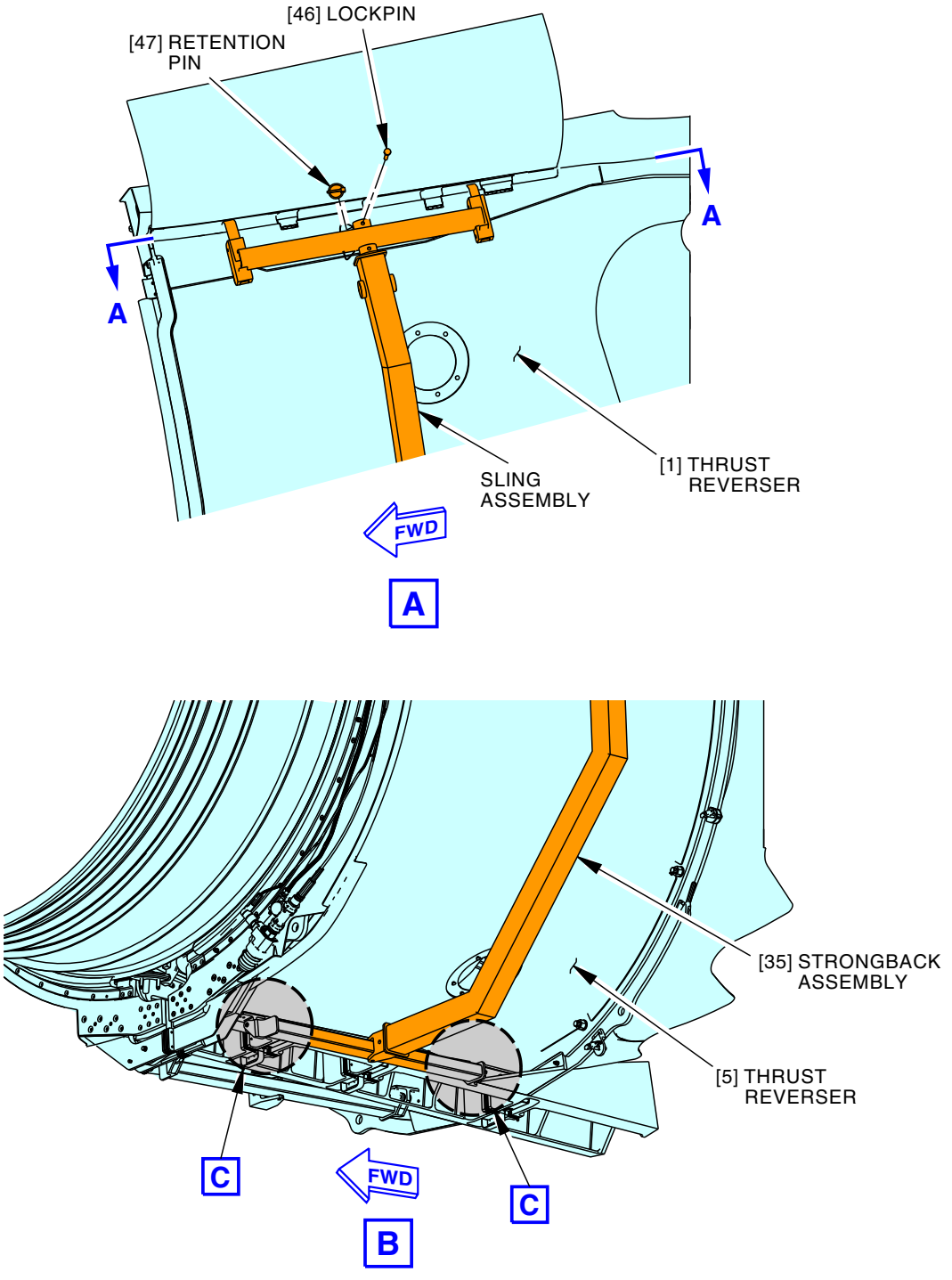
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355156 S00061516658_V2

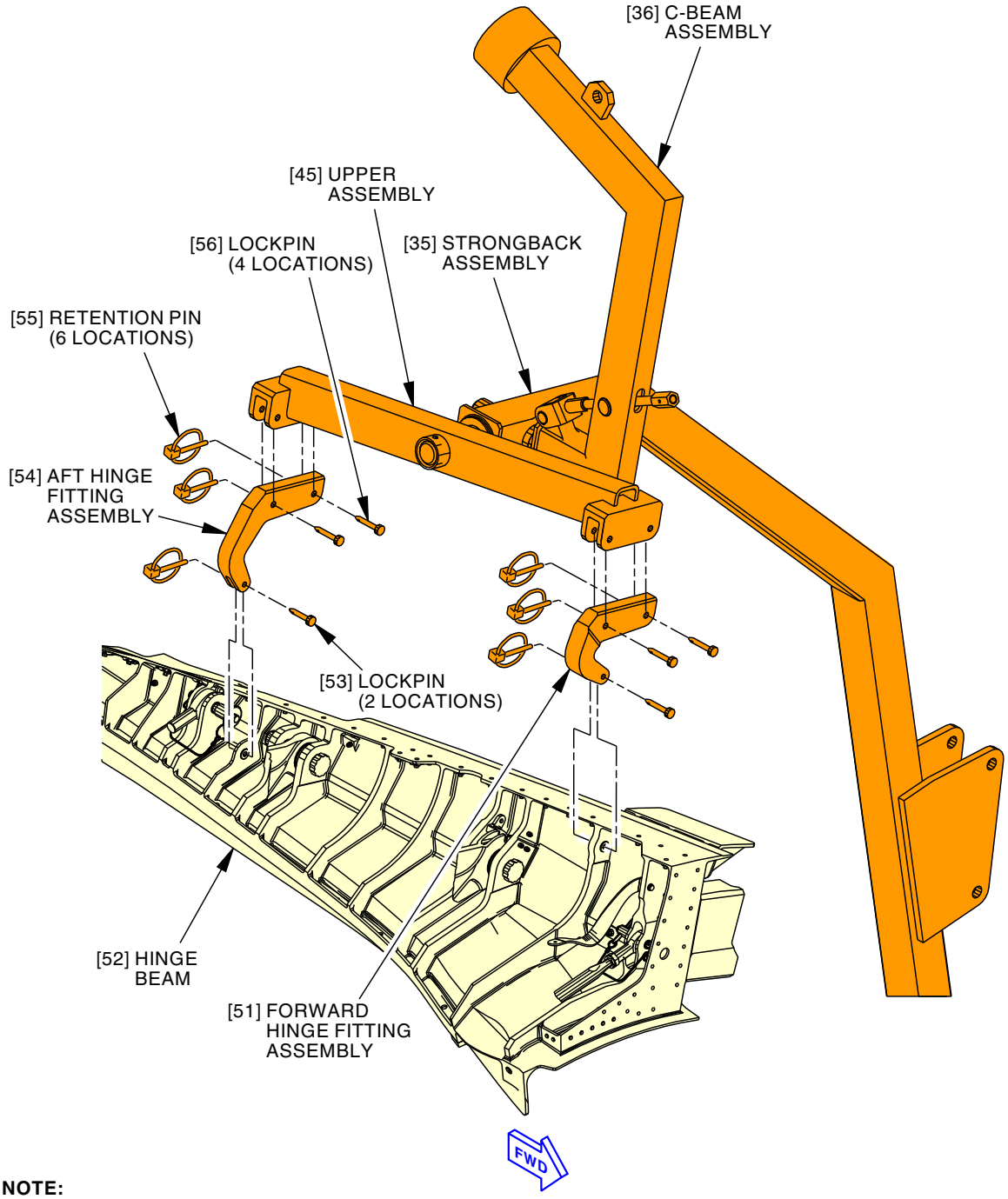
Thrust Reverser (Sling Assembly with Boom Hoist) Installation
Figure 407/78-31-01-990-804-G00 (Sheet 1 of 4)

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Thrust Reverser (Sling Assembly with Boom Hoist) Installation
Figure 407/78-31-01-990-804-G00 (Sheet 2 of 4)

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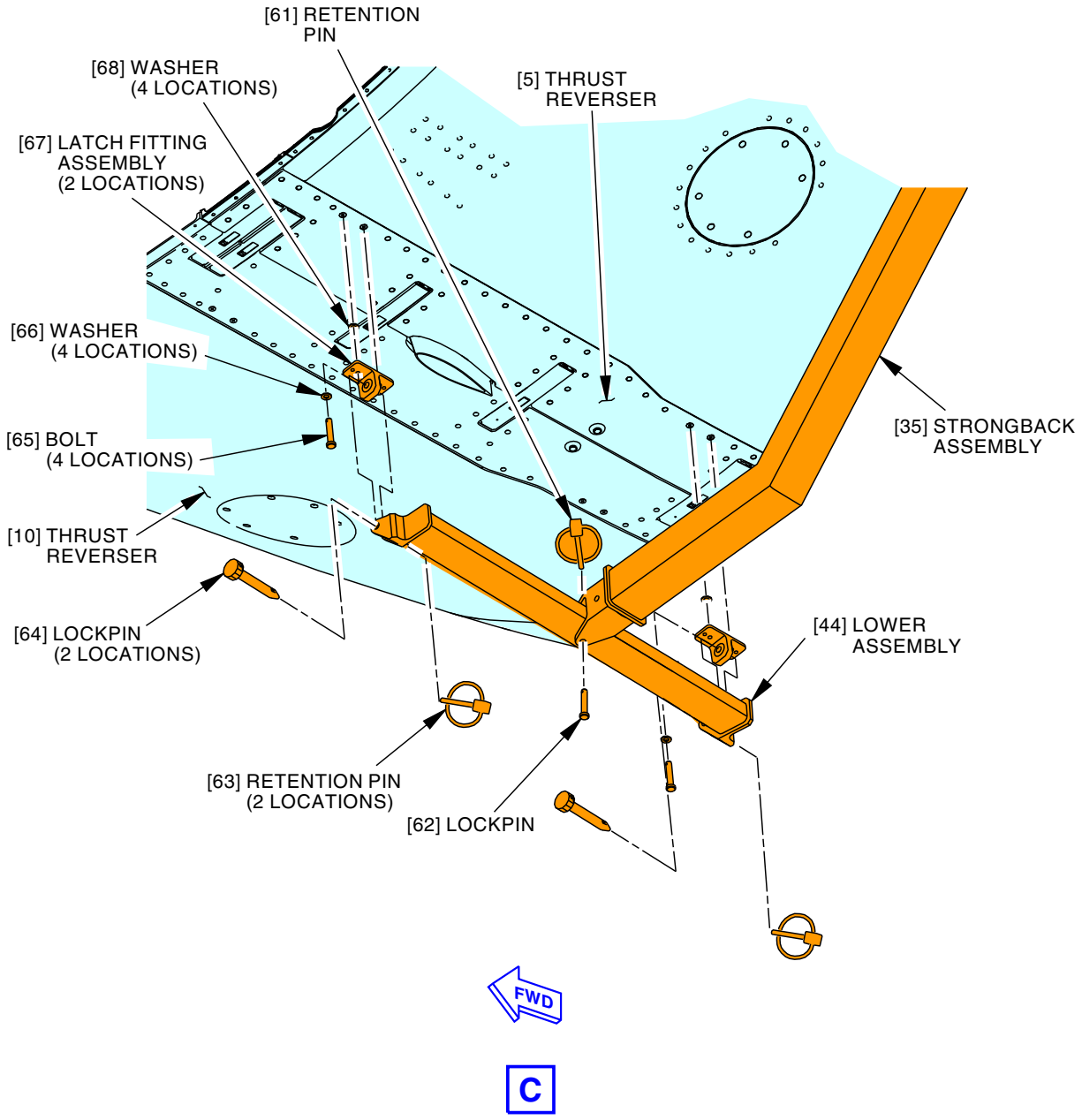
NOTE:

SOME THRUST REVERSER COMPONENTS NOT SHOWN.

2355158 S00061516660_V2

Thrust Reverser (Sling Assembly with Boom Hoist) Installation
Figure 407/78-31-01-990-804-G00 (Sheet 3 of 4)

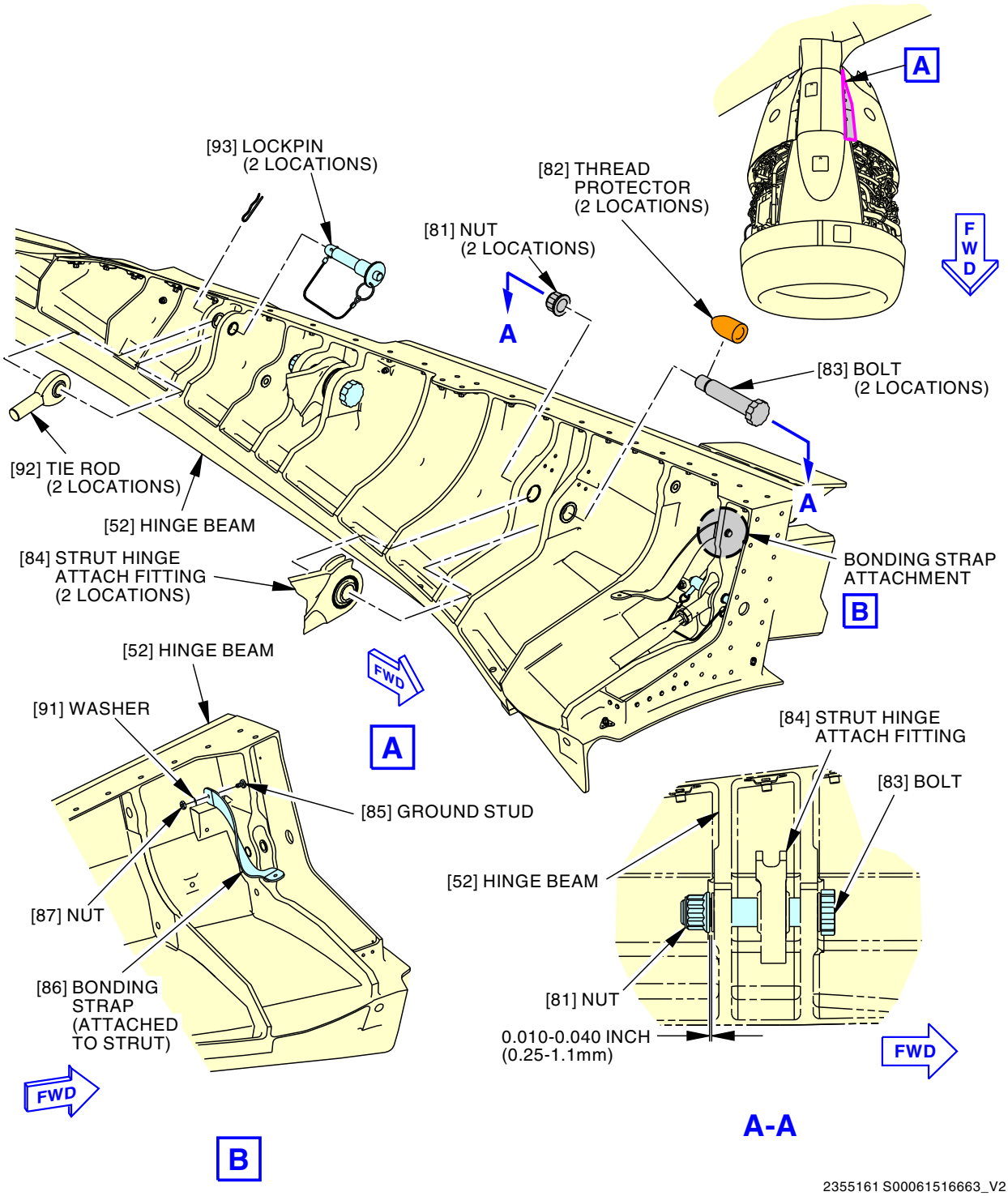
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2355159 S00061516661_V2

Thrust Reverser (Sling Assembly with Boom Hoist) Installation
Figure 407/78-31-01-990-804-G00 (Sheet 4 of 4)

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Thrust Reverser Installation
Figure 408/78-31-01-990-806-G00

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TASK 78-31-01-400-801-G00

3. Thrust Reverser Installation

A. General

(1) This task gives the instructions to install the left or right thrust reverser half.

NOTE: The total acoustic panel blockage for the engine installation must be recalculated when components are changed per SRM SUBJECT 54-00-01.

(2) It is acceptable to have one thrust reverser half with composite inner wall and the other thrust reverser half with titanium inner wall, on the same engine.

(3) You must do the thrust reverser adjustment task after you install the thrust reverser.

NOTE: You must do the thrust reverser adjustment if you re-install the thrust reverser that you removed, or if you install a different thrust reverser.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
54-51-06-000-801	Thrust Reverser Cross Tie Rod Lanyard Removal (P/B 401)
54-51-06-400-801	Thrust Reverser Cross Tie Rod Lanyard Installation (P/B 401)
71-11-04-400-801-G00	Fan Cowl Panels Installation (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-01-280-801-G00	Thrust Reverser Rigging Check (P/B 601)
78-31-01-820-801-G00	Thrust Reverser Adjustment (P/B 501)
78-31-05-000-801-G00	Cascade Removal (P/B 401)
78-31-05-400-801-G00	Cascade Installation (P/B 401)
78-31-09-420-801-G00	Krueger Flap Deflector Installation (P/B 401)
SRM 54-00-01	NACELLES/PYLONS - GENERAL

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). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
SPL-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205

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(Continued)

Reference	Description
SPL-14549	Equipment - Sling, Thrust Reverser, LEAP-1B Engine Part #: C78032-1 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-1095	Crane - Lift, 2000 lb Capacity, 30 Foot Height

D. Consumable Materials

Reference	Description	Specification
A00648	Compound - Retaining - Loctite 242	ASTM D5363 Grp 3 Cl 2 Gd 1 (SUPERSEDES MIL-S-46163)
B50073	Alcohol - Isopropyl	ASTM D 770
D00633	Grease - Aircraft General Purpose	BMS3-33
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50625	Strap - Plastic, Adjustable, Self-locking, 14.40 Inches (365.76 mm) Long	BACS38K3

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

G. Prepare for the Installation

SUBTASK 78-31-01-860-007-G00

(1) Make sure that the thrust reverser you will install is compatible with the engine and airplane.

NOTE: If applicable, refer to the Boeing Service Bulletin for a list of all concurrent requirements.

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SUBTASK 78-31-01-480-005-G00

WARNING THE TOOL WEIGHS APPROXIMATELY 240 POUNDS (109 KG), MAKE SURE THAT THE TOOL IS CORRECTLY ATTACHED TO THE OVERHEAD CRANE. IF YOU DO NOT OBEY THIS INSTRUCTION, THE TOOL CAN FALL AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT ATTACH THE HOIST ASSEMBLY TO THE THRUST REVERSER SLEEVE. STRUCTURAL DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(2) Prepare for the installation of the thrust reverser (Figure 401, Figure 408).

(a) If the left thrust reverser half is to be installed, make sure that the latches are taped in the closed position.

NOTE: This will prevent damage to the latches.

(b) If the thrust reverser sling equipment, SPL-14549, is not installed on the thrust reverser, install it (TASK 78-31-01-000-801-G00).

(c) Make sure that the applicable hinge beam fairings are removed from the thrust reverser that you will install (Figure 401).

1) If it is necessary, remove the applicable hinge beam fairings (TASK 78-31-01-000-801-G00).

(d) Install the thread protectors [82] on the two hinge bolts [83].

NOTE: The thread protectors are part of the GSE equipment and are in the storage box with the GSE thrust reverser sling equipment, SPL-14549.

CAUTION DO NOT APPLY GREASE TO OTHER SURFACES. IF YOU APPLY GREASE TO OTHER SURFACES, IT CAN CAUSE DAMAGE.

(e) Apply grease, D00633, to the shanks of the two hinge bolts [83].

(f) Apply grease, D00633, to the forward and aft lockpins [93].

(g) If the inboard thrust reverser is to be installed using the overhead crane, put a protective mat, STD-585, on the leading edge of the wing to prevent damage to the surface.

NOTE: When the tool and the thrust reverser are put into position, the chain on the chain hoist will hit the leading edge of the wing.

(h) If the fan cowl panels are installed, make sure that the panels are fully open and that the fan cowl panel hold open rods are in place and locked.

1) If it is necessary, open and lock the fan cowl panels in the open position (TASK 78-31-01-000-801-G00).

(i) Make sure that the leading edge flaps and slats devices are retracted and deactivated.

1) If it is necessary, retract and deactivate the leading edge devices (TASK 78-31-01-000-801-G00).

(j) Make sure that the applicable hydraulic system is depressurized and deactivated.

1) If it is necessary, depressurize and deactivate the applicable hydraulic system (TASK 78-31-01-000-801-G00).

(k) Make sure that the applicable circuit breakers are open.

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1) If it is necessary, open the applicable circuit breakers (TASK 78-31-01-000-801-G00).

H. Thrust Reverser Installation

SUBTASK 78-31-01-420-002-G00

WARNING THE THRUST REVERSER WEIGHS APPROXIMATELY 800 POUNDS (363 KG), MAKE SURE THAT THE WEIGHT OF THE THRUST REVERSER IS HELD BY THE TOOL. IF YOU DO NOT OBEY THIS INSTRUCTION, THE THRUST REVERSER CAN FALL AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT YOU MONITOR THE THRUST REVERSER POSITION WHEN YOU MOVE IT AWAY FROM THE STRUT AND ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION, THE THRUST REVERSER CAN HIT THE ADJACENT STRUCTURES AND DAMAGE CAN OCCUR.

CAUTION MAKE SURE THAT THE THRUST REVERSER V-BLADE ALIGNS WITH (AND FULLY ENGAGES), THE V-GROOVE ON THE FAN CASE WHEN YOU INSTALL THE THRUST REVERSER. IF YOU DO NOT ALIGN (AND FULLY ENGAGE), THE V-BLADE AND V-GROOVE, DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(1) Install the thrust reverser half (Figure 408).

(a) Position the thrust reverser half so that the thrust reverser hinge beam [52] is near the strut hinge attach fittings [84].

(b) Put the thrust reverser half into the approximately eight degree open position.

NOTE: At the eight degree open position, it will be easier to install the fasteners.

(c) Make sure that the V-blades on the thrust reverser half and the V-grooves on the engine are aligned.

(d) Align the thrust reverser half with the strut hinge attach fittings [84] at hinge numbers 2 and 3.

1) Make sure that the cams located at hinge number 2 are correctly aligned.

(e) Install the forward hinge bolt [83] into hinge number 2 from the forward side.

(f) Remove the thread protector [82] from the forward hinge bolt [83] and install the nut [81] hand tight.

(g) Install the aft hinge bolt [83] into hinge number 3 from the forward side.

(h) Remove the thread protector [82] from the aft hinge bolt [83] and install the nut [81] hand tight.

(i) Lower the thrust reverser.

1) Make sure that the opening actuator [75] is aligned with the torque box fitting [72].

(j) Remove the thrust reverser sling equipment, SPL-14549, from the thrust reverser (Figure 406, Figure 407).

1) Remove the lockpins [56] and retention pins [55] to disconnect the upper assembly [45] from the forward hinge fitting assembly [51] and the aft hinge fitting assembly [54].

2) Remove the retention pins [63] and lockpins [64] to disconnect the lower assembly [44] from the thrust reverser.

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3) Disconnect the thrust reverser sling equipment, SPL-14549, from the thrust reverser.

4) If you used the overhead crane for installation, remove a protective mat, STD-585, from the leading edge of the wing.

5) Remove the forward and aft latch fitting assemblies [67] from the latch beam:

a) Remove the bolts [65] and washers [66] to remove the aft latch fitting assembly [67] from the latch beam.

b) Remove the bolts [65] and washers [66] to remove the forward latch fitting assembly [67] from the latch beam.

c) Install the four screws where the latch fitting assemblies [67] were attached to the thrust reverser, and torque to 50 ±5 in-lb (5.6 ±0.6 N·m).

6) Remove the forward hinge fitting assembly [51] and aft hinge fitting assembly [54] from the hinge beam [52] (Figure 407, Figure 408).

a) Remove the retention pin [55] from the end of the lockpin [53].

b) Remove the lockpin [53] to disconnect the aft hinge fitting assembly [54] from the hinge beam [52].

c) Remove the retention pin [55] from the end of the lockpin [53].

d) Remove the lockpin [53] to disconnect the forward hinge fitting assembly [51] from the hinge beam [52].

(k) Torque the number 2 and 3 hinge bolts [83] to 600 ±100 in-lb (68 ±12 N·m).

(l) Align the ends of the forward and aft tie rods [92] with the hinge number 1 and hinge number 4 locations on the hinge beam (Figure 408).

1) Install the lockpins [93].

a) If adjustment is needed to install the lockpins [93], do these steps:

<1> Break the Loctite seal on the nuts on the ends of the tie rod assembly.

<2> Clean the tie rod assembly of any remaining locking compound.

<3> Adjust the tie rod by adjusting both ends of the tie rod using the same number of turns for each rod end.

<4> Apply Loctite 242 compound, A00648, to the tie rod end assembly.

<5> Torque the nuts to 102.5 ±2.5 in-lb (11.6 ±0.3 N·m).

b) Install the aft lockpin [93] into hinge no. 4 from the forward side.

c) Install the forward lockpin [93] into hinge no. 1 from the aft side.

d) Make sure that the lockpin [93] ball locks are engaged.

NOTE: When the ball locks are correctly engaged, the lockpin will not pull out of the fitting.

e) Install the retention pins onto the lockpins [93].

(m) If you used the boom hoist to install the thrust reverser, remove the boom hoist, SPL-2430, from the thrust reverser sling equipment, SPL-14549 (Figure 407).

1) Remove the retention pin [61] and the lockpin [62] to disconnect the lower assembly [44] from the bottom fitting on the strongback assembly [35].

2) Remove the retention pin [47] and the lockpin [46] to disconnect the upper assembly [45] from the top fitting on the strongback assembly [35].

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3) Remove the two lockpins [101] and the two retention pins [103] to remove the boom hoist [104] from the strongback assembly [35] handling flange.

(n) If you used an overhead crane to install the thrust reverser, remove the thrust reverser sling equipment, SPL-14549, from the overhead crane (Figure 406).

1) Remove the lockpin [62] and the retention pin [61] to disconnect the lower assembly [44] from the bottom fitting on the strongback assembly [35].

2) Remove the lockpin [46] and the retention pin [47] to disconnect the upper assembly [45] from the top fitting on the strongback assembly [35].

3) Disconnect the web sling [32] from the triangle lift plate [31] and from the strongback assembly [35].

4) Remove the hand chain hoist [37] from the triangle lift plate [31] and from the C-beam assembly [36].

5) Disconnect the master link from the 30 foot height (2000 lb capacity) lift crane, STD-1095.

6) Remove the load cell [38] from the triangle lift plate [31] and from the master link [39].

7) Remove the retention pin [43], lockpin [41] and collar [42] to disconnect the C-beam assembly [36] from the strongback assembly [35].

(o) Attach the thrust reverser opening actuator [75] to the thrust reverser (Figure 403).

CAUTION

DO NOT APPLY GREASE TO OTHER SURFACES. IF YOU APPLY GREASE TO OTHER SURFACES, IT CAN CAUSE DAMAGE.

1) Apply a thin film of grease, D00633, onto the shank of the bolt [76].

2) Remove the adjustable plastic strap, G50625, that secures the opening actuator [75] to the engine.

3) Put the opening actuator [75] into its position on the thrust reverser torque box fitting [72].

4) Install the bolt [76], washer [77], bushing [71], barrel nut [74], and retainer [73] that attaches the actuator to the thrust reverser.

5) Torque the bolt [76] to 350 ±10 in-lb (39.5 ±1.2 N·m).

SUBTASK 78-31-01-410-001-G00

(2) Connect the electrical bonding strap [86] to the hinge beam [52] (Figure 408).

(a) Use alcohol, B50073, or other approved solvent, and a cotton wiper, G00034, to clean the electrical the bonding strap [86], ground stud [85], area around the ground stud, washers [91], and nut [87].

(b) Install the electrical bonding strap [86] onto the ground stud [85].

(c) Install the washer [91] and nut [87].

1) Use a wrench to hold the head of the ground stud [85] fastener so that it will not turn when you torque the nut [87].

2) Torque the nut [87] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

3) Use a intrinsically safe approved bonding meter, COM-1550, to do a check of the electrical resistance between the terminal of the bonding strap [86] and the hinge beam [52] structure.

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a) Make sure that the electrical resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 78-31-01-410-002-G00

WARNING

DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING

MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(3) Connect the thrust reverser retract line flexhose [22] and extend line flexhose [23] (Figure 404).

(a) If hydraulic fitting plugs were installed on the flexhoses, use a hydraulic resistant container to catch the residual hydraulic fluid that is in the flexhoses.

1) Remove the hydraulic fitting plugs.

(b) If cotton wiper, G00034, is around the flexhoses, remove the cloth.

(c) Connect the extend line flexhose [23] to the strut fitting.

1) Torque the extend line flexhose [23] coupling nut to 900 ±45 in-lb (102 ±5 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

(d) Connect the retract line flexhose [22] to the strut fitting.

1) Torque the retract line flexhose [22] coupling nut to 270 ±13 in-lb (30.5 ±1.5 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 270 ±13 in-lb (30.5 ±1.5 N·m).

SUBTASK 78-31-01-410-003-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTIONS ARE NOT DIRTY BEFORE YOU CONNECT OR DISCONNECT THEM. SOLID OR LIQUID CONTAMINATION OF THE ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

(4) Connect the electrical connector [24] and electrical connector [27] to the strut receptacle [25] and strut receptacle [26] (Figure 404):

(a) For the left thrust reverser [5], connect the electrical connector [27], D30002, and electrical connector [24], D30008, to the strut receptacles.

(b) For the right thrust reverser [10], connect the electrical connector [27], D30006, and electrical connector [24], D30010, to the strut receptacles.

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SUBTASK 78-31-01-420-003-G00

(5) Connect the aft cowl cross tie rod [113] to the deflection limiting strap [112] on the applicable thrust reverser half (Figure 402).

(a) Open the applicable thrust reverser half (TASK 78-31-00-010-801-G00).

CAUTION

DO NOT APPLY GREASE TO OTHER SURFACES. IF YOU APPLY GREASE TO OTHER SURFACES, IT CAN CAUSE DAMAGE.

(b) Apply a thin film of grease, D00633, to the shank of the bolt [115].

SIA ALL; AIRPLANES WITHOUT LANYARD

(c) Install the nut [110], bolt [115], bushing [111], and bushing [114] that attach the aft cowl cross tie rod [113] to the deflection limiting strap [112].

SIA ALL; AIRPLANES WITH LANYARD

(d) Install the nut [110], lanyard [118], washer [117], bolt [115], bushing [111], and bushing [114] that attach the aft cowl cross tie rod [113] to the deflection limiting strap [112].

1) If the lanyard [118] is damaged or broken, replace it (TASK 54-51-06-000-801 and TASK 54-51-06-400-801).

SIA ALL

(e) Torque the nut [110] to 320 ±80 in-lb (36 ±9 N·m).

(f) Close the applicable thrust reverser half (TASK 78-31-00-010-802-G00).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-860-008-G00

(1) If a new replacement thrust reverser is installed or a thrust reverser from another engine is installed, look at the part number of the cascade segments to make sure that they are installed in the correct position for the left or right engine.

NOTE: The thrust reversers are interchangeable between engine position, but cascades and Krueger deflectors must be correct for the installation location.

(a) If it is necessary, change the cascade segments to the correct positions for the left or right engine location.

1) Do these tasks:

- Cascade Removal, TASK 78-31-05-000-801-G00.
- Cascade Installation, TASK 78-31-05-400-801-G00.

SUBTASK 78-31-01-410-004-G00

(2) Install the applicable access panels (Figure 401).

(a) If you are installing the inboard thrust reverser on Engine 1, install this access panels:

Number	Name/Location
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1

1) Apply grease, D00633, to the threads of the bolts before you install the bolts.

2) Install 13 bolts [8] in the forward 13 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

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3) Install 12 bolts [1] in the aft 12 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

(b) If you are installing the outboard thrust reverser on Engine 1, install this access panels:

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1

1) Apply grease, D00633, to the threads of the bolts before you install the bolts.

2) Install 13 bolts [7] in the forward 13 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

3) Install 12 bolts [4] in the aft 12 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

(c) If you are installing the inboard thrust reverser on Engine 2, install this access panels:

Number	Name/Location
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2

1) Apply grease, D00633, to the threads of the bolts before you install the bolts.

2) Install 13 bolts [7] in the forward 13 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

3) Install 12 bolts [4] in the aft 12 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

(d) If you are installing the outboard thrust reverser on Engine 2, install this access panels:

Number	Name/Location
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

1) Apply grease, D00633, to the threads of the bolts before you install the bolts.

2) Install 13 bolts [8] in the forward 13 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

3) Install 12 bolts [1] in the aft 12 holes and torque them to 50 ±5 in-lb (5.6 ±0.6 N·m).

(e) Make sure that the lip of the hinge fairing fits under the strut panel.

SUBTASK 78-31-01-430-001-G00

(3) If the inboard thrust reverser was installed, make sure that the Krueger flap deflectors are installed (TASK 78-31-09-420-801-G00).

NOTE: The Krueger flap deflectors are installed on the inboard translating sleeve.

SUBTASK 78-31-01-820-001-G00

(4) If the thrust reverser installed is a replacement thrust reverser, do the thrust reverser adjustment (TASK 78-31-01-820-801-G00).

SUBTASK 78-31-01-730-001-G00

(5) If the thrust reverser was removed and the same thrust reverser was installed, do the thrust reverser rigging check (TASK 78-31-01-280-801-G00).

SUBTASK 78-31-01-410-006-G00

(6) If you removed the fan cowl, reinstall the fan cowl (TASK 71-11-04-400-801-G00).

SUBTASK 78-31-01-860-010-G00

(7) Activate the applicable hydraulic system (TASK 29-11-00-860-801).

(a) For Engine 1, pressurize system A.

(b) For Engine 2, pressurize system B.

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SUBTASK 78-31-01-860-011-G00

(8) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-440-001-G00

(9) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-820-002-G00

(10) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

(a) Move the thrust reverser through a minimum of 4 deploy cycles.

(b) Make sure that the sleeves move smoothly.

(c) Do a check for hydraulic fluid leaks (TASK 29-00-00-790-801).

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-31-01-440-002-G00

(11) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

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THRUST REVERSER - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) An adjustment of the thrust reverser.

TASK 78-31-01-820-801-G00

2. Thrust Reverser Adjustment

(Figure 501 or Figure 502, Figure 503, Figure 504, Figure 505)

A. General

(1) This task gives the instructions to rig and adjust the thrust reverser after installation.

(2) This task is required after thrust reverser replacement and if the thrust reverser rig check is not in limits.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-11-820-801-G00	Latches Adjustment (P/B 501)
78-31-12-000-801-G00	Fire Seal Removal (P/B 401)
78-31-12-400-801-G00	Fire Seal Installation (P/B 401)
78-31-24 P/B 401	BLOCKER DOOR AERO SEAL - REMOVAL/INSTALLATION

C. Tools/Equipment

Reference	Description
STD-1097	Caliper - Vernier, 0-6 inch, Readable to 1/1000 inch
STD-1184	Scale - Spring, 0-100 Lbs, Tension

D. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B50073	Alcohol - Isopropyl	ASTM D 770
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	
D50294	Compound - Antiseize, Pure Nickel Special - Never Seez	BAC5008
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G02020	Clay, Modeling	
G02380	Developer - Inspection - Met-L-Chek D-70	
G02415	Agent - Parting, Paste Wax (Johnson's Paste Wax or equivalent)	
G50092	Compound - Metrology Casting Material - ReproRubber Quick Setting Putty	

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(Continued)

Reference	Description	Specification
G50146	Developer - Non-acqueous - Dubl-Check D-100	SAE AMS2644
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Prepare for the Adjustment

SUBTASK 78-31-01-010-024-G00

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

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G. Thrust Reverser Adjustment

SUBTASK 78-31-01-210-002-G00

(1) Do a check of the six receiver cups [1] on the upper edge of the inner wall on the left and right thrust reverser (View B and View F, Figure 501 or Figure 502).

NOTE: There are three receiver cups on the left thrust reverser and three on the right thrust reverser.

(a) Remove the applicable receiver cup [1].

(b) Make sure that there is one spacer [21] and no spacers [8] under each receiver cup [1].

1) If there is one or more spacers [8] under each receiver cup [1], do these steps:

a) Remove all spacers [8] and spacer [21].

b) Apply Never-Seez NSBT compound, D00006, to the threads of the receiver cup [1].

c) Install the receiver cup [1] with one spacer [21].

d) Tighten the receiver cup [1] to 87.5 ±7.5 in-lb (9.9 ±0.9 N·m).

SUBTASK 78-31-01-820-004-G00

CAUTION

MAKE SURE THAT YOU REMOVE THE WEARPLATE-AND-SHIM COMBINATION. IF YOU DO NOT REMOVE THE WEARPLATE-AND-SHIM COMBINATION, AN INCORRECT CLAY CHECK AND DAMAGE CAN OCCUR TO THE THRUST REVERSER.

(2) Remove the screws [12], washer [33], washers [34] (if applicable), compression pad wear plates [6], and all spacers [11] from the applicable lower TPS retention spacers or inner wall closeout fitting (View E and View G, Figure 501 or Figure 502).

NOTE: There are three compression pads on the left thrust reverser and three on the right thrust reverser. The compression pads are on the lower edge of the inner wall of the thrust reverser.

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(a) Keep the screws [12], washer [33], washers [34] (if applicable), compression pad wear plates [6], and spacers [11] together and record the location from where they were removed for the subsequent installation.

SUBTASK 78-31-01-410-020-G00

(3) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-31-01-820-008-G00

(4) Adjust the thrust reverser centerline and aft cowl side latches.

(a) Measure the closing force 1.0 in. (25.4 mm) from the end of each latch handle.

(b) If it is necessary, adjust the closing force for each latch (TASK 78-31-11-820-801-G00).

SUBTASK 78-31-01-410-018-G00

(5) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

SUBTASK 78-31-01-820-009-G00

(6) Do the V-blade fit up and latch rigging.

NOTE: The radial positions in the steps below coincide with the engine fan strut locations.

(a) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, approximately 0.15 in. (3.81 mm) thick into the outer V-groove at the 45°, 90°, 135°, 225°, 270, and 315° radial positions.

NOTE: The top and bottom 10.5 in. (26.7 cm) approximately of the outer V-Blade is reduced in height. Do not apply clay there. If you do, the results will be in error.

(b) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, a minimum of 0.25 in. (6.35 mm) thick into the inner V-groove at the 30°, 90°, 150°, 210°, 270, and 330° radial positions.

(c) If you will use the clay, G02020, apply a paste wax parting agent, G02415, in the corresponding locations on the outer and inner V-blades of the thrust reverser.

SUBTASK 78-31-01-820-006-G00

(7) Do the upper compression rod and receiver gap verification setup (Figure 501 or Figure 502, Figure 505).

(a) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, approximately 0.40 in. (10.16 mm) thick in each upper compression pad receiver cups on the left thrust reverser half (3 places).

1) Make sure that no air pocket forms in the clay or Reprorubber compound.

(b) If you are using clay, G02020, apply paste wax parting agent, G02415, to the contact area on the left ends of the upper compression rod assemblies.

SUBTASK 78-31-01-200-001-G00

(8) Do the lower compression pad gap verification setup (Figure 501 or Figure 502).

(a) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, approximately 0.30 in. (7.62 mm) thick on the applicable lower TPS retention spacers and inner wall closeout fitting on the left thrust reverser half.

(b) If you are using the clay, G02020, apply paste wax parting agent, G02415, on the contact area on the applicable lower TPS retention spacers and inner wall closeout fitting on the right thrust reverser half.

SUBTASK 78-31-01-970-001-G00

(9) Do the aft cowl cross tie rod verification setup (View D, Figure 501 or Figure 502).

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(a) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, approximately 0.20 in. (5.08 mm) thick on the aft cowl bearing plates on either side of the thrust reverser.

(b) If you are using clay, G02020, apply paste wax parting agent, G02415, to the contact areas on the ends of the aft cowl cross tie rod.

SUBTASK 78-31-01-020-012-G00

(10) Do the fire seal foot print verification setup (Figure 503).

(a) Make sure that the strut, the engine and the thrust reverser fire seals and seal depressors are free of debris.

1) If it is necessary, use a cotton wiper, G00034, and alcohol, B50073, to remove debris.

(b) Apply Met-L-Chek D-70 developer, G02380, or Dubl-Check D-100 developer, G50146, approximately 1.5 in. (38.1 mm) wide along the seal depressors and 12:00 o'clock strut engine seal.

SUBTASK 78-31-01-010-007-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Close and latch the thrust reverser but do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

(a) If you used ReproRubber Quick Setting Putty compound, G50092, make sure that you leave the thrust reverser closed for the manufacturer's recommended setting time.

SUBTASK 78-31-01-010-025-G00

(12) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

SUBTASK 78-31-01-970-002-G00

(13) Measure the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the aft cowl bearing plates.

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the aft cowl bearing plates [13].

(b) Measure the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092.

NOTE: The clay thickness represents the change required in the length of the cross-tie rod.

(c) Make sure that the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, is a minimum of 0.010 in. (0.254 mm) but not more than 0.030 in. (0.7620 mm).

(d) If it is necessary, adjust the length of the cross-tie rod.

1) Remove the lockwire from the cross-tie rod turnbuckles.

2) Loosen the jam nuts on the cross-tie rod turnbuckles.

3) Adjust the cross-tie rod lengths as required.

NOTE: One full turn of the rod with the rod ends restrained will change the overall length by 0.10 in. (2.54 mm).

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4) Tighten the jam nuts to 80 ±5 in-lb (9 ±1 N·m).

5) Install MS20995NC32 lockwire, G50347, on the jam nuts.

SUBTASK 78-31-01-970-003-G00

(14) Measure the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the inner V-groove(Figure 503).

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the inner V-groove at the six locations.

(b) Measure the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, with a vernier caliper (0 - 6 inch, readable to 1/1000 inch), STD-1097.

(c) Record the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the inner V-groove and the location from where you measured.

(d) Make sure that the thickness at each location is as shown in the table below:

Table 501/78-31-01-993-812-G00 Clay Thickness

EDGE ZONE	SECTION	THICKNESS
[A]	A-A	0.020 in. (0.508 mm) to 0.190 in. (4.826 mm)

SUBTASK 78-31-01-970-004-G00

(15) Measure the thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the outer V-groove.

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the outer V-groove at the six locations.

(b) Measure the thickness of each clay, G02020, or ReproRubber Quick Setting Putty compound, G50092.

(c) Record the thickness of each clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the outer V-groove and the location from where you measured.

(d) Calculate the average thickness of the three pieces of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the left thrust reverser half.

(e) Calculate the average thickness of the three pieces of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the right thrust reverser half.

(f) Make sure that the average thickness (clearance) for each side is not more than 0.020 in. (0.508 mm).

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SUBTASK 78-31-01-970-005-G00

(16) If it is necessary, adjust the latch beam wear pad shims as required at the wear plate locations (Figure 501 or Figure 502).

NOTE: Remove wear plate and peel shims as required to adjust the V-blade gap. If necessary, use additional wear plate and peel shims to get the required additional thickness. The total wearplate plus shim stack-up at each location must not exceed a maximum thickness of 0.122 in. (3.099 mm). No finish on shim is required during reinstallation. If chatter is present, install the above shims on the T/R that appears to have the most chatter. Install shims of various thickness under the eight lower latch beam pads with limitations. The maximum shim thickness variation between all eight pads is 0.036 in. (0.914 mm). Maximum shim thickness variation between all two pads common to the same set of latches is 0.018 in. (0.457 mm). Shimming shall be done to load latch beam in one continuous curve and not to load latch beam into a wavy form.

(a) Do the above measurement steps again until all clearances meet the specifications.

SUBTASK 78-31-01-160-003-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(17) Remove all clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, that remains in the inner and outer V-grooves with solvent, B00062.

SUBTASK 78-31-01-970-006-G00

(18) Adjust the upper receiver cups [1] (Figure 505).

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the receiver cup [1].

(b) Use a vernier caliper (0 - 6 inch, readable to 1/1000 inch), STD-1097, to measure the thickness of the impression of the compression rod on the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the receiver cup.

(c) Make sure that the thickness of the impression is a minimum of 0.010 in. (0.254 mm) to a maximum of 0.030 in. (0.762 mm).

(d) If the clearances between the compression rods and receiver cups are in the limits, continue to the steps below to do the lower compression pad adjustment.

(e) If the clearances between the compression rods and receiver cups are not in the limits, do these steps:

1) Calculate the amount of spacers [8] that you will need to adjust the clearances.

NOTE: The thickness of a spacer [11] is 0.016 in. (0.406 mm).

2) Install the spacers [8] at each of the three receiver cups [1] on each thrust reverser half.

a) A maximum of five spacers [8] in addition to one spacer [21] are permitted under the receiver cup [1].

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b) A minimum of one spacer [21] must be under the receiver cup [1].

NOTE: If the number or spacers required are more than the maximum permitted, balance the spacers required on the cup on the opposite side.

c) Install the receiver cups [1], spacer [21] and required number of spacers [8] for the left and right thrust reverser halves. The spacers [8] must be installed between the receiver cups [1] and the spacer [21], if used.

d) Tighten the receiver cups [1] to 87.5 ±7.5 in-lb (9.9 ±0.9 N·m).

e) Install the compression rods.

SUBTASK 78-31-01-820-010-G00

(19) Adjust the lower compression pad.

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the applicable lower TPS retention spacers and inner wall closeout fitting on the left thrust reverser half (Figure 501 or Figure 502).

(b) Use a vernier caliper (0 - 6 inch, readable to 1/1000 inch), STD-1097, to measure the compressed thickness of the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, at the compression pad wear plates [6] on the three compression pads.

NOTE: The clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, thickness represents the wearplate/shim thickness plus the nominal gap required for an acceptable installation.

(c) Make sure that the compressed thickness at each location is a minimum of 0.010 in. (0.254 mm) to a maximum of 0.030 in. (0.762 mm).

NOTE: If the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, minus the corresponding combined compression pad wear plate [6] and spacer [11] thickness is within the gap tolerance band, then the existing thickness of the spacer [11] is satisfactory.

(d) Clean the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the applicable lower TPS retention spacers and inner wall closeout fitting with alcohol, B50073.

(e) If the existing spacer [11] thickness is satisfactory, re-install the compression pad wear plate [6], washer [33], washers [34] (if applicable), and spacer [11] that you removed from the compression pads.

1) Make sure that you re-install the compression pad wear plate [6], washer [33], washers [34] (if applicable), and spacer [11] to the same positions from which they were removed.

2) Make sure that there is no gap between the lower compression pad assembly and lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28].

a) If it is necessary, use a maximum three washers [34] to accommodate differences in TPS thickness.

3) Tighten the lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28] to 40 in-lb (5 N·m) - 50 in-lb (6 N·m).

a) If it is necessary, apply Never Seez, D50294 to the threads of the lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28].

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4) Apply Never-Seez NSBT compound, D00006, on the threads of the screw [12].

5) Tighten the screw [12] to 25 in-lb (3 N·m) - 35 in-lb (4 N·m).

(f) If the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, thickness minus the corresponding compression pad wear plate [6] and spacer [11] thickness is outside the gap tolerance band, then add or subtract spacer [11] as required.

(g) Re-install the compression pad wear plate [6], washer [33], washers [34] (if applicable), and spacer [11] with the screws [12].

(h) Increase or decrease the screws [12] grip length as required based on the number of spacers [11] added or removed.

NOTE: The following table shows an example calculation of determining the necessary adjustments.

Table 502/78-31-01-993-803-G00

Example:	
Measured clay or ReproRubber thickness	0.300
Minus the nominal gap	-0.020
Minus the removed wear plane and spacer thickness	-0.210
Change in spacer thickness required	0.070

1) Make sure that there is no gap between the lower compression pad assembly and lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28].

a) If it is necessary, use a maximum three washers [34] to accommodate differences in TPS thickness.

2) Tighten the lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28] to 40 in-lb (5 N·m) - 50 in-lb (6 N·m).

a) If it is necessary, apply Never Seez, D50294 to the threads of the lower TPS retention spacer #2 [27] or lower TPS retention spacer #1 [28].

3) Apply Never-Seez NSBT compound, D00006, on the threads of the screws [12].

4) Tighten the screw [12] to 25 in-lb (3 N·m) - 35 in-lb (4 N·m).

SUBTASK 78-31-01-211-001-G00

(20) Make sure that the fire/aero compression have an acceptable amount of contact with the seal land.

(a) Examine the areas on the seals where you applied Dubl-Check D-100 developer, G50146, or Met-L-Chek D-70 developer, G02380.

(b) For the seal zone definitions and acceptable seal contact widths, refer to Figure 503, cross sections A-A and B-B.

(c) If a section of the fire seal does not have an acceptable width of the developer (footprint), do the following steps:

1) Apply paste wax parting agent, G02415, on the seal depressor surface.

2) Extend paste wax parting agent, G02415, minimum of 3 in. (7.62 cm) beyond the noted discrepant area.

3) Let the parting agent dry.

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4) Apply a continuous and uniform layer of the sealant, A00160, on the fire seal.
   a) Make sure that layer is not more than 0.25 in. (0.64 cm) inches thick.
   b) Make sure that sealant extends to 1 in. (2.54 cm) in each direction past the discrepant area.
5) Close and latch the thrust reverser (TASK 78-31-00-010-802-G00).
6) Let the sealant fully dry.
7) Open the thrust reverser (TASK 78-31-00-010-801-G00).
8) Remove the parting agent.
9) Make sure that the width of the developer is acceptable.
   a) Do the foot print verification setup to make sure that there are no remaining gaps at the discrepant location (Figure 503).

(d) If the seals do not have acceptable seal contact widths and all of the adjustments above are not in the limits, then replace the fire seals (TASK 78-31-12-000-801-G00, TASK 78-31-12-400-801-G00).

H. Prepare for the Aft Cowl Wear Pad Adjustment

SUBTASK 78-31-01-820-030-G00

(1) At the aft cowl on the right thrust reverser, put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, 0.10 in. (2.54 mm) thick on the wear plate [31].

NOTE: The aft cowl wear plate is on the lower edge at the aft end of the thrust reverser.

(a) Apply paste wax parting agent, G02415, on the aft cowl on the left thrust reverser that will touch the clay.

SUBTASK 78-31-01-820-031-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) In the steps that follow, obey all of the WARNINGS and CAUTIONS in the referenced procedures:

(a) Close and latch the thrust reverser but do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

SIA 006-999; SIA 001-005 PRE SB 737-78-1104

(b) Measure the latch number 7 handle closing force.
   1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.
   2) If the closing force is not in the limits, adjust the handle closing force (Latches Adjustment, TASK 78-31-11-820-801-G00).
      a) Make sure the latch remains closed as you do the adjustment fo the other latches.
   3) If the closing force is in the limits, leave the latch number 7 closed.

(c) Close and measure the latch number 8 and latch number 9 handle closing force.

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SIA 006-999; SIA 001-005 PRE SB 737-78-1104 (Continued)

1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handles to close it.
2) If the closing force is not in the limits, adjust the handle closing force (Latches Adjustment, TASK 78-31-11-820-801-G00).
   a) Leave the latch number 8 and latch number 9 closed.

SIA 001-005 POST SB 737-78-1104

(d) Measure the latch number 7 handle closing force.
1) Make sure that the closing force is 40 lbf (178 N) - 75 lbf (334 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.
2) If the closing force is not in the limits, adjust the handle closing force (Latches Adjustment, TASK 78-31-11-820-801-G00).
   a) Make sure the latch remains closed as you do the adjustment for the other latches.

(e) Close and measure the latch number 8 and latch number 9 handle closing force.
1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handles to close it.
2) If the closing force is not in the limits, adjust the handle closing force (Latches Adjustment, TASK 78-31-11-820-801-G00).
   a) Leave the latch number 8 and latch number 9 closed.

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(f) If you used ReproRubber Quick Setting Putty compound, G50092, make sure that you leave the thrust reverser closed for the manufacturer's recommended setting time.

(g) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

I. Aft Cowl Wear Pad - Adjustment

SUBTASK 78-31-01-820-032-G00

(1) To adjust the clearance between the wear plates [31] at the aft cowl, do the following steps (View H, Figure 501 or Figure 502):
(a) Use a caliper to measure the compressed thickness of the clay at the wear plate [31] on the aft cowl.
1) The limit for clearance between the wear plates [31] is 0.000 +0.100 / -0.000 in. (0.000 +2.540 / -0.000 mm).

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

> **WARNING** DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Remove the clay from the wear plates [31] and clean off the clay residue with solvent, B00062.

(c) If the clearance between the wear plates [31] at the aft cowl is in the limit, no further action is required.

SIA 006-999; SIA 001-005 PRE SB 737-78-1104

(d) If the clearance between the wear plates [31] at the aft cowl is not in the limit, do this step:

1) Re-adjust the aft cowl center latch (number 7) to a higher closing force 40 lbf (178 N) - 70 lbf (311 N) to decrease the clearance between the wear plates [31] at the aft cowl (Latches Adjustment, TASK 78-31-11-820-801-G00).

SIA 001-005 POST SB 737-78-1104

(e) If the clearance between the wear plates [31] at the aft cowl is not in the limit, do this step:

1) Re-adjust the aft cowl center latch (number 7) to a higher closing force 40 lbf (178 N) - 75 lbf (334 N) to decrease the clearance between the wear plates [31] at the aft cowl (Latches Adjustment, TASK 78-31-11-820-801-G00).

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

J. Thrust Reverser Adjustment

SUBTASK 78-31-01-210-007-G00

(1) Do a check of the six receiver cups [1] on the upper edge of the inner wall on the left and right thrust reverser (View B, Figure 501 or Figure 502).

NOTE: There are three receiver cups on the left thrust reverser and three on the right thrust reverser.

NOTE: Airplanes can have spacers that are 0.8750 in. (22.23 mm) diameter or 2.0000 in. (50.8 mm) in diameter.

(a) Remove the applicable receiver cup [1].

(b) Make sure that there is one spacer [21] under each receiver cup [1].

1) If there is more than one 0.8750 in. (22.23 mm) spacer [21] under each receiver cup [1], do these steps:

a) Remove the receiver cup [1] and all spacers [21].

b) Record the amount of the spacers [21] that are removed and their location for the subsequent installation.

c) Apply Never-Seez NSBT compound, D00006, to the threads of the receiver cup [1].

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

d) Install the receiver cup [1] with one spacer [21].

e) Make sure that the outside diameter of the receiver cup [1] with a 0.8750 in. (22.23 mm) diameter is aligned with the outside diameter of the spacer [21] 0.8750 ±0.0100 in. (22.225 ±0.254 mm).

f) Tighten the receiver cup [1] to 87.5 ±7.5 in-lb (9.9 ±0.9 N·m).

2) If there is more than one 2.0000 in. (50.8 mm) spacer [21] under each receiver cup [1], do these steps:

a) Remove the receiver cup [1] and all but one spacer [21].

NOTE: The spacer against the receiver cup fitting will stay in its position, because there is sealant on the surface of the spacer that is adjacent to the receiver cup fitting.

b) Record the amount of the spacers [21] that are removed and their location for the subsequent installation.

c) Make sure that the spacer [21] against the receiver cup fitting is in its position.

d) Install the receiver cup [1].

e) Tighten the receiver cup [1] to 87.5 ±7.5 in-lb (9.9 ±0.9 N·m).

SUBTASK 78-31-01-820-011-G00

(2) Remove the screws [12], compression pad wear plates [6] and all spacers [11] from the applicable inner wall, (View E, Figure 501 or Figure 502).

NOTE: There are three compression pads on the left thrust reverser and three on the right thrust reverser. The compression pads are on the lower edge of the inner wall of the applicable thrust reverser.

(a) Keep the screws [12], compression pad wear plates [6] and all spacers [11] together and record the location from where they were removed for the subsequent installation.

SUBTASK 78-31-01-820-012-G00

(3) Remove the two bolts [30], wear plate [31], and spacers [32] from the wear pad on the lower edge of the aft cowl on the left thrust reverser.

(a) Keep the two bolts [30], wear plate [31] and spacers [32] together for the subsequent installation.

K. Prepare for the V-blade to V-groove Clearance and Latch Beam Wear Plate Adjustment

SUBTASK 78-31-01-820-013-G00

(1) Put a piece of clay, G02020, 0.15 in. (3.81 mm) thick into the outer V-groove on the fan frame at the 1:00, 2:00, 4:00, 5:00, 7:00, 8:00, 10:00 and 11:00 o'clock positions (Figure 501 or Figure 502).

NOTE: These positions are the same as the engine fan strut locations.

(a) Apply paste wax parting agent, G02415, on the outer V-blade areas on the thrust reverser where the clay will touch.

SUBTASK 78-31-01-820-014-G00

(2) Put a piece of clay, G02020, not less than 0.25 in. (6.35 mm) thick into the inner V-groove on the engine extension ring at the 1:00, 2:00, 4:00, 5:00, 7:00, 8:00, 10:00 and 11:00 o'clock positions.

NOTE: These positions are the same as the engine fan strut locations.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

(a) Apply paste wax parting agent, G02415, on the inner V-blade areas on the thrust reverser where the clay will touch.

SUBTASK 78-31-01-410-022-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) In the steps that follow, obey all of the WARNINGS and CAUTIONS in the referenced procedures (Figure 501 or Figure 502):

(a) Close and latch the thrust reverser; but, do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

1) Make sure that the tension latches have a closing force of 50 ±10 lbf (222 ±45 N) .

a) If the closing force is not in the limits, do this task: Latches Adjustment, TASK 78-31-11-820-801-G00.

(b) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

L. V-blade to V-groove Clearance and Latch Beam Wear Plate Clearance Adjustment

SUBTASK 78-31-01-820-015-G00

(1) Do these steps to adjust the clearance between the V-blades and V-grooves (Figure 501 or Figure 502, Figure 504):

(a) For the inner V-groove, use a caliper to measure the compressed thickness of the clay at the six locations.

1) Make sure that you record the thickness of the compressed clay and the location from where you measured.

2) At each radial location, the limit for the inner V-groove to V-blade clearance is as shown in the table below:

Table 503/78-31-01-993-811-G00 Inner V-groove Clearance

EDGE ZONE	SECTION	CLEARANCE
[A]	A-A	0.0200 in. (0.51 mm) to 0.190 in. (4.83 mm)

(b) For the outer V-groove, use a caliper to measure the compressed thickness of the clay at the eight locations.

1) Make sure that you record the thickness of the compressed clay and the location from where you measured.

2) For each thrust reverser, calculate the average of the four clay thickness measurements.

3) The limit for the outer V-groove to V-blade average clearance is 0.000 in. (0.00 mm) to 0.020 in. (0.508 mm).

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

> **WARNING** DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Remove the clay from the inner and outer V-groove and clean off the clay residue with solvent, B00062.

(d) If the clearance between the V-grooves and V-blades are in the limits, continue at the steps below to prepare for the compression rod, compression pad, and aft cowl wear pad adjustment.

(e) If the clearance between the V-grooves and V-blades are not in the limits, do these steps:

1) Adjust the wear plate shims [10] at the eight latch beam wear plate locations.

a) Remove the screws [9] that attach the latch beam wear plate [5] and shims [10] to the latch beam.

<1> If it is necessary, remove the screws [9], nut [38], washer [37], and screw [36] that attach the latch beam wear plate [35] and shims [10] to the latch beam.

b) Peel the shims [10] to decrease the clearance or replace the shims [10] to increase the clearance.

<1> Maximum shims [10] thickness between all eight pads is 0.036 in. (0.91 mm).

<2> Maximum shims [10] thickness between any two pads common to the same set of latches is 0.018 in. (0.46 mm).

<3> Shim the latch beam in one continuous curve and not into a wavy form.

NOTE: A continuous curve will make sure that the sleeves operate smoothly.

c) Re-install the latch beam wear plate [5], shims [10], and screws [9].

<1> If it is necessary, re-install the latch beam wear plate [35], shims [10], screws [9], screw [36], washer [37], and nut [38].

2) Do the clay check again and adjust the shims [10] until the V-groove to V-blade clearance is correct.

a) After the V-groove to V-blade clearance is correct, make sure that when the thrust reverser is closed and latched that the latch beam wear plate [5] and latch beam wear plate [35] shim gap is 0.000 in. (0.00 mm).

M. Prepare for the Compression Rod, Compression Pad and Aft Cowl Wear Pad Adjustment

SUBTASK 78-31-01-820-016-G00

(1) Put a piece of clay, G02020, 0.40 in. (10.16 mm) thick in the three compression rod receiver cups [1] on the left thrust reverser (Figure 505).

NOTE: The three compression receiver cups are on the upper edge of the thrust reverser.

(a) Apply paste wax parting agent, G02415, on the end of the compression rod that will touch the clay.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

SUBTASK 78-31-01-820-017-G00

(2) At the three compression pads on the right thrust reverser, put a piece of clay, G02020, 0.30 in. (7.62 mm) thick on the compression pad wear plates [6].

NOTE: The three compression pads are on the lower edge of the thrust reverser.

(a) Apply paste wax parting agent, G02415, on the compression pads on the left thrust reverser that will touch the clay.

SUBTASK 78-31-01-820-018-G00

(3) At the aft cowl on the right thrust reverser, put a piece of clay, G02020, 0.10 in. (2.54 mm) thick on the wear plate [31].

NOTE: The aft cowl wear plate is on the lower edge at the aft end of the thrust reverser.

(a) Apply paste wax parting agent, G02415, on the aft cowl on the left thrust reverser that will touch the clay.

SUBTASK 78-31-01-410-023-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) In the steps that follow, obey all of the WARNINGS and CAUTIONS in the referenced procedures:

(a) Close and latch the thrust reverser but do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

(b) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

N. Compression Rod - Adjustment

SUBTASK 78-31-01-750-001-G00

(1) To adjust the clearance of the compression rod to the receiver cup [1], do the following steps (Figure 505):

(a) Use a caliper to measure the compressed thickness of the clay at the three receiver cups [1].

1) Make sure that you record the thickness of the compressed clay and location from where you measured.

2) The limits for the compression rod to the three receiver cups [1] clearance are as follows:

a) For compression rod no. 1 [16] (forward), the limit is 0.010 in. (0.254 mm) to 0.040 in. (1.016 mm).

b) For compression rod no. 2 [15] (middle) and compression rod no. 3 [17] (aft), the limit is 0.020 in. (0.508 mm) to 0.050 in. (1.270 mm).

(b) Remove the clay from the receiver cups [1].

(c) If the clearance between the compression rods and the receiver cups [1] are in the limits, continue at the steps below to do the compression pad adjustment.

(d) If the clearance between the compression rods and receiver cups [1] is not in the limits, do these steps:

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

1) Remove the receiver cups [1] and spacers [21] from the left and right thrust reversers.

NOTE: If the airplane has 2.000 in. (50.8 mm) diameter spacers, the spacer against the receiver cup fitting will stay in its position, because there is sealant on the surface of the spacer that is adjacent to the receiver cup fitting.

a) If the spacer that is 2.000 in. (50.8 mm) in diameter does not have sealant, clean the spacer and receiver cup surfaces that will touch with solvent, B00062, and fay seal with sealant, A00160.

2) Calculate the amount of spacers [21] that are necessary to adjust the clearance.

NOTE: The thickness of a spacer is 0.016 in. (0.406 mm).

3) Install half of the spacers [21] at the receiver cup [1] on the left thrust reverser and half at thereceiver cup [1] on the right thrust reverser.

a) Make sure that there is at least one spacer [21] under each receiver cup [1] but, no more than seven.

b) Make sure that the outside diameter of the receiver cup [1] with a 0.8750 in. (22.23 mm) diameter is aligned with the outside diameter of the spacer [21] 0.8750 ±0.0100 in. (22.225 ±0.254 mm).

c) Make sure that the spacer with the 2.000 in. (50.8 mm) diameter that is against the receiver cup fitting has sealant.

d) Apply Never-Seez NSBT compound, D00006, on the threads of the receiver cup [1].

e) Tighten the receiver cup [1] to 80 in-lb (9.04 N·m) - 95 in-lb (10.73 N·m).

O. Compression Pad Adjustment

SUBTASK 78-31-01-820-019-G00

(1) To adjust the compression pad clearance, do the following steps (Figure 505):

(a) Use a caliper to measure the compressed thickness of the clay at the compression pad wear plates [6] on the three compression pads.

1) Make sure that you record the thickness of the compressed clay and location from where you measured.

2) The limit for the clearance between the compression pad wear plates [6] on the compression pads is 0.030 +0.020 / -0.000 in. (0.762 +0.508 / -0.000 mm).

3) Calculate the spacer [11] thickness that is necessary.

Table 504/78-31-01-993-804-G00

Example:		
Measured clay thickness		0.300
Minus removed wear plate and spacer thickness		-0.210
Minus the nominal gap		-0.030
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Change in spacer thickness	-0.000/+0.020	0.060

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

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(b) Remove the clay from the compression pad wear plates [6] on the compression pads and clean off the clay residue with solvent, B00062.

(c) If the clearance between the compression pad wear plates [6] on the compression pads is in the limit, do these steps:

1) Re-install the spacers [11], compression pad wear plates [6], and screws [12] that were removed in the previous steps.

a) Apply Never-Seez NSBT compound, D00006, on the threads of the screws [12].

b) Tighten the screws [12] to 25.0 in-lb (2.82 N·m) - 35.0 in-lb (3.95 N·m).

(d) If the clearance between the compression pads is not in the limit, do these steps:

1) Remove or add the change (calculated and recorded above) to the spacers [11] that were removed to get the correct clearance.

2) Install the spacers [11], compression pad wear plates [6], and screws [12].

a) Apply Never-Seez NSBT compound, D00006, on the threads of the screws [12].

b) Tighten the screws [12] to 25.0 in-lb (2.82 N·m) - 35.0 in-lb (3.95 N·m).

P. Aft Cowl Wear Pad - Adjustment

SUBTASK 78-31-01-820-020-G00

(1) Do these steps to adjust the clearance between the wear plates [31] at the aft cowl (Figure 501 or Figure 502):

SIA 006-999; SIA 001-005 PRE SB 737-78-1104

(a) Measure the latch number 7 handle closing force.

1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

2) If the closing force is not in the limits, adjust the handle closing force (TASK 78-31-11-820-801-G00).

a) Make sure the latch remains closed as you do the adjustment for the other latches.

3) If the closing force is in the limits, leave the latch number 7 closed.

(b) Close and measure the latch number 8 and latch number 9 handle closing force.

1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

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SIA 006-999; SIA 001-005 PRE SB 737-78-1104 (Continued)

2) If the closing force is not in the limits, adjust the handle closing force (TASK 78-31-11-820-801-G00).

a) Leave the latch number 8 and latch number 9 closed.

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(c) Measure the latch number 7 handle closing force.

1) Make sure that the closing force is 40 lbf (178 N) - 75 lbf (334 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

2) If the closing force is not in the limits, adjust the handle closing force (TASK 78-31-11-820-801-G00).

a) Make sure the latch remains closed as you do the adjustment for the other latches.

3) If the closing force is in the limits, leave the latch number 7 closed.

(d) Close and measure the latch number 8 and latch number 9 handle closing force.

1) Make sure that the closing force is 40 lbf (178 N) - 60 lbf (267 N) with a spring scale (0-100 Lbs), STD-1184 no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

2) If the closing force is not in the limits, adjust the handle closing force (TASK 78-31-11-820-801-G00).

a) Leave the latch number 8 and latch number 9 closed.

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(e) Use a caliper to measure the compressed thickness of the clay at the wear plate [31] on the aft cowl.

1) The limit for clearance between the wear plates [31] is 0.000 +0.100 / -0.000 in. (0.000 +2.540 / -0.000 mm).

WARNING

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(f) Remove the clay from the wear plates [31] and clean off the clay residue with solvent, B00062.

(g) If the clearance between the wear plates [31] at the aft cowl is in the limit, no further action is required.

SIA 006-999; SIA 001-005 PRE SB 737-78-1104

(h) If the clearance between the wear plates [31] at the aft cowl is not in the limit, do this step:

1) Re-adjust the aft cowl center latch (number 7) to a higher closing force 40 lbf (178 N) - 70 lbf (311 N) to decrease the clearance between the wear plates [31] at the aft cowl (TASK 78-31-11-820-801-G00).

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SIA 001-005 POST SB 737-78-1104

(i) If the clearance between the wear plates [31] at the aft cowl is not in the limit, do this step:

1) Re-adjust the aft cowl center latch (number 7) to a higher closing force 40 lbf (178 N) - 75 lbf (334 N) to decrease the clearance between the wear plates [31] at the aft cowl (TASK 78-31-11-820-801-G00).

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SUBTASK 78-31-01-820-021-G00

(2) If adjustments were made to the compression rod or compression pad, do a clay rig check again.

Q. Prepare for the Fireseal and Aero Seal Compression Check

SUBTASK 78-31-01-820-022-G00

WARNING

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(1) Clean the fire seals [4] on the left and right thrust reverser and the areas on the strut, engine and lower edge of the right thrust reverser that the fire seals [4] will compress against with solvent, B00062 (Figure 504).

SUBTASK 78-31-01-820-023-G00

(2) Clean the aero seals [29] on the left and right thrust reverser and clean the aft edge of the outer V-groove on the fan case that the aero seal [29] will compress against with solvent, B00062 (Figure 501 or Figure 502).

SUBTASK 78-31-01-820-028-G00

(3) Apply Met-L-Chek D-70 developer, G02380, or Dubl-Check D-100 developer, G50146, approximately 2.00 in. (50.8 mm) wide on the areas on the strut, engine and lower edge of the right thrust reverser where the fire seals [4] will touch.

SUBTASK 78-31-01-820-024-G00

(4) Apply Met-L-Chek D-70 developer, G02380, approximately 2.00 in. (50.8 mm) wide on the aft edge of the outer V-groove where the aero seal [29] will touch.

SUBTASK 78-31-01-820-025-G00

(5) Make sure that the developer is dry before the thrust reverser is closed.

NOTE: The developer becomes a white powder with a dull finish when it is dry.

SUBTASK 78-31-01-410-024-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) In the steps that follow, obey all of the WARNINGS and CAUTIONS in the referenced procedures:

(a) Close and latch the thrust reverser, but, do not do the thrust reverser or leading edge activation at this time Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

(b) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

R. Fireseal - Adjustment

SUBTASK 78-31-01-820-026-G00

(1) Measure the width of the developer that is on the fire seals [4], (Figure 504).

(a) Make sure that the minimum width of the developer is 0.35 in. (8.89 mm) along the full length of the fire seals [4].

(b) If the above limit is not met, use the steps below to measure the developer in each section:

1) Divide the fire seal [4] into three sections as follows:

a) The fire seal [4] on the upper edge of a thrust reverser where it compresses against the strut is one section.

b) The fire seal [4] on the forward edge of a thrust reverser where it compresses against the engine is another section.

c) The fire seal [4] on the lower edge of the left thrust reverser where it compresses against the lower edge of the right thrust reverser is another section.

2) For each section, areas where the developer is 0.20 in. (5.08 mm) to 0.35 in. (8.89 mm) wide is permitted with these condition:

a) The length of each area is not more than 1.50 in. (38.1 mm).

b) The total length of all areas is not more than 3.00 in. (76.2 mm).

3) For each section, areas where the developer is less than 0.20 in. (5.08 mm) wide is permitted with these conditions:

a) The length of each area is not more than 0.25 in. (6.35 mm).

b) The total length of all areas is not more than 1.00 in. (25.4 mm).

4) If a section of the fire seal does not have an acceptable width of the developer (footprint), do the following steps:

a) Apply paste wax parting agent, G02415, on the seal depressor surface.

b) Extend paste wax parting agent, G02415, minimum of 3 in. (7.62 cm) beyond the noted discrepant area.

c) Let the parting agent dry.

d) Apply a continuous and uniform layer of the sealant, A00160, on the fire seal.

<1> Make sure that layer is not more than 0.25 in. (6.35 mm) thick.

<2> Make sure that sealant extends to 1 in. (2.54 cm) in each direction past the discrepant area.

e) Close and latch the thrust reverser (TASK 78-31-00-010-802-G00).

f) Let the sealant fully dry.

g) Open the thrust reverser (TASK 78-31-00-010-801-G00).

h) Remove the parting agent.

i) Make sure that the width of the developer is acceptable.

<1> Do the foot print verification setup to make sure that there are no remaining gaps at the discrepant location.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

5) If the fire seal [4] compression is not in the limits and all of the adjustments above are not in the limits, then replace the worn fire seal [4] (TASK 78-31-12-000-801-G00, TASK 78-31-12-400-801-G00).

S. Aero Seal - Adjustment

SUBTASK 78-31-01-820-027-G00

(1) Measure the width of the developer that is on the aero seal [29] on the left and right thrust reversers, (Figure 501 or Figure 502).

(a) Make sure that the minimum width of the developer is 0.35 in. (8.89 mm) for the full length of the aero seal [29] on each thrust reverser.

(b) Areas where the developer is 0.20 in. (5.08 mm) to 0.35 in. (8.89 mm) wide are permitted with this condition:

1) The total length of all areas on each thrust reverser is not more than 10.0 in. (254.0 mm).

(c) If the aero seal [29] is not in the limits, replace the aero seal [29], (BLOCKER DOOR AERO SEAL - REMOVAL/INSTALLATION, PAGEBLOCK 78-31-24/401).

SUBTASK 78-31-01-410-025-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURES TO OPEN AND CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

NOTE: It is not necessary to clean off the developer.

SIA ALL

T. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-710-002-G00

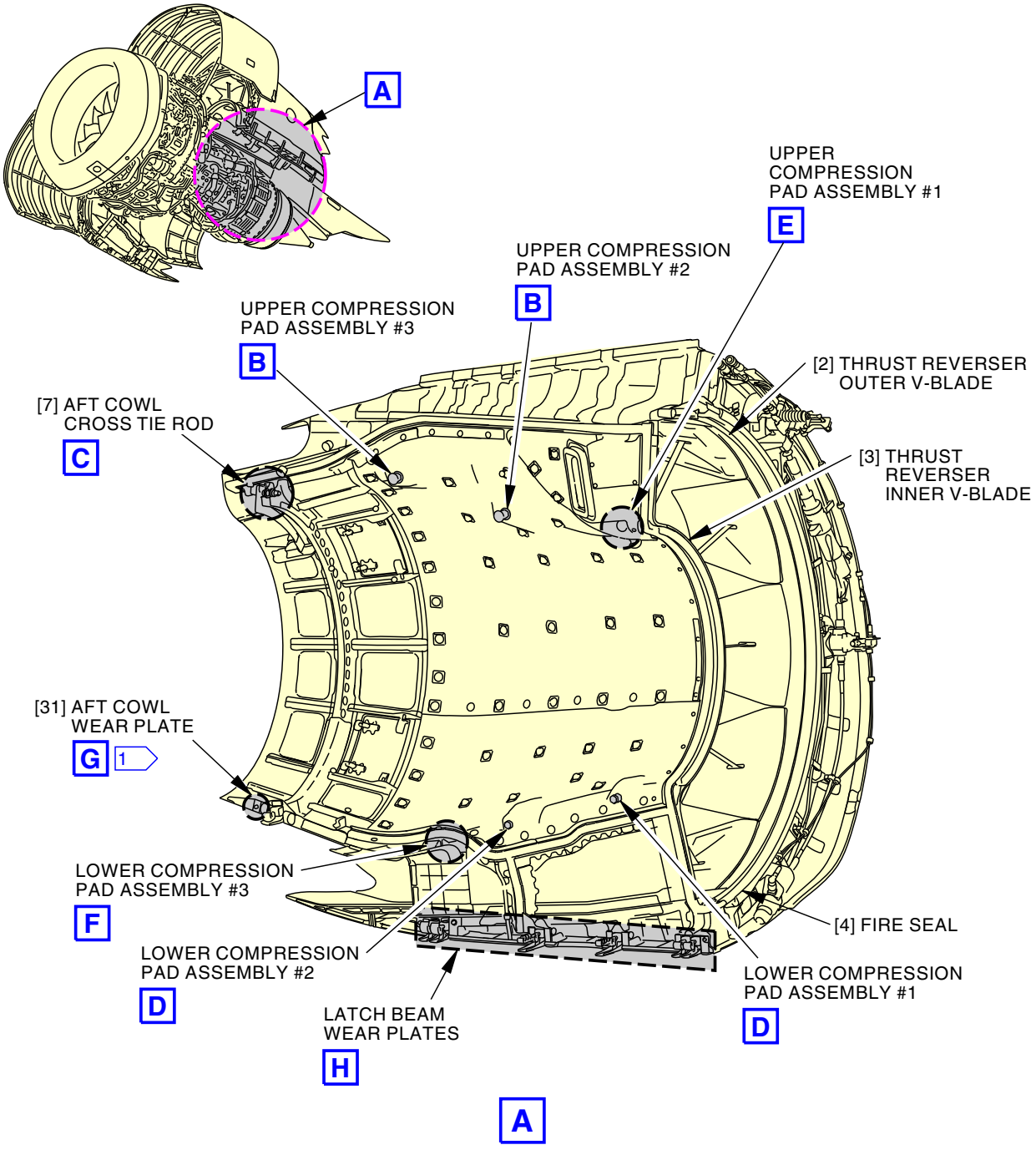
(1) Close the thrust reversers (TASK 78-31-00-010-802-G00).

(a) Make sure that each of the six latches on the thrust reverser latch beam have a closing force of 50.0 ±10.0 lbf (222.4 ±44.5 N).

(b) If it is necessary, adjust the latches (TASK 78-31-11-820-801-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

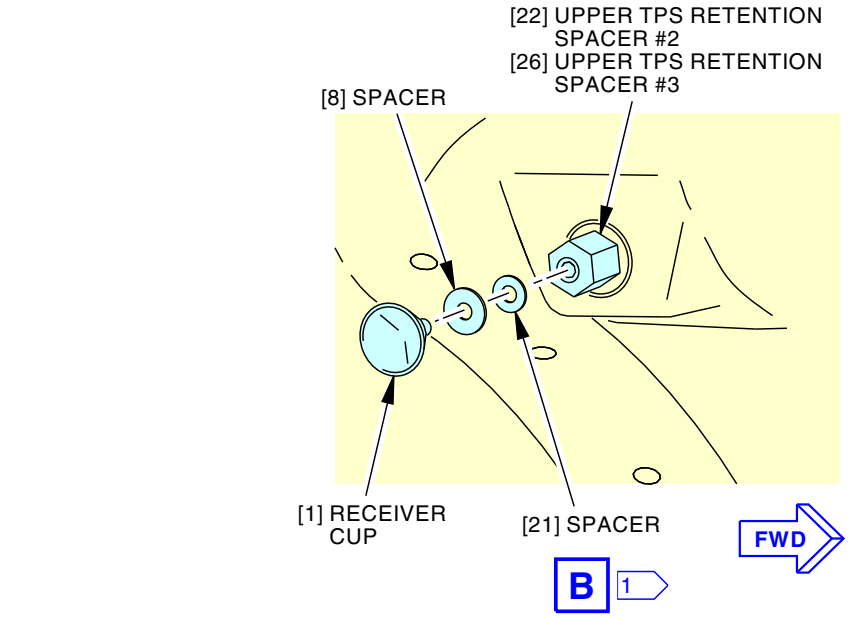


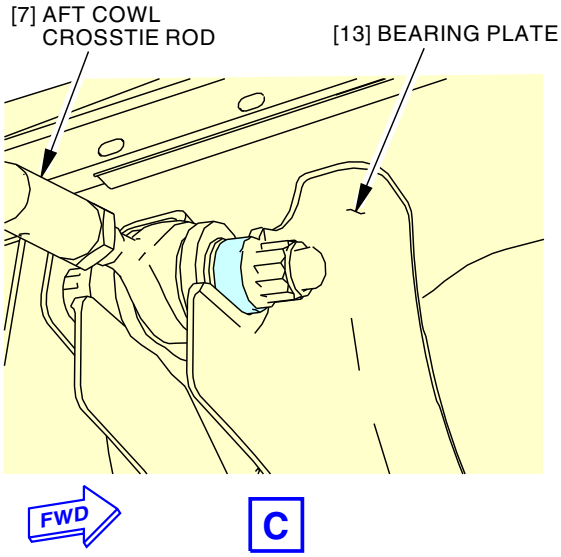
1 CLEARANCE BETWEEN THE AFT COWL AFT-MOST WEAR PLATES AFTER THE T/R IS LATCHED IS 0.000 +0.100/-0.000 INCH (0.000 +2.540/-0.000 mm).

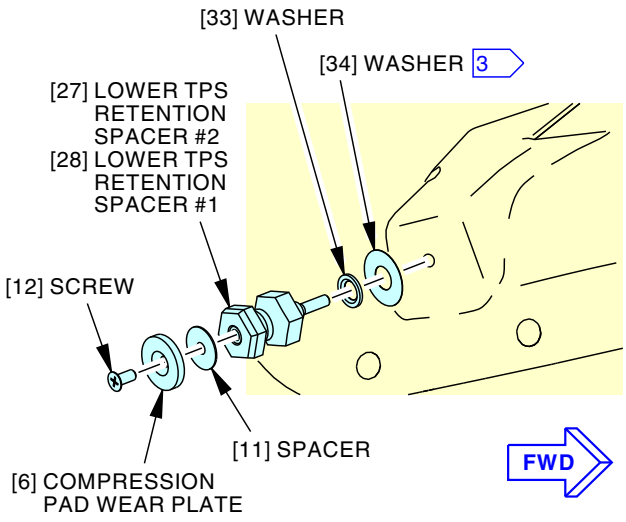
2355162 S00061516667_V5

Thrust Reverser Adjustment
Figure 501/78-31-01-990-807-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details







LOWER COMPRESSION PAD ASSEMBLY

D 2

1 UPPER COMPRESSION PAD ASSEMBLY #2 IS SHOWN. UPPER COMPRESSION PAD #3 IS EQUIVALENT. EXCEPT UPPER TPS RETENTION SPACER #3 IS USED INSTEAD OF UPPER TPS RETENTION SPACER #2.

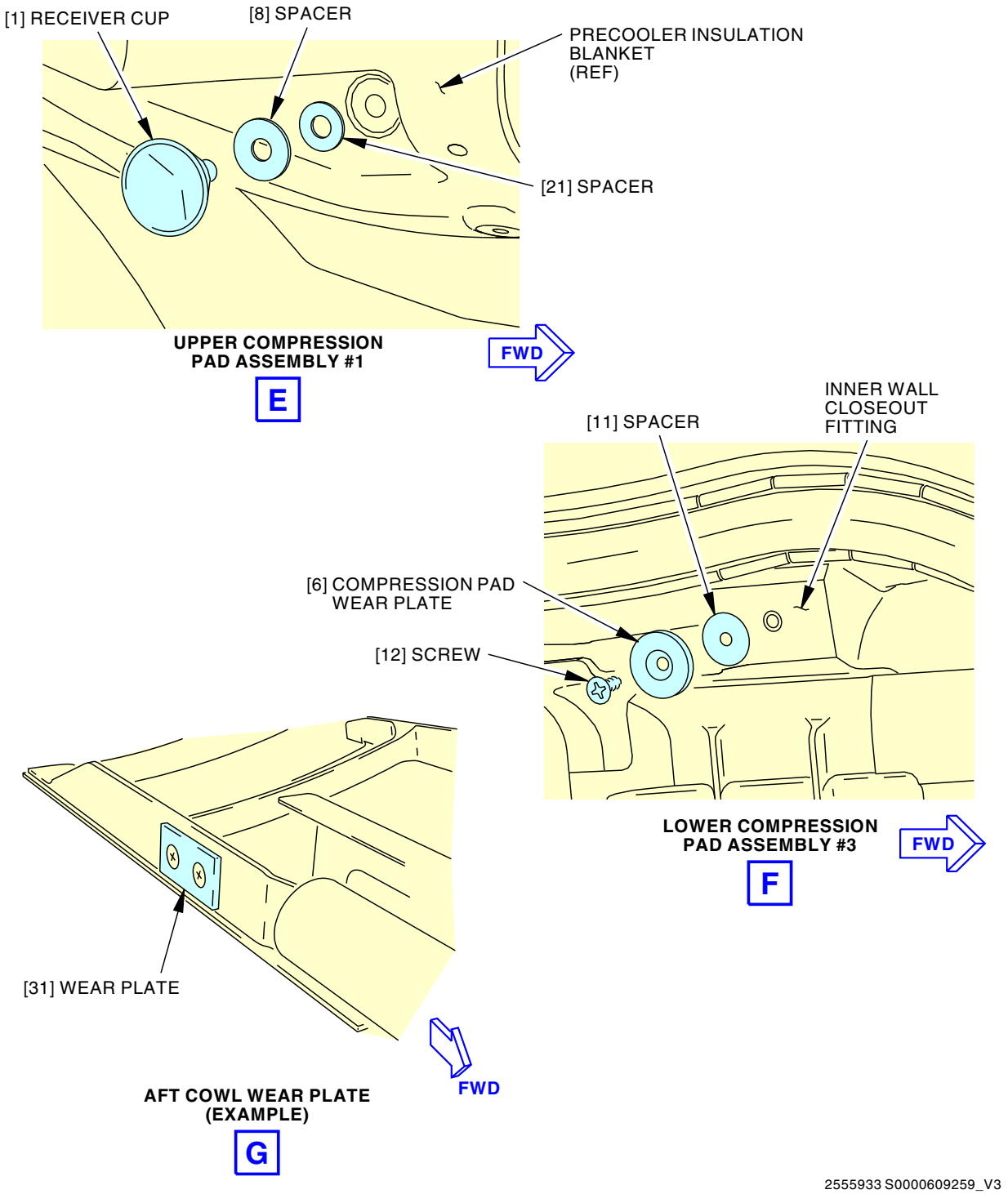
2 LOWER COMPRESSION PAD ASSEMBLY #2 IS SHOWN. LOWER COMPRESSION PAD #1 IS EQUIVALENT. EXCEPT LOWER TPS RETENTION SPACER #1 IS USED INSTEAD OF UPPER TPS RETENTION SPACER #2.

3 USE UP TO THREE WASHERS TO FILL THE GAP BETWEEN THE COMPRESSION PAD ASSEMBLY AND LOWER TPS RETENTION SPACER.

2355163 S00061516668_V5

Thrust Reverser Adjustment
Figure 501/78-31-01-990-807-G00 (Sheet 2 of 4)

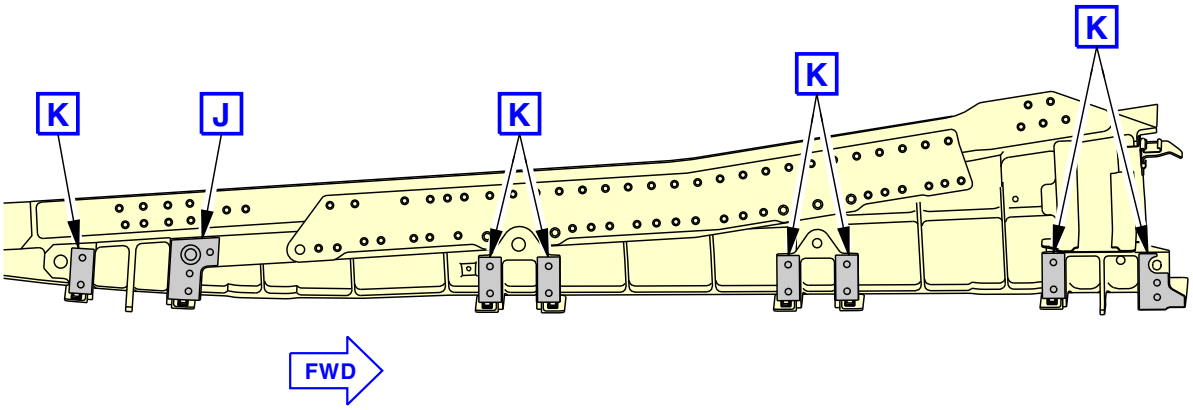
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2555933 S0000609259_V3

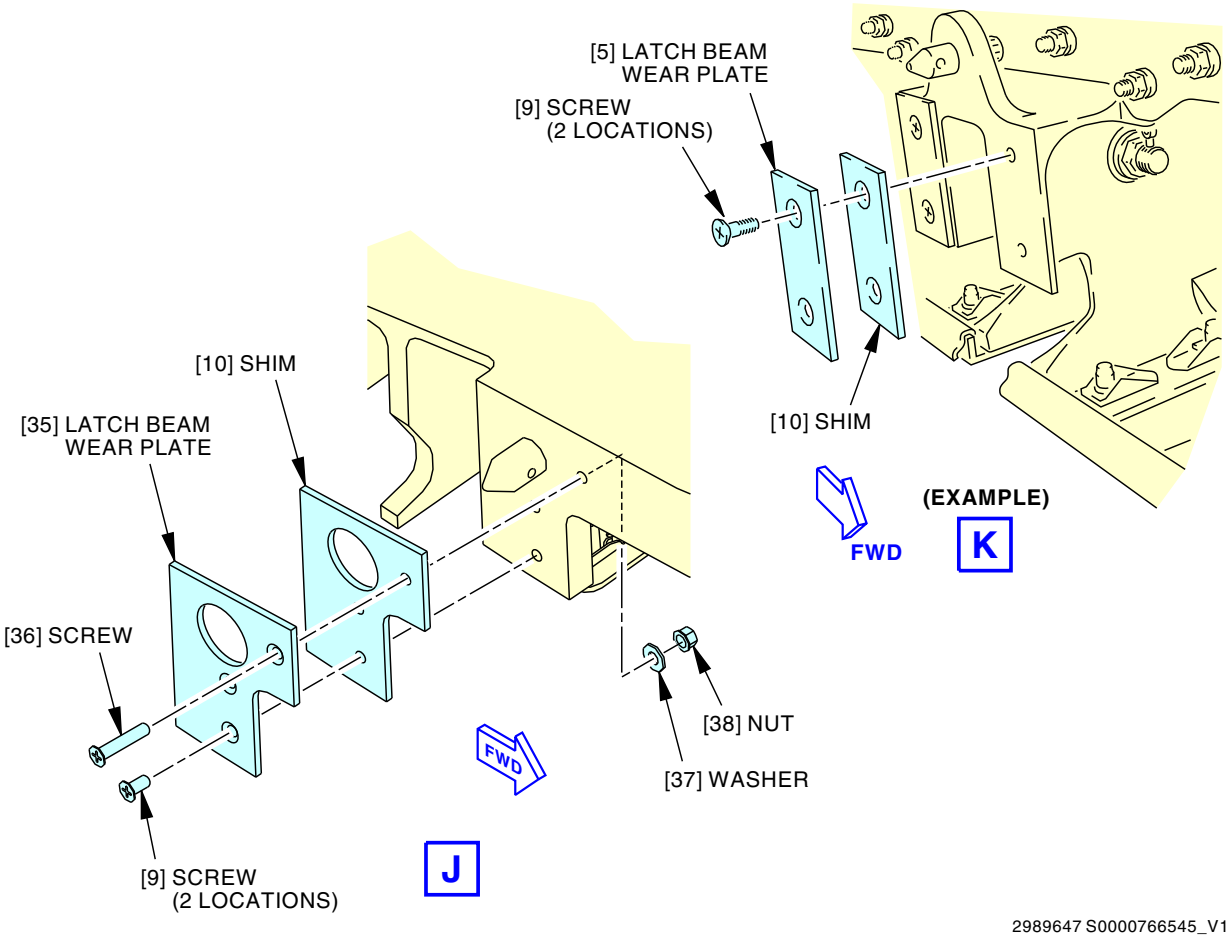
Thrust Reverser Adjustment
Figure 501/78-31-01-990-807-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LATCH BEAM WEAR PLATES

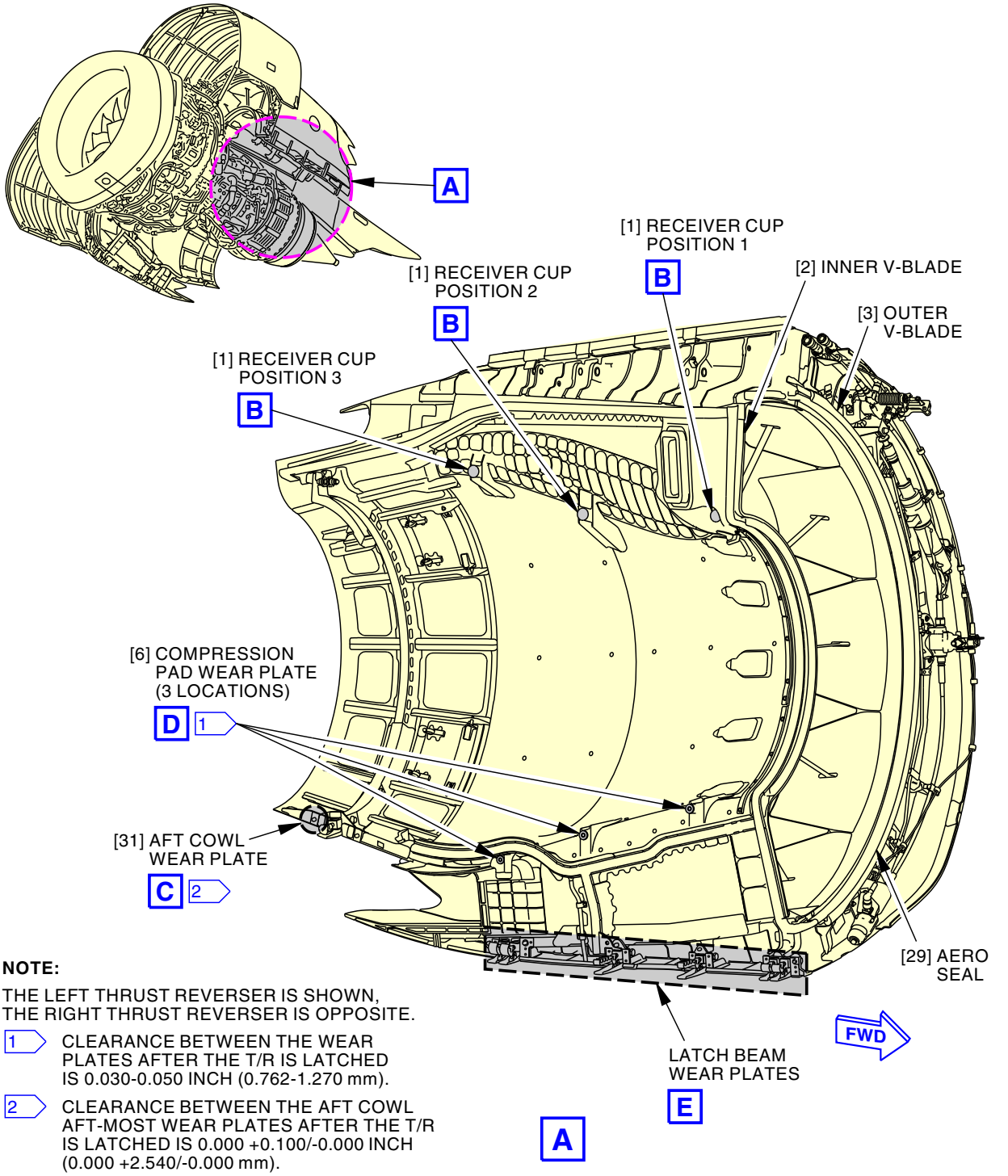
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2989647 S0000766545_V1

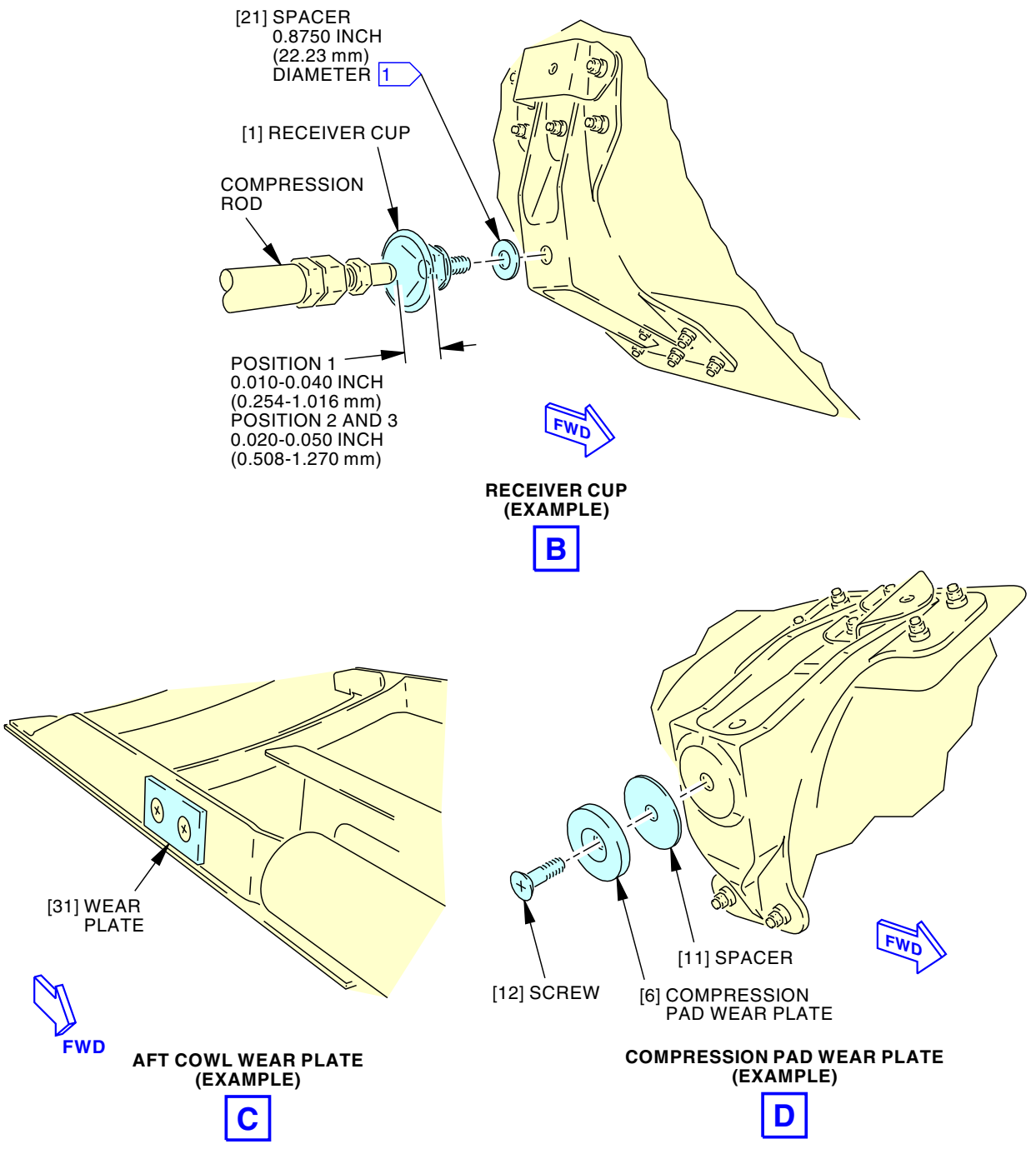
Thrust Reverser Adjustment
Figure 501/78-31-01-990-807-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Adjustment
Figure 502/78-31-01-990-824-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

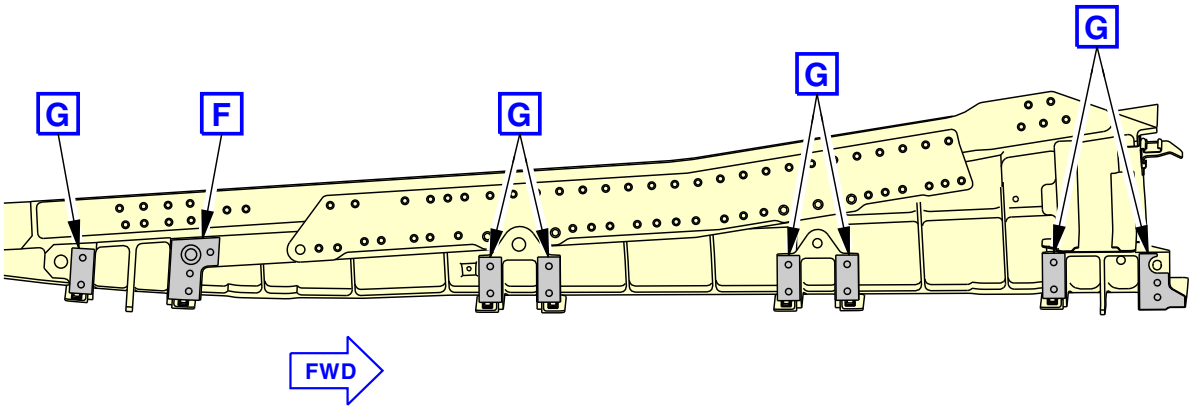


1 SOME AIRPLANES HAVE 2.000 INCH (50.8 mm) DIAMETER SPACERS.

2579288 S0000620115_V4

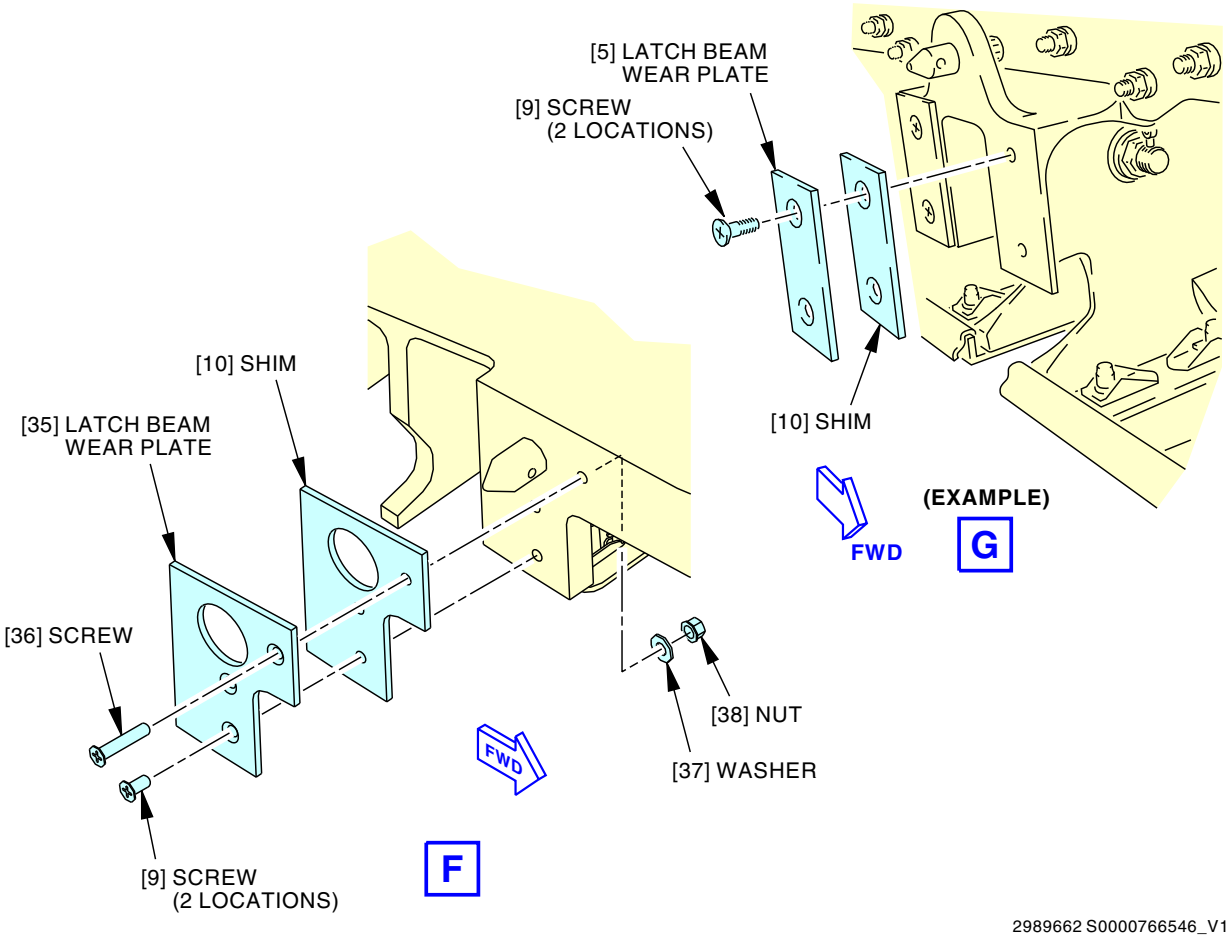
Thrust Reverser Adjustment
Figure 502/78-31-01-990-824-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LATCH BEAM WEAR PLATES

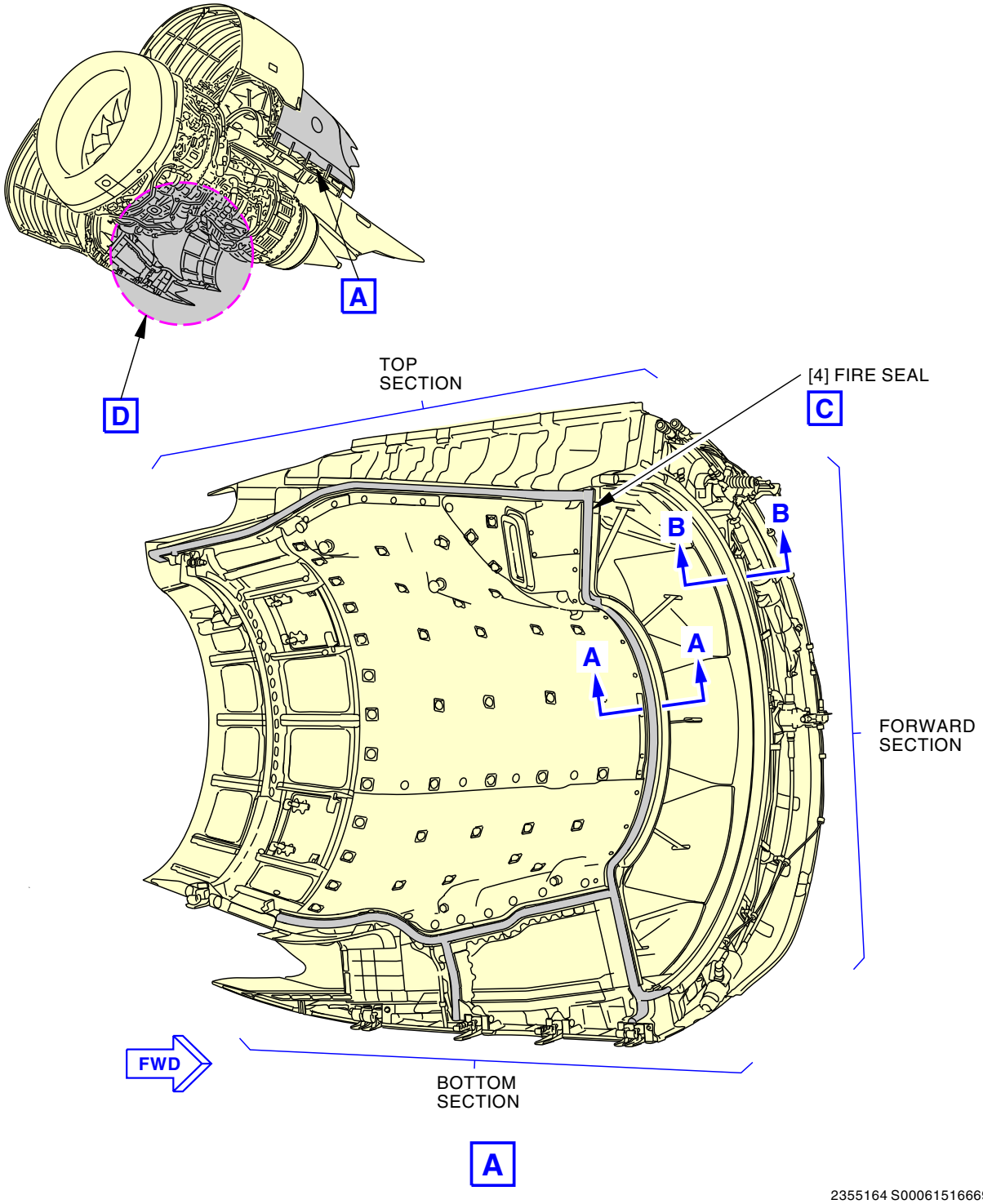
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2989662 S0000766546_V1

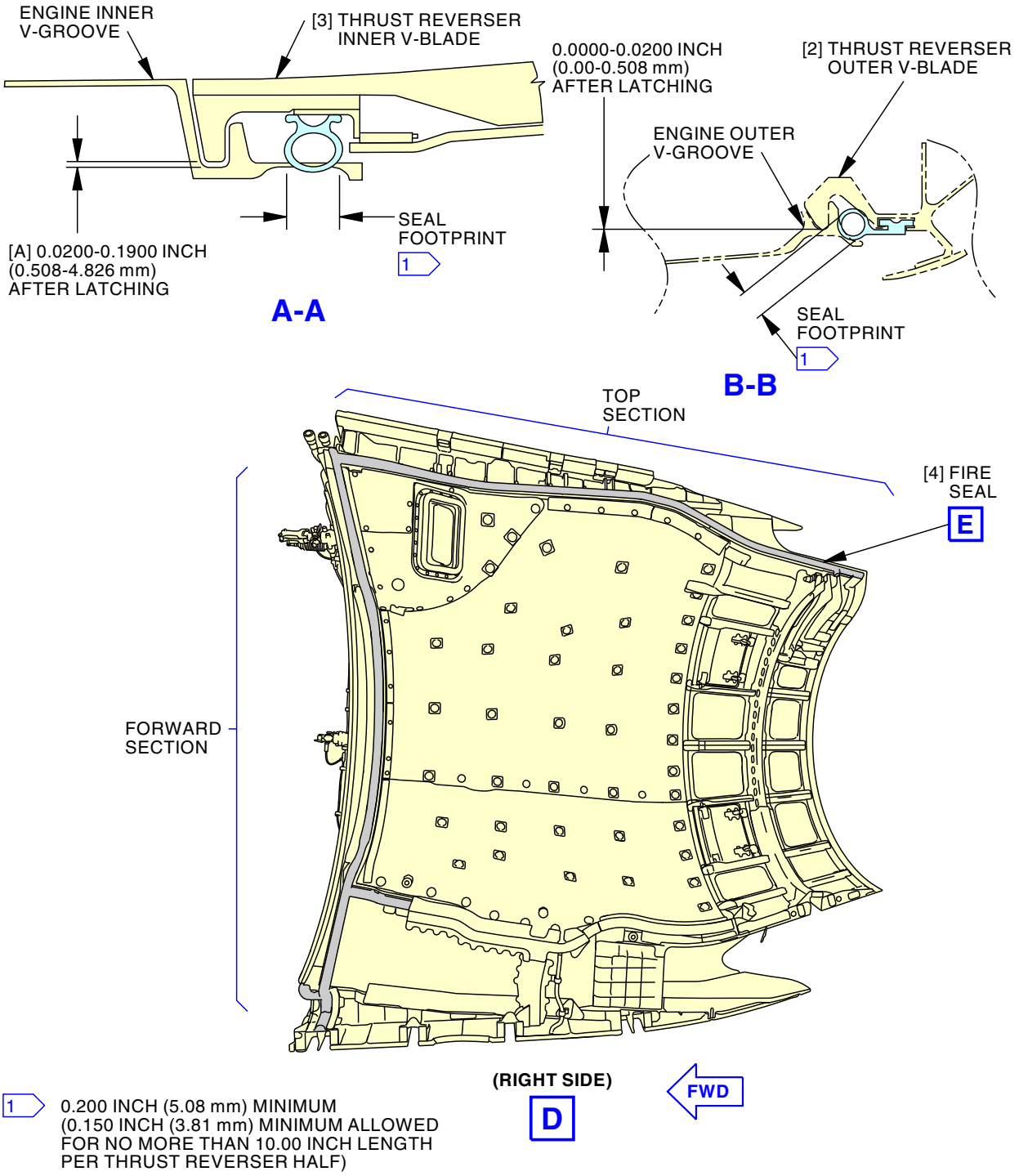
Thrust Reverser Adjustment
Figure 502/78-31-01-990-824-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fireseal Compression Check
Figure 503/78-31-01-990-808-G00 (Sheet 1 of 4)

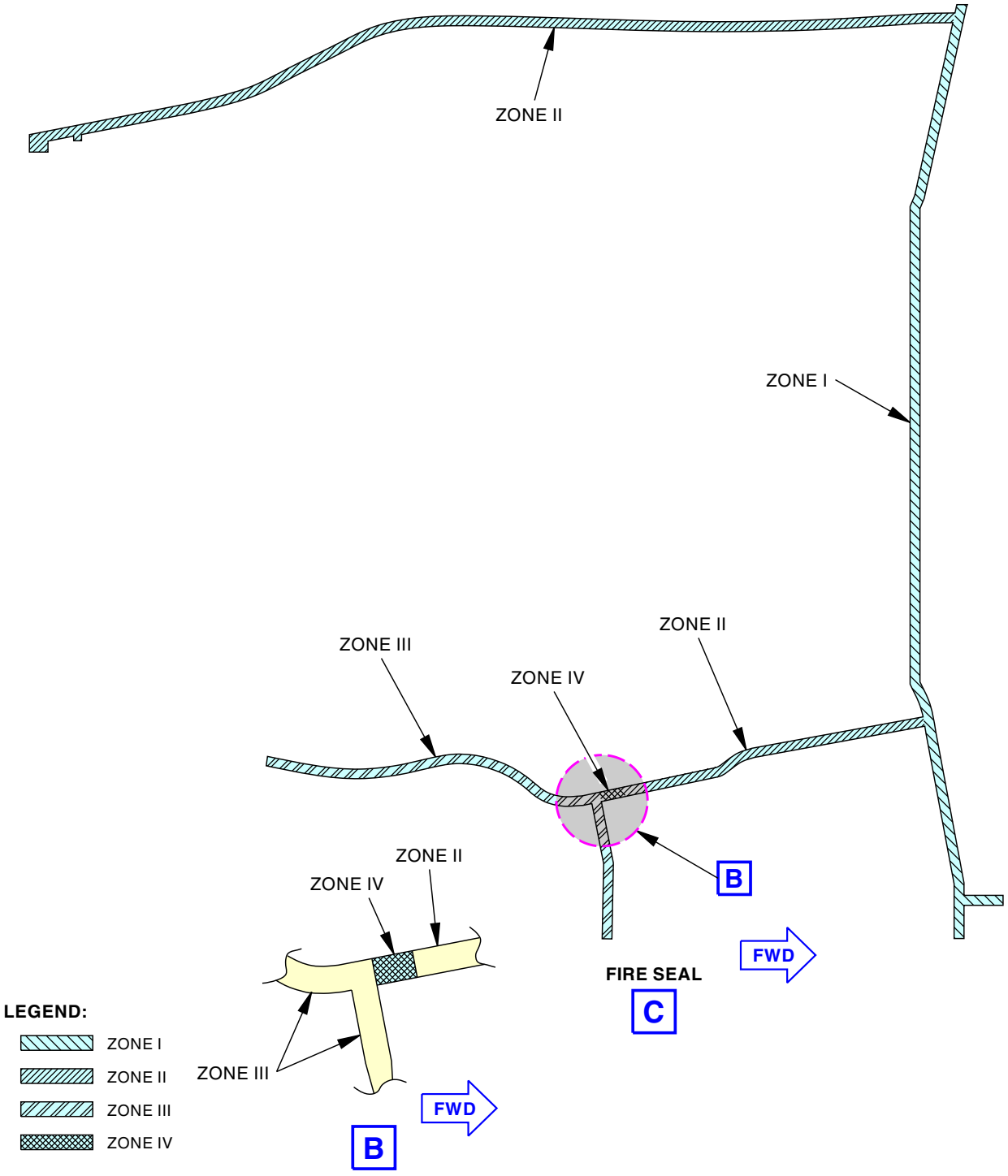
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355165 S00061516670_V8

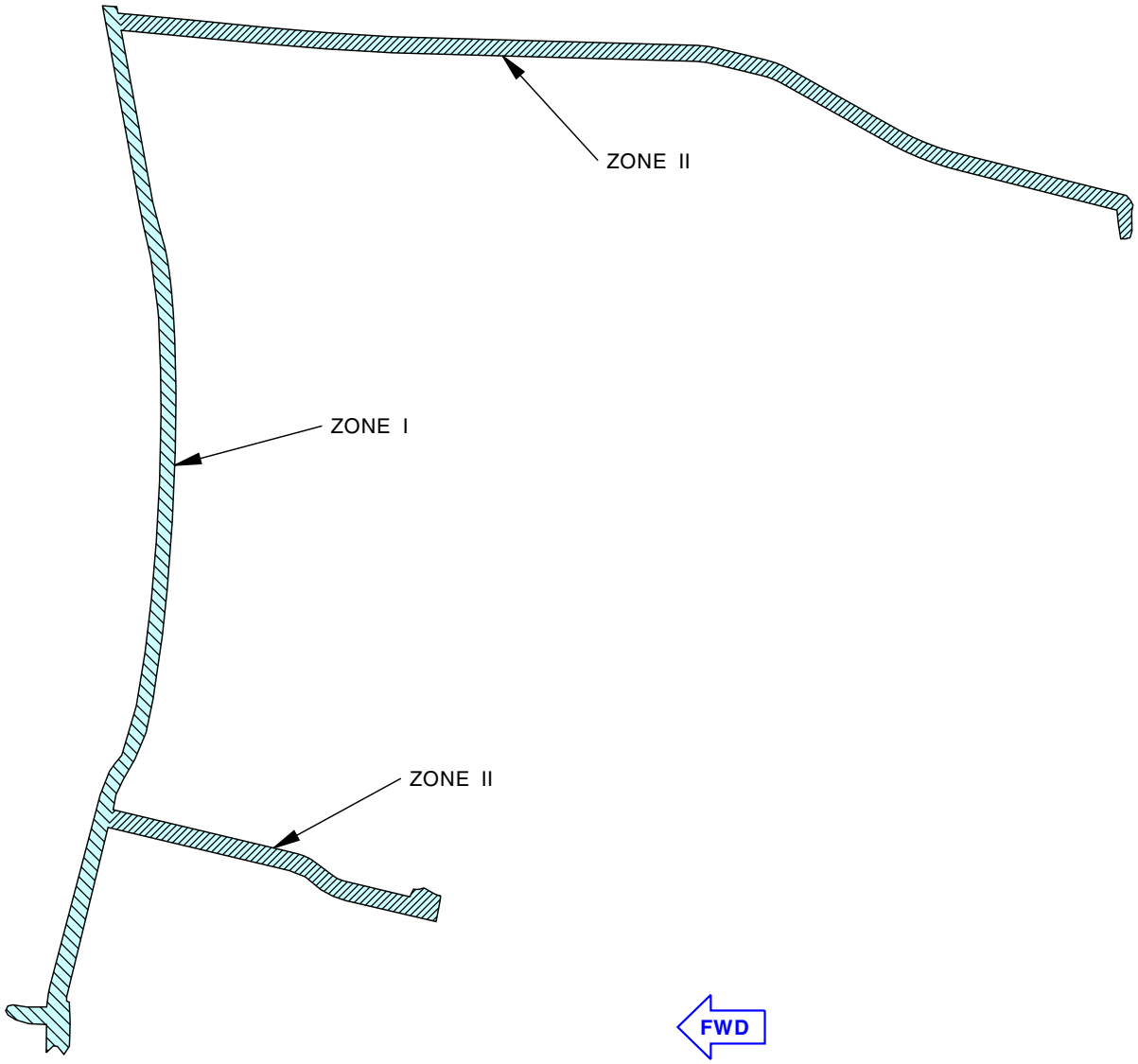
Fireseal Compression Check
Figure 503/78-31-01-990-808-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fireseal Compression Check
Figure 503/78-31-01-990-808-G00 (Sheet 3 of 4)

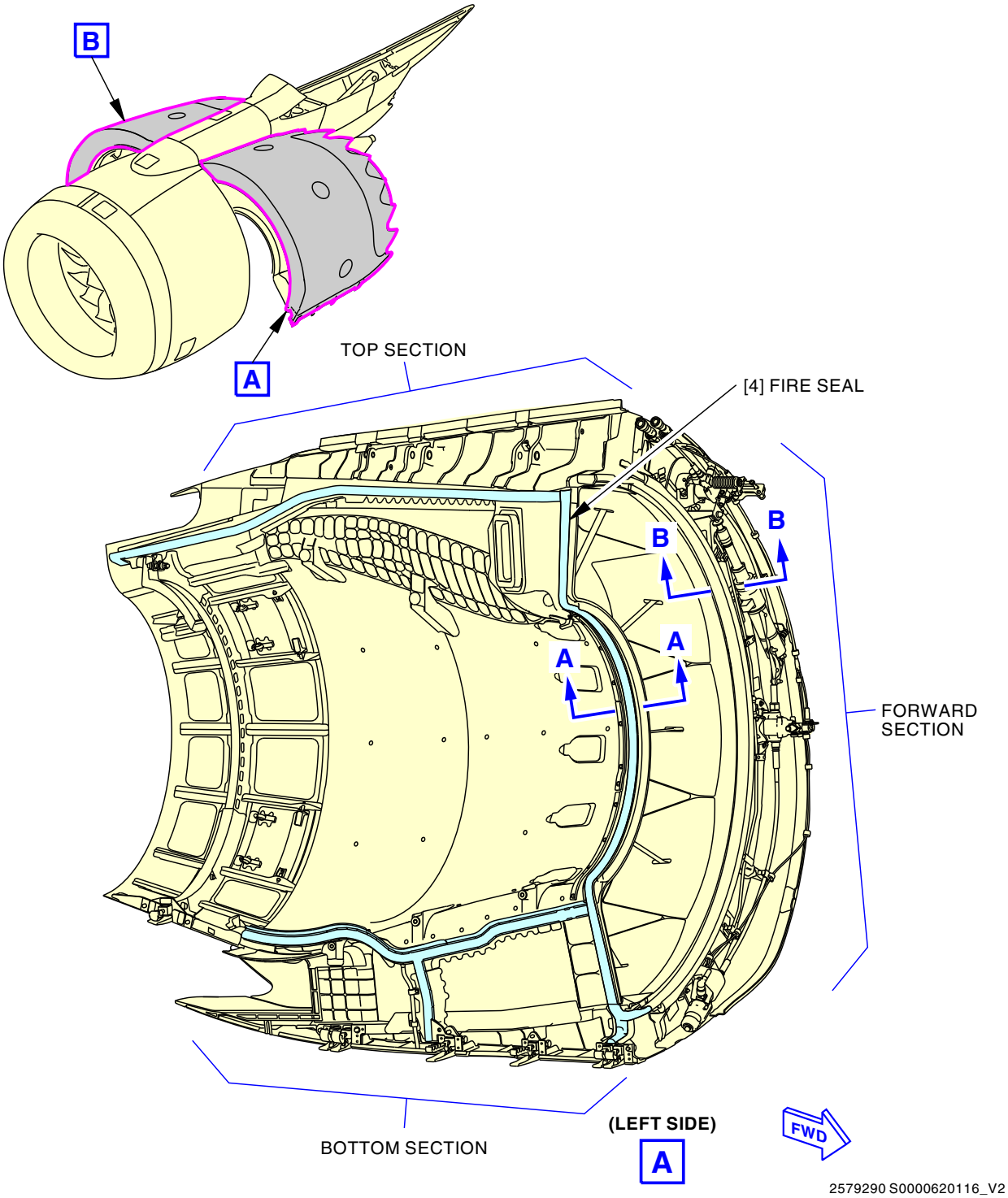
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2501850 S0000588504_V1

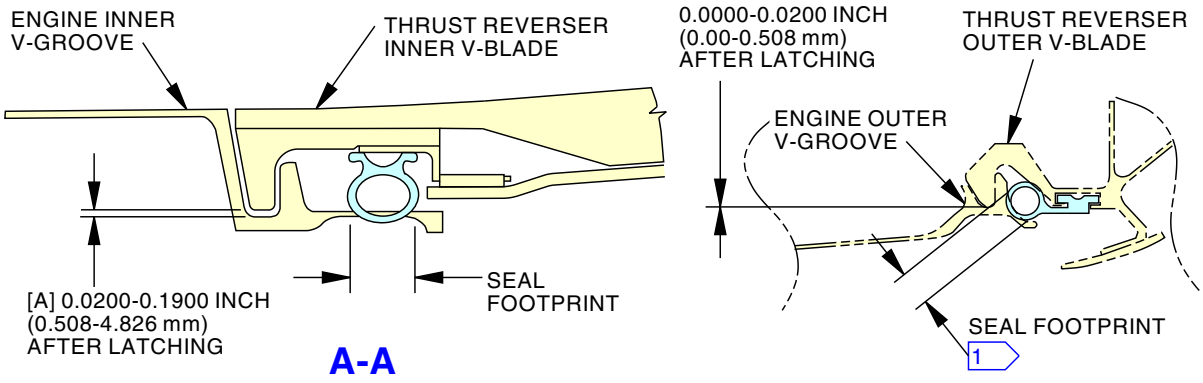
Fireseal Compression Check
Figure 503/78-31-01-990-808-G00 (Sheet 4 of 4)

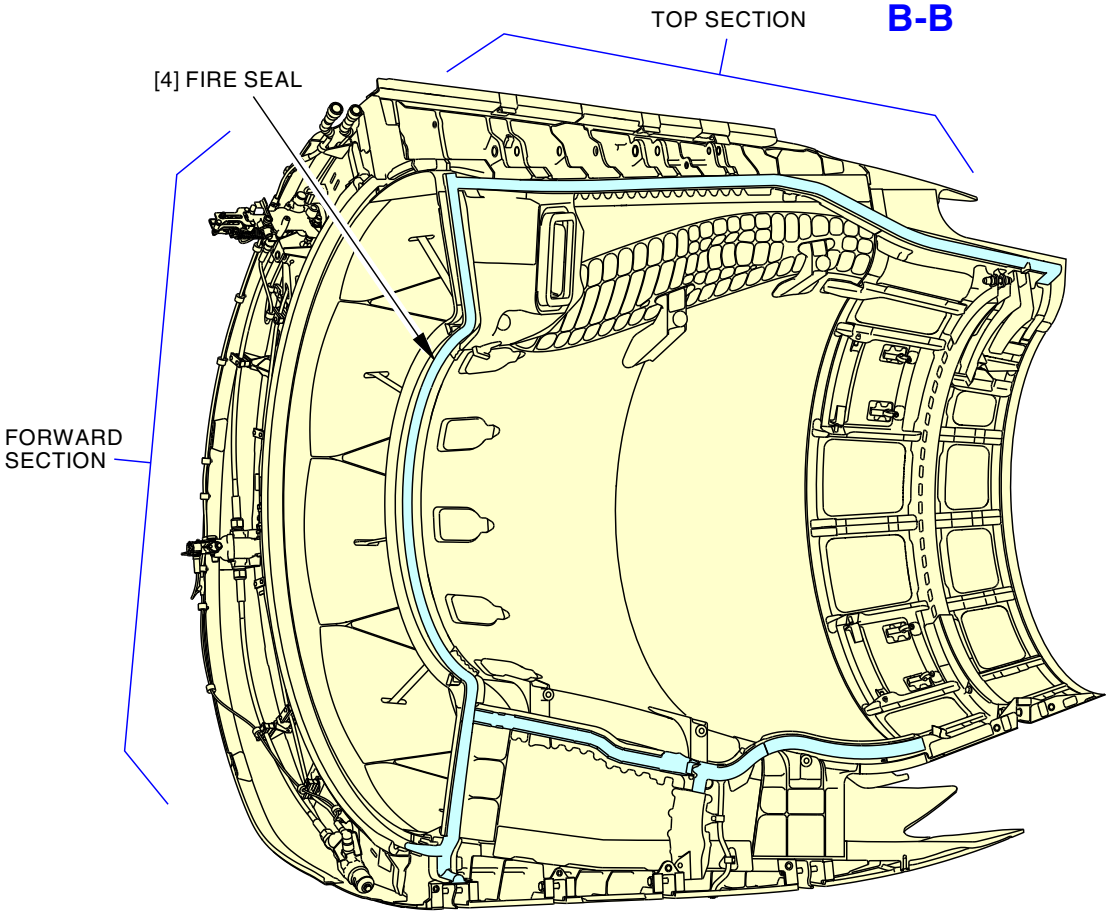
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fireseal Compression Check
Figure 504/78-31-01-990-825-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details





1 0.200 INCH (5.08 mm) MINIMUM
(0.150 INCH (3.81 mm) MINIMUM
ALLOWED FOR NO MORE THAN
10.00 INCH LENGTH PER THRUST
REVERSER HALF)

(RIGHT SIDE)

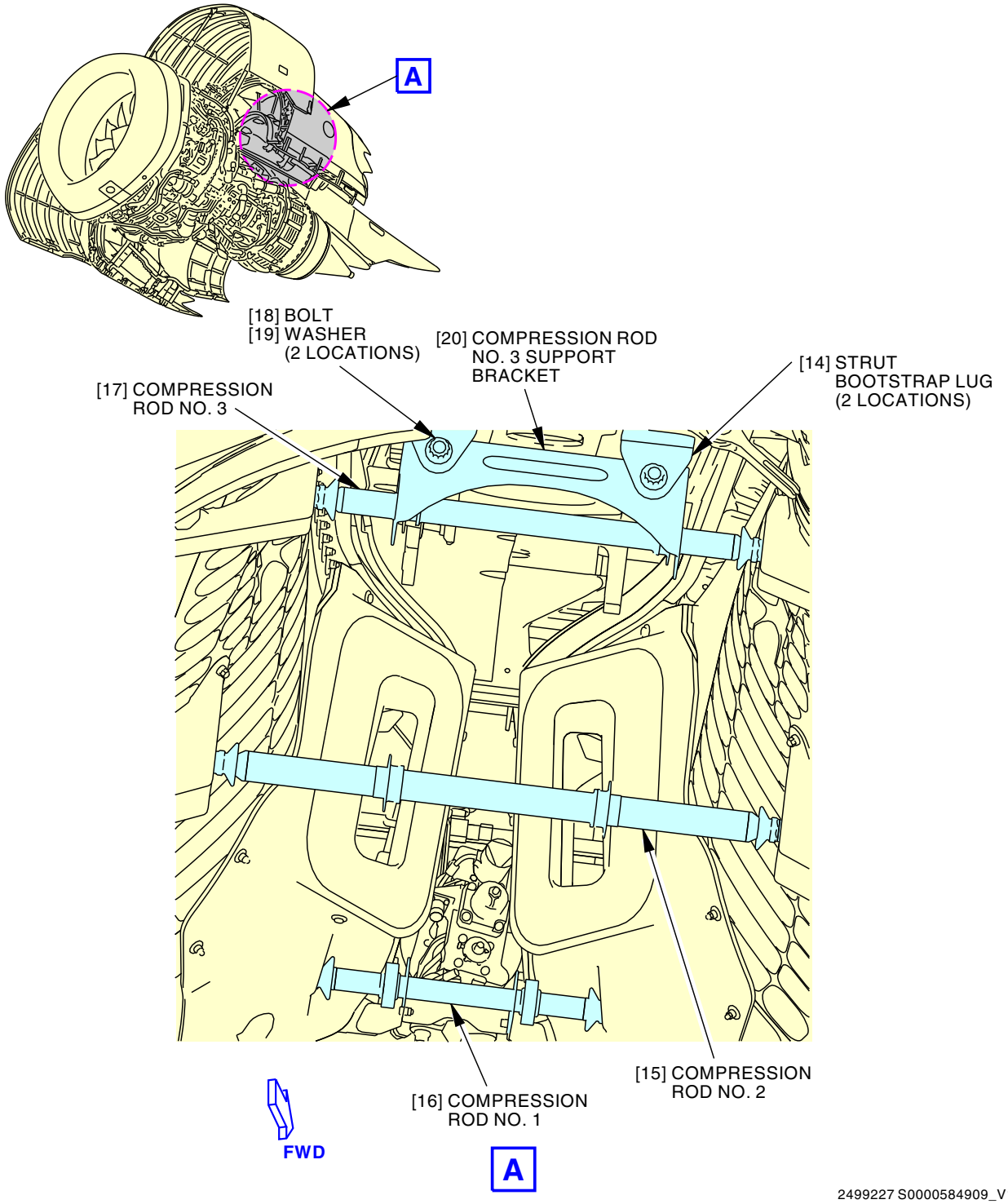
B

FWD

2579291 S0000620118_V2

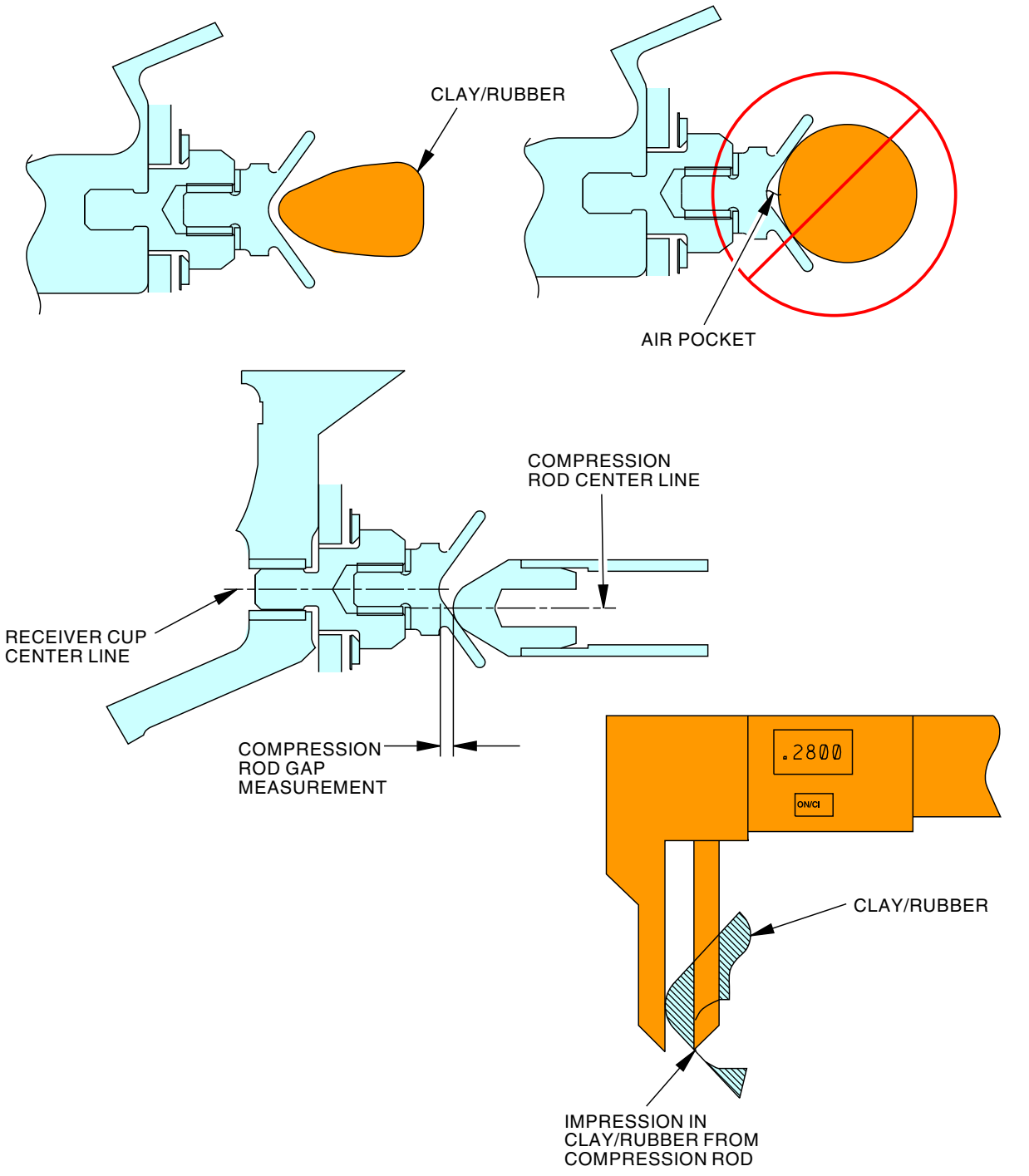
Fireseal Compression Check
Figure 504/78-31-01-990-825-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Compression Rod Gap Check
Figure 505/78-31-01-990-817-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2499719 S0000584912_V2

Compression Rod Gap Check
Figure 505/78-31-01-990-817-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) A visual inspection of the fan duct walls to make sure that they will provide an aerodynamically smooth surface for the passage of fan air or if there was damage from a RTO duct burst.

(2) A visual inspection of the cowl hinges.

(3) A visual inspection of the pre-cooler kiss seal.

(4) A visual inspection of the inner and outer v-blades for damage.

(5) A visual inspection of the outer v-blade seal.

(6) A visual inspection of the outer v-blade.

(7) A visual inspection of the fire seals.

(8) A check of the thrust reverser rigging following an engine change or thrust reverser change.

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(9) A visual inspection of the composite inner wall.

(10) A visual inspection of the composite inner wall inlet and exhaust ports.

SIA ALL

TASK 78-31-01-200-801-G00

2. Thrust Reverser Fan Duct Wall Inspection

(Figure 601, Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This is a task to do a visual inspection check of the fan duct inner and outer walls for damage.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Prepare for the Inspection

SUBTASK 78-31-01-010-009-G00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Thrust Reverser Fan Duct Wall Inspection

SUBTASK 78-31-01-210-001-G00

(1) Look through the forward and aft ends of the fan duct to examine the walls for the damage that follows:

(a) Holes, cracks, nicks, gouges, delamination, dents and edge corrosion.

(b) Pitting in the surface layer (small areas where the surface appears chipped away around the perforation of the acoustic panel) (Figure 602).

NOTE: This pitting can occur during the usual manufacturing process of the acoustic panel. This condition has been inspected and approved for in-service use at the time of manufacture.

1) No action is necessary with the following conditions:

a) The surface area adjacent to each pitting location has the original silver finish and does not show the black panel material.

b) There are no signs of edge erosion.

F. Put the Airplane Back to its Usual Condition

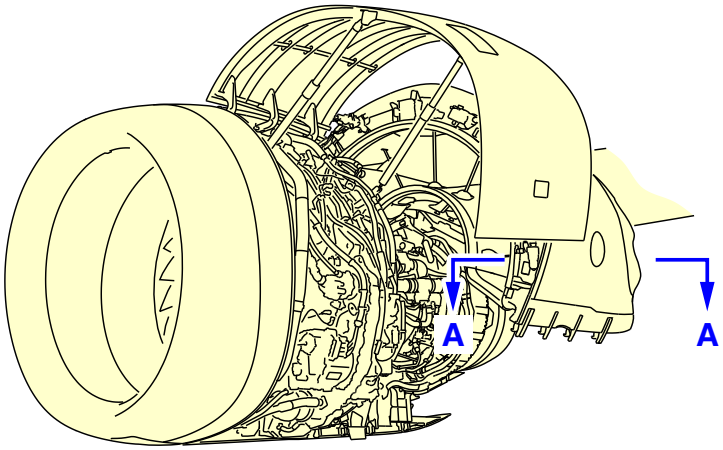
SUBTASK 78-31-01-410-007-G00

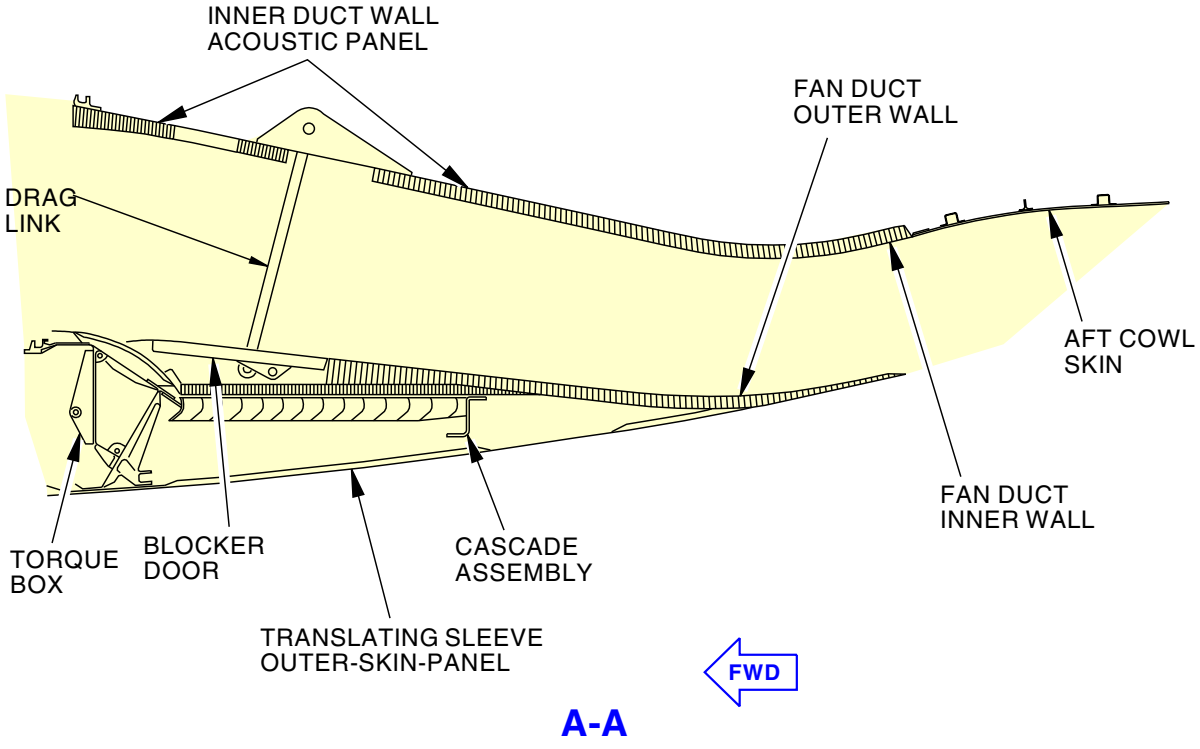
WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

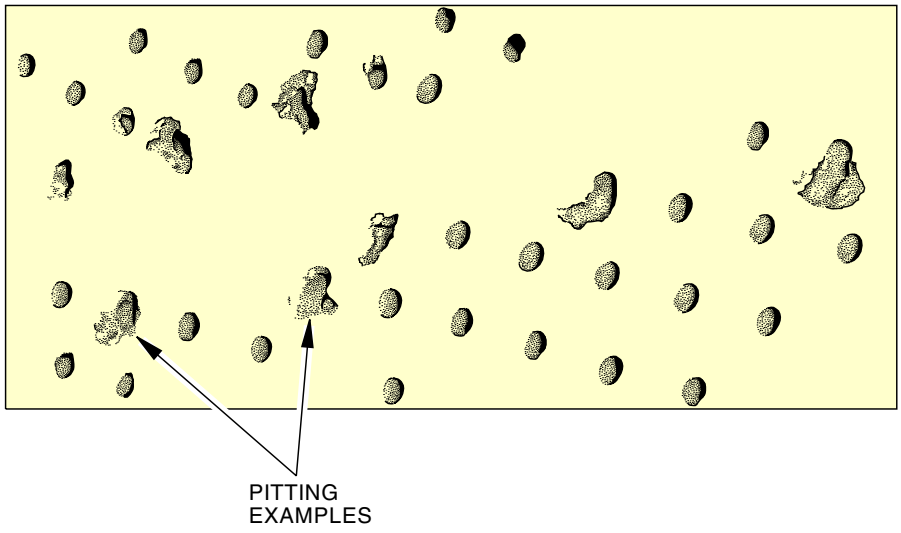




2355166 S00061516673_V1

Thrust Reverser Fan Duct Wall Inspection
Figure 601/78-31-01-990-809-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355168 S00061516674_V1

Inner and Outer Duct Wall Acoustic Panel Inspection
Figure 602/78-31-01-990-810-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-211-801-G00

3. Thrust Reverser Cowl Hinge Inspection

(Figure 603)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions for the inspection of the thrust reverser cowl hinge.

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-01-860-020-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-021-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-022-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-010-017-G00

(4) Remove the applicable access panels:

(a) Open these access panels:

Number	Name/Location
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1

(b) Open these access panels:

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1

(c) Open these access panels:

Number	Name/Location
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2

(d) Open these access panels:

Number	Name/Location
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

F. Cowl Hinges Inspection

SUBTASK 78-31-01-210-003-G00

(1) Do a general visual inspection of the thrust reverser cowl hinges for cracks.

(a) Cracks are not permitted.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-012-G00

(1) Install the applicable access panels:

(a) Close these access panels:

Number	Name/Location
416AR	Right Forward Thrust Reverser Hinge Fairing, Engine 1
416BR	Right Aft Thrust Reverser Hinge Fairing, Engine 1

(b) Close these access panels:

Number	Name/Location
415AL	Left Forward Thrust Reverser Hinge Fairing, Engine 1
415BL	Left Aft Thrust Reverser Hinge Fairing, Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Close these access panels:

Number	Name/Location
425AL	Left Forward Thrust Reverser Hinge Fairing, Engine 2
425BL	Left Aft Thrust Reverser Hinge Fairing, Engine 2

(d) Close these access panels:

Number	Name/Location
426AR	Right Forward Thrust Reverser Hinge Fairing, Engine 2
426BR	Right Aft Thrust Reverser Hinge Fairing, Engine 2

SUBTASK 78-31-01-860-024-G00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-060-G00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-025-G00

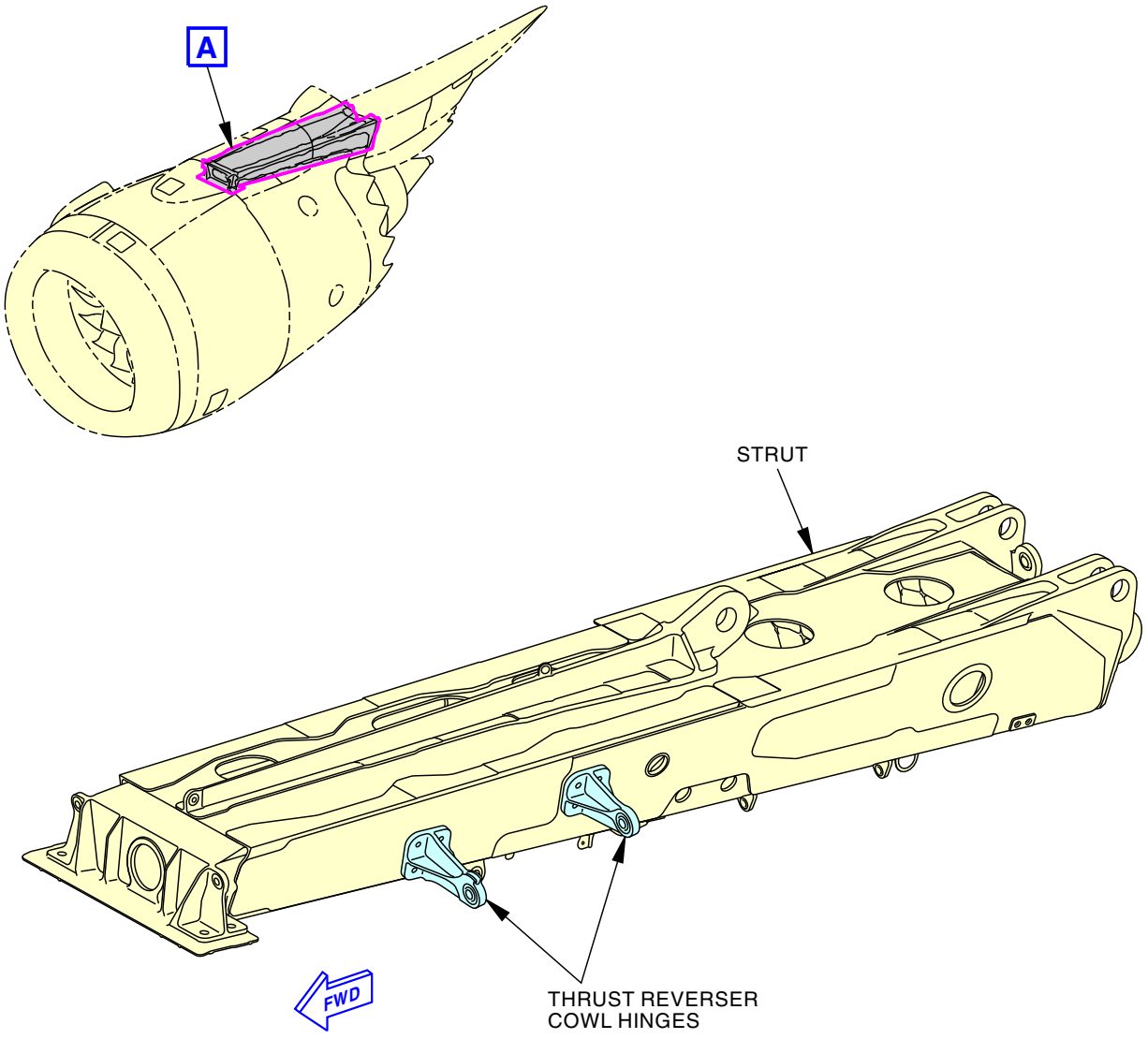
(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**(LEFT THRUST REVERSER COWL HINGES ARE SHOWN,
RIGHT THRUST REVERSER COWL HINGES ARE OPPOSITE)**

A

2972626 S0000750821_V1

**Thrust Reverser Cowl Hinge Inspection
Figure 603/78-31-01-990-830-G00**

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-211-802-G00

4. Pre-Cooler Kiss Seal Inspection

(Figure 604)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions for the inspection of the pre-cooler kiss seal.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-15-000-801-G00	Pre-cooler Inlet Duct Seal - Removal (P/B 401)
78-31-15-400-801-G00	Pre-cooler Inlet Duct Seal - Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Inspection

SUBTASK 78-31-01-860-026-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-027-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-028-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-029-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-01-040-004-G00

(5) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-01-010-018-G00

(6) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Pre-Cooler Kiss Seal Inspection

SUBTASK 78-31-01-210-004-G00

(1) Do a visual inspection of the pre-cooler kiss seal for degradation of the seal.

(a) Degradation of the seal is not permitted.

SUBTASK 78-31-01-900-001-G00

(2) If it is necessary, replace the seal (TASK 78-31-15-000-801-G00 and TASK 78-31-15-400-801-G00).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-013-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-440-003-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-030-G00

(3) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-031-G00

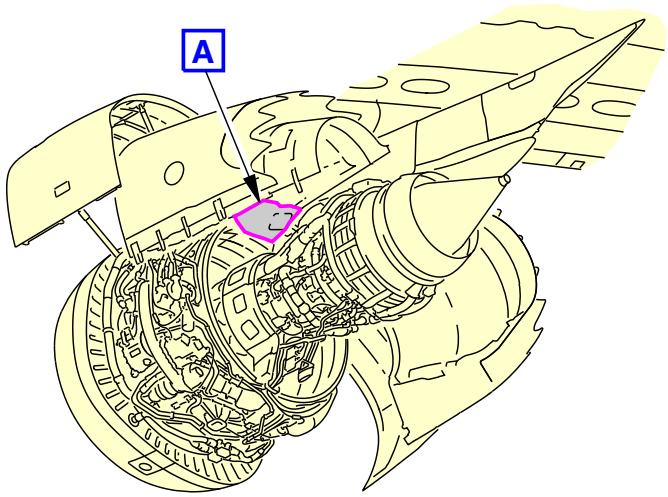
(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

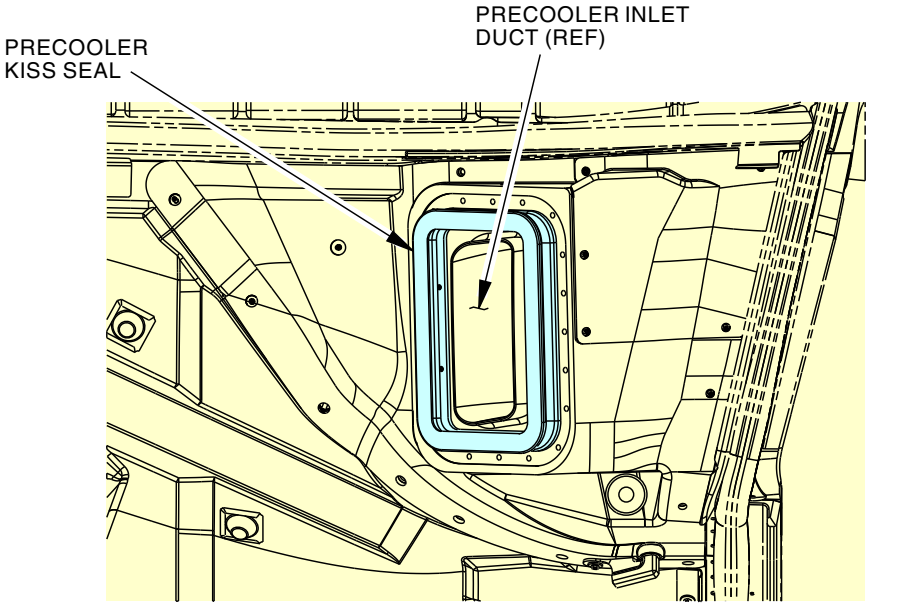
(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





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Pre-Cooler Kiss Seal Inspection
Figure 604/78-31-01-990-829-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-211-803-G00

5. Thrust Reverser Inner and Outer V-Blade Inspection

(Figure 605)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions for the inspection of the inner and outer V-blades on the thrust reverser.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Inspection

SUBTASK 78-31-01-860-032-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-033-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-034-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-035-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804

SUBTASK 78-31-01-040-005-G00

(5) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801

SUBTASK 78-31-01-010-019-G00

(6) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Thrust Reverser Inner and Outer V-Blade Inspection

SUBTASK 78-31-01-210-005-G00

(1) Do a detailed inspection of the thrust reverser inner and outer V-blade for damage and degradation.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-014-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-440-004-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-036-G00

(3) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-037-G00

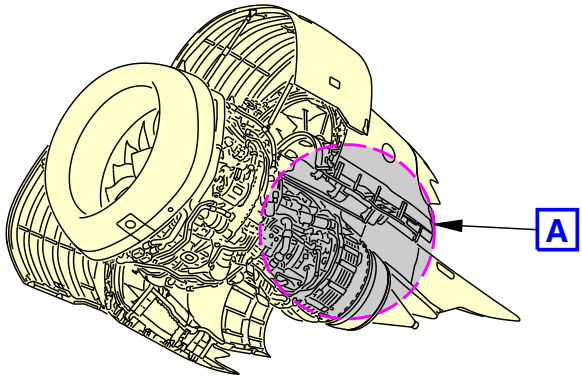
(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

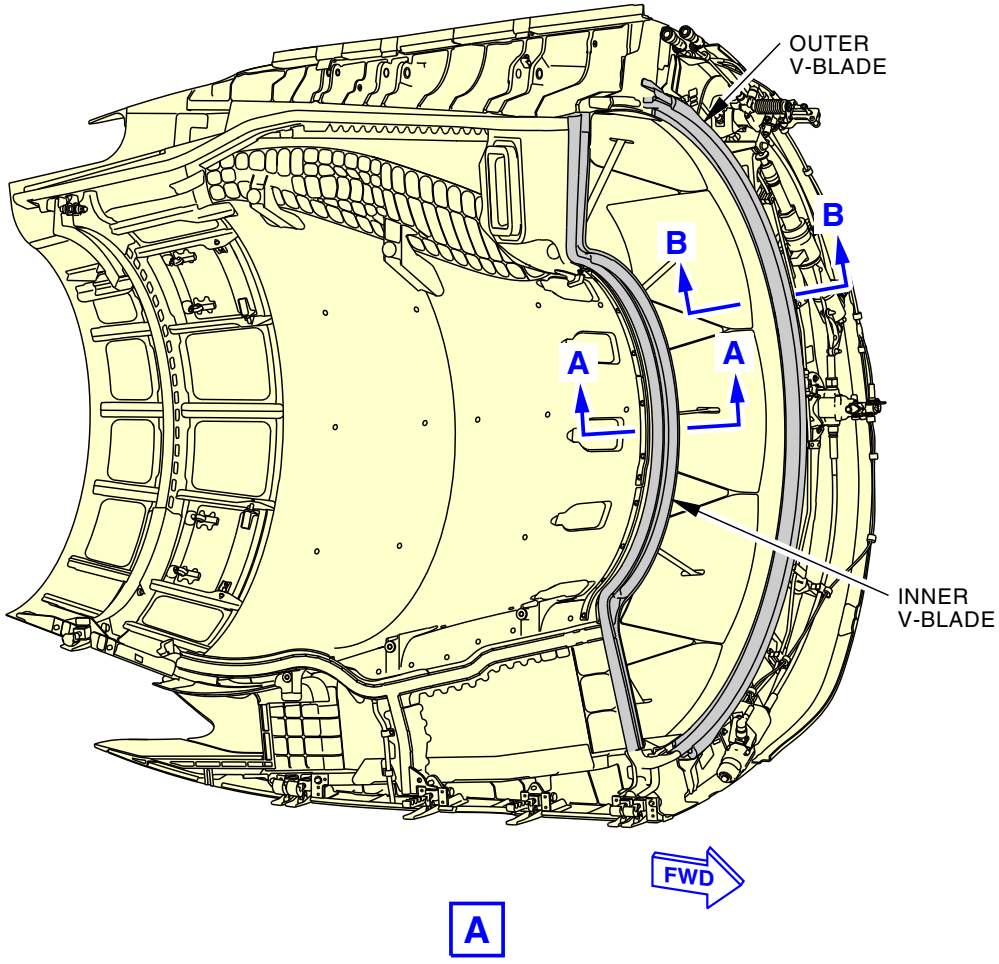
(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





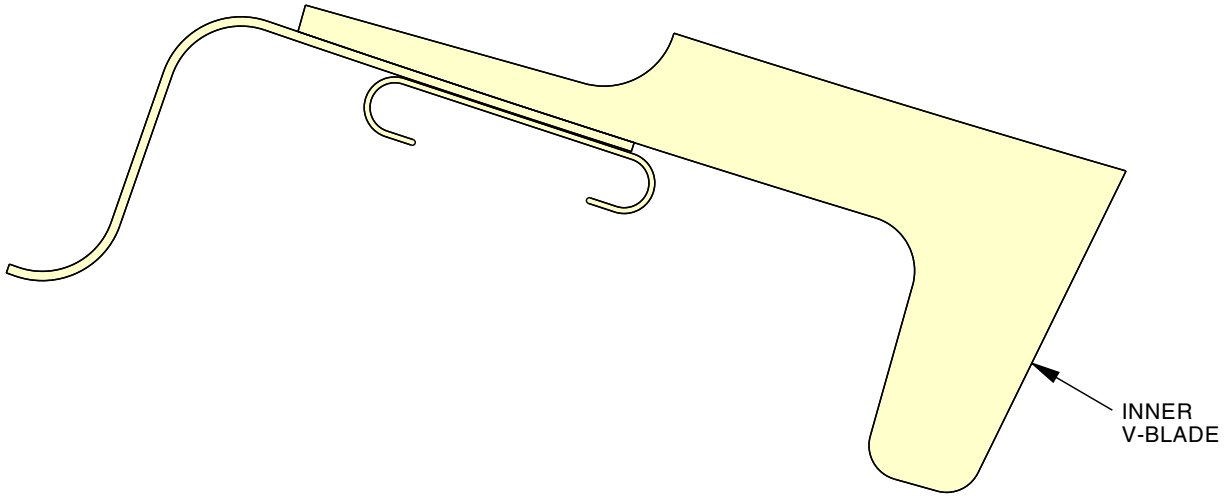
NOTE:

THE LEFT THRUST REVERSER IS SHOWN,
THE RIGHT THRUST REVERSER IS OPPOSITE.

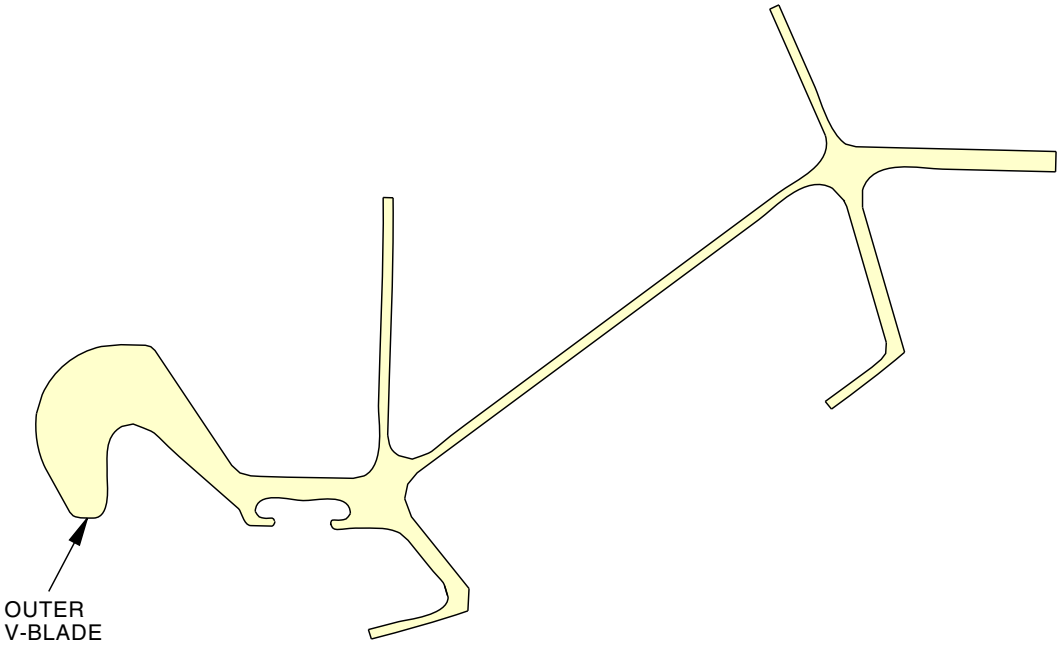
2966184 S0000745093_V1

Thrust Reverser Inner and Outer V-Blade Inspection
Figure 605/78-31-01-990-828-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



A-A



B-B

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Thrust Reverser Inner and Outer V-Blade Inspection
Figure 605/78-31-01-990-828-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-211-804-G00

6. Thrust Reverser Outer V-Blade Seal Inspection

(Figure 605)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-01-860-038-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-039-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-040-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-041-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804

SUBTASK 78-31-01-040-006-G00

(5) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801

SUBTASK 78-31-01-010-020-G00

(6) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. V-Blade Seal Inspection

SUBTASK 78-31-01-211-002-G00

(1) Do a detailed visual inspection of the thrust reverser outer V-blade seal for fretting and cracking.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-015-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-440-005-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-01-860-042-G00

(3) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-600-001-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 78-31-01-211-805-G00

7. Thrust Reverser Outer V-Blade Inspection

(Figure 605)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1

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(Continued)

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-01-860-043-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-044-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-01-860-045-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-046-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-01-040-007-G00

(5) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-01-010-021-G00

(6) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Outer V-Blade Inspection

SUBTASK 78-31-01-211-003-G00

(1) Do a detailed visual inspection of the thrust reverser outer V-blade for fretting and cracking.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-016-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

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1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-440-006-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-01-860-047-G00

(3) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-048-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 78-31-01-211-806-G00

8. Thrust Reverser Fire Seal Inspection

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-01-860-049-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-01-860-050-G00

(2) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-051-G00

(3) For engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-052-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804

SUBTASK 78-31-01-040-008-G00

(5) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801

SUBTASK 78-31-01-010-022-G00

(6) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Thrust Reverser Fire Seal Inspection

SUBTASK 78-31-01-210-006-G00

(1) Do a general visual inspection of the thrust reverser fire seal for degradation.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-017-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-440-007-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 78-31-01-860-053-G00

(3) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-31-01-860-054-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

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(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 78-31-01-280-801-G00

9. Thrust Reverser Rigging Check

(Figure 606)

A. General

(1) This task gives the instructions on how to check the rigging of the thrust reverser after installation of an engine or thrust reverser.

(a) It is strongly recommended that this rig check be accomplished after engine replacement or after removal of one or both thrust reverser halves and re-installation of the same thrust reverser halves.

NOTE: The intent of the rigging check is to prevent excessive wear to the inner V-blade interface if the rigging gaps have changed from the original installation.

(2) If one or both thrust reverser halves were replaced with different thrust reverser halves, do this task: Thrust Reverser Adjustment, TASK 78-31-01-820-801-G00.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-01-820-801-G00	Thrust Reverser Adjustment (P/B 501)
78-31-11-820-801-G00	Latches Adjustment (P/B 501)

C. Tools/Equipment

Reference	Description
STD-1097	Caliper - Vernier, 0-6 inch, Readable to 1/1000 inch
STD-1184	Scale - Spring, 0-100 Lbs, Tension

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
G02020	Clay, Modeling	
G02415	Agent - Parting, Paste Wax (Johnson's Paste Wax or equivalent)	
G50092	Compound - Metrology Casting Material - ReproRubber Quick Setting Putty	

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Check

SUBTASK 78-31-01-010-026-G00

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

G. Rigging Check

SUBTASK 78-31-01-860-055-G00

(1) Do the V-blade rigging check.

(a) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, that is coned shaped (approximately 0.20 in. (5.08 mm) in diameter by 0.15 in. (3.81 mm) thick) into the outer V-groove at the 45°, 90°, 135°, 225°, 270, and 315° radial positions.

NOTE: The top and bottom 10.5 in. (26.7 cm) approximately of the outer V-Blade is reduced in height. Do not apply clay there. If you do, the results will be in error.

(b) Put a piece of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, that is coned shaped (approximately 0.20 in. (5.08 mm) in diameter by 0.25 in. (6.35 mm) thick) into the inner V-groove at the 30°, 90°, 150°, 210°, 270, and 330° radial positions.

(c) If you will use clay, G02020, apply paste wax parting agent, G02415, in the corresponding locations on the outer and inner V-blades of the thrust reverser.

SUBTASK 78-31-01-860-056-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN AND CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close and latch the thrust reverser but do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

(a) If you used ReproRubber Quick Setting Putty compound, G50092, make sure that you leave the thrust reverser closed for the manufacturer's recommended setting time.

SUBTASK 78-31-01-860-057-G00

(3) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

SUBTASK 78-31-01-220-001-G00

(4) Measure the thickness of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the inner V-groove.

(a) Remove clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the inner V-groove at the six locations.

(b) Measure the thickness of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, with a vernier caliper (0 - 6 inch, readable to 1/1000 inch), STD-1097.

(c) Record the thickness of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the inner V-groove and location from where it was taken.

(d) Make sure that the thickness at each location is as shown in the table below:

Table 601/78-31-01-993-808-G00 Clay Thicknesses

EDGE ZONE	SECTION	THICKNESS
[A]	B-B	minimum 0.020 in. (0.508 mm) not more 0.190 in. (4.826 mm)

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SUBTASK 78-31-01-220-002-G00

(5) Measure the thickness of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the outer V-groove.

(a) Remove the clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the outer V-groove at the six locations.

(b) Measure the thickness of each clay, G02020, or ReproRubber Quick Setting Putty compound, G50092.

(c) Record the thickness of each clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, from the outer V-groove and the location from where it was taken.

(d) Calculate the average thickness of the three pieces of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the left thrust reverser half.

(e) Calculate the average thickness of the three pieces of clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, on the right thrust reverser half.

(f) Make sure that the average thickness (clearance) for each side is not more than 0.020 in. (0.508 mm).

SUBTASK 78-31-01-160-004-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(6) Remove all clay, G02020, or ReproRubber Quick Setting Putty compound, G50092, that remains in the inner and outer V-grooves with solvent, B00062.

SUBTASK 78-31-01-820-029-G00

(7) If the thrust reverser rig check is not in the limits, do this task: Thrust Reverser Adjustment, TASK 78-31-01-820-801-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-021-G00

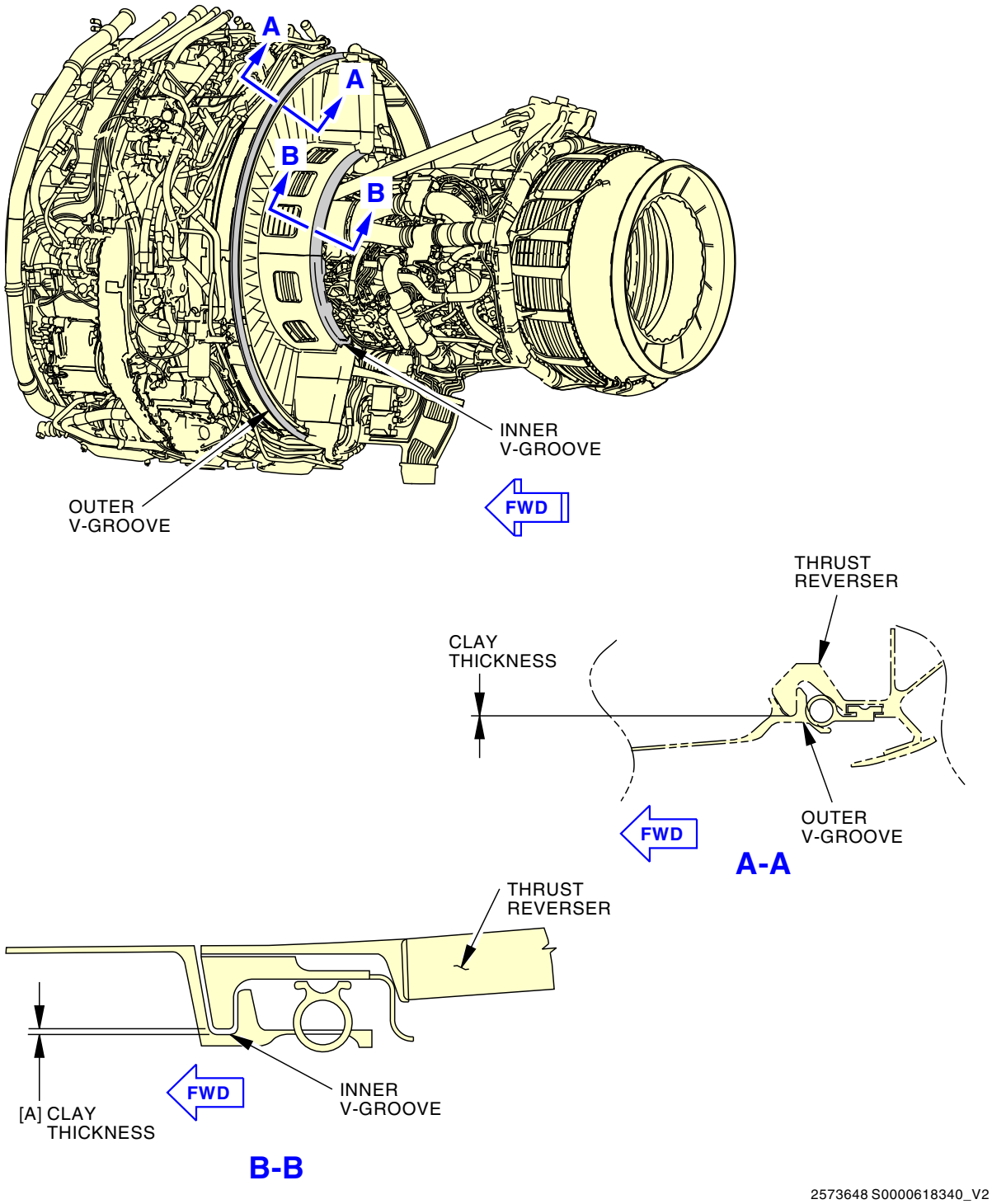
(1) Close the thrust reversers (TASK 78-31-00-010-802-G00).

(a) Make sure that latches number 1 through latch number 6 on the thrust reverser latch beam have a closing force of 40 lbf (178 N) - 60 lbf (267 N) using a spring scale (0-100 Lbs), STD-1184.

(b) If adjustments are necessary, do this task: Latches Adjustment, TASK 78-31-11-820-801-G00.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Rigging Check
Figure 606/78-31-01-990-823-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

TASK 78-31-01-211-807-G00

10. Composite Inner Wall Inspection

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task is for a visual inspection of the composite inner wall of the left and right thrust reversers.

NOTE: See Thrust Reverser Inner Duct Wall Skin /SRM PROCEDURE 54-30-01-0I-3.

(2) The procedures are the same for the left and right thrust reversers.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-01 P/B 401	THRUST REVERSER - REMOVAL/INSTALLATION
78-31-13-000-801-G00	Insulation Blankets - Removal (P/B 401)
78-31-13-400-801-G00	Insulation Blankets - Installation (P/B 401)
SRM 54-30-01-0I-3	Thrust Reverser Inner Duct Wall Skin
SRM 54-30-01-1A-6	Thrust Reverser Composite Inner Duct Wall Skin Panel
SRM 54-30-01-2R-6	Thrust Reverser Composite Inner Duct Wall Acoustic Panel

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

E. Prepare for the Inspection

SUBTASK 78-31-01-010-027-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-31-01-010-029-G00

(2) Remove the insulation blankets, upper thermal protection system (TPS) panel, and lower TPS panel (TASK 78-31-13-000-801-G00).

F. Composite Inner Wall Inspection

SUBTASK 78-31-01-211-004-G00

(1) Inspect the inner wall of the thrust reverser for damage:

NOTE: For allowable damage limits, see Thrust Reverser Composite Inner Duct Wall Skin Panel/SRM PROCEDURE 54-30-01-1A-6.

(a) Cracks

(b) Thermal degradation

(c) Delamination

(d) Disbanding

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

SUBTASK 78-31-01-300-001-G00

(2) If damage is found, see Thrust Reverser Composite Inner Duct Wall Acoustic Panel/SRM PROCEDURE 54-30-01-2R-6.

SUBTASK 78-31-01-960-010-G00

(3) If the damage found is beyond repair limits, replace the thrust reverser: THRUST REVERSER - REMOVAL/INSTALLATION, PAGEBLOCK 78-31-01/401.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-026-G00

(1) Install the lower TPS panel, upper TPS panel, and insulation blankets (TASK 78-31-13-400-801-G00).

SUBTASK 78-31-01-410-028-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

TASK 78-31-01-210-801-G00

11. Composite Inner Wall Inlet and Exhaust Ports

(Figure 607)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task is for a general visual inspection of the composite inner wall inlet and exhaust ports for the left and right thrust reversers.

(2) The procedures are the same for the left and the right thrust reversers.

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-01-010-028-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Composite Inner Wall Inlet and Exhaust Ports Inspection

SUBTASK 78-31-01-210-008-G00

(1) Examine the inlet ports for blockage, FOD, or unwanted material:

(a) Examine the inlet ports on the upstream side of the blocker door drag link anchor fittings (5 locations on each thrust reverser).

(b) Examine the inlet port (1 location) on the inner wall in the fan duct near the NO. 2 compression pad fitting on the lower bifurcation.

SUBTASK 78-31-01-210-009-G00

(2) Examine the exhaust and drain ports for blockage, FOD, or unwanted material.

NOTE: There are six exhaust ports on the vertical flange, forward of the insulation blankets, on each thrust reverser.

NOTE: There are two drain ports (that also operate as exhaust ports) on the bottom of each thrust reverser.

SUBTASK 78-31-01-100-001-G00

(3) Remove all blockage, FOD, or unwanted material from the inlet and exhaust ports.

SUBTASK 78-31-01-211-005-G00

(4) If you find damage, do this task: Composite Inner Wall Inspection, TASK 78-31-01-211-807-G00.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-027-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

(Continued)

Number	Name/Location
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

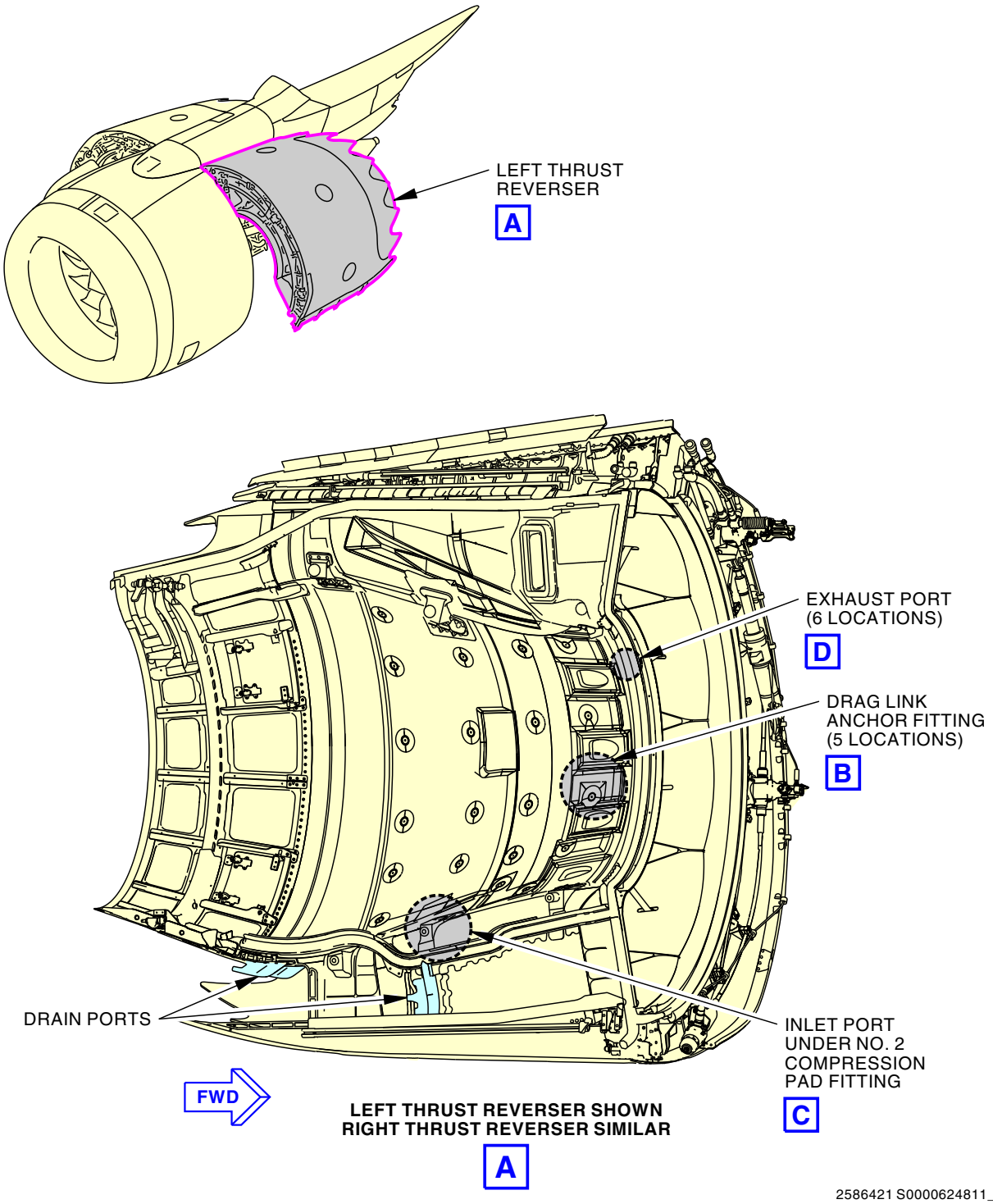
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

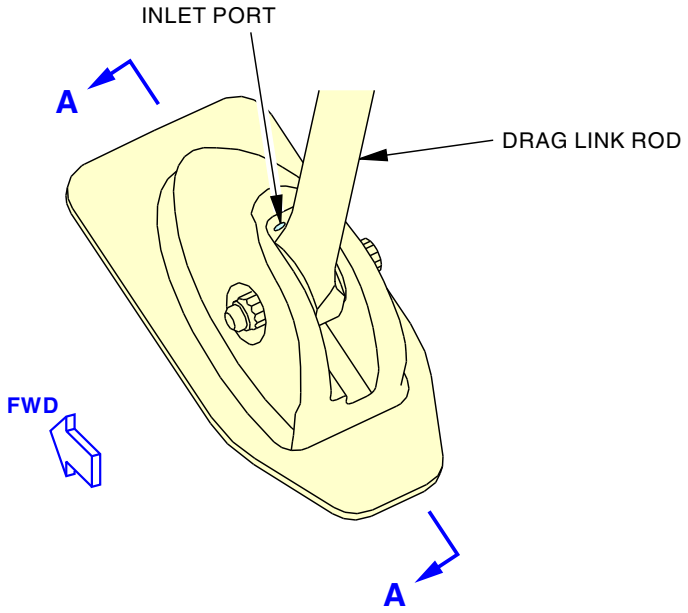
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



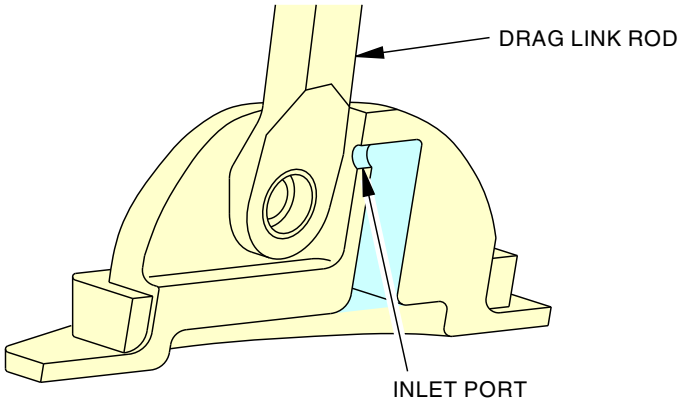
Composite Inner Wall Inlet and Exhaust Ports
Figure 607/78-31-01-990-826-G00 (Sheet 1 of 3)

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DRAG LINK ANCHOR FITTING

B

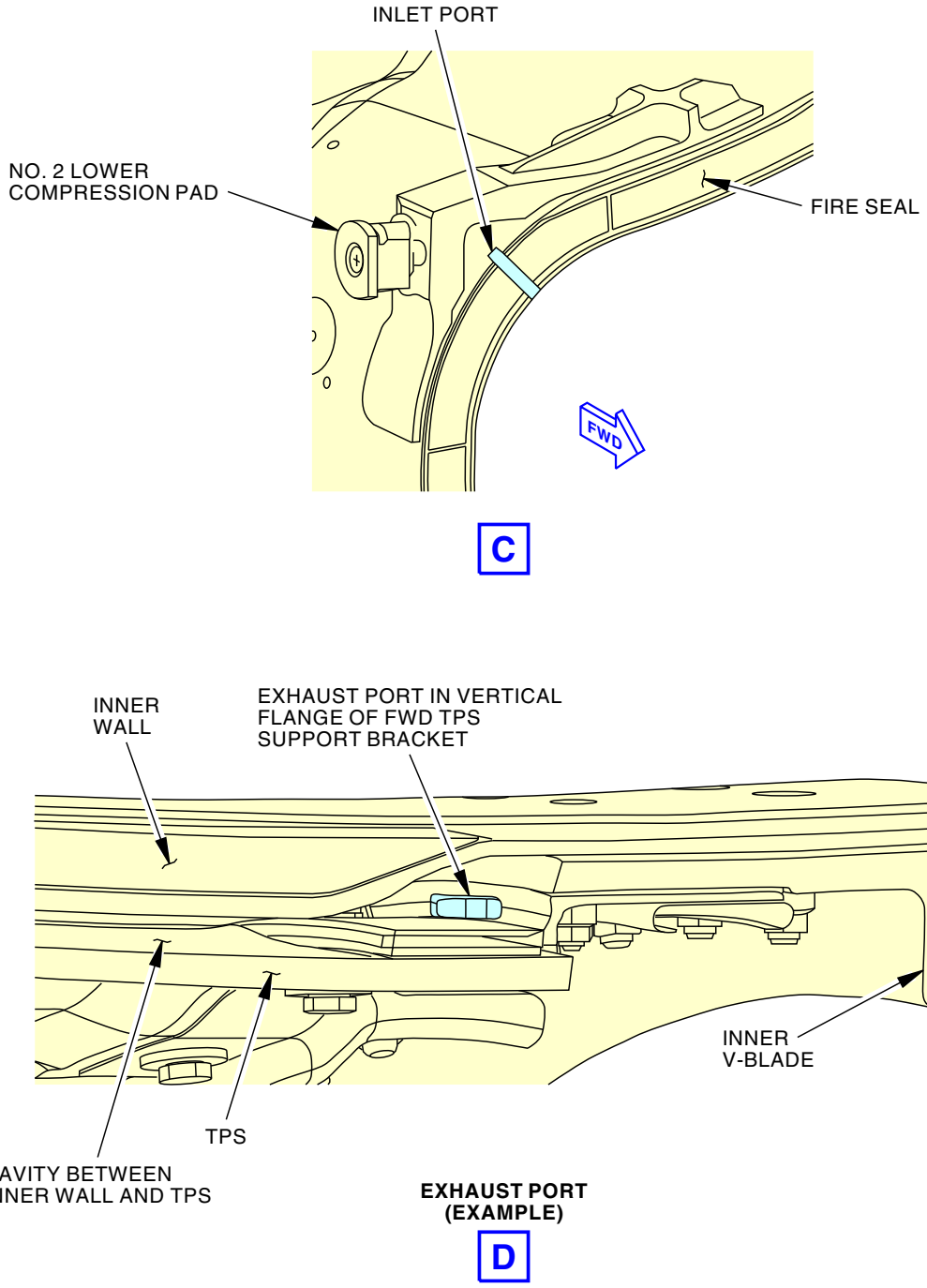


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Composite Inner Wall Inlet and Exhaust Ports
Figure 607/78-31-01-990-826-G00 (Sheet 2 of 3)

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Composite Inner Wall Inlet and Exhaust Ports
Figure 607/78-31-01-990-826-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER- CLEANING/PAINTING

1. General

A. This procedure has these tasks:

(1) Thrust Reverser Witness Mark Installation

(2) Thrust Reverser Acoustic Surfaces Cleaning.

TASK 78-31-01-370-801-G00

2. Thrust Reverser Witness Mark Installation

(Figure 701)

A. General

(1) This task gives the instructions to paint a replacement witness mark on the inside surface of the thrust reverser duct.

B. References

Reference	Title
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-128	Brush - Paint

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
C00033	Coating - Protective Enamel, Flexibility Use	BMS10-60 Type II
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00251	Abrasive - Mat, Non-Woven, Non-Metallic	A-A-58054
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)

E. Apply the Witness Mark

SUBTASK 78-31-01-860-012-G00

WARNING KEEP PERSONNEL AND EQUIPMENT AWAY FROM THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Pressurize the applicable hydraulic system (TASK 29-11-00-860-801).

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SUBTASK 78-31-01-860-058-G00

(2) Start the thrust reverser cycle special function (TASK 71-00-00-700-816-G00).

SUBTASK 78-31-01-860-013-G00

(3) Slowly move the engine No. 1 (2) reverse thrust lever up and aft to the extended position.

(a) Make sure that the reverser sleeves on engine No. 1 (2) move to the fully extended position.

SUBTASK 78-31-01-860-014-G00

(4) Move the engine No. 1 (2) reverse thrust lever forward and down to the retracted position.

(a) Make sure that the reverser sleeves on engine No. 1 (2) move to the fully retracted position.

SUBTASK 78-31-01-040-009-G00

(5) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-01-370-001-G00

(6) Prepare the surface to be painted.

(a) Apply a mask around the witness mark area with Scotch Flatback Masking Tape 250, G00270 or equivalent adhesive masking tape.

(b) Roughen and activate the enamel paint on the surface with 400 grit, abrasive mat, G00251 or equivalent abrasive mat.

(c) Use a clean cloth cotton wiper, G00034 that is moist with solvent, B00062 to make the roughened surface clean.

(d) Wipe the surface dry with a dry and clean cotton wiper, G00034 before the solvent becomes dry.

SUBTASK 78-31-01-370-002-G00

(7) Immediately apply 1 coat of black enamel coating, C00033 in the area shown.

(a) Use a paint brush, STD-128 to apply a uniform coat.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-370-003-G00

(1) Remove the masking tape.

SUBTASK 78-31-01-440-008-G00

(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-01-860-059-G00

(3) Start the thrust reverser cycle special function (TASK 71-00-00-700-816-G00).

SUBTASK 78-31-01-860-015-G00

(4) Slowly move the engine No. 1 (2) reverse thrust lever up and aft to the extended position.

(a) Make sure that the reverser sleeves on engine No. 1 (2) move to the fully extended position.

SUBTASK 78-31-01-860-016-G00

(5) Move the reverse thrust lever forward and down to the retracted position.

(a) Make sure that the reverser sleeves on engine No. 1 (2) move to the fully retracted position.

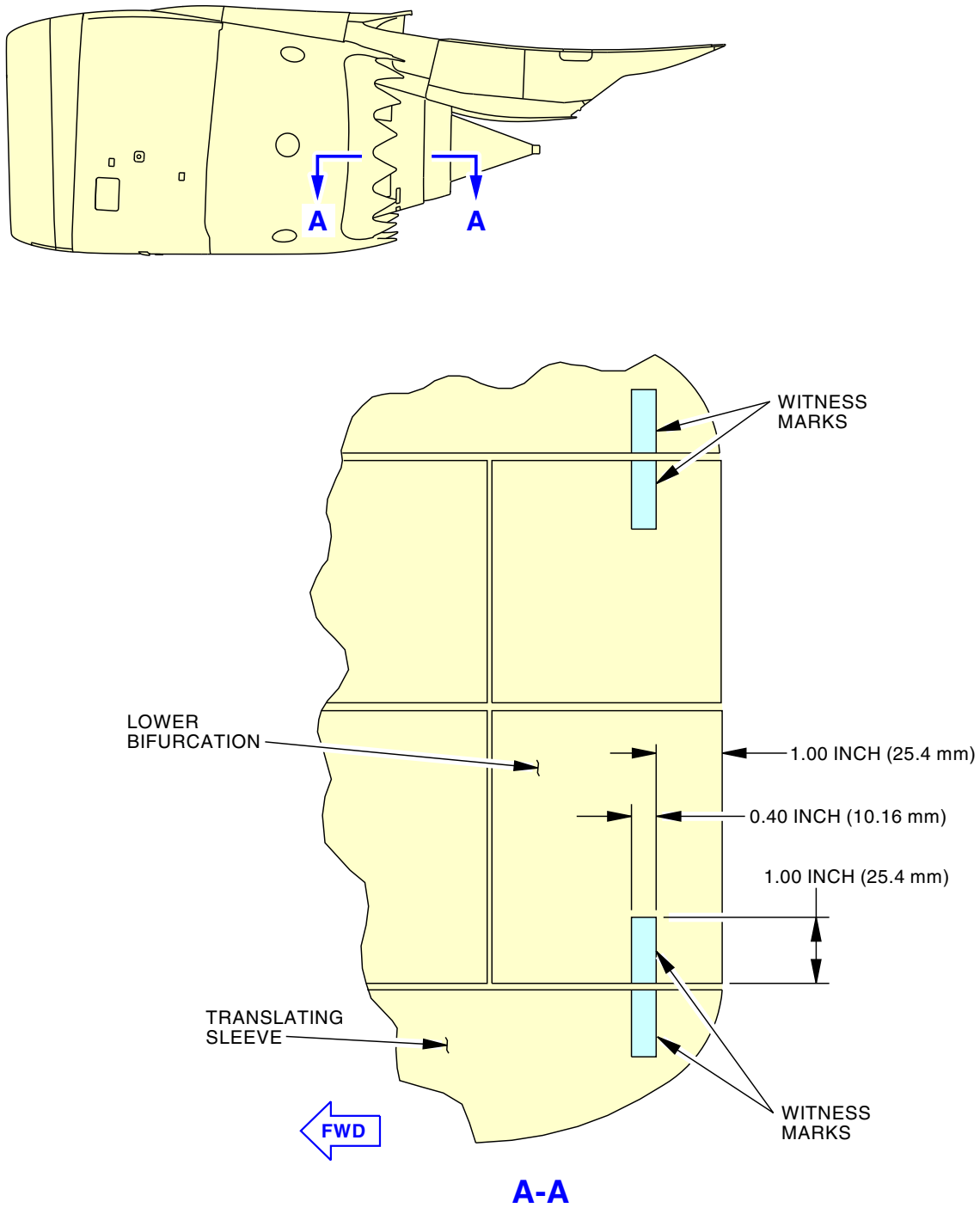
ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-860-017-G00

(6) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

END OF TASK

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Thrust Reverser Witness Mark
Figure 701/78-31-01-990-812-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-160-801-G00

3. Thrust Reverser Acoustic Surfaces Cleaning

A. General

(1) This task gives the instructions to clean the acoustic panels of the thrust reverser.

(2) Special attention should be given to prevent water and cleaning agents from entering the cells of the acoustic panels. Follow the steps below to minimize the ingestion of cleaning solutions and water into the acoustic panels.

(3) Use only cleaning agents certified for use in cleaning the acoustic surfaces.

(4) If it is necessary, contact your maintenance or Boeing to make sure that the cleaning agent or solvent is certified for use.

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
B50135	Solvent - 1,1,1 Trichloroethane	
G50933	Cloth - Cleaning, Low-Lint Cloth (General Use)	A-A-59323 Type II (Supersedes MIL-C-85043)

D. Prepare for the Cleaning

SUBTASK 78-31-01-860-018-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

E. Thrust Reverser Acoustic Surfaces Cleaning

SUBTASK 78-31-01-110-001-G00



CAUTION

DO NOT LET WATER AND CLEANING AGENTS STAY IN THE PANEL. WATER AND CLEANING AGENTS CAN CAUSE CORROSION OF THE ALUMINUM HONEYCOMB CORE.

(1) Wipe the cleaning solution on with a low-lint cleaning cloth, G50933.

NOTE: The cloth must be damp but not saturated with the cleaning solution.

SUBTASK 78-31-01-110-002-G00

(2) Wipe with a low-lint cleaning cloth, G50933 damp with water to remove all residues.

SUBTASK 78-31-01-160-001-G00

(3) Use a clean dry cloth to wipe and remove all moisture.

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SUBTASK 78-31-01-950-001-G00

CAUTION

DO NOT USE A SPRAY WITH STRONG PRESSURE ON SKIN AREAS WITH HOLES OR PUT THEM IN SOLVENTS OR WATER. WATER, CLEANING AGENTS OR SOLVENTS CAN CAUSE CORROSION.

(4) If you will pressure wash components around acoustic panels, do the applicable step that follows:

NOTE: This will prevent ingestion of the cleaning solution into acoustic material.

(a) If the thrust reverser contains a composite inner wall, you must cover all the acoustic portions of the nacelle.

(b) If the thrust reverser contains a titanium inner wall, you must cover all the acoustic portions of the nacelle except the titanium inner wall.

SUBTASK 78-31-01-110-005-G00

CAUTION

DO NOT VAPOR-DEGREASE GRAPHITE/ARAMID EPOXY STRUCTURES WITH CHLORINATED AGENTS. DAMAGE TO THE STRUCTURES CAN OCCUR.

CAUTION

DO NOT PUT THE PARTS IN THE SOLVENT OR LET IT SOAK IN THE SOLVENT. DAMAGE TO THE PART CAN OCCUR.

(5) Use 1,1,1-Trichloroethane solvent, B50135 only as a wipe solvent.

NOTE: Trichloroethane solvent is one of the solvents approved to wipe clean composite components.

NOTE: Methylene Chloride, Trichoroethylene and Trichloroethane are chlorinated agents that you cannot use to vapor-degrease graphite/aramid epoxy structures.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-860-019-G00

(1) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER - REPAIRS

1. General

A. This procedure has these tasks.

(1) Thrust reverser hinge beam fire wall replacement.

(2) Blocker door support assembly replacement.

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(3) Through stud replacement.

SIA ALL

TASK 78-31-01-960-801-G00

2. Thrust Reverser Hinge Beam Fire Wall Replacement

(Figure 801)

A. General

(1) This task gives the instructions to replace the fire wall plate on the thrust reverser hinge beam.

(2) The fire wall is attached to the aluminum hinge beam of the thrust reverser. The upper flange of the firewall can become worn which would allow a breach of the engine fan compartment fire protection features.

(3) The fire wall helps to contain an engine fan case compartment fire from the components on the fan case mounted gearbox.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (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-768	Sealant Removal Tool, Non-Metallic Part #: ST982L-9 Supplier: 81205 Part #: ST982LF-9 Supplier: 81205 Part #: ST982LH-A-1 Supplier: 81205
STD-764	Scraper - Non-metallic

D. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
C00304	Coating - Teflon Filled, Non Decorative, Sprayable Material	BMS10-86 Type I

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left

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(Continued)

Zone	Area
426	Engine 2 - Thrust Reverser, Right

F. Replace the Firewall

SUBTASK 78-31-01-010-010-G00

(1) Open the thrust reverser.

WARNING OBEY THE INSTRUCTIONS IN THIS PROCEDURE WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

SUBTASK 78-31-01-020-009-G00

(2) Remove the left firewall [1].

(a) Remove the two bolts [3] and nuts [4] that attach the left firewall [1] to the seal retainer [2].

(b) Remove the 19 bolts [6], washers [7] and nuts [8] that attach the left firewall [1] to the hinge beam.

(c) Remove the five bolts [9], washers [10] and nuts [11] that attach the seal retainer [5] and the left firewall [1] to the hinge beam.

(d) Use an non-metallic scraper, STD-764 to pry the fire wall from the hinge beam and remove the firewall.

NOTE: The fire wall was installed with fire wall sealant, between the fire wall and the hinge beam flange.

1) Do not scratch or damage the surface of the metal hinge beam.

SUBTASK 78-31-01-020-010-G00

(3) Remove the right firewall [12].

(a) Remove the two bolts [14] and nuts [15] that attach the right firewall [12] to the seal retainer [13].

(b) Remove the 19 bolts [17], washers [18] and nuts [19] that attach the right firewall [12] to the hinge beam.

(c) Remove the five bolts [20], washers [21] and nuts [22] that attach the seal retainer [16] and the right firewall [12] to the hinge beam.

(d) Use an non-metallic scraper, STD-764 to pry the fire wall from the hinge beam and remove the firewall.

NOTE: The fire wall was installed with fire wall sealant, between the fire wall and the hinge beam flange.

1) Do not scratch or damage the surface of the metal hinge beam.

SUBTASK 78-31-01-160-002-G00

(4) Clean the surface of the hinge beam with sealant removal tool, SPL-768 to remove old firewall sealant.

(a) Do not scratch or damage the surface of the metal hinge beam.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-01-350-001-G00

(5) Apply fire wall sealant, A00160 to the forward surface of the hinge beam and to the mating surface of the fire wall.

(a) Prepare the sealant with the manufacturers instructions.

SUBTASK 78-31-01-390-001-G00

(6) Apply fire wall sealant, A00160 to the mating surface of the fire wall and the seal retainer.

(a) Prepare the sealant with the manufacturers instructions.

SUBTASK 78-31-01-420-004-G00

(7) Install the left firewall [1].

(a) Position the fire wall on the forward flange of the hinge beam.

(b) Apply fire wall sealant, A00160 to the fasteners and immediately install the fasteners with wet sealant.

(c) Install the 19 bolts [6], washers [7] and nuts [8] that attach the left firewall [1] to the hinge beam.

(d) Apply a Teflon coating, C00304 to the heads of the fasteners.

(e) Install the five bolts [9], washers [10] and nuts [11] that attach the seal retainer [5] and the left firewall [1] to the hinge beam.

(f) Install the two bolts [3] and nuts [4] that attach the left firewall [1] to the seal retainer [2].

(g) Tighten all the fasteners to 15 in-lb (2 N·m)-25 in-lb (3 N·m).

SUBTASK 78-31-01-420-005-G00

(8) Install the right firewall [12].

(a) Position the fire wall on the forward flange of the hinge beam.

(b) Apply fire wall sealant, A00160 to the fasteners and immediately install the fasteners with wet sealant.

(c) Install the 19 bolts [17], washers [18] and nuts [19] that attach the right firewall [12] to the hinge beam.

(d) Apply a Teflon coating, C00304 to the heads of the fasteners.

(e) Install the five bolts [20], washers [21] and nuts [22] that attach the seal retainer [16] and the right firewall [12] to the hinge beam.

(f) Install the two bolts [14] and nuts [15] that attach the right firewall [12] to the seal retainer [13].

(g) Tighten all the fasteners to 15 in-lb (2 N·m)-25 in-lb (3 N·m).

SUBTASK 78-31-01-410-008-G00

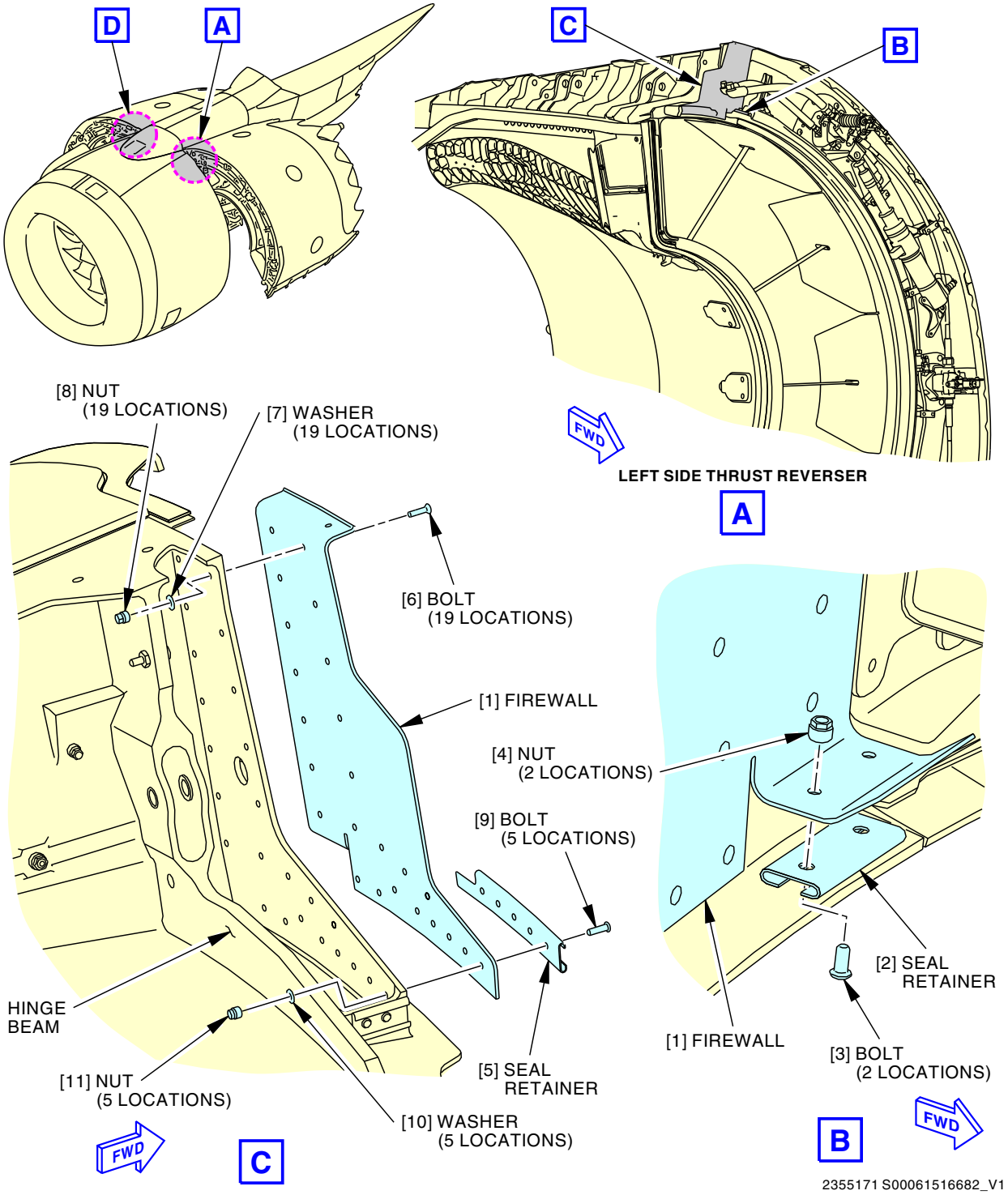
(9) Close the thrust reverser.

WARNING OBEY THE INSTRUCTIONS IN THIS PROCEDURE WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

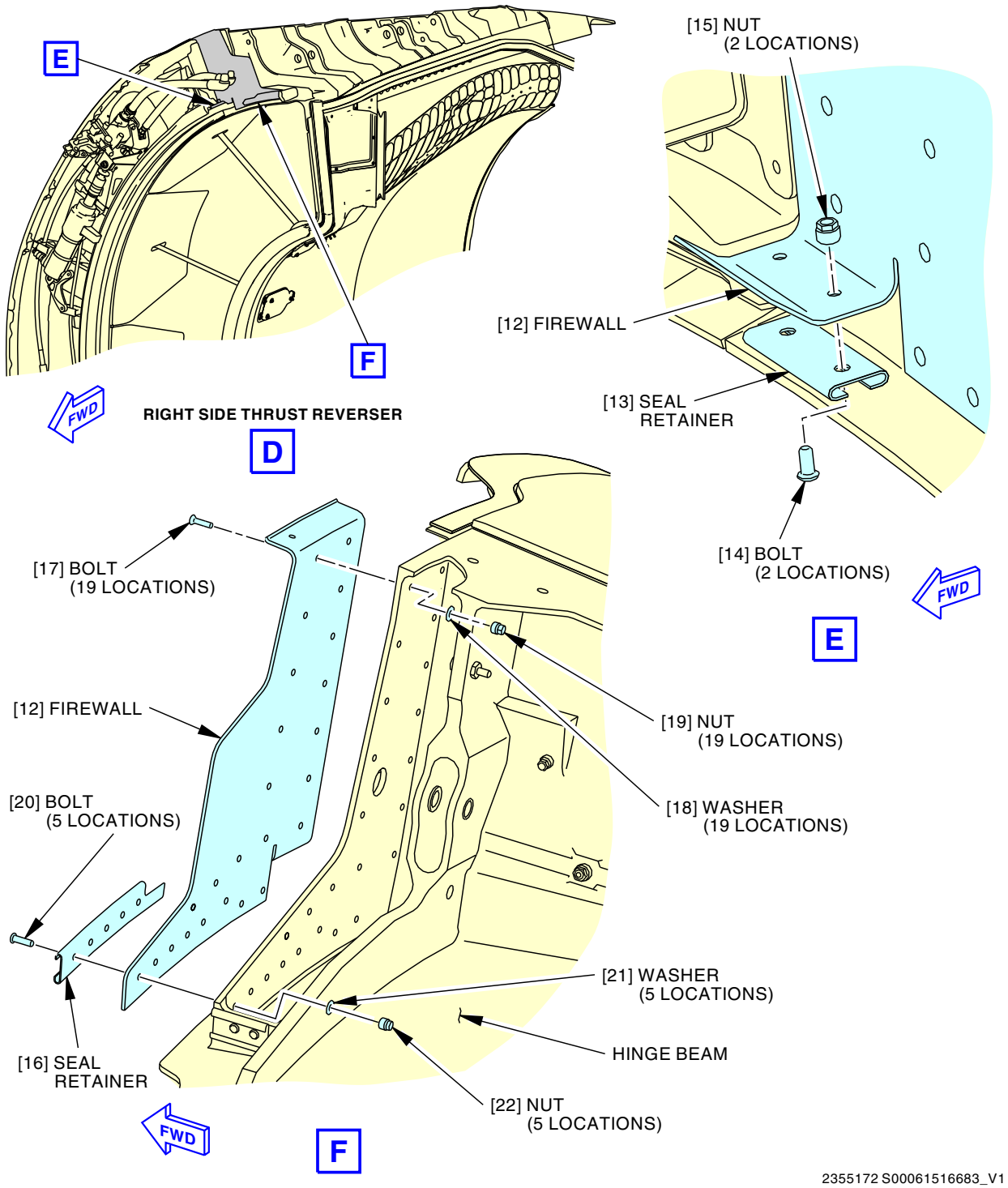
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Hinge Beam Fire Wall
Figure 801/78-31-01-990-813-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Hinge Beam Fire Wall
Figure 801/78-31-01-990-813-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-01-960-802-G00

3. Blocker Door Support Assembly Replacement

(Figure 802)

A. General

(1) This task gives the instructions to replace the blocker door bumpers on the support assemblies.

(2) The blocker door support assemblies are the two bumpers that are attached to the translating sleeve below the edge of each blocker door.

(3) For access to the blocker door support assemblies, the thrust reverser translating sleeve must be extended or the blocker door must be removed.

B. References

Reference	Title
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)
78-31-06-000-801-G00	Blocker Door Removal (P/B 401)
78-31-06-400-801-G00	Blocker Door Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Repair

SUBTASK 78-31-01-010-011-G00

(1) For access to the support assemblies, do one of these tasks:

(a) Blocker Door Removal, TASK 78-31-06-000-801-G00

(b) Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00

F. Replace the Support Assemblies

SUBTASK 78-31-01-020-011-G00

(1) Remove the support assembly as follow:

(a) Remove the screw [25] that attaches the pad [28], bumper assembly [27], and washer [26] to the support bracket.

(b) Remove the pad [28], bumper assembly [27], and washer [26] from the support bracket.

SUBTASK 78-31-01-420-006-G00

(2) Install a new support assembly as follow:

(a) Put the new pad [28], bumper assembly [27], and washer [26] in the correct position on the support bracket.

1) Install the washers [26] as necessary to make the outside surfaces of the blocker door flush with the surface of the bond assembly within 0.004 in. (0.102 mm).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Make sure the total thickness of the stack of washers [26] is less than 0.158 in. (4.013 mm).

(b) Wet install the screw [25] with sealant, A00767.

1) Tighten the screw [25] to 10 in-lb (1.1 N·m) to 20 in-lb (2.3 N·m) so the pad compresses at least 0.02 in. (0.51 mm) but not more than 0.06 in. (1.52 mm).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-01-410-009-G00

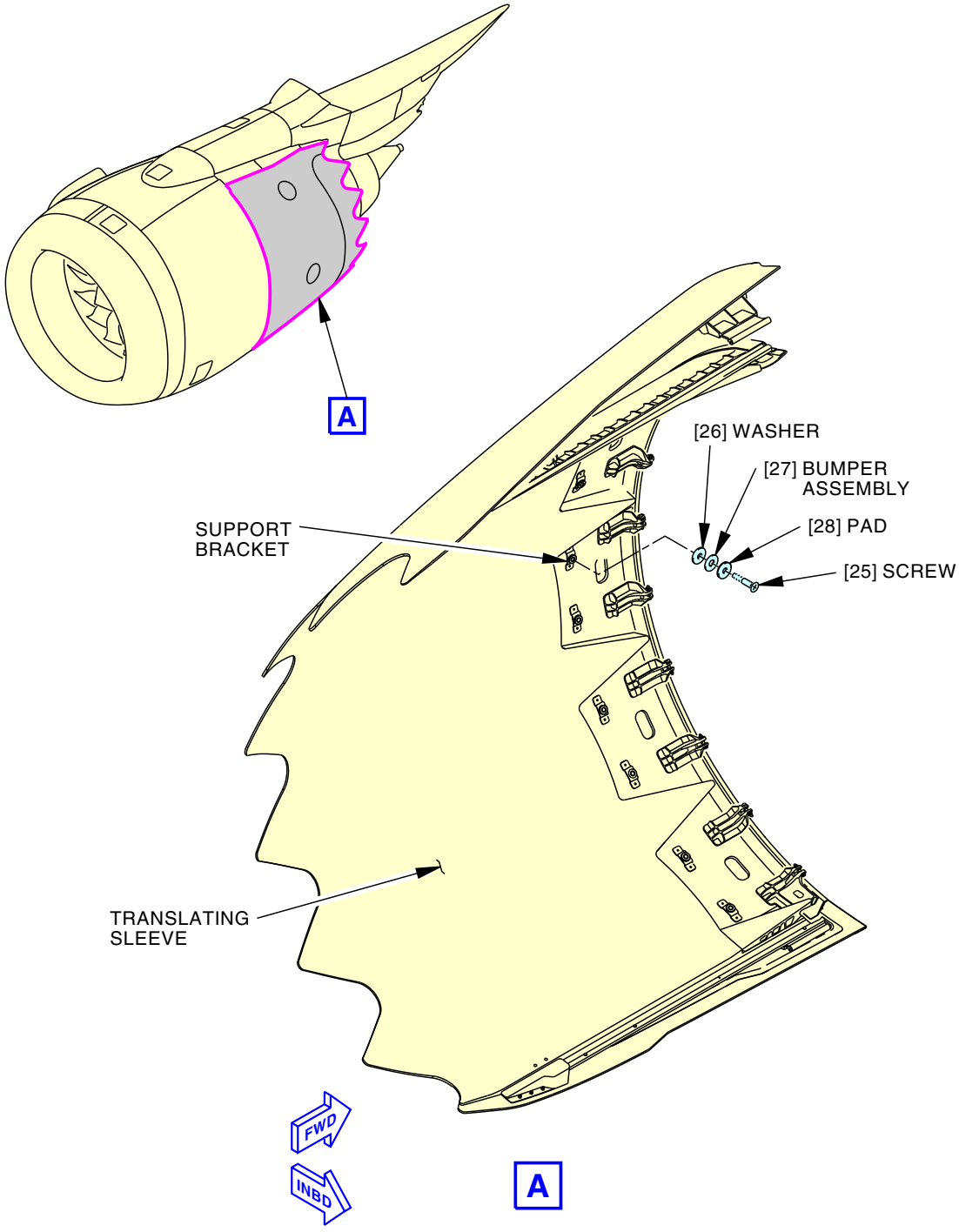
(1) If it is necessary, install the blocker door (TASK 78-31-06-400-801-G00).

SUBTASK 78-31-01-910-001-G00

(2) If it is necessary, retract the thrust reverser (TASK 78-31-00-980-802-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Blocker Door Support Assembly Replacement
Figure 802/78-31-01-990-821-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

TASK 78-31-01-960-803-G00

4. Through Stud Replacement

Figure 803

A. General

(1) This procedure gives the on-wing instructions to remove and replace damaged or cross-threaded through studs on the thrust reversers.

(a) The through studs are part of the fasteners that hold the thermal insulation blankets to the inner wall of the thrust reverser.

(b) The procedures are the same for the left and right thrust reversers.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00130	Alcohol - Isopropyl	TT-I-735
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	
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
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Replacement

SUBTASK 78-31-01-010-023-G00

WARNING DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

F. Through Stud Replacement Procedure

SUBTASK 78-31-01-960-009-G00

(1) Remove the applicable damaged through stud [1], or through stud [13] or through stud [14] or through stud [15] or through stud [16] or through stud [17] from the applicable inner wall [9] (Preferred Method), as follows:

(a) Unfold the flaps of the fastener cap cover.

(b) Remove the nut [4], washer [6], fastener cap [5], TPS nut [3], and the spring washer [2], if installed, from the applicable through stud.

(c) Do not remove the washer [6] that contacts the inner wall, if installed.

(d) Remove the applicable through stud.

SUBTASK 78-31-01-960-002-G00

(2) Clean the surface of the inner wall.

(a) Wipe or scrub the surface of the inner wall to remove any loose soil, oil, grease, or hydraulic fluid with a clean cotton wiper, G00034.

CAUTION

DO NOT DAMAGE ANY UNDERLYING STRUCTURAL PLIES.

(b) Sand mating surfaces with 180 grit or finer aluminum oxide silicone free sand paper until all sealant and surface gloss is removed.

(c) Wet a clean cotton wiper, G00034 with alcohol, B00130 or solvent, B00062 or solvent, B00148 and wipe the surface of the inner wall.

1) Remove all excess solvent or alcohol with a cloth.

2) Continue to wipe the surface with a new cloth and solvent until the cloth remains clean.

(3) Inspect the inner wall [9] for any damage from the removal procedure.

SUBTASK 78-31-01-960-003-G00

(4) Install the replacement through stud [1] or through stud [18], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [1] or through stud [18].

(b) Install the through stud [1] or through stud [18], in the inner wall [9] and the washer [6].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [1] or through stud [18].

(d) Install the spring washer [2] and the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

SUBTASK 78-31-01-960-004-G00

(5) Install the replacement through stud [13] or through stud [19], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [13] or through stud [19].

(b) Install the through stud [13] or through stud [19], in the inner wall [9] and the washer [6].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [13] or through stud [19].

(d) Install the spring washer [2] and the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

SUBTASK 78-31-01-960-005-G00

(6) Install the replacement through stud [14], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [14].

(b) Install the through stud [14], in the inner wall [9] and the TPS precooler seal land [11].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [14].

(d) Install the spring washer [2] and the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

SUBTASK 78-31-01-960-006-G00

(7) Install the replacement through stud [15], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [15].

(b) Install the through stud [15], in the inner wall [9] and the TPS precooler seal land [11].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [15].

(d) Install the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

SUBTASK 78-31-01-960-007-G00

(8) Install the replacement through stud [16], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [16].

(b) Install the through stud [16], in the inner wall [9], the wear pad [12] and the splice strap [20].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [16].

(d) Install the spring washer [2] and the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

SUBTASK 78-31-01-960-008-G00

(9) Install the replacement through stud [17], as follows:

(a) Apply a continuous and uniform layer of sealant, A00160 to the base of the through stud [17].

(b) Install the through stud [17], in the inner wall [9], the wear pad [12] and the splice strap [20].

(c) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006 to the threads of the through stud [17].

(d) Install the spring washer [2] and the TPS nut [3].

(e) Tighten the TPS nut [3] 25 in-lb (2.8 N·m) to 35 in-lb (4.0 N·m).

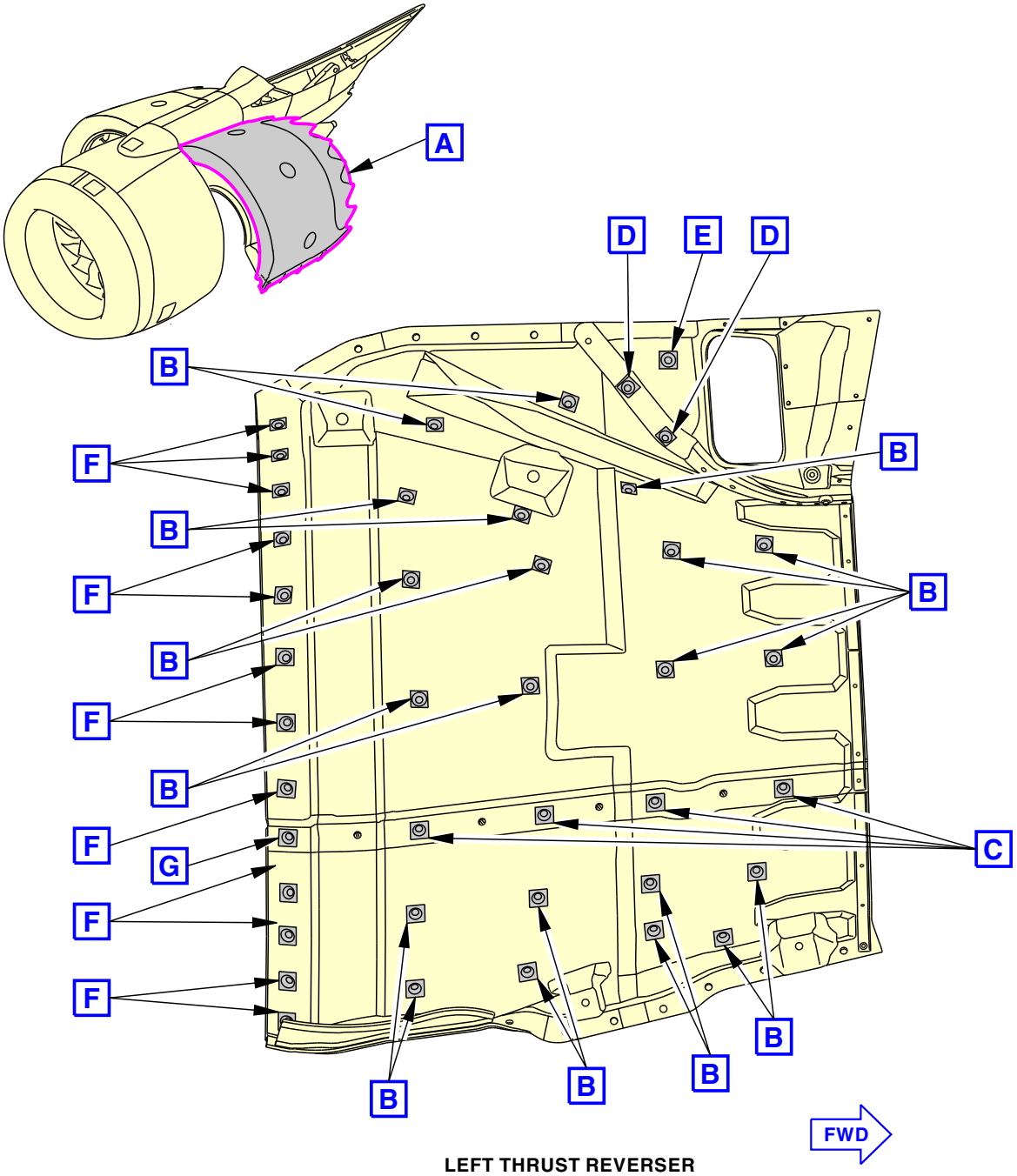
(f) Install the fastener cap [5], washer [6] and the nut [4] on the applicable TPS panel. Orient hinged edge of the fastener cap [5] facing the forward direction.

(g) Tighten the nut [4] 20 in-lb (2.3 N·m) to 22 in-lb (2.5 N·m).

(h) Once final nut torque is met, fold cover over fastener cap [5] and firmly fold flaps to secure cover.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



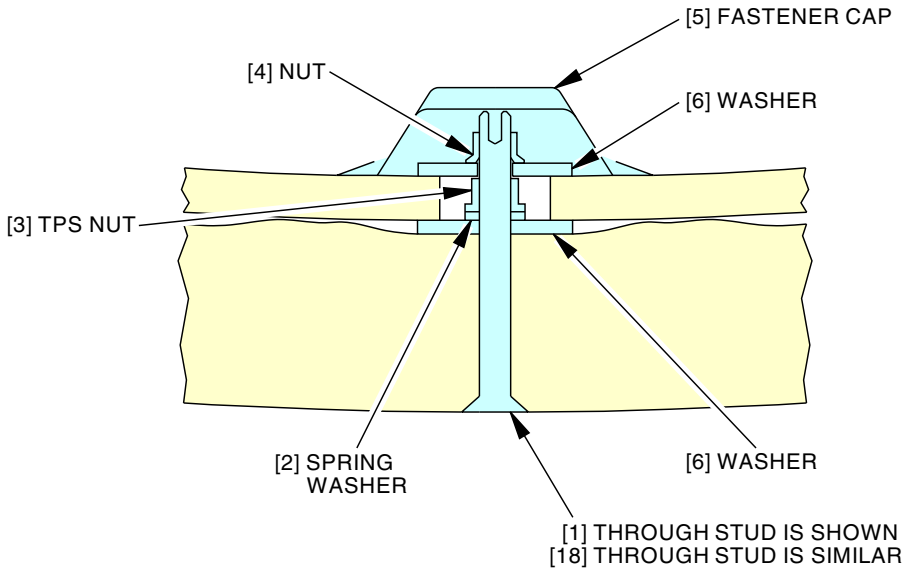
LEFT THRUST REVERSER
(RIGHT THRUST REVERSER IS OPPOSITE)
SIDE VIEW

A

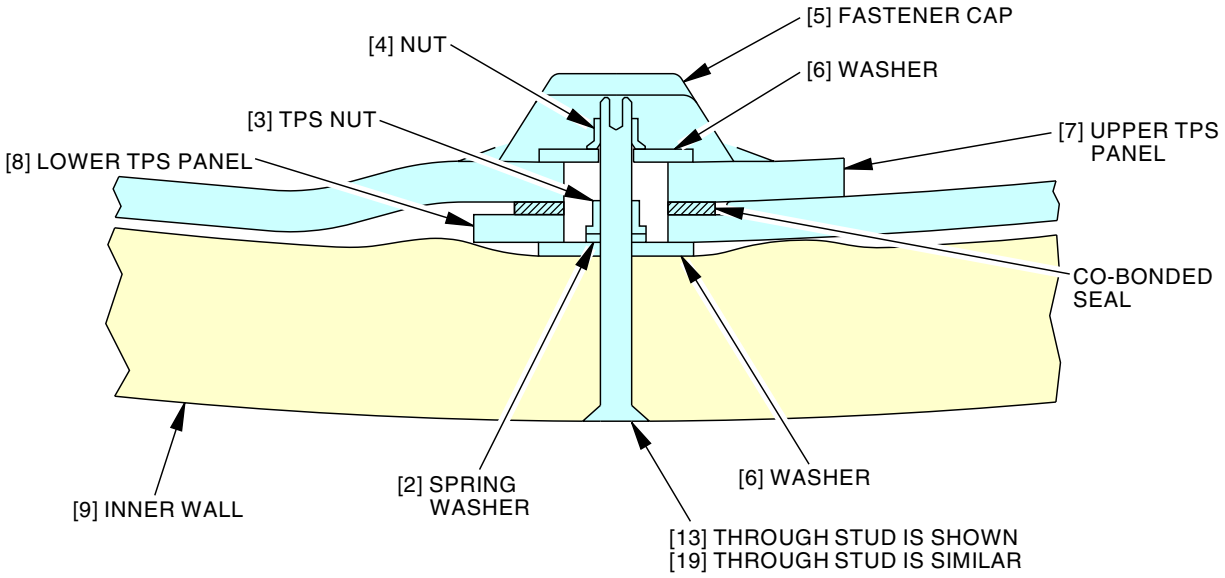
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Through Stud Replacement
Figure 803/78-31-01-990-822-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



B

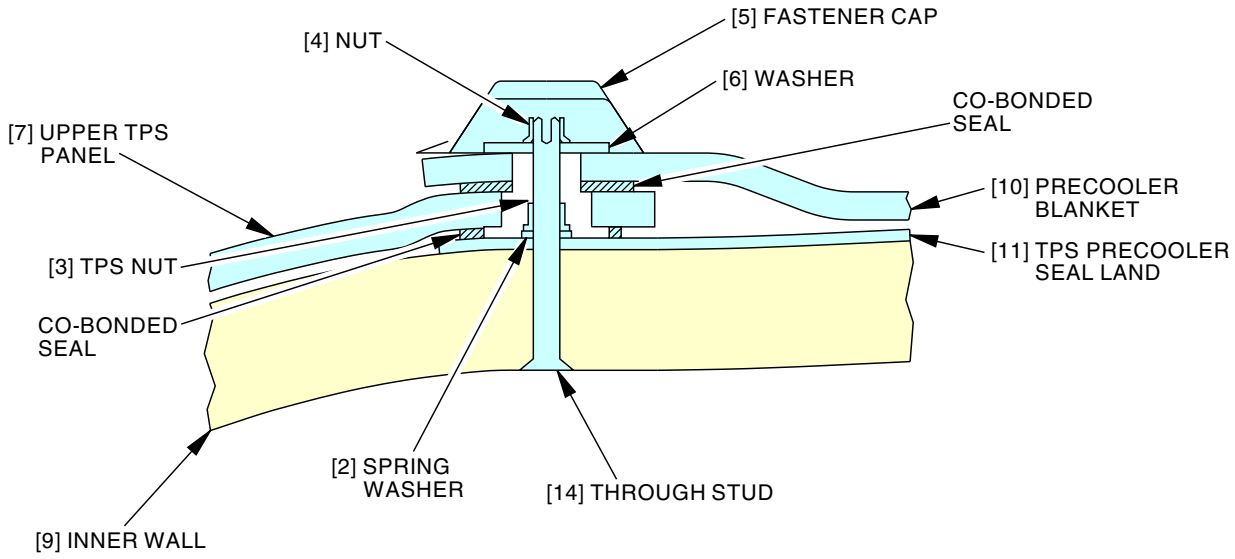


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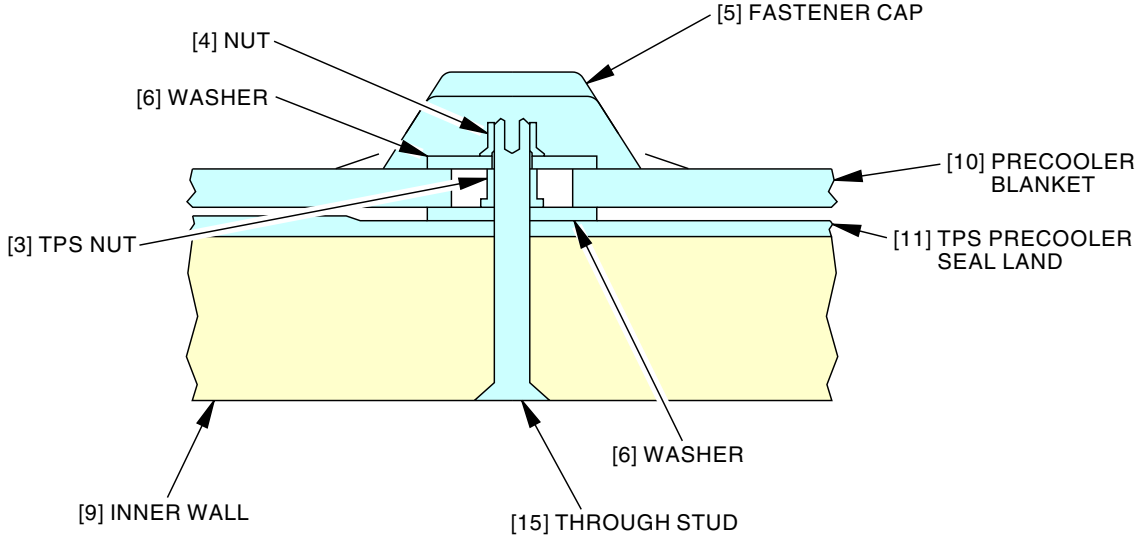
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Through Stud Replacement
Figure 803/78-31-01-990-822-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



D

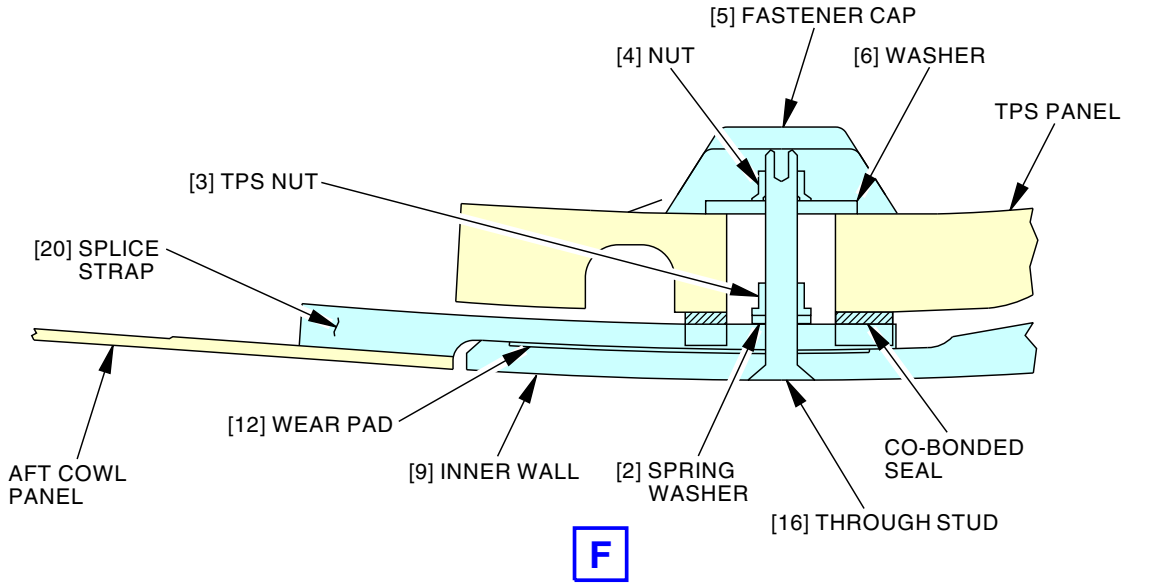


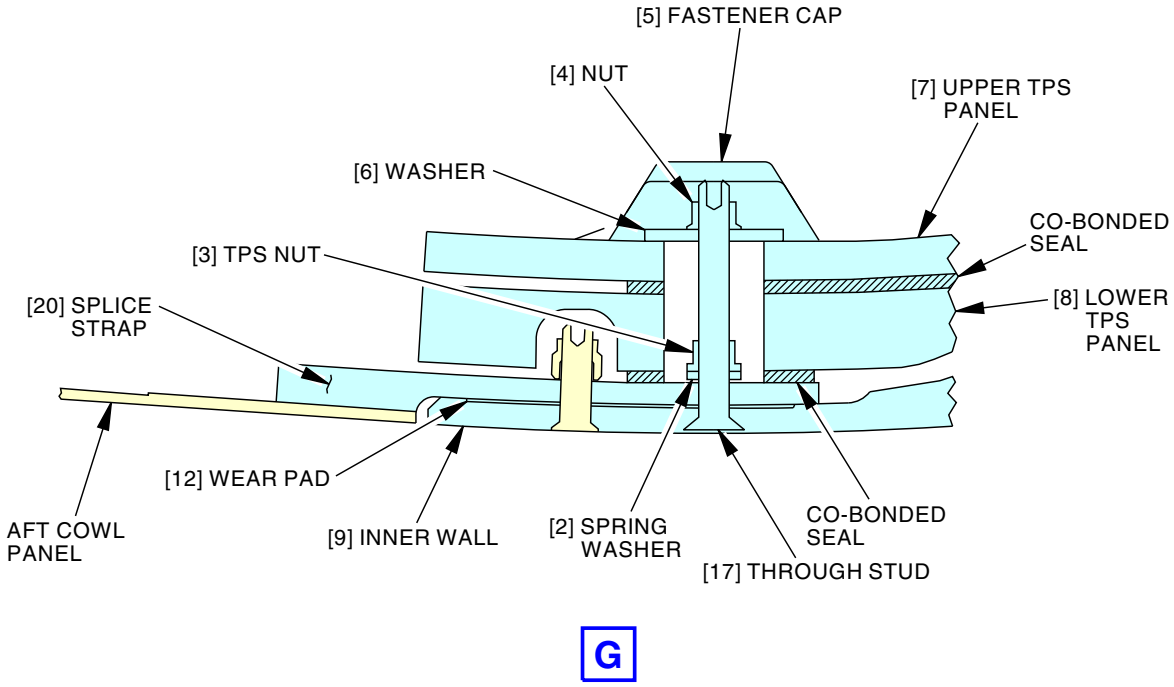
E

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Through Stud Replacement
Figure 803/78-31-01-990-822-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details





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Through Stud Replacement
Figure 803/78-31-01-990-822-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TRANSLATING SLEEVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the translating sleeve

(2) An installation of the translating sleeve.

TASK 78-31-02-000-801-G00

2. Translating Sleeve Removal

(Figure 401 and Figure 402)

A. General

(1) This task gives the instructions to remove the translating sleeve from the thrust reverser.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-02-200-802-G00	Main Slider and Auxiliary Slider Inspection (P/B 601)
78-31-07-000-801-G00	Blocker Door Drag Link Removal (P/B 401)
78-31-09-010-801-G00	Krueger Flap Deflector Removal (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-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205
SPL-14556	Sling - Thrust Reverser Sleeve, LEAP-1B Engine Part #: C78034-1 Supplier: 81205

D. 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)
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	

E. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

F. Prepare for the Removal

SUBTASK 78-31-02-010-009-G00

(1) If an inboard translating sleeve will be removed, remove the lower Krueger flap deflector to remove the access door for the actuator rod end (TASK 78-31-09-010-801-G00).

SUBTASK 78-31-02-010-016-G00

(2) Remove the access door for the applicable actuator, do these steps:

(a) Remove the six bolts [25] that attach the access doors [26] and access doors [29].

(b) For the upper actuator, remove these access doors [29]:

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

(c) For the middle actuator, remove these access doors [26]:

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(d) For the lower actuator, remove these access doors [29]:

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

SUBTASK 78-31-02-010-001-G00

WARNING

DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-02-980-001-G00

(4) Remove the five drag links [1] at the blocker doors from the thrust reverser inner fixed structure (TASK 78-31-07-000-801-G00).

(a) Secure a cotton wiper, G00034, with Vibration Damping Tape 434 tape, G02329, around the ends of the drag links so that they do not cause contact damage to the inner fixed structure.

(b) Use Vibration Damping Tape 434 tape, G02329, to hold the five drag links [1] in position so that they will not contact the inner fixed structure when you remove the translating sleeve.

G. Translating Sleeve Removal

SUBTASK 78-31-02-410-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the thrust reverser. Do this task:Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-31-02-020-001-G00

(2) Manually extend the thrust reverser translating sleeve [21] until it is approximately 3.0 in. (76.2 mm) from the stowed position (TASK 78-31-00-980-803-G00).

SUBTASK 78-31-02-020-002-G00

CAUTION DO NOT LET THE ROD ENDS OF THE HYDRAULIC ACTUATOR TURN WHEN YOU REMOVE THE BOLTS. IF THE ROD END TURNS, IT CAN CAUSE DAMAGE TO THE HYDRAULIC ACTUATOR AND THRUST REVERSER STRUCTURE.

(3) Disconnect the three thrust reverser actuator rod ends from the applicable translating sleeve (Figure 401).

(a) Remove the nut [28], washer [27], bolt [22], washer [23], and bushing [24] at each of the three actuator rod ends.

(b) Manually slide the translating sleeve [21] aft approximately 2 in. (5 cm) until the actuator rod ends move out of the translating sleeve actuator attach fittings.

(c) Safety the actuator rod ends.

1) Make sure that the actuator rod ends will not turn.

SUBTASK 78-31-02-480-001-G00

WARNING MAKE SURE THAT YOU HOLD THE GSE SLING SATISFACTORILY DURING SLEEVE INSTALLATION. THE SLING IS HEAVY. IF YOU DO NOT OBEY THIS INSTRUCTION, THE SLING CAN FALL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Install the thrust reverser sleeve sling, SPL-14556, on the thrust reverser translating sleeve [21].

NOTE: The sling weights approximately 225.0 lb (102.1 kg).

(a) Install the two adapter fittings [54] onto the upper and middle actuator attach fittings [48] with the thumb screws [57] and thumb nuts [58].

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(b) Put the frame assembly [47] into its position on the two adapter fittings [54].

(c) Attach the frame assembly [47] to the two adapter fittings [54] with the lockpins [55] and retention pins [56].

(d) Align the cross arm assembly [46] with the frame assembly [47] and deactivation pin fitting on the translating sleeve [21].

1) Make sure that the deactivation pin is not installed in the deactivation pin fitting.

(e) Attach the cross arm assembly [46] to the frame assembly [47] with the two lock pins and retaining pins.

(f) Install the hand knob [59] that attach the cross arm assembly [46] to the translating sleeve [21] at the deactivation pin fitting.

SUBTASK 78-31-02-020-003-G00

WARNING MAKE SURE THAT THE GSE SLING CAN HOLD THE WEIGHT OF THE SLEEVE BEFORE YOU REMOVE THE SLEEVE. THE SLEEVE IS HEAVY. IF YOU DO NOT OBEY THIS INSTRUCTION, THE SLEEVE CAN FALL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION MAKE SURE THAT YOU MONITOR THE POSITION OF THE SLEEVE AND SLING AS YOU MOVE THE SLEEVE AWAY FROM THE THRUST REVERSER. IF YOU DO NOT OBEY THIS INSTRUCTION, THE SLEEVE CAN HIT THE ADJACENT STRUCTURES AND DAMAGE CAN OCCUR.

(5) Remove the translating sleeve [21].

NOTE: The sleeve weights approximately 196 lb (89 kg).

(a) Manually push the sleeve aft approximately 15 in. (38 cm).

NOTE: If you move the sleeve aft before you attach the crane or boom hoist to the sling, there will be less distance that the crane or boom hoist can move with it attached to the sleeve.

(b) If an overhead crane will be used to remove the translating sleeve, do these steps to attach the frame assembly to the overhead crane.

1) Use the shackles [53] and web shackle [42] to attach the hand chain hoist [51], web sling [43], and a 500.0 lb (226.8 kg) capacity load cell [52] to the triangle lift plate [41].

2) Attach the load cell [52] to the overhead crane with the master link [40].

3) Lift the hand chain hoist [51] into position with the overhead crane.

4) Attach the hand chain hoist [51] to the frame assembly [47] with the hook and shackle [50].

5) Attach the web sling to the frame assembly with the web shackle [42].

(c) If the boom hoist [70] (boom hoist, SPL-2430) will be used to remove the translating sleeve [21], do these steps:

1) Attach the adjuster assembly [60] to the frame assembly [47] with the lockpin and retainer pin.

2) Attach the boom hoist [70] to the adjuster assembly [60] with the lockpin and retainer pin.

(d) Adjust the overhead crane or boom hoist [70] so that the full weight of the translating sleeve [21] is supported.

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(e) Manually push the translating sleeve [21] aft and off the tracks.

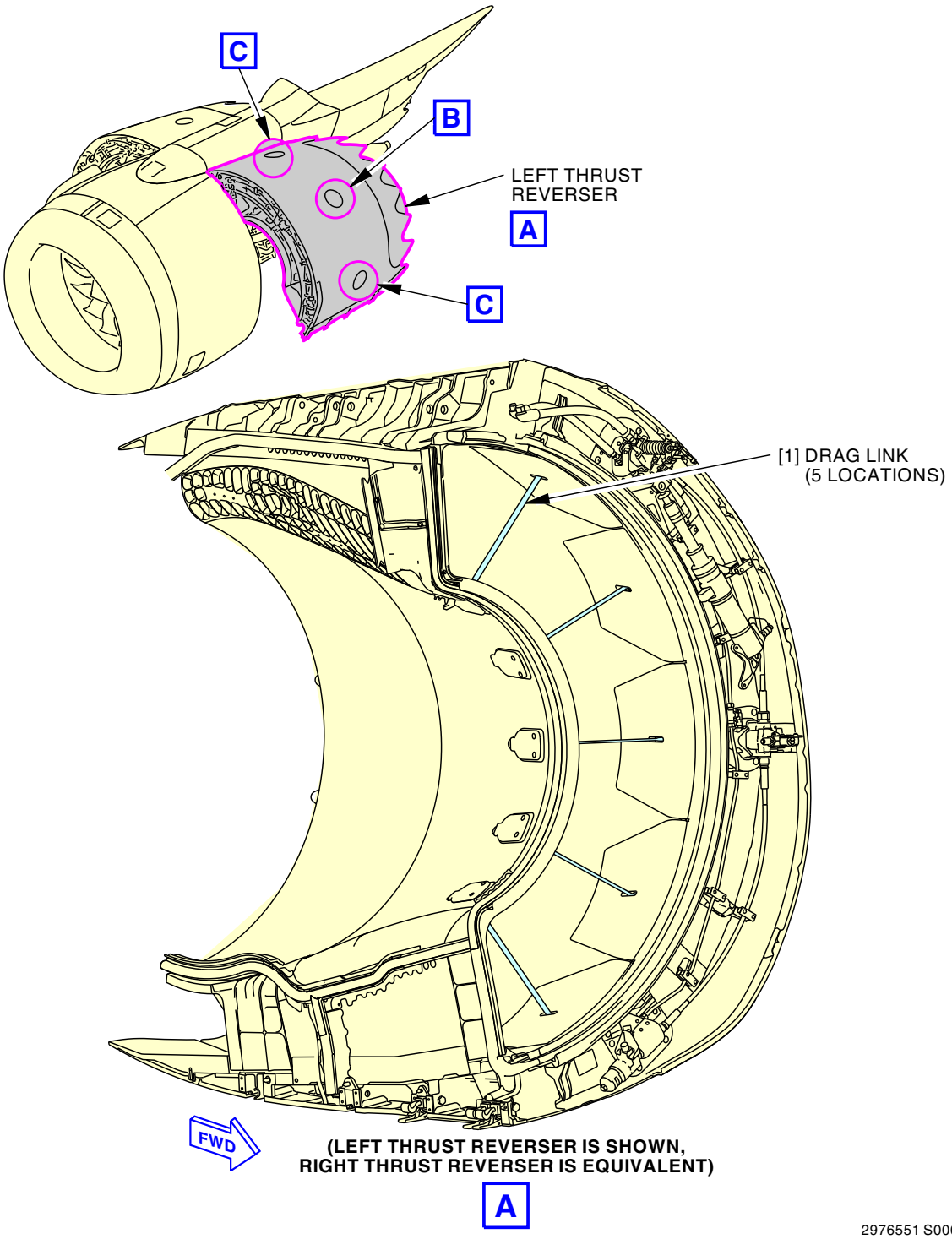
(f) Put the translating sleeve [21] on a suitable pallet and dunnage.

SUBTASK 78-31-02-210-001-G00

(6) Do this task: Main Slider and Auxiliary Slider Inspection, TASK 78-31-02-200-802-G00.

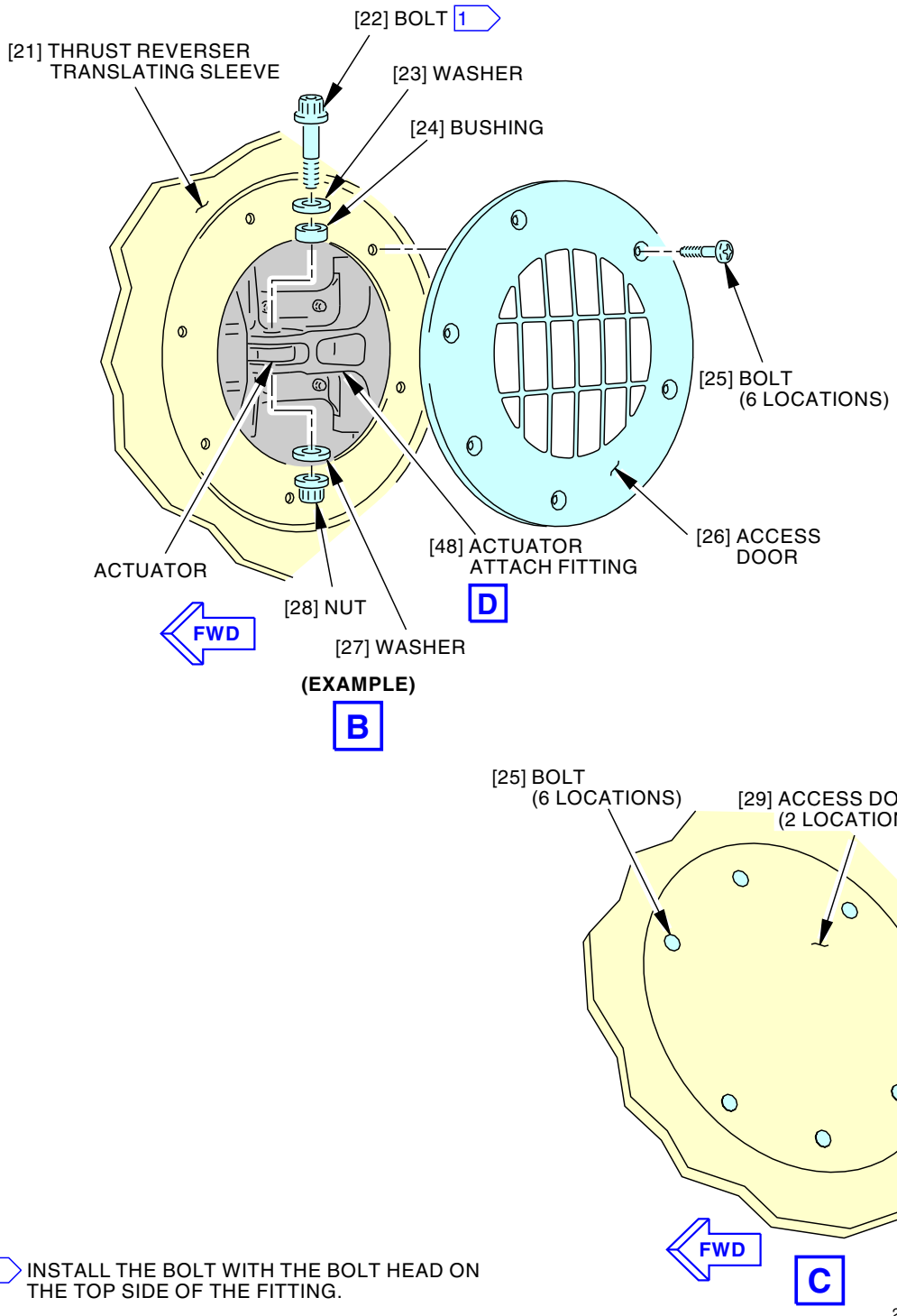
——— END OF TASK ———

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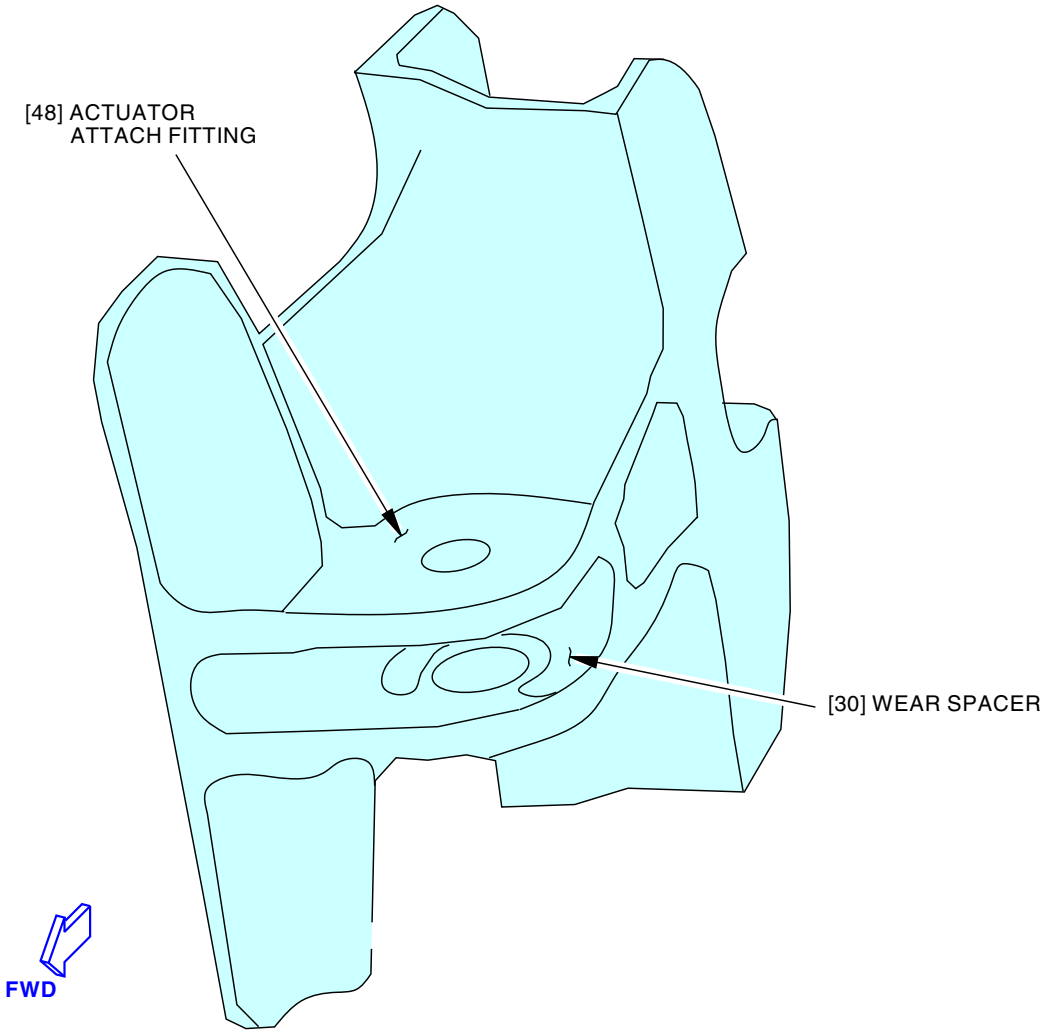
Translating Sleeve Installation
Figure 401/78-31-02-990-802-G00 (Sheet 1 of 3)

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Translating Sleeve Installation
Figure 401/78-31-02-990-802-G00 (Sheet 2 of 3)

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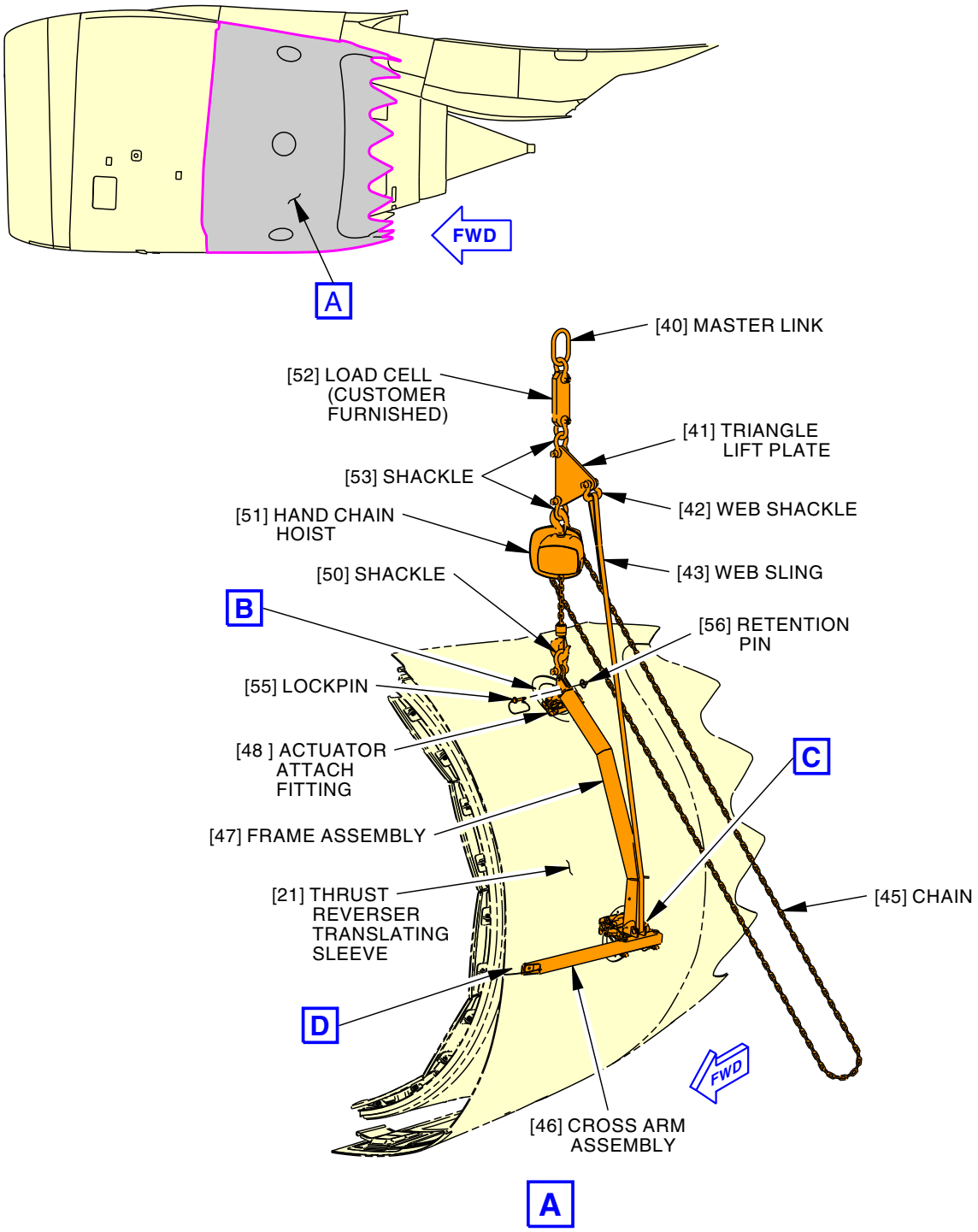
ACTUATOR ATTACH FITTING

D

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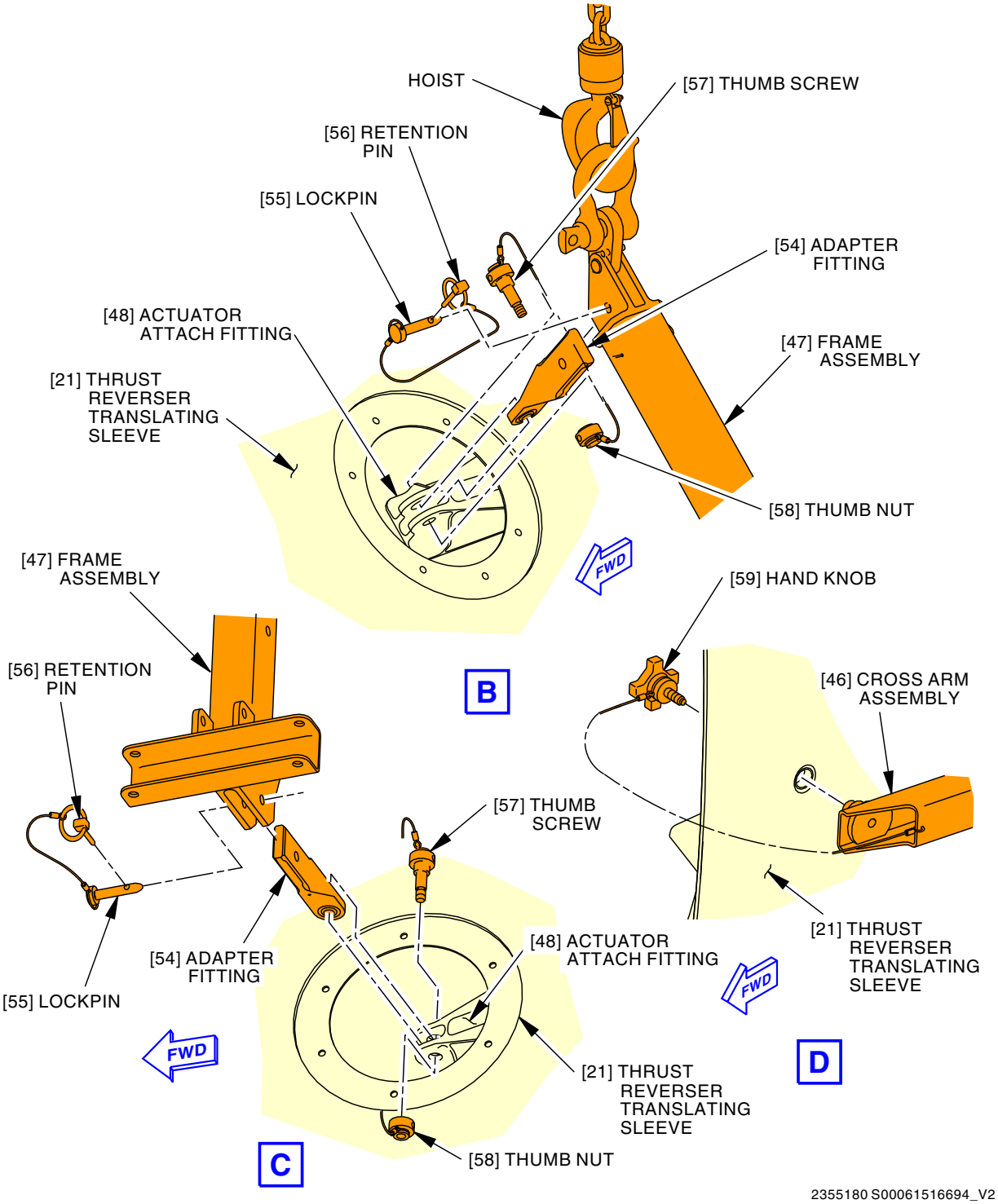
Translating Sleeve Installation
Figure 401/78-31-02-990-802-G00 (Sheet 3 of 3)

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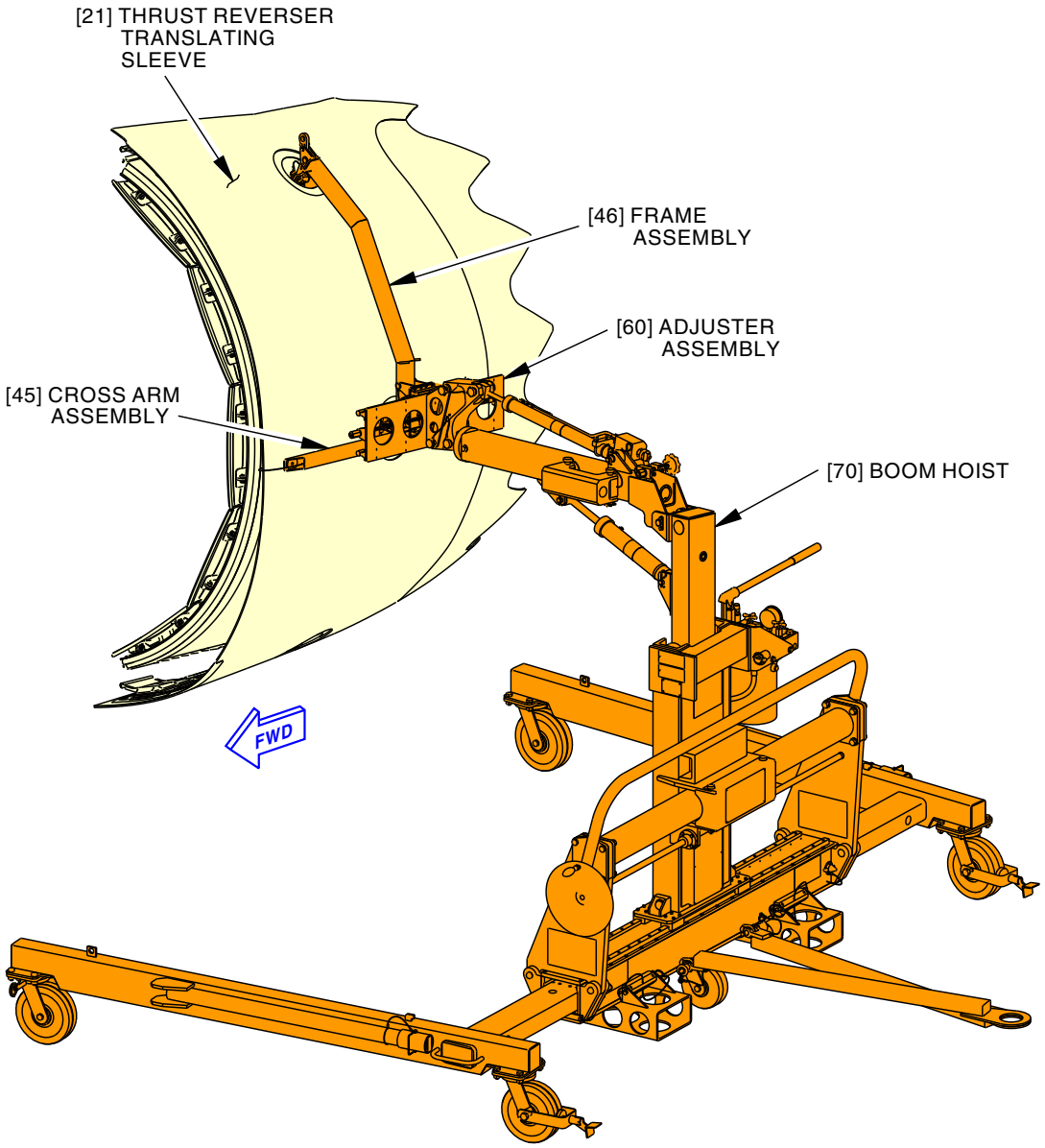
Translating Sleeve Sling Installation
Figure 402/78-31-02-990-803-G00 (Sheet 1 of 3)

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Translating Sleeve Sling Installation
Figure 402/78-31-02-990-803-G00 (Sheet 2 of 3)

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HOIST EQUIPMENT WITH THRUST REVERSER BOOM HOIST (C20002)

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Translating Sleeve Sling Installation
Figure 402/78-31-02-990-803-G00 (Sheet 3 of 3)

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TASK 78-31-02-400-801-G00

3. Translating Sleeve Installation

(Figure 401, Figure 402)

A. General

(1) This task gives the instructions to install the translating sleeve on the thrust reverser.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-09-420-801-G00	Krueger Flap Deflector 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-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205
SPL-14556	Sling - Thrust Reverser Sleeve, LEAP-1B Engine Part #: C78034-1 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
D50004	Compound - Antiseize	BMS3-28

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Drag link	78-31-07-01-125	SIA ALL
21	Translating sleeve	78-31-02-01-050	SIA ALL

F. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2

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(Continued)

Number	Name/Location
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

G. Translating Sleeve Installation

SUBTASK 78-31-02-410-010-G00

(1) Make sure that the thrust reversers are closed (Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00).

SUBTASK 78-31-02-210-002-G00

(2) Examine the tracks and track liners for damage and contamination:

(a) Clean all contamination from the tracks.

(b) Repair all damage that you find on the tracks.

SUBTASK 78-31-02-420-001-G00

(3) If it is necessary, do the steps in the removal task to attach the thrust reverser sleeve sling, SPL-14556, to the translating sleeve [21], and overhead crane or boom hoist [70] (TASK 78-31-02-000-801-G00).

SUBTASK 78-31-02-420-002-G00

CAUTION

MAKE SURE THAT THE UPPER AND LOWER SLIDERS ALIGN WITH THE TRACKS BEFORE YOU TRY TO MOVE THE SLEEVE. MAKE SURE THAT THE TOP AND BOTTOM OF THE SLEEVE MOVE TOGETHER WHILE YOU MOVE THE SLEEVE ALONG THE TRACKS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE "RULON J" CAN OCCUR.

(4) Install the translating sleeve [21] on the thrust reverser (Figure 402):

(a) Lift the translating sleeve [21] and move it into its position at the rear of the thrust reverser.

(b) Align the sliders on the translating sleeve [21] with the tracks on the hinge and latch beam.

(c) Engage the sliders in the tracks and push the translating sleeve [21] forward until the actuator rod ends align with the actuator attach fittings on the sleeve.

1) Make sure that the top and bottom of the translating sleeve [21] move together.

SUBTASK 78-31-02-080-001-G00

WARNING

BE CAREFUL WHEN YOU DISCONNECT THE SLING ASSEMBLY. THE SLING IS HEAVY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Remove the thrust reverser sleeve sling, SPL-14556, from the translating sleeve [21] as follows:

NOTE: The sling weights approximately 225.0 lb (102.1 kg).

(a) If the overhead crane will be used to install the translating sleeve [21], disconnect the hand chain hoist [51] and web sling [43] from the frame assembly [47].

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(b) If the boom hoist [70] will be used to install the translating sleeve [21], do these steps:

1) Disconnect the boom hoist [70] (boom hoist, SPL-2430) from the adjuster assembly [60].

2) Remove the adjuster assembly [60] from the frame assembly [47].

(c) Remove the hand knob [59] that attaches the cross arm assembly [46] to the translating sleeve [21] at the deactivation pin fitting.

(d) Remove the cross arm assembly [46] from the frame assembly [47].

(e) Remove the lockpin [49] that attaches the adapter fitting [54] on the middle actuator attach fitting [48] to the frame assembly [47].

(f) Support the frame assembly [47] and remove the lockpin [49] that attaches the upper actuator attach fitting [48] to the frame assembly [47].

(g) Remove the frame assembly [47] from upper and middle adapter fitting [54].

(h) Remove the thumb nuts [58] and thumb screws [57] that attach the upper and middle adapter fittings [54] to the actuator attach fittings [48] on the translating sleeve [21].

(i) Remove the upper and middle adapter fittings [54] from the translating sleeve [21].

SUBTASK 78-31-02-420-003-G00

(6) Connect the three actuator rod ends to the actuator attach fittings [48] on the translating sleeve [21] (Figure 401):

(a) Lubricate the shanks of the three bolts [22] with compound, D50004.

(b) Make sure that each of the actuator attach fittings [48] have a wear spacer [30].

1) If there is no wear spacer [30], use sealant, A00803, to secure a new wear spacer [30] into place.

CAUTION DO NOT LET THE ROD ENDS OF THE HYDRAULIC ACTUATOR TURN WHEN YOU REMOVE THE BOLTS. IF THE ROD END TURNS, IT CAN CAUSE DAMAGE TO THE HYDRAULIC ACTUATOR AND THRUST REVERSER STRUCTURE.

(c) Pull the actuator rod ends by hand to align them with the clevis on the three actuator attach fittings [48].

NOTE: Do not let the rod end turn when you extend it manually. Make sure that you hold the rod end when you extend the actuator manually. Do not use hydraulic power to extend the rod end.

(d) Install the bolt [22], washer [23], bushing [24], washer [27], and nut [28] to attach each actuator rod end to its actuator attach fitting [48].

1) Tighten the nuts [28] to 530 ±16 in-lb (60 ±2 N·m).

SUBTASK 78-31-02-410-002-G00

(7) Install the access door for the applicable actuator, do these steps:

(a) For the upper actuator, put the access doors [29] in the correct position to align the bolt holes:

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

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(b) For the middle actuator, put the access doors [26] in the correct position to align the bolt holes:

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(c) For the lower actuator access doors [29], do these steps:

1) Make sure that the installation surfaces are clean.

2) Use sealant, A50110, to create a prepack or injection seal between the access doors [29] and installation surface on the thrust reverser.

3) For the lower actuator, put the access doors [29] in the correct position to align the bolt holes:

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

(d) Install the six bolts [25] to attach the access doors [26] and access doors [29].

1) Tighten the bolts [25] to 30.0 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-02-010-002-G00

WARNING OBEY THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE PROCEDURE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Open the inboard and outboard thrust reverser(TASK 78-31-00-010-801-G00).

SUBTASK 78-31-02-980-007-G00

(9) Manually extend the inboard and outboard translating sleeve just enough to connect the drag links(TASK 78-31-00-980-803-G00).

(a) Make sure to have enough clearance between the thrust reverser and the wing leading edge.

SUBTASK 78-31-02-420-004-G00

(10) Attach each of the drag links [1] to the inner fixed structure as follows:

(a) Remove the tape and protective cloth from the blocker doors and five drag links [1].

(b) Make sure that the five drag links [1] are installed correctly on the blocker doors.

(c) Align the end of the drag links [1] with the drag link attach fittings on the inner fixed structure.

(d) Make sure that there is no damage or burrs on the bushings [4] before installation.

(e) On each drag link [1] install the bolt, washer, bushing, second washer, and nut.

1) Make sure that the bushing is installed from the bottom of each drag link.

(f) Tighten the nut to 400 ±12 in-lb (45.2 ±1.4 N·m).

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SUBTASK 78-31-02-410-003-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Close and latch the thrust reverser, but do not do the thrust reverser or leading edge activation at this time (TASK 78-31-00-010-802-G00).

SUBTASK 78-31-02-980-003-G00

(12) Manually translate the sleeve through an extend and retract cycle (TASK 78-31-00-980-803-G00).

(a) Make sure that the translating sleeve [21] moves smoothly.

SUBTASK 78-31-02-440-001-G00

(13) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-02-710-001-G00

(14) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

(a) Operate the thrust reverser through an extend and retract cycle four times to make sure that it operates correctly.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-02-410-004-G00

(1) If the inboard translating sleeve was replaced, install the lower Krueger flap deflector (TASK 78-31-09-420-801-G00).

SUBTASK 78-31-02-410-005-G00

(2) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-02-440-002-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

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TRANSLATING SLEEVE - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Translating sleeve inspection

(2) Main slider and auxiliary slider inspection

(3) Main slider and auxiliary slider general visual inspection

(4) Thrust reverser actuator attach fitting visual inspection

(5) Thrust reverser actuator attach fitting detailed inspection.

TASK 78-31-02-200-801-G00

2. Translating Sleeve Inspection

(Figure 601)

A. General

(1) This task gives the instructions on how to examine the outer-skin-panel and the inner-acoustic-panel on the translating sleeve for damage.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
SRM 54-30-01-1A-1	Thrust Reverser Translating Sleeve Outer Skin

C. Prepare for the Inspection

SUBTASK 78-31-02-860-001-G00

WARNING RETRACT THE LEADING EDGE FLAPS AND SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE LEFT OR THE RIGHT THRUST REVERSER ON AN ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-02-040-001-G00

(2) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

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SUBTASK 78-31-02-040-002-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

D. Translating Sleeve Outer-Skin-Panel Inspection

SUBTASK 78-31-02-210-003-G00

(1) Examine the outer-skin-panel on the translating sleeve for the damage that follows:

(a) Holes, cracks, nicks, gouges, delamination, dents and edge corrosion.

1) Cracks in the paint layer that do not affect the sealant or the structure of the panel are acceptable.

2) If you find damage, refer to the Thrust Reverser Translating Sleeve Outer Skin/SRM PROCEDURE 54-30-01-1A-1 for the permitted limits and repair procedures.

E. Translating Sleeve Inner-Acoustic-Panel Inspection

SUBTASK 78-31-02-210-004-G00

(1) Look through the aft end of the fan duct to examine the aft end of the inner-acoustic-panel on the translating sleeve for the damage that follows:

(a) Holes, cracks, nicks, gouges, delamination, dents and edge corrosion.

1) Cracks in the paint layer that do not affect the sealant or the structure of the panel are acceptable.

2) If you find damage, refer to the Thrust Reverser Translating Sleeve Outer Skin/SRM PROCEDURE 54-30-01-1A-1 for the permitted limits and repair procedures.

(b) Pitting in the surface layer (small areas where the surface appears chipped away around the perforation of the acoustic panel) (Figure 602).

NOTE: This pitting can occur during the usual manufacturing process of the acoustic panel. This condition has been inspected and approved for in-service use at the time of manufacture.

1) No action is necessary with the following conditions:

a) The surface area adjacent to each pitting location has the original silver finish and does not show the black panel material.

b) There are no signs of edge erosion.

SUBTASK 78-31-02-010-003-G00

WARNING DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

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SUBTASK 78-31-02-210-005-G00

(3) Look through the forward end of the fan duct to examine the forward end of the inner-acoustic-panel on the translating sleeve for the damage that follows:

(a) Holes, cracks, nicks, gouges, delamination, dents and edge corrosion.

1) Cracks in the paint layer that do not affect the sealant or the structure of the panel are acceptable.

2) If you find damage, refer to the Thrust Reverser Translating Sleeve Outer Skin/SRM PROCEDURE 54-30-01-1A-1 for the permitted limits and repair procedures.

(b) Pitting in the surface layer (small areas where the surface appears chipped away around the perforation of the acoustic panel) (Figure 602)

NOTE: This pitting can occur during the usual manufacturing process of the acoustic panel. This condition has been inspected and approved for in-service use at the time of manufacture.

1) No action is necessary with the following conditions:

a) The surface area adjacent to each pitting location has the original silver finish and does not show the black panel material.

b) There are no signs of edge erosion.

F. Put the Airplane Back to its Usual Condition

SUBTASK 78-31-02-410-006-G00

WARNING

OBEY THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE PROCEDURE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-31-02-440-003-G00

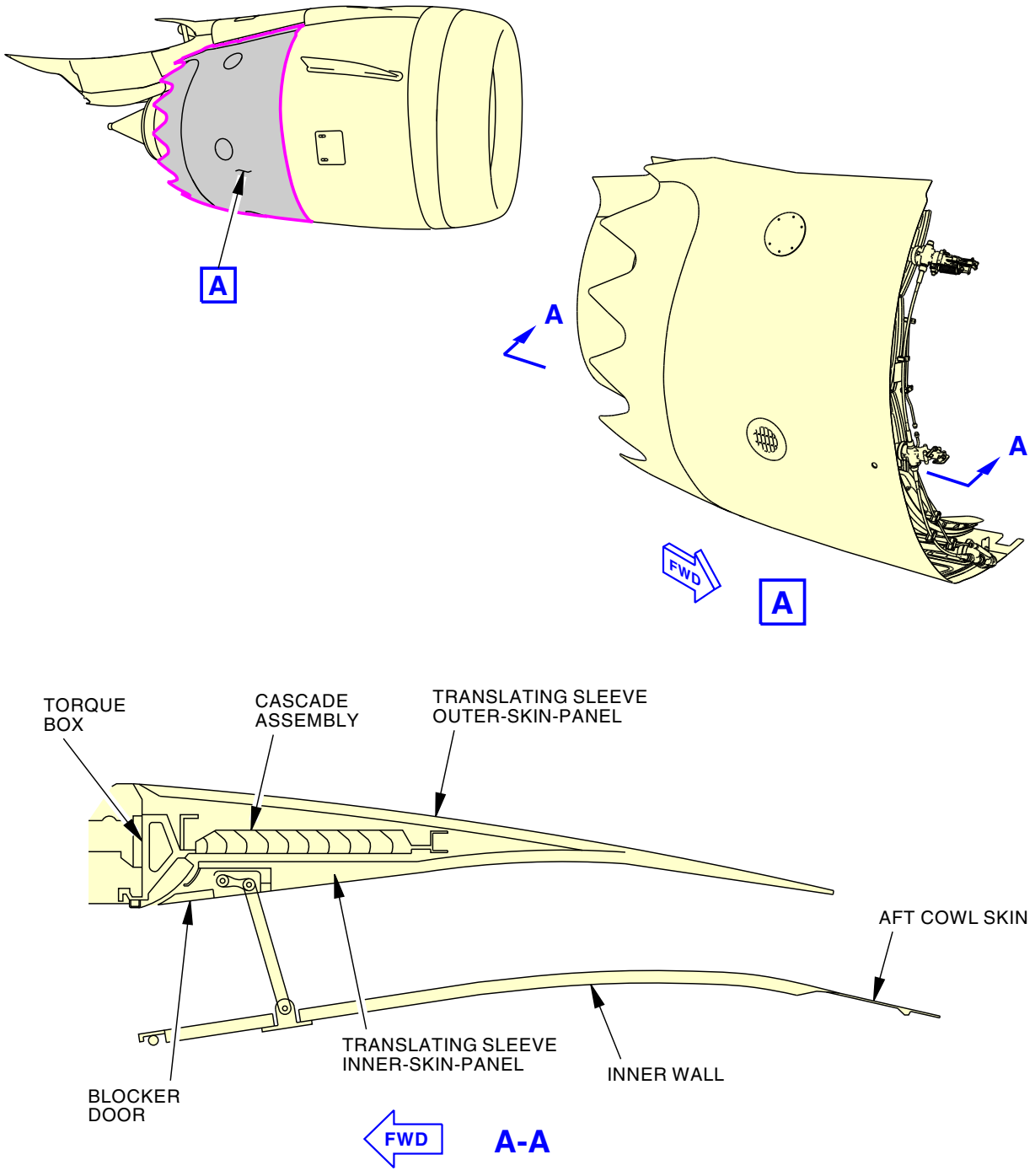
(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-02-440-004-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

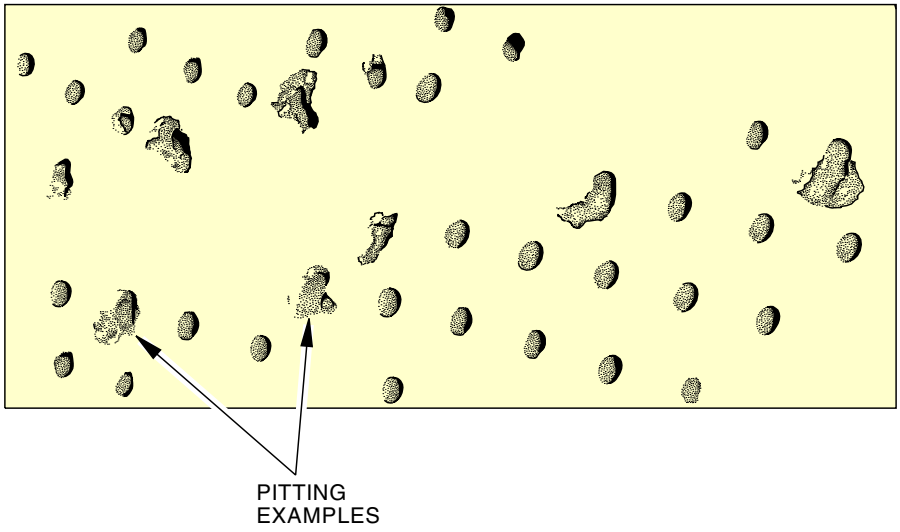
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Translating Sleeve Inspection
Figure 601/78-31-02-990-804-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355183 S00061516700_V1

Translating Sleeve Inner-Acoustic-Panel Inspection
Figure 602/78-31-02-990-805-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-02-200-802-G00

3. Main Slider and Auxiliary Slider Inspection

(Figure 603)

A. General

(1) This task gives the instructions on how to examine the Rulon J on the auxiliary slider and on the shoe assembly that is installed on the main slider, when the translating sleeve is removed.

B. References

Reference	Title
78-31-02-000-801-G00	Translating Sleeve Removal (P/B 401)
78-31-02-400-801-G00	Translating Sleeve Installation (P/B 401)
CMM 78-31-24	Thrust Reverser Sleeve Assembly

C. Inspection

SUBTASK 78-31-02-010-004-G00

(1) Do this task: Translating Sleeve Removal, TASK 78-31-02-000-801-G00.

SUBTASK 78-31-02-210-006-G00

(2) Examine the Rulon J on the auxiliary slider and on the shoe assembly that is installed on the main slider for the damage that follows:

(a) Obvious damage, wear through the tape thickness, and disbonding.

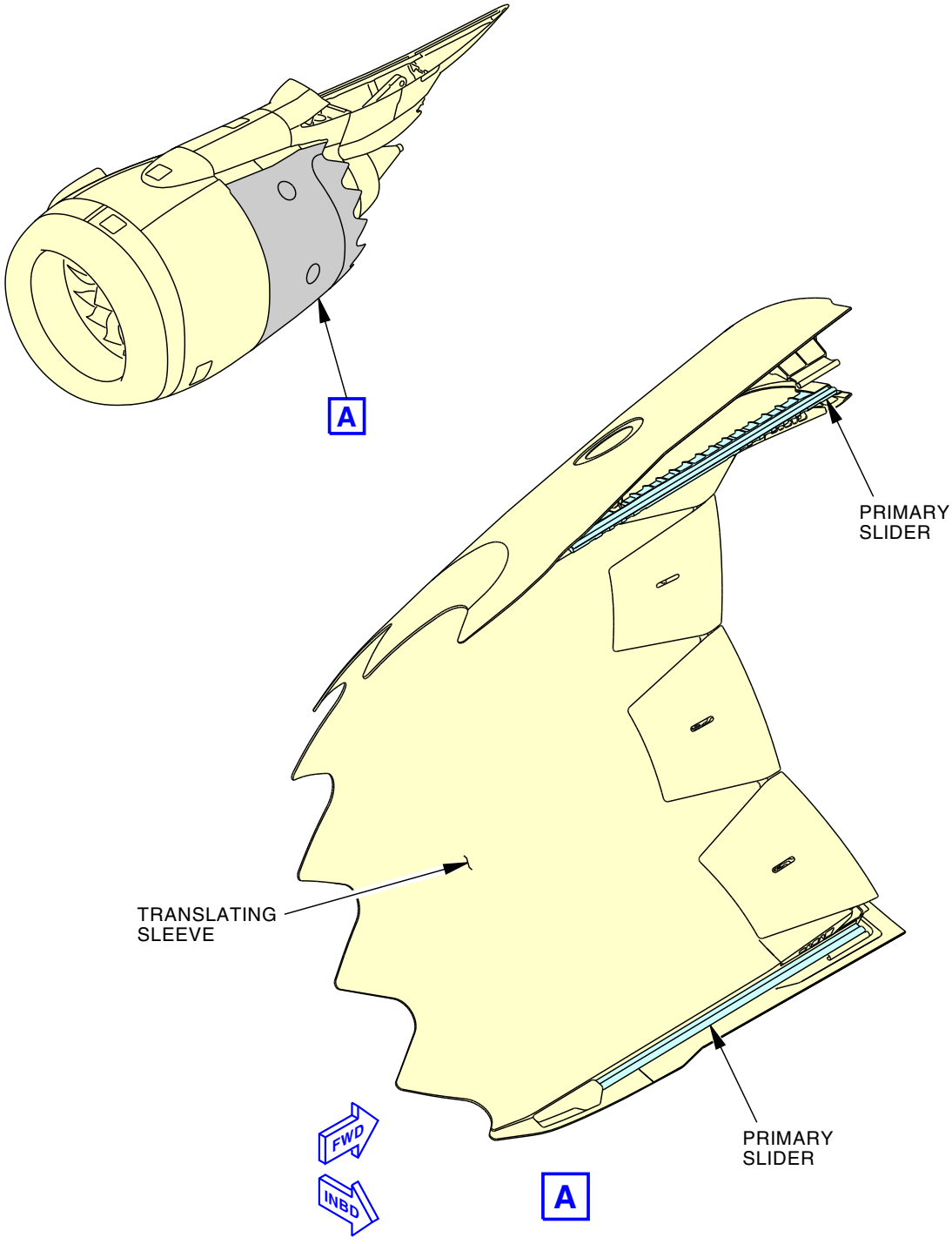
1) If you find damage, refer to the CMM 78-31-24 for the permitted limits and repair procedures.

SUBTASK 78-31-02-010-005-G00

(3) Do this task: Translating Sleeve Installation, TASK 78-31-02-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355184 S00061516701_V2

Main Slider and Auxiliary Slider Inspection
Figure 603/78-31-02-990-809-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-02-210-801-G00

4. Engine Thrust Reverser Hinge Beam and Latch Beam Primary Track and Translating Sleeve Primary Slider General Visual Inspection for Wear with the Thrust Reverser Deployed

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides instructions to do general visual inspection of engine thrust reverser hinge beam and latch beam primary track and translating sleeve primary slider.

B. References

Reference	Title
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)

C. Prepare for the Inspection

SUBTASK 78-31-02-860-006-G00

(1) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

D. Inspection

SUBTASK 78-31-02-210-007-G00

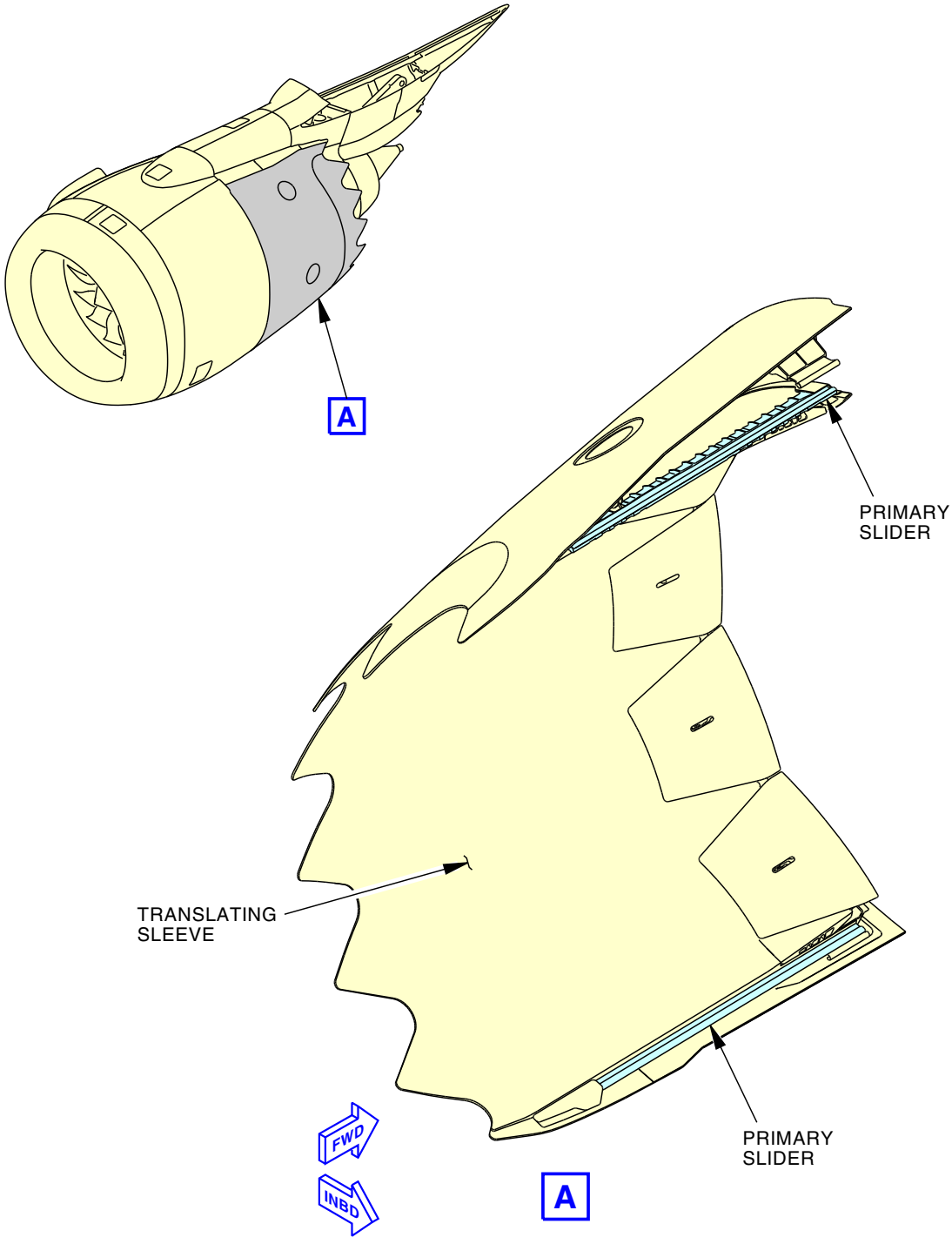
(1) Do general visual inspection of the engine thrust reverser hinge beam and latch beam primary track and translating sleeve primary slider for wear with the thrust reverser deployed.

SUBTASK 78-31-02-860-007-G00

(2) Do this task: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355184 S00061516701_V2

Engine Thrust Reverser Hinge Beam and Latch Beam Primary Track and Translating Sleeve Primary Slider General Visual Inspection
Figure 604/78-31-02-990-810-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-02-200-803-G00

5. Thrust Reverser Actuator Attach Fitting Visual Inspection

(Figure 605)

A. General

(1) This task gives the instructions for a visual inspection of the thrust reverser actuator attach fittings.

(a) The thrust reverser actuator attach fittings are installed on the translating sleeve.

(b) There are three actuator attach fittings per thrust reverser half.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-03-610-801-G00	Thrust Reverser Hydraulic Actuator Rod End Inspection (P/B 601)

C. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

D. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-02-040-003-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure for the thrust reverser for ground maintenance (TASK 78-31-00-040-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-02-010-008-G00

(2) To remove the upper actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

To remove the middle actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

To remove the lower actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

F. Thrust Reverser Actuator Attach Fitting Visual Inspection

SUBTASK 78-31-02-212-001-G00

(1) Examine the thrust reverser actuator attach fitting for these items:

(a) Cracks

1) Not permitted.

(b) Nicks

1) Not permitted.

(c) Dents

1) Not permitted.

(d) Scratches

1) Not permitted.

SUBTASK 78-31-02-869-001-G00

(2) If you find damage on the actuator attach fitting, do these steps:

(a) Do this task: Thrust Reverser Actuator Attach Fitting Detailed Inspection, TASK 78-31-02-200-804-G00.

(b) Do this task: Thrust Reverser Hydraulic Actuator Rod End Inspection, TASK 78-31-03-610-801-G00.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-02-410-009-G00

(1) For the upper actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

For the middle actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(a) For the lower actuator access door [2], do the steps that follow:

1) Make sure that the installation surfaces are clean.

2) Use sealant, A50110 to create a prepack or injection seal between the access door [2] and the installation surface on the thrust reverser.

3) Put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

(b) Install the six bolts [1] onto the access door [2].

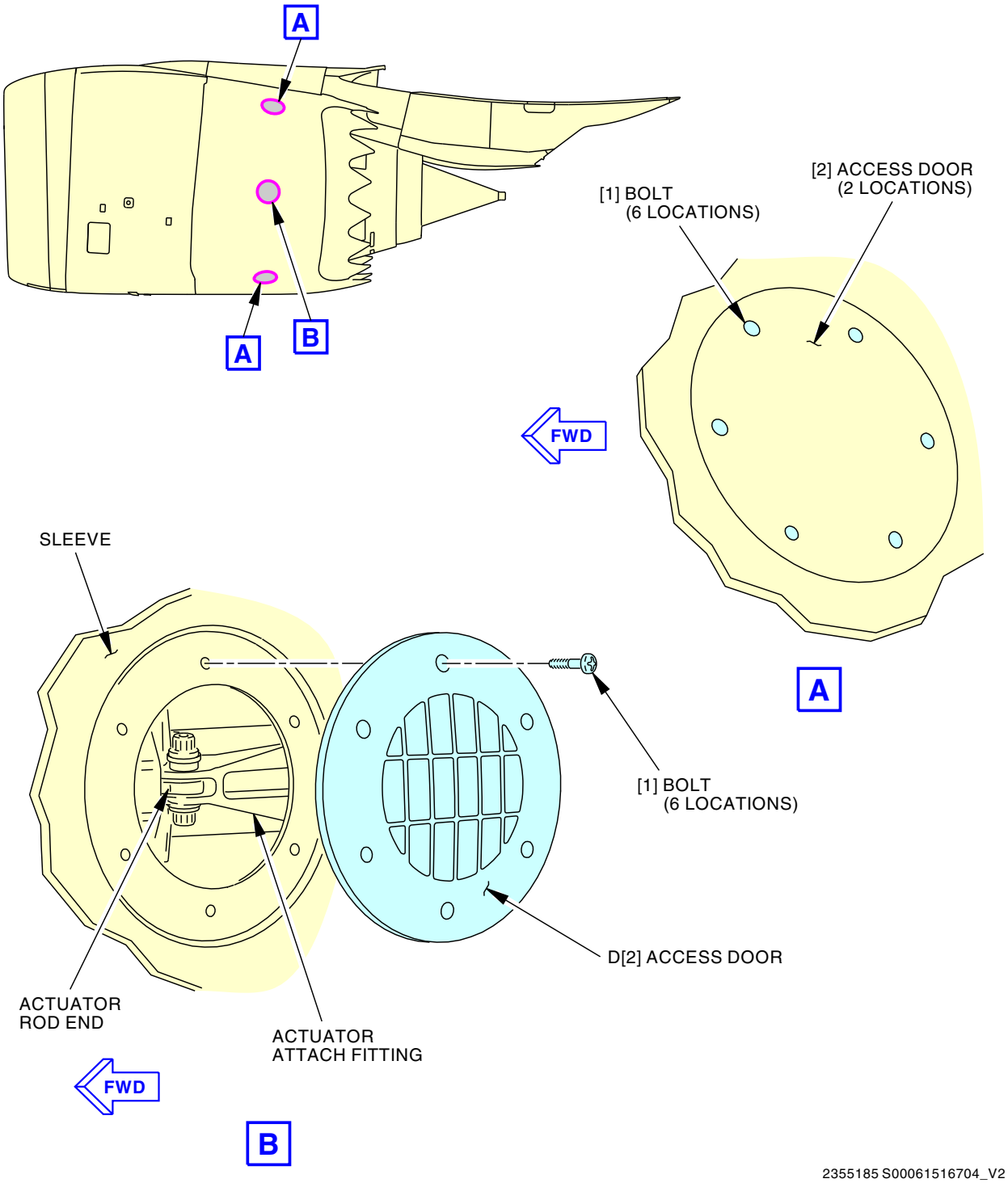
1) Tighten the bolts [1] to 30 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-02-440-005-G00

(2) Do the activation procedure for the thrust reverser (TASK 78-31-00-440-801-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355185 S00061516704_V2

Thrust Reverser Actuator Attach Fitting Visual Inspection
Figure 605/78-31-02-990-807-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-02-200-804-G00

6. Thrust Reverser Actuator Attach Fitting Detailed Inspection

(Figure 606)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions for a detailed inspection of the thrust reverser actuator attach fittings.

(a) The thrust reverser actuator attach fittings are installed on the translating sleeve.

(b) There are three actuator attach fittings per thrust reverser half.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-802-G00	Thrust Reverser System Normal Operational Test (P/B 501)
78-31-02-000-801-G00	Translating Sleeve Removal (P/B 401)
78-31-02-400-801-G00	Translating Sleeve Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
C50294	Alodine - 1000L, 1001 or 1500. Clear Film.	BAC5719, Type II, Class B. MIL-DTL-5541, Class3. F-17.11.
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

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(Continued)

Number	Name/Location
426ER	Right Thrust Reverser Actuator (Middle), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-02-040-004-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure for the thrust reverser for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-02-860-004-G00

(2) To remove the upper actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

To remove the middle actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

To remove the lower actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

SUBTASK 78-31-02-020-004-G00

CAUTION DO NOT LET THE ROD ENDS OF THE HYDRAULIC ACTUATOR TURN WHEN YOU REMOVE THE BOLTS. IF THE ROD END TURNS, IT CAN CAUSE DAMAGE TO THE HYDRAULIC ACTUATOR AND THRUST REVERSER STRUCTURE.

(3) Disconnect the actuator rod end from the actuator attach fitting on the translating sleeve (TASK 78-31-02-000-801-G00).

SUBTASK 78-31-02-860-002-G00

(4) Move the translating sleeve away from the actuator rod 2 in. (51 mm) to 3 in. (76 mm) to get access for the inspection.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Thrust Reverser Actuator Attach Fitting Detailed Inspection

SUBTASK 78-31-02-211-001-G00

(1) Examine the wear spacer [3] for these conditions:

(a) Tears

1) Not permitted.

(b) Holes

1) Not permitted.

(c) Disbonds

1) Not permitted.

(d) Thickness reduction

1) Thickness less than 0.020 in. (0.508 mm) is not permitted.

(e) If you find a condition that is not permitted, replace the wear spacer [3].

SUBTASK 78-31-02-211-002-G00

(2) Examine the applicable thrust reverser actuator attach fitting for damage:

(a) Do a detailed inspection on the attach fitting for damage caused by the rod end to the lower side of the fitting lug.

1) The lug thickness less than 0.20 in. (5.08 mm) is not permitted.

2) If the minimum lug thickness is more than 0.20 in. (5.08 mm), do the steps that follow to repair the attach fitting:

a) Remove the wear spacer [3] from the attach fitting.

b) Remove the surface damage to a maximum depth of 0.005 in. (0.127 mm) and a minimum radius of 1.0 in. (25.4 mm).

c) Surface finish to 125 micro inch or better the rework areas.

WARNING MAKE SURE TO PREVENT ACETONE CONTACT WITH SKIN. ACETONE IRRITATES SKIN AND IS EXPLOSIVE. USE FUME CONTROL OR USE A RESPIRATOR TO PREVENT INJURY.

d) Clean the attach fitting with a clean cotton wiper, G00034, moist with solvent, B00062.

<1> Wipe the solvent before it becomes dry with another clean cloth wiper.

e) Apply Alodine, C50294, and then apply one coat of primer, C00259, to the attach fitting, except bushing holes.

f) Apply faying surface seal with sealant, A00803, on the etched surface of the wear spacer.

<1> Install the wear spacer [3] to the attach fitting.

g) Remove all tools and items used to do the repair.

SUBTASK 78-31-02-211-003-G00

(3) If the surface damage is more than the allowable limits, replace the actuator attach fitting.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-02-860-003-G00

CAUTION

DO NOT TURN THE ACTUATOR ROD END. THE ACTUATOR LENGTH IS SET. IF YOU TURN THE ACTUATOR ROD END, DAMAGE TO THE ACTUATOR OR THE STRUCTURE CAN OCCUR.

(1) Move the translating sleeve to align the actuator rod end with the clevis on the attach fitting.

SUBTASK 78-31-02-420-005-G00

(2) Connect the actuator rod end to the actuator attach fitting on the sleeve (TASK 78-31-02-400-801-G00).

SUBTASK 78-31-02-860-005-G00

(3) For the upper actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

For the middle actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(a) For the lower actuator access door [2], do the steps that follow:

1) Make sure that the installation surfaces are clean.

2) Use sealant, A50110, to create a prepack or injection seal between the access door [2] and installation surface on the thrust reverser.

3) Put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

(b) Install the six bolts [1] onto the access door [2].

1) Tighten the bolts [1] to 30 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-02-440-006-G00

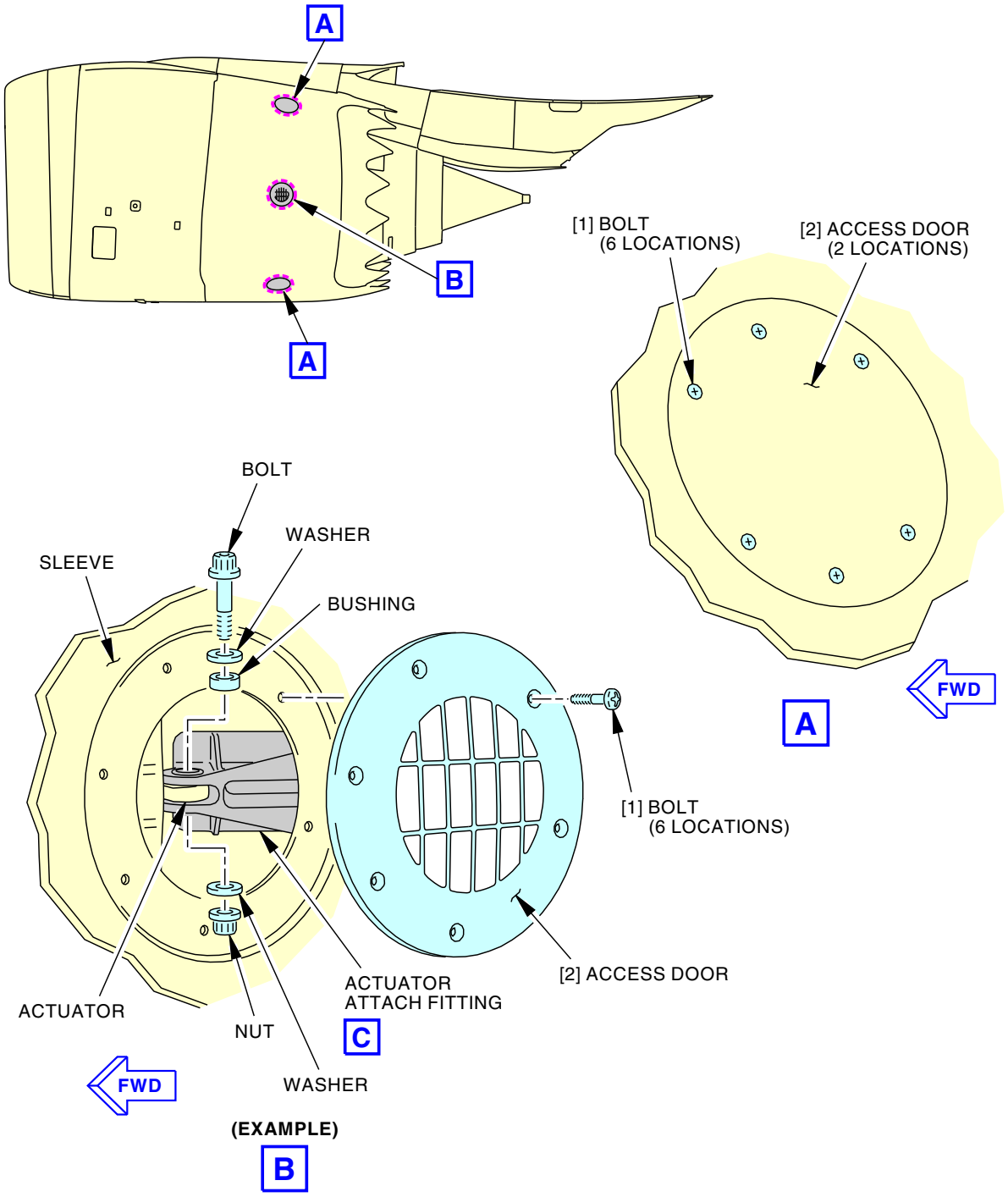
(4) Do the activation procedure for the thrust reverser (TASK 78-31-00-440-801-G00).

SUBTASK 78-31-02-710-002-G00

(5) Move the thrust reverser through the deploy and stow cycles at least 3 times until the sleeves move smoothly (TASK 78-31-00-700-802-G00).

END OF TASK

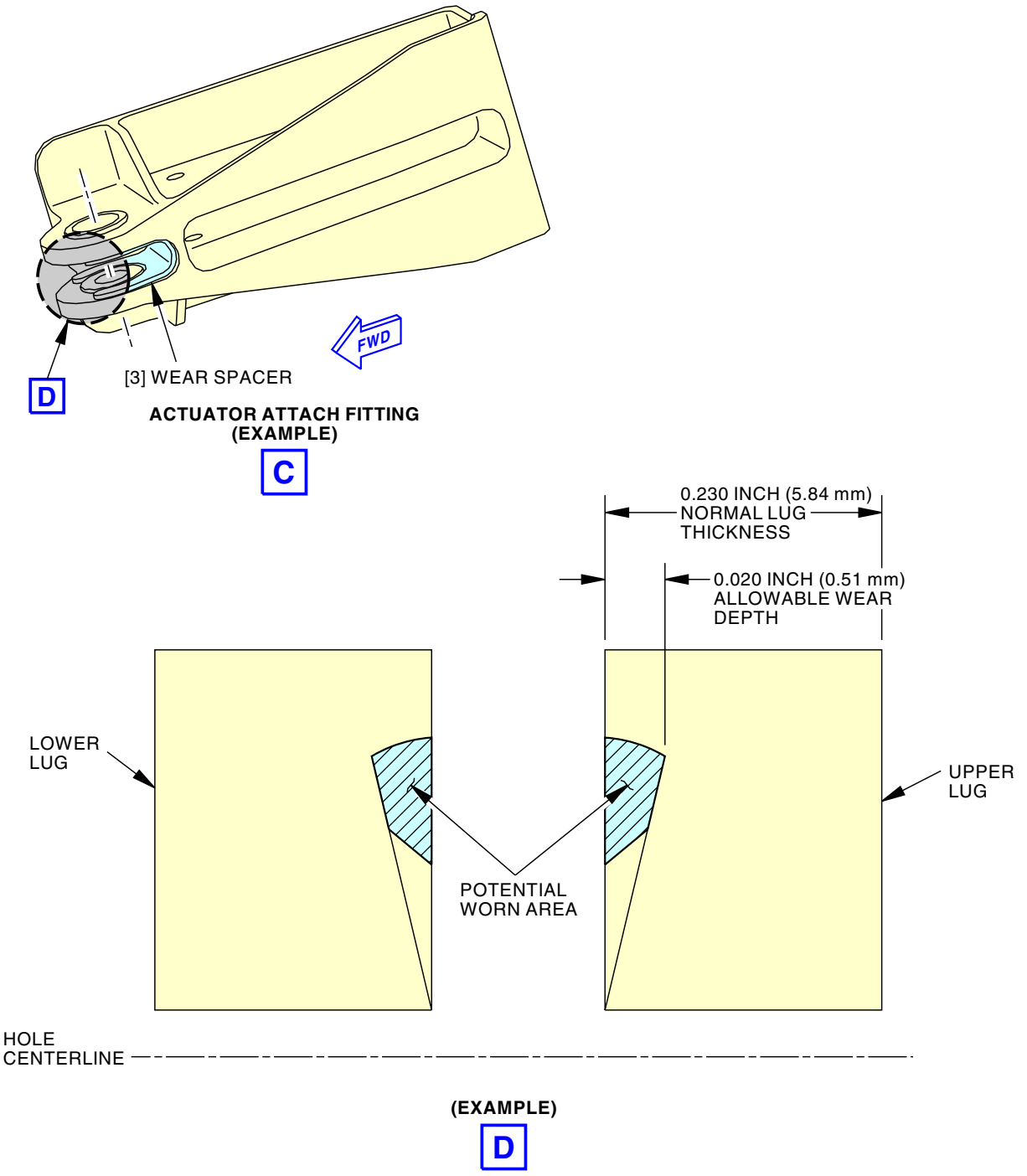
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Thrust Reverser Actuator Attach Fitting Detailed Inspection
Figure 606/78-31-02-990-808-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Actuator Attach Fitting Detailed Inspection
Figure 606/78-31-02-990-808-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-02-210-802-G00

7. Engine Thrust Reverser Hinge Beam and Latch Beam Secondary Track and Translating Sleeve Secondary Slider General Visual Inspection for Wear with the Thrust Reverser Deployed

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides instructions to do general visual inspection of engine thrust reverser hinge beam and latch beam secondary track and translating sleeve secondary slider.

B. References

Reference	Title
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)

C. Prepare for the Inspection

SUBTASK 78-31-02-860-008-G00

(1) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

D. Inspection

SUBTASK 78-31-02-210-010-G00

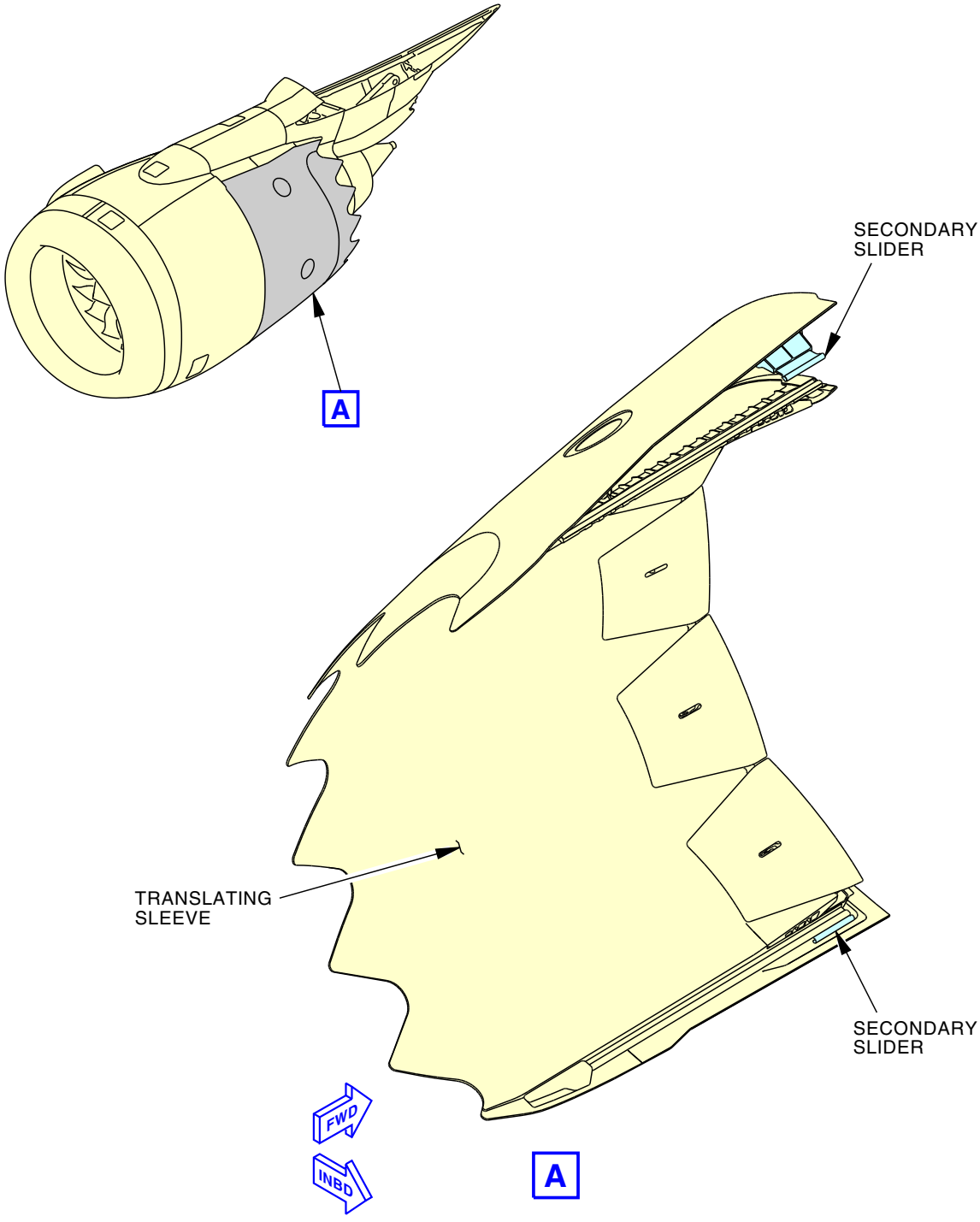
(1) Do general visual inspection of the engine thrust reverser hinge beam and latch beam secondary track and translating sleeve secondary slider for wear with the thrust reverser deployed.

SUBTASK 78-31-02-860-009-G00

(2) Do this task: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Thrust Reverser Hinge Beam and Latch Beam Secondary Track and Translating Sleeve Secondary Slider General Visual Inspection
Figure 607/78-31-02-990-813-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER HYDRAULIC ACTUATORS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Thrust Reverser Hydraulic Actuator Removal (selection)

(2) Thrust Reverser Hydraulic Actuator Installation (selection)

(3) Upper Locking Hydraulic Actuator Removal

(4) Upper Locking Hydraulic Actuator Installation

(5) Middle Locking Hydraulic Actuator Removal

(6) Middle Locking Hydraulic Actuator Installation

(7) Lower Hydraulic Actuator Removal

(8) Lower Hydraulic Actuator Installation.

TASK 78-31-03-000-801-G00

2. Thrust Reverser Hydraulic Actuator Removal (Selection)

A. Procedure

SUBTASK 78-31-03-020-001-G00

(1) Do the procedure for the applicable thrust reverser hydraulic actuator:

(a) Do this task: Upper Locking Hydraulic Actuator Removal, TASK 78-31-03-000-802-G00.

(b) Do this task: Middle Locking Hydraulic Actuator Removal, TASK 78-31-03-000-803-G00.

(c) Do this task: Lower Hydraulic Actuator Removal, TASK 78-31-03-000-804-G00.

——— END OF TASK ———

TASK 78-31-03-400-801-G00

3. Thrust Reverser Hydraulic Actuator Installation (Selection)

A. Procedure

SUBTASK 78-31-03-420-001-G00

(1) Do the procedure for the applicable thrust reverser hydraulic actuator:

(a) Do this task: Upper Locking Hydraulic Actuator Installation, TASK 78-31-03-400-802-G00.

(b) Do this task: Middle Locking Hydraulic Actuator Installation, TASK 78-31-03-400-803-G00.

(c) Do this task: Lower Hydraulic Actuator Installation, TASK 78-31-03-400-804-G00.

——— END OF TASK ———

TASK 78-31-03-000-802-G00

4. Upper Locking Hydraulic Actuator Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the upper locking hydraulic actuator.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-09-010-801-G00	Krueger Flap Deflector Removal (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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205
SPL-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)
STD-7895	Wrench - Allen, 3/16 inch
STD-14286	Allen Wrench - Hex, 1/4 Inch

D. 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)

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1

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(Continued)

Number	Name/Location
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

G. Prepare for the Removal

SUBTASK 78-31-03-040-032-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-03-860-001-G00

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-03-040-002-G00

(3) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-03-040-003-G00

(4) Remove the hydraulic power from the applicable engine as follows (TASK 29-11-00-860-805):

(a) For Engine 1, remove the system A hydraulic power.

(b) For Engine 2, remove the system B hydraulic power.

SUBTASK 78-31-03-040-004-G00

(5) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-31-03-040-005-G00

(6) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-31-03-010-017-G00

(7) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-03-010-023-G00

(8) Remove the applicable access doors:

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

(a) Remove the bolts [14].

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SUBTASK 78-31-03-010-029-G00

(9) Remove the applicable access doors:

Number	Name/Location
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2

(a) Remove the Krueger Flap Deflector (TASK 78-31-09-010-801-G00).

(b) Remove the bolts [14].

SUBTASK 78-31-03-980-006-G00

(10) Unlock the upper locking actuator as follows (Figure 401 (Sheet 1), View B):

NOTE: Make sure that the thrust reverser is fully closed and retracted. If it is necessary, retract the thrust reverser hydraulically. If there is a small gap, the thrust reverser is not fully closed and you cannot move the manual unlock lever.

(a) Move and hold forward the manual unlock lever [5].

(b) Push the detent pin in.

(c) Release the manual unlock lever.

SUBTASK 78-31-03-010-002-G00

(11) Expose the gimbal pins and prepare for the use of the actuator removal and installation tool as follows:

NOTE: Removal of the gimbal pins from the aft side of the torque box and to use the actuator removal and installation tool requires extension of the thrust reverser sleeve.

CAUTION DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN THE PERMITTED LIMIT. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. DAMAGE CAN OCCUR.

(a) For the inboard thrust reverser sleeve, manually extend the sleeve no more than 15 in. (38 cm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(b) For the outboard thrust reverser sleeve, manually fully extend the thrust reverser sleeve (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing. The tool will be easier to use with the sleeve fully extended.

SUBTASK 78-31-03-020-002-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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(WARNING PRECEDES)

CAUTION DO NOT LET HYDRAULIC FLUID GET ON EQUIPMENT. IF HYDRAULIC FLUID GETS ON EQUIPMENT, IMMEDIATELY CLEAN IT FROM THE EQUIPMENT. HYDRAULIC FLUID CAN CAUSE DAMAGE TO EQUIPMENT.

(12) Drain the hydraulic fluid from the hydraulic lines at the lower hydraulic actuator as follows (TASK 78-31-03-000-804-G00):

NOTE: To decrease hydraulic fluid spray when the coupling nuts are loosened, wrap cotton wiper, G00034, around the wrench, nut and hydraulic line.

(a) Wrap cotton wiper, G00034, around the electrical connector on the sync lock receptacle on the lower actuator.

NOTE: The cloth will catch the hydraulic fluid and prevent damage to the electrical connector.

(b) Loosen the two bolts on each of the two clamp blocks that hold the lower hydraulic retract line.

NOTE: To remove the sleeve fitting on the hydraulic retract line from the actuator port, the hydraulic retract line must be carefully flexed. If the clamp blocks are loose, the hydraulic retract line can be flexed easier.

(c) Disconnect the hydraulic retract line at the lower actuator.

1) Carefully remove the sleeve fitting on the hydraulic retract line from the actuator port.

2) Let the hydraulic fluid drain into a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(d) Disconnect the coupling nut on the sync shaft tubing at the lower actuator.

1) Let the hydraulic fluid drain into the 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

CAUTION USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(e) Re-connect the coupling nut for the lower sync shaft to the lower actuator.

1) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

CAUTION USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(f) Re-connect the coupling nut for the lower retract line to the lower actuator.

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1) Tighten the coupling nut to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).
2) Loosen the coupling nut.
3) Tighten the coupling nut again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(g) Tighten the two bolts on each of the two clamp blocks that hold the lower hydraulic retract line.

1) Tighten the bolts to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

H. Upper Locking Actuator Removal

SUBTASK 78-31-03-020-003-G00

(1) Disconnect the electrical connectors from the Linear Variable Differential Transformer (LVDT) receptacle on the upper locking actuator [1] as follows Figure 401 (Sheet 2):

(a) For the left thrust reverser, disconnect the electrical connectors, D30072 and D30076.

(b) For the right thrust reverser, disconnect the electrical connectors, D30074 and D30078.

SUBTASK 78-31-03-020-004-G00

(2) Remove the sleeve lock proximity sensor [8] from the upper locking actuator [1] ((Figure 401 (Sheet 2)) as follows:

(a) Remove the jamnut [38] from the sleeve lock proximity sensor [8].

NOTE: It is necessary to remove only the jamnut adjacent to the target.

(b) Remove the sleeve lock proximity sensor [8] and key washer [39].

(c) Re-install the key washer [39] and jamnut [38] on the sleeve lock proximity sensor [8] for storage.

(d) Safety the sleeve lock proximity sensor [8] away from the actuator.

SUBTASK 78-31-03-020-006-G00

(3) Remove the two gimbal pins [19] that attach the upper locking actuator [1] to the gimbal ring on the aft side of the torque box as follows (Figure 401 (Sheet 3), View F):

(a) If you use the clamp assembly tool [42] (Actuator tool, SPL-2439) to remove the two gimbal pins [19], do these steps (Figure 401 (Sheet 6), View I):

NOTE: Use a allen wrench, STD-7895 to turn the clamp block screws [40] and use a 1/4 inch allen wrench, STD-14286 to turn the adjustment screw [41].

1) Loosen the clamp block screws [40] sufficiently so that the clamp block will fit over the upper locking actuator [1].
2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

3) Tilt the aft end of the clamp assembly tool down and over the aft cascade support ring.
4) Lower the forward end of the clamp assembly tool until the clamp block engages the upper locking actuator [1].
5) Tighten the adjustment screw [41] to move the clamp block aft.
   a) Move the clamp block until the aft edge touches where the diameter of the upper locking actuator [1] increases.
6) Tighten the clamp block screws [40].
7) Tighten the adjustment screw [41] to compress the fire seal [30] or fire seal [31] against the torque box.

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(b) Remove a bolt [20] and a washer [21] from each of the two gimbal pins [19].

(c) Remove the two gimbal pins [19].

(d) If the clamp assembly tool [42] (Actuator tool, SPL-2439) was used, loosen the adjustment screw [41] and clamp block screw [40] to remove the tool.

SUBTASK 78-31-03-010-022-G00

(4) Retract the inboard and outboard thrust reverser sleeve to the stowed position (TASK 78-31-00-980-804-G00).

SUBTASK 78-31-03-020-028-G00

(5) Disconnect the rod end of the upper locking actuator [1] as follows (Figure 401 (Sheet 3), View E):

(a) Remove the nut [17], bolt [11], washer [16], washer [12], and bushing [13] that attach the rod end of the actuator to the attach fitting on the sleeve.

(b) Disconnect the rod end of the upper locking actuator [1] from the actuator attach fitting.

SUBTASK 78-31-03-020-035-G00

(6) Disconnect the hydraulic lines from the upper locking actuator [1] as follows (Figure 401 (Sheet 1), View B and Figure 401 (Sheet 2), View C):

(a) Disconnect the extend line flexhose [7] from the upper extend port.

(b) Disconnect the retract line flexhose [6] from the upper retract port.

(c) Loosen the two bolts on the clamp block that holds the upper hydraulic retract line [2].

NOTE: To remove the sleeve fitting on the hydraulic retract line from the actuator port, the hydraulic retract line must be carefully flexed. With the clamp blocks loose, the hydraulic retract line can be flexed easier.

(d) Disconnect the upper hydraulic retract line [2] from the union [3].

1) Carefully remove the sleeve fitting on the upper hydraulic retract line from the actuator port.

(e) Disconnect the sync shaft tubing at the upper locking actuator.

1) Move the coupling nut and tube adapter back along the tubing to get access to the sync shaft end.

2) Flex the sync shaft to remove it from the internal spline port in the upper locking actuator [1].

NOTE: If it is necessary, remove the supporting block to allow removal of the sync shaft.

CAUTION

DO NOT LET DIRT OR OTHER CONTAMINATION GET ON THE SYNC SHAFT. DAMAGE TO THE SYNC SHAFT CAN OCCUR.

3) Remove the sync shaft.

NOTE: Make sure that dirt or contamination does not get on the sync shaft.

(f) Remove the union [3] and packing [4] from the lower retract port (Figure 401 (Sheet 1), View B).

(g) Keep the union [3] for the subsequent installation.

(h) Discard the packing [4].

(i) Remove the union [9] and packing [10] from the upper retract port (Figure 401 (Sheet 2)).

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(j) Keep the union [9] for the installation.

(k) Discard the packing [10].

(l) Install protective covers on the hydraulic lines and the actuator ports.

SUBTASK 78-31-03-010-004-G00

(7) Do these steps to get the necessary clearance to remove the upper locking actuator [1]:

(a) For the inboard thrust reverser, open the thrust reverser.

1) Make sure the leading edge flaps are completely retracted.

NOTE: Without hydraulics to hold the flaps in the retract position, the weight of the flaps can cause them to extend a small amount.

WARNING

MAKE SURE THAT YOU MONITOR THE POSITION OF THE INBOARD THRUST REVERSER WHILE IT OPENS. MAKE SURE THAT THE INBOARD THRUST REVERSER DOES NOT TOUCH THE WING LEADING EDGE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

2) For the removal of the upper locking actuator [1] on the inboard thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

a) Make sure to install the actuator safety lock assembly, SPL-14551.

<1> Make sure to use safety lock PN C78035-3. This is the full open inboard tool.

SUBTASK 78-31-03-010-015-G00

(8) For the removal of the upper locking actuator [1] on the outboard thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

(a) Make sure to install the actuator safety lock assembly, SPL-14551.

1) Make sure to use safety lock PN C78035-2. This is the full open outboard tool.

NOTE: The outboard thrust reverser will not touch the leading edge of the wing.

SUBTASK 78-31-03-010-005-G00

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(9) Carefully remove the upper locking actuator [1].

NOTE: You will move the actuator and its push rod through an opening in the cascade support ring and torque box.

SIA 001-014

SUBTASK 78-31-03-020-007-G00

(10) Remove the fire shield [29] and the fire seal [30] from the upper locking actuator [1] (Figure 401 (Sheet 4), View H).

(a) Examine the fire seal [30] for damage.

(b) If you find no damage, keep the fire seal [30] for the installation.

(c) If you find damage, replace the fire seal [30].

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SIA 015-999

SUBTASK 78-31-03-020-031-G00

(11) Remove the fire seal [31] from the upper locking actuator [1] (Figure 401 (Sheet 5), View H).

(a) Examine the fire seal [31] for damage.

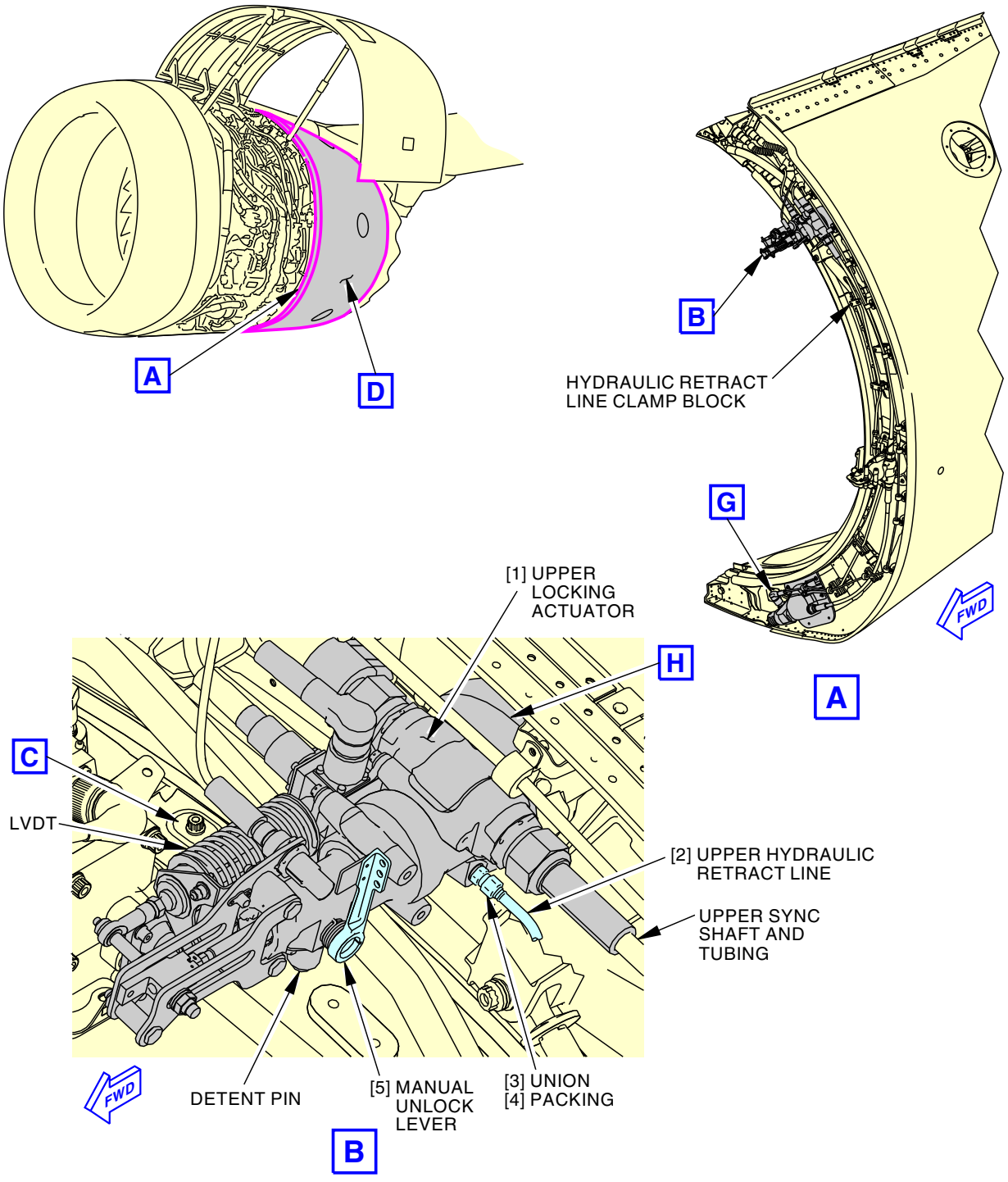
(b) If you find no damage, keep the fire seal [31] for the installation.

(c) If you find damage, replace the fire seal [31].

SIA ALL

——— END OF TASK ———

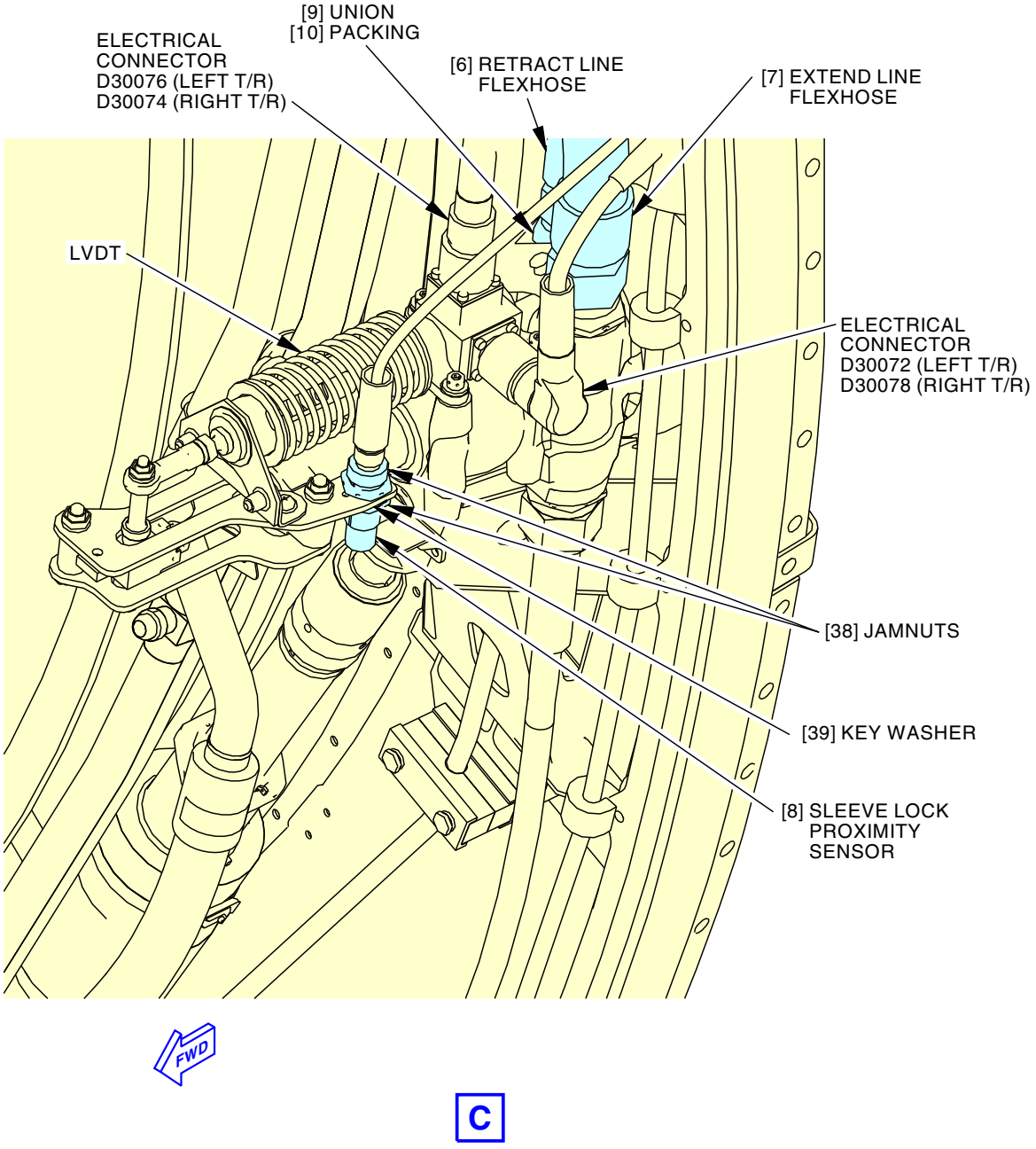
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355189 S00061516714_V2

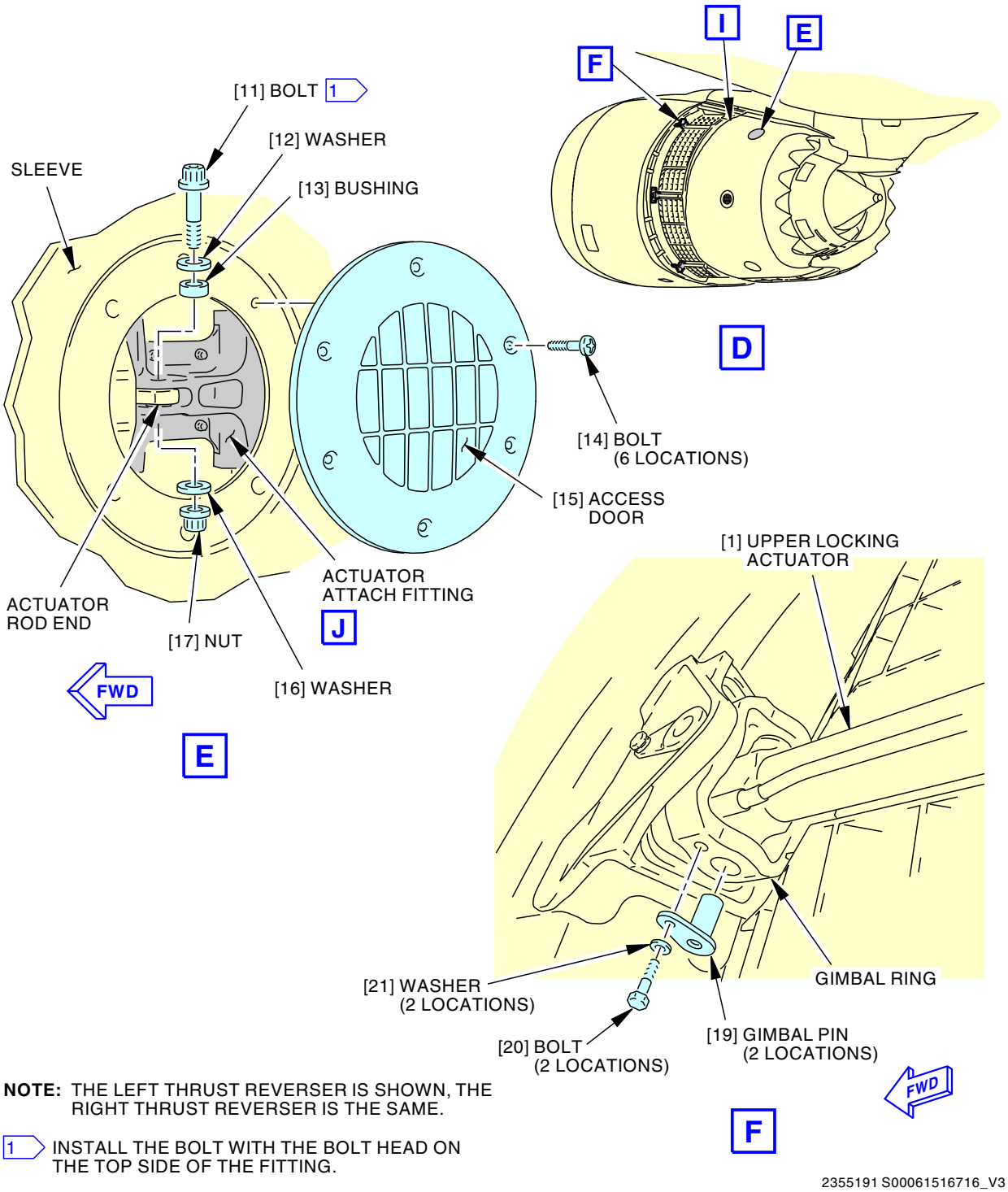
Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 1 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 2 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



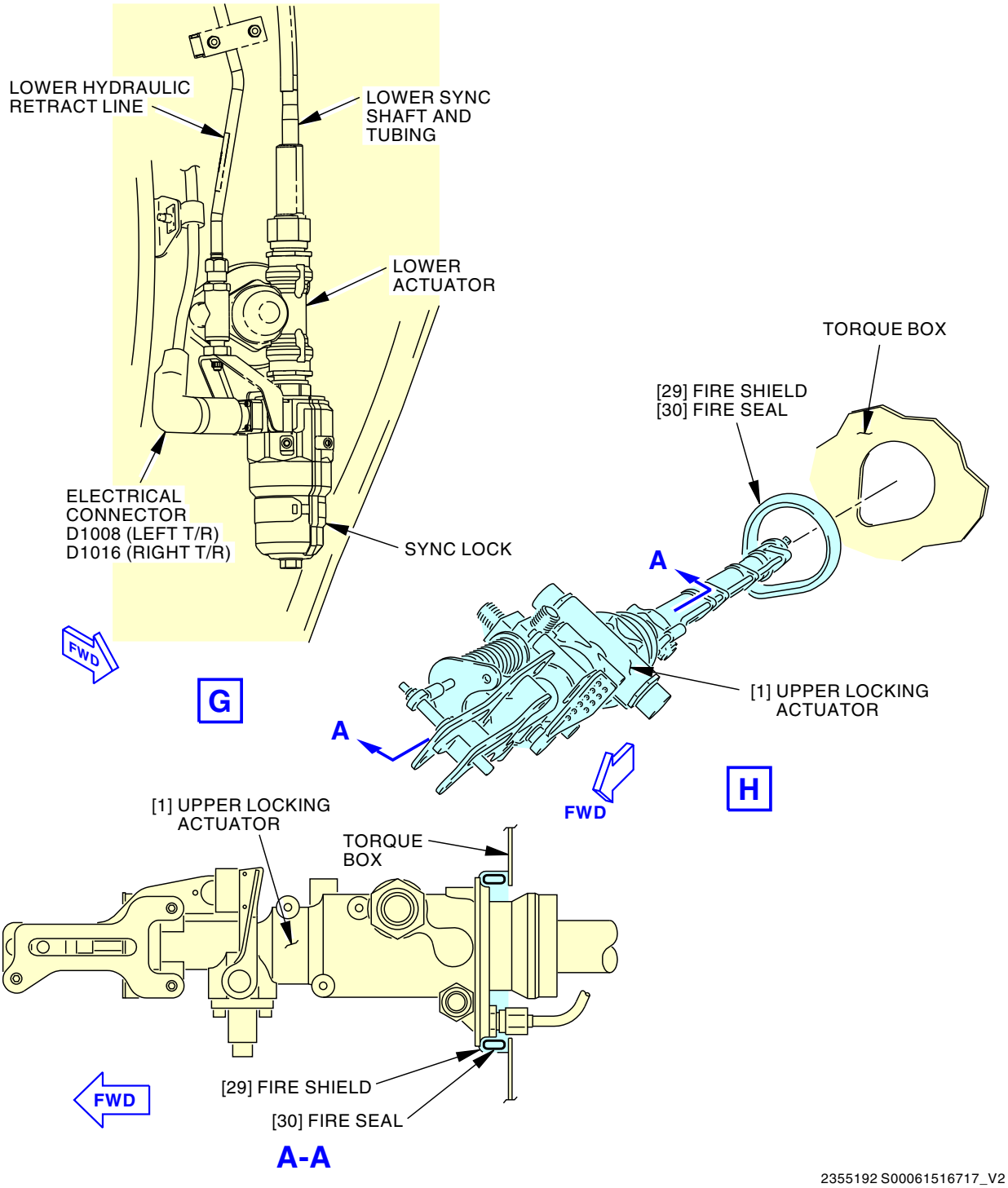
NOTE: THE LEFT THRUST REVERSER IS SHOWN, THE RIGHT THRUST REVERSER IS THE SAME.

1 INSTALL THE BOLT WITH THE BOLT HEAD ON THE TOP SIDE OF THE FITTING.

2355191 S00061516716_V3

Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 3 of 7)

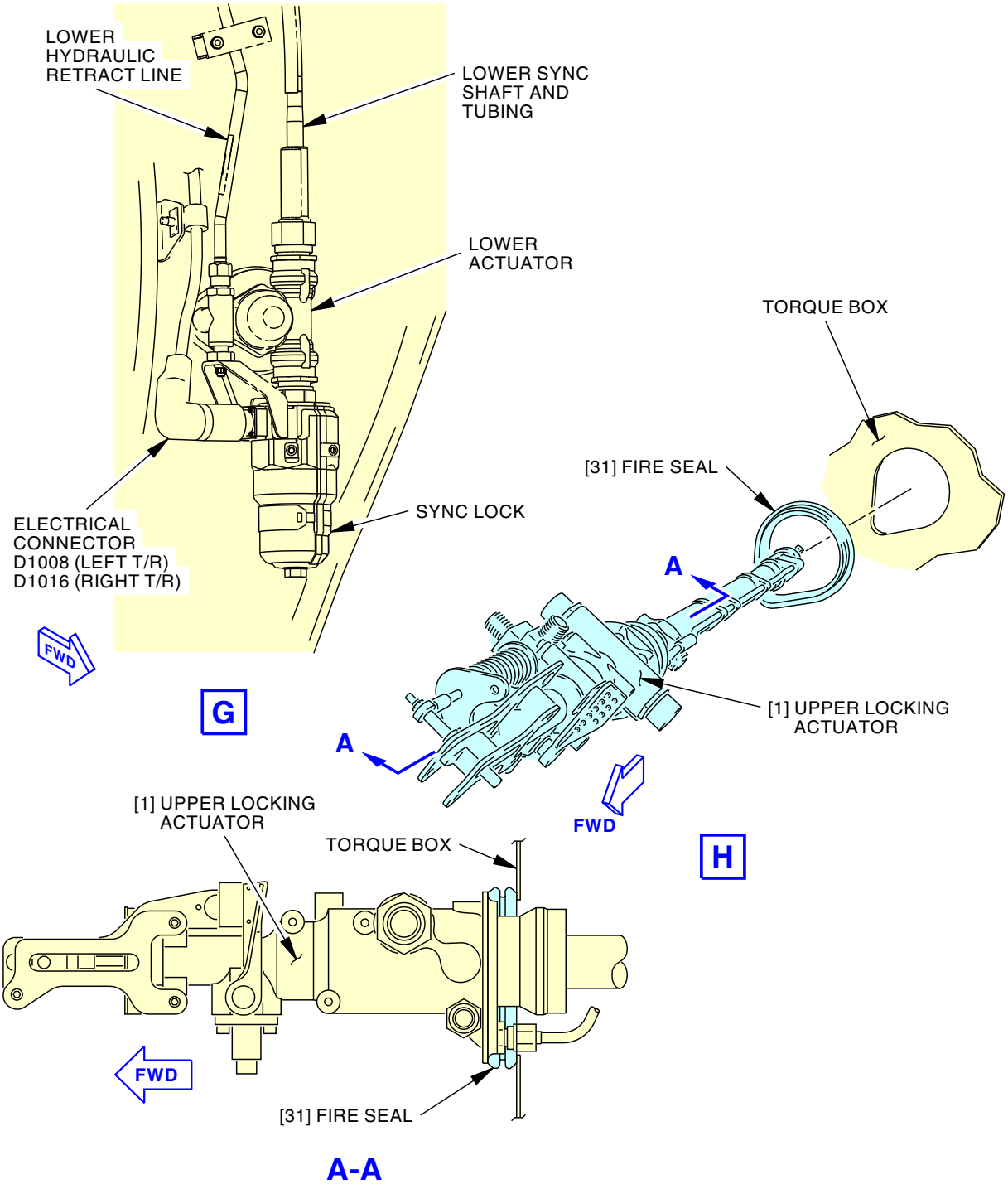
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355192 S00061516717_V2

Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 4 of 7)

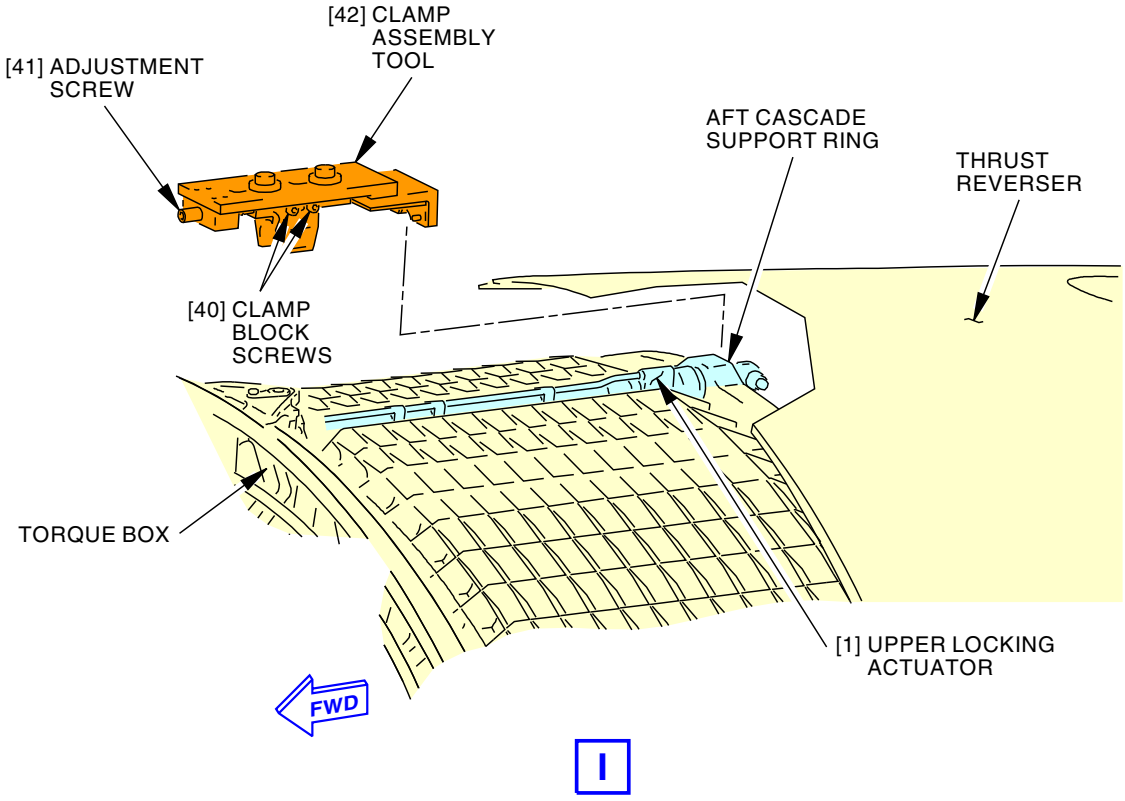
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2896786 S0000690950_V1

Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 5 of 7)

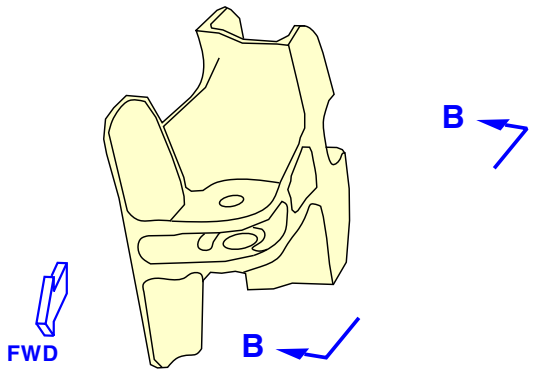
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355193 S00061516718_V2

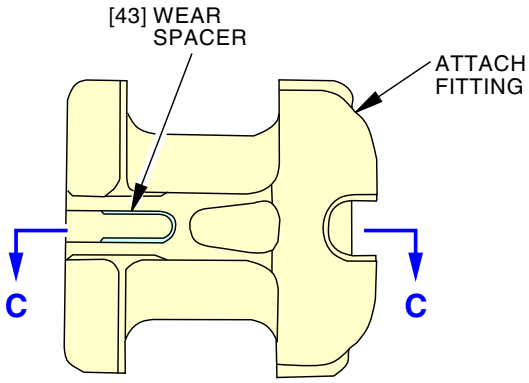
Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 6 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

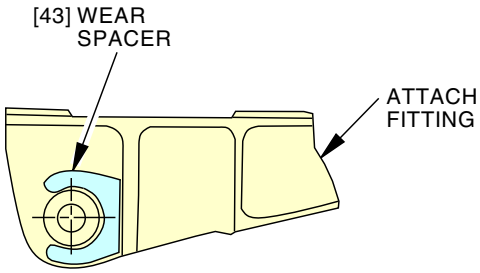


ACTUATOR ATTACH FITTING

J



B-B



C-C

2355194 S00061516719_V2

Upper Locking Actuator Installation
Figure 401/78-31-03-990-801-G00 (Sheet 7 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-03-400-802-G00

5. Upper Locking Hydraulic Actuator Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the upper locking hydraulic actuator.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-700-805-G00	Thrust Reverser Proximity Sensors Operational Test (P/B 501)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-04 P/B 401	SYNC SHAFT - REMOVAL/INSTALLATION
78-31-09-420-801-G00	Krueger Flap Deflector Installation (P/B 401)
78-34-03-400-801-G00	Thrust Reverser Sleeve Lock Proximity Sensor Installation (P/B 401)
78-34-03-800-801-G00	Sleeve Lock Proximity Sensor Adjustment and Test (P/B 501)

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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	
D00153	Fluid - Hydraulic Fluid, Fire Resistant (Interchangeable And Intermixable With BMS 3-11 Type V)	BMS3-11 Type IV
D00633	Grease - Aircraft General Purpose	BMS3-33
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Packing	78-31-03-01-150	SIA ALL
10	Packing	78-31-03-01-160	SIA ALL

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

H. Install the Upper Locking Actuator

SIA 001-014

SUBTASK 78-31-03-420-002-G00

(1) Install the fire seal [30] and fire shield [29] on the upper locking actuator [1] as follows:

(a) Put the fire seal [30] in the fire shield [29].

(b) Put the fire seal [30] and fire shield [29] over the rod end of the upper locking actuator [1].

NOTE: Make sure that the fire seal [30] contacts the forward side of the torque box.

SIA 015-999

SUBTASK 78-31-03-420-024-G00

(2) Install the fire seal [31] on the upper locking actuator [1] as follows:

(a) Put the fire seal [31] over the rod end of the upper locking actuator [1].

NOTE: Make sure that the fire seal [31] contacts the forward side of the torque box.

SIA ALL

SUBTASK 78-31-03-420-003-G00

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

CAUTION

DO NOT LET THE ROD END TURN AFTER THE ACTUATOR IS UNLOCKED. IF YOU LET THE ROD END TURN IT WILL AFFECT VERY IMPORTANT INTERNAL MECHANISM ADJUSTMENT.

(3) Install the upper locking actuator [1]:

(a) Unlock the upper locking actuator [1].

1) If applicable, remove the rig shipping pin from the rig pin hole in the proximity sensor bracket and feedback rod end.

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2) Move the manual unlock lever [5] forward.

3) Hold it in the forward position as you push the detent pin in.

4) Release the manual unlock lever [5].

(b) To extend the rod end, pull the rod end out by hand.

NOTE: Do not let the rod end turn when you extend it manually. Make sure that you hold the rod end when you extend the actuator manually. Do not use hydraulic power to extend the rod end.

1) For the inboard and outboard thrust reverser, extend the rod end approximately the same length as the one removed.

NOTE: It is also acceptable to extend the rod 1 in. (3 cm) - 2 in. (5 cm) longer to facilitate installation of the rod end bolt.

(c) Carefully insert the rod end through the opening in the torque box and aft cascade support ring.

SUBTASK 78-31-03-420-027-G00

(4) Align the rod end of the upper locking actuator [1] with the clevis on the attach fitting.

(a) Make sure that the actuator attach fitting has a wear spacer [43].

1) If it is necessary, attach a wear spacer [43] into place with sealant, A00803.

NOTE: Seal around the edge of the fitting and inner sleeve.

(b) Install the bushing [13], washer [16], washer [12], bolt [11], and nut [17] that attach the rod end to the actuator attach fitting.

(c) Tighten the nut [17] to 370 in-lb (41.8 N·m) - 690 in-lb (78.0 N·m).

SUBTASK 78-31-03-410-001-G00

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

NOTE: This will make the attachment of the rod end of the upper locking actuator and the installation of the access door easier.

SUBTASK 78-31-03-010-021-G00

(6) For the inboard thrust reverser sleeve, manually extend the sleeve no more than 15 in. (38 cm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(a) For the outboard thrust reverser sleeve, manually fully extend the thrust reverser sleeve (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing. The tool will be easier to use with the sleeve fully extended.

SUBTASK 78-31-03-420-004-G00

(7) Install the two gimbal pins [19] that attach the upper locking actuator [1] to the gimbal ring on the aft side of the torque box:

(a) Apply grease, D00633 on the shanks of the two gimbal pins [19].

(b) Align the attachment holes in the upper locking actuator [1] and the gimbal ring.

(c) If will you use the clamp assembly tool [42] (Actuator tool, SPL-2439) to compress the fire seal [30] or fire seal [31] against the torque box, do these steps:

1) Loosen the clamp block screws [40] sufficiently so that the clamp block will fit over the upper locking actuator [1].

2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

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3) Tilt the aft end of the clamp assembly tool down and over the aft cascade support ring.

4) Lower the forward end of the clamp assembly tool until the clamp block engages the upper locking actuator [1].

5) Tighten the adjustment screw [41] to move the clamp block aft.

a) Move the clamp block until the aft edge touches where the diameter of the upper locking actuator [1] increases.

6) Tighten the clamp block screws [40].

7) Tighten the adjustment screw [41] to compress the fire seal [30] or fire seal [31] against the torque box.

8) Turn the housing one direction or the other to align the attachment holes.

(d) Manually compress the fire seal [30] or fire seal [31] against the torque box as follows:

1) Push aft on the forward end of the upper locking actuator [1] to compress the fire seal against the torque box.

2) Turn the housing one direction or the other to align the attachment holes.

(e) Install the two gimbal pins [19] as follows:

1) Install a washer [21] and a bolt [20] in each of the gimbal pins [19].

2) Tighten the bolts to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

(f) If you used the clamp assembly tool [42] (Actuator tool, SPL-2439), loosen the adjustment screw [41] and the clamp block screws [40] to remove the tool.

SUBTASK 78-31-03-410-002-G00

(8) Install the applicable access doors:

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2

(a) Install the bolts [14] to attach the access door [15].

1) Tighten the bolts [14] to 30 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-03-410-012-G00

(9) Install the applicable access doors:

Number	Name/Location
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

(a) Install the bolts [14] to attach the access door [15].

1) Tighten the bolts [14] to 30 in-lb (3 N·m) - 50 in-lb (6 N·m).

(b) Install the Krueger Flap Deflector (TASK 78-31-09-420-801-G00).

SUBTASK 78-31-03-420-006-G00

(10) Do these steps if the replacement upper locking actuator [1] does not have the union [3] installed or the union [9] :

(a) Remove the protective covers from the hydraulic actuator ports.

(b) Lubricate a new packing [4] and new packing [10] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(c) Install the new packing [4] on the union [3].

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(d) Install the new packing [10] on the union [9].

(e) Lubricate the threads of the union [3] and union [9] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(f) Install the union [3] in the lower retract port.

(g) Tighten the union [3] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(h) Install the union [9] in the upper retract port.

(i) Tighten the union [9] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

SUBTASK 78-31-03-020-008-G00

(11) Connect the hydraulic lines to the upper locking actuator [1]:

(a) Remove the protective covers from the hydraulic lines and the actuator ports.

(b) Connect the upper hydraulic retract line [2] to the union [3].

1) Hand tighten the coupling nut at this time.

2) Tighten the two bolts on the clamp block that hold the upper hydraulic retract line [2] to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

3) Tighten the coupling nut on the upper hydraulic retract line [2] as follows:

a) Tighten the coupling nut to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

b) Loosen the coupling nut.

c) Tighten the coupling nut again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(c) Temporarily install the sync shaft and tubing:

NOTE: To manually retract the thrust reverser, the sync shafts must be temporarily installed.

1) If there is contamination, remove the contamination from the sync shaft with a cotton wiper, G00034.

2) Move the coupling nut and tube adaptor along the tubing.

3) Insert the sync shaft into the tubing.

a) Make sure that the sync shaft engages the internal spline in the middle actuator port.

4) Flex the sync shaft and insert the opposite end into the internal spline in the upper locking actuator port.

5) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

NOTE: This is a temporary installation and it is not necessary to double-torque the coupling nuts.

(d) Connect the retract line flexhose [6] to the union [9].

1) Tighten the coupling nut to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(e) Connect the extend line flexhose [7] to the upper extend port.

1) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

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SUBTASK 78-31-03-020-009-G00

(12) Connect the electrical connectors to the LVDT receptacles on the upper locking actuator [1] as follows:

(a) For the left thrust reverser, connect the electrical connectors, D30072 and D30076.

(b) For the right thrust reverser, connect the electrical connectors, D30074 and D30078.

SUBTASK 78-31-03-420-022-G00

CAUTION MAKE SURE THAT YOU FOLLOW THE STEPS TO UNLOCK THE UPPER LOCKING ACTUATOR. IF YOU DO NOT OBEY INSTRUCTIONS, THE COMPONENTS WILL NOT CORRECTLY ENGAGE AND DAMAGE CAN OCCUR TO THE SYNC SHAFT.

(13) Unlock the upper locking actuator [1].

NOTE: If the sync shaft failure occurs, Foreign Object Debris (FOD) can be inside the actuator and sync lock.

(a) Move the manual unlock lever [5] forward.

(b) Hold the manual unlock lever [5] in the forward position as you push the detent pin in.

(c) Release the manual unlock lever [5].

NOTE: If the thrust reverser faults occur after the sync shaft replacement, thrust reverser hydraulics can be contaminated with FOD.

SUBTASK 78-31-03-980-002-G00

(14) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

SUBTASK 78-31-03-410-003-G00

(15) Rig the upper sync shaft between the upper locking actuator and the middle actuator as follows:

(a) Remove and re-install the upper sync shaft that you temporarily installed (PAGEBLOCK 78-31-04/401).

SUBTASK 78-31-03-420-023-G00

(16) Install the sleeve lock proximity sensor [8] as follows:

(a) Do this task: Thrust Reverser Sleeve Lock Proximity Sensor Installation, TASK 78-34-03-400-801-G00.

(b) Do this task: Sleeve Lock Proximity Sensor Adjustment and Test, TASK 78-34-03-800-801-G00.

SUBTASK 78-31-03-440-002-G00

(17) If not done, do this task:Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-03-710-001-G00

(18) Do the operational test of the thrust reverser (TASK 78-31-00-700-801-G00).

SUBTASK 78-31-03-210-003-G00

(19) Examine the thrust reverser area for hydraulic fluid leaks (TASK 29-00-00-790-801).

SUBTASK 78-31-03-710-002-G00

(20) Do this task: Thrust Reverser Proximity Sensors Operational Test, TASK 78-31-00-700-805-G00.

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I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-03-410-004-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-03-040-010-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 78-31-03-000-803-G00

6. Middle Locking Hydraulic Actuator Removal

(Figure 402)

A. General

(1) This task gives the instructions to remove the middle locking hydraulic actuator.

(2) The middle locking hydraulic actuator will be referred to as middle actuator.

(3) There are three hydraulic actuators on each torque box of the left and right thrust reversers on an engine.

(4) The upper and middle hydraulic actuators are locking actuators, the lower hydraulic actuator is a non-locking actuator.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205
SPL-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)
STD-7895	Wrench - Allen, 3/16 inch
STD-14286	Allen Wrench - Hex, 1/4 Inch

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D. 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)

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

G. Prepare for the Removal

SUBTASK 78-31-03-040-011-G00

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-03-860-002-G00

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-03-040-012-G00

(3) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-03-040-013-G00

(4) Remove the hydraulic power from the applicable engine as follows (TASK 29-11-00-860-805):

(a) For Engine 1, remove the system A hydraulic power.

(b) For Engine 2, remove the system B hydraulic power.

SUBTASK 78-31-03-040-014-G00

(5) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-31-03-040-015-G00

(6) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-31-03-010-014-G00

(7) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1

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(Continued)

Number	Name/Location
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-03-020-036-G00

(8) Remove the applicable access door [64]:

(a) Open these access panels:

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

SUBTASK 78-31-03-980-007-G00

(9) Unlock the middle locking actuator as follows:

NOTE: Make sure that the thrust reverser is fully closed and retracted. If it is necessary, retract the thrust reverser hydraulically. If there is a small gap, the thrust reverser is not fully closed and you cannot move the manual unlock lever.

(a) Move the manual unlock lever forward.

(b) Hold the manual unlock lever in the forward position as you push the detent pin in.

(c) Release the manual unlock lever.

SUBTASK 78-31-03-980-003-G00

(10) Expose the gimbal pins and prepare for the use of the actuator removal and installation tool:

NOTE: The thrust reverser sleeve must be extended to remove the gimbal pins from the aft side of the torque box and to use the actuator removal and installation tool.

CAUTION

DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN THE PERMITTED LIMIT. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. DAMAGE CAN OCCUR.

(a) For the inboard thrust reverser sleeve, manually extend the thrust reverser sleeve no more than 15 in. (381 mm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(b) For the outboard thrust reverser sleeve, manually extend the thrust reverser sleeve to the fully extended position (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing. The tool will be easier to use with the sleeve fully extended.

SUBTASK 78-31-03-020-011-G00

WARNING

DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

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(WARNING PRECEDES)

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT LET HYDRAULIC FLUID GET ON EQUIPMENT. IF HYDRAULIC FLUID GETS ON EQUIPMENT, IMMEDIATELY CLEAN IT FROM THE EQUIPMENT. HYDRAULIC FLUID CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(11) Drain the hydraulic fluid from the hydraulic lines at the lower hydraulic actuator as follows (TASK 78-31-03-000-804-G00):

NOTE: To decrease hydraulic fluid spray when the coupling nuts are loosened, wrap a cotton wiper, G00034, around the wrench, nut and hydraulic line.

(a) Wrap a cotton wiper, G00034, around the electrical connector on the sync lock receptacle on the lower actuator .

NOTE: The cloth will catch the hydraulic fluid and prevent damage to the electrical connector.

(b) Loosen the clamp block screws on the clamp blocks that hold the lower hydraulic retract line.

NOTE: To remove the sleeve fitting on the hydraulic retract line from the actuator port, the hydraulic retract line must be carefully flexed. If the clamp blocks are loose, the hydraulic retract line can be flexed easier.

(c) Disconnect the hydraulic retract line at the lower actuator.

1) Carefully remove the sleeve fitting on the hydraulic retract line from the actuator port.

2) Let the hydraulic fluid drain into the 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(d) Disconnect the coupling nut on the sync shaft tubing at the lower actuator.

1) Let the hydraulic fluid drain into a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

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CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(e) Re-connect the coupling nut for the lower sync shaft to the lower actuator.

1) Torque the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(f) Re-connect the coupling nut for the lower retract line to the lower actuator.

1) Torque the coupling nut to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

2) Loosen the coupling nut.

3) Torque the coupling nut again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

H. Middle Hydraulic Actuator Removal

SUBTASK 78-31-03-020-012-G00

(1) Remove the sleeve lock proximity sensor [73] from the middle actuator [51] as follows (Figure 402 (Sheet 4), View D):

(a) Remove the jamnut [71] from the sleeve lock proximity sensor [73].

NOTE: It is necessary to remove only the jamnut adjacent to the target.

(b) Remove the sleeve lock proximity sensor [73] and key washer [72].

(c) Re-install the key washer [72] and jamnut [71] on the sleeve lock proximity sensor [73] for storage.

(d) Safety the sleeve lock proximity sensor [73] away from the actuator.

SUBTASK 78-31-03-020-037-G00

(2) Remove the two gimbal pins [68] that attach the middle actuator [51] to the gimbal ring on the aft side of the torque box (Figure 402 (Sheet 3), View H):

(a) If you use the Actuator tool, SPL-2439 to remove the gimbal pins [68], do these steps:

NOTE: Use a allen wrench, STD-7895 to turn the clamp block screw [40] and use a 1/4 inch allen wrench, STD-14286 to turn the middle actuator [51].

1) If not already done, loosen the clamp block screws [40] sufficiently so that the clamp block will fit over the middle actuator [51].

2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

3) Tilt the aft end of the clamp assembly tool [42] down and over the aft cascade support ring.

4) Lower the forward end of the clamp assembly tool [42] until the clamp block engages the middle actuator [51].

5) Tighten the adjustment screw [41] to move the clamp block aft.

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a) Move the clamp block until the aft edge touches where the diameter of the middle actuator [51] increases.

6) Tighten the clamp block screws [40].

7) Tighten the adjustment screw [41] to compress the fire seal [80] or fire seal [81] against the torque box.

(b) Remove a bolt [69] and washer [70] from each of the two gimbal pins [68].

1) Remove the two gimbal pins [68].

(c) If you used the clamp assembly tool [42] (Actuator tool, SPL-2439), do these steps:

1) Loosen the adjustment screw [41] and two clamp block screws [40].

2) Remove the clamp assembly tool [42].

SUBTASK 78-31-03-010-024-G00

(3) Retract the inboard and outboard thrust reverser sleeve to the stowed position (TASK 78-31-00-980-804-G00).

SUBTASK 78-31-03-020-038-G00

(4) Disconnect the rod end of the middle actuator [51] as follows (Figure 402 (Sheet 3), View G):

(a) Remove the nut [66], the bolt [60], the washer [61], the washer [65], and the bushing [62] that attach the rod end to the actuator attach fitting on the sleeve.

(b) Disconnect the rod end of the middle actuator [51] from the actuator attach fitting.

SIA 001-014

SUBTASK 78-31-03-020-014-G00

(5) Disconnect the hydraulic lines from the middle actuator [51] (Figure 402 (Sheet 1), View B):

(a) Loosen the two bolts on each of the two clamp blocks that hold the upper retract line.

(b) Disconnect the elbow [50] from the tee fitting [56] and the restrictor [54].

(c) Install protective covers on the fittings.

(d) Disconnect the upper and lower sync shaft tubing at the middle actuator.

1) Move the coupling nuts and tube adapters back along the tubing to get access to the sync shaft ends.

2) Flex the sync shaft to remove it from the internal splined port in the actuator.

CAUTION

DO NOT LET DIRT OR OTHER CONTAMINATION GET ON THE SYNC SHAFT. DAMAGE TO THE SYNC SHAFT CAN OCCUR.

3) Remove the sync shafts from the upper and lower sync shaft tubing.

a) Make sure that dirt or contamination does not get on the sync shafts.

(e) Remove the restrictor [54] and packing [55] from the upper retract port on the middle actuator (Figure 402 (Sheet 1), View B).

1) Keep the restrictor [54] for the subsequent installation and discard the packing [55].

(f) Remove the bleed plug [52] and packing [53] from the lower retract port on the middle actuator (Figure 402 (Sheet 1), View B).

1) Keep the bleed plug [52] for the subsequent installation and discard the packing [53].

(g) Install protective covers on the hydraulic lines and the actuator ports.

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SIA 015-999

SUBTASK 78-31-03-020-034-G00

(6) Disconnect the hydraulic lines from the middle actuator [51] (Figure 402 (Sheet 2), View B):

(a) Loosen the two bolts on each of the two clamp blocks that hold the upper retract line.

(b) Disconnect the elbow [50] from the tee fitting [56] and the restrictor [54].

(c) Install protective covers on the fittings.

(d) Disconnect the upper and lower sync shaft tubing at the middle actuator.

1) Move the coupling nuts and tube adapters back along the tubing to get access to the sync shaft ends.

2) Flex the sync shaft to remove it from the internal splined port in the actuator.

CAUTION

DO NOT LET DIRT OR OTHER CONTAMINATION GET ON THE SYNC SHAFT. DAMAGE TO THE SYNC SHAFT CAN OCCUR.

3) Remove the sync shafts from the upper and lower sync shaft tubing.

a) Make sure that dirt or contamination does not get on the sync shafts.

(e) Remove the restrictor [54] and packing [55] from the upper retract port on the middle actuator (Figure 402 (Sheet 2), View B).

1) Keep the restrictor [54] for the subsequent installation and discard the packing [55].

(f) Remove the bleed plug [52] and packing [53] from the lower retract port on the middle actuator (Figure 402 (Sheet 2), View B).

1) Keep the bleed plug [52] for the subsequent installation and discard the packing [53].

(g) Install protective covers on the hydraulic lines and the actuator ports.

SIA ALL

SUBTASK 78-31-03-010-007-G00

(7) Do these steps to get the necessary clearance to remove the middle actuator [51]:

(a) For the inboard thrust reverser, open the thrust reverser:

1) Make sure that the leading edge flaps are completely retracted.

NOTE: Without hydraulics to hold the flaps in the retract position, the weight of the flaps can cause them to extend a small amount.

WARNING

MAKE SURE THAT YOU MONITOR THE POSITION OF THE INBOARD THRUST REVERSER WHILE IT OPENS. MAKE SURE THAT THE INBOARD THRUST REVERSER DOES NOT TOUCH THE WING LEADING EDGE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

2) For the removal of the middle actuator [51] on the inboard thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

a) Install the actuator safety lock assembly, SPL-14551, on the inboard thrust reverser only.

<1> Make sure to use safety lock PN C78035–3. This is the full open inboard tool.

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(b) For the removal of the middle actuator [51] on the outboard thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

1) Make sure to use safety lock PN C78035–2. This is the full open outboard tool.

NOTE: The outboard thrust reverser will not touch the leading edge of the wing.

SUBTASK 78-31-03-010-008-G00

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(8) Carefully remove the middle actuator [51].

SIA 001-014

SUBTASK 78-31-03-020-017-G00

(9) Remove the fire shield [79] and the fire seal [80] from the middle actuator [51] (Figure 402 (Sheet 5), View F).

(a) Examine the fire seal [80] for damage.

(b) If you find no damage, keep the fire seal for the subsequent installation.

(c) If you find damage, replace the fire seal [80].

SIA 015-999

SUBTASK 78-31-03-020-032-G00

(10) Remove the fire seal [81] from the middle actuator [51] (Figure 402 (Sheet 6), View F).

(a) Examine the fire seal [81] for damage.

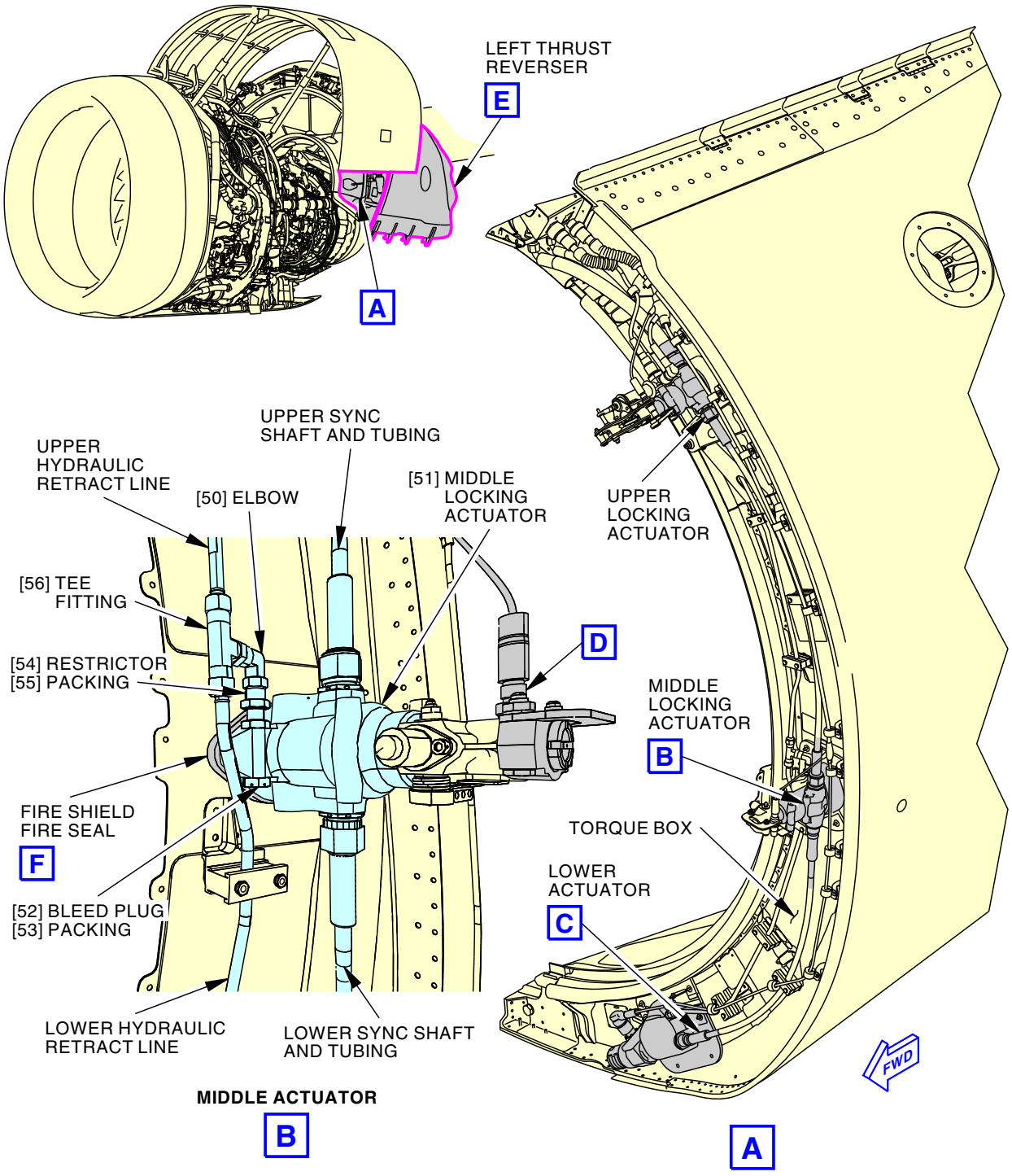
(b) If you find no damage, keep the fire seal for the subsequent installation.

(c) If you find damage, replace the fire seal [81].

SIA ALL

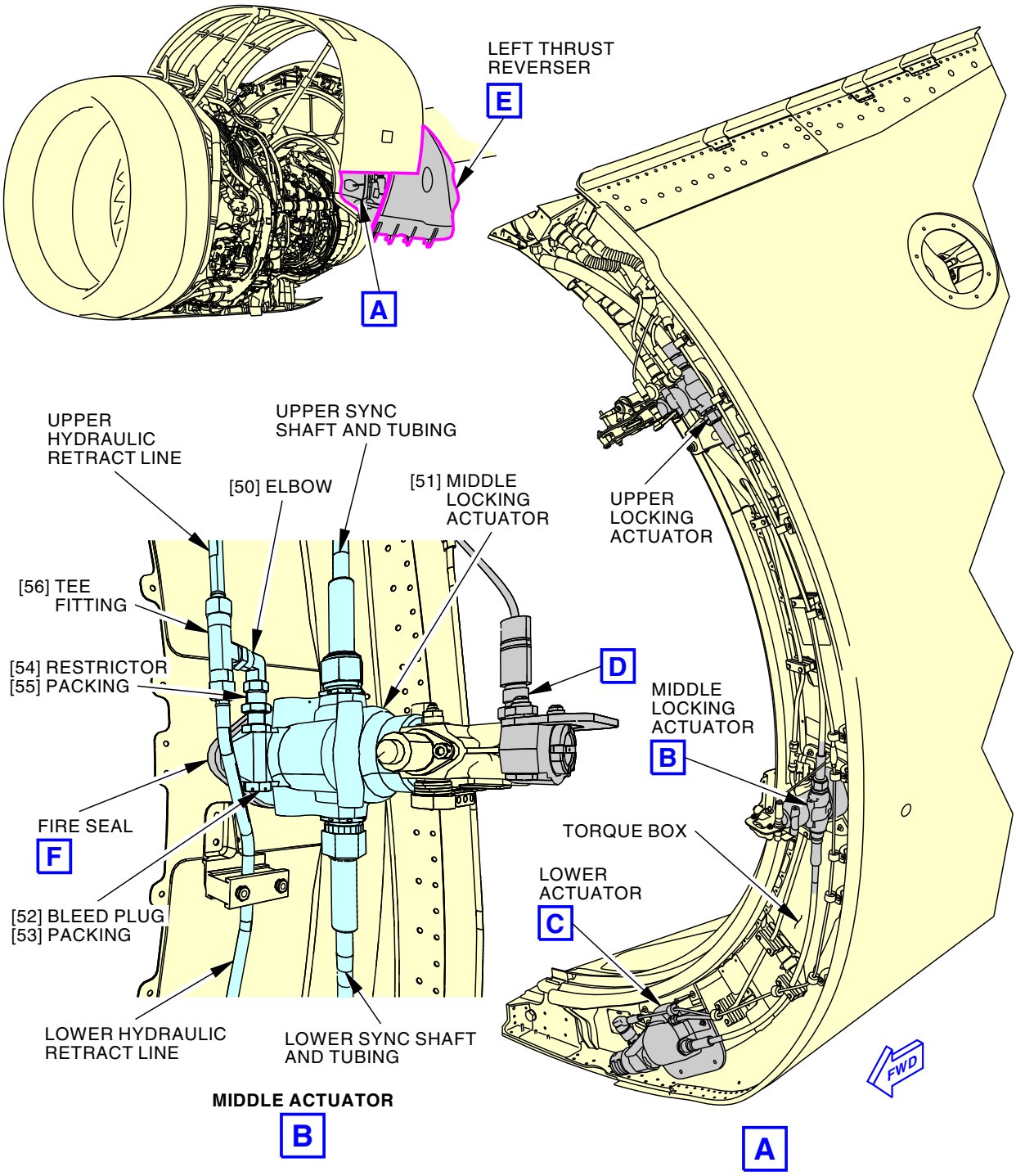
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



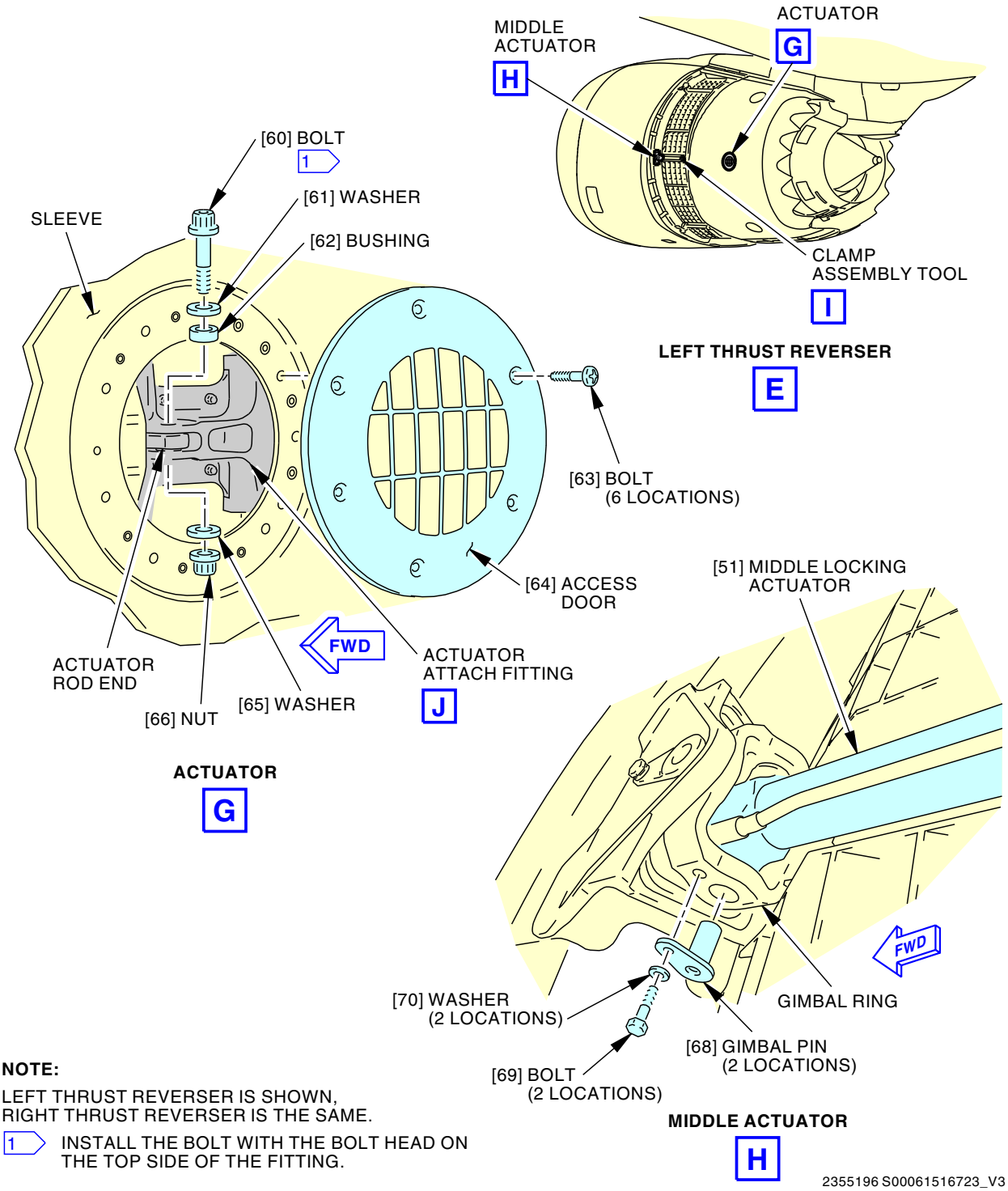
Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 1 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



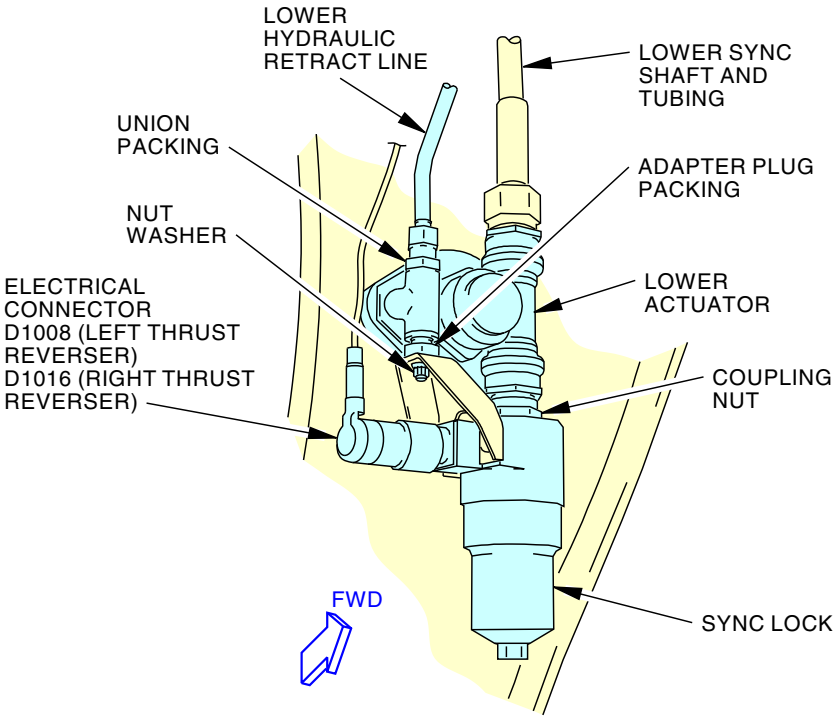
Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 2 of 8)

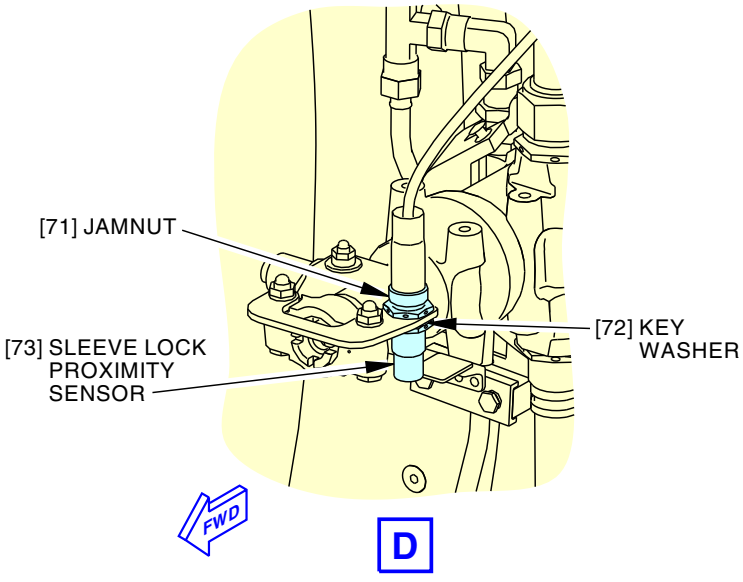
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 3 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

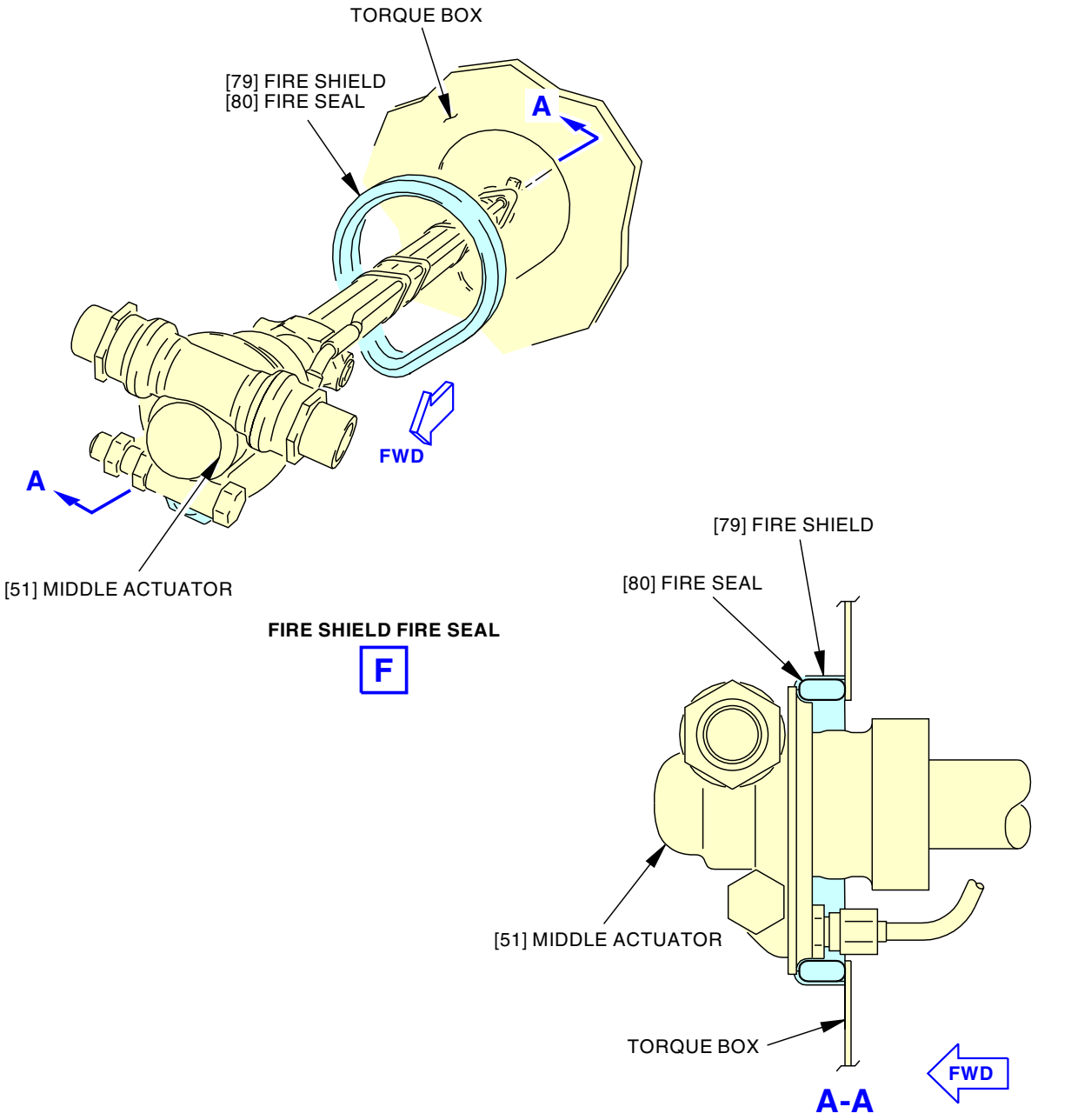




2355197 S00061516724_V2

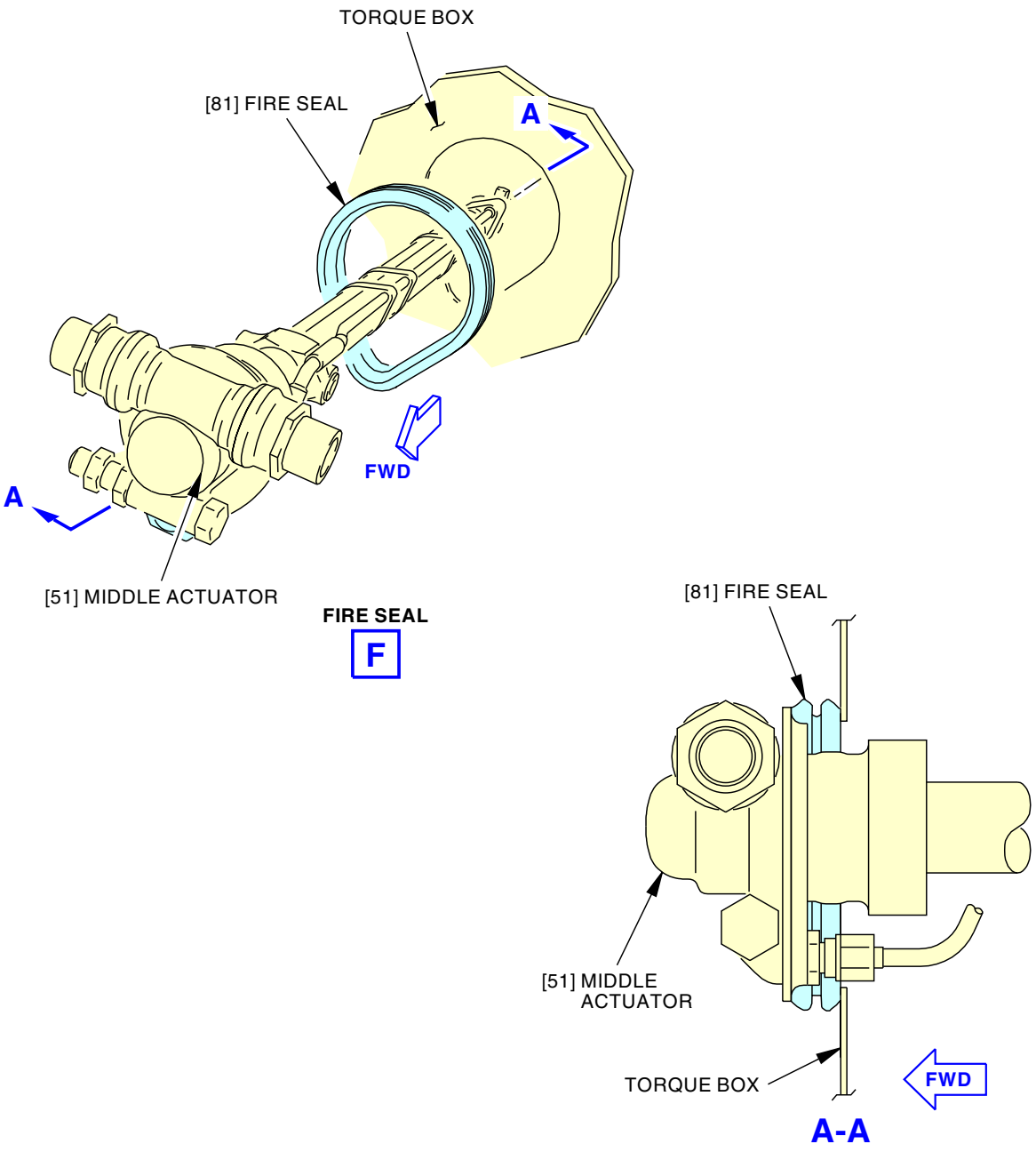
Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 4 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



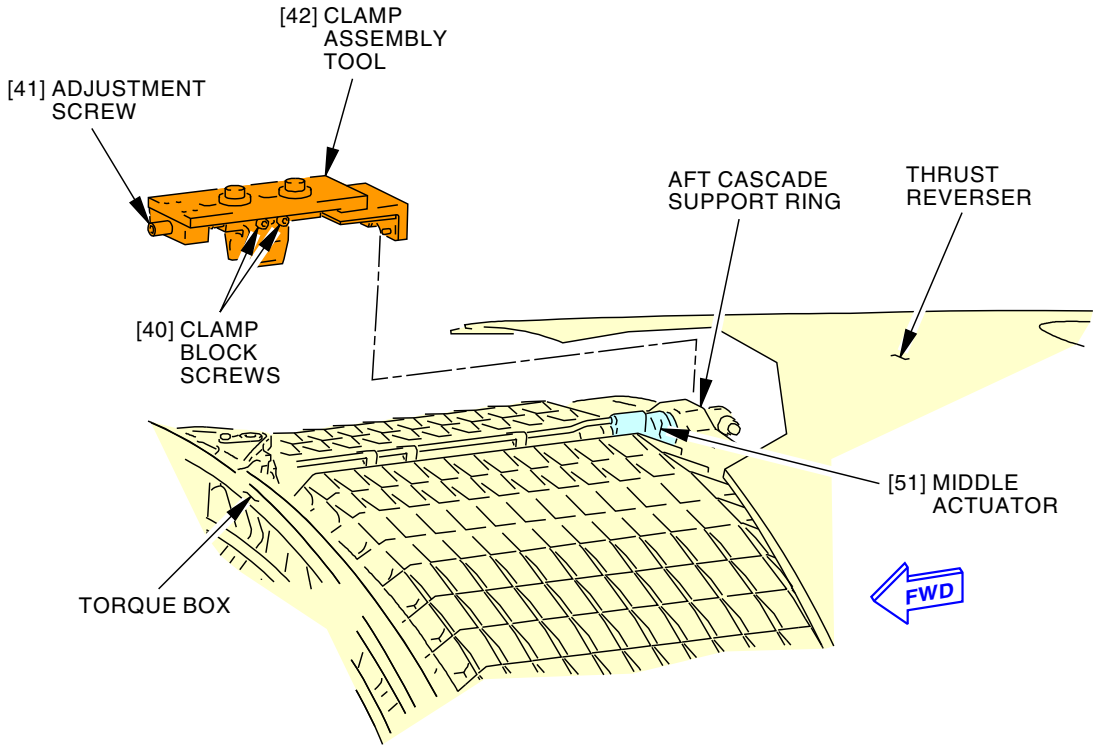
Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 5 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 6 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

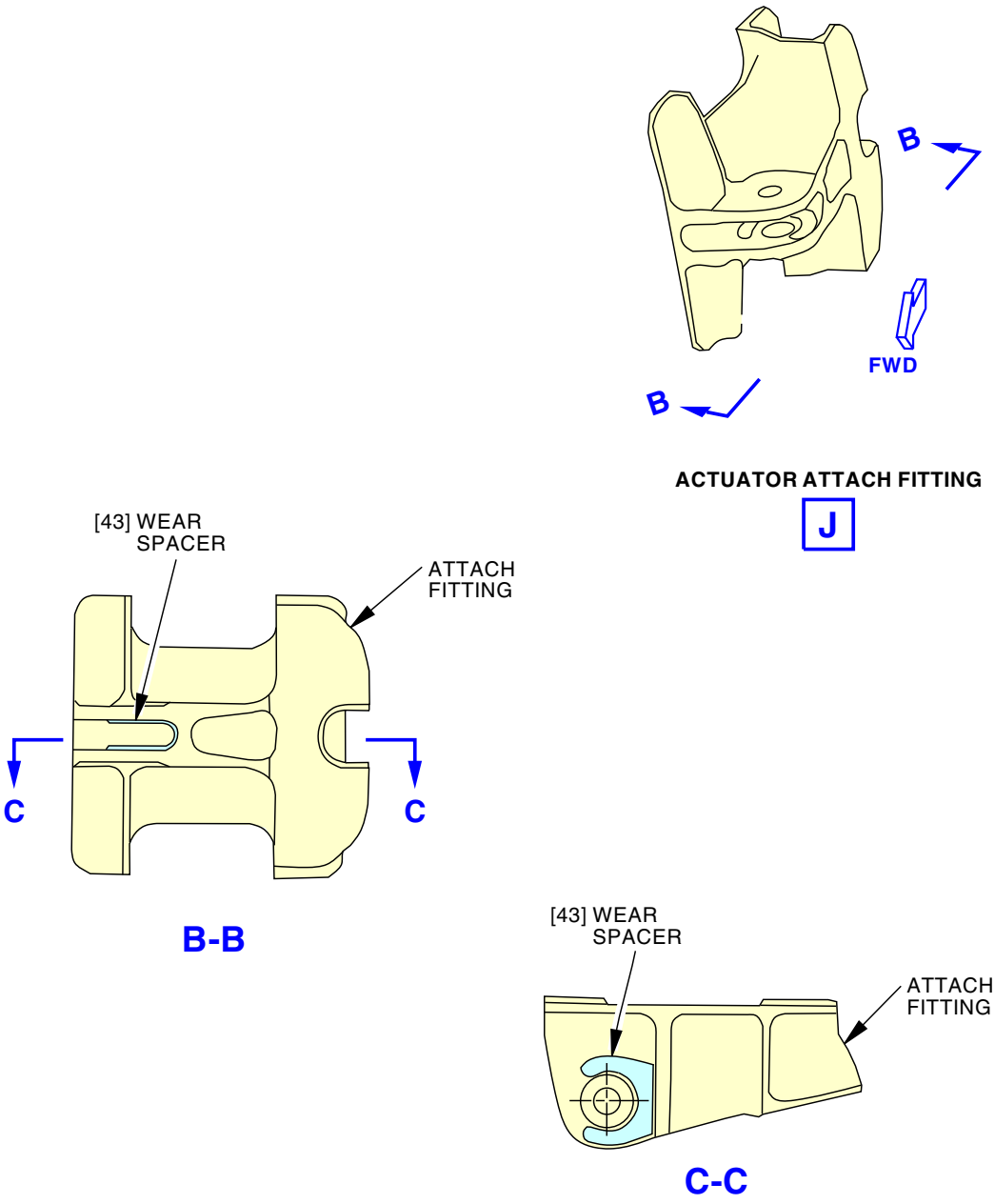


I

2355199 S00061516726_V2

Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 7 of 8)

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2355200 S00061516727_V2

Middle Locking Actuator Installation
Figure 402/78-31-03-990-802-G00 (Sheet 8 of 8)

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TASK 78-31-03-400-803-G00

7. Middle Locking Hydraulic Actuator Installation

(Figure 402)

A. General

(1) This task gives the instructions to install the middle locking hydraulic actuator.

(2) The middle locking hydraulic actuator will be referred to as middle actuator.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-04 P/B 401	SYNC SHAFT - REMOVAL/INSTALLATION
78-34-03-400-801-G00	Thrust Reverser Sleeve Lock Proximity Sensor Installation (P/B 401)
78-34-03-800-801-G00	Sleeve Lock Proximity Sensor Adjustment and Test (P/B 501)

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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205
SPL-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	
D00153	Fluid - Hydraulic Fluid, Fire Resistant (Interchangeable And Intermixable With BMS 3-11 Type V)	BMS3-11 Type IV
D00633	Grease - Aircraft General Purpose	BMS3-33
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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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
53	Packing	78-31-03-02-185	SIA ALL
55	Packing	78-31-03-02-185	SIA ALL

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

H. Prepare for the Installation

SIA 001-014

SUBTASK 78-31-03-420-007-G00

(1) Install the fire seal [80] and fire shield [79] on the middle actuator [51] as follows:

(a) Put the fire seal [80] in the fire shield [79].

(b) Put the fire seal [80] and fire shield [79] over the rod end of the middle actuator [51].

1) Make sure that the fire seal [80] will contact the forward side of the torque box.

SIA 015-999

SUBTASK 78-31-03-420-025-G00

(2) Install the fire seal [81] on the middle actuator [51] as follows:

(a) Put the fire seal [81] over the rod end of the middle actuator [51].

1) Make sure that the fire seal [81] will contact the forward side of the torque box.

SIA ALL

I. Middle Locking Hydraulic Actuator Installation

SUBTASK 78-31-03-860-006-G00

(1) Unlock the middle actuator [51] as follows:

(a) Move the manual unlock lever forward.

(b) Hold the manual unlock lever in the forward position as you push the detent pin in.

(c) Release the manual unlock lever.

SUBTASK 78-31-03-420-008-G00

(2) Install the middle actuator [51] as follows:

NOTE: Recommended to not turn the actuator rod end. For actuators without an LVDT, accidental rotation of the rod end will not cause detrimental effects.

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(a) Pull the rod end out of the middle actuator [51] by hand to extend as follows:

NOTE: Do not let the rod end turn when you extend it manually. Make sure that you hold the rod end when you extend the actuator manually. Do not use hydraulic power to extend the rod end.

1) For the inboard and outboard thrust reverser, extend the rod end approximately the same length as the one removed.

NOTE: It is also acceptable to extend the rod 1 in. (3 cm) - 2 in. (5 cm) longer to facilitate installation of the rod end bolt.

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(b) Carefully insert the rod end through the opening in the torque box and aft cascade support ring.

SUBTASK 78-31-03-420-028-G00

(3) Align the rod end of the middle actuator [51] with the clevis on the attach fitting.

(a) Make sure that the actuator attach fitting has a wear spacer [43] (Figure 402 (Sheet 8)).

1) If it is necessary, attach a wear spacer [43] into place with sealant, A00803.

NOTE: Seal around the edge of the fitting and inner sleeve.

(b) Install the bushing [62], washer [61], washer [65], bolt [60] and nut [66] that attach the rod end to the actuator attach fitting.

(c) Tighten the nut [66] to 370 in-lb (41.8 N·m) - 690 in-lb (78.0 N·m).

SUBTASK 78-31-03-410-005-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

NOTE: This will make the attachment of the rod end of the middle actuator and the installation of the access door easier.

(a) Remove the actuator safety Lock Assembly, SPL-14993, from the inboard thrust reverser only.

(b) Do not do the thrust reverser or leading edge activation.

(c) Do not close the fan cowl panels at this time.

SUBTASK 78-31-03-010-027-G00

(5) For the inboard thrust reverser sleeve, manually extend the sleeve no more than 15 in. (38 cm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(a) For the outboard thrust reverser sleeve, manually fully extend the thrust reverser sleeve (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing. The tool will be easier to use with the sleeve fully extended.

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SUBTASK 78-31-03-420-009-G00

(6) Install the two gimbal pins [68] that attach the middle actuator [51] to the gimbal ring on the aft side of the torque box:

(a) Apply grease, D00633 on the shanks of the two gimbal pins [68].

(b) Align the attachment holes in the middle actuator [51] and the gimbal ring.

(c) If you use the clamp assembly tool [42] (Actuator tool, SPL-2439) to compress the fire seal [80] or fire seal [81] against the torque box, do these steps:

1) Loosen the clamp block screws [40] sufficiently, so that the clamp block will fit over the middle actuator [51].

2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

3) Tilt the aft end of the clamp assembly tool [42] down and over the aft cascade support ring.

4) Lower the forward end of the clamp assembly tool [42] until the clamp block engages the middle actuator [51].

5) Tighten the adjustment screw [41] to move the clamp block aft.

NOTE: Move the clamp block until the aft edge touches where the diameter of the middle actuator [51] increases.

6) Tighten the clamp block screw [40].

7) Tighten the adjustment screw [41] to compress the fire seal [80] or fire seal [81] against the torque box.

8) Turn the housing one direction or the other to align the attachment holes.

(d) Manually compress the fire seal [80] or fire seal [81] against the torque box as follows:

1) Push aft on the forward end of the middle actuator [51] to compress the fire seal [80] or fire seal [81] against the torque box.

2) Turn the housing one direction or the other to align the attachment holes.

(e) Install the two gimbal pins [68] as follows:

1) Install a washer [70] and a bolt [69] in each gimbal pin [68].

2) Tighten the bolts to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

(f) If you used the clamp assembly tool [42] (Actuator tool, SPL-2439), loosen the adjustment screw [41] and clamp block screws [40] to remove the tool.

SUBTASK 78-31-03-410-006-G00

(7) Close these access panels:

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(a) Install the six bolts [63] to attach the access door [64].

(b) Tighten the bolts [63] to 30 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-03-020-018-G00

(8) Do these steps if the replacement middle actuator [51] does not have the restrictor [54] or bleed plug [52]:

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(a) Remove the protective covers from the hydraulic actuator ports.

(b) Lubricate the new packing [53] and new packing [55] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(c) Install the new packing [53] on the bleed plug [52].

(d) Install the new packing [55] on the restrictor [54].

(e) Lubricate the threads of the bleed plug [52] and restrictor [54] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(f) Install the bleed plug [52] in the lower retract port.

(g) Tighten the bleed plug [52] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(h) Install the restrictor [54] in the upper retract port.

(i) Tighten the restrictor [54] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

SUBTASK 78-31-03-020-019-G00

(9) Connect and tighten the hydraulic lines:

(a) Remove the protective covers from the hydraulic fittings.

(b) Connect the elbow [50] to the tee fitting [56] and the restrictor [54].

NOTE: Hand tighten the nuts on the elbow [50] at this time.

(c) Tighten the bolts on the clamp blocks that hold the upper and lower retract lines to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

(d) Tighten the nuts on the elbow [50] at the tee fitting [56] and the restrictor [54] as follows:

1) Tighten the nuts to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

2) Loosen the nuts.

3) Tighten the nuts again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(e) Temporarily install the upper and lower sync shaft and tubing:

NOTE: To manually retract the thrust reverser, the sync shafts must be temporarily installed.

1) If there is contamination, remove the contamination from the sync shaft with a cotton wiper, G00034.

2) Move the coupling nut and tube adaptor along the tubing.

3) Insert the sync shaft into the tubing.

a) Make sure that the sync shaft engages the internal spline in the lower and upper actuator port.

4) Flex the sync shaft and insert the opposite end into the internal spline in the middle actuator port.

5) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

NOTE: This is a temporary installation and it is not necessary to double-torque the coupling nut.

SUBTASK 78-31-03-420-011-G00

(10) Install the sleeve lock proximity sensor [73] (TASK 78-34-03-400-801-G00).

SUBTASK 78-31-03-700-001-G00

(11) Do this task: Sleeve Lock Proximity Sensor Adjustment and Test, TASK 78-34-03-800-801-G00.

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SUBTASK 78-31-03-980-004-G00

(12) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

SUBTASK 78-31-03-420-012-G00

(13) Rig the upper sync shaft between the upper locking actuator and the middle actuator as follows:

(a) Remove and re-install the upper sync shaft that you temporarily installed (PAGEBLOCK 78-31-04/401).

SUBTASK 78-31-03-440-003-G00

(14) If not done, do this task:Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-03-710-003-G00

(15) Do the operational test of the thrust reverser (TASK 78-31-00-700-801-G00).

SUBTASK 78-31-03-210-004-G00

(16) Examine the thrust reverser area for hydraulic fluid leaks (TASK 29-00-00-790-801).

J. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-03-410-007-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-03-040-020-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 78-31-03-000-804-G00

8. Lower Hydraulic Actuator Removal

(Figure 403)

A. General

(1) This task gives the instructions to remove the lower hydraulic actuator.

(2) There are three hydraulic actuators on each torque box of the left and right thrust reversers on an engine.

(3) The upper and middle hydraulic actuators are locking actuators, the lower hydraulic actuators is a non-locking actuator.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)

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(Continued)

Reference	Title
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205
SPL-14551	Lock - Thrust Reverser Opening Actuator, Fully Extended, LEAP-1B Part #: C78035-1 Supplier: 81205
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)
STD-7895	Wrench - Allen, 3/16 inch
STD-14286	Allen Wrench - Hex, 1/4 Inch

D. 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)

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

G. Prepare for the Removal

SUBTASK 78-31-03-040-021-G00

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-03-860-003-G00

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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SUBTASK 78-31-03-040-022-G00

(3) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-03-040-023-G00

(4) Remove the hydraulic power from the applicable engine as follows (TASK 29-11-00-860-805):

(a) For Engine 1, remove the system A hydraulic power.

(b) For Engine 2, remove the system B hydraulic power.

SUBTASK 78-31-03-040-024-G00

(5) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-31-03-040-025-G00

(6) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-31-03-010-018-G00

(7) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-31-03-010-025-G00

(8) Remove the applicable access door [15].

Open these access panels:

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

SUBTASK 78-31-03-980-005-G00

(9) Expose the gimbal pins and prepare for the use of the actuator removal and installation tool:

NOTE: The thrust reverser sleeve must be extended to remove the gimbal pins from the aft side of the torque box and to use the actuator removal and installation tool.

CAUTION

DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN THE PERMITTED LIMIT. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. DAMAGE CAN OCCUR.

(a) For the inboard thrust reverser sleeve, manually extend the thrust reverser sleeve no more than 15 in. (381 mm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(b) For the outboard thrust reverser sleeve, manually extend the thrust reverser sleeve to the fully extended position (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing and if the sleeve is fully extended, the tool will be easier to use.

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SUBTASK 78-31-03-020-020-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT LET HYDRAULIC FLUID GET ON EQUIPMENT. IF HYDRAULIC FLUID GETS ON EQUIPMENT, IMMEDIATELY CLEAN IT FROM THE EQUIPMENT. HYDRAULIC FLUID CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(10) Drain the hydraulic fluid from the hydraulic lines (Figure 403 (Sheet 1), View B):

NOTE: To decrease hydraulic fluid spray when the coupling nuts are loosened, wrap cotton wiper, G00034, around the wrench, nut and hydraulic line.

(a) Wrap a cotton wiper, G00034, around the electrical connector on the sync lock receptacle on the lower actuator.

NOTE: The cloth will catch the hydraulic fluid and prevent damage to the electrical connector.

(b) Loosen the two bolts on each of the two clamp blocks that hold the lower hydraulic retract line [132].

NOTE: To remove the sleeve fitting on the hydraulic retract line from the actuator port, the hydraulic retract line must be carefully flexed. If the clampblocks are loose, the hydraulic retract line can be flexed easier.

(c) Disconnect the lower hydraulic retract line [132] at the lower actuator [103].

1) Carefully remove the sleeve fitting on the lower hydraulic retract line [132] from the actuator port.

2) let the hydraulic fluid drain in a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

(d) Disconnect the coupling nut on the sync shaft tubing at the lower actuator [103].

1) Let the hydraulic fluid drain into the 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

2) Move the coupling nut and tube adapter back along the tubing to get access to the sync shaft end.

3) Flex the sync shaft to remove it from the internal spline port in the lower actuator [103].

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CAUTION

DO NOT LET DIRT OR OTHER CONTAMINATION GET ON THE SYNC SHAFT. DAMAGE TO THE SYNC SHAFT CAN OCCUR.

4) Remove the sync shaft.

NOTE: Make sure that dirt or contamination does not get on the sync shaft.

(e) Remove the union [110] and packing [111] from the upper retract port of the lower actuator (Figure 403 (Sheet 1), View B).

NOTE: Keep the union [110] for the installation.

(f) Discard the packing [111].

(g) Install protective covers on the hydraulic lines and actuator ports.

SUBTASK 78-31-03-020-021-G00

(11) Remove the sync lock [105] as follows:

(a) Disconnect the electrical connector from the sync lock receptacle as follows (Figure 403 (Sheet 1), View B):

1) For the left thrust reverser, disconnect the electrical connector D1008.

2) For the right thrust reverser, disconnect the electrical connector D1016.

(b) Remove the nut [106] and washer [107] from the adapter plug [108].

NOTE: You do not have to remove the two bolts that hold the bracket to the sync lock. After the coupling nut is loose, the bracket will move off the stud.

(c) Loosen the coupling nut on the sync lock [105].

(d) Remove the sync lock [105] and bracket.

(e) Remove the adapter plug [108] and packing [109].

(f) Discard the packing [109].

(g) Install protective covers on the sync lock [105] and lower actuator [103].

H. Lower Actuator Removal

SUBTASK 78-31-03-020-022-G00

(1) Remove the two gimbal pins [120] that attach the lower actuator [103] to the gimbal ring on the aft side of the torque box as follows (Figure 403 (Sheet 2), View E):

(a) If you use the clamp assembly tool [42] (Actuator tool, SPL-2439) to remove the gimbal pins [120], do these steps (Figure 403 (Sheet 5), View E):

NOTE: Use a allen wrench, STD-7895 to turn the clamp block screws [40] and use a 1/4 inch allen wrench, STD-14286 to turn the adjustment screw [41].

1) Loosen the clamp block screws [40] sufficiently so that the clamp block will fit over the lower actuator [103].

2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

3) Tilt the aft end of the clamp assembly tool down and over the aft cascade support ring.

4) Lower the forward end of the clamp assembly tool until the clamp block engages the lower actuator [103].

5) Tighten the adjustment screw [41] to move the clamp block aft.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) Move the clamp block until the aft edge touches where the diameter of the lower actuator [103] increases.

6) Tighten the clamp block screws [40].

7) Tighten the adjustment screw [41] to compress the fire seal [123] or fire seal [125] against the torque box.

(b) Remove a bolt [121] and washer [122] from each of the gimbal pins [120].

1) Remove the gimbal pins [120].

(c) If you used the clamp assembly tool [42] (Actuator tool, SPL-2439), loosen the adjustment screw [41] and clamp block screw [40] to remove the tool.

SUBTASK 78-31-03-010-026-G00

(2) Retract the inboard and outboard thrust reverser sleeve to the stowed position (TASK 78-31-00-980-804-G00).

SUBTASK 78-31-03-020-029-G00

(3) Disconnect the rod end of the lower actuator [103] as follows (Figure 403 (Sheet 2), View H):

(a) Remove the nut [118], bolt [112], washer [113], washer [117], and the bushing [114] that attach the rod end of the actuator to the attach fitting on the sleeve.

(b) Disconnect the rod end of the lower actuator [103] from the actuator attach fitting.

SUBTASK 78-31-03-010-011-G00

(4) Do these steps to get the necessary clearance to remove the lower actuator [103]:

WARNING MAKE SURE THAT YOU MONITOR THE POSITION OF THE INBOARD THRUST REVERSER WHILE IT OPENS. MAKE SURE THAT THE INBOARD THRUST REVERSER DOES NOT TOUCH THE WING LEADING EDGE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) For the inboard thrust reverser, open the thrust reverser.

(b) Make sure that the leading edge flaps are completely retracted.

NOTE: Without hydraulics to hold the flaps in the retract position, the weight of the flaps can cause them to extend a small amount.

1) If it is necessary, do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

(c) For the removal of the lower actuator [103] on the inboard thrust reverser, do this task:TASK 78-31-00-010-801-G00.

1) Install the actuator safety lock assembly, SPL-14551, on the inboard thrust reverser only.

a) Make sure to use safety lock PN C78035–3. This is the full open inboard tool.

SUBTASK 78-31-03-010-016-G00

(5) For the removal of the lower actuator [103] on the outboard thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

(a) Make sure to install the actuator safety lock assembly, SPL-14551.

1) Make sure to use safety lock PN C78035–2. This is the full open outboard tool.

NOTE: The outboard thrust reverser will not touch the leading edge of the wing.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-03-010-012-G00

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(6) Carefully remove the lower actuator [103].

SIA 001-014

SUBTASK 78-31-03-020-023-G00

(7) Remove the fire shield [124] and the fire seal [123] from the lower actuator [103] as follows (Figure 403 (Sheet 3), View F):

(a) Examine the fire seal [123] for damage.

(b) If you find no damage, keep the fire seal for the subsequent installation.

(c) If you find damage, replace the fire seal [123].

SIA 015-999

SUBTASK 78-31-03-020-033-G00

(8) Remove the fire seal [125] from the lower actuator [103] as follows (Figure 403 (Sheet 4), View F):

(a) Examine the fire seal [125] for damage.

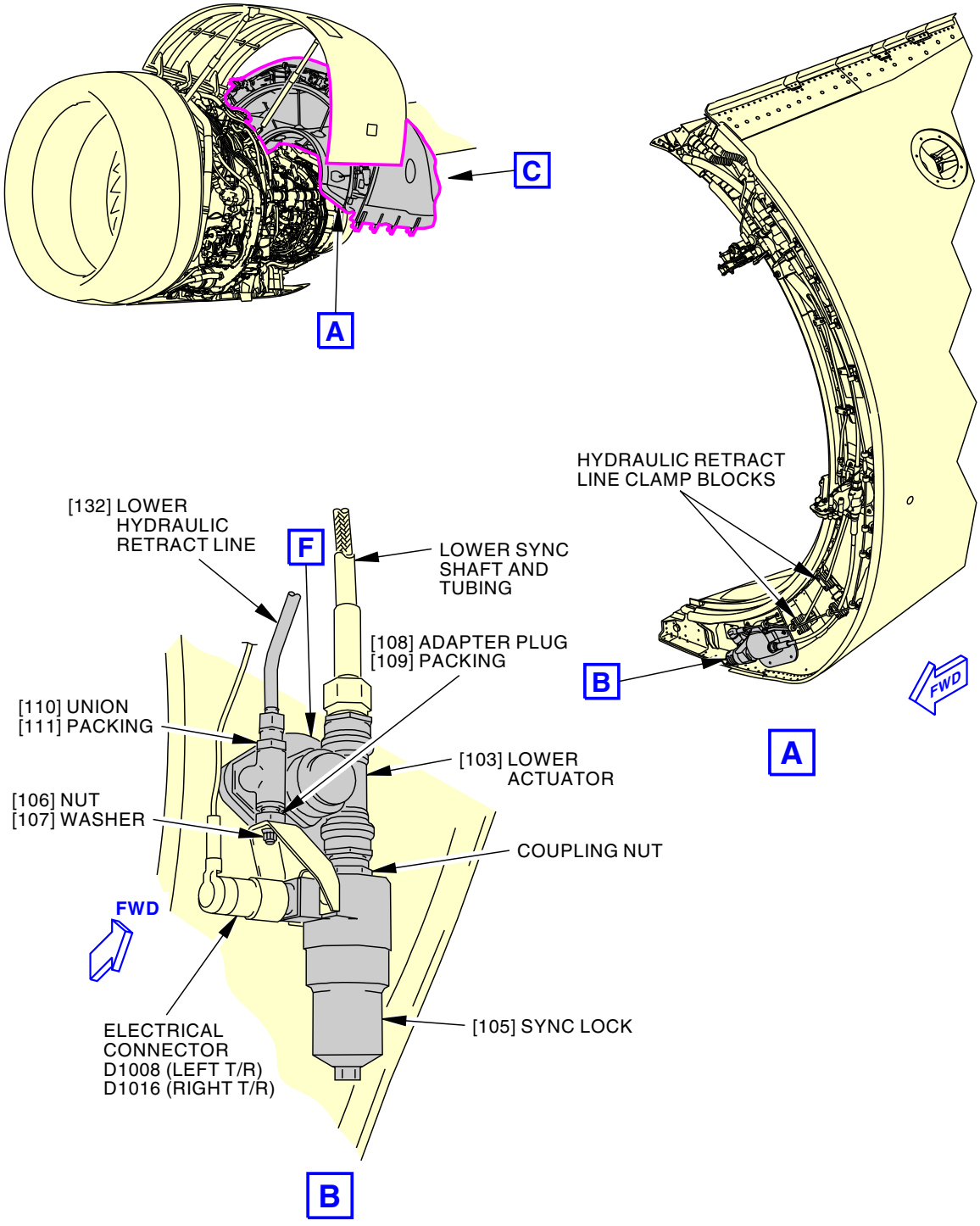
(b) If you find no damage, keep the fire seal for the subsequent installation.

(c) If you find damage, replace the fire seal [125].

SIA ALL

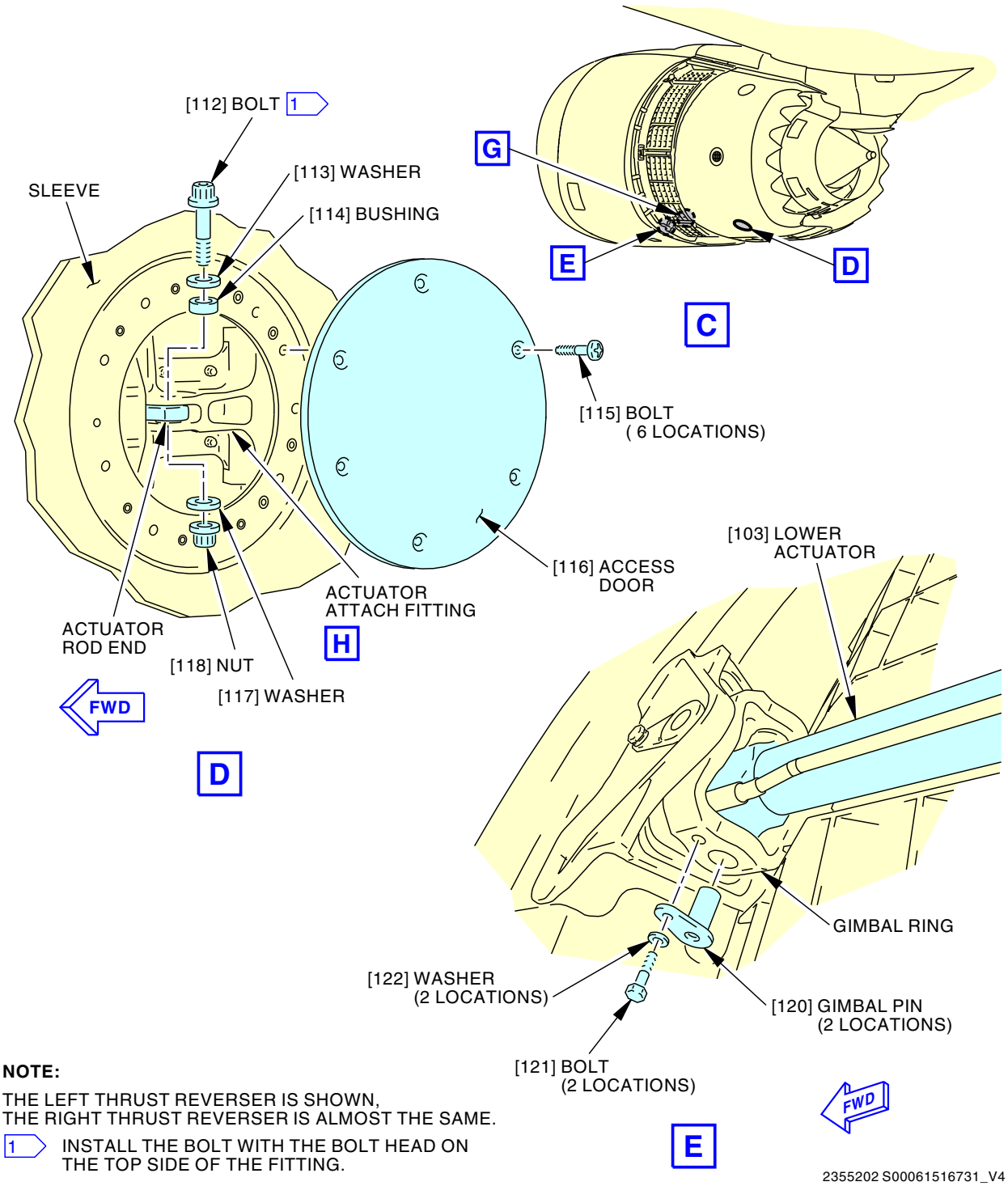
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 1 of 6)

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NOTE:

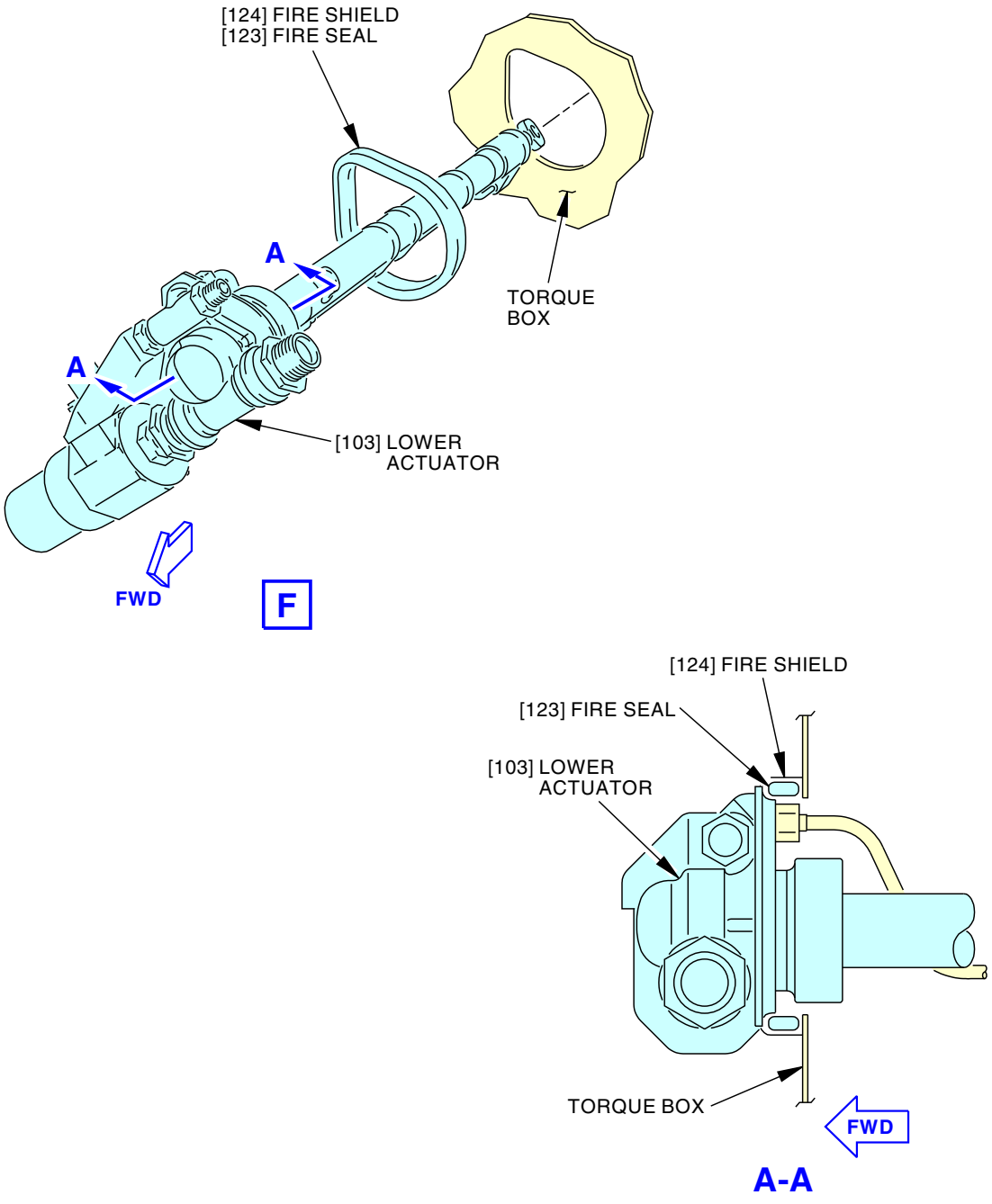
THE LEFT THRUST REVERSER IS SHOWN,
THE RIGHT THRUST REVERSER IS ALMOST THE SAME.

1 INSTALL THE BOLT WITH THE BOLT HEAD ON THE TOP SIDE OF THE FITTING.

2355202 S00061516731_V4

Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 2 of 6)

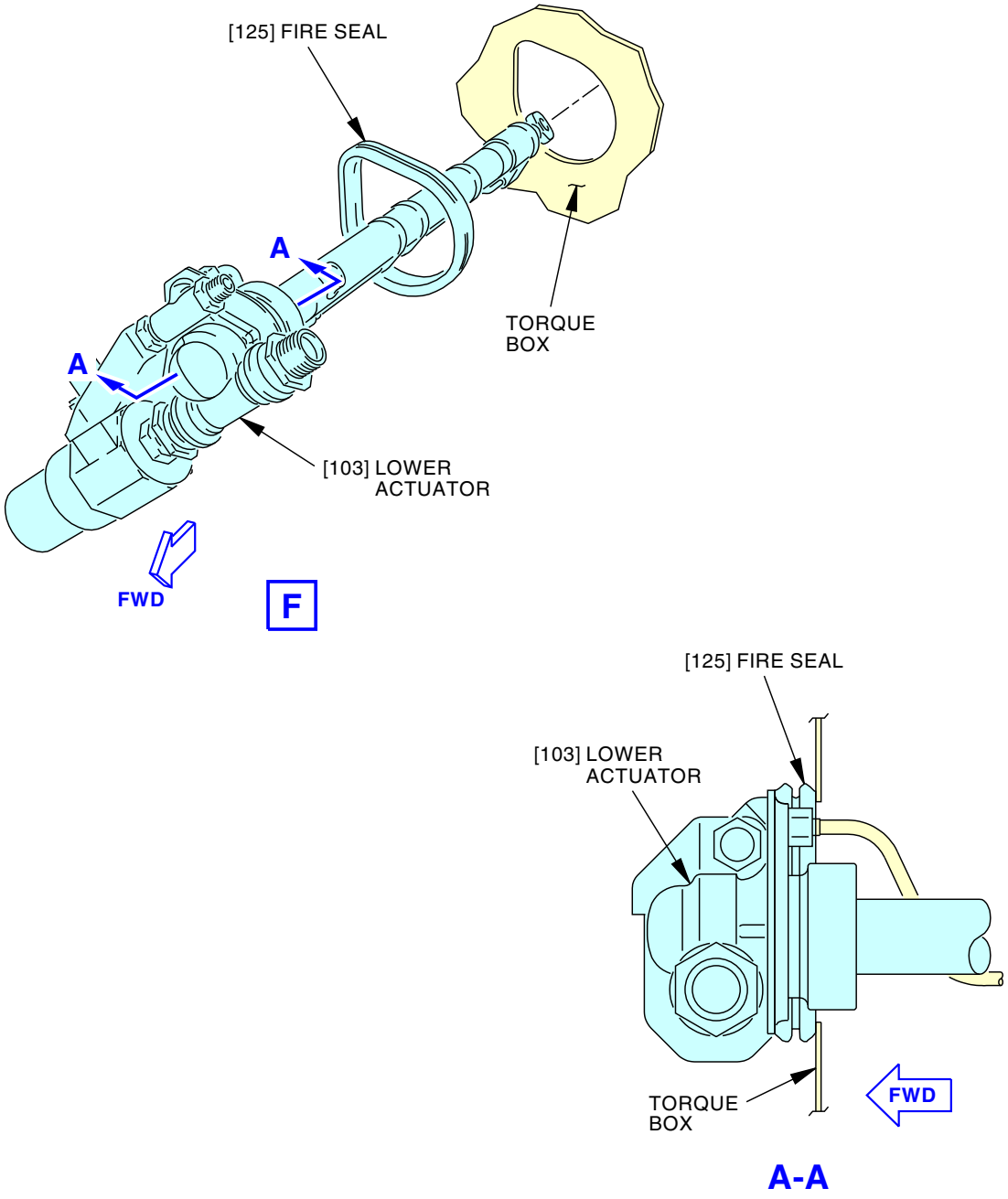
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355203 S00061516732_V2

Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 3 of 6)

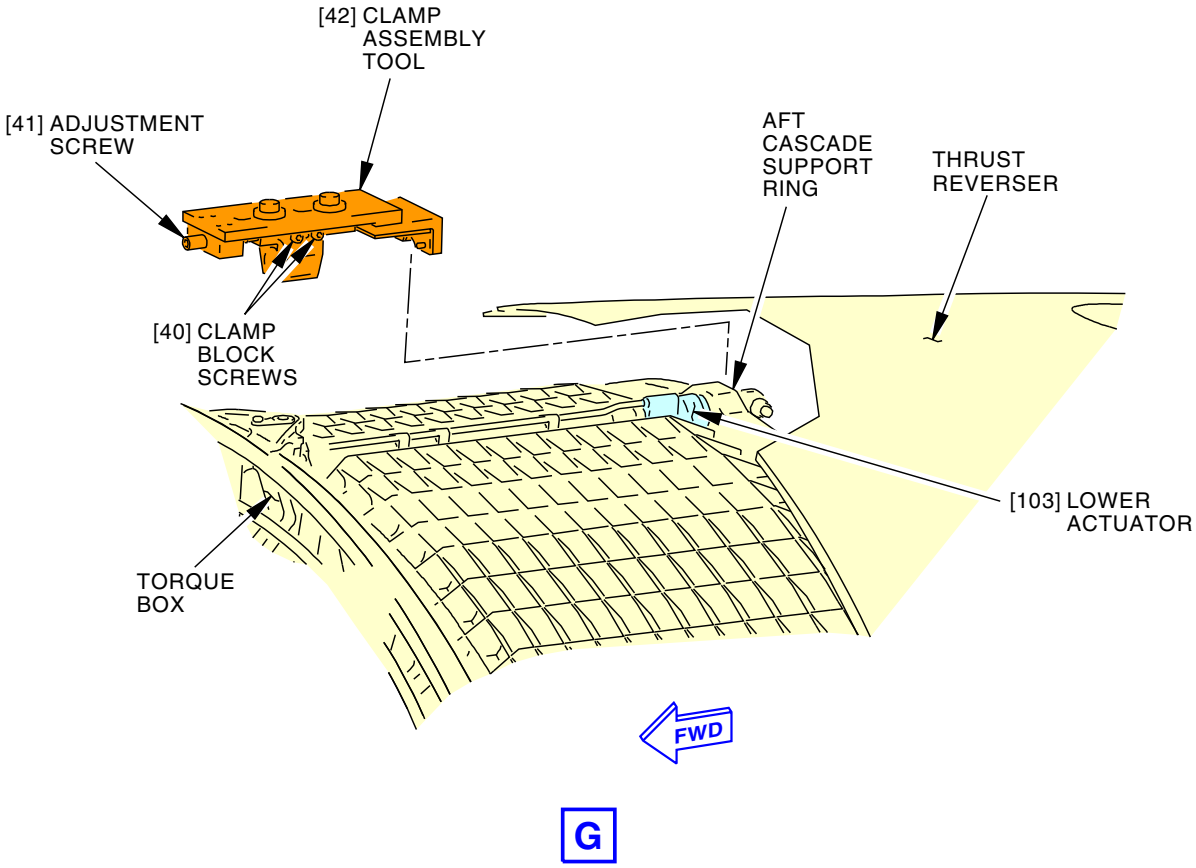
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2896984 S0000690954_V1

Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 4 of 6)

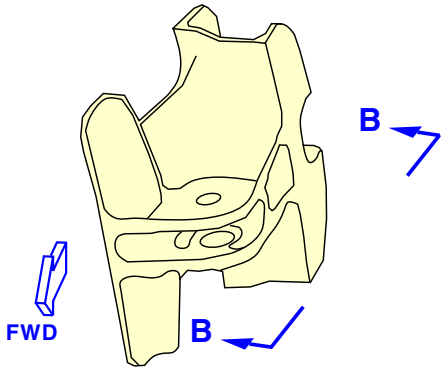
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355204 S00061516733_V2

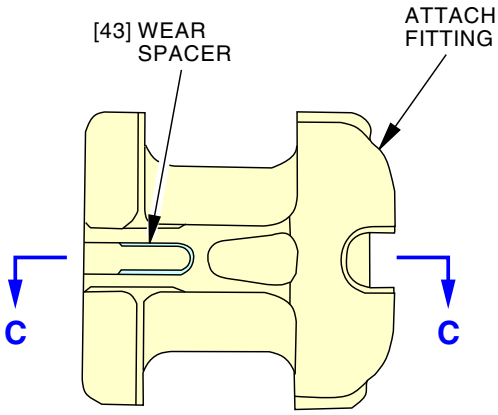
Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 5 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

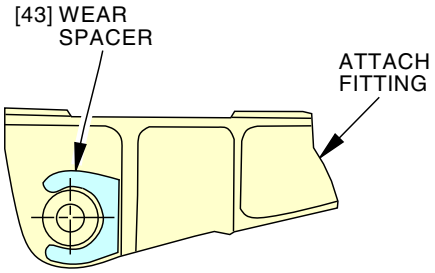


ACTUATOR ATTACH FITTING

H



B-B



C-C

2355205 S00061516734_V2

Lower Actuator Installation
Figure 403/78-31-03-990-803-G00 (Sheet 6 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-03-400-804-G00

9. Lower Hydraulic Actuator Installation

(Figure 403)

A. General

(1) This task gives the instructions to install the lower actuator.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-04-400-801-G00	Sync Shaft 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-2439	Tool - Thrust Reverser Actuator, Installation/Removal Part #: C78025-30 Supplier: 81205
SPL-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	
D00153	Fluid - Hydraulic Fluid, Fire Resistant (Interchangeable And Intermixable With BMS 3-11 Type V)	BMS3-11 Type IV
D00633	Grease - Aircraft General Purpose	BMS3-33
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
109	Packing	78-31-03-01-160	SIA ALL
111	Packing	78-31-03-01-150	SIA ALL

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F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

H. Lower Hydraulic Actuator Installation

SIA 001-014

SUBTASK 78-31-03-420-013-G00

(1) Install the fire seal [123] and fire shield [124] on the lower actuator [103] as follows:

(a) Put the fire seal [123] in the fire shield [124].

(b) Put the fire seal [123] and fire shield [124] over the rod end of the lower actuator [103] as follows:

1) Make sure that the fire seal [123] will contact the forward side of the torque box.

SIA 015-999

SUBTASK 78-31-03-420-026-G00

(2) Install the fire seal [125] on the lower actuator [103] as follows:

(a) Put the fire seal [125] over the rod end of the lower actuator [103] as follows:

1) Make sure that the fire seal [125] will contact the forward side of the torque box.

SIA ALL

SUBTASK 78-31-03-420-014-G00

CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(3) Install the lower actuator [103] as follows:

NOTE: Recommended to not turn the actuator rod end. For actuators without an LVDT, accidental rotation of the rod end will not cause detrimental effects.

(a) Pull the rod end out of the lower actuator [103] by hand to extend as follows:

NOTE: Do not let the rod end turn when you extend it manually. Make sure that you hold the rod end when you extend the actuator manually. Do not use hydraulic power to extend the rod end.

1) For the inboard and outboard thrust reverser, extend the rod end approximately the same length as the one removed.

NOTE: It is also acceptable to extend the rod 1 in. (3 cm) - 2 in. (5 cm) longer to facilitate installation of the rod end bolt.

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CAUTION

DO NOT LET THE PUSH-ROD HIT THE AFT CASCADE-SUPPORT-RING OR THE TORQUE BOX. DAMAGE TO THE PUSH-ROD CAN OCCUR.

(b) Carefully insert the rod end through the opening in the torque box and aft cascade support ring.

SUBTASK 78-31-03-420-029-G00

(4) Align the rod end of the lower actuator [103] with the clevis on the attach fitting as follows:

(a) Make sure that the actuator attach fitting has a wear spacer [43].

1) If it is necessary, attach a wear spacer [43] into place with sealant, A00803.

NOTE: Seal around the edge of the fitting and inner sleeve.

(b) Install the bushing [114], washer [113], washer [117], bolt [112], and nut [118] that attach the rod end.

(c) Tighten the nut [118] to 370 in-lb (41.8 N·m) - 690 in-lb (78.0 N·m).

SUBTASK 78-31-03-860-004-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

(a) Remove the actuator safety Lock Assembly, SPL-14993, from the inboard thrust reverser only.

(b) Do not do the thrust reverser or leading edge activation.

(c) Do not close the fan cowl panels at this time.

SUBTASK 78-31-03-010-028-G00

(6) For the inboard thrust reverser, manually extend the sleeve no more than 15 in. (38 cm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

(a) For the outboard thrust reverser sleeve, manually fully extend the thrust reverser sleeve (TASK 78-31-00-980-803-G00).

NOTE: The outboard thrust reverser sleeve will not touch the leading edge of the wing. The tool will be easier to use with the sleeve fully extended.

SUBTASK 78-31-03-420-015-G00

(7) Install the two gimbal pins [120] that attach the lower actuator [103] to the gimbal ring on the aft side of the torque box as follows:

(a) Apply grease, D00633 on the shanks of the two gimbal pins [120].

(b) Align the attachment holes in the lower actuator [103] and the gimbal ring.

(c) If you use the clamp assembly tool [42] (Actuator tool, SPL-2439) to compress the fire seal [123] or fire seal [125] against the torque box, do these steps:

1) Loosen the clamp block screws [40] sufficiently, so that the clamp block will fit over the lower actuator [103].

2) Make sure that the adjustment screw [41] is retracted.

NOTE: The adjustment screw is on the forward end of the tool.

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3) Tilt the aft end of the clamp assembly tool [42] down and over the aft cascade support ring.

4) Lower the forward end of the clamp assembly tool [42] until the clamp block engages the lower actuator [103].

5) Tighten the adjustment screw [41] to move the clamp block aft.

NOTE: Move the clamp block until the aft edge touches where the diameter of the lower actuator [103] increases.

6) Tighten the clamp block screws [40].

7) Tighten the adjustment screw [41] to compress the fire seal [123] or fire seal [125] against the torque box.

8) Turn the housing one direction or the other to align the attachment holes.

(d) Manually compress the fire seal [123] or fire seal [125] against the torque box as follows:

1) Push aft on the forward end of the lower actuator [103] to compress the fire seal [123] or fire seal [125] against the torque box.

2) Turn the housing one direction or the other to align the attachment holes.

(e) Install the two gimbal pins [120].

(f) Install a washer [122] and a bolt [121] in each of the gimbal pins [120].

(g) Tighten the bolts [121] to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

(h) If you used the clamp assembly tool [42], loosen the adjustment screw [41] and clamp block screws [40] to remove the tool.

SUBTASK 78-31-03-410-008-G00

(8) Install the applicable access doors [116]:

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

(a) Make sure that the installation surfaces are clean.

(b) Use sealant, A50110 to create a prepack or injection seal between the access door [116] and the installation surface on the thrust reverser.

(c) Put the access door [116] in the correct position to align the bolt holes.

(d) Install the six bolts [115] to attach the access door [116].

(e) Tighten the bolts [115] to 30 in-lb (3.4 N·m) - 50 in-lb (5.6 N·m).

SUBTASK 78-31-03-020-024-G00

(9) Do these steps if the replacement lower actuator [103] does not have the union [110] installed:

(a) Remove the protective covers from the lower actuator ports.

(b) Lubricate a new packing [111] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(c) Install the new packing [111] on the union [110].

(d) Lubricate the threads of the union [110] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(e) Install the union [110] in the upper retract port.

(f) Tighten the union [110] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

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SUBTASK 78-31-03-420-017-G00

(10) Install the sync lock [105] and the adapter plug [108] as follows:

(a) Lubricate a new packing [109] with hydraulic fluid, D00153, or MCS 352B fluid, D00054.

(b) Install the new packing [109] on the adapter plug [108].

(c) Lubricate the threads of the adapter plug [108] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

(d) Install the adapter plug [108] in the lower retract port of the lower actuator.

(e) Tighten the adapter plug [108] to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(f) Put the sync lock [105] in the correct position.

NOTE: Make sure that the fastener hole in the bracket aligns with the stud on the adapter plug [108].

(g) Hand tighten the coupling nut on the sync lock [105].

(h) Install the washer [107] and nut [106] that connect the bracket to the adapter plug stud.

(i) Tighten the nut [106] to 65 in-lb (7.3 N·m) - 100 in-lb (11.3 N·m).

CAUTION

USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(j) Tighten the coupling nut on the sync lock [105] as follows:

1) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

SUBTASK 78-31-03-020-025-G00

(11) Connect the hydraulic lines as follows:

(a) Remove the protective covers from the hydraulic lines.

(b) Connect the lower hydraulic retract line [132] to the upper retract port of the lower actuator [103].

1) Hand tighten the coupling nut at this time.

(c) Tighten the two bolts on each of the two clamp blocks that hold the lower hydraulic retract line [132] to 30 in-lb (3.4 N·m) - 35 in-lb (4.0 N·m).

(d) Tighten the coupling nut on the lower hydraulic retract line [132] as follows:

1) Tighten the coupling nut to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 256 in-lb (28.9 N·m) - 283 in-lb (32.0 N·m).

(e) Temporarily install the lower sync shaft and tubing:

NOTE: To manually retract the thrust reverser, the sync shafts must be temporarily installed.

1) If there is contamination, remove the contamination from the sync shaft with a cotton wiper, G00034.

2) Move the coupling nut and tube adaptors along the tubing.

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3) Insert the sync shaft into the tubing.

NOTE: Make sure that the sync shaft engages the internal spline in the middle actuator port.

4) Flex the sync shaft and insert the opposite end into the internal spline in the lower actuator port.

5) Tighten the coupling nut to 855 in-lb (96.6 N·m) - 945 in-lb (106.8 N·m).

NOTE: This is a temporary installation and it is not necessary to double-torque the coupling nuts.

SUBTASK 78-31-03-420-018-G00

(12) Connect the electrical connectors to the sync lock receptacle as follows:

(a) For the left thrust reverser, connect the electrical connector, D1008.

(b) For the right thrust reverser, connect the electrical connector, D1016.

SUBTASK 78-31-03-420-019-G00

(13) Rig the lower sync shaft between the lower actuator [103] and the middle actuator [51] as follows:

(a) Remove and re-install the lower sync shaft that you temporarily installed (TASK 78-31-04-400-801-G00).

SUBTASK 78-31-03-710-004-G00

(14) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

(a) Operate the thrust reverser through the deploy and stow cycles until the sleeves move smoothly.

(b) Examine the thrust reverser area for hydraulic fluid leaks (TASK 29-00-00-790-801).

SUBTASK 78-31-03-440-004-G00

(15) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-03-410-009-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-03-040-030-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

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THRUST REVERSER HYDRAULIC ACTUATORS - INSPECTION/CHECK

1. General

A. This procedure has one task.

(1) Thrust reverser hydraulic actuator rod end inspection.

TASK 78-31-03-610-801-G00

2. Thrust Reverser Hydraulic Actuator Rod End Inspection

(Figure 601)

A. General

(1) This task gives the instructions for the visual inspection of the hydraulic actuator rod ends.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-02-400-801-G00	Translating Sleeve Installation (P/B 401)
78-31-03-000-801-G00	Thrust Reverser Hydraulic Actuator Removal (Selection) (P/B 401)
78-31-03-400-801-G00	Thrust Reverser Hydraulic Actuator Installation (Selection) (P/B 401)

C. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

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F. Prepare for the Inspection

SUBTASK 78-31-03-040-031-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure for the thrust reverser for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-31-03-010-013-G00

(2) Do these steps to remove the access door for the applicable actuator:

(a) To remove the upper actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

(b) To remove the middle actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(c) To remove the lower actuator access doors [2], remove the six bolts [1].

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

SUBTASK 78-31-03-020-027-G00

CAUTION DO NOT LET THE ROD ENDS OF THE HYDRAULIC ACTUATOR TURN WHEN YOU REMOVE THE BOLTS. IF THE ROD END TURNS, IT CAN CAUSE DAMAGE TO THE HYDRAULIC ACTUATOR AND THRUST REVERSER STRUCTURE.

(3) Disconnect the actuator rod end from the actuator attach fitting on the translating sleeve (TASK 78-31-03-000-801-G00).

NOTE: It is necessary to disconnect the actuator rod end for the inspection.

G. Thrust Reverser Hydraulic Actuator Rod End Inspection

SUBTASK 78-31-03-212-001-G00

(1) Examine the applicable rod end for these conditions:

(a) Cracks

1) Not permitted.

(b) Nicks

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1) Not permitted.

(c) Dents

1) Not permitted.

(d) Scratches

1) Not permitted.

(e) Bushing damage

1) Not permitted.

SUBTASK 78-31-03-869-001-G00

(2) If you find a condition that is not permitted, replace the hydraulic actuator (TASK 78-31-03-000-801-G00 and TASK 78-31-03-400-801-G00).

SUBTASK 78-31-03-210-001-G00

(3) Examine the applicable rod end bolt and nut for a hardware that is missing, cracked, or bent.

(a) If a hardware is missing, cracked, or bent, replace the bolt or nut.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-03-420-021-G00

CAUTION

DO NOT TURN THE ACTUATOR ROD END. THE ACTUATOR LENGTH IS SET. IF YOU TURN THE ACTUATOR ROD END, DAMAGE TO THE ACTUATOR OR THE STRUCTURE CAN OCCUR.

(1) Connect the actuator rod end to the actuator attach fitting on the sleeve (TASK 78-31-02-400-801-G00).

SUBTASK 78-31-03-410-010-G00

(2) Do these steps to install the access door for the applicable actuator:

(a) For the upper actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415DL	Left Thrust Reverser Actuator (Upper), Engine 1
416DR	Right Thrust Reverser Actuator (Upper), Engine 1
425DL	Left Thrust Reverser Actuator (Upper), Engine 2
426DR	Right Thrust Reverser Actuator (Upper), Engine 2

(b) For the middle actuator, put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415EL	Left Thrust Reverser Actuator (Middle), Engine 1
416ER	Right Thrust Reverser Actuator (Middle), Engine 1
425EL	Left Thrust Reverser Actuator (Middle), Engine 2
426ER	Right Thrust Reverser Actuator (Middle), Engine 2

(c) For the lower actuator access door [2], do the steps that follow:

1) Make sure that the installation surfaces are clean.

2) Use sealant, A50110 to create a prepack or injection seal between the access door [2] and the installation surface on the thrust reverser.

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3) Put the access doors [2] in the correct position to align the bolt holes.

Number	Name/Location
415FL	Left Thrust Reverser Actuator (Lower), Engine 1
416FR	Right Thrust Reverser Actuator (Lower), Engine 1
425FL	Left Thrust Reverser Actuator (Lower), Engine 2
426FR	Right Thrust Reverser Actuator (Lower), Engine 2

(d) Install the six bolts [1] to attach the applicable access door [2].

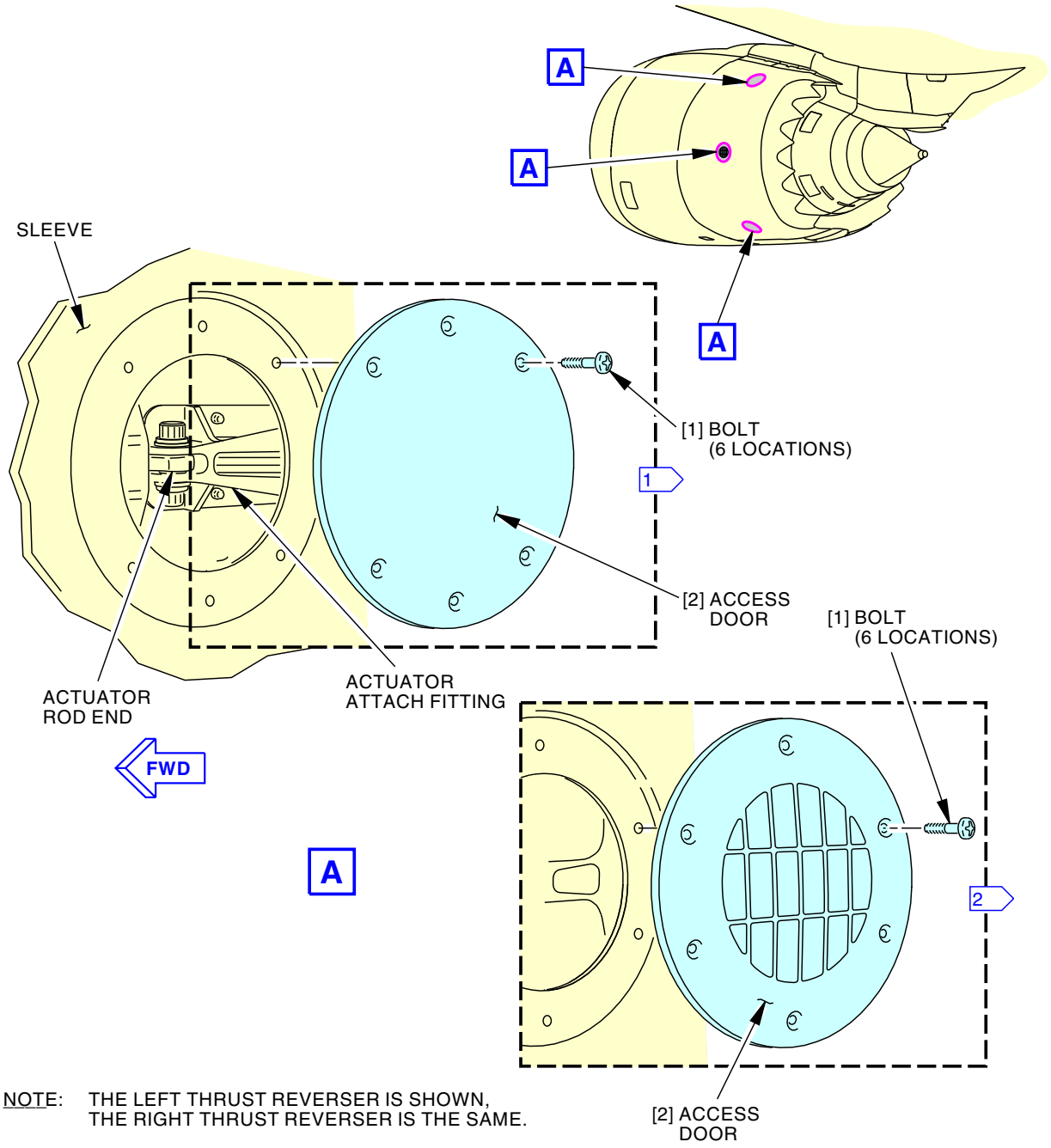
1) Tighten the bolts [1] to 30.0 in-lb (3.4 N·m) - 50.0 in-lb (5.6 N·m).

SUBTASK 78-31-03-440-001-G00

(3) Do the activation procedure for the thrust reverser (TASK 78-31-00-440-801-G00).

——— END OF TASK ———

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NOTE: THE LEFT THRUST REVERSER IS SHOWN, THE RIGHT THRUST REVERSER IS THE SAME.

1 UPPER AND LOWER ACCESS DOOR

2 MIDDLE ACCESS DOOR

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Thrust Reverser Hydraulic Actuator Rod End Inspection
Figure 601/78-31-03-990-804-G00

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THRUST REVERSER HYDRAULIC ACTUATORS - REPAIRS

1. General

A. This procedure has one task.

(1) Manual Unlock Handle Assembly Replacement.

TASK 78-31-03-300-801-G00

2. Manual Unlock Handle Assembly Replacement

(Figure 801, Figure 802, and Figure 803)

A. General

(1) This task gives the instructions to replace the manual unlock handle assembly on the upper and center locking hydraulic actuator.

(2) The locking actuator must be in the stowed and locked position to do this task.

B. References

Reference	Title
71-00-00-710-806-G00	Test No. 17 - Electronic Engine Control (EEC) System Test (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-802-G00	Thrust Reverser System Normal Operational Test (P/B 501)
78-31-03-000-802-G00	Upper Locking Hydraulic Actuator Removal (P/B 401)
78-31-03-000-803-G00	Middle Locking Hydraulic Actuator Removal (P/B 401)
78-31-03-400-802-G00	Upper Locking Hydraulic Actuator Installation (P/B 401)
78-31-03-400-803-G00	Middle Locking Hydraulic Actuator 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-4156	Locator Assembly - Proximity Sensor (Included in Overhaul Set) Part #: B78015-39 Supplier: 81205
SPL-15435	Gap Measurement Gauge - TRAS Locking Actuator Part #: C78030-18 Supplier: 81205

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

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E. Prepare for the Replacement

SUBTASK 78-31-03-860-005-G00

(1) For on-wing replacement of the manual unlock handle assembly [1], do these steps:

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(c) Make sure that the thrust reverser sleeve is in the stowed and locked position.

SUBTASK 78-31-03-000-001-G00

(2) For off-wing replacement of the manual unlock handle assembly [1], do these steps:

(a) Remove the applicable locking hydraulic actuator (TASK 78-31-03-000-802-G00 or TASK 78-31-03-000-803-G00).

(b) Retract and lock the actuator.

F. Manual Lockout Handle Assembly Replacement

SUBTASK 78-31-03-020-026-G00

(1) Do these steps to remove the defective :

(a) Mark the position of the handle relative to the actuator housing so that the new handle assembly is installed in the same position.

NOTE: In the locked position, the handle lever is approximately vertical to the axis of the actuator.

(b) Remove the two screws [9] that attach the detent housing [2] to the actuator housing [13].

(c) Remove the detent housing [2], manual unlock pin [10], spring [11] and spring guide [12].

(d) Remove the nut [6] from the manual unlock handle assembly [1].

(e) Remove the shim [5], unlock lever [7], torsion spring [8], and the manual unlock handle assembly [1].

NOTE: It is not necessary to remove the bushing on each side of the housing.

(f) Remove the two rivets [4] and the target [3] from the manual unlock handle assembly [1].

NOTE: Remove the target for installation on the new manual unlock handle assembly.

SUBTASK 78-31-03-420-020-G00

(2) Do these steps to install the new manual unlock handle assembly [1]:

(a) If it is necessary, install the target [3] with the two rivets [4] on the new manual unlock handle assembly [1].

(b) Install the torsion spring [8] on the new manual unlock handle assembly [1].

NOTE: Locate one leg of the torsion spring [8] in the hole.

(c) Install the unlock lever [7] in the locked position in the actuator housing [13].

(d) Align the manual unlock handle assembly [1] with the mark (locked position) and insert the manual unlock handle assembly [1] through the bushing until the splines just engage.

1) Pull the free leg of the torsion spring [8] around to align with the hole in the actuator housing [13].

2) Push the manual unlock handle assembly [1] through until it bottoms on the bushing [21].

NOTE: Make sure that the installation of torsion spring is correct.

(e) Install the shim [5] with the counterbore towards the actuator housing [13].

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1) Measure the gap G between the shim [5] and the bushing [20].
   a) If the gap G is more than 0.004 in. (0.102 mm), make a new shim [5].
   b) If there is no gap and the shim face is in contact with the bushing [20], trim the shim [5] as follows:
      <1> Measure F (the distance from the shoulder end of the lockout handle shaft) and subtract 0.002 in. (0.051 mm) to get the shim thickness (S3) you will need.
      <2> Trim the shim face that contacts the bushing [20] to obtain the S3 thickness (the gap tolerance is 0.001 in. (0.025 mm) to 0.004 in. (0.102 mm).

      NOTE: A new shim is oversized. The shim face will be in contact with the bushing. You will need to trim it to obtain the 0.002 in. (0.051 mm) gap.

(f) Install and tighten the nut [6] to 20 in-lb (2.26 N·m) - 30 in-lb (3.39 N·m).

(g) Pull the manual unlock handle assembly [1] to the unlocked position.

(h) Make sure that the unlock lever [7] and manual unlock handle assembly [1] operate correctly with no binding.

(i) Put the manual unlock handle assembly [1] back to the locked position.

(j) Make sure that the actuator is in the stowed and locked position.

(k) Remove the six bolts [14] from the applicable access panel cover [15].

(l) Remove the upper or center access panel cover [15] from the TR sleeve [19] to get access to the actuator rod end [18].

(m) Make sure that the spacer is within 0.007 in. (0.18 mm) - 0.033 in. (0.84 mm) of the rod stop [16].

(n) Do these steps to install the detent housing [2] as follows:
   1) Install the spring guide [12], spring [11], manual unlock pin [10], and detent housing [2] in the actuator housing [13].
   2) Install the two screws [9] that attach the detent housing [2] to the actuator housing [13].
   3) Tighten the two screws [9] to 27 in-lb (3.05 N·m) - 30 in-lb (3.39 N·m).
   4) Install lockwire to the screws [9].

(o) Pull the manual unlock handle assembly [1] to the unlocked position, then push and release the manual unlock pin [10].
   1) Make sure that manual unlock pin [10] does not bind and springs back smoothly.

(p) Put the manual unlock handle assembly [1] back to the locked position.

(q) Make sure that the actuator is in the stowed and locked position as follows:
   1) Look through the access area and see if the rod stop [16] is in contact with the gland nut [17].

(r) Do these steps to install the target [3] on the manual unlock handle assembly [1]:

NOTE: It is recommended to use proximity sensor locator, SPL-4156, or gap gauge, SPL-15435, to put the target in position on the manual unlock handle assembly [1].

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1) Apply and keep a slight pressure to the manual unlock handle assembly [1] in the unlock position.

NOTE: Keep light pressure against the internal lock sleeve but not move the sleeve.

2) Make sure that the target is 0.28 in. (7.11 mm) - 0.30 in. (7.62 mm) from the center of the bracket sensor hole.

3) Install the target [3] on the handle with the two rivets [4].

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-03-410-011-G00

(1) For on-wing replacement of the manual unlock handle assembly [1], do these steps:

(a) Install the access panel cover [15] on the TR sleeve [19] with six bolts [14].

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-03-400-001-G00

(2) For off-wing replacement of the manual unlock handle assembly [1], install the locking hydraulic actuator (TASK 78-31-03-400-802-G00 or TASK 78-31-03-400-803-G00).

SUBTASK 78-31-03-710-006-G00

(3) For on-wing replacement of the manual unlock handle assembly [1], do these checks:

(a) Do this task:Thrust Reverser System Normal Operational Test, TASK 78-31-00-700-802-G00.

NOTE: Operate the thrust reverser through the deploy and stow cycles until the sleeves move smoothly.

(b) Do this task: Test No. 17 - Electronic Engine Control (EEC) System Test, TASK 71-00-00-710-806-G00.

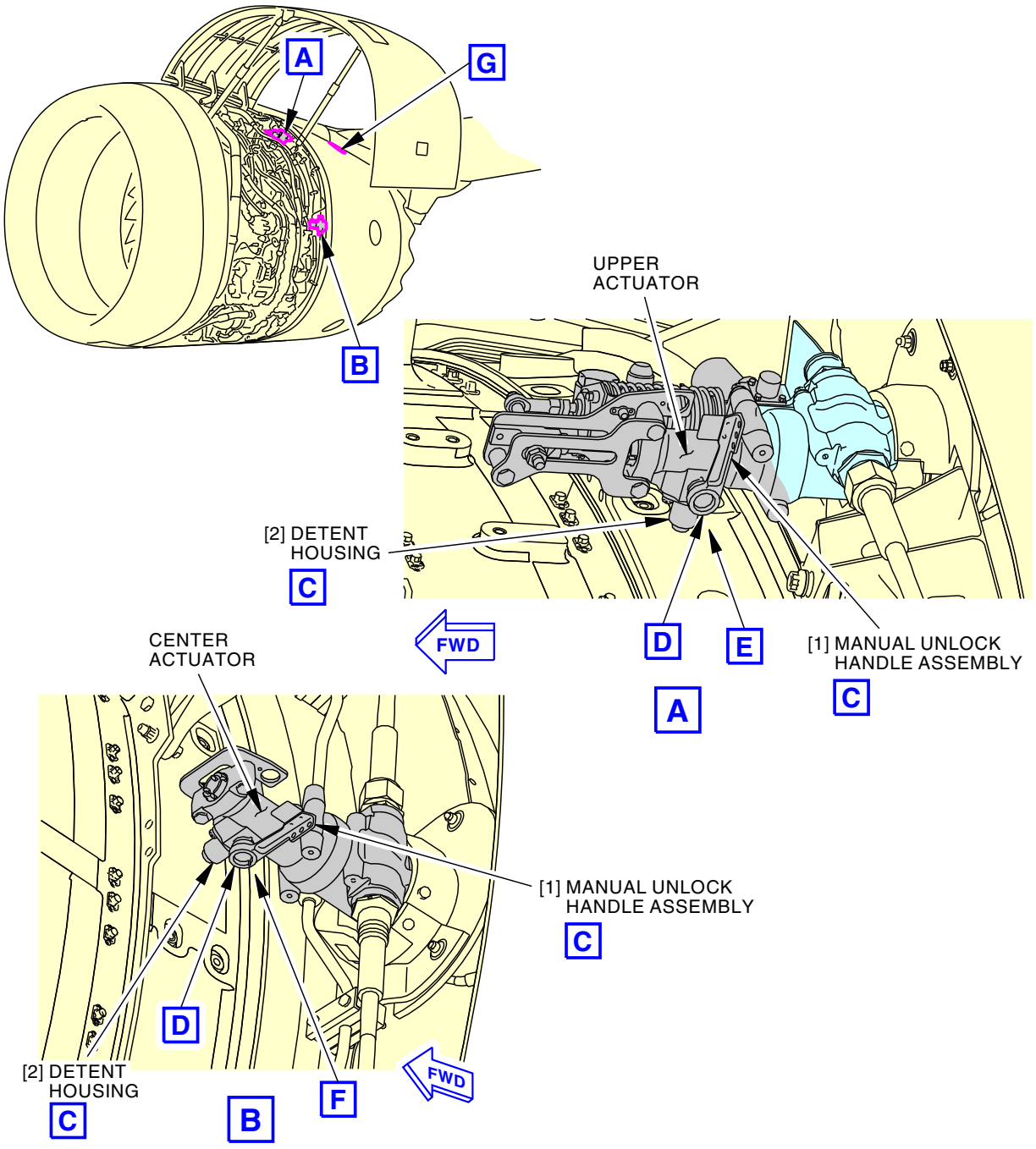
NOTE: This check will make sure that the electrical connections for the LVDT's are correct.

1) Make sure that no LVDT maintenance messages show.

a) If a maintenance message shows, do the applicable procedure in the IFIM for that maintenance message.

——— END OF TASK ———

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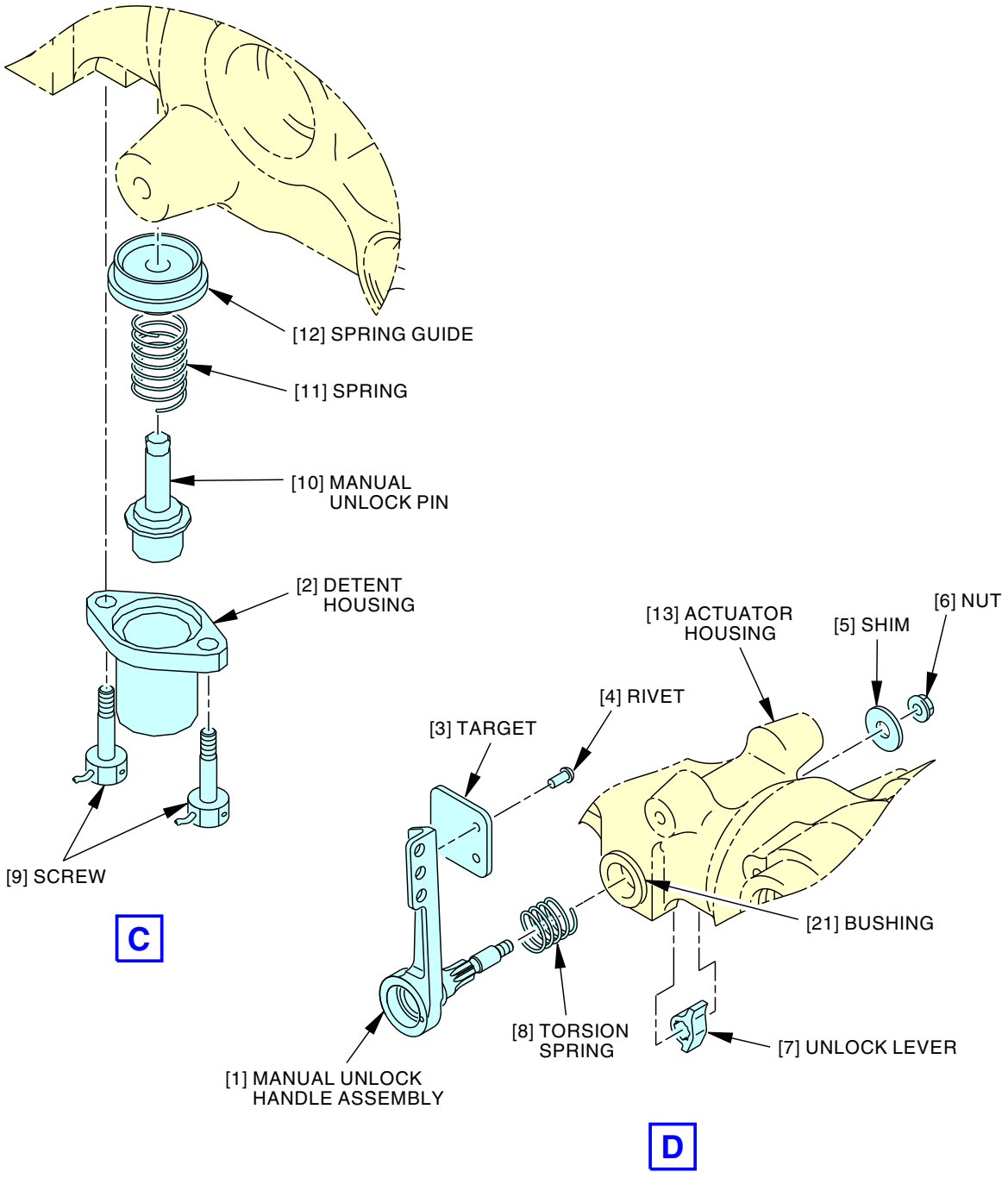
NOTE:

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE.

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Manual Unlock Handle Assembly Repair
Figure 801/78-31-03-990-805-G00 (Sheet 1 of 4)

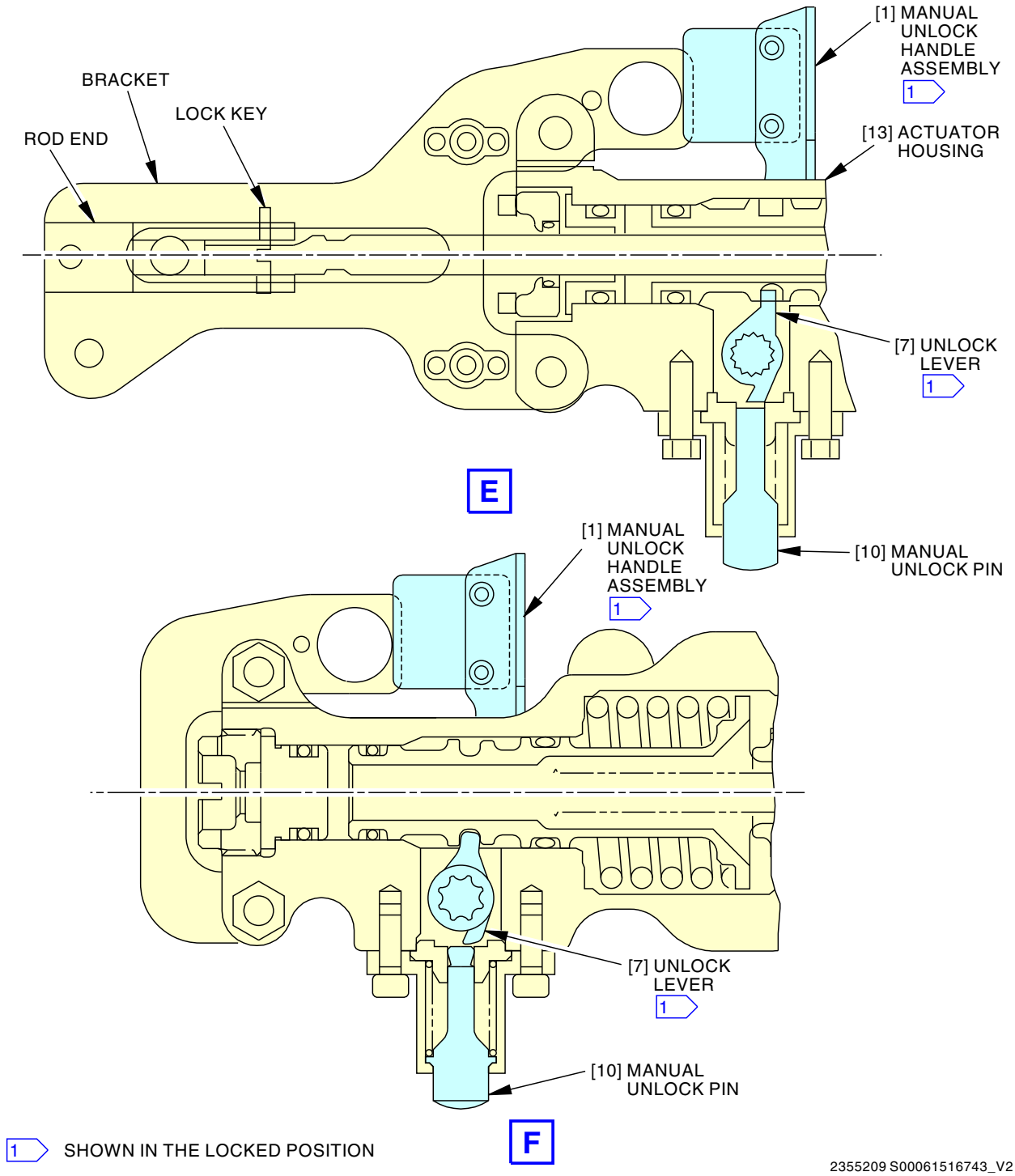
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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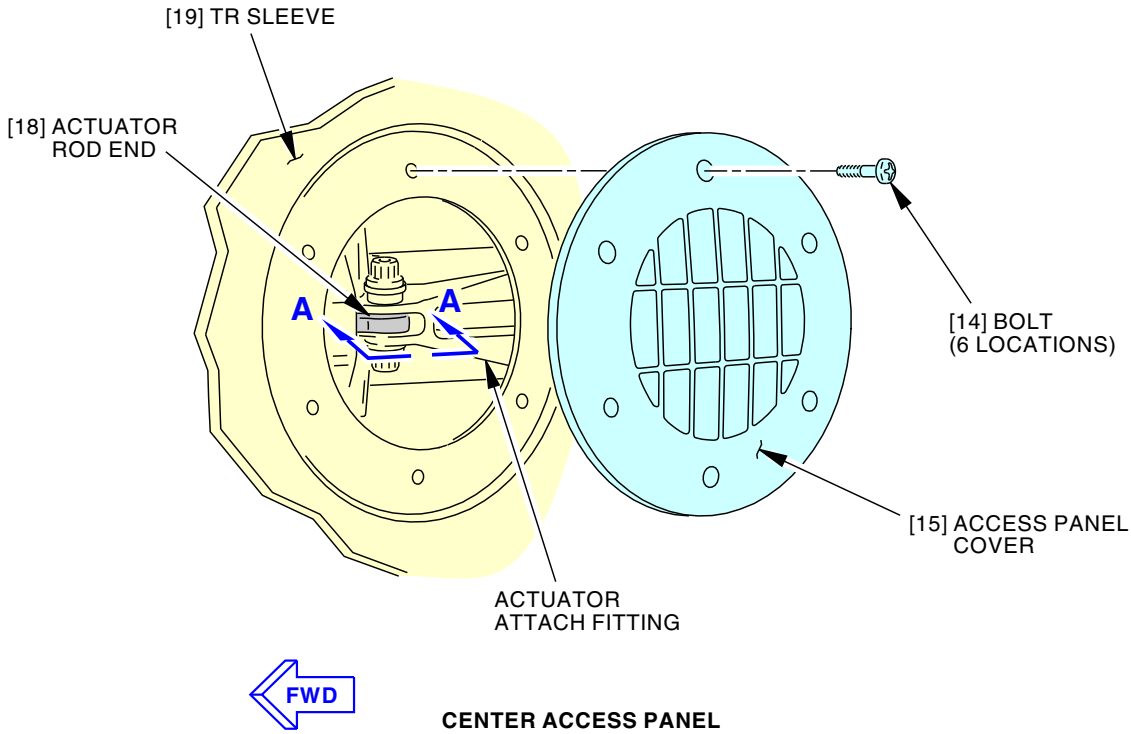
Manual Unlock Handle Assembly Repair
Figure 801/78-31-03-990-805-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



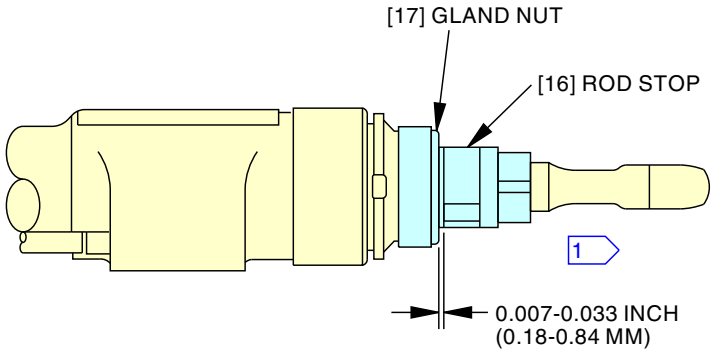
Manual Unlock Handle Assembly Repair
Figure 801/78-31-03-990-805-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CENTER ACCESS PANEL

G



CENTER LOCKING ACTUATOR

A-A

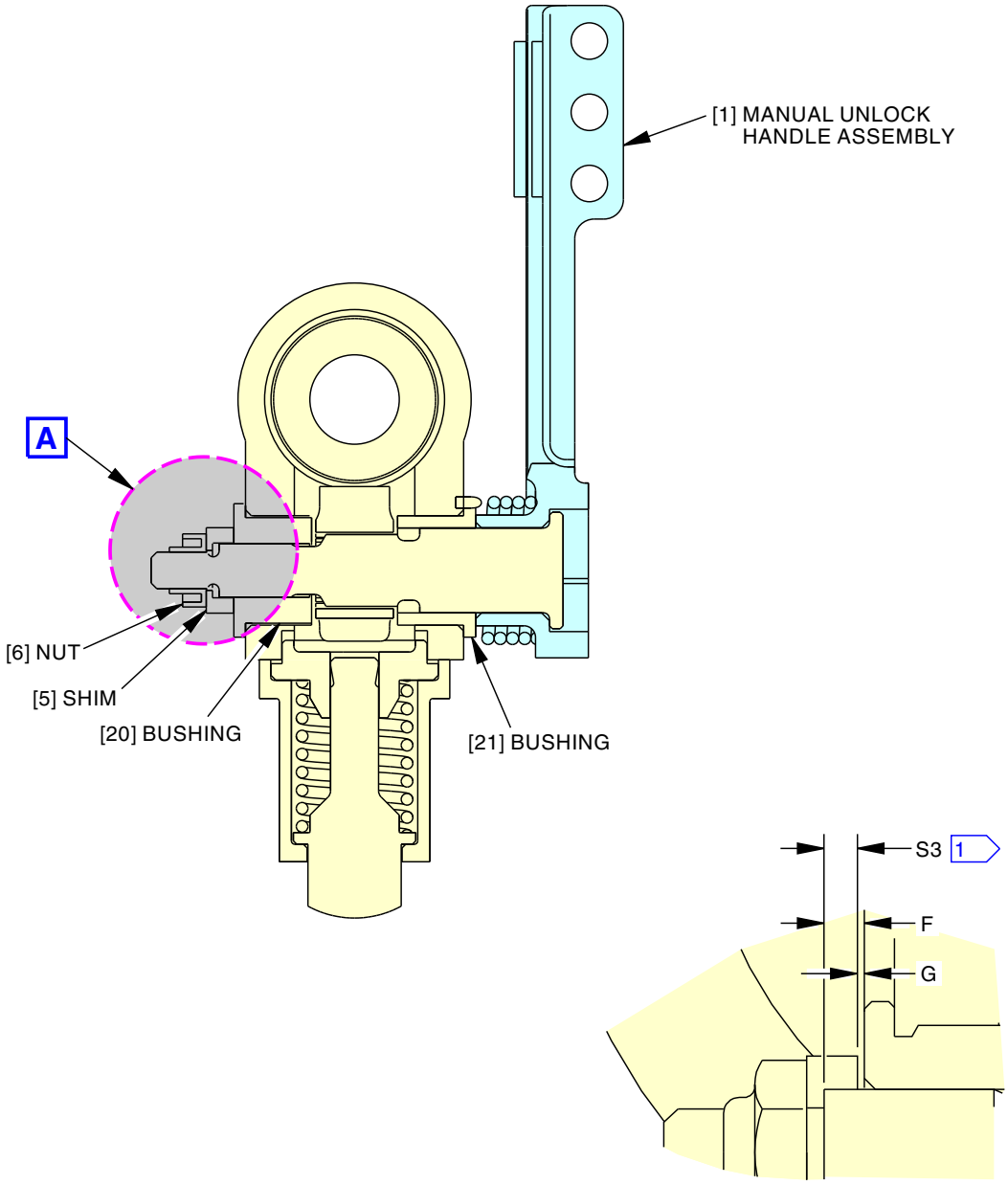
NOTE:

1 THE SAME GAP DIMENSION APPLIES TO THE UPPER LOCKING ACTUATOR

2355210 S00061516744_V2

Manual Unlock Handle Assembly Repair
Figure 801/78-31-03-990-805-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

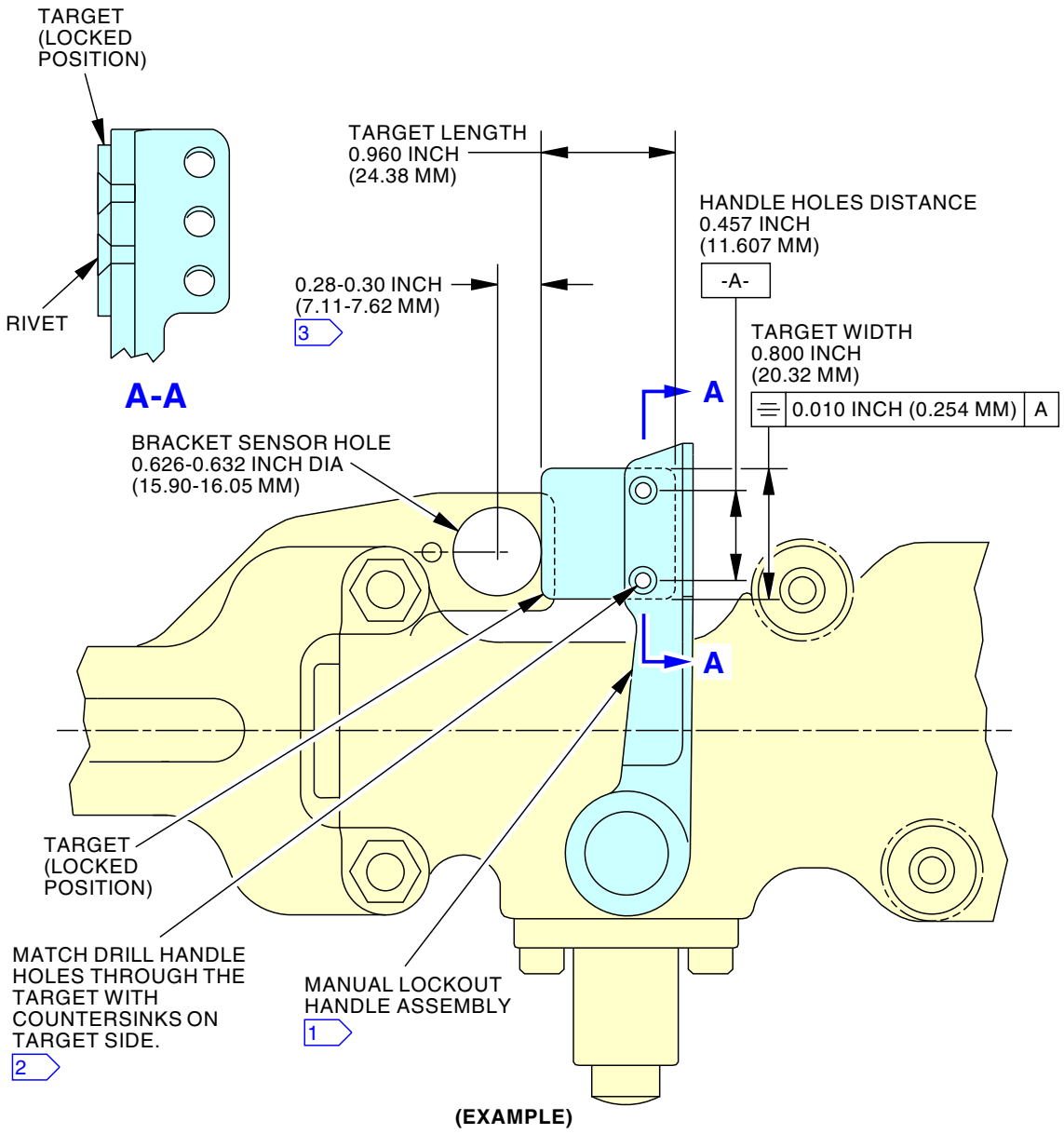


1 DIMENSION S3 IS THE NECESSARY SHIM THICKNESS. ADJUST COUNTERBORE DEPTH OF SHIM TO DIMENSION S3.

2355211 S00061516745_V2

Shim Installation
Figure 802/78-31-03-990-806-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(EXAMPLE)

1. APPROXIMATELY PERPENDICULAR WITH ACTUATOR CENTERLINE WHEN PISTON IS IN FULLY LOCKED POSITION.
2. MARK TARGET HOLES AGAINST THE HANDLE. DRILL TARGET HOLES, INSTALL TARGET TO HANDLE ON BENCH.
3. MEASUREMENT SHOULD BE MADE WITH HANDLE IN RELAXED POSITION. DO NOT MOVE HANDLE FROM REST POSITION BEFORE MAKING MEASUREMENT.

2355212 S00061516746_V1

Target Installation
Figure 803/78-31-03-990-807-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SYNC SHAFT - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Sync Shaft Removal

(2) Sync Shaft Installation.

TASK 78-31-04-000-801-G00

2. Sync Shaft Removal

(Figure 401, Figure 402)

A. General

(1) This task is the removal of the sync shafts from the left or right thrust reverser on an engine.

(2) The sync shafts are located between the upper and middle actuators and between the middle and lower actuators on each thrust reverser torque box.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)

D. 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)

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Prepare for the Removal

SUBTASK 78-31-04-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

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SUBTASK 78-31-04-860-001-G00

(2) For engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-04-860-002-G00

(3) For engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-04-860-003-G00

(4) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-31-04-860-004-G00

(5) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-31-04-010-001-G00

(6) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 78-31-04-020-001-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT LET HYDRAULIC FLUID GET ON EQUIPMENT. IF HYDRAULIC FLUID GETS ON EQUIPMENT, IMMEDIATELY CLEAN IT FROM THE EQUIPMENT. HYDRAULIC FLUID CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE UNION, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND UNIONS CAN OCCUR.

(7) Do these steps to drain the hydraulic fluid from the hydraulic lines:

NOTE: To decrease the hydraulic fluid spray when the coupling nuts are loosened, wrap a cotton wiper, G00034, around the wrench, the coupling nut and the hydraulic line.

(a) Wrap a cotton wiper, G00034, around the electrical connector on the sync lock receptacle on the lower actuator.

NOTE: The cotton wiper, G00034, will catch the hydraulic fluid and prevent contamination of the electrical connector.

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(b) Disconnect the sync shaft tubing (deploy tube) at the lower actuator.

(c) Disconnect the hydraulic retract line (stow tube) at the lower actuator.

(d) Let the hydraulic fluid drain into a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110.

(e) Loosen the coupling nuts on the deploy and stow line flexhoses at the upper actuator.

NOTE: This will let air into the hydraulic lines to let the hydraulic fluid drain.

SUBTASK 78-31-04-420-001-G00

(8) Torque the coupling nut on the retract line flexhose at the upper actuator.

(a) Torque the coupling nut to 270 ±13 in-lb (31 ±2 N·m).

(b) Loosen the coupling nut.

(c) Torque the coupling nut again to 270 ±13 in-lb (31 ±2 N·m).

SUBTASK 78-31-04-420-002-G00

(9) Torque the coupling nut on the deploy line flexhose at the upper actuator.

(a) Torque the coupling nut to 900 ±45 in-lb (102 ±5 N·m).

(b) Loosen the coupling nut.

(c) Torque the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

SUBTASK 78-31-04-420-003-G00

(10) Re-connect the stow line at the lower actuator.

(a) Torque the coupling nut to 270 ±13 in-lb (31 ±2 N·m).

(b) Loosen the coupling nut.

(c) Torque the coupling nut again to 270 ±13 in-lb (31 ±2 N·m).

SUBTASK 78-31-04-420-004-G00

(11) If the lower sync shaft [4] will not be removed, re-connect the sync shaft tubing at the lower actuator.

(a) Torque the coupling nut to 900 ±45 in-lb (102 ±5 N·m).

(b) Loosen the coupling nut.

(c) Torque the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

SUBTASK 78-31-04-010-002-G00

(12) If the upper sync shaft [4] and tubing will be removed, do this step to remove the upper clamp block assembly.

(a) Remove the two bolts [9], two washers [10], clamp block retainer [8], clamp block [11], clamp block [12], two sleeve spacers [13], clamp block retainer [7] and spacer [6].

NOTE: To eliminate tubing preload during installation, it is important to keep the clamp block retainer [8], clamp block retainer [7], clamp block [11], clamp block [12], and spacer [6] together and to note their position for the subsequent installation.

SUBTASK 78-31-04-010-003-G00

(13) If the lower sync shaft [4] and tubing will be removed, do this step to remove the lower clamp block assembly.

NOTE: To eliminate tubing preload during installation, it is important to keep the clamp block retainer [8], clamp block retainer [7], clamp block [11], clamp block [12], and spacer [6] together and to note their position for the subsequent installation.

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(a) Remove the bolt [9], bolt [15], two washers [10], wiring clamp [14], and clamp block retainer [8].

(b) Remove the clamp block [11], clamp block [12], two sleeve spacers [13], clamp block retainer [7] and spacer [6].

G. Sync Shaft Removal

SUBTASK 78-31-04-020-002-G00

CAUTION

DO NOT LET DIRT OR OTHER CONTAMINATION GET ON THE SYNC SHAFT. DAMAGE TO THE SYNC SHAFT CAN OCCUR.

(1) Do these steps to remove the sync shaft [4]:

(a) Disconnect the coupling nuts at the two ends of the upper tube [2] or lower tube [3].

(b) Move the coupling nuts and tube adapters back along the tube [2] or tube [3] to get access to the ends of the sync shaft [4].

(c) Flex the sync shaft [4] to remove it from the splined receiver in the actuator port [1].

(d) Remove the sync shaft [4] and the tube [2] or tube [3] together.

SUBTASK 78-31-04-420-005-G00

WARNING

MAKE SURE THAT THE TWO SYNC SHAFT TUBES ARE INSTALLED BETWEEN THE ACTUATORS. IF THE TUBES ARE NOT INSTALLED WHEN YOU SUPPLY RETRACT PRESSURE, PRESSURIZED HYDRAULIC FLUID CAN HIT PERSONNEL. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these steps to temporarily install the upper tube [2] or lower tube [3]:

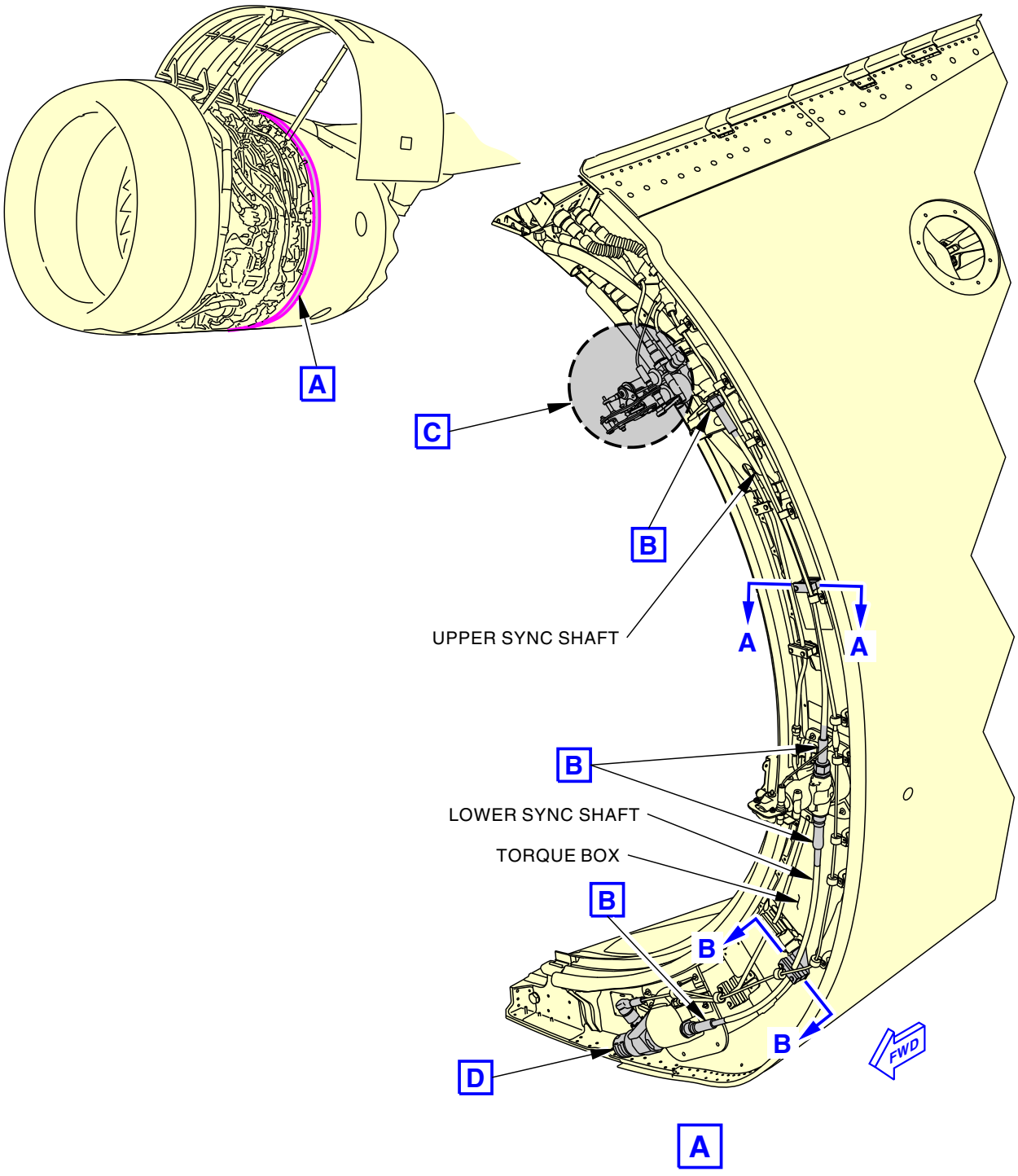
(a) Put the upper tube [2] or lower tube [3], without the sync shaft [4], in its position between the actuators.

(b) Torque the coupling nuts to 900 ±45 in-lb (102 ±5 N·m).

NOTE: This is a temporary installation and it is not necessary to torque, loosen, then torque again (double-torque) the coupling nuts.

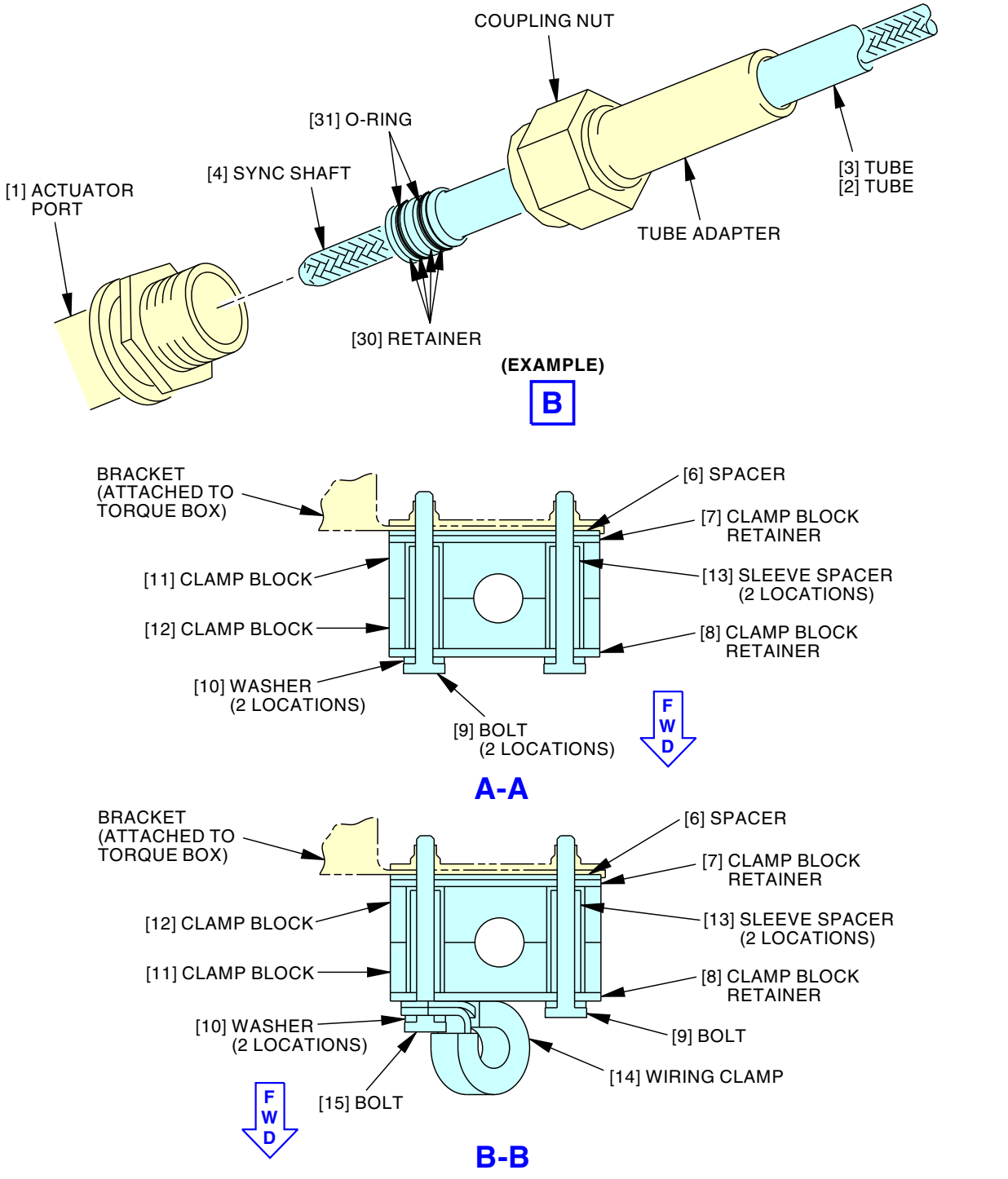
——— END OF TASK ———

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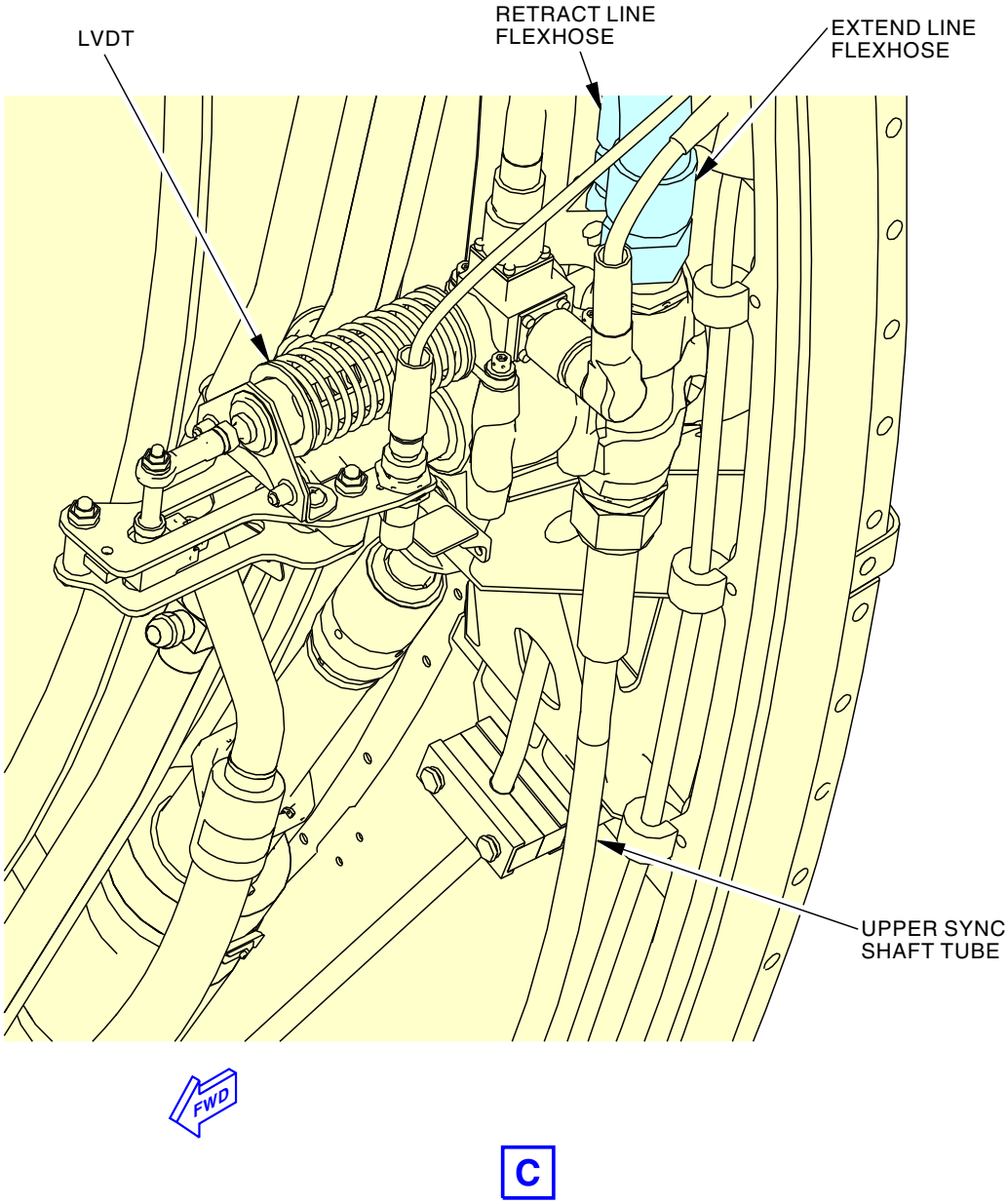
Sync Shaft Installation
Figure 401/78-31-04-990-801-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



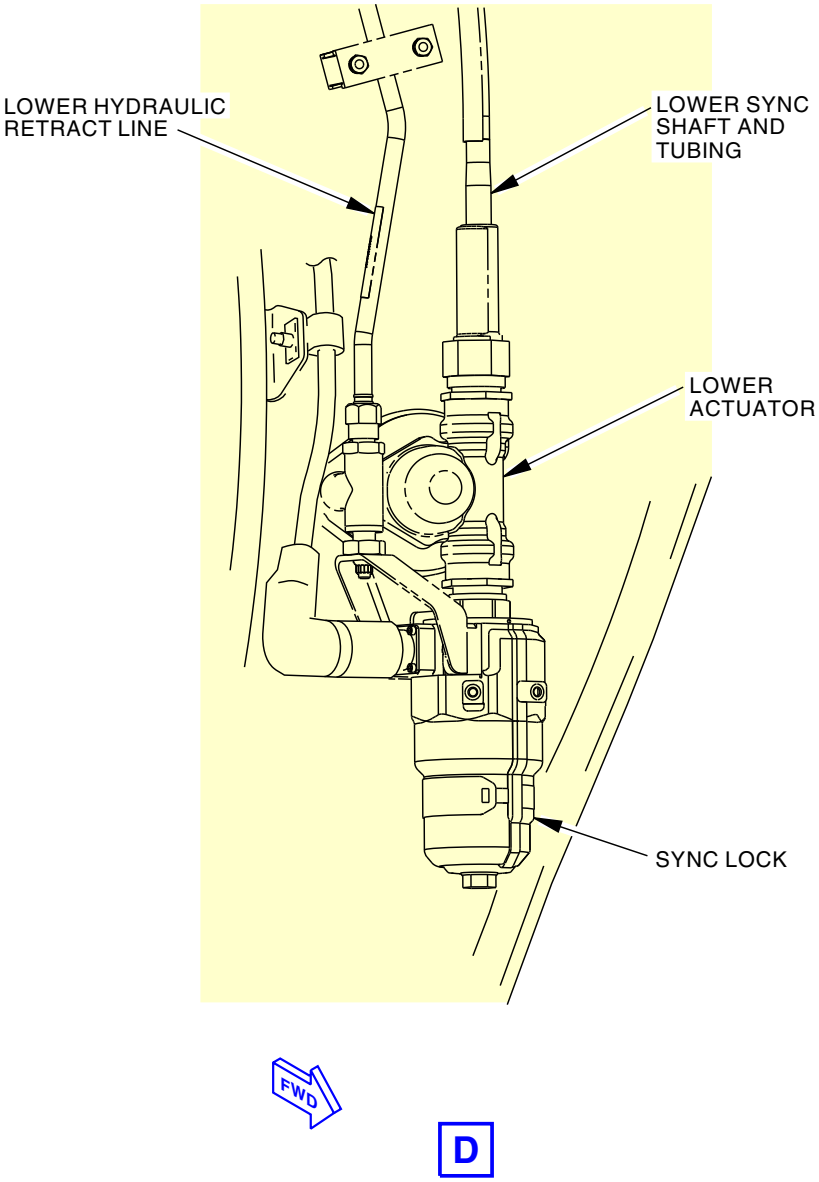
Sync Shaft Installation
Figure 401/78-31-04-990-801-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Sync Shaft Installation
Figure 401/78-31-04-990-801-G00 (Sheet 3 of 4)

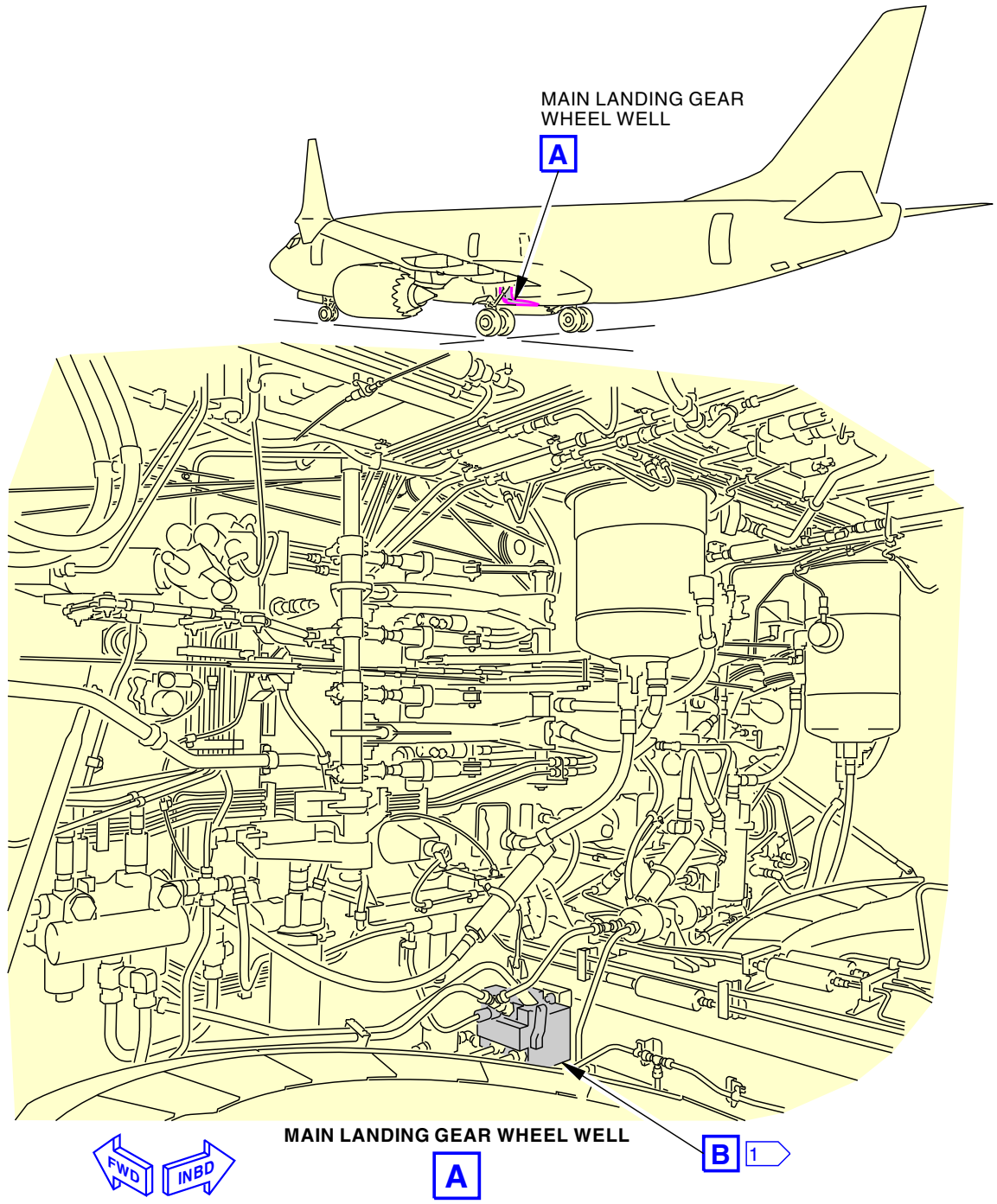
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Sync Shaft Installation
Figure 401/78-31-04-990-801-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

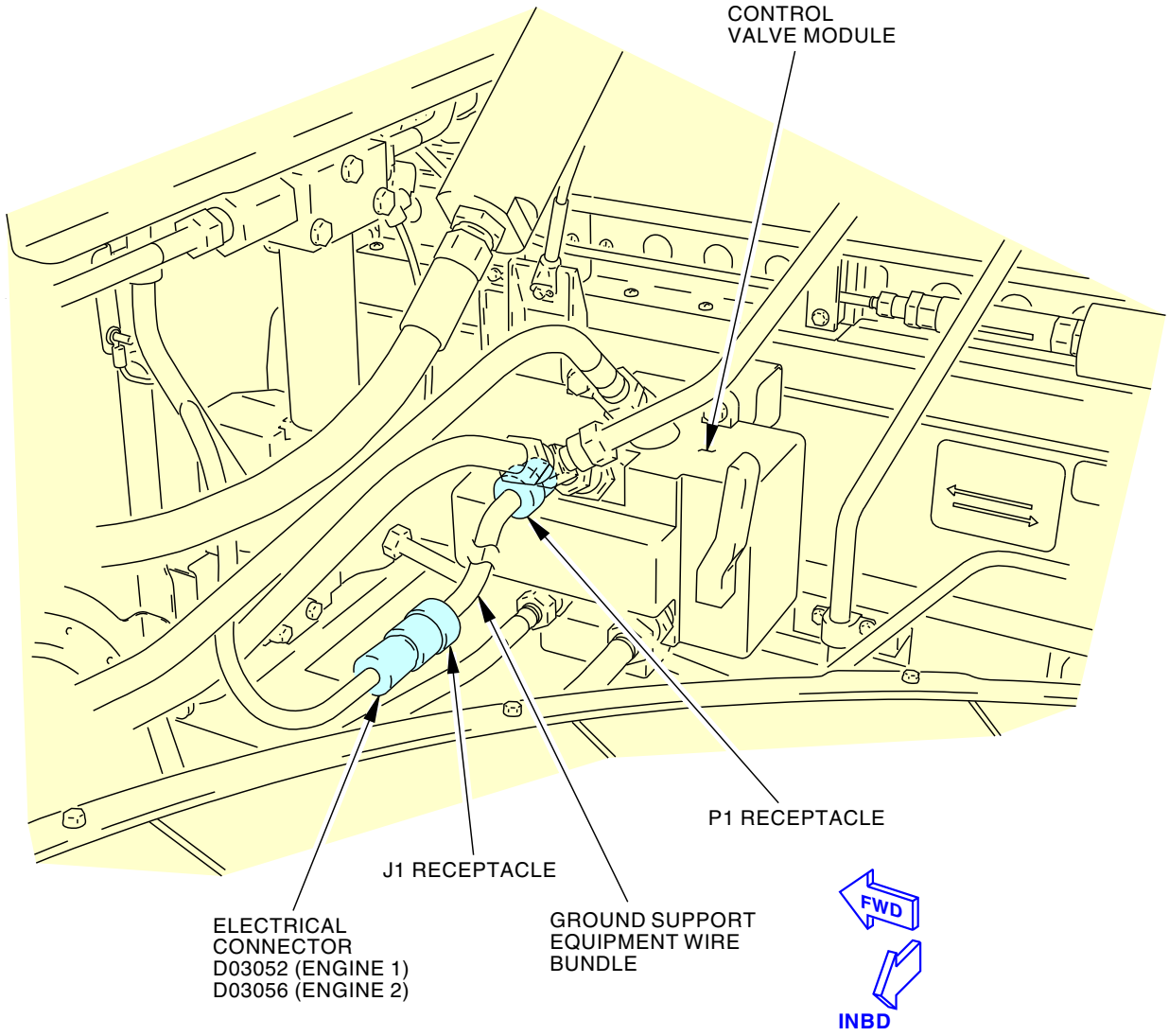


1 ENGINE 1 CONTROL VALVE MODULE IS SHOWN,
ENGINE 2 CONTROL VALVE MODULE IS ON THE RIGHT SIDE OF THE KEEL BEAM.

2355215 S00061516752_V1

Ground Support Equipment Wire Bundle Installation
Figure 402/78-31-04-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355216 S00061516753_V1

Ground Support Equipment Wire Bundle Installation
Figure 402/78-31-04-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-04-400-801-G00

3. Sync Shaft Installation

(Figure 401, Figure 402)

A. General

(1) After you install the sync shaft and tubing, you must do the thrust reverser normal operational test.

(2) To correctly rig the sync shaft, hydraulic pressure must be applied to the retract side of the thrust reverser actuators when the sync shaft is installed.

(3) The upper and lower sync shafts are interchangeable and can be reversed end for end and left thrust reverser half to right thrust reverser half.

B. References

Reference	Title
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (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-9002	Lock Equipment - Thrust Reverser Maintenance Part #: B78009-26 Supplier: 81205
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B00316	Solvent - Aliphatic Naphtha (For Organic Coatings)	TT-N-95 Type I, ASTM D-3735 Type I
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	

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(Continued)

Reference	Description	Specification
D00153	Fluid - Hydraulic Fluid, Fire Resistant (Interchangeable And Intermixable With BMS 3-11 Type V)	BMS3-11 Type IV
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
30	Retainer	78-31-04-01-095	SIA ALL
		78-31-04-02-095	SIA ALL
31	O-ring	78-31-04-01-100	SIA ALL
		78-31-04-02-100	SIA ALL

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Prepare for the Installation

SUBTASK 78-31-04-480-001-G00

WARNING MAKE SURE THAT YOU DEACTIVATE THE DEPLOY CONTROL CIRCUIT. THIS WILL MAKE SURE THAT THE HYDRAULIC PRESSURE IS ON THE RETRACT LINE ONLY. IF YOU DO NOT, THE TR SLEEVES CAN DEPLOY. INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Connect the B78009-5 cable assembly from the thrust reverser maintenance lock equipment, SPL-9002, to the control valve module as follows:

NOTE: The B78009-5 cable assembly is part of the thrust reverser maintenance lock equipment. There are two -5 wire bundle cable assemblies in the B78009 tool. The cable assembly disables the directional control valve stow and deploy solenoid allowing only the arm solenoid to be energized.

(a) Disconnect the electrical connector from the applicable control valve module receptacle.

1) For Engine 1, disconnect the electrical connector, D03052.

2) For Engine 2, disconnect the electrical connector, D03056.

(b) Connect the P1 connector of the -5 cable assembly to the control valve module receptacle.

(c) Connect the electrical connector to the J1 receptacle of the -5 cable assembly.

SUBTASK 78-31-04-860-005-G00

(2) Do these steps to supply hydraulic power to the retract side of the actuators:

(a) Make sure that the tubing is temporarily installed.

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(b) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(c) For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

WARNING MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(d) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

1) For engine 1, pressurize hydraulic system A.

2) For engine 2, pressurize hydraulic system B.

(e) Start the thrust reverser cycle special function (TASK 71-00-00-700-816-G00).

NOTE: Thrust reverser cycle special function will time out after 5 minutes of no thrust lever movement. If this occurs, restart thrust reverser cycle special function.

(f) Move the applicable reverse thrust lever up and aft to the extend (deploy) position.

NOTE: This will unlock the sync lock.

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF THE THRUST REVERSER. IF YOU PARTIALLY DEPLOY THE THRUST REVERSER, IT WILL RETRACT WHEN YOU REMOVE THE LOCKPIN. INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Remove the lockpin from the manual isolation valve handle on the control valve module.

NOTE: Because the cable assembly is installed that disables the deploy actuation circuit, the thrust reverser will retract (stow) as soon as the lockpin is removed from the manual isolation valve handle. This will keep hydraulic pressure on the stow side of the actuators during the flex shaft installation.

H. Sync Shaft Installation

SUBTASK 78-31-04-420-006-G00

(1) Do these steps to install the sync shaft [4] and tube [2] or tube [3]:

(a) Remove the upper tube [2] or lower tube [3] that was temporarily installed.

1) Replace the two O-rings [31] and the four retainers [30] on the upper tube [2] or lower tube [3] as follows:

a) Slide the coupling nut and tube adapter away from the end of the tube.

b) Remove the two O-rings [31] and four retainers [30].

<1> Discard the two O-rings [31] and four retainers [30].

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WARNING ALIPHATIC NAPHTHA IS THE RECOMMENDED SOLVENT AND IS ALSO POISONOUS. IF YOU USE NAPHTHA IN A CONFINED SPACE, MECHANICAL VENTILATION IS MANDATORY. RESPIRATORY DEVICES AND SKIN PROTECTION ARE NECESSARY. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, INJURY TO PERSONS CAN OCCUR.

c) Clean the seal surfaces and grooves with a clean cotton wiper, G00034, moistened with solvent, B00316.

<1> Wipe all the solvent off the surfaces with a clean, dry cotton wiper, G00034.

NOTE: Do not let the solvent, B00316, dry on the surfaces.

d) Lubricate the new O-rings [31] and new retainers [30] with MCS 352B fluid, D00054, or hydraulic fluid, D00153.

e) Install the two new O-rings [31] and four new retainers [30].

NOTE: Each O-ring [31] is installed with two retainers [30]. There is a retainer [30] on each side of the O-ring [31].

f) Slide the coupling nut and tube adapter toward the end of the tube [2] or tube [3].

(b) If there is contamination on the sync shaft [4], remove the contamination with a cotton wiper, G00034.

(c) Insert the sync shaft [4] into the tube [2] or tube [3].

(d) Move the coupling nuts and tube adapters back along the tube [2] or tube [3] to get access to the sync shaft [4] ends.

(e) Insert one end of the sync shaft [4] into the internal spline in the actuator port [1].

(f) Flex the sync shaft [4] and insert the opposite end into the internal spline in the other actuator port [1].

(g) Tighten the coupling nuts enough to engage one or two threads at this time.

(h) Center the tube [2] or tube [3] in the coupling nuts and adapters.

(i) Do these steps to tighten the coupling nuts:

1) Tighten the coupling nut to 900 ±45 in-lb (102 ±5 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

SUBTASK 78-31-04-410-001-G00

(2) To install the clamp blocks, do these steps:

NOTE: To eliminate tubing preload, it is important to install the clamp block retainer, clamp block and spacers back in their original positions.

(a) For the upper clamp block assembly, install the spacer [6], clamp block retainer [7], clamp block [12], clamp block [11], two sleeve spacers [13], clamp block retainer [8], two washers [10], and two bolts [9].

(b) For the lower clamp block assembly, install the spacer [6], clamp block retainer [7], clamp block [12], clamp block [11], two sleeve spacers [13], clamp block retainer [8], wiring clamp [14], two washers [10], bolt [9] and bolt [15].

(c) Tighten the bolts [9] and bolt [15] to 32.5 ±2.5 in-lb (3.7 ±0.3 N·m).

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SUBTASK 78-31-04-040-002-G00

(3) Do these steps again:

(a) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

(b) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(d) For Engine 1, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(e) For Engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

SUBTASK 78-31-04-860-010-G00

(4) Make sure that the thrust reverser is fully closed (TASK 78-31-00-010-802-G00 and TASK 78-31-00-980-802-G00).

SUBTASK 78-31-04-860-006-G00

(5) Move the applicable reverse thrust lever forward and down to the retract (stow) position.

NOTE: If there is a small gap, the thrust reverser is not fully closed and the manual unlock lever cannot be moved.

SUBTASK 78-31-04-080-001-G00

(6) Do these steps to disconnect the thrust reverser maintenance lock equipment, SPL-9002, B78009-5 cable assembly, from the control valve module:

(a) Disconnect the P1 connector of the -5 cable assembly from the control valve module receptacle.

(b) Disconnect the electrical connector from the J1 receptacle of the -5 cable assembly.

(c) Connect the electrical connector to the control valve module.

1) For Engine 1, connect the electrical connector, D03052.

2) For Engine 2, connect the electrical connector, D03056.

SUBTASK 78-31-04-980-001-G00

(7) Manually extend and retract the thrust reverser through one cycle.

(a) Do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

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I. Sync Shaft Installation Test

SUBTASK 78-31-04-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-04-710-001-G00

(2) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

(a) Remove the DO NOT OPERATE tag, STD-858, from the reverse thrust lever.

(b) Operate the thrust reverser through the extend (deploy) and retract (stow) cycles until all of the air is removed from the thrust reverser hydraulic system.

NOTE: This is shown by a smooth movement of the sleeves.

1) Do a check of the hydraulic tubes and connections for hydraulic fluid leaks.

a) If you find leaks, do a check of the hydraulic system for external leakage (TASK 29-00-00-790-801).

NOTE: Refer to the tube connections, static seals, and other dynamic seals sections of the procedure for the leakage limits.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-04-410-002-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SYNC SHAFT - INSPECTION/CHECK

1. General

A. This procedure contains a visual inspection of the Sync Shafts.

TASK 78-31-04-200-801-G00

2. Sync Shaft Inspection

(Figure 601)

A. General

(1) This task gives the instructions to examine the thrust reverser sync shaft.

B. References

Reference	Title
78-31-04-000-801-G00	Sync Shaft Removal (P/B 401)
78-31-04-400-801-G00	Sync Shaft Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-3912	Lens - Magnifying, 5x, Hand Held

D. Prepare for the Inspection

SUBTASK 78-31-04-020-003-G00

(1) Remove the sync shaft that you will examine (TASK 78-31-04-000-801-G00).

E. Sync Shaft Inspection

SUBTASK 78-31-04-210-002-G00

(1) Use a hand held 5x magnifying lens, STD-3912 to do a visual inspection of the sync shaft wires:

(a) Look for a broken wire.

1) If you find a broken wire, replace the sync shaft.

(b) Look for wire strand separations.

1) Permitted, if the width of the strand separation is equal to or less than the diameter of the wire strand.

2) If the width of the strand separation is greater than the diameter of the wire strand, replace the sync shaft.

SUBTASK 78-31-04-210-003-G00

(2) Look for twists in the square ends of the sync shaft.

(a) If you find a twist in the square end, replace the sync shaft.

SUBTASK 78-31-04-210-004-G00

(3) Look for kinks in the sync shaft.

(a) Permitted, if you find a kink that is less than or equal to 0.020 in. (0.508 mm).

(b) If you find a kink that is greater than 0.020 in. (0.508 mm), replace the sync shaft.

SUBTASK 78-31-04-210-005-G00

(4) Look for abraded or worn areas on the surface of the sync shaft.

(a) If you find abraded or worn areas, then calculate the amount of face wear W as follows:

1) Measure the diameter D2 of the sync shaft at the maximum depth of the worn area.

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2) Measure the diameter D1 of the sync shaft in an adjacent area that have no damage.

3) Subtract diameter D2 from diameter D1 and then divide by 2.

NOTE: (D1 - D2) /2 = W.

(b) Permitted, If the face wear W is less than or equal to 0.013 in. (0.330 mm).

(c) If the face wear W is greater than 0.013 in. (0.330 mm), replace the sync shaft.

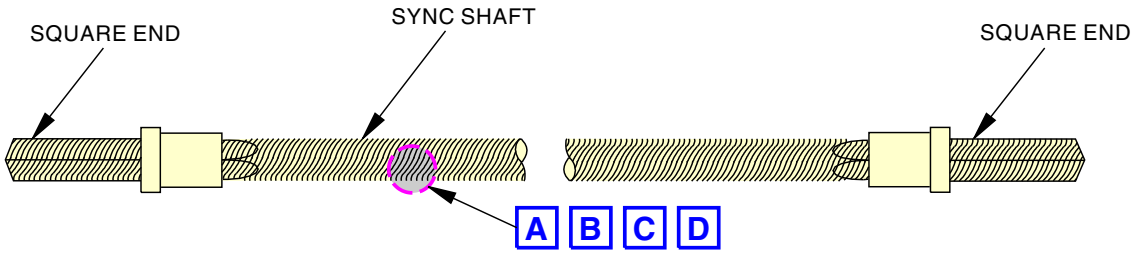
F. Put the Airplane Back to Its Usual Condition

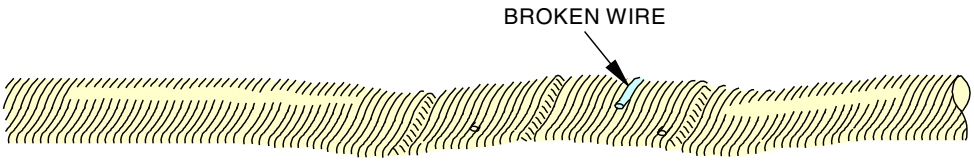
SUBTASK 78-31-04-420-007-G00

(1) Install the serviceable and replacement sync shafts (TASK 78-31-04-400-801-G00).

——— END OF TASK ———

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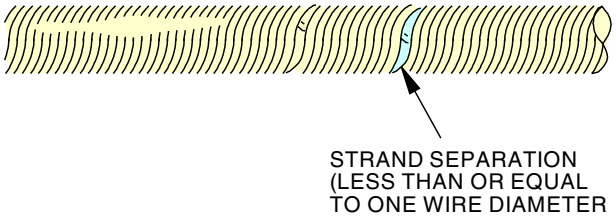
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A

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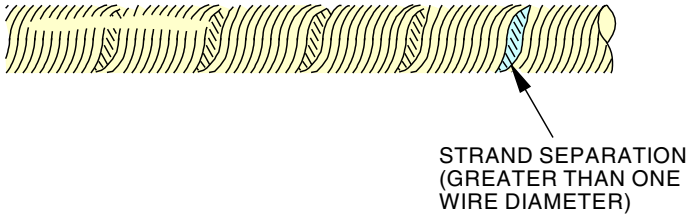
Sync Shaft Inspection
Figure 601/78-31-04-990-803-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(PERMITTED)

B



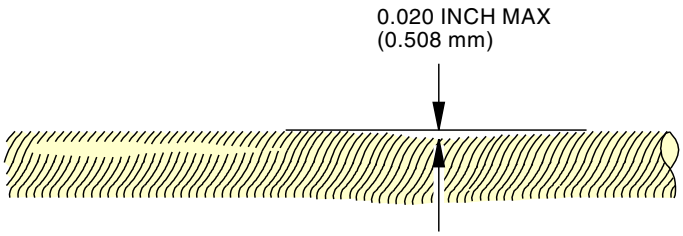
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B

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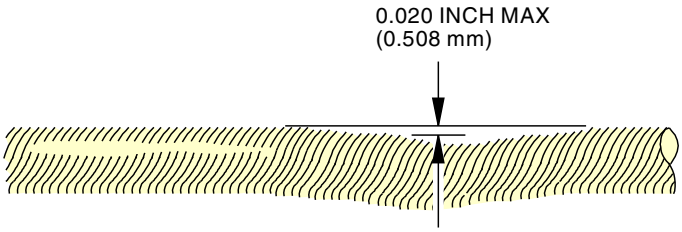
Sync Shaft Inspection
Figure 601/78-31-04-990-803-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(PERMITTED KINK)

C



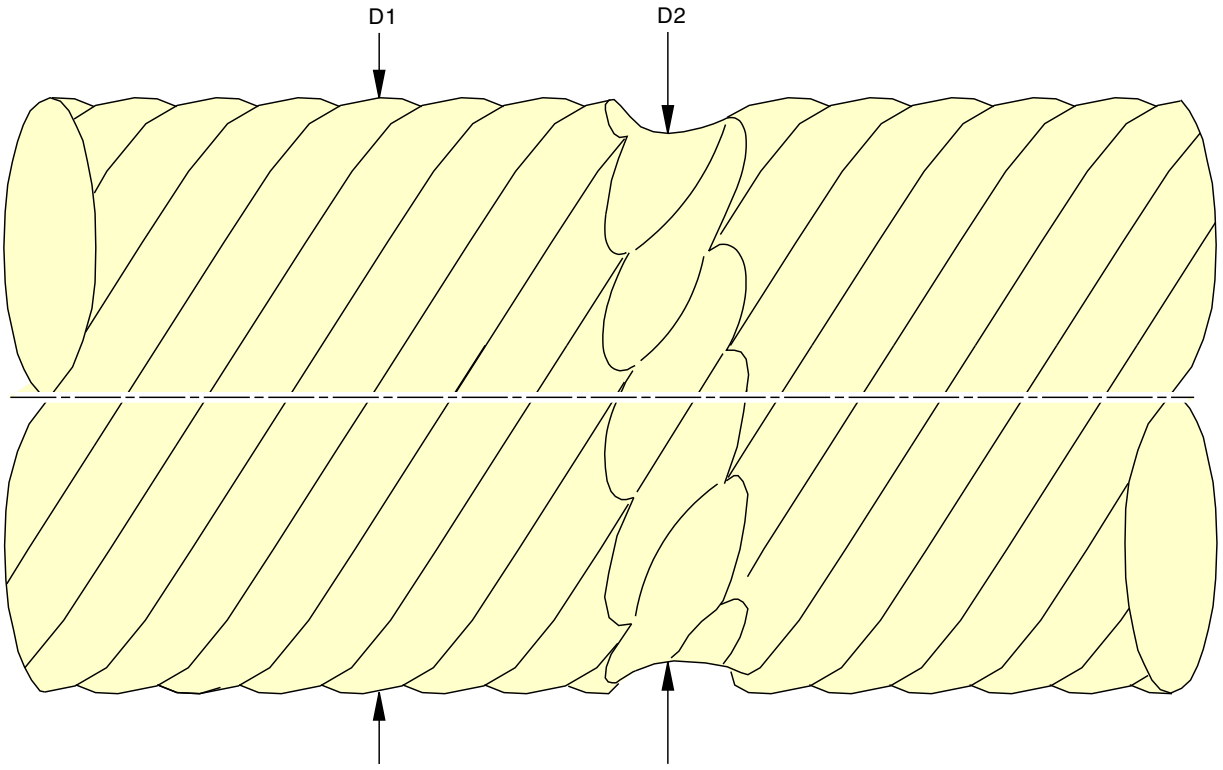
(NOT PERMITTED KINK)

C

2355219 S00061516759_V1

Sync Shaft Inspection
Figure 601/78-31-04-990-803-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(FACE WEAR)

D

2355220 S00061516760_V1

Sync Shaft Inspection
Figure 601/78-31-04-990-803-G00 (Sheet 4 of 4)

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CASCADES - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the cascades.

(2) The installation of the cascades.

TASK 78-31-05-000-801-G00

2. Cascade Removal

(Figure 401, Figure 402)

A. General

(1) This task is for the removal of the cascades from the left or right thrust reverser on an engine.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Prepare for the Removal

SUBTASK 78-31-05-840-001-G00

(1) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00, to expose the thrust reverser cascades.

SUBTASK 78-31-05-040-001-G00

WARNING DO THE THRUST REVERSER DEACTIVATION PROCEDURE FOR GROUND MAINTENANCE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00, to deactivate the thrust reverser for ground maintenance.

E. Cascade Removal

SUBTASK 78-31-05-000-001-G00

(1) Do these steps to remove the applicable cascade:

(a) Remove the bolts [30] and washers [31] that attach the cascade to the aft cascade support ring.

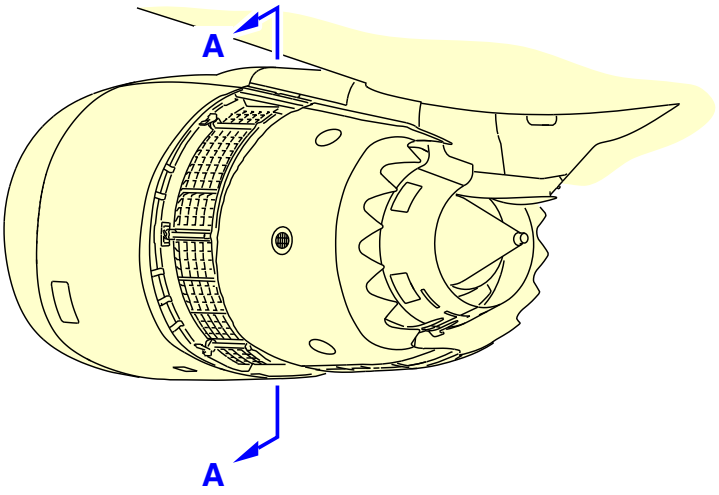
(b) Remove the bolts [30] and washers [31] that attach the cascade to the torque box.

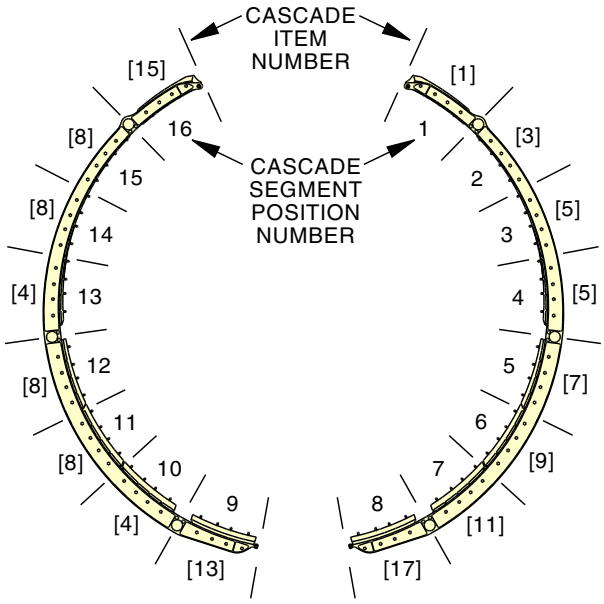
ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the cascade [1], cascade [2], cascade [3], cascade [4], cascade [5], cascade [6], cascade [7], cascade [8], cascade [9], cascade [10], cascade [11], cascade [12], cascade [13], cascade [14], cascade [15], cascade [16], or cascade [17].

END OF TASK

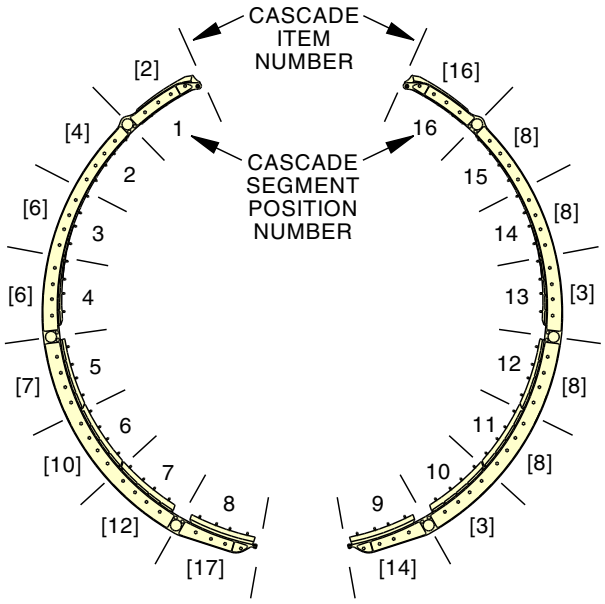
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**ENGINE POSITION 1,
THRUST REVERSER CASCADES
(AFT LOOKING FORWARD)**

A-A



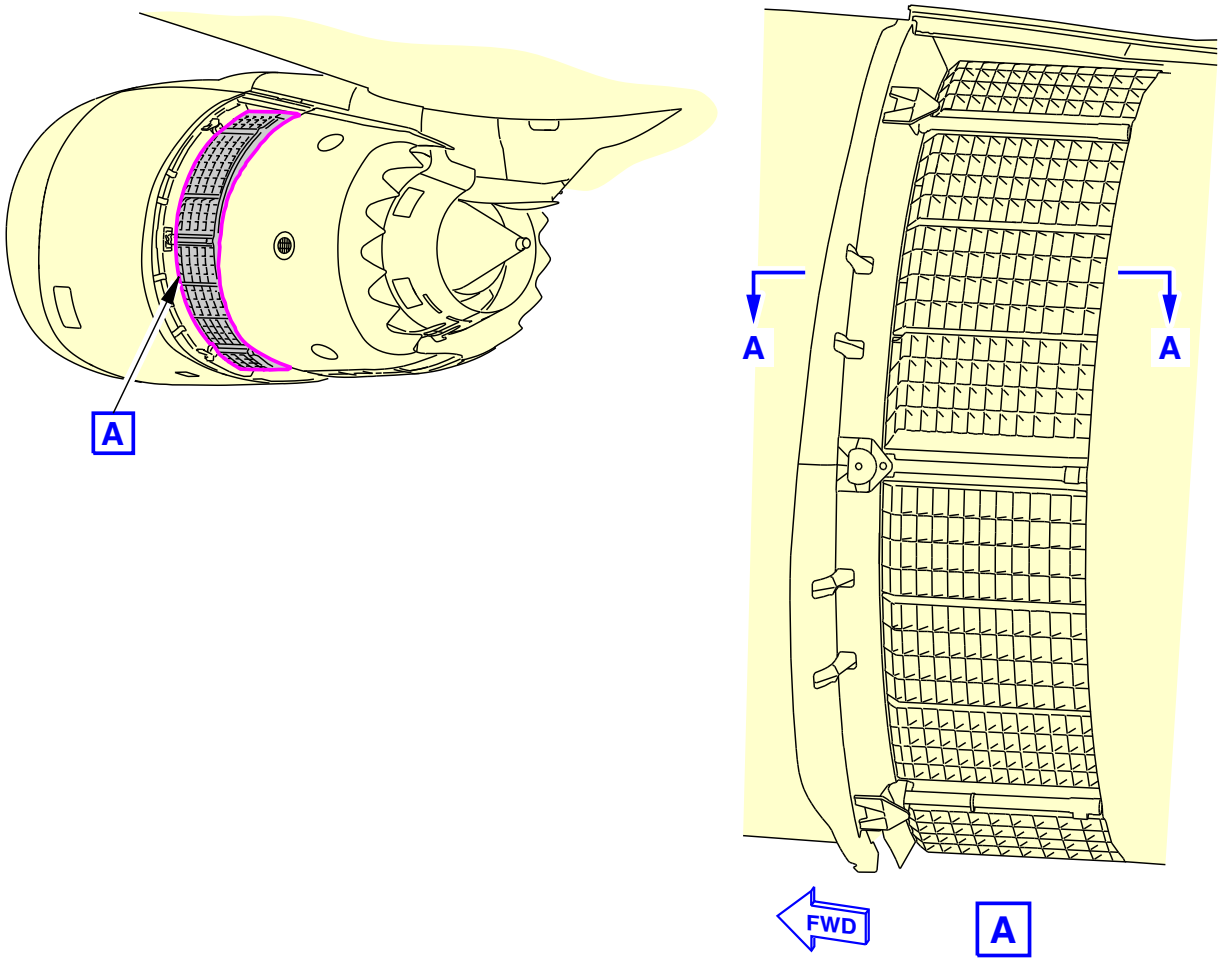
**ENGINE POSITION 2,
THRUST REVERSER CASCADES
(AFT LOOKING FORWARD)**

A-A

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**Cascade Positions
Figure 401/78-31-05-990-802-G00**

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Cascade Installation
Figure 402/78-31-05-990-804-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-05-400-801-G00

3. Cascade Installation

(Figure 401, Figure 402))

A. References

Reference	Title
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-806-G00	Thrust Reverser Operation - Retract (Power Procedure) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
D00633	Grease - Aircraft General Purpose	BMS3-33

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Cascade Installation

SUBTASK 78-31-05-420-001-G00

CAUTION MAKE SURE THE CORRECT CASCADES ARE INSTALLED AT THEIR APPLICABLE LOCATIONS. INCORRECT CASCADES INSTALLATION CAN EFFECT THE ENGINE PERFORMANCE.

(1) Use the table that follows to identify the correct cascade part number for the cascade position on the engine.

Cascade Position and Part Number Cross Reference Table

Cascade Item Number	Cascade Segment Position Number	Cascade Part Number
1	Engine 1, #1	LP5001
2	Engine 2, #1	LP5002
3	Engine 1, #2 Engine 2, #10 and #13	LP5003
4	Engine 1, #10 and #13 Engine 2, #2	LP5004
5	Engine 1, #3 and #4	LP5005 (Combination Cascade)
6	Engine 2, #3 and #4	LP5006 (Combination Cascade)
7	Engine 1, #5 Engine 2, #5	LP5007
8	Engine 1, #11, #12, #14 and #15 Engine 2, #11, #12, #14 and #15	LP5008

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Cascade Position and Part Number Cross Reference Table (Continued)

Cascade Item Number	Cascade Segment Position Number	Cascade Part Number
9	Engine 1, #6	LP5009
10	Engine 2, #6	LP5010
11	Engine 1, #7	LP5011
12	Engine 2, #7	LP5012
13	Engine 1, #9	LP5013
14	Engine 2, #9	LP5014
15	Engine 1, #16	LP5015
16	Engine 2, #16	LP5016
17	Engine 1, #8 Engine 2, #8	LP5017 (Blocked)

SUBTASK 78-31-05-000-002-G00

(2) Do these steps to install the cascade that was identified in the table:

(a) Apply primer, C00259, to the fastener holes in the cascade, the cascade support ring and the torque box.

1) Let the primer dry for 30 minutes.

(b) Lubricate the bolts [30] with grease, D00633.

(c) Install in its position cascade [1], cascade [2], cascade [3], cascade [4], cascade [5], cascade [6], cascade [7], cascade [8], cascade [9], cascade [10], cascade [11], cascade [12], cascade [13], cascade [14], cascade [15], cascade [16], or cascade [17].

(d) Align the bolt holes in the cascade with the fastener holes in the cascade support ring and the torque box.

(e) Install the bolts [30] and washers [31] in each fastener location to hold the cascade in its position.

(f) Tighten the bolts [30] at the torque box and the aft cascade support ring to 62.5 ±12.5 in-lb (7.1 ±1.5 N·m).

E. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-05-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00, to activate the thrust reverser after ground maintenance.

SUBTASK 78-31-05-840-002-G00

(2) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00, to stow the thrust reverser.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CASCADE - INSPECTION/CHECK

1. General

A. This procedure has this task:

(1) An inpection of the thrust reverser cascade segments.

TASK 78-31-05-200-801-G00

2. Thrust Reverser Cascade Segments Inspection

(Figure 601)

A. General

(1) The cascade segments are made of a graphite/epoxy material. The cascade segments are mounted between the forward torque box and the aft cascade support ring. When the thrust reverser is stowed, the cascade segments are located between the outer and inner skin of the thrust reverser sleeve.

(2) During reverse thrust, the strongbacks transfer the thrust load from the cascade vanes to the forward torque box through the attachment flanges.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)
78-31-05-000-801-G00	Cascade Removal (P/B 401)
78-31-05-400-801-G00	Cascade Installation (P/B 401)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Prepare for the Inspection

SUBTASK 78-31-05-010-001-G00

(1) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00, to expose the thrust reverser cascades.

SUBTASK 78-31-05-010-002-G00

WARNING

YOU MUST DO THE THRUST REVERSER DEACTIVATION PROCEDURE FOR GROUND MAINTENANCE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(2) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00, to deactivate the thrust reverser for ground maintenance.

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E. Thrust Reverser Cascade Segments Inspection

SUBTASK 78-31-05-210-001-G00

(1) Examine the cascade segments for damage, tears, cracks or delaminated areas in the cascade vanes, strongbacks and attachment flanges.

(a) If damage, tears, cracks or delaminated areas in the cascade vanes, strongbacks or attachment flanges is found, replace the cascade segment.

These are the tasks:

Cascade Removal, TASK 78-31-05-000-801-G00,

Cascade Installation, TASK 78-31-05-400-801-G00.

(b) Contact Boeing to report the kind of damage and delamination found for repair disposition.

NOTE: If it is possible, document the damage with digital photographs that can be sent by email, or provide a sketch of the damage that can be faxed.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-05-440-002-G00

WARNING

DO ALL THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO PREPARE THE THRUST REVERSER FOR OPERATION. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

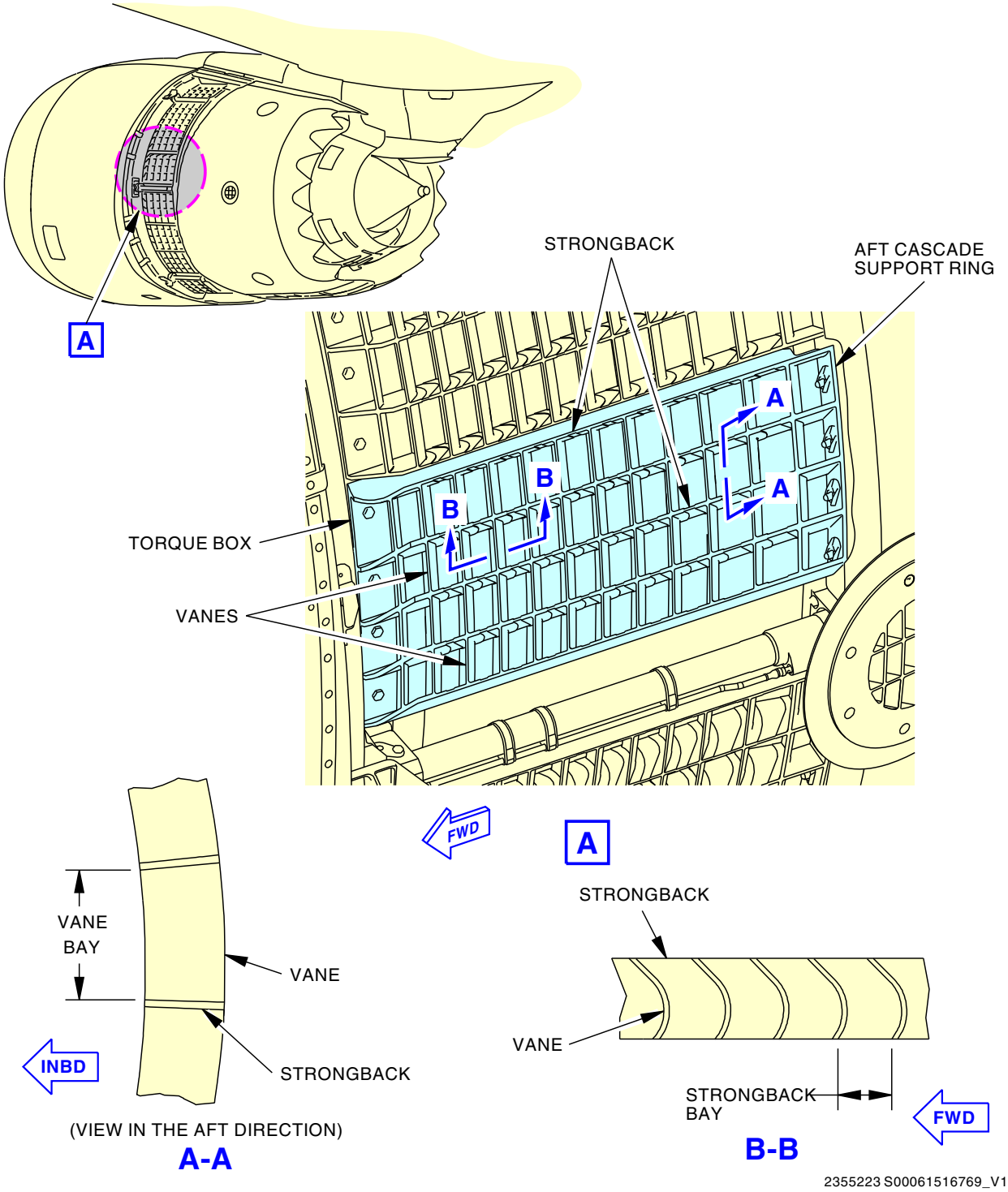
(1) Do these tasks in this sequence to activate and stow the thrust reverser:

(a) Do this task to activate the thrust reverser: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

(b) Do this task to stow the thrust reverser: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Cascade Segment Inspection
Figure 601/78-31-05-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BLOCKER DOORS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the blocker door

(2) An installation of the blocker door.

TASK 78-31-06-000-801-G00

2. Blocker Door Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the blocker door.

B. References

Reference	Title
78-31-07-000-801-G00	Blocker Door Drag Link Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Blocker Door Removal

SUBTASK 78-31-06-010-002-G00

(1) Disconnect the drag link at the blocker door (TASK 78-31-07-000-801-G00).

SUBTASK 78-31-06-020-001-G00

CAUTION

MAKE SURE THAT YOU PUT PROTECTION ON THE FAN DUCT WALLS AND BLOCKER DOORS. DAMAGE CAN OCCUR IF A TOOL OR DRAG LINK HITS THE WALL OR DOORS.

(2) Do these steps to remove the blocker door:

(a) Make sure that there is protective mat, STD-585, on the fan duct walls and blocker doors.

(b) Disconnect the applicable hinges:

NOTE: Each blocker door has two hinges with different fastening set.

1) At the hinge [1], remove the nut [8], washers [6], bushings [7], anti-rotation bracket [5], and bolt [4] (View B, Figure 401).

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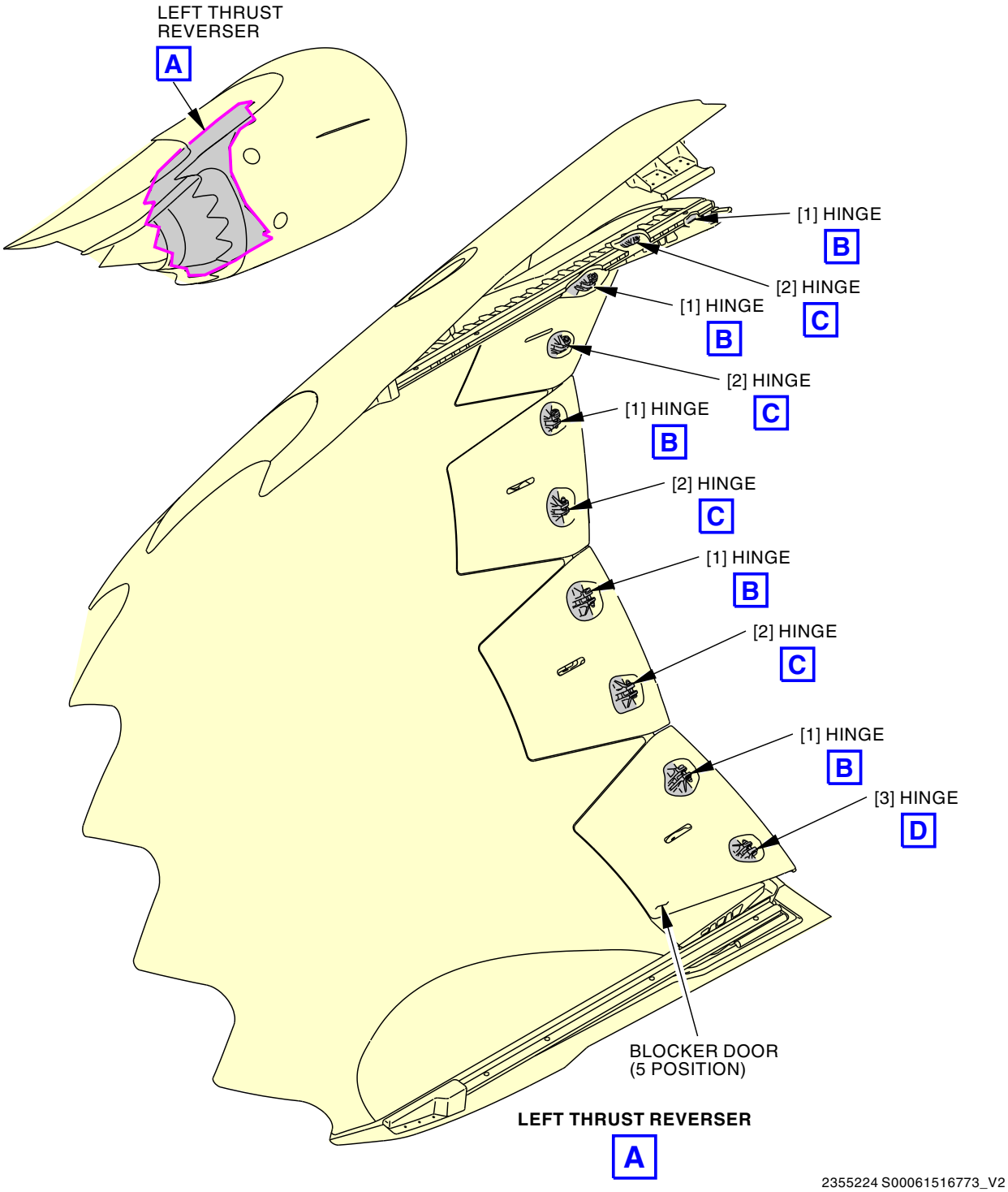
2) At the hinge [2] and hinge [3], remove the nut [8], washers [6], bushing [7], washer [9], and bolt [4] (View C and D, Figure 401).

NOTE: The hinge [2] has the bushing installed at the bolt head. The hinge [3] has the bushing installed at the threaded end of the bolt.

(c) Remove the blocker door.

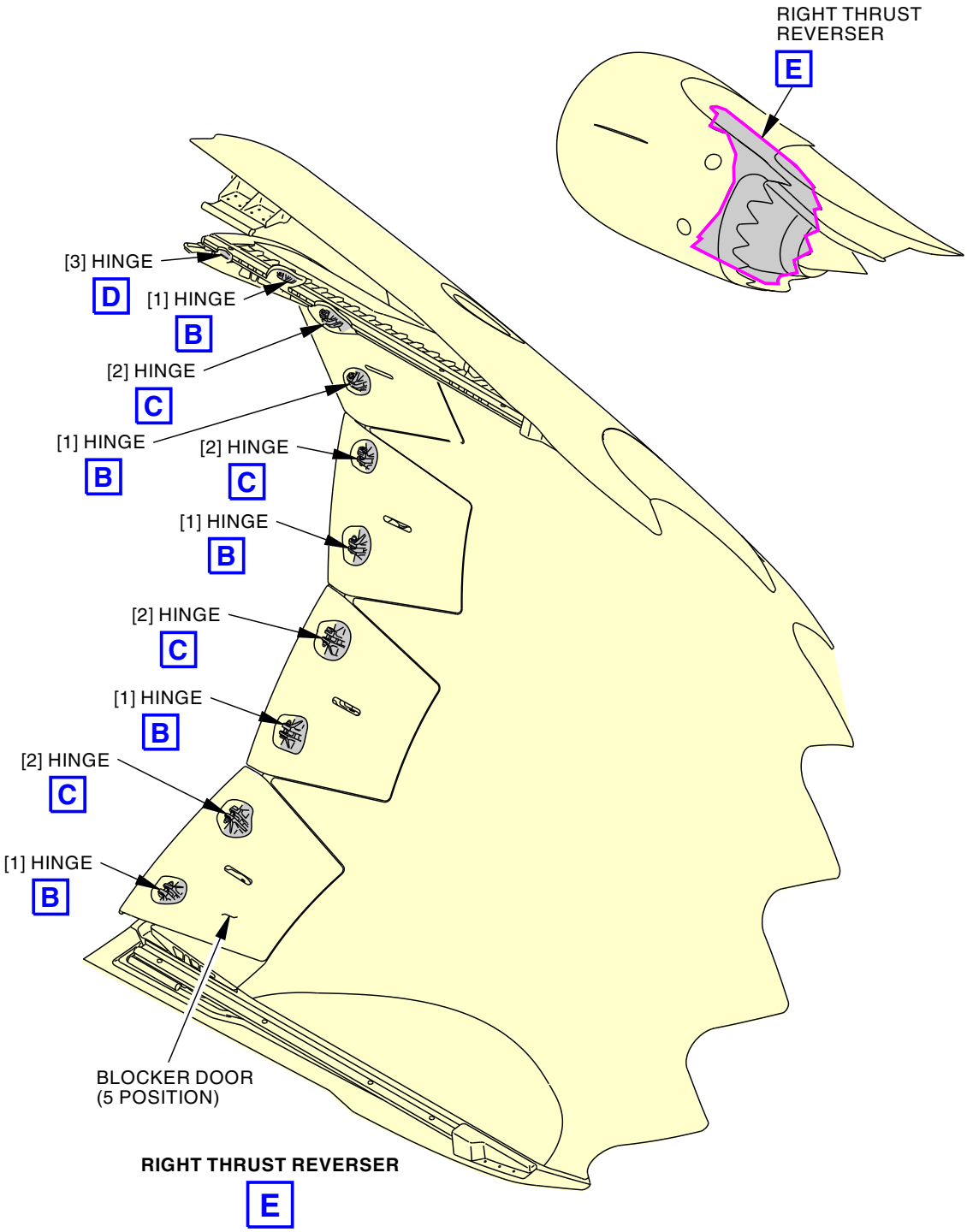
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



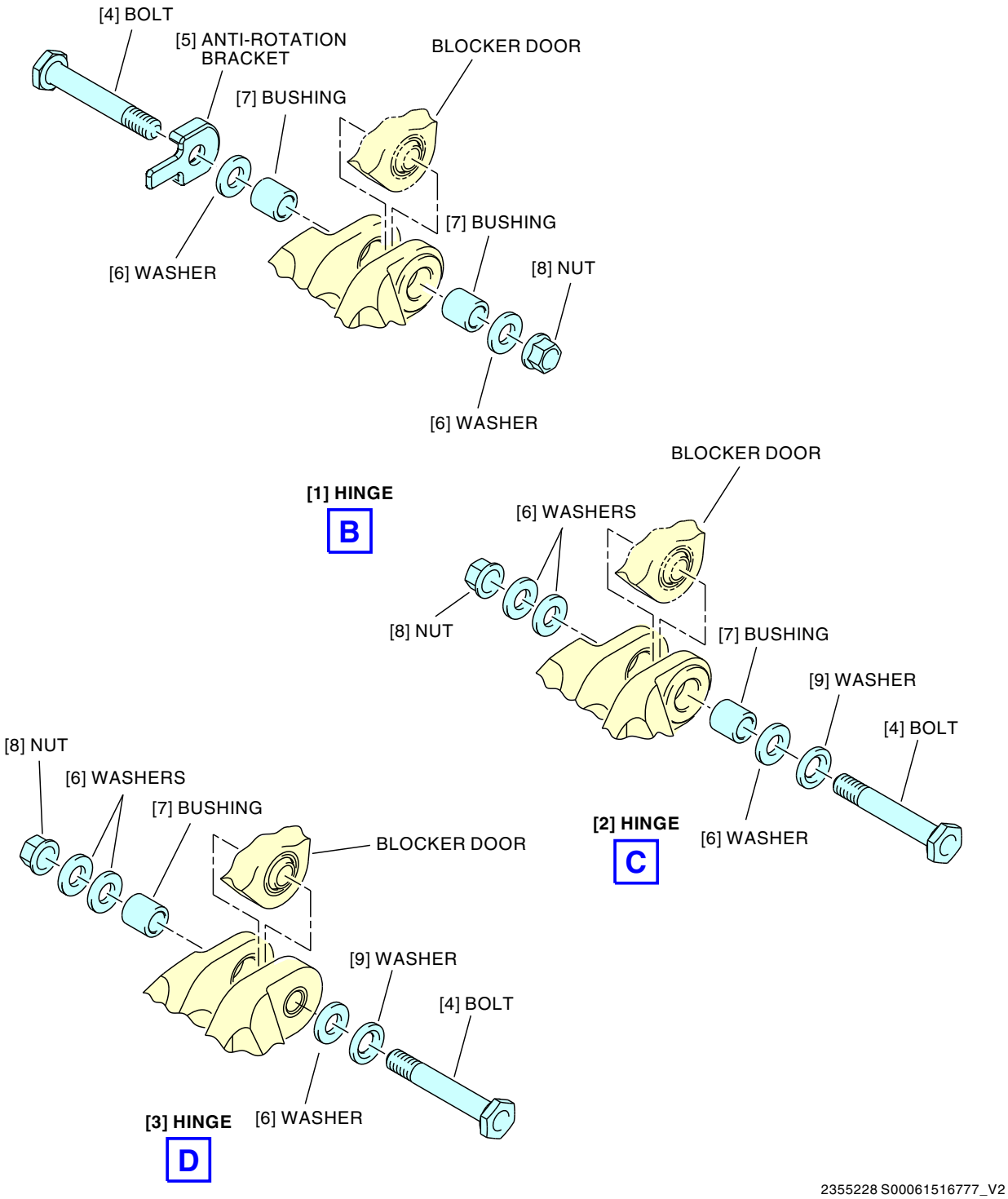
Blocker Door Installation
Figure 401/78-31-06-990-801-G00 (Sheet 1 of 3)

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Blocker Door Installation
Figure 401/78-31-06-990-801-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Blocker Door Installation
Figure 401/78-31-06-990-801-G00 (Sheet 3 of 3)

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TASK 78-31-06-400-801-G00

3. Blocker Door Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the blocker door.

B. References

Reference	Title
78-31-07-400-801-G00	Blocker Door Drag Link Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Blocker Door Installation

SUBTASK 78-31-06-420-001-G00

CAUTION MAKE SURE THAT YOU PUT PROTECTION ON THE FAN DUCT WALLS AND BLOCKER DOORS. DAMAGE CAN OCCUR IF A TOOL OR DRAG LINK HITS THE WALL OR DOORS.

(1) Do these steps to install the blocker door:

(a) Make sure that there is protective mat, STD-585, on the fan duct walls and blocker doors.

(b) Align the fastener holes in the blocker door hinge and the sleeve hinge fitting.

(c) Connect the applicable hinges as follows:

NOTE: Each blocker door has two hinges with a different fastening set.

1) At the hinge [1], install the bolt [4], anti-rotation bracket [5], washers [6], bushings [7], and nut [8] (View B, Figure 401).

2) At the hinge [2] and hinge [3], install the bolt [4], washer [9], washers [6], bushing [7], and nut [8] (View C and D, Figure 401).

NOTE: The hinge [2] has the bushing installed at the bolt head. The hinge [3] has the bushing installed at the threaded end of the bolt.

3) Make sure that the anti-rotation bracket [5] fit in the slot in the acoustic panel assembly.

4) Tighten the nut [8] to 65 in-lb (7.3 N·m) - 70 in-lb (7.9 N·m).

SUBTASK 78-31-06-700-001-G00

(2) Do this check of the blocker door:

NOTE: If there is side movement of the blocker door or if more than three threads show at the end of the bolt at the clamped hinge, this is an indication that the hinge is not clamped.

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(a) Make sure that there is no side movement of the blocker door at the hinges.

(b) Make sure that three threads or less show at the end of the bolt [4].

1) If there is side movement of the blocker door at the hinges or more than three threads show at the end of the bolt [4], add more washers [6] at the nut [8].

2) Tighten the nut [8] to 65 in-lb (7.3 N·m) - 70 in-lb (7.9 N·m).

SUBTASK 78-31-06-420-002-G00

(3) Connect the drag link at the blocker door (Blocker Door Drag Link Installation, TASK 78-31-07-400-801-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BLOCKER DOORS - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) A visual check of the blocker doors.

(2) A visual check of the blocker door hinge attachments and bearings.

TASK 78-31-06-200-801-G00

2. Blocker Door Visual Inspection

(Figure 601, Figure 602, Figure 603)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions on how to do a visual check of the blocker doors.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)
78-31-01-960-802-G00	Blocker Door Support Assembly Replacement (P/B 801)
78-31-06 P/B 401	BLOCKER DOORS - REMOVAL/INSTALLATION
78-31-24 P/B 401	BLOCKER DOOR AERO SEAL - REMOVAL/INSTALLATION
SRM 54-30-01	FAN THRUST REVERSER COWL SKIN

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2

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(Continued)

Number	Name/Location
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Inspection

SUBTASK 78-31-06-860-003-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-06-010-004-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

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G. Blocker Door Visual Inspection

SUBTASK 78-31-06-210-001-G00

(1) Look for missing blocker doors.

SUBTASK 78-31-06-400-001-G00

(2) If blocker doors are missing, replace the blocker doors (PAGEBLOCK 78-31-06/401).

SUBTASK 78-31-06-210-002-G00

(3) Examine the blocker doors for the damage that follows:

(a) holes

(b) cracks

(c) nicks

(d) gouges

(e) scratches

(f) dents

(g) edge damage.

SUBTASK 78-31-06-910-001-G00

(4) If you find damage, refer to the SRM SUBJECT 54-30-01 for the permitted limits and repair procedures.

SUBTASK 78-31-06-860-001-G00

(5) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

SUBTASK 78-31-06-210-004-G00

(6) Examine the blocker door support assemblies.

(a) If one support assembly is missing below a blocker door, the Continue-In-Service limit is a maximum of 14 days.

NOTE: The limit of 14 days is an action to prevent damage. The limit makes it necessary to replace the first missing support because it is possible that the second support could also detach. Two blocker door supports prevent the vibration of the closed blocker door. One blocker door support is permitted because the door is supported. If the second support detaches, the blocker door will vibrate which will cause wear and damage to the blocker door and the thrust reverser sleeve.

(b) If two support assemblies are missing below a blocker door, replace the support assemblies (TASK 78-31-01-960-802-G00).

NOTE: Continued operation, for a maximum of 14 days, is permitted if one support assembly is re-installed. If a new part is not available, one support assembly from an adjacent door, that has two support assemblies, can be removed and installed.

SUBTASK 78-31-06-210-005-G00

(7) Examine the blocker door aero seal for missing material, cuts, gouges, and holes through the material (Figure 603).

(a) If the blocker door aero seal is damaged, replace the seal (PAGEBLOCK 78-31-24/401) or contact Boeing.

SUBTASK 78-31-06-860-002-G00

(8) Do this task: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-06-410-005-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-06-860-004-G00

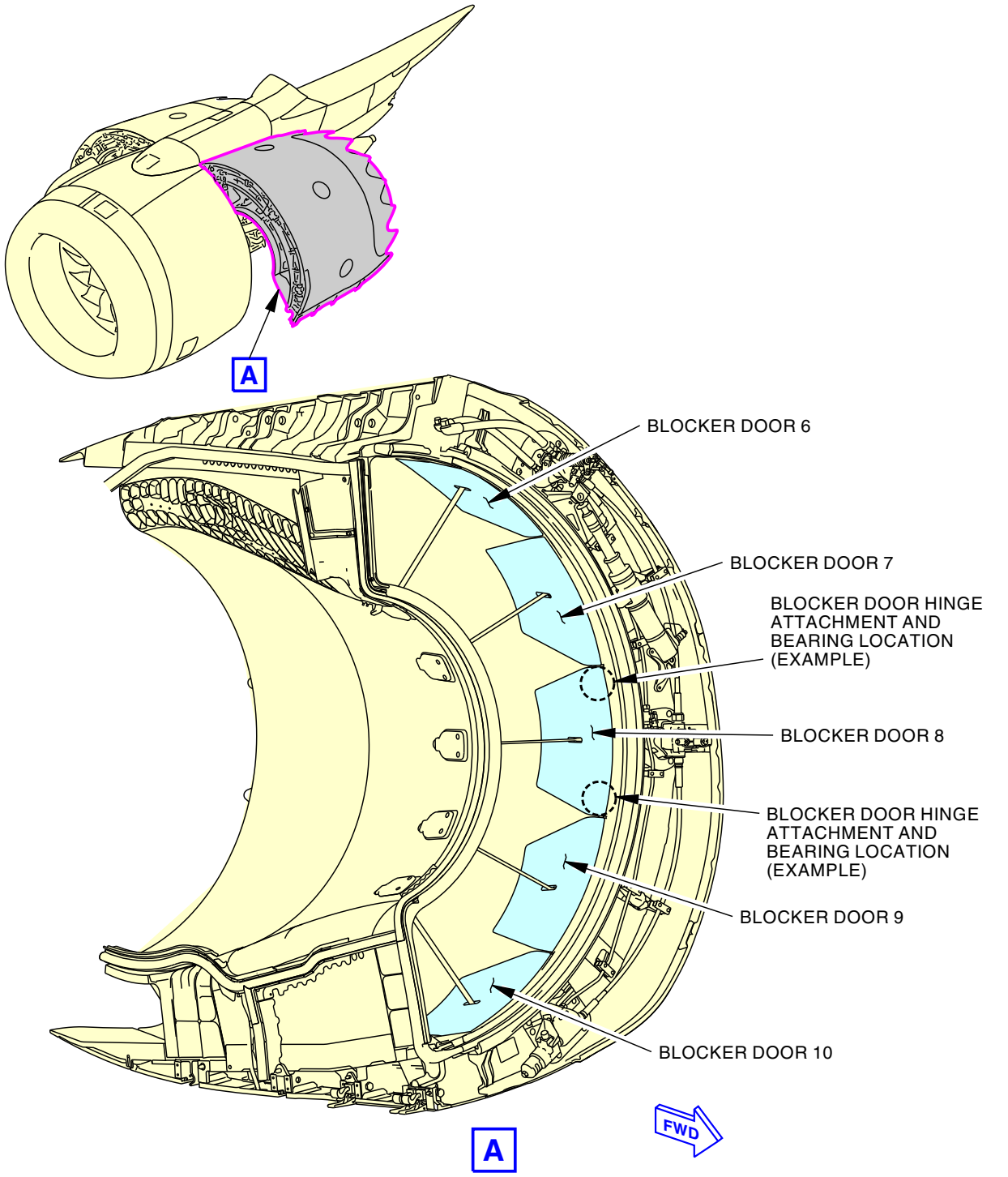
(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

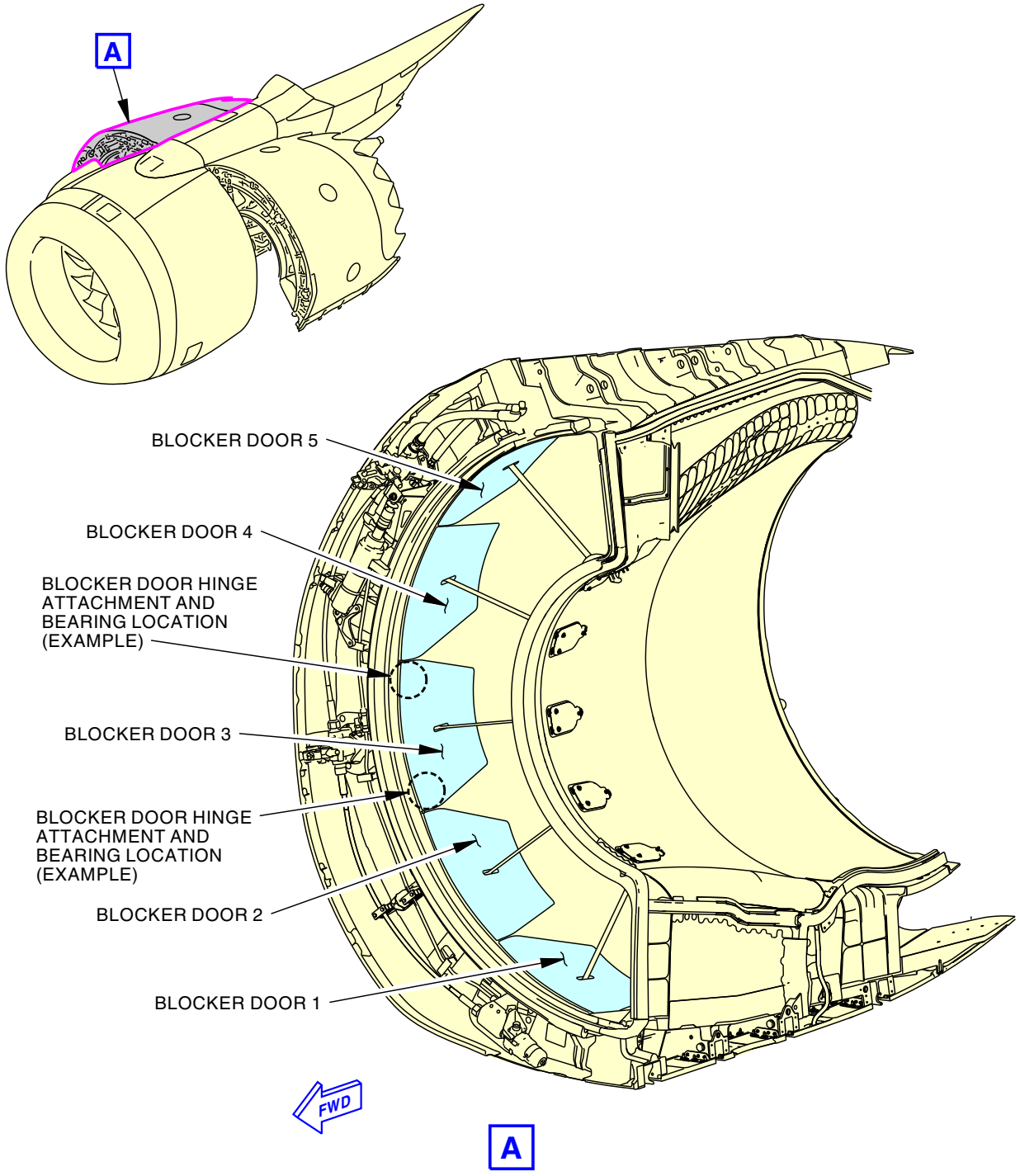
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Thrust Reverser Blocker Door Inspection
Figure 601/78-31-06-990-802-G00

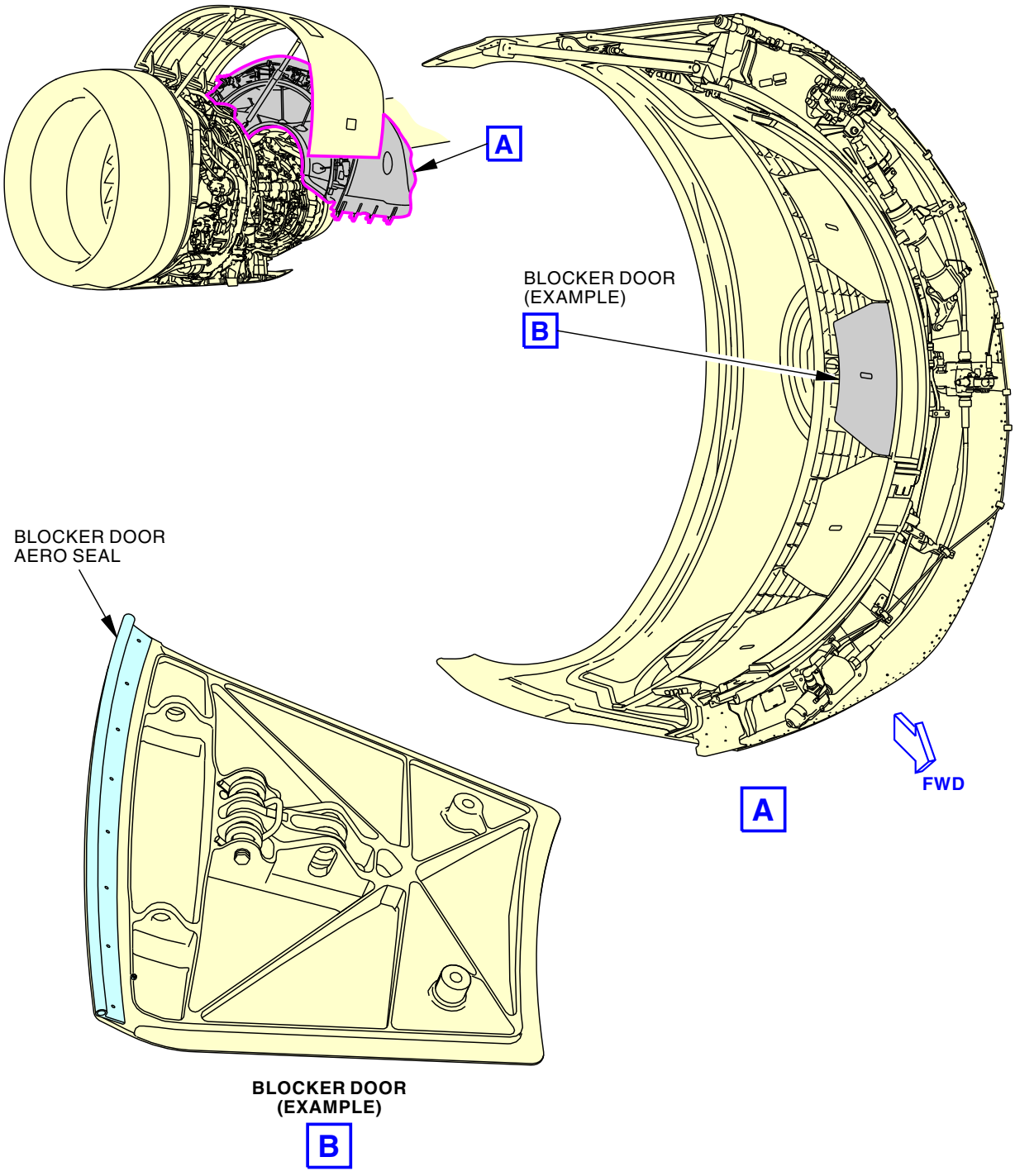
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Right Thrust Reverser Blocker Door Inspection
Figure 602/78-31-06-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2971999 S0000750745_V1

Blocker Door Aero Seal Inspection
Figure 603/78-31-06-990-804-G00

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TASK 78-31-06-211-801-G00

3. Blocker Door Hinge Attachments and Bearings Inspection

(Figure 601, Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to do a visual check of the blocker door hinge attachments and bearings.

B. References

Reference	Title
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Inspection

SUBTASK 78-31-06-860-005-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-06-860-006-G00

(2) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

F. Blocker Door Hinge Attachments and Bearings Inspection

SUBTASK 78-31-06-211-001-G00

(1) Do a detailed inspection of the thrust reverser blocker door hinge attachments and bearings for fretting and cracking.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-06-860-007-G00

(1) Do this task: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

SUBTASK 78-31-06-860-008-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

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(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

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BLOCKER DOOR DRAG LINKS - MAINTENANCE PRACTICES

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has one task:

(1) To inspect and replace, if necessary, the ball of the spherical bearing in the blocker door drag link.

TASK 78-31-07-900-801-G00

2. Drag Link Spherical Bearing Removal and Inspection

(Figure 201)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions on how to remove and examine the spherical bearing in the drag link.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)
78-31-00-980-806-G00	Thrust Reverser Operation - Retract (Power Procedure) (P/B 201)
78-31-07-000-801-G00	Blocker Door Drag Link Removal (P/B 401)
78-31-07-400-801-G00	Blocker Door Drag Link 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-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

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D. 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)
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Prepare for the Inspection

SUBTASK 78-31-07-040-001-G00

(1) Deactivate the leading edge flaps and slats in the retract position (TASK 27-81-00-040-801).

SUBTASK 78-31-07-010-005-G00

WARNING

DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

(a) Install the actuator safety Lock Assembly, SPL-14993, on the inboard thrust reversers only.

NOTE: The part number of the actuator safety lock is C78035-14. The part number (C78035-14) is for the set of two actuator safety locks.

SUBTASK 78-31-07-010-009-G00

CAUTION

DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN THE PERMITTED LIMIT. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. DAMAGE CAN OCCUR.

(3) Manually extend the outboard thrust reverser sleeve no more than 10 in. (254.0 mm) and inboard thrust reverser sleeve no more than 15 in. (381.0 mm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

NOTE: Monitor the position of the thrust reverser sleeve as it is extends. Make sure that it does not touch the leading edge of the wing.

NOTE: The sleeve must be partially extended to release the load on the drag link. This also permits you to get to the hardware that attaches the drag link to the blocker door.

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SUBTASK 78-31-07-840-001-G00

CAUTION: MAKE SURE THAT YOU PUT PROTECTION ON THE FAN DUCT WALLS AND BLOCKER DOORS. DAMAGE CAN OCCUR IF A TOOL OR DRAG LINK HITS THE WALL OR DOORS.

(4) Put protective mat, STD-585 on the fan duct walls and blocker doors.

SUBTASK 78-31-07-010-007-G00

(5) Get access to the front of the thrust reverser duct.

NOTE: To facilitate the access from the front of the thrust reverser duct, disconnect one blocker door at a time.

SUBTASK 78-31-07-020-002-G00

(6) From the front of the thrust reverser duct, disconnect the drag link [1] at the inner wall (TASK 78-31-07-000-801-G00).

SUBTASK 78-31-07-420-003-G00

(7) Install a cotton wiper, G00034, with Vibration Damping Tape 434 tape, G02329, around the end of the drag link [1] to prevent damage to the inner wall.

SUBTASK 78-31-07-210-004-G00

(8) Make sure that the blocker door can rotate freely with the attached drag link [1].

SUBTASK 78-31-07-480-001-G00

(9) Rotate and set the blocker door approximately perpendicular to its stowed position.

(a) Use Vibration Damping Tape 434 tape, G02329, to hold the blocker door in this position.

SUBTASK 78-31-07-010-006-G00

(10) Examine the drag link [1] for these conditions:

NOTE: Record the drag links location and condition.

(a) Loose nuts [6] on the drag link bolts [4].

(b) Drag link bolts [4] that have a shank length that is too long.

(c) If you find one or more of these conditions, repair or replace the drag link [1].

SUBTASK 78-31-07-020-003-G00

(11) Disconnect the drag link [1] at the blocker door (TASK 78-31-07-000-801-G00).

G. Drag Link Spherical Bearing Removal and Inspection

SUBTASK 78-31-07-010-004-G00

(1) Open the applicable blocker door.

SUBTASK 78-31-07-010-010-G00

(2) Remove the cotton wiper, G00034, with the Vibration Damping Tape 434 tape, G02329, from the end of the drag link [1].

SUBTASK 78-31-07-210-001-G00

(3) Examine the drag link [1] for these conditions:

NOTE: Record the drag links location and condition.

(a) The bushing [5] and bushing [14] in the pivot links of the blocker door are worn.

(b) The bushing [11] in the drag link [1] anchor fittings are worn.

(c) The race of the spherical bearings are loose in the drag link [1].

(d) The pivot links or anchor fittings have cracks or other damage.

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(e) If you find one or more of these conditions, repair or replace the drag link [1].

SUBTASK 78-31-07-210-003-G00

(4) Examine the ball and the spherical bearing race for pits, scratches, tears in the liner or missing liner.

NOTE: The spherical bearing consists of a ball and a race. The ball is not removable on the liner spherical bearing. The liner is attached to the inside of the race.

(a) Turn the ball 90°.

(b) Clean the ball with a cotton wiper, G00034.

(c) If the ball has pits or scratches, replace the drag link [1].

(d) If you find tears in the liner or missing liner on the race, replace the drag link [1].

NOTE: The liner material from the race may transfer to the ball which will be light brown in color. The transfer of liner material on to the ball is permitted. The liner bearing will not corrode. Do not mistake the liner material, dirt or grease as corrosion on the bearing.

NOTE: The re-application of the solid film lubricant is not recommended.

SUBTASK 78-31-07-420-001-G00

(5) Install the drag link [1] at the blocker door and the inner wall (TASK 78-31-07-400-801-G00).

SUBTASK 78-31-07-010-011-G00

(6) Remove the protective mat, STD-585 from the fan duct walls and the blocker doors.

SUBTASK 78-31-07-010-012-G00

(7) Manually retract the thrust reverser sleeves (TASK 78-31-00-980-804-G00).

SUBTASK 78-31-07-410-006-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Close and latch the thrust reversers (TASK 78-31-00-010-802-G00).

(a) Remove the actuator safety Lock Assembly, SPL-14993, from the inboard thrust reversers only.

(b) Do not do the thrust reverser or leading edge activation.

(c) Do not close the fan cowl panels at this time.

SUBTASK 78-31-07-980-002-G00

(9) Manually translate the sleeves through an extend and retract cycle as follows:

(a) Do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

(c) Make sure that the blocker doors and drag links move smoothly.

H. Drag Link Spherical Bearing Installation Test

SUBTASK 78-31-07-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

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SUBTASK 78-31-07-710-001-G00

(2) Operate the thrust reverser a minimum of three cycles to make sure that the drag link and blocker door move correctly.

(a) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00.

(c) Make sure that the blocker doors and drag links operate correctly.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-07-000-002-G00

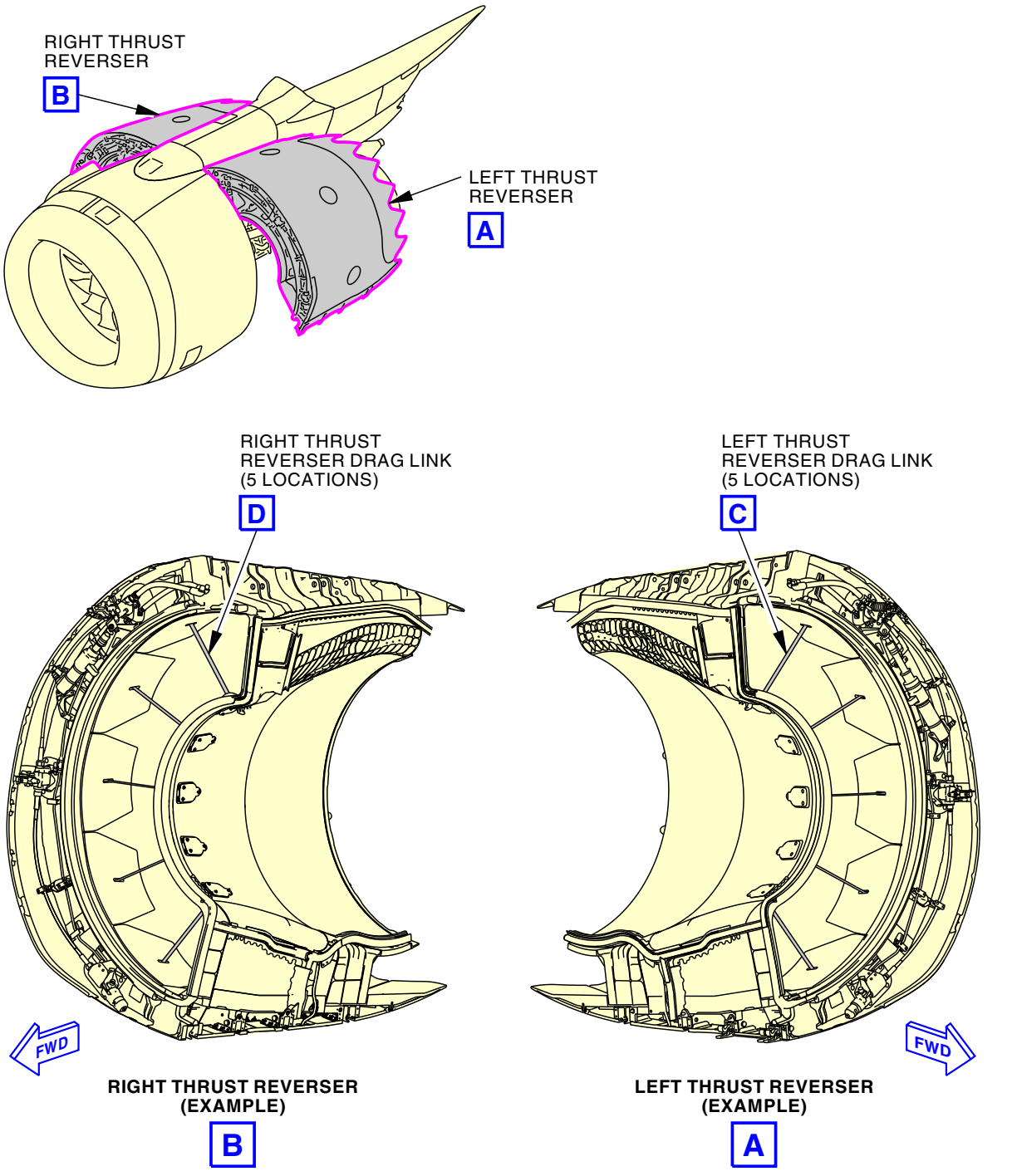
(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-07-000-003-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

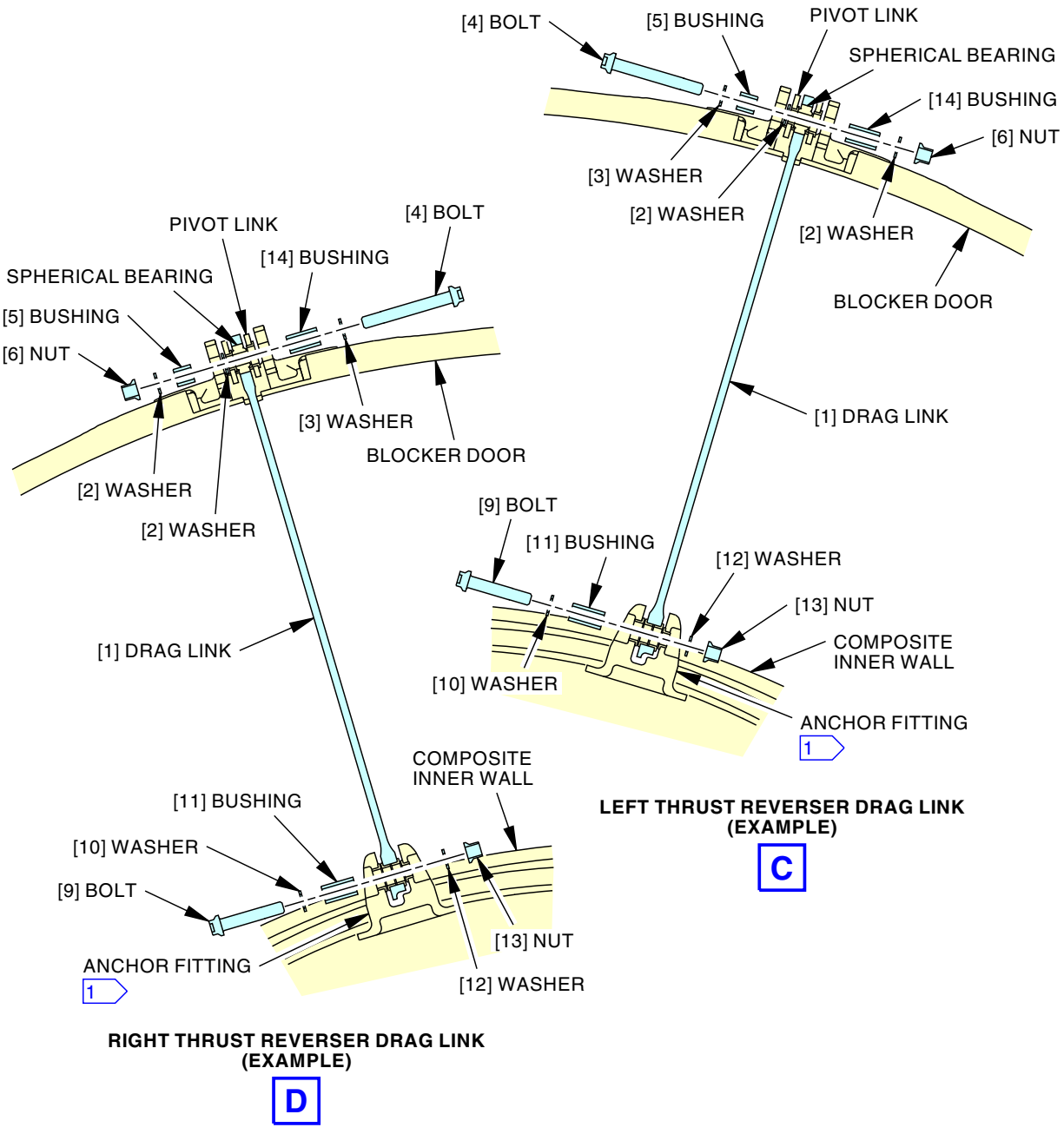
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Drag Link Spherical Bearing Installation
Figure 201/78-31-07-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

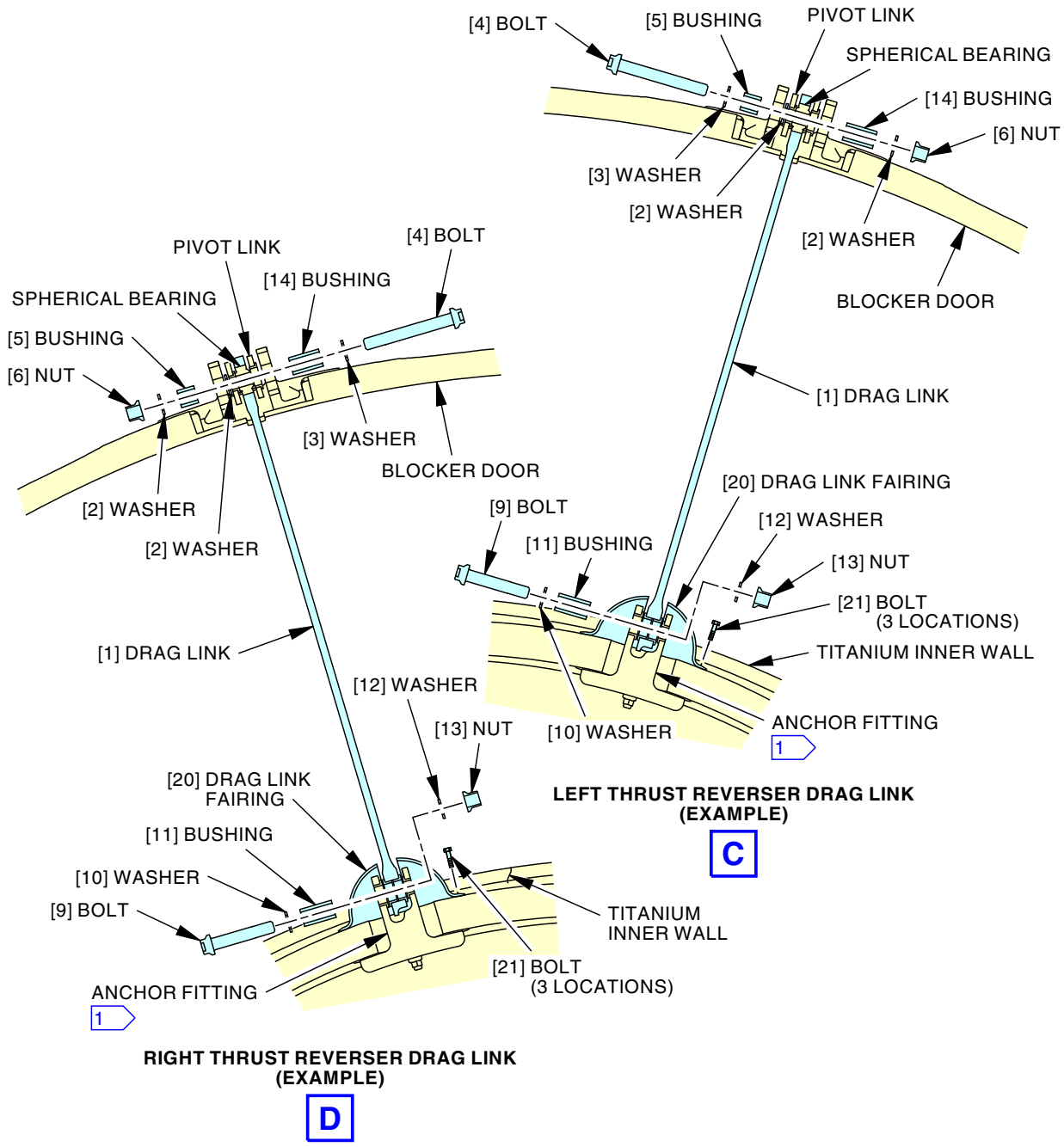


1 WRAP CLOTH AROUND THE ANCHOR FITTING TO PROTECT THE INNER WALL

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Drag Link Spherical Bearing Installation
Figure 201/78-31-07-990-801-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 WRAP CLOTH AROUND THE ANCHOR FITTING TO PROTECT THE INNER WALL

3042306 S0000809617_V1

Drag Link Spherical Bearing Installation
Figure 201/78-31-07-990-801-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BLOCKER DOOR DRAG LINKS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the blocker door drag links.

(2) The installation of the blocker door drag links.

TASK 78-31-07-000-801-G00

2. Blocker Door Drag Link Removal

(Figure 401)

A. General

(1) This task is for the removal of the blocker door drag links from the left or right thrust reverser on an engine. There are five blocker door drag links on each thrust reverser and the removal task is the same for all of the blocker door drag links.

(2) The blocker door drag links are between the blocker doors and the inner wall of the thrust reverser fan duct.

(3) For this task the blocker door drag links will be referred to as the drag links.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (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-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. 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)
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Zone	Area
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Prepare for the Removal

SUBTASK 78-31-07-010-002-G00

(1) Deactivate the leading edge flaps and slats in the retract position (TASK 27-81-00-040-801).

SUBTASK 78-31-07-980-003-G00

WARNING

DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

(a) Install the actuator safety Lock Assembly, SPL-14993, on the inboard thrust reversers only.

NOTE: The part number of the actuator safety lock is C78035-14. The part number (C78035-14) is for the set of two actuator safety locks.

SUBTASK 78-31-07-010-008-G00

CAUTION

DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN 6 INCHES. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE CAN OCCUR.

(3) Manually extend the outboard thrust reverser sleeve no more than 10 in. (254.0 mm) and inboard thrust reverser 3 in. (76.2 mm) - 6 in. (152.4 mm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

NOTE: Monitor the position of the thrust reverser sleeve as it is extends. Make sure that it does not touch the leading edge of the wing.

NOTE: The sleeve must be partially extended to release the load on the drag link. This also permits you to get to the hardware that attaches the drag link to the blocker door.

G. Blocker Door Drag Link Removal

SUBTASK 78-31-07-020-001-G00

CAUTION

MAKE SURE THAT YOU PUT PROTECTION ON THE FAN DUCT WALLS AND BLOCKER DOORS. DAMAGE CAN OCCUR IF A TOOL OR DRAG LINK HITS THE WALL OR DOORS.

(1) Do these steps to remove the drag link [1], (Figure 401):

(a) Put protective mat, STD-585 on the fan duct walls and blocker doors.

(b) Put cotton wiper, G00034, around the anchor fitting and drag link at the inner wall.

NOTE: When the drag link is disconnected from the blocker door, it can move forward or aft and fall against the inner wall. This cause damage to the inner wall composite panel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(c) Disconnect the drag link [1] at the inner wall, as follows:

1) Remove the nut [13], washer [12], bushing [11], washer [10], and bolt [9] from the anchor fitting.

2) Remove the drag link [1].

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

(d) Disconnect the drag link [1] at the inner wall, as follows:

1) Remove the three bolts [21] and the drag link fairing [20] from the inner wall.

2) Remove the nut [26], washer [25], bushing [24], washer [23], and bolt [22] from the anchor fitting.

3) Remove the drag link [1].

SIA ALL

(e) Make sure that the blocker door can rotate freely with the attached drag link [1].

(f) Rotate and set the blocker door against the outer wall of the fan duct and approximately perpendicular to its stowed position.

1) Use Vibration Damping Tape 434 tape, G02329, to hold the blocker door in this position.

(g) Disconnect the drag link [1] at the blocker door, as follows:

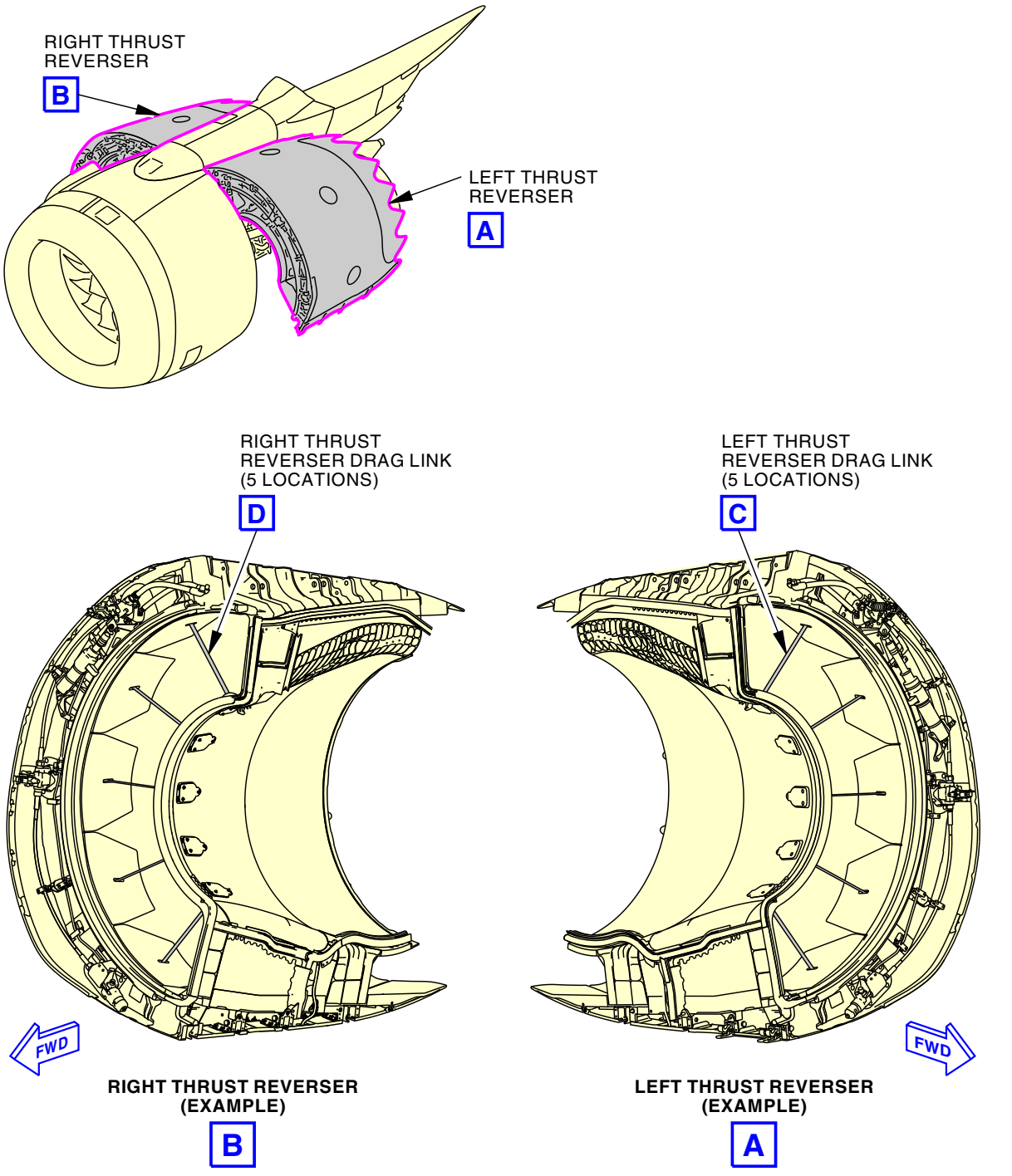
1) For the left thrust reverser, remove the nut [6], washer [2], bushing [14], washer [2], bushing [5], washer [3], and bolt [4] from the pivot link.

2) For the right thrust reverser, remove the nut [6], washer [2], bushing [5], washer [2], bushing [14], washer [3], and bolt [4] from the pivot link.

3) Put a tie strap through the spherical bearing to hold the ball in its position.

END OF TASK

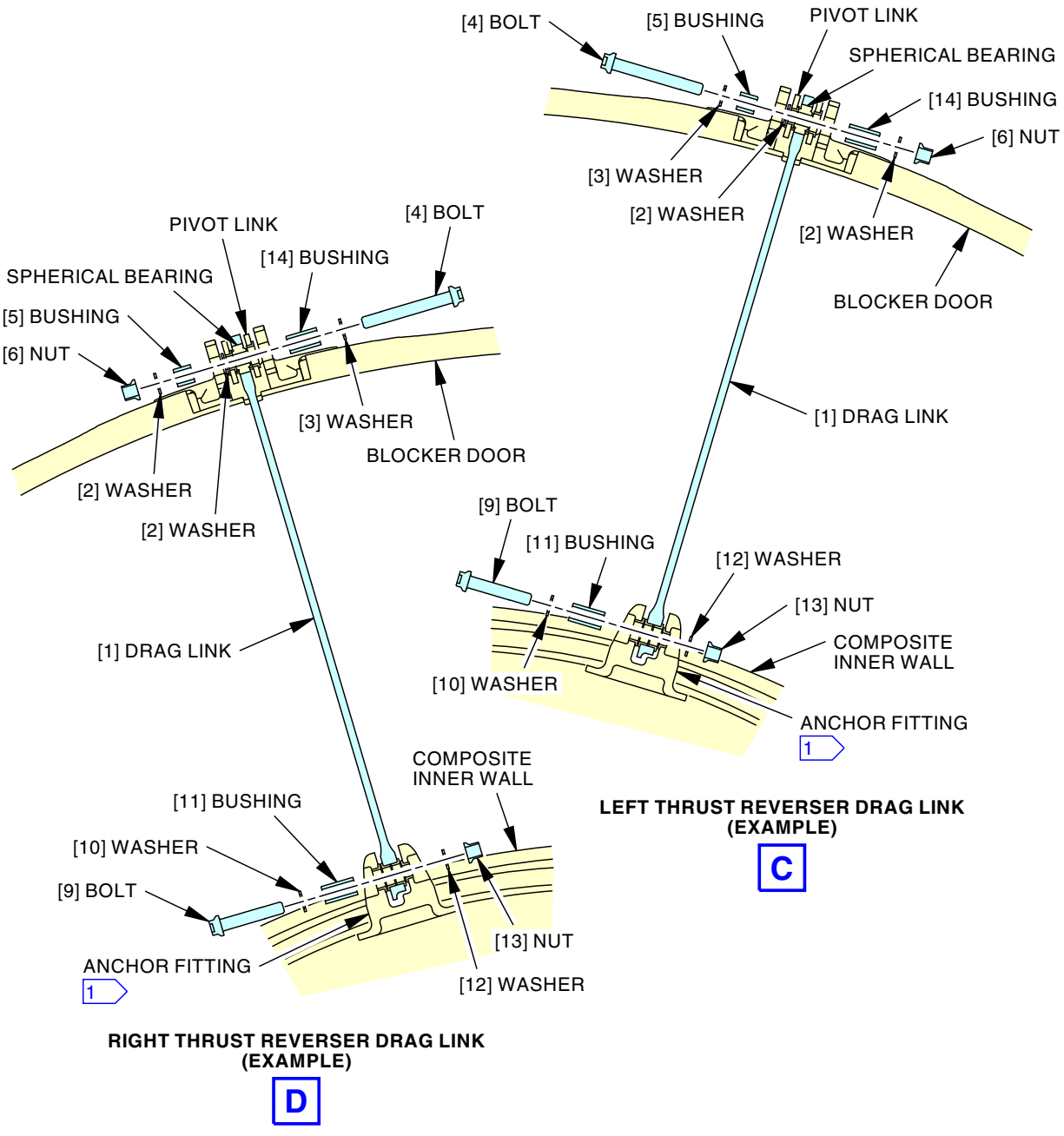
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Drag Link Installation
Figure 401/78-31-07-990-803-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

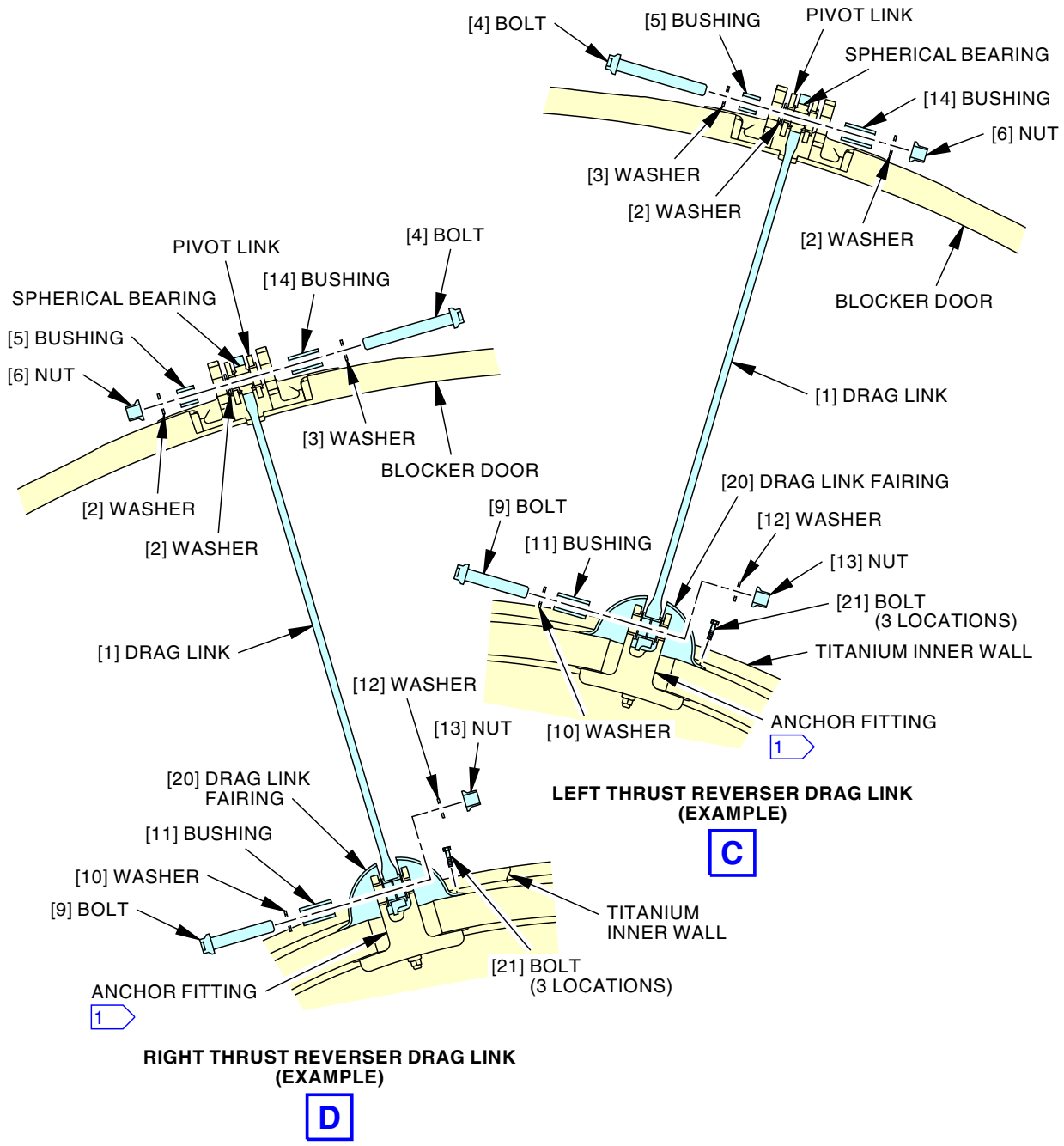


1 WRAP CLOTH AROUND THE ANCHOR FITTING TO PROTECT THE INNER WALL

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Drag Link Installation
Figure 401/78-31-07-990-803-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Drag Link Installation
Figure 401/78-31-07-990-803-G00 (Sheet 3 of 3)

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TASK 78-31-07-400-801-G00

3. Blocker Door Drag Link Installation

(Figure 401)

A. General

(1) This task is for the installation of the blocker door drag links on the left or right thrust reverser on an engine. The installation is the same for all of the drag links.

(2) For this task the blocker door drag links will be referred to as drag links.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)
78-31-00-980-806-G00	Thrust Reverser Operation - Retract (Power Procedure) (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-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. 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)
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Blocker Door Drag Link Installation

SUBTASK 78-31-07-420-002-G00

(1) Examine the bottom of the replacement drag link to find the forward edge of the drag link (Figure 401).

NOTE: There is a raised key feature on the side of the drag link that attaches to the drag link anchor fitting. The key only goes across half of the bottom of the drag link. The key moves in a slot in the anchor fitting and should prevent the drag link from being installed in the incorrect direction. The key can be missing from the drag link if key was damaged.

(a) If the key is missing, look at the contours of the leading edge and trailing edge of the drag link and the cut away in the contours near the ends of the drag link (Figure 401).

NOTE: There are flanged bushings installed in the end of the drag link that attaches to the anchor fitting. There is a spherical bearing installed in the end of the drag link that attaches to the pivot fitting in the blocker door.

SUBTASK 78-31-07-000-001-G00

CAUTION

MAKE SURE THAT YOU PUT PROTECTION ON THE FAN DUCT WALLS AND BLOCKER DOORS. DAMAGE CAN OCCUR IF A TOOL OR DRAG LINK HITS THE WALL OR DOORS.

(2) Install the drag link [1], as follows:

(a) Make sure that there is protective mat, STD-585 on the fan duct walls and the blocker doors.

(b) Connect the drag link [1] at the blocker door, as follows:

1) Remove the Vibration Damping Tape 434 tape, G02329, from the blocker door.

2) Remove the tie strap, if you installed it through the spherical bearing to hold the ball in its position.

3) Align the drag link and pivot link bolt holes.

4) For the left thrust reverser, install the bolt [4], washer [3], bushing [5], washer [2], bushing [14], washer [2], and nut [6].

NOTE: The bolt [4] must be installed with the bolt head on the top position.

a) Tighten the nut [6] to 388 in-lb (44 N·m) - 412.0 in-lb (46.5 N·m).

5) For the right thrust reverser, install the bolt [4], washer [3], bushing [14], washer [2], bushing [5], washer [2], and nut [6].

NOTE: The bolt [4] must be installed with the bolt head in the top position.

a) Tighten the nut [6] to 388 in-lb (44 N·m) - 412.0 in-lb (46.5 N·m).

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(c) Connect the drag link [1] at the inner wall, as follows:

1) Align the drag link [1] and anchor fitting bolt holes.

2) Install the bolt [9], washer [10], bushing [11], washer [12], and nut [13] to the anchor fitting.

NOTE: The bushing [11] only goes in on one side of the anchor fitting.

a) Make sure that the bolt [9] head is on the same side as the bushing [11].

b) Tighten the nut [13] to 388 in-lb (44 N·m) - 412.0 in-lb (46.5 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

(d) Connect the drag link [1] at the inner wall, as follows:

1) Align the drag link [1] and anchor fitting bolt holes.

2) Install the bolt [9], washer [10], bushing [11], washer [12], and nut [13] to the anchor fitting.

NOTE: The bushing [11] only goes in on one side of the anchor fitting.

a) Make sure that the bolt [9] head is on the same side as the bushing [11].

b) Tighten the nut [13] to 388 in-lb (44 N·m) - 412.0 in-lb (46.5 N·m).

3) Install the drag link fairing [20] and the three bolts [21] to the inner wall.

SIA ALL

(e) Remove the cotton wiper, G00034, from the anchor fitting at the inner wall and the protective mat, STD-585 from the fan duct walls and blocker doors.

(f) Manually retract the thrust reverser sleeves (TASK 78-31-00-980-804-G00).

SUBTASK 78-31-07-410-003-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Close and latch the thrust reversers (TASK 78-31-00-010-802-G00).

(a) Remove the actuator safety Lock Assembly, SPL-14993, from the inboard thrust reversers only.

(b) Do not do the thrust reverser or leading edge activation.

(c) Do not close the fan cowl panels at this time.

SUBTASK 78-31-07-980-004-G00

(4) Manually translate the sleeve through an extend and retract cycle.

(a) Do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

(c) Make sure that the blocker doors and drag links move smoothly.

G. Blocker Door Drag Link Installation Test

SUBTASK 78-31-07-440-003-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-07-710-002-G00

(2) Operate the thrust reverser a minimum of three cycles to make sure that the drag link and blocker door move correctly.

(a) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00.

(b) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00.

(c) Make sure that the blocker doors and drag links operate correctly.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-07-410-004-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-07-440-004-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER OPENING ACTUATOR - MAINTENANCE PRACTICES

1. General

A. This procedure has one task:

(1) To fill and bleed the thrust reverser opening actuator.

TASK 78-31-08-870-801-G00

2. Fill and Bleed Procedure

A. General

(1) This task gives the instructions how to fill and bleed the thrust reverser opening actuator with oil.

(2) This task is necessary when the opening actuator is replaced or when the opening actuator retracts quickly more than 0.5 in. (1.3 cm). The quick retraction indicates that there is air or a vacuum in the opening actuator. It can also indicate damage to the actuator.

B. References

Reference	Title
78-31-08-000-801-G00	Thrust Reverser Opening Actuator Removal (P/B 401)
78-31-08-400-801-G00	Thrust Reverser Opening Actuator 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-2417	Pump - Hand, Cowl Opening Part #: A78019-29 Supplier: 81205 Part #: B54001-53 Supplier: 81205 Part #: C78005-60 Supplier: 81205 Opt Part #: A78019-27 Supplier: 81205 Opt Part #: C78005-26 Supplier: 81205 Opt Part #: C78005-53 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3

E. Fill and Bleed Procedure

SUBTASK 78-31-08-020-001-G00

(1) Do this task: Thrust Reverser Opening Actuator Removal, TASK 78-31-08-000-801-G00.

SUBTASK 78-31-08-610-001-G00

(2) Prepare the cowl opening hand pump, SPL-2417:

NOTE: If available, it is recommended to use C78005-60. This will help to prevent damage to the thrust reverser equipment.

(a) Make sure that the hand pump is full of oil, D00071, or oil, D00068.

(b) Close the return valve on the hand pump.

(c) Connect the hand pump hose to the inlet fitting on the opening actuator.

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SUBTASK 78-31-08-870-001-G00

(3) Do these steps to fill and bleed the opening actuator:

(a) Hold the opening actuator vertically so that the inlet fitting is at the top.

(b) Operate the hand pump to fully extend the opening actuator until there is large increase in resistance and operate the hand pump handle one more time through its full travel.

(c) Open the return valve on the pump.

(d) Move the locking collar by pushing towards the rod end bearing to unlock the opening actuator.

(e) Keep the opening actuator vertically with inlet fitting at the top and use hand to push the piston rod in to the fully retracted position.

(f) Immediately close the return valve on the hand pump.

(g) Disconnect the hand pump hose from the opening actuator.

SUBTASK 78-31-08-720-001-G00

(4) Do these steps to make sure that there is no air or vacuum in the opening actuator:

(a) Slowly pull the actuator piston rod with your hand until the actuator lock collar engages.

(b) After 60 seconds, move the actuator lock collar to disengage the lock and do these steps:

1) Push the actuator piston rod back to the fully retracted position.

2) Make sure that the actuator piston rod moves smoothly to the fully retracted position.

NOTE: Usually the actuator piston rod will initially move quickly a small amount (less than 0.5 in. (1.3 cm)).

3) If the actuator piston rod quickly retracts more than 0.5 in. (1.3 cm), repeat the fill and bleed procedure.

4) If there is still too much movement, replace the opening actuator.

SUBTASK 78-31-08-420-001-G00

(5) Do this task: Thrust Reverser Opening Actuator Installation, TASK 78-31-08-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER OPENING ACTUATOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the thrust reverser opening actuator

(2) An installation of the thrust reverser opening actuator.

TASK 78-31-08-000-801-G00

2. Thrust Reverser Opening Actuator Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the thrust reverser opening actuator from the left or right thrust reverser on an engine.

(2) In this task, the thrust reverser opening actuator will be referred to as the Manual Door Opening System (MDOS) actuator.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (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
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Removal

SUBTASK 78-31-08-040-001-G00

CAUTION

RETRACT THE LEADING EDGE SLATS. DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS BEFORE YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE LEADING EDGE SLATS AND THRUST REVERSERS CAN OCCUR.

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 78-31-08-040-002-G00

(2) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

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SUBTASK 78-31-08-040-003-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-08-010-001-G00

(4) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 78-31-08-010-002-G00

(5) Remove the dust cover [13], do these steps:

(a) Remove the MS20995C32 lockwire, G01048, on the bolt [14].

(b) Remove the bolt [14] and dust cover washer [15] on the actuator body.

(c) Remove the dust cover [13] from the inlet fitting [16].

F. Opening Actuator Removal

SUBTASK 78-31-08-020-002-G00

(1) Remove the thrust reverser MDOS actuator [1], do these steps:

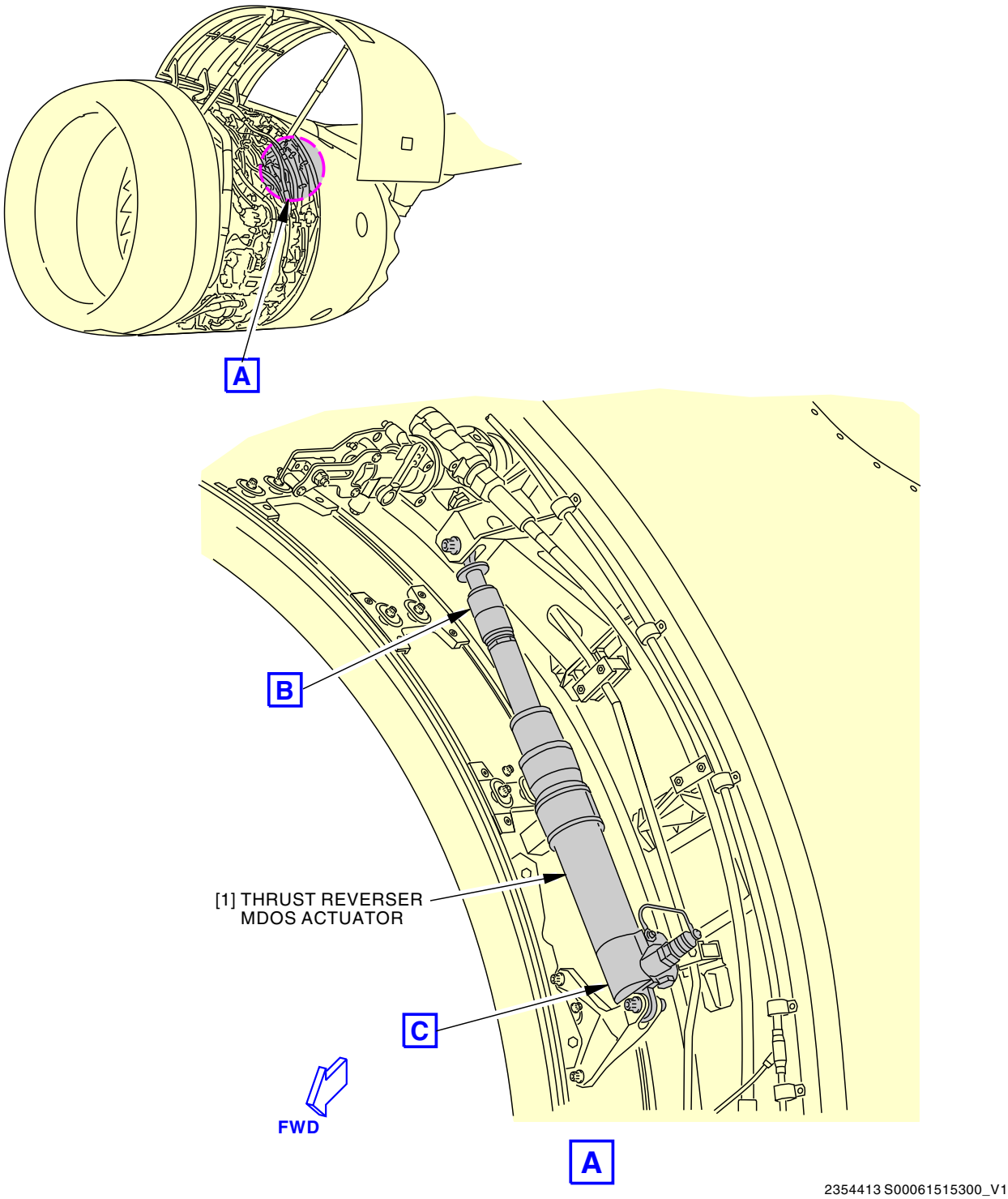
(a) Remove the bolt [7], washer [8], bushing [9], aligment washer [12], washer [10], and nut [11], from the fitting on the fan case.

(b) Remove the bolt [2], washer [3], bushing [4], barrel nut [5], and barrel retainer [6] from the fitting on the thrust reverser torque box.

(c) Remove the thrust reverser MDOS actuator [1].

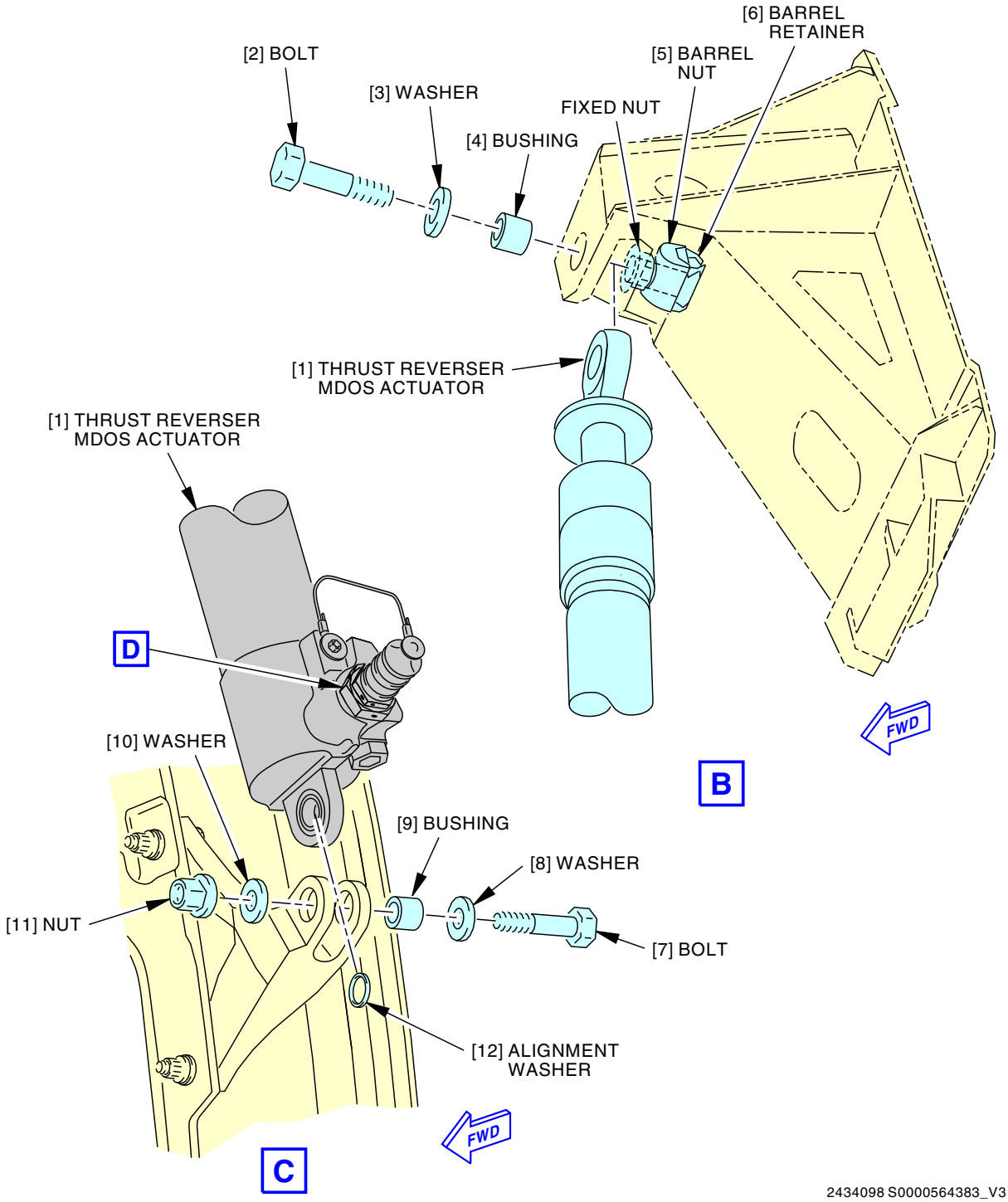
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



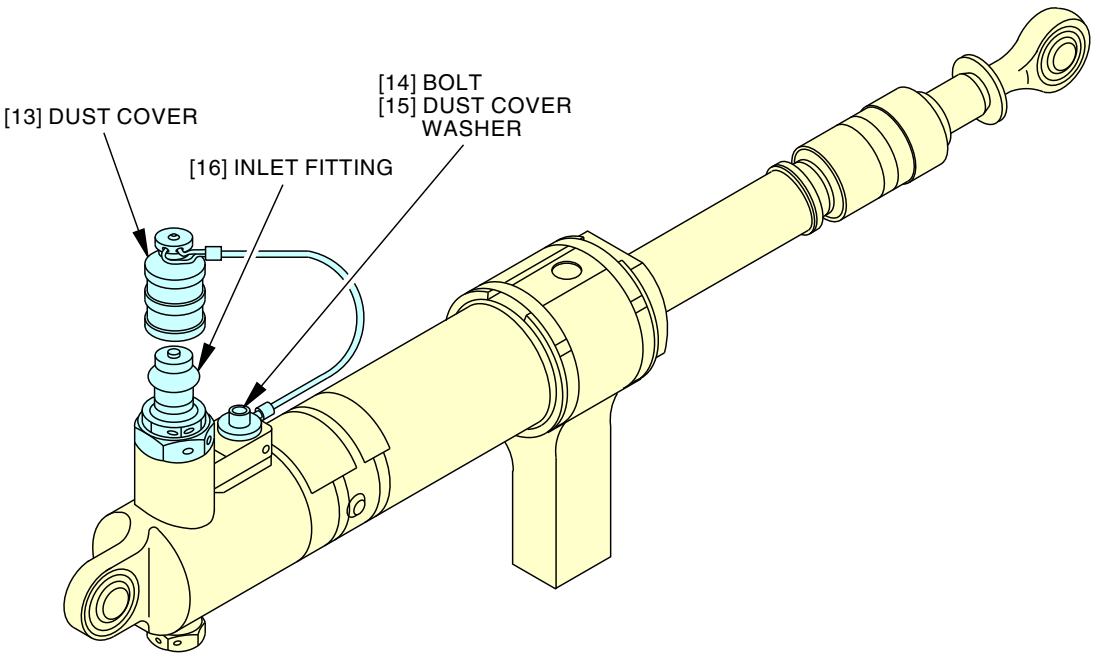
Thrust Reverser MDOS Actuator Installation
Figure 401/78-31-08-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser MDOS Actuator Installation
Figure 401/78-31-08-990-801-G00 (Sheet 2 of 3)

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D

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Thrust Reverser MDOS Actuator Installation
Figure 401/78-31-08-990-801-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-08-400-801-G00

3. Thrust Reverser Opening Actuator Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the thrust reverser opening actuator to the left or right thrust reverser on an engine.

(2) The opening actuators for the inboard and outboard thrust reversers are different part numbers. Make sure that you install the correct actuator for the position.

B. References

Reference	Title
20-50-11-910-801	Standard Torque Values (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-08-870-801-G00	Fill and Bleed Procedure (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-2417	Pump - Hand, Cowl Opening Part #: A78019-29 Supplier: 81205 Part #: B54001-53 Supplier: 81205 Part #: C78005-60 Supplier: 81205 Opt Part #: A78019-27 Supplier: 81205 Opt Part #: C78005-26 Supplier: 81205 Opt Part #: C78005-53 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3
D00633	Grease - Aircraft General Purpose	BMS3-33
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

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F. Opening Actuator Installation

SUBTASK 78-31-08-870-002-G00

WARNING

DO THIS TASK TO MAKE SURE THAT THERE IS MINIMUM AIR OR A VACUUM IN THE OPENING ACTUATOR. AIR OR A VACUUM IN THE OPENING ACTUATOR COULD CAUSE THE THRUST REVERSER TO CLOSE SUDDENLY WHEN YOU OPEN OR CLOSE THE THRUST REVERSER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(1) If you will replace the thrust reverser MDOS actuator [1], fill and bleed the replacement thrust reverser MDOS actuator [1] before you install it (TASK 78-31-08-870-801-G00).

SUBTASK 78-31-08-870-003-G00

(2) Install the dust cover [13], do these steps:

(a) Install the dust cover [13] on the inlet fitting [16].

(b) Install the dust cover washer [15] onto the bolt [14].

(c) Install the bolt [14] through the dust cover [13] cable loop end and into the actuator body.

(d) Tighten the bolt [14] to 30 in-lb (3 N·m) - 40 in-lb (5 N·m).

(e) Install the MS20995C32 lockwire, G01048, on the bolt [14].

SUBTASK 78-31-08-420-002-G00

(3) Install the thrust reverser MDOS actuator [1] as follows:

(a) Apply grease, D00633, to the shank of the bolt [2] and bolt [7].

NOTE: Do not get grease on the threads of the bolts.

(b) Align the actuator rod end with the attach fitting on the thrust reverser torque box.

1) Install the bolt [2], washer [3], bushing [4], barrel nut [5], and barrel retainer [6].

a) Do a check of the barrel nut [5] for the minimum breakaway torque (TASK 20-50-11-910-801).

<1> If it is necessary, replace the barrel nut [5] and barrel retainer [6].

b) Tighten the bolt [2] to 340.0 in-lb (38.4 N·m) - 361.0 in-lb (40.8 N·m).

(c) Align the thrust reverser MDOS actuator [1] with the attach fitting on the fan case.

1) Install the bolt [7], washer [8], bushing [9], aligment washer [12], washer [10], and nut [11].

a) Make sure that you install the aligment washer [12] with the teflon surface against the actuator spherical bearing.

NOTE: The alignment washer has a rubber and teflon layer, the thinner layer is teflon with a smoother surface.

b) Tighten the nut [11] to 290.0 in-lb (32.8 N·m) - 310.0 in-lb (35.0 N·m).

G. Opening Actuator Installation Test

SUBTASK 78-31-08-710-001-G00

WARNING

DO NOT OPEN OR CLOSE THE THRUST REVERSER IN HIGH WINDS OR SUDDEN-STRONG-WINDS CONDITIONS. MAKE SURE THAT THE CONSTANT WINDS OR SUDDEN WINDS ARE LESS THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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(WARNING PRECEDES)

WARNING

DO NOT STAY BETWEEN THE THRUST REVERSER AND THE ENGINE WHEN YOU DO THE INSTALLATION TEST FOR THE OPENING ACTUATOR. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR IF THE THRUST REVERSER SUDDENLY CLOSES.

(1) Test the thrust reverser MDOS actuator [1], do these steps:

NOTE: You will open the thrust reverser to the half open position and then lower it. You will open it again to the full open position and the opening actuator locks, and then lower the thrust reverser.

(a) Make sure that the cowl opening hand pump, SPL-2417, is full of oil, D00071, or oil, D00068.

NOTE: If available, it is recommended to use C78005-60. This will help to prevent damage to the thrust reverser equipment.

(b) Remove the dust cap from the inlet fitting on the thrust reverser MDOS actuator [1].

(c) Connect the hand pump to the inlet fitting.

SIA 006-999; SIA 001-005 POST SB 737-78-1095

1) Route the hand pump hose at the MDOS-GSE hose support.

NOTE: The MDOS-GSE hose support is near the top of the oil tank and AGB.

SIA ALL

(d) Cycle the thrust reverser to the half open position as follows:

1) With the return valve on the hand pump closed, operate the hand pump to extend the thrust reverser MDOS actuator [1] and lift the thrust reverser to the half open position.

2) Open the hand pump return valve and let the thrust reverser lower.

(e) Cycle the thrust reverser to the fully open position as follows:

1) With the return valve on the hand pump closed, operate the hand pump to extend the thrust reverser MDOS actuator [1] and lift the thrust reverser to the fully open position.

NOTE: Listen for the click sound of the lock collar.

2) These are the indications that the thrust reverser is in the fully open position and thrust reverser MDOS actuator [1] is locked:

a) Make sure that the word LOCKED shows on the bottom of the extended piston.

b) Make sure that you can see the red band on the actuator rod.

3) Open the return valve on the hand pump to let the weight of the thrust reverser rest on the locked thrust reverser MDOS actuator [1].

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WARNING

MAKE SURE THAT THE RETURN VALVE ON THE HAND PUMP IS CLOSED WHEN THE THRUST REVERSER IS HELD BY THE LOCKED OPENING ACTUATOR. IF THE RETURN VALVE IS LEFT OPEN, THE ENGINE OIL CAN CONTINUE TO DRAIN OUT OF THE ACTUATOR INTO THE HAND PUMP. DECREASED ENGINE OIL CAN PERMIT THE THRUST REVERSER TO CLOSE QUICKLY DURING SUBSEQUENT OPERATIONS TO CLOSE THE THRUST REVERSER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

4) After the thrust reverser rests on the thrust reverser MDOS actuator [1], close the return valve on the hand pump.

WARNING

ALWAYS EXTEND THE OPENING ACTUATOR TO LIFT THE WEIGHT OF THE THRUST REVERSER OFF THE OPENING ACTUATOR LOCK. DO NOT OPEN THE RETURN VALVE ON THE HAND PUMP UNTIL YOU DISENGAGE THE ACTUATOR LOCK COLLAR. THIS WILL PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

5) With the return valve closed on the hand pump, operate the hand pump to release the load on the thrust reverser MDOS actuator [1].

6) Push up on the actuator lock collar to disengage the lock.

7) Open the hand pump return valve and let the thrust reverser lower.

8) Make sure that the thrust reverser closes fully.

9) Disconnect the hand pump from the thrust reverser MDOS actuator [1].

10) Install dust caps on the inlet fitting on the thrust reverser MDOS actuator [1] and hand pump hose.

11) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-08-040-004-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-08-040-005-G00

(2) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-08-040-006-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

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KRUEGER FLAP DEFLECTOR AND PLUG - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Krueger flap deflector removal

(2) Krueger flap deflector installation.

TASK 78-31-09-010-801-G00

2. Krueger Flap Deflector Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the Krueger flap deflector from the translating sleeve on the inboard thrust reverser on an engine.

(2) Make sure that the Krueger flap deflectors are installed only on the inboard translating sleeve.

(3) It is possible to install the Krueger flap deflector on the left or right translating sleeve.

(4) On the translating sleeve without the Krueger flap deflectors, plugs are installed in the mounting holes.

B. References

Reference	Title
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38

D. Prepare for the Removal

SUBTASK 78-31-09-010-001-G00

WARNING OBEY ALL OF THE WARNINGS AND CAUTIONS IN THE REFERENCED PROCEDURE. IF YOU DO NOT OBEY THE WARNINGS AND CAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

E. Krueger Flap Deflector Removal

SUBTASK 78-31-09-020-001-G00

(1) Do these steps to remove the applicable Krueger flap deflector [1]:

NOTE: Be sure not to drop hardware, bolts, washers or nuts into the thrust reverser structure or through the cascade vanes.

You get access to these bolts from the inside wall of the outer cowl.

(a) Remove the 12 bolts [2] that attach the upper Krueger flap deflector [1] to the self-locking nuts on the outer cowl.

(b) Remove the eight bolts [3] that attach the lower Krueger flap deflector [1] to the self-locking nuts on the outer cowl.

(c) Remove the Krueger flap deflector [1].

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SUBTASK 78-31-09-020-004-G00

(2) If the Krueger flap deflector [1] is not to be replaced on this translating sleeve, do the steps that follow:

(a) Make sure that the surfaces of the translating sleeve and the Krueger flap deflector [1] holes are clean.

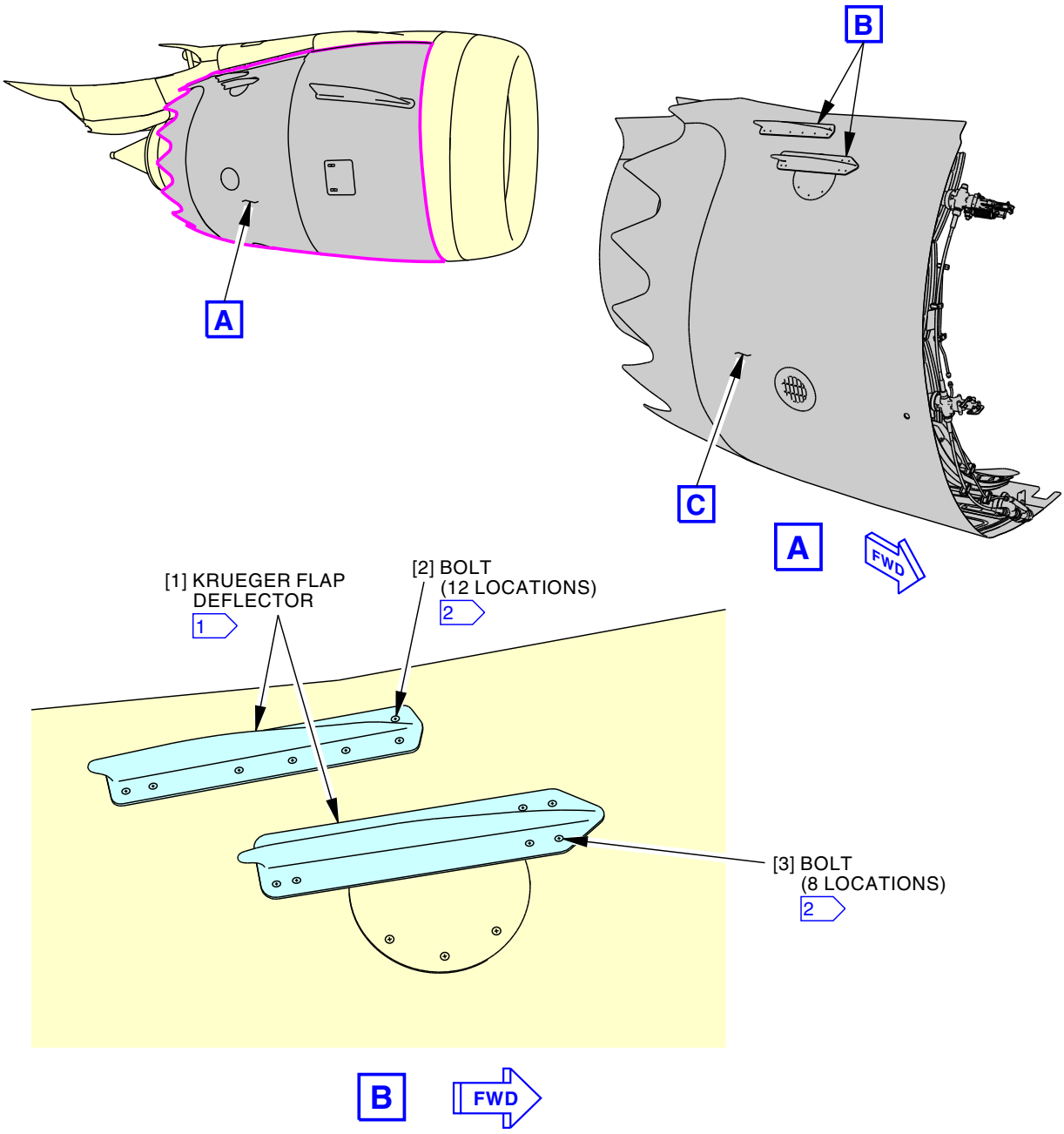
(b) Install the plugs [4] and plugs [5] into the open holes on the skin.

(c) Tighten the plug [4] and plug [5] to 60 ±5 in-lb (7 ±1 N·m).

(d) Apply the corrosion inhibiting material, G50136, to the plug fasteners.

——— END OF TASK ———

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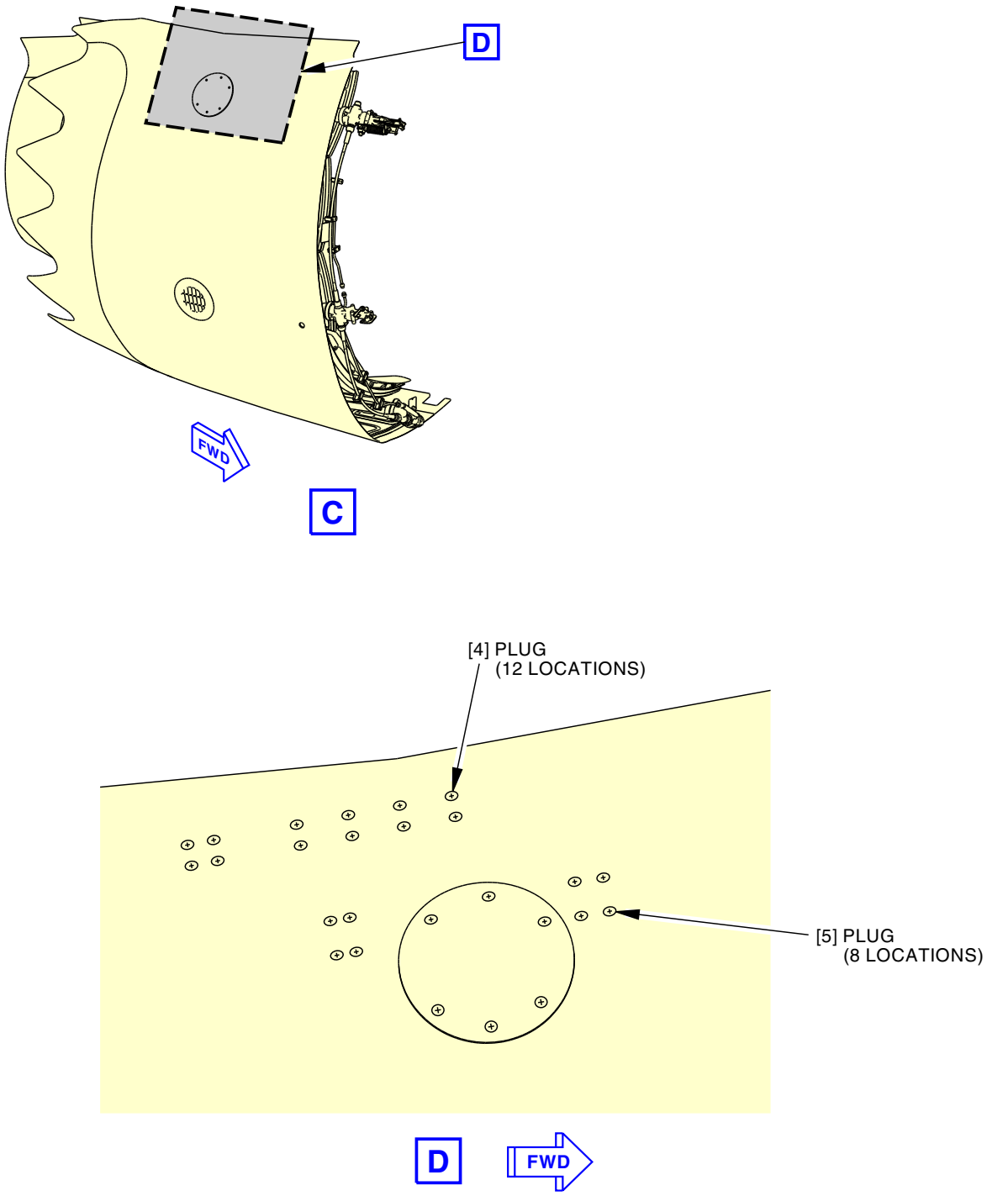
NOTE:

1. THE KRUEGER FLAP DEFLECTORS ARE INSTALLED ON THE INBOARD SIDE OF THE THRUST REVERSER. THE KRUEGER FLAP DEFLECTORS ARE INTERCHANGEABLE ON THE LEFT OR RIGHT TRANSLATING SLEEVE.
2. DESIGNATED BOND FASTENER RESISTANCE CHECK.

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Krueger Flap Deflector Installation
Figure 401/78-31-09-990-801-G00 (Sheet 1 of 2)

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Krueger Flap Deflector Installation
Figure 401/78-31-09-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-09-420-801-G00

3. Krueger Flap Deflector Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the Krueger flap deflector to the translating sleeve on the inboard thrust reverser on an engine.

(2) Make sure that the Krueger flap deflectors are installed only on the inboard translating sleeve.

(3) It is possible to install the Krueger flap deflector on the left or right translating sleeve.

(4) On the translating sleeve without the Krueger flap deflectors, plugs are installed in the mounting holes.

B. References

Reference	Title
51-22-00-160-801	Prepare For Sealing (P/B 201)
51-22-00-390-802	Removable Faying (Mated) Surface Seal Application (P/B 201)
78-31-00-980-802-G00	Thrust Reverser Operation - Retract (Selection) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38

D. Prepare for the Installation

SUBTASK 78-31-09-010-002-G00

(1) If the translating sleeve had the plug fasteners installed, remove the plug fasteners as follows:

NOTE: Be sure not to drop hardware, bolts, washers or nuts into the thrust reverser structure or through the cascade vanes.

(a) Remove the plugs [4] and plugs [5].

SUBTASK 78-31-09-390-001-G00

(2) Do this task: Prepare For Sealing, TASK 51-22-00-160-801.

(a) Make sure that the mating surfaces of the outer cowl and the Krueger flap deflector [1] are clean.

E. Krueger Flap Deflector Installation

SUBTASK 78-31-09-420-003-G00

(1) Do these steps to install the applicable Krueger flap deflector [1]:

NOTE: Be sure not to drop hardware, bolts, washers or nuts into the thrust reverser structure or through the cascade vanes.

(a) Put the Krueger flap deflector [1] in the correct position on the outer cowl.

(b) Put Scotch Flatback Masking Tape 250, G00270 on the outer cowl around the periphery of the Krueger flap deflector [1].

(c) Remove the Krueger flap deflector [1].

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(d) Apply faying surface seal with corrosion inhibiting material, G50136 to the outer cowl surface in the area where the Krueger flap deflector [1] will be installed (TASK 51-22-00-390-802).

(e) Remove the Scotch Flatback Masking Tape 250, G00270.

(f) Apply sealant, A00436 to the surfaces of the Krueger flap deflector [1] that will be against the outer cowl.

(g) Put the Krueger flap deflector [1] in the correct position on the outer cowl.

1) Apply pressure to the Krueger flap deflector [1] until the sealant pushes out around the deflector.

a) Make sure that the sealant pushes out around the entire periphery of the Krueger flap deflector [1].

(h) Apply the corrosion inhibiting material, G50136 to the shank and the threads of the bolts.

(i) Install the 12 bolts [2] that attach the upper Krueger flap deflector [1] to the self-locking nuts on the outer cowl.

1) Tighten the bolts [2] to 30 in-lb (3 N·m) - 50 in-lb (6 N·m).

(j) Install the eight bolts [3] that attach the lower Krueger flap deflector [1] to the self-locking nuts on the outer cowl.

1) Tighten the bolts [3] to 30 in-lb (3 N·m) - 50 in-lb (6 N·m).

(k) Do the designated bond fastener resistance check.

NOTE: The resistance between the fastener head and the Krueger flap deflector [1] should not be more than 5.0 milliohm (0.005 ohm).

F. Put the Airplane Back to its Usual Condition

SUBTASK 78-31-09-410-001-G00

WARNING OBEY ALL OF THE WARNINGS AND CAUTIONS IN THE REFERENCED PROCEDURE. IF YOU DO NOT OBEY THE WARNINGS AND CAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Thrust Reverser Operation - Retract (Selection), TASK 78-31-00-980-802-G00.

END OF TASK

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KRUEGER FLAP DEFLECTOR - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Krueger flap deflector inspection.

TASK 78-31-09-200-801-G00

2. Krueger Flap Deflector Inspection

A. General

(1) This task provides the instructions on how to do a visual inspection of the Krueger flap deflector that is on the inboard thrust reverser sleeve at the top of the sleeve.

(2) If the damage is more than the specified limits, the Krueger flap deflector must be replaced.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-09-010-801-G00	Krueger Flap Deflector Removal (P/B 401)
78-31-09-420-801-G00	Krueger Flap Deflector Installation (P/B 401)

C. Prepare for the Inspection

SUBTASK 78-31-09-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

D. Krueger Flap Deflector Inspection

SUBTASK 78-31-09-210-001-G00

(1) Do a check of the Krueger flap deflector for obvious damage:

(a) Scratches, gouges and worn areas are permitted if the depth of the damage is not more than 0.050 in. (1.27 mm).

(b) If the depth of the damage is more than 0.050 in. (1.27 mm), replace the Krueger flap deflector.

These are the tasks:

- Krueger Flap Deflector Removal, TASK 78-31-09-010-801-G00
- Krueger Flap Deflector Installation, TASK 78-31-09-420-801-G00.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-09-410-002-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

END OF TASK

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RUBSTRIP - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Rubstrip removal

(2) Rubstrip installation.

TASK 78-31-10-000-801-G00

2. Rubstrip Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the rubstrips from the torque box on the left or right thrust reverser on an engine.

(2) The forward rubstrips interface with the fan cowl panel and the aft rubstrips interface with the thrust reverser translating sleeve.

(3) For this procedure, the rubstrips and shims will be referred to as follows:

Table 401/78-31-10-993-801-G00

RUBSTRIP NUMBER	INTERFACES WITH	REFERRED TO AS
1 1A	Fan Cowl Panel	Forward-Upper Rubstrip Forward-Upper Shim
2 2A	Fan Cowl Panel	Forward-Mid Rubstrip Forward-Mid Shim
3 3A	Fan Cowl Panel	Forward-Lower Rubstrip Forward-Lower Shim
4 4A	Fan Cowl Panel	Forward-Bottom Rubstrip Forward-Bottom Shim
5 5A	Fan Cowl Panel	Forward-Top Rubstrip Forward-Top Shim
6 6A	Fan Cowl Panel	Forward-Bottom Beam Rubstrip Forward-Bottom Beam Shim
7 7A	Translating Sleeve	Aft-Upper Rubstrip Aft-Upper Shim
8 8A	Translating Sleeve	Aft-Upper-Mid Rubstrip Aft-Upper-Mid Shim
9 9A	Translating Sleeve	Aft-Mid Rubstrip Aft-Mid Shim
10 10A	Translating Sleeve	Aft-Lower-Mid Rubstrip Aft-Lower-Mid Shim
11 11A	Translating Sleeve	Aft-Upper-Lower Rubstrip Aft-Upper-Lower Shim

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Table 401/78-31-10-993-801-G00 (Continued)

RUBSTRIP NUMBER	INTERFACES WITH	REFERRED TO AS
12 12A	Translating Sleeve	Aft-Lower Rubstrip Aft-Lower Shim
13 13A	Translating Sleeve	Aft-Bottom Rubstrip Aft-Bottom Shim
14 14A	Translating Sleeve	Aft Guide Block Aft Guide Shim

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)

C. Prepare the Removal

SUBTASK 78-31-10-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-31-10-010-001-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 78-31-10-840-001-G00

(3) Manually extend the thrust reverser sleeve approximately 4 in. (10 cm) to expose the aft rubstrips, do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

D. Forward Rubstrip Removal

SUBTASK 78-31-10-020-022-G00

(1) For all of the forward rubstrips, make sure that you keep the shims for the subsequent installation.

NOTE: If the original shim is used with the replacement rubstrip, there will be less adjustment to get the necessary rubstrip height dimensions.

SUBTASK 78-31-10-020-023-G00

(2) To remove the forward-top rubstrip [5], do these steps (View C):

(a) Remove all of the sealant that bonds the forward-top rubstrip [5] to the hinge beam.

(b) Remove the three rivets [15].

NOTE: Use the standard overhaul practices to remove the rivets.

(c) Remove the forward-top rubstrip [5] and forward-top shim [5A].

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1) Keep the forward-top shim [5A] for the subsequent installation.

SUBTASK 78-31-10-020-024-G00

(3) To remove the forward-upper rubstrip [1], do these steps (View C):

(a) Remove the four bolts [16], washers [17], and nuts [18] from the four upper locations.

(b) Remove the remaining 14 bolts [19], washers [17], and nuts [18].

(c) Remove the forward-upper rubstrip [1] and forward-upper shim [1A].

1) Keep the forward-upper shim [1A] for the subsequent installation.

SUBTASK 78-31-10-020-025-G00

(4) To remove the forward-mid rubstrip [2], do these steps (View D):

(a) Remove the 21 bolts [19], washers [17], and nuts [18].

(b) Remove the two bolts [20], washers [17], and nuts [18].

(c) Remove the forward-mid rubstrip [2] and forward-mid shim [2A].

1) Keep the forward-mid shim [2A] for the subsequent installation.

SUBTASK 78-31-10-020-026-G00

(5) To remove the forward-lower rubstrip [3], do these steps (View E):

(a) Remove the 18 bolts [19], washers [17], and nuts [18].

(b) Remove the two bolts [20], washers [17], and nuts [18].

(c) Remove the forward-lower rubstrip [3] and forward-lower shim [3A].

1) Keep the forward-lower shim [3A] for the subsequent installation.

SUBTASK 78-31-10-020-027-G00

(6) To remove the forward-bottom rubstrip [4], do these steps (View F):

(a) Remove the 11 bolts [19], washers [17], and nuts [18].

(b) Remove the forward-bottom rubstrip [4] and forward-bottom shim [4A].

1) Keep the forward-bottom shim [4A] for the subsequent installation.

SUBTASK 78-31-10-020-028-G00

(7) To remove the forward-bottom beam rubstrip [6], do these steps (View F):

(a) Remove all of the sealant that bonds the forward-bottom beam rubstrip [6] and the aft-bottom rubstrip [13] to the latch beam.

(b) Remove the eight bolts [16], washers [17], and nuts [18] from the eight upper locations.

(c) Remove the remaining four bolts [19], washers [17], and nuts [18].

(d) Remove the forward-bottom beam rubstrip [6] and forward-bottom beam shim [6A].

1) Keep the forward-bottom beam shim [6A] for the subsequent installation.

E. Aft Rubstrip Removal

SUBTASK 78-31-10-020-007-G00

(1) For all of the aft rubstrips, make sure that you keep the shims for the subsequent installation.

NOTE: If the original shim is used with the replacement rubstrip, there will be less adjustment to get the necessary rubstrip height dimensions.

SUBTASK 78-31-10-020-008-G00

(2) To remove the aft-upper rubstrip [7], do these steps (View C):

(a) Remove the nine bolts [21], washers [22], and nuts [23].

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(b) Remove the aft-upper rubstrip [7] and aft-upper shim [7A].

1) Keep the aft-upper shim [7A] for the subsequent installation.

SUBTASK 78-31-10-020-009-G00

(3) To remove the aft-upper-mid rubstrip [8], do these steps (View C):

(a) Remove the 11 bolts [21], washers [22], and nuts [23].

(b) Remove the aft-upper-mid rubstrip [8] and aft-upper-mid shim [8A].

1) Keep the aft-upper-mid shim [8A] for the subsequent installation.

SUBTASK 78-31-10-020-010-G00

(4) To remove the aft-mid rubstrip [9], do these steps (View D):

(a) Remove the 10 bolts [21], washers [22], and nuts [23].

(b) Remove the aft-mid rubstrip [9] and aft-mid shim [9A].

1) Keep the aft-mid shim [9A] for the subsequent installation.

SUBTASK 78-31-10-020-011-G00

(5) To remove the aft-lower-mid rubstrip [10], do these steps (View D):

(a) Remove the 10 bolts [21], washers [22], and nuts [23].

(b) Remove the four bolts [24], washers [22], and nuts [23].

(c) Remove the aft-lower-mid rubstrip [10] and aft-lower-mid shim [10A].

1) Keep the aft-lower-mid shim [10A] for the subsequent installation.

SUBTASK 78-31-10-020-012-G00

(6) To remove the aft-upper-lower rubstrip [11], do these steps (View E):

(a) Remove the seven bolts [21], washers [22], and nuts [23].

(b) Remove the aft-upper-lower rubstrip [11] and aft-upper-lower shim [11A].

1) Keep the aft-upper-lower shim [11A] for the subsequent installation.

SUBTASK 78-31-10-020-021-G00

(7) To remove the aft-lower rubstrip [12], do these steps (View F):

(a) Remove the four bolts [21], washers [22], and nuts [23].

(b) Remove the aft-lower rubstrip [12] and aft-lower shim [12A].

1) Keep the aft-lower shim [12A] for the subsequent installation.

SUBTASK 78-31-10-020-013-G00

(8) To remove the aft-bottom rubstrip [13], do these steps (View F):

(a) Remove the 11 bolts [21], washers [22], and nuts [23].

(b) Remove the aft-bottom rubstrip [13] and aft-bottom shim [13A].

1) Keep the aft-bottom shim [13A] for the subsequent installation.

SUBTASK 78-31-10-020-014-G00

(9) To remove the aft guide block [14], do these steps (View C, D, E, and F):

NOTE: There are five aft guide blocks on each of the left and right thrust reversers on an engine.

(a) Remove the two bolts [21], washers [22], and nuts [23].

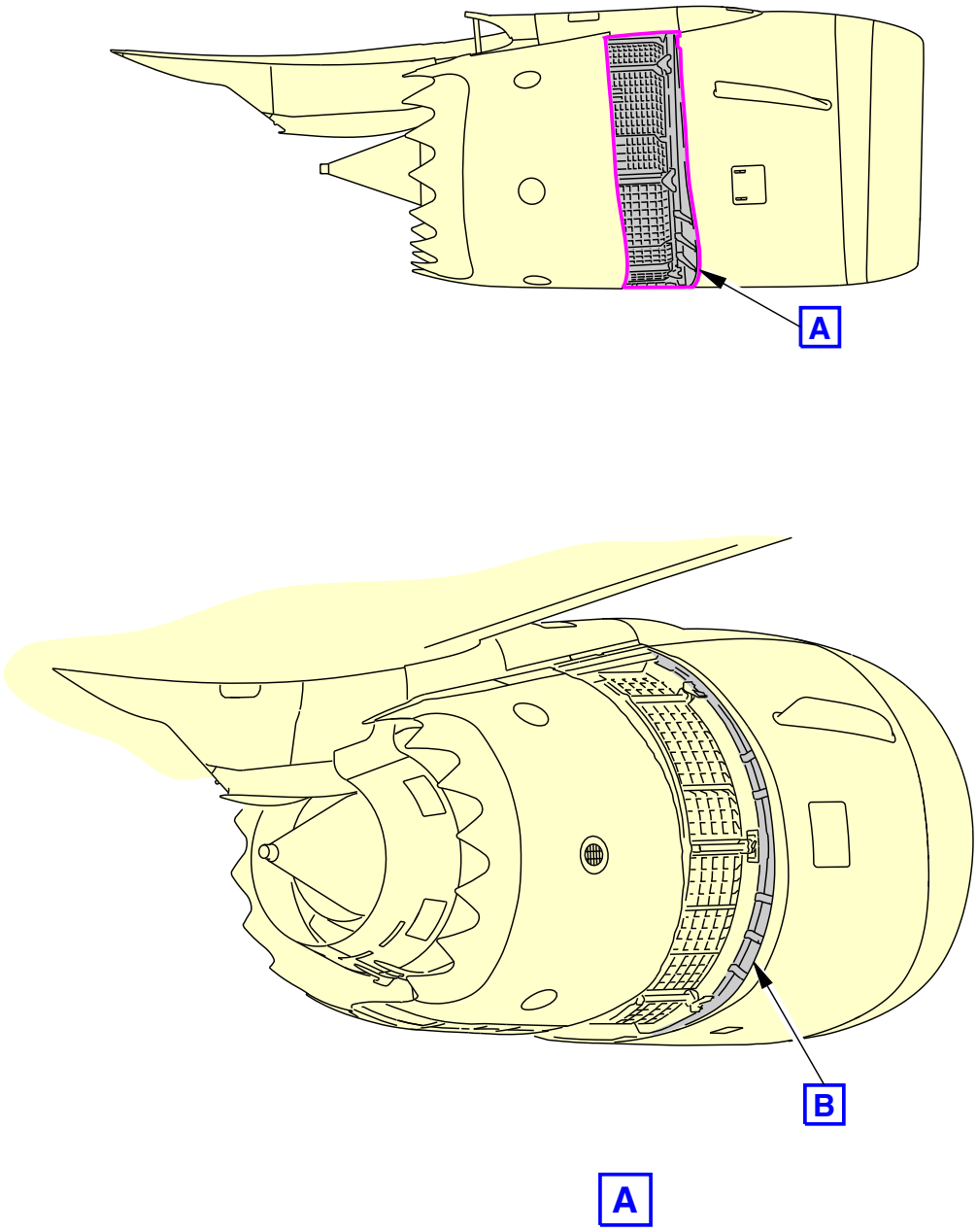
(b) Remove the aft guide block [14] and aft guide shim [14A].

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1) Keep the aft guide shim [14A] for the subsequent installation.

——— END OF TASK ———

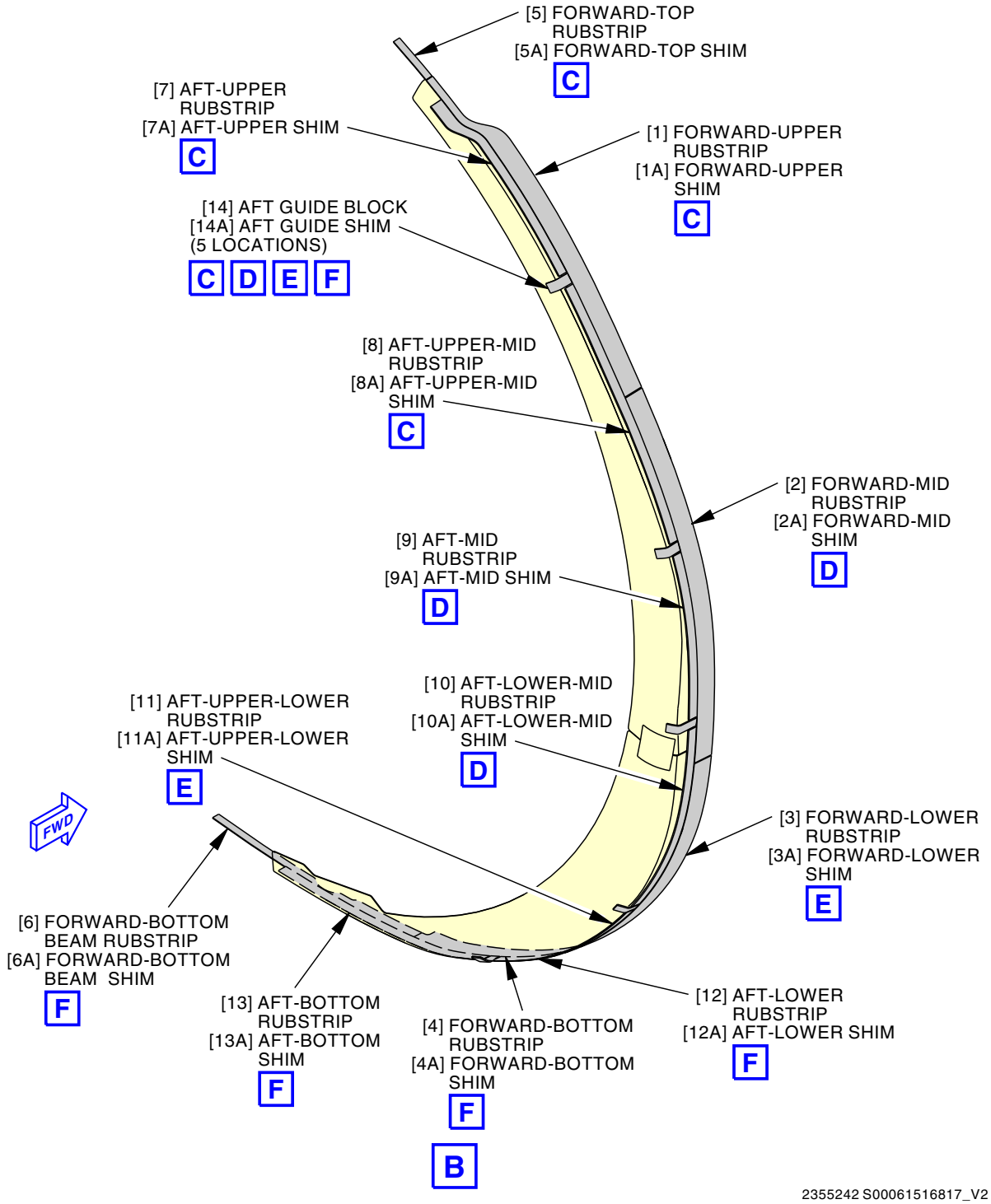
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355241 S00061516816_V1

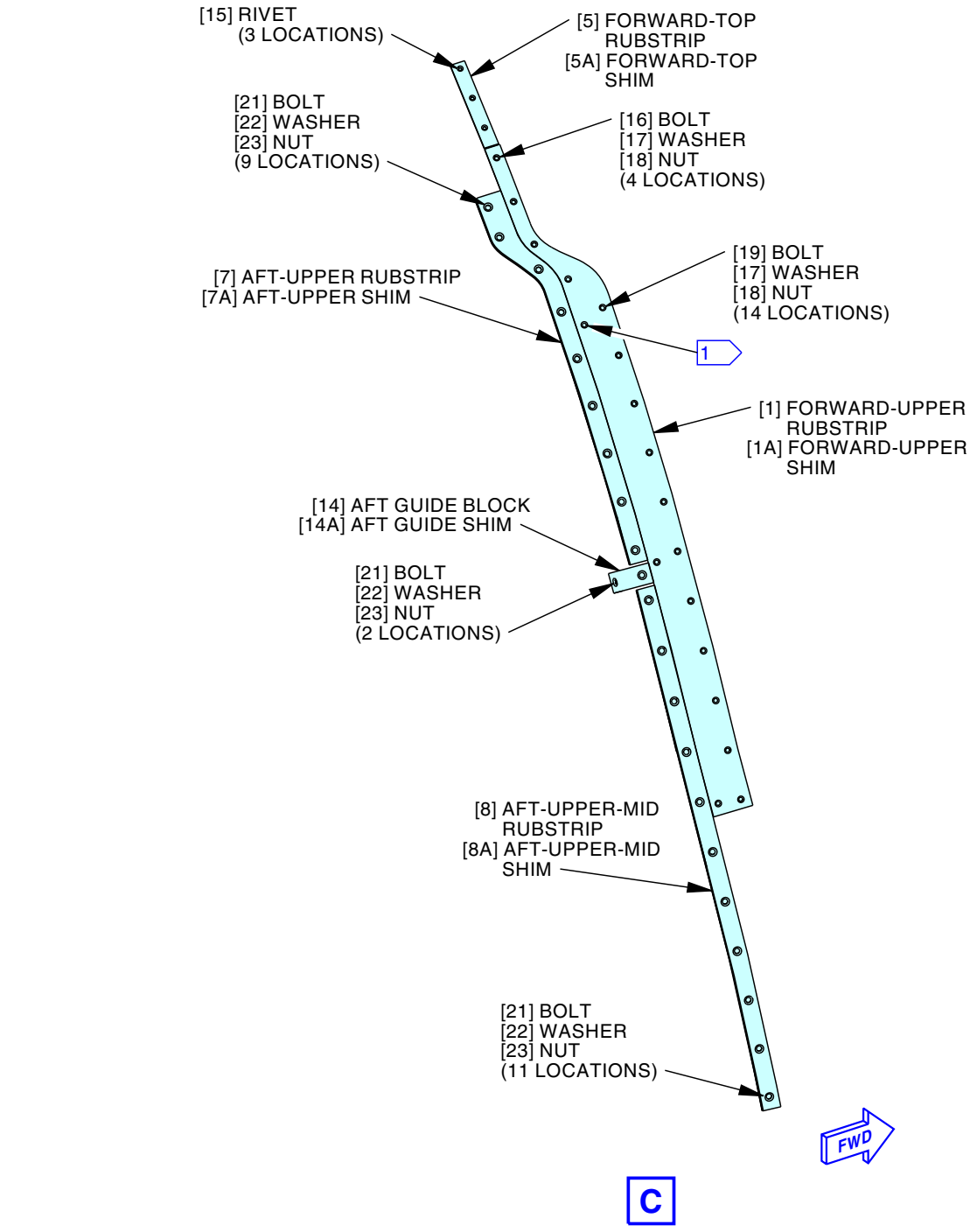
Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 1 of 6)

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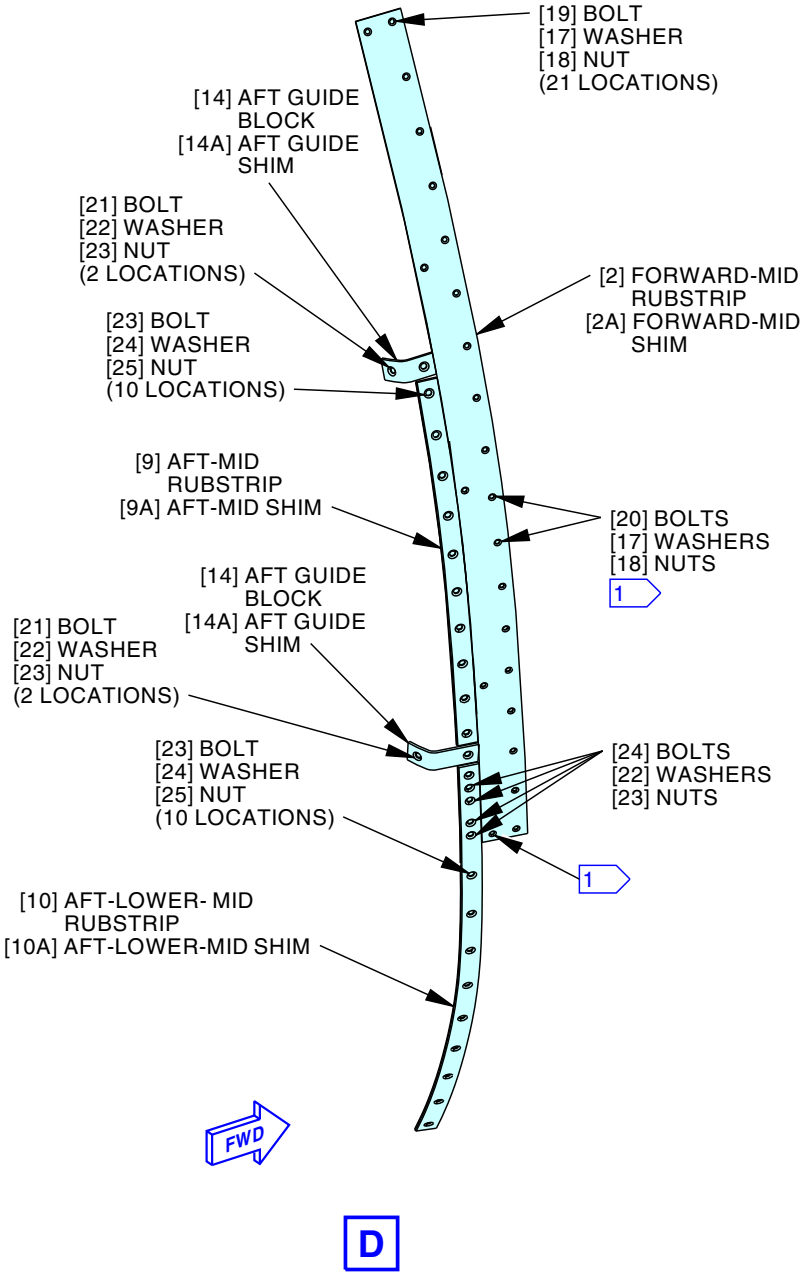
Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 2 of 6)

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Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 3 of 6)

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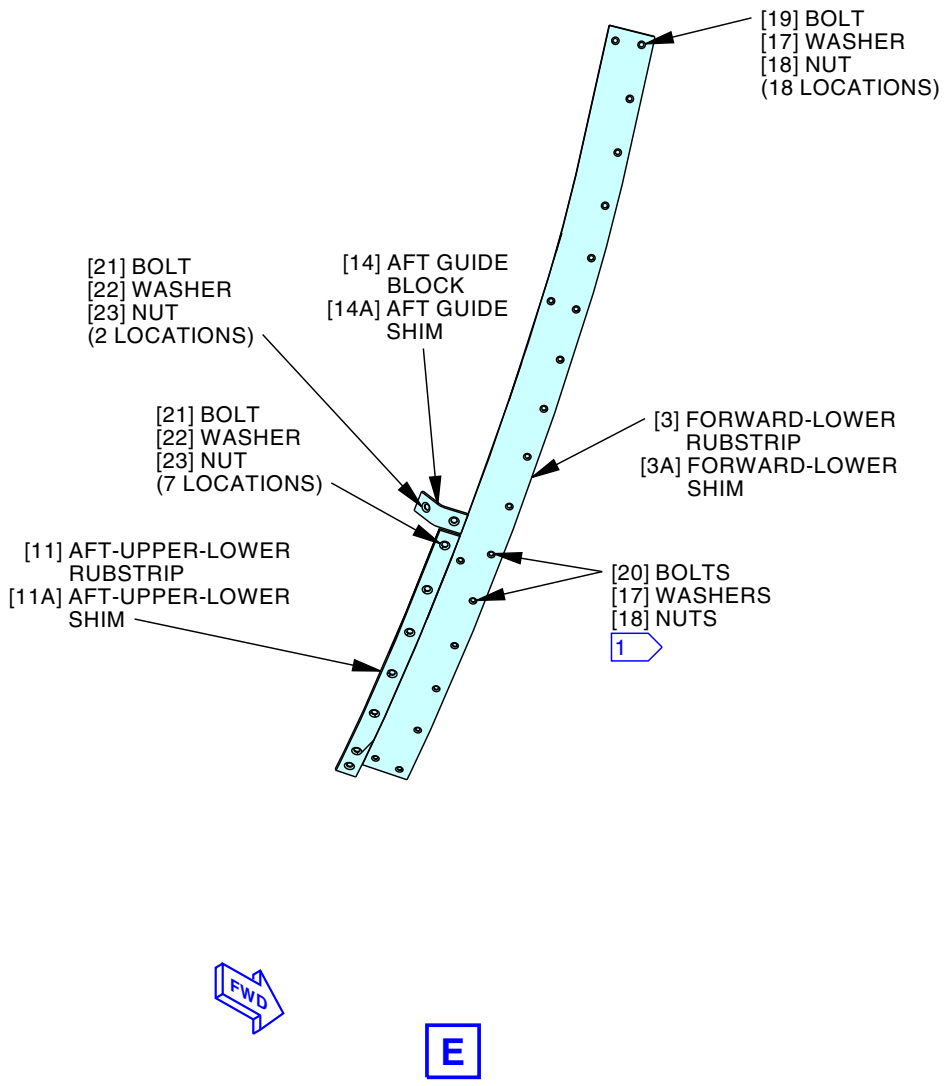


1 DRILL HOLE ON NEW RUBSTRIP

2355244 S00061516819_V3

Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 4 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

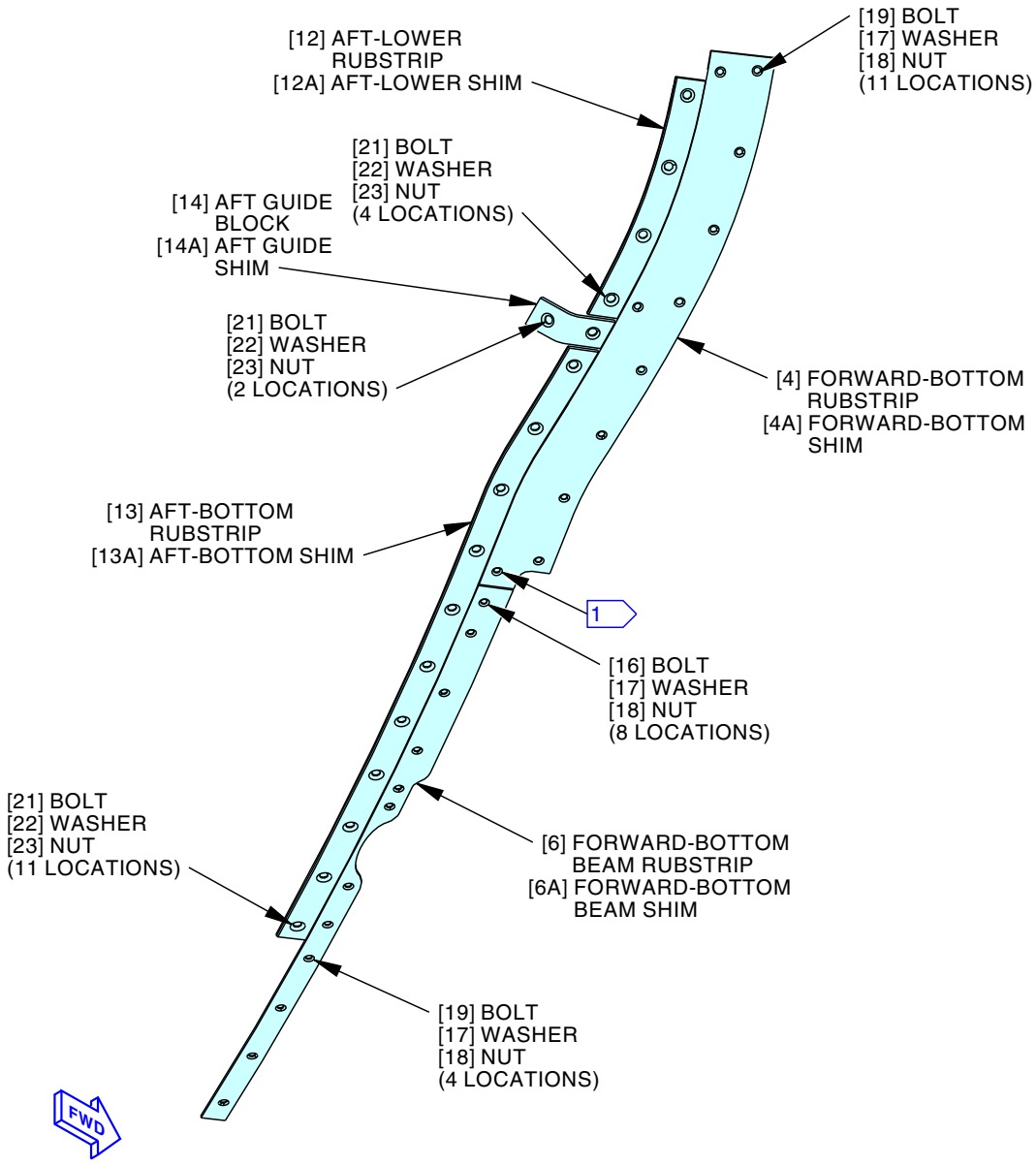


1 DRILL HOLE ON NEW RUBSTRIP

2355245 S00061516820_V3

Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 5 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 DRILL HOLE ON NEW RUBSTRIP

2355246 S00061516821_V3

Rubstrip Installation
Figure 401/78-31-10-990-801-G00 (Sheet 6 of 6)

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TASK 78-31-10-400-801-G00

3. Rubstrip Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the rubstrips on the torque box for the left or right thrust reverser.

(2) If all of the rubstrips are removed, install the aft rubstrips and shims before you install the forward rubstrips and shims.

B. References

Reference	Title
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63

D. Prepare for the Installation

SUBTASK 78-31-10-420-002-G00

(1) If necessary, temporarily install the replacement aft rubstrip with the applicable shim.

NOTE: If the original shim is used with the replacement rubstrip, there will be less adjustment to get the necessary rubstrip height dimensions.

SUBTASK 78-31-10-420-003-G00

(2) For all of the aft rubstrips, there can be 0.00 in. (0.00 mm) - 0.060 in. (1.52 mm) measurement between the rubstrips.

E. Aft Rubstrip Installation

SUBTASK 78-31-10-420-004-G00

(1) To install the aft-upper rubstrip [7] and aft-upper shim [7A], do these steps:

(a) Align the aft-upper rubstrip [7] and aft-upper shim [7A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-upper rubstrip [7] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the nine bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-upper rubstrip [7] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

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SUBTASK 78-31-10-420-005-G00

(2) To install the aft-upper-mid rubstrip [8] and aft-upper-mid shim [8A], do these steps:

(a) Align the aft-upper-mid rubstrip [8] and aft-upper-mid shim [8A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-upper-mid rubstrip [8] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the 11 bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-upper-mid rubstrip [8] and the translating sleeve is still in the limit.

1) If the measurement is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

SUBTASK 78-31-10-420-006-G00

(3) To install the aft-mid rubstrip [9] and aft-mid shim [9A], do these steps:

(a) Align the aft-mid rubstrip [9] and aft-mid shim [9A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-mid rubstrip [9] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the 10 bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-mid rubstrip [9] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

SUBTASK 78-31-10-420-007-G00

(4) To install the aft-lower-mid rubstrip [10] and aft-lower-mid shim [10A], do these steps:

(a) Align the aft-lower-mid rubstrip [10] and aft-lower-mid shim [10A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-lower-mid rubstrip [10] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the 10 bolts [21], washers [22], and nuts [23].

(d) Install the four bolts [24], washers [22], and nuts [23].

(e) Make sure that the measurement between the aft-lower-mid rubstrip [10] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

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SUBTASK 78-31-10-420-008-G00

(5) To install the aft-upper-lower rubstrip [11] and aft-upper-lower rubstrip [11], do these steps:

(a) Align the aft-upper-lower rubstrip [11] and aft-upper-lower shim [11A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-upper-lower rubstrip [11] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the seven bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-upper-lower rubstrip [11] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

SUBTASK 78-31-10-420-012-G00

(6) To install the aft-lower rubstrip [12] and aft-lower shim [12A], do these steps:

(a) Align the aft-lower rubstrip [12] and aft-lower shim [12A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-lower rubstrip [12] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the four bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-lower rubstrip [12] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

SUBTASK 78-31-10-420-009-G00

(7) To install the aft-bottom rubstrip [13] and aft-bottom shim [13A], do these steps:

(a) Align the aft-bottom aft-bottom rubstrip [13] and aft-bottom shim [13A] with the holes on the thrust reverser structure.

NOTE: The shim is installed under the rubstrip.

(b) Make sure that the measurement between the aft-bottom rubstrip [13] and the translating sleeve is in the limit.

1) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

(c) Install the 11 bolts [21], washers [22], and nuts [23].

(d) Make sure that the measurement between the aft-bottom rubstrip [13] and the translating sleeve is still in the limit.

1) If the dimension is correct, tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

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SUBTASK 78-31-10-420-010-G00

(8) To install the aft guide block [14], do these steps:

NOTE: There are five aft guide blocks on the torque box on the left and right thrust reverser on an engine.

(a) Align the aft guide block [14] and aft guide shim [14A] with the holes on the thrust reverser structure.

1) If the measurement between the aft guide block [14] and the adjacent rubstrips is not 0.00 in. (0.00 mm) - 0.060 in. (1.52 mm), cut the aft guide block [14] to get the correct dimension.

(b) Measure the measurement between the height of the aft guide block [14] and the height of the adjacent aft rubstrips.

(c) Make sure that the height of the aft guide block [14] is 0.000 in. (0.000 mm) - 0.020 in. (0.508 mm) below the adjacent aft rubstrips.

1) If the dimension is not correct, add shim or remove the lamination skins from the shim to get the correct dimension.

NOTE: A shim must be installed under the aft guide block.

(d) Install the two bolts [21], washers [22], and nuts [23].

1) Tighten the nuts [23] to 18 in-lb (2.0 N·m) - 25 in-lb (2.8 N·m).

(e) Slowly retract the translating sleeve manually to the completely retracted position.

1) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

2) Make sure that the translating sleeve moves smoothly over the aft guide blocks.

3) Stop the retraction of the translating sleeve if there is interference with the aft guide blocks or rubstrips.

(f) If there is interference, do the Translating Sleeve to Aft Rubstrip Dimension Check again.

F. Translating Sleeve to Aft Rubstrip Dimension Check

SUBTASK 78-31-10-220-001-G00

(1) Do these steps to measure the measurement between the aft rubstrips and the translating sleeve:

(a) Slowly retract the translating sleeve manually to the completely retracted position.

1) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

2) Make sure that the translating sleeve moves smoothly over the rubstrips.

3) Stop the retraction of the translating sleeve if there is interference with the rubstrips.

4) If the rubstrip interferes with the movement of the translating sleeve, do these steps:

a) Measure and mark the area on the rubstrip where it is too high.

b) Manually extend the translating sleeve to get access to the rubstrip.

<1> Do this task: Thrust Reverser Operation - Extend (Manual Procedure), TASK 78-31-00-980-803-G00.

c) Remove the aft rubstrip and shim.

d) Remove the laminations from the shim until the rubstrip is at the correct height.

e) Make sure that you do not remove too many of the lamination skins.

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<1> The measurement between the translating sleeve and the rubstrip must be no more that 0.0300 in. (0.7620 mm).

f) Re-install the rubstrip and shim.

g) Manually retract the translating sleeve until it is in the completely retracted position.

h) Do the above steps again if there is still interference.

(b) Use a feeler gage to measure the measurement between the translating sleeve and each of the rubstrips.

NOTE: Take measurements at several locations on each rubstrip.

1) Record the measurements found at each location for each of the rubstrips.

2) The measurement between the aft rubstrip and the translating sleeve must be 0.0000 in. (0.0000 mm) - 0.0300 in. (0.7620 mm).

3) If the measurement is not in the limits, add a new shim or remove laminations from the original shim to get the necessary measurement.

G. Forward Rubstrip Installation

SUBTASK 78-31-10-420-011-G00

(1) For all of the rubstrips, there can be 0.00 in. (0.00 mm) - 0.060 in. (1.52 mm) measurement between the rubstrips.

SUBTASK 78-31-10-020-015-G00

(2) To install the forward-top rubstrip [5] and forward-top shim [5A] do these steps:

(a) Use the forward-top shim [5A] if it is necessary, 0.032 in. (0.813 mm) maximum to keep forward-top rubstrip [5] between 0.000 in. (0.000 mm) - 0.020 in. (0.508 mm) below the adjacent rubstrip.

(b) Align the forward-top rubstrip [5] and forward-top shim [5A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the three rivets [15].

NOTE: The uppermost rivet is the largest of the three rivets [15].

NOTE: Use the standard overhaul practices to install the rivets.

(d) Apply a 0.0525 in. (1.3335 mm) fillet seal around the gap between the forward-top rubstrip [5] and the edge of the hinge beam with sealant, A00160.

1) Apply the fillet seal for a minimum of 2.0 in. (50.8 mm) from the top of the forward-top rubstrip [5]

2) Remove excess sealant and smooth the transitions.

SUBTASK 78-31-10-020-016-G00

(3) To install the forward-upper rubstrip [1] and forward-upper shim [1A], do these steps:

(a) Lubricate the threads of the bolts [16] and bolts [19] with the sealant, A00160.

(b) Align the forward-upper rubstrip [1] and forward-upper shim [1A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the four bolts [16], washers [17], and nuts [18] to the four upper locations.

(d) Install the remaining 14 bolts [19], washers [17], and nuts [18].

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1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

SUBTASK 78-31-10-020-017-G00

(4) To install the forward-mid rubstrip [2] and forward-mid shim [2A], do these steps:

(a) Lubricate the threads of the bolts [19] and bolts [20] with the sealant, A00160.

(b) Align the forward-mid rubstrip [2] and forward-mid shim [2A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the 18 bolts [19], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

(d) Install the two bolts [20], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

SUBTASK 78-31-10-020-018-G00

(5) To install the forward-lower rubstrip [3] and forward-lower shim [3A], do these steps:

(a) Lubricate the threads of the bolts [19] and bolts [20] with the sealant, A00160.

(b) Align the forward-lower rubstrip [3] and forward-lower shim [3A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the 18 bolts [19], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

(d) Install the two bolts [20], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

SUBTASK 78-31-10-020-019-G00

(6) To install the forward-bottom rubstrip [4] and forward-bottom shim [4A], do these steps:

(a) Lubricate the threads of the bolts [19] with the sealant, A00160.

(b) Align the forward-bottom rubstrip [4] and forward-bottom shim [4A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the 11 bolts [19], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

SUBTASK 78-31-10-020-020-G00

(7) To install the forward-bottom beam rubstrip [6] and forward-bottom beam shim [6A], do these steps:

(a) Lubricate the threads of the bolts [16] and bolts [19] with the sealant, A00160.

(b) Align the forward-bottom beam rubstrip [6] and forward-bottom beam shim [6A] with the holes on the fan cowl structure.

NOTE: The shim is installed under the rubstrip.

(c) Install the eight bolts [16], washers [17], and nuts [18] to the eight upper locations.

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

(d) Install the remaining four bolts [19], washers [17], and nuts [18].

1) Tighten the nuts [18] to 10 in-lb (1.1 N·m) - 18 in-lb (2.0 N·m).

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(e) Fillet seal the gap below the forward-bottom beam rubstrip [6] and the end of the aft-bottom rubstrip [13] using sealant, A00160.

1) Remove excess sealant and smooth the transitions.

SUBTASK 78-31-10-820-001-G00

(8) Do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-10-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

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TENSION LATCHES - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Tension Latch Removal

(2) Tension Latch Installation.

TASK 78-31-11-000-801-G00

2. Tension Latch Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the tension latches from the thrust reverser.

(a) There are a total of nine tension latches.

(2) For this task a tension latch will be referred to as a latch.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-6634	Knife - Plastic

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-31-11-010-002-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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WARNING

DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Latch Removal

SUBTASK 78-31-11-020-001-G00

(1) Do these steps to remove the applicable latch [1] (No. 1-6):

(a) If necessary, use a plastic knife, STD-6634 to break the bond of the sealant that is around the washers.

NOTE: After you break the bond of the sealant from the attach fitting, the sealant will come off with the washers.

(b) Remove the nut [8].

(c) Remove the washer [6] and washers [7] as necessary.

NOTE: Keep the washers for the installation.

(d) Remove the bolt.

1) To remove the latch No. 1 and latch No. 2 (which are adjacent), remove bolt [5].

NOTE: The latch No. 1 and latch No. 2 are held in their positions with one bolt. The bolt connects the two latches to the attach fitting.

2) To remove the latch No. 3, remove bolt [4].

3) To remove the latch No. 4, remove bolt [3].

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4) To remove the latch No. 5 and latch No. 6 (which are adjacent), remove the bolt [2].

NOTE: The latch No. 5 and latch No. 6 are held in their positions with one bolt. The bolt connects the two latches to the attach fitting.

(e) Remove the latch.

(f) If necessary, remove the sealant that remains from the fitting assembly with solvent, B00062.

SUBTASK 78-31-11-020-002-G00

(2) Do these steps to remove the applicable latch [1] (No. 7-9):

(a) Remove the latch No. 7 as follows:

1) Remove the cotter pin [24] and nut [15].
2) Remove the washer [16] and washer [17].
3) Remove the bolt [10] and washer [12].
4) Remove the latch No. 7.

(b) Remove the latch No. 8 as follows:

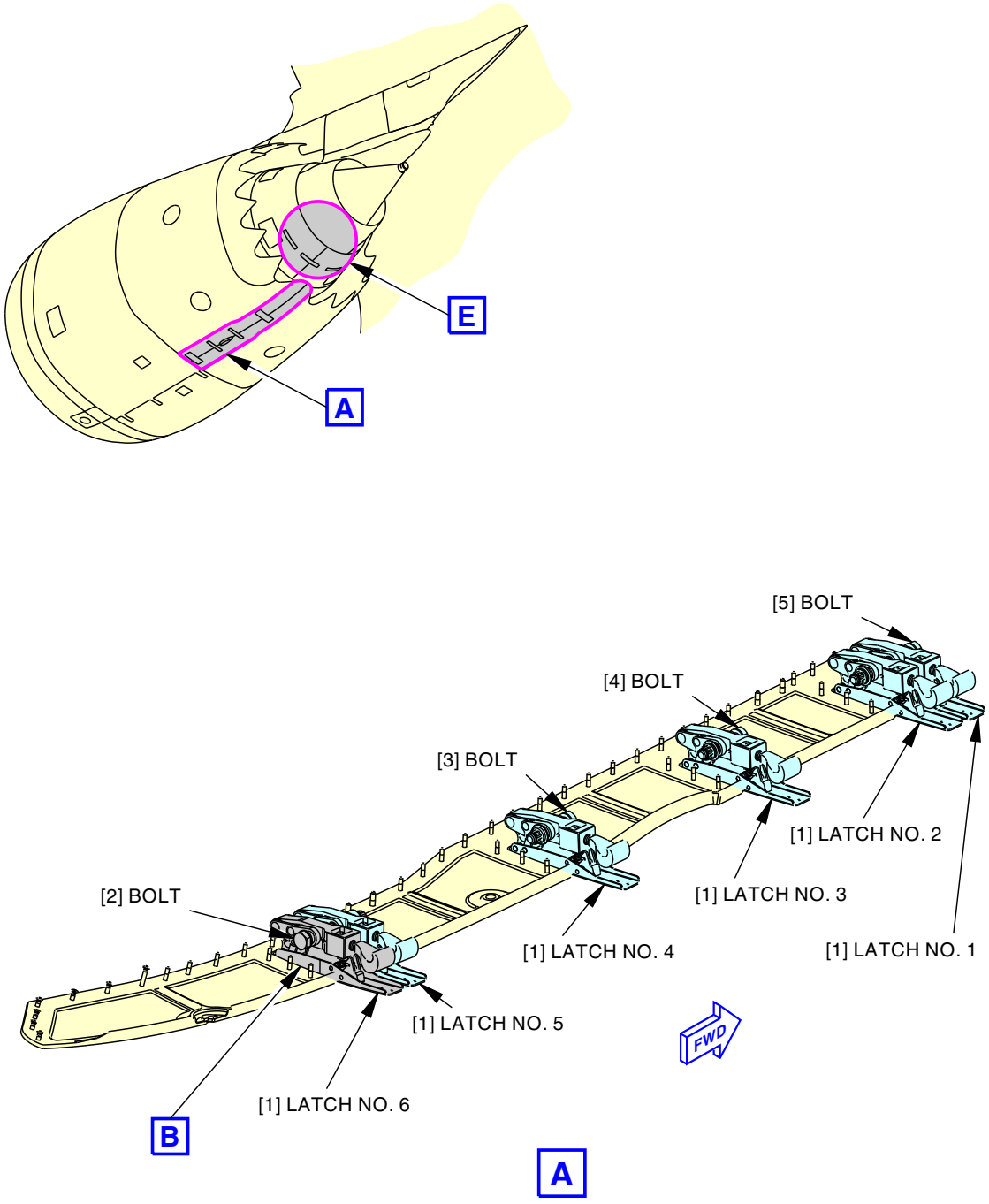
1) Remove the cotter pin [24] and nut [18].
2) Remove the washer [19] and two washers [20].
3) Remove the bolt [9] and washer [13].
4) Remove the latch No. 8.

(c) Remove the latch No. 9 as follows:

1) Remove the cotter pin [24] and nut [21].
2) Remove the washer [22] and two washers [23].
3) Remove the bolt [11] and washer [14].
4) Remove the latch No. 9.

END OF TASK

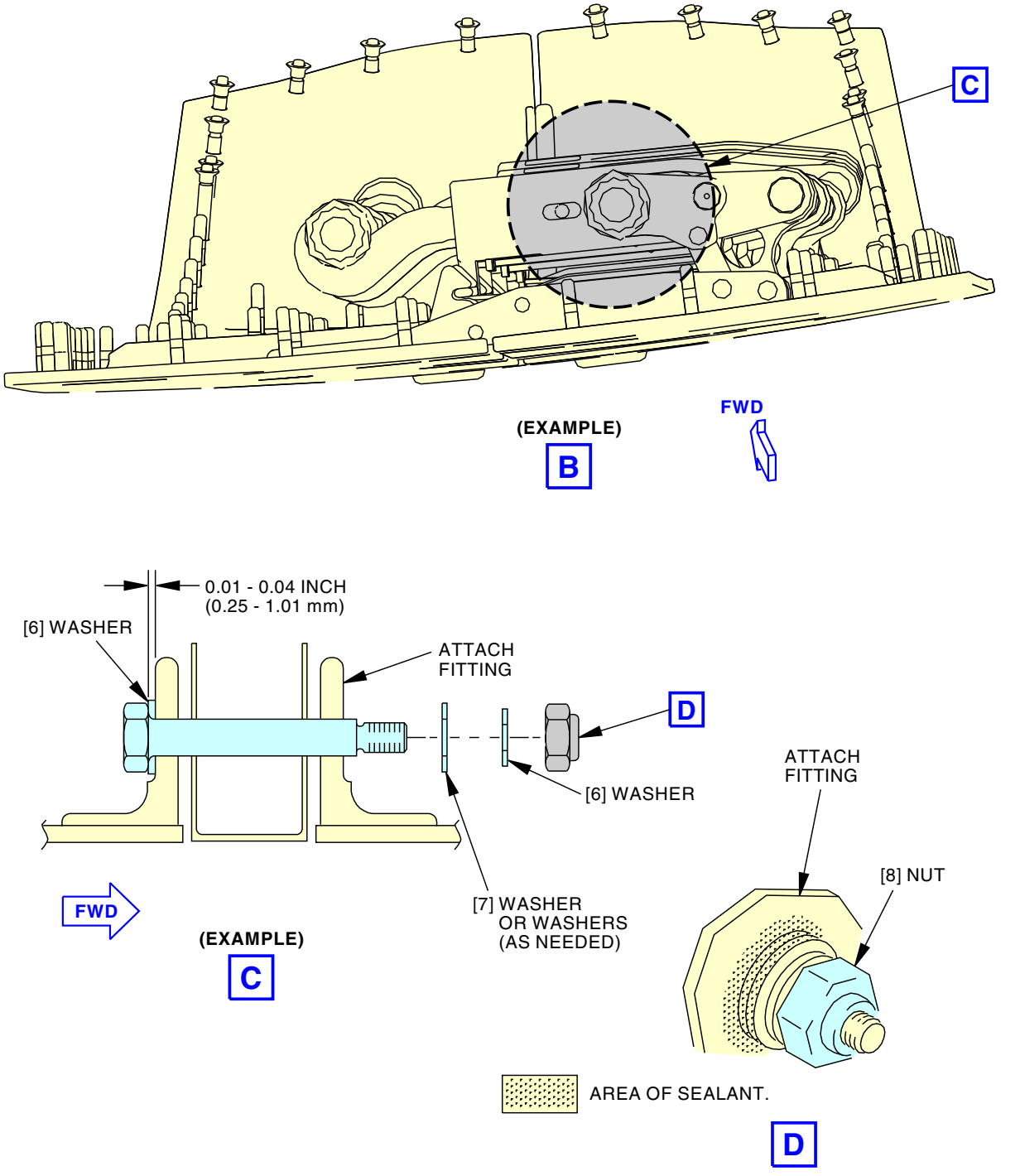
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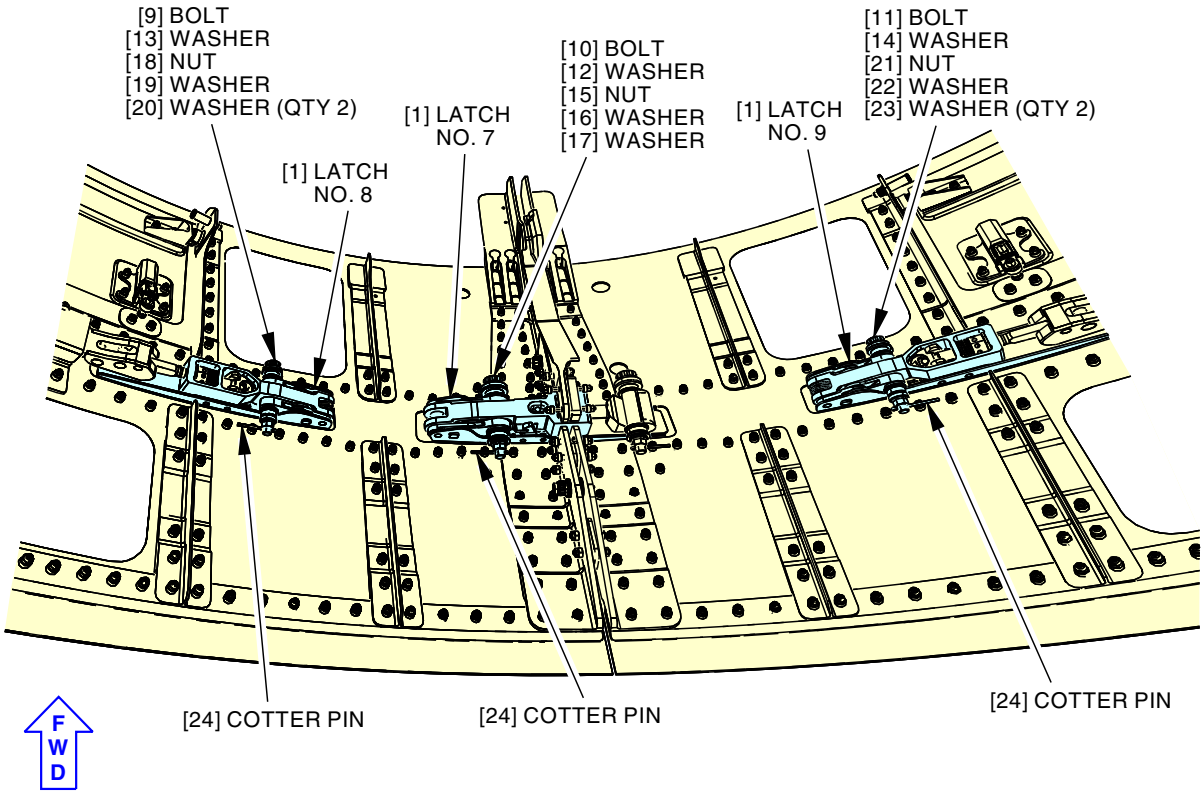
Thrust Reverser Tension Latch Installation
Figure 401/78-31-11-990-801-G00 (Sheet 1 of 3)

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Thrust Reverser Tension Latch Installation
Figure 401/78-31-11-990-801-G00 (Sheet 2 of 3)

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(AFT COWL STRUCTURES REMOVED FOR CLARITY)

E

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Thrust Reverser Tension Latch Installation
Figure 401/78-31-11-990-801-G00 (Sheet 3 of 3)

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TASK 78-31-11-400-801-G00

3. Tension Latch Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the tension latches on the thrust reverser.

B. References

Reference	Title
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-11-820-801-G00	Latches Adjustment (P/B 501)

C. Tools/Equipment

Reference	Description
STD-1107	Gauge - Feeler, 0.0 - 0.5 Inch, Readable to 1/1000th

D. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)

E. Latch Installation

SUBTASK 78-31-11-010-001-G00

(1) Make sure the thrust reverser is open (TASK 78-31-00-010-801-G00).

SUBTASK 78-31-11-420-001-G00

(2) Do these steps to install the applicable latch [1] (No. 1-6):

(a) If necessary, remove the sealant that remains with solvent, B00062.

(b) Install the latch [1] in the attach fitting.

NOTE: The latches are installed with unique different length bolts. Make sure that you use the correct bolt with the applicable latch or latches.

(c) Install the applicable bolt with the washer [6] under the bolt head.

1) For latch No. 1 and latch No.2 (adjacent), use bolt [5]:

NOTE: Latch No. 1 and latch No. 2 are held in their positions with one bolt. The bolt connects the two latches to the attach fitting.

2) For latch No. 3, use bolt [4].

3) For latch No. 4, use bolt [3].

4) For latch No. 5 and latch No. 6 (adjacent), use bolt [2].

NOTE: Latch No. 5 and latch No. 6 are held in their positions with one bolt. The bolt connects the two latches to the attach fitting.

(d) Install the washer or washers [7] that were removed in the removal task.

(e) Install the washer [6] and the nut [8].

1) Hand tighten the nut only.

(f) Use a 0.0 - 0.5 Inch feeler gauge, STD-1107 to measure the distance between the bolt head and the attach fitting (View C).

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1) When you measure the distance, move the bolt until the nut holds the washers against the attach fitting.

NOTE: Alternative: you can move the head of bolt and washer against the fitting to measure the distance.

2) The distance must be 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) (correct axial movement).

3) If the dimension is not correct, add or remove the applicable washers [7] as necessary.

NOTE: Only latches No.1 and 2 are permitted to have three washers. Latch No. 3-6 can have a maximum of two washers.

a) The thickness of the available washers are: 0.016 in. (0.406 mm), 0.032 in. (0.813 mm), and 0.063 in. (1.600 mm).

(g) Tighten the nut to 400 in-lb (45 N·m) - 430 in-lb (49 N·m) or the bolt head to 500 in-lb (56 N·m) - 530 in-lb (60 N·m).

(h) Apply a fillet of sealant, A00436 around bolt shank between the washers and the attach fitting (View D).

SUBTASK 78-31-11-420-002-G00

(3) Do these steps to install the applicable latch [1] (No. 7-9):

(a) Install the latch No. 7 as follows:

1) Hold the latch No. 7 in the attach fitting.

2) Install the washer [12] and bolt [10].

3) Install the washer [16], washer [17], and nut [15].

4) Tighten the nut [15] to 194 in-lb (22 N·m) - 206 in-lb (23 N·m).

5) Install the cotter pin [24].

(b) Install the latch No. 8 as follows:

1) Hold the latch No. 8 in the attach fitting.

2) Install the washer [13] and bolt [9].

3) Install the washer [19], two washers [20], and nut [18].

4) Tighten the nut [18] to 121 in-lb (14 N·m) - 129 in-lb (15 N·m).

5) Install the cotter pin [24].

(c) Install the latch No. 9 as follows:

1) Hold the latch No. 9 in the attach fitting.

2) Install the bolt [11] and washer [14].

3) Install the washer [22], two washers [23], and nut [21].

4) Tighten the nut [21] to 121 in-lb (14 N·m) - 129 in-lb (15 N·m).

5) Install the cotter pin [24].

SUBTASK 78-31-11-410-001-G00

WARNING OBEY THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE PROCEDURE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Close the Thrust Reverser (TASK 78-31-00-010-802-G00).

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SUBTASK 78-31-11-820-001-G00

(5) Adjust the latches (TASK 78-31-11-820-801-G00).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TENSION LATCHES - ADJUSTMENT/TEST

1. General

A. This procedure has this task:

(1) The adjustment of the latches.

TASK 78-31-11-820-801-G00

2. Latches Adjustment

(Figure 501)

A. General

(1) This task is for the adjustment of the thrust reverser tension latches.

(2) The thrust reverser tension latches are at the bottom centerline of the thrust reverser.

(3) For this task the thrust reverser tension latch will be called the latch.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1184	Scale - Spring, 0-100 Lbs, Tension
STD-1330	Wrench - Hexdrive, Allen Wrench

D. Prepare for the Adjustment

SUBTASK 78-31-11-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

E. Latches Adjustment

SUBTASK 78-31-11-820-007-G00

(1) Make sure that all the latches are closed.

SUBTASK 78-31-11-820-002-G00

(2) Do these steps to adjust the latches No. 1 through No. 6:

(a) Open the latch hook to disengage the hook from the latch pin.

CAUTION DO NOT USE MORE THAN 100 POUNDS FORCE ON THE LATCH HANDLE. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH, LATCH KEEPER, OR THE FAN COWL PANEL.

(b) Apply 40 lbf (178 N) - 60 lbf (267 N) of force with a spring scale (0-100 Lbs), STD-1184, no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

(c) If the force is not in the limits, do these steps to adjust the latch:

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1) Disengage the latch.
2) Put an hexdrive allen wrench, STD-1330, in the latch load adjustment wheel in the latch housing.
   a) Turn the hexdrive allen wrench, STD-1330, clockwise to increase the latch tension.
   b) Turn the hexdrive allen wrench, STD-1330, counterclockwise to decrease the latch tension.
3) Do the above steps again until the latch tension is in the limits.
4) Make sure that the latch remains closed as the adjustment for the other latches is done.

SIA 006-999; SIA 001-005 PRE SB 737-78-1104

SUBTASK 78-31-11-820-005-G00

(3) Do these steps to adjust the latches number 7 thru 9 as follows:

NOTE: Leave latches number 1 through 7 closed after the latch adjustment is completed.

(a) Open the latch hook to disengage the hook from the latch pin.

CAUTION

DO NOT USE MORE THAN 100 POUNDS FORCE ON THE LATCH HANDLE. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH, LATCH KEEPER, OR THE FAN COWL PANEL.

(b) Apply 40 lbf (178 N) - 60 lbf (267 N) of force with a spring scale (0-100 Lbs), STD-1184, no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

(c) If the force is not in the limits, do these steps to adjust the latch:
   1) Disengage the latch.
   2) Put a hexdrive allen wrench, STD-1330, in the latch load adjustment wheel in the latch housing.
      a) Turn the hexdrive allen wrench, STD-1330, clockwise to increase the latch tension.
      b) Turn the hexdrive allen wrench, STD-1330, counterclockwise to decrease the latch tension.

(d) Do the above steps again until the latch tension is in the limits.

(e) Make sure that the latch remains closed as the adjustment for the other latches is done.

SIA 001-005 POST SB 737-78-1104

SUBTASK 78-31-11-820-006-G00

(4) Do these steps to adjust the latches number 7 thru 9 as follows:

NOTE: Leave latches number 1 through 7 closed after the latch adjustment is completed.

(a) Open the latch hook to disengage the hook from the latch pin.

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SIA 001-005 POST SB 737-78-1104 (Continued)

CAUTION DO NOT USE MORE THAN 100 POUNDS FORCE ON THE LATCH HANDLE. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH, LATCH KEEPER, OR THE FAN COWL PANEL.

(b) For latch number 7, apply 40 lbf (178 N) - 75 lbf (334 N) of force with a spring scale (0-100 Lbs), STD-1184, no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

CAUTION DO NOT USE MORE THAN 100 POUNDS FORCE ON THE LATCH HANDLE. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH, LATCH KEEPER, OR THE FAN COWL PANEL.

(c) For latch number 8 and latch number 9, apply 40 lbf (178 N) - 60 lbf (267 N) of force with a spring scale (0-100 Lbs), STD-1184, no more than 1.0 in. (25.4 mm) from the end of the latch handle to close it.

(d) If the force is not in the limits, do these steps to adjust the latch:

1) Disengage the latch.

2) Put a hexdrive allen wrench, STD-1330, in the latch load adjustment wheel in the latch housing.

a) Turn the hexdrive allen wrench, STD-1330, clockwise to increase the latch tension.

b) Turn the hexdrive allen wrench, STD-1330, counterclockwise to decrease the latch tension.

(e) Do the above steps again until the latch tension is in the limits.

(f) Make sure that the latch remains closed as the adjustment for the other latches is done.

SIA ALL

SUBTASK 78-31-11-820-003-G00

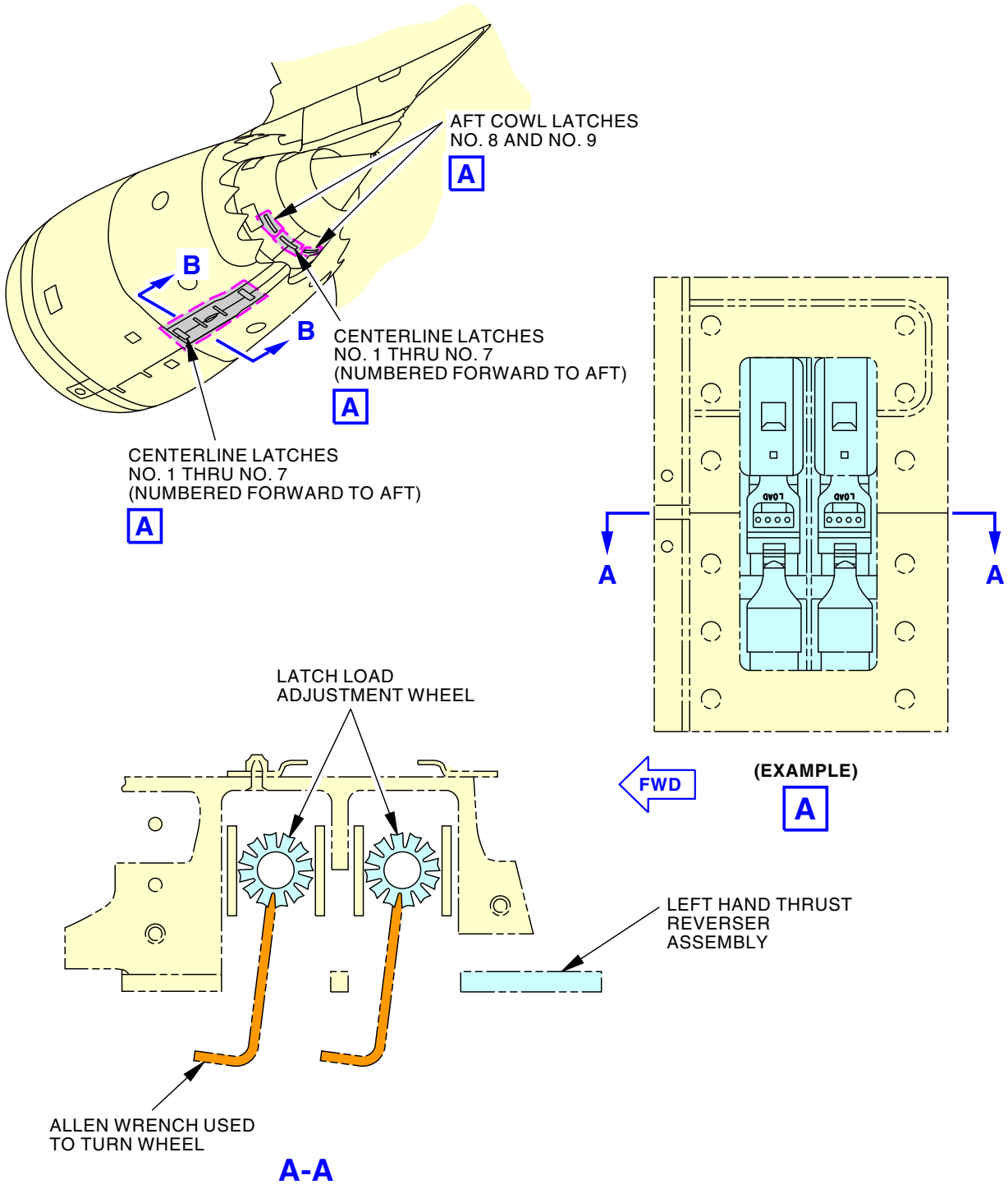
(5) Do a check of all of the latches again to make sure that the tension for each latch is still in the limits.

SUBTASK 78-31-11-440-001-G00

(6) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

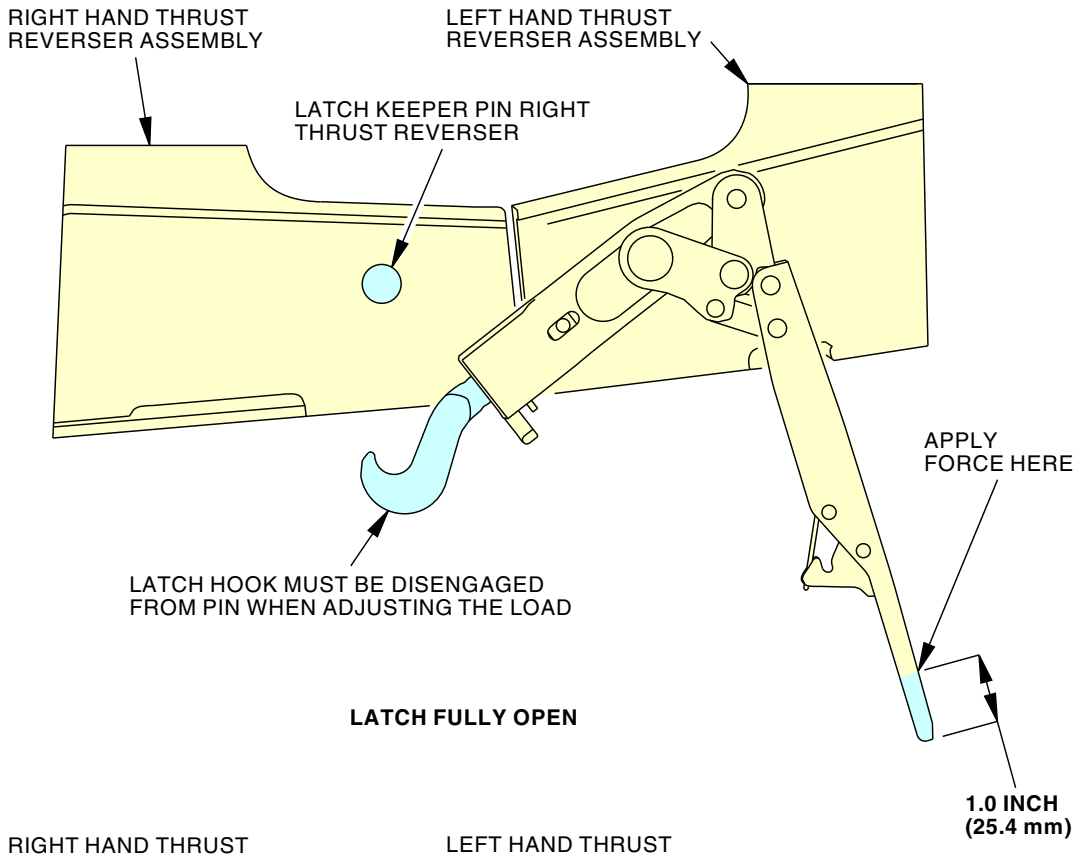
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Thrust Reverser Tension Latch Adjustment
Figure 501/78-31-11-990-802-G00 (Sheet 1 of 2)

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B-B

2355251 S00061516833_V1

Thrust Reverser Tension Latch Adjustment
Figure 501/78-31-11-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FIRE SEAL - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the thrust reverser fire seal.

(2) The installation of the thrust reverser fire seal.

TASK 78-31-12-000-801-G00

2. Fire Seal Removal

(Figure 401, Figure 402, Figure 403, Figure 404)

A. General

(1) This task is for the removal of the fire seal from the left or right thrust reverser.

(2) For this task the forward firewall blockseal will be referred to as the blockseal.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-765	Scraper - Plastic

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-31-12-010-001-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL

G. Left Side Thrust Reverser Fire Seal Removal

SUBTASK 78-31-12-020-018-G00

(1) Do these steps to remove the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] from the left side thrust reverser (View B, Figure 401):

(a) Carefully remove the sealant from the area where the forward firewall blockseal [5] is inserted into the forward firewall fire resistance blockseal [6].

(b) Remove all of the sealant that bonds the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] to the fireseal retainer [7] (View A-A, Figure 401).

(c) Slide the forward firewall blockseal [5] out of the fireseal retainer [7].

(d) Slide the forward firewall fire resistance blockseal [6] out of the fireseal retainer [7].

SUBTASK 78-31-12-020-001-G00

(2) Do these steps to remove the upper fire seal [1] from the left side thrust reverser (Figure 401):

(a) Remove all of the sealant that bonds the upper fire seal [1] to the fireseal retainer [7] (View A-A, Figure 401).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the upper fire seal [1] to remove approximately 3.0 in. (76.2 mm) of the upper fire seal [1] from the fireseal retainer [7].

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the upper fire seal [1] from the fireseal retainer [7] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the upper fire seal [1] to pull the rest upper fire seal [1] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the upper fire seal [1] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the upper fire seal [1] with a mirror.

(f) Remove the upper fire seal [1] from the fireseal retainer [7].

SUBTASK 78-31-12-020-012-G00

(3) Do these steps to remove the barrel fire seal [2] from the left side thrust reverser (Figure 401):

(a) Remove all of the sealant that bonds the barrel fire seal [2] to the fireseal retainer [7] (View A-A, Figure 401).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the barrel fire seal [2] to remove approximately 3.0 in. (76.2 mm) of the barrel fire seal [2] from the fireseal retainer [7].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the barrel fire seal [2] from the fireseal retainer [7] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the barrel fire seal [2] to pull the rest barrel fire seal [2] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the barrel fire seal [2] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the barrel fire seal [2] with a mirror.

(f) Remove the barrel fire seal [2] from the fireseal retainer [7].

SUBTASK 78-31-12-020-013-G00

(4) Do these steps to remove the lower fire seal [3] from the left side thrust reverser (Figure 401):

(a) Remove all of the sealant that bonds the lower fire seal [3] to the fireseal retainer [7] (View A-A, Figure 401).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the lower fire seal [3] to remove approximately 3.0 in. (76.2 mm) of the lower fire seal [3] from the fireseal retainer [7].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the lower fire seal [3] from the fireseal retainer [7] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the lower fire seal [3] to pull the rest lower fire seal [3] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the lower fire seal [3] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the lower fire seal [3] with a mirror.

(f) Remove the lower fire seal [3] from the fireseal retainer [7].

SUBTASK 78-31-12-020-019-G00

(5) Do these steps to remove the fire seal [9] from the left side thrust reverser (View B-B and View C, Figure 401):

(a) Remove all of the sealant that bonds the fire seal [9] to the fireseal retainer [7].

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

(b) Slide the fire seal [9] out of the fireseal retainer [7].

SUBTASK 78-31-12-020-014-G00

(6) Do these steps to remove the forward latch beam fire seal [8] from the left side thrust reverser (View D, Figure 401):

(a) Remove the two bolts [10], two washers [11], and two collars [12].

(b) Use the plastic scraper, STD-765, to remove the forward latch beam fire seal [8] from the structure.

H. Right Side Thrust Reverser Fire Seal Removal

SUBTASK 78-31-12-020-020-G00

(1) Do these steps to remove the forward firewall fire resistance blockseal [16] and forward firewall blockseal [17] from the right side thrust reverser (View B, Figure 402):

(a) Carefully remove the sealant from the area where the forward firewall blockseal [17] is inserted into the forward firewall fire resistance blockseal [16].

(b) Remove all of the sealant that bonds the forward firewall blockseal [17] and forward firewall fire resistance blockseal [16] to the fireseal retainer [18] (View A-A, Figure 402).

(c) Slide the forward firewall blockseal [17] out of the fireseal retainer [18].

(d) Slide the forward firewall fire resistance blockseal [16] out of the fireseal retainer [18].

SUBTASK 78-31-12-020-021-G00

(2) Do these steps to remove the upper fire seal [13] from the right side thrust reverser (Figure 402):

(a) Remove all of the sealant that bonds the upper fire seal [13] to the fireseal retainer [18] (View A-A, Figure 402).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the upper fire seal [13] to remove approximately 3.0 in. (76.2 mm) of the upper fire seal [13] from the fireseal retainer [18].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the upper fire seal [13] from the fireseal retainer [18] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the upper fire seal [13] to pull the rest upper fire seal [13] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the upper fire seal [13] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the upper fire seal [13] with a mirror.

(f) Remove the upper fire seal [13] from the fireseal retainer [18].

SUBTASK 78-31-12-020-022-G00

(3) Do these steps to remove the barrel fire seal [14] from the right side thrust reverser (Figure 402):

(a) Remove all of the sealant that bonds the barrel fire seal [14] to the fireseal retainer [7] (View A-A, Figure 402).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the barrel fire seal [14] to remove approximately 3.0 in. (76.2 mm) of the barrel fire seal [14] from the fireseal retainer [18].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the barrel fire seal [14] from the fireseal retainer [18] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the barrel fire seal [14] to pull the rest barrel fire seal [14] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the barrel fire seal [14] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the barrel fire seal [14] with a mirror.

(f) Remove the barrel fire seal [14] from the fireseal retainer [18].

SUBTASK 78-31-12-020-023-G00

(4) Do these steps to remove the lower fire seal [15] from the right side thrust reverser (Figure 402):

(a) Remove all of the sealant that bonds the lower fire seal [15] to the fireseal retainer [18] (View A-A, Figure 402).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the lower fire seal [15] to remove approximately 3.0 in. (76.2 mm) of the lower fire seal [3] from the fireseal retainer [18].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the lower fire seal [15] from the fireseal retainer [18] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the lower fire seal [15] to pull the rest lower fire seal [15] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the lower fire seal [15] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the lower fire seal [15] with a mirror.

(f) Remove the lower fire seal [15] from the fireseal retainer [18].

SUBTASK 78-31-12-020-024-G00

(5) Do these steps to remove the fire seal [19] from the right side thrust reverser (View B-B, Figure 402):

(a) Remove all of the sealant that bonds the fire seal [19] to the fireseal retainer [18].

(b) Slide the fire seal [19] out of the fireseal retainer [18].

SUBTASK 78-31-12-020-025-G00

(6) Do these steps to remove the forward latch beam fire seal [20] from the right side thrust reverser (View C, Figure 402):

(a) Remove the two bolts [21], two washers [22], and two collars [23].

(b) Use the plastic scraper, STD-765, to remove the forward latch beam fire seal [20] from the structure.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL

I. Left Thrust Reverser Fire Seal Removal

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL COMPOSITE INNER WALL

SUBTASK 78-31-12-020-030-G00

(1) Do these steps to remove the pressure seal [42] from the left side thrust reverser (View A, Figure 403):

(a) Carefully remove the sealant from the area around the pressure seal [42].

(b) Remove all of the sealant that bonds the pressure seal [42] to the inner wall.

(c) Use the plastic scraper, STD-765, to remove the pressure seal [42] from the inner wall.

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL

SUBTASK 78-31-12-020-002-G00

(2) Do these steps to remove the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] from the left side thrust reverser (View B, Figure 403):

(a) Carefully remove the sealant from the area where the forward fireseal blockseal [25] is inserted into the forward firewall fire resistance blockseal [26].

(b) Remove all of the sealant that bonds the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] to the fireseal retainer [27] (View A-A, Figure 403).

(c) Slide the forward fireseal blockseal [25] out of the fireseal retainer [27].

(d) Slide the forward firewall fire resistance blockseal [26] out of the fireseal retainer [27].

SUBTASK 78-31-12-020-003-G00

(3) Do these steps to remove the main fire seal [24] from the left side thrust reverser (Figure 403):

(a) Remove all of the sealant that bonds the main fire seal [24] to the fireseal retainer [27] (View A-A, Figure 403).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the main fire seal [24] to remove approximately 3.0 in. (76.2 mm) of the main fire seal [24] from the fireseal retainer [27].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the main fire seal [24] from the fireseal retainer [27] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the main fire seal [24] to pull the rest main fire seal [24] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the main fire seal [24] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the main fire seal [24] with a mirror.

(f) Remove the main fire seal [24] from the fireseal retainer [27].

SUBTASK 78-31-12-020-015-G00

(4) Do these steps to remove the fire seal [28] from the left side thrust reverser (View B-B, Figure 403):

(a) Remove all of the sealant that bonds the fire seal [28] to the fireseal retainer [27].

(b) Slide the fire seal [28] out of the fireseal retainer [27].

SUBTASK 78-31-12-020-008-G00

(5) Do these steps to remove the forward latch beam fire seal [20] from the left side thrust reverser (View C, Figure 403):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

(a) Remove the two bolts [21], two washers [22], and two collars [23].

(b) Use the plastic scraper, STD-765, to remove the forward latch beam fire seal [20] from the structure.

J. Right Thrust Reverser Fire Seal Removal

SUBTASK 78-31-12-020-026-G00

(1) Do these steps to remove the forward firewall fire resistance blockseal [34] and forward firewall blockseal [35] from the right side thrust reverser (View B, Figure 404):

(a) Carefully remove the sealant from the area where the forward firewall blockseal [35] is inserted into the forward firewall fire resistance blockseal [34].

(b) Remove all of the sealant that bonds the forward firewall blockseal [35] and forward firewall fire resistance blockseal [34] to the fireseal retainer [36] (View A-A, Figure 404).

(c) Slide the forward firewall blockseal [35] out of the fireseal retainer [36].

(d) Slide the forward firewall fire resistance blockseal [34] out of the fireseal retainer [36].

SUBTASK 78-31-12-020-027-G00

(2) Do these steps to remove the main fire seal [33] from the right side thrust reverser (Figure 404).

(a) Remove all of the sealant that bonds the main fire seal [33] to the fireseal retainer [36] (View A-A, Figure 404).

(b) Insert a plastic scraper, STD-765, into the unsealed aft edge of the main fire seal [33] to remove approximately 3.0 in. (76.2 mm) of the main fire seal [33] from the fireseal retainer [27].

(c) Use the plastic scraper, STD-765, to remove the upper unsealed edge of the main fire seal [33] from the fireseal retainer [36] in the direction from the aft edge to the forward edge.

(d) Use the removed aft 3.0 in. (76.2 mm) of the main fire seal [33] to pull the rest main fire seal [33] outwards and up at a 45 degree angle from the insulation blanket.

(e) Continue to remove the main fire seal [33] at the same time a second person will break any sealant beads with a sharpened plastic scraper, STD-765.

1) If it is necessary, monitor the removal of the main fire seal [33] with a mirror.

(f) Remove the main fire seal [33] from the fireseal retainer [36].

SUBTASK 78-31-12-020-028-G00

(3) Do these steps to remove the fire seal [37] from the right side thrust reverser (View B-B, Figure 404):

(a) Remove all of the sealant that bonds the fire seal [37] to the fireseal retainer [36].

(b) Slide the fire seal [37] out of the fireseal retainer [36].

SUBTASK 78-31-12-020-029-G00

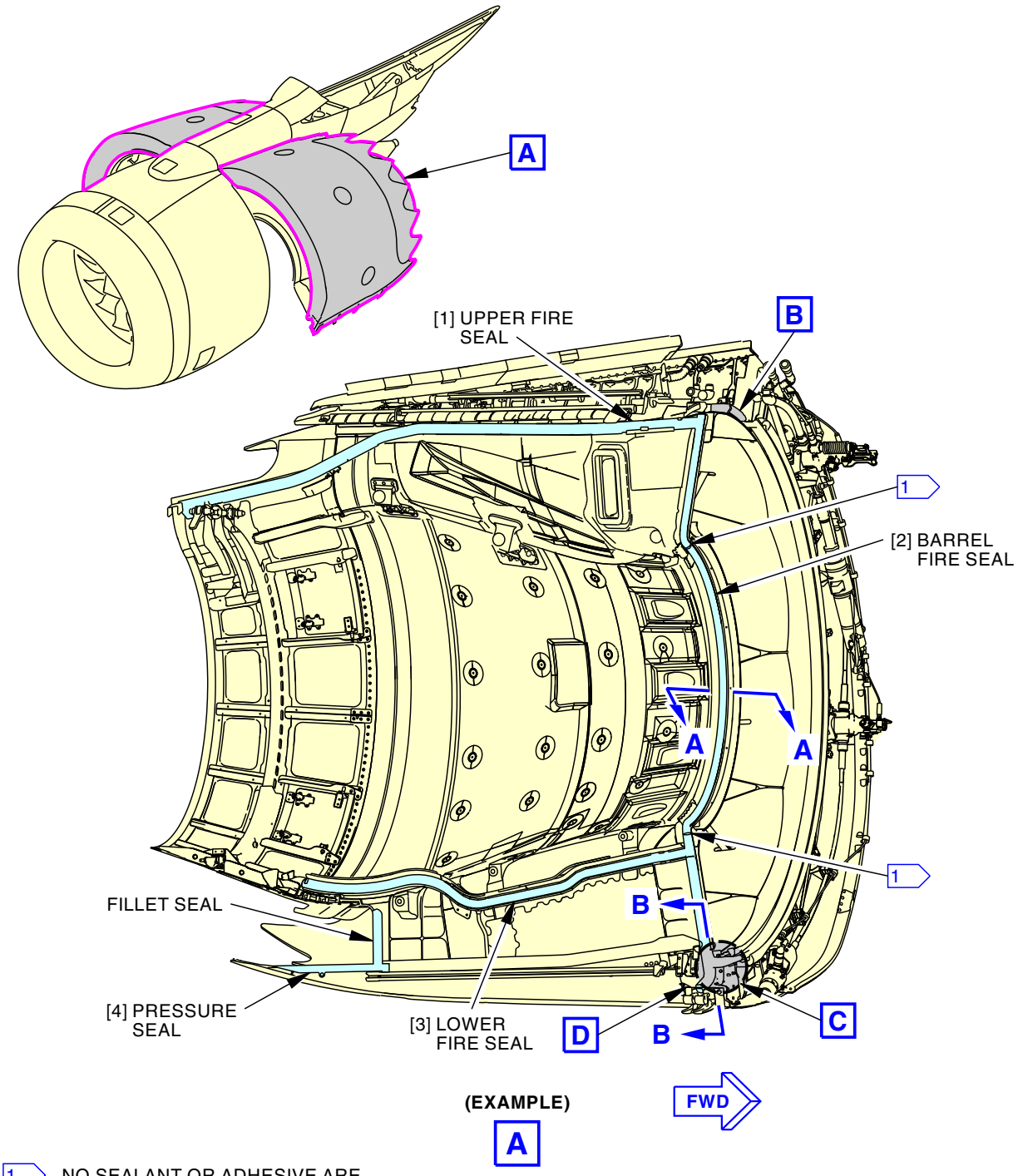
(4) Do these steps to remove the forward latch beam fire seal [38] from the right side thrust reverser (View C, Figure 404):

(a) Remove the two bolts [39], two washers [40], and two collars [41].

(b) Use the plastic scraper, STD-765, to remove the forward latch beam fire seal [38] from the structure.

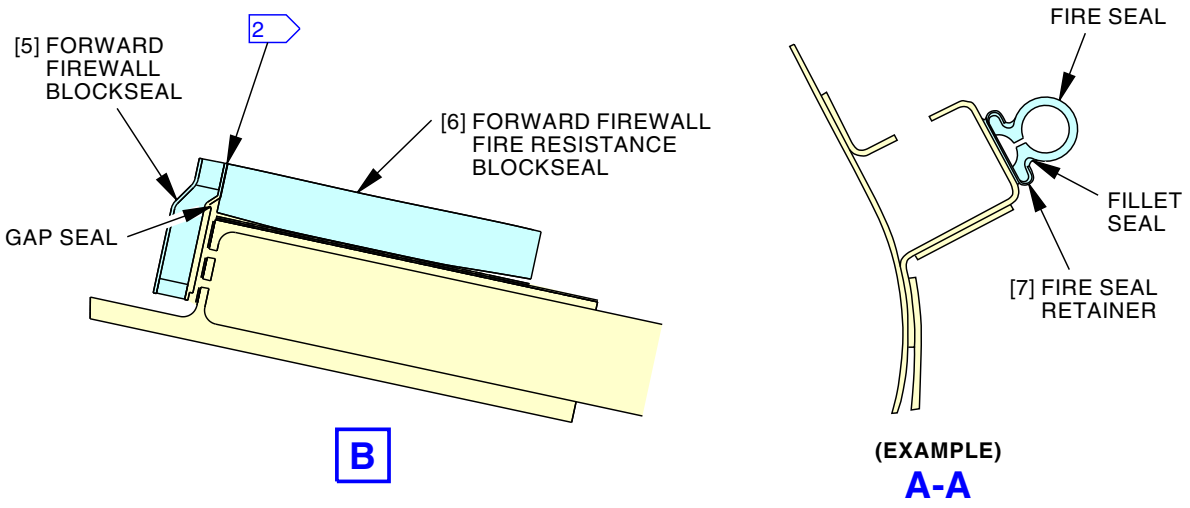
END OF TASK

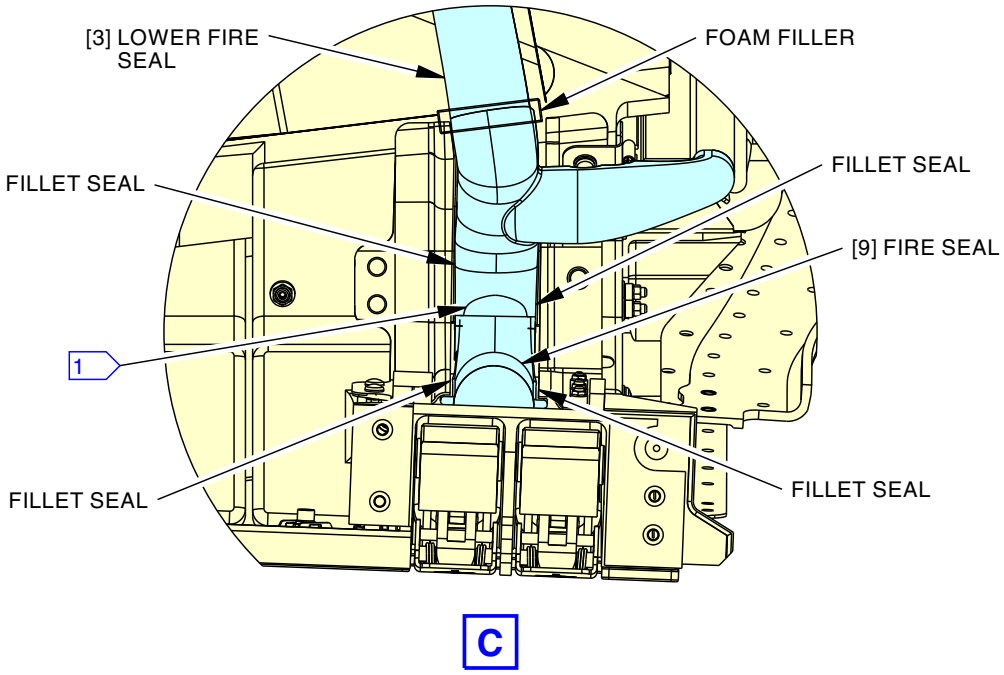
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Side Thrust Reverser Fire Seal Installation
Figure 401/78-31-12-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



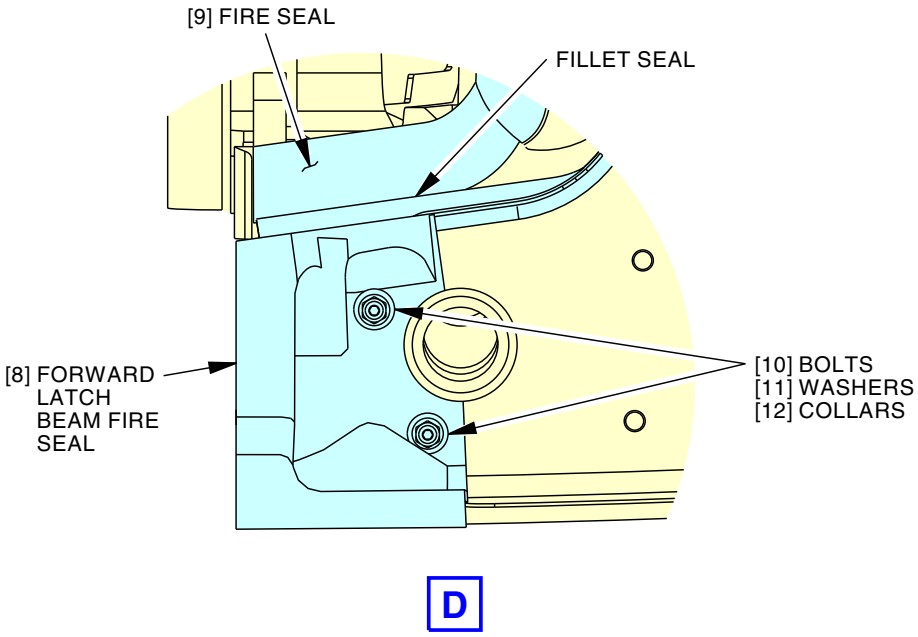


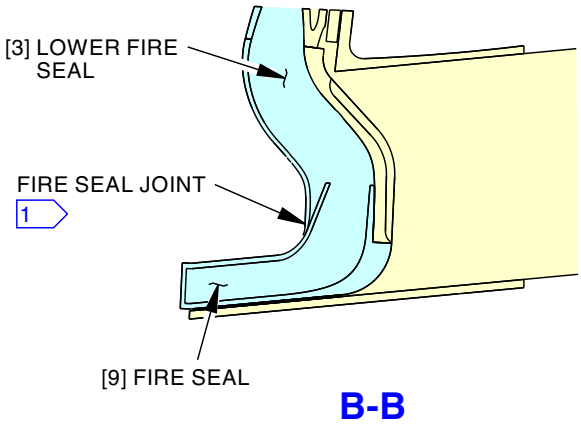
2 THE SURFACES MUST BE FLUSH BEFORE YOU APPLY ADHESIVE.

2355254 S00061516839_V3

Left Side Thrust Reverser Fire Seal Installation
Figure 401/78-31-12-990-801-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

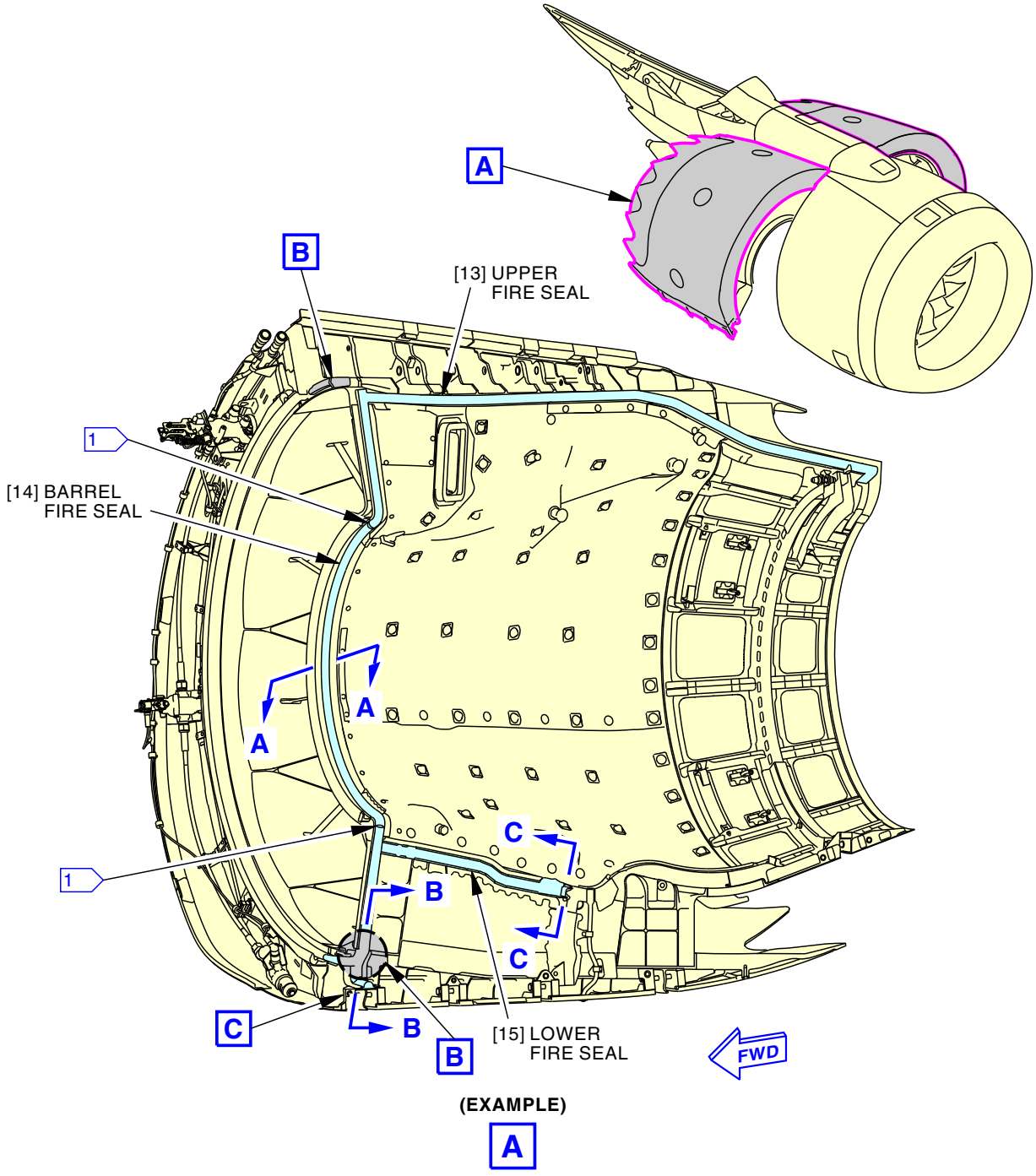




2968935 S0000748079_V1

Left Side Thrust Reverser Fire Seal Installation
Figure 401/78-31-12-990-801-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

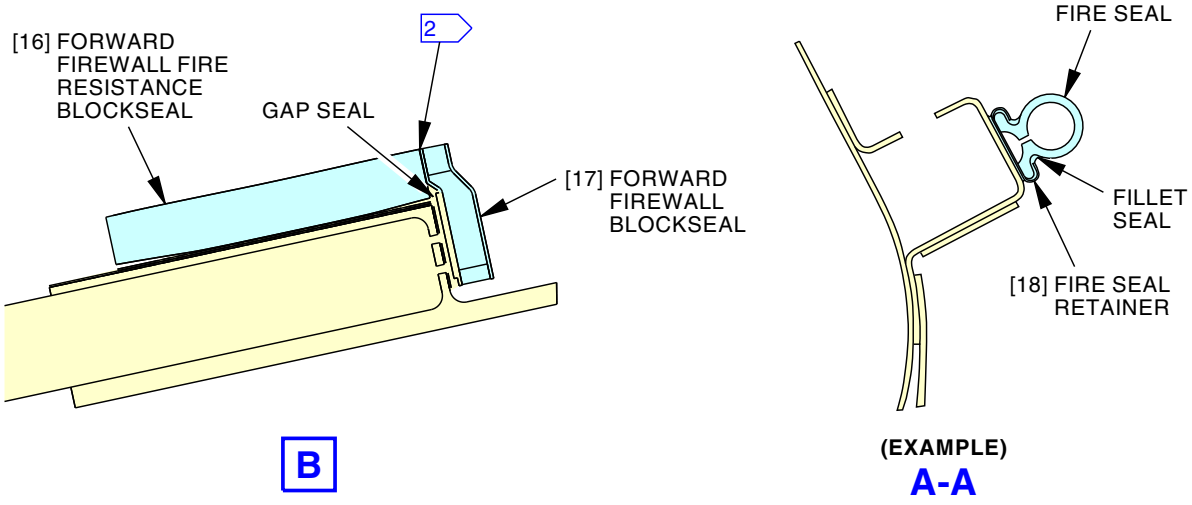


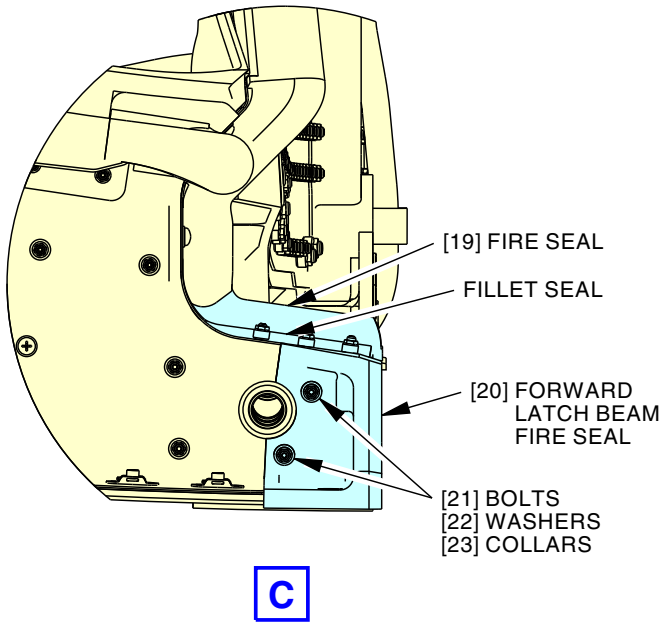
1 NO SEALANT OR ADHESIVE ARE ACCEPTABLE TO JOINT BETWEEN SEAL.

2355256 S00061516841_V5

Right Side Thrust Reverser Fire Seal Installation
Figure 402/78-31-12-990-802-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



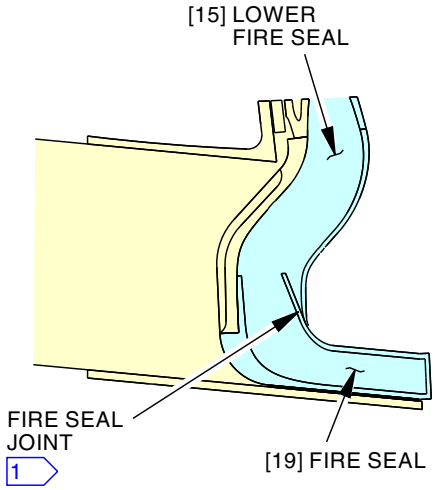


2 THE SURFACES MUST BE FLUSH BEFORE YOU APPLY ADHESIVE.

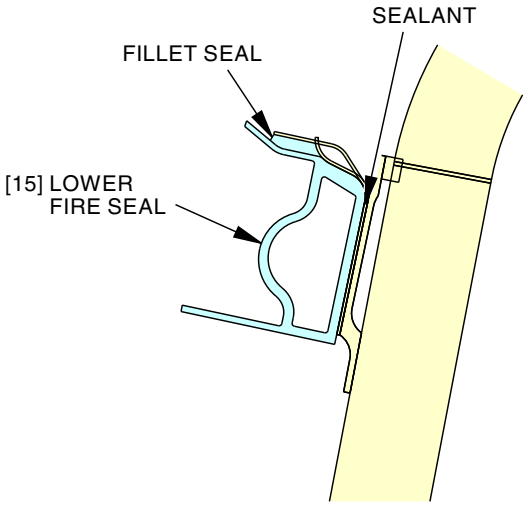
2355257 S00061516842_V4

Right Side Thrust Reverser Fire Seal Installation
Figure 402/78-31-12-990-802-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



B-B

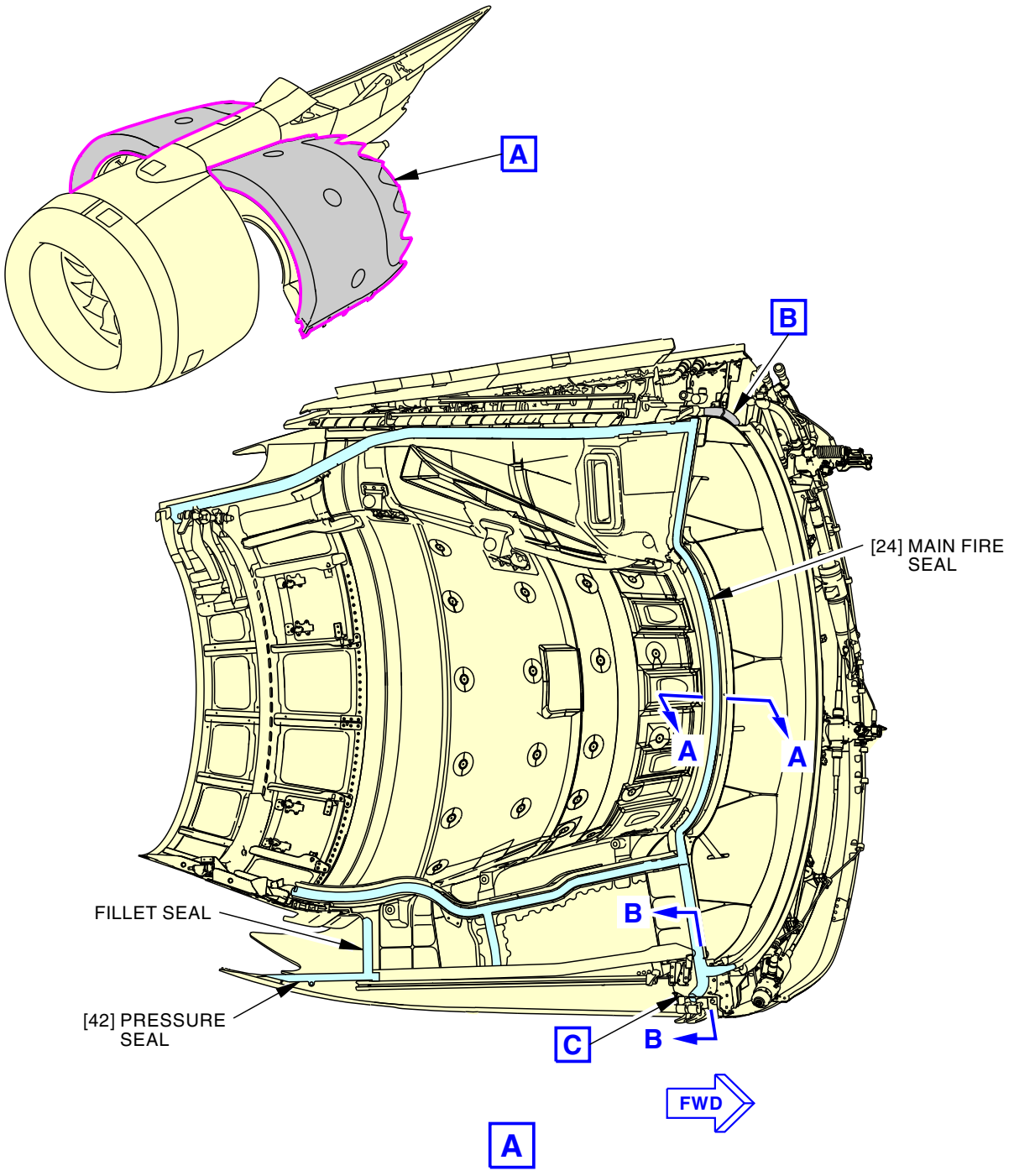


C-C

2968948 S0000748080_V1

Right Side Thrust Reverser Fire Seal Installation
Figure 402/78-31-12-990-802-G00 (Sheet 3 of 3)

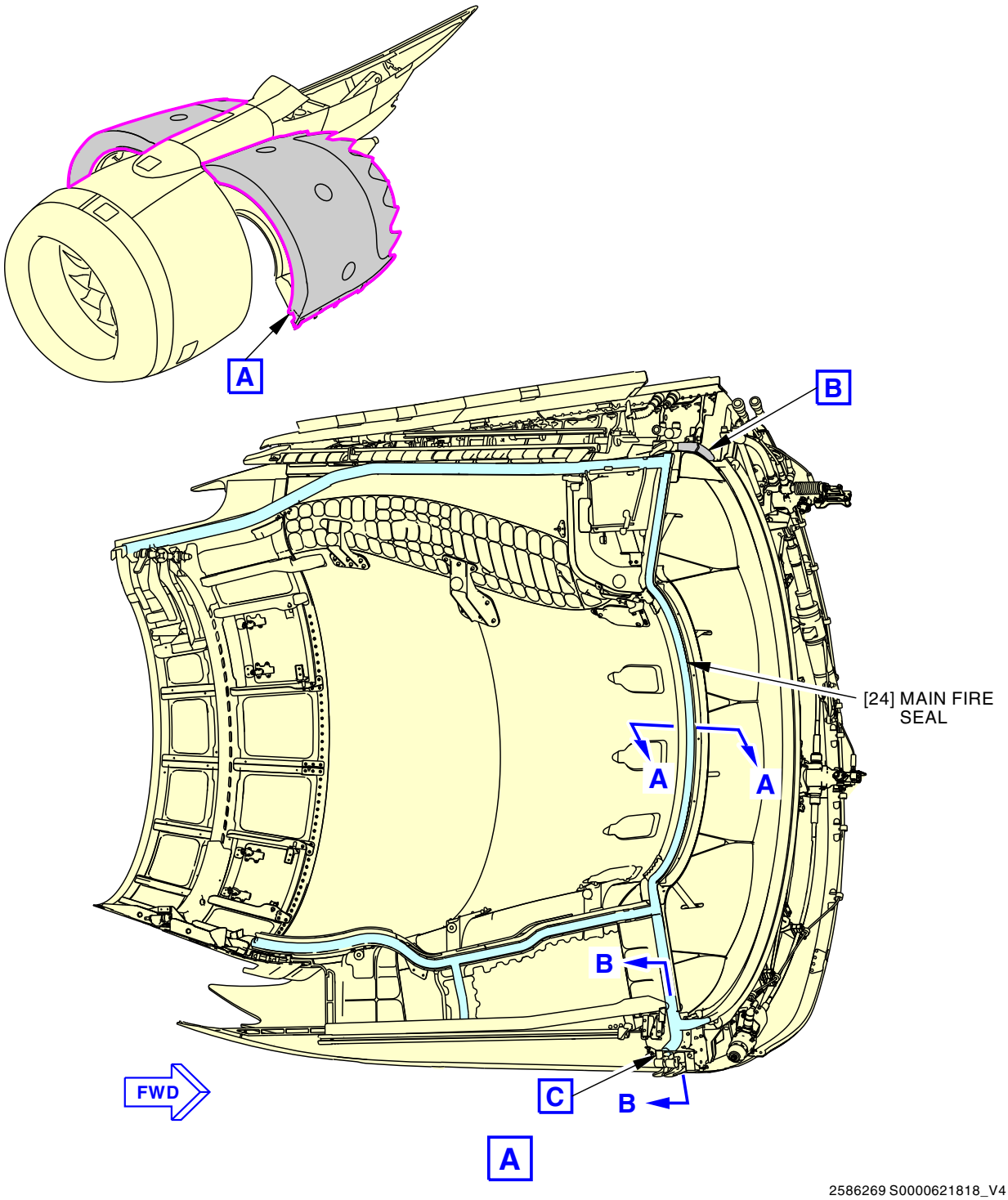
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355253 S00061516838_V5

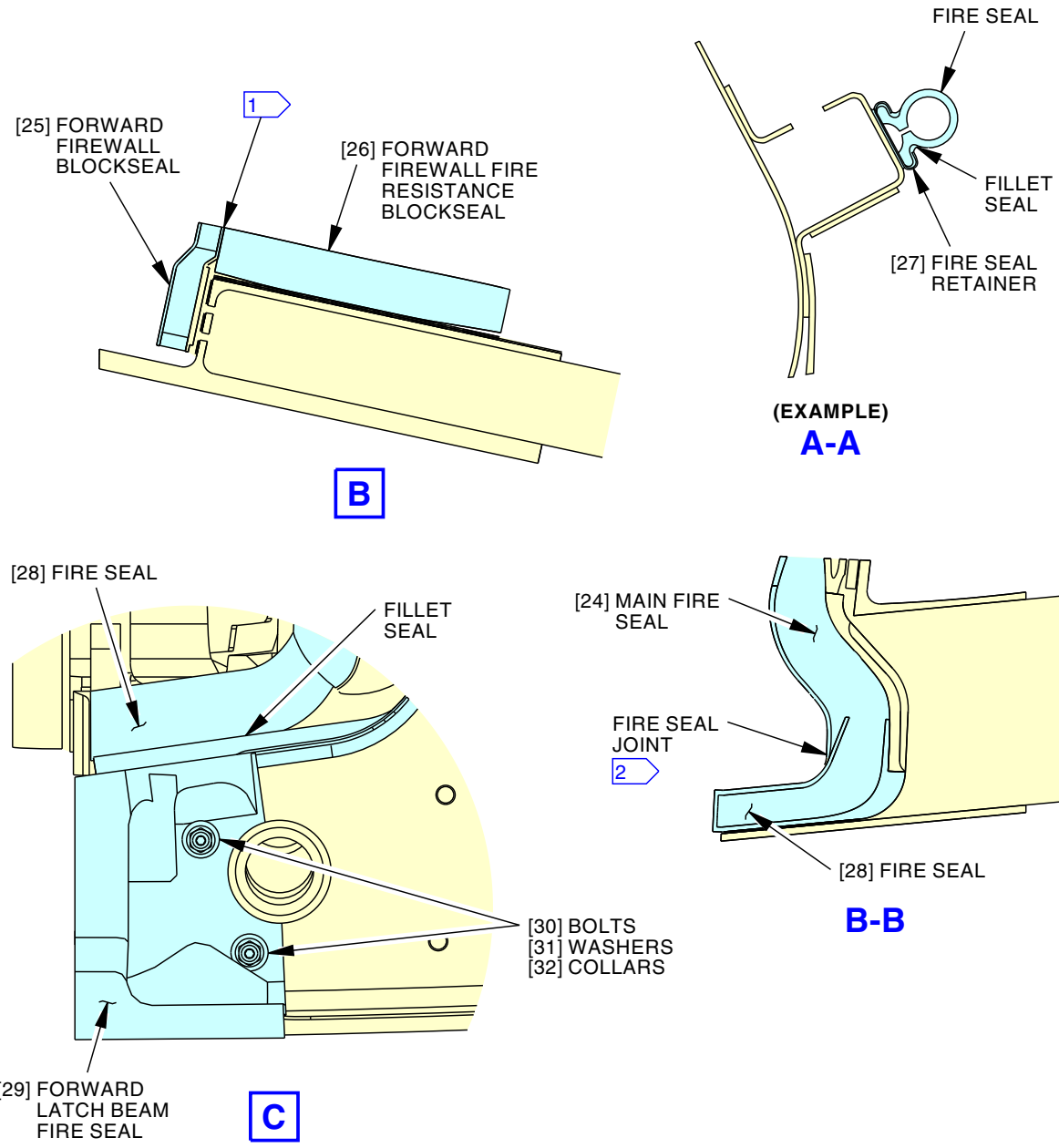
Left Side Thrust Reverser Fire Seal Installation
Figure 403/78-31-12-990-806-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Side Thrust Reverser Fire Seal Installation
Figure 403/78-31-12-990-806-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



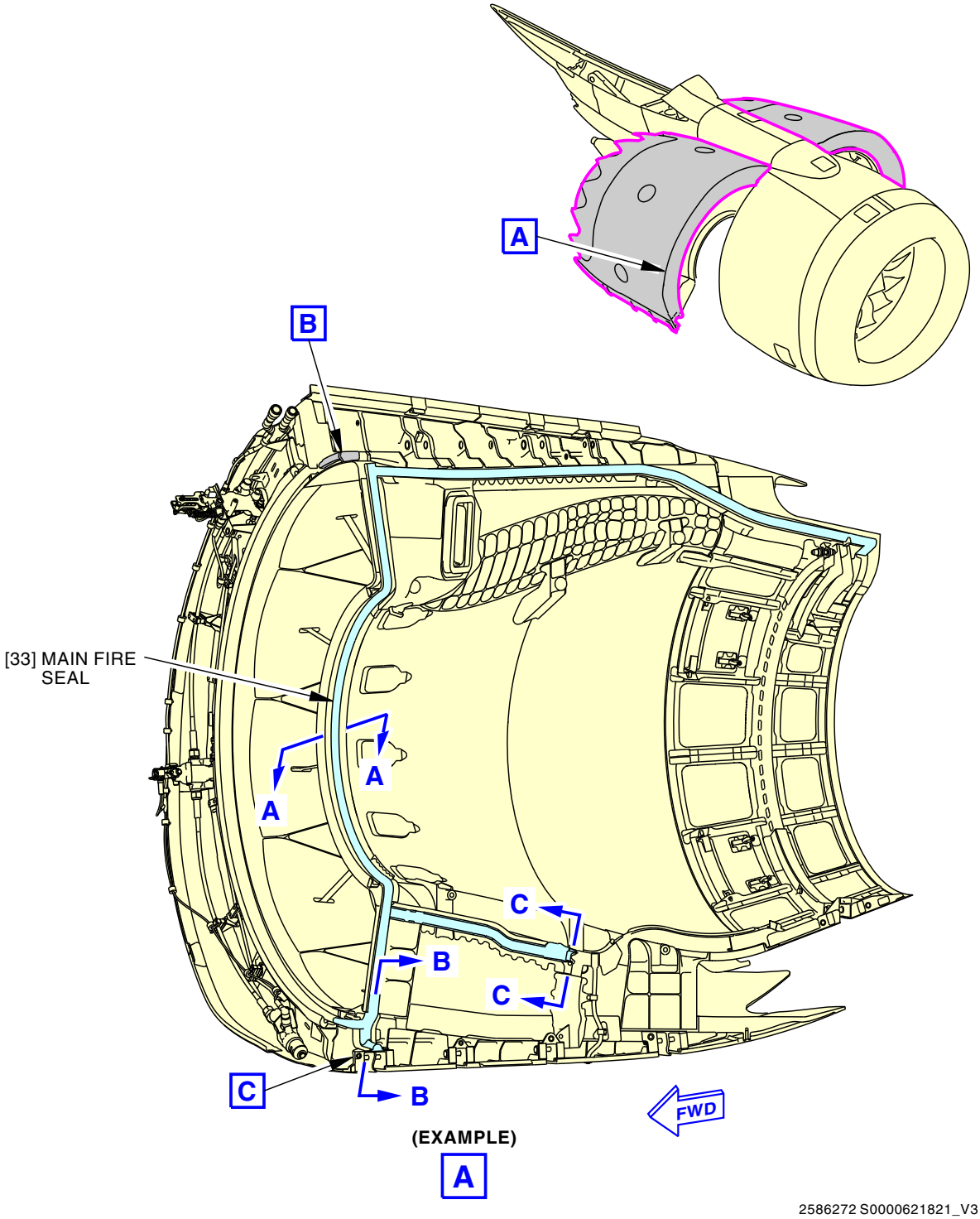
1 THE SURFACES MUST BE FLUSH BEFORE YOU APPLY ADHESIVE.

2 NO SEALANT OR ADHESIVE ARE ACCEPTABLE TO JOINT BETWEEN SEAL.

2948126 S0000725055_V2

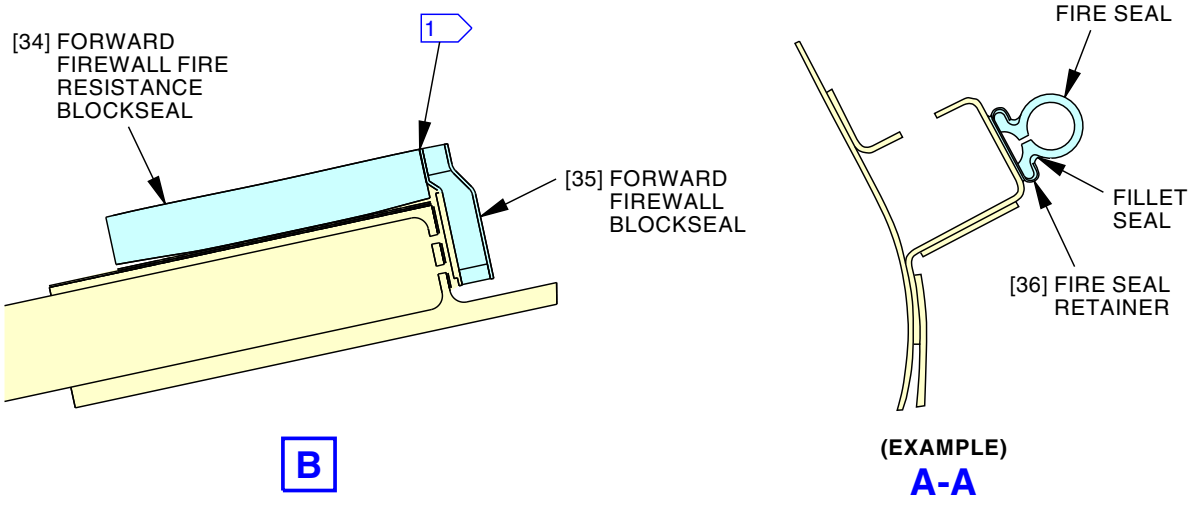
Left Side Thrust Reverser Fire Seal Installation
Figure 403/78-31-12-990-806-G00 (Sheet 3 of 3)

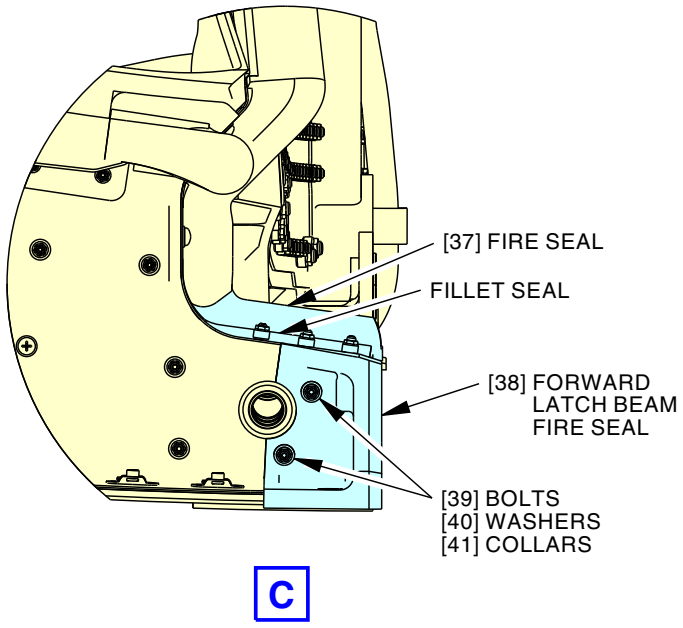
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Right Side Thrust Reverser Fire Seal Installation
Figure 404/78-31-12-990-807-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



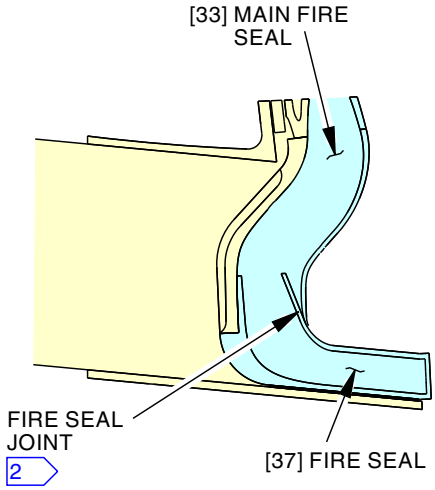


1 THE SURFACES MUST BE FLUSH BEFORE YOU APPLY ADHESIVE.

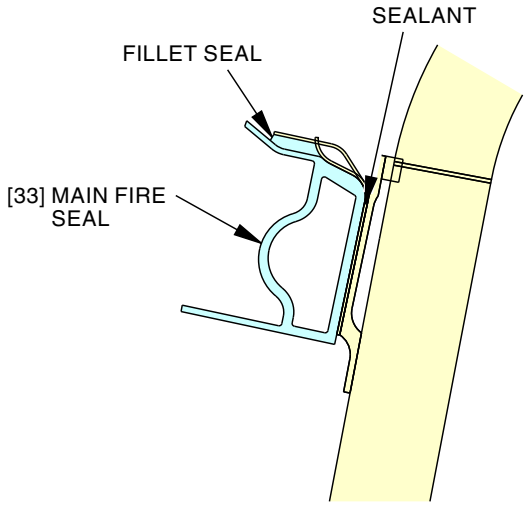
2948138 S0000725056_V2

Right Side Thrust Reverser Fire Seal Installation
Figure 404/78-31-12-990-807-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



B-B



C-C

2 NO SEALANT OR ADHESIVE ARE ACCEPTABLE TO JOINT BETWEEN SEAL.

2969047 S0000748082_V1

Right Side Thrust Reverser Fire Seal Installation
Figure 404/78-31-12-990-807-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-12-400-801-G00

3. Fire Seal Installation

(Figure 401, Figure 402, Figure 403, Figure 404)

A. General

(1) This task provides instruction for the installation of the fire seals for the left or right thrust reverser.

(2) It is important that all sealants are applied correctly. The incorrect application of sealants can decrease the fire protection of the fire seals.

(3) For this task the lower fire seal/aero blockseal will be referred to as the blockseal.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-12-800-801-G00	Fire Seal Compression Check (P/B 601)

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-4127	Durometer Part #: H-1000-A Supplier: 1GGG5
STD-765	Scraper - Plastic

D. Consumable Materials

Reference	Description	Specification
A00081	Adhesive - Silicone Rubber - RTV 106	BAC5010 Type 74
A50096	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Upper fire seal	78-31-12-05-165	SIA 006-999
2	Barrel fire seal	78-31-12-05-160	SIA 006-999
3	Lower fire seal	78-31-12-05-170	SIA 006-999
4	Pressure seal	78-31-12-05-142	SIA ALL
13	Upper fire seal	78-31-12-06-095	SIA 006-999
14	Barrel fire seal	78-31-12-06-090	SIA 006-999
15	Lower fire seal	78-31-12-06-100	SIA 006-999

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F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

H. Prepare for the Installation

SUBTASK 78-31-12-010-002-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
426	Right Thrust Reverser, Engine 2

I. Left Side Thrust Reverser Fire Seal Installation

SUBTASK 78-31-12-420-013-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure that the new pressure seal [4] is installed on the left side thrust reverser (View A, Figure 401).

(a) If the new pressure seal [4] is installed, skip these steps.

(b) If the pressure seal [42] is installed, do these steps (Figure 403):

1) Remove the old pressure seal [42] refer to Paragraph I. (1) (TASK 78-31-12-000-801-G00).

2) Clean all the sealant residue from the inner wall with solvent, B00062.

3) Install the pressure seal [4] on the inner wall (Figure 401).

4) Apply RTV 106 adhesive, A00081, to bond the mounting surface of the pressure seal [4] to inner wall.

a) Completely seal all gaps under bond joint to ensure a continuous bond.

5) Apply RTV 106 adhesive, A00081, to form fillet seal around contour of pressure seal [4].

NOTE: Do not mix materials for the bonding and fillet sealing.

SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL

SUBTASK 78-31-12-420-001-G00

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.

(2) Do these steps to install the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] on the left side thrust reverser (View B, Figure 401):

(a) Clean all the sealant residue from the fireseal retainer [7] with solvent, B00062.

(b) Slide the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] into the fireseal retainer [7] sections.

(c) Position the forward firewall blockseal [5] with end surface flush with the surface of forward firewall fire resistance blockseal [6].

(d) Make sure that the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] are flush.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

(e) Apply sealant, A50096, along the forward firewall blockseal [5] and forward firewall fire resistance blockseal [6] to seal gaps.

NOTE: The indication of the fillet seal is not required.

SUBTASK 78-31-12-420-002-G00

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.

(3) Do these steps to install the upper fire seal [1] on the left side thrust reverser (Figure 401):

NOTE: The joint between the upper fire seal and barrel fire seal slips. Do not apply sealant in this area.

(a) Clean all the sealant residue from the fireseal retainer [7] with solvent, B00062.

(b) Compress the upper fire seal [1] foot into the fireseal retainer [7] along the length of the fireseal retainer [7].

1) Use a plastic scraper, STD-765, with a twisting motion to push the upper fire seal [1] foot into the fireseal retainer [7].

(c) Do these steps to seal the edges of the upper fire seal [1]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the upper fire seal [1] and fireseal retainer [7].

3) Completely fill all gaps between the fireseal retainer [7] sections to ensure a continuous seal.

SUBTASK 78-31-12-400-001-G00

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.

(4) Do these steps to install the barrel fire seal [2] on the left side thrust reverser (Figure 401):

NOTE: The joints between the barrel fire seal, upper fire seal, and lower fire seal slips. Do not apply sealant in these areas.

(a) Clean all the sealant residue from the fireseal retainer [7] with solvent, B00062.

(b) Compress the barrel fire seal [2] foot into the fireseal retainer [7] along the length of the fireseal retainer [7].

1) Use a plastic scraper, STD-765, with a twisting motion to push the barrel fire seal [2] foot into the fireseal retainer [7].

(c) Do these steps to seal the edges of the barrel fire seal [2]:

1) Clean the areas to be sealed with solvent, B00062.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the barrel fire seal [2] and fireseal retainer [7].

3) Completely fill all gaps between fireseal retainer [7] sections to ensure a continuous seal.

SUBTASK 78-31-12-400-002-G00

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.

(5) Do these steps to install the lower fire seal [3] on the left side thrust reverser (Figure 401):

NOTE: The joint between the barrel fire seal and lower fire seal slips. Do not apply sealant in this area.

(a) Clean all the sealant residue from the fireseal retainer [7] with solvent, B00062.

(b) Compress the lower fire seal [3] foot into the fireseal retainer [7] along the length of the fireseal retainer [7].

1) Use a plastic scraper, STD-765, with a twisting motion to push the lower fire seal [3] foot into the fireseal retainer [7].

(c) Do these steps to seal the edges of the lower fire seal [3]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the lower fire seal [3] and fireseal retainer [7].

3) Completely fill all gaps between the fireseal retainer [7] sections to ensure a continuous seal.

(d) Apply RTV 106 adhesive, A00081, to mounting surface of the foam filler.

1) Completely seal all gaps under bond joint to ensure a continuous bond.

SUBTASK 78-31-12-420-014-G00

(6) Do these steps to install the fire seal [9] on the left side thrust reverser (View B-B and View C, Figure 401):

(a) Clean all the sealant residue from the fireseal retainer [7] with solvent, B00062.

(b) Compress the fire seal [9] foot into the fireseal retainer [7] along the length of the fireseal retainer [7].

1) Use a plastic scraper, STD-765, with a twisting motion to push the fire seal [9] foot into the fireseal retainer [7].

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-400-003-G00

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.

(7) Do these steps to install the forward latch beam fire seal [8] on the left side thrust reverser (View D, Figure 401):

(a) Apply RTV 106 adhesive, A00081, to the mating surface of the forward latch beam fire seal [8].

(b) Install the two bolts [10], two washers [11], and two collars [12].

1) Hand tighten the two collars [12] until two washers [11] is snug against the surface of seal.

2) Tighten the two collars [12] one half revolution.

3) Make sure that there is minimum amount of the squeeze-out.

(c) Make sure that each fastener is not loose.

(d) Make sure that the two bolts [10] show thread protrusion through the two collars [12].

SUBTASK 78-31-12-390-001-G00

(8) Let all the sealant cure as follows:

(a) Let RTV 106 adhesive, A00081, cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

WARNING

DO NOT USE DECREASED CURE TIME FOR A SERVICE BULLETIN WITH AN AIRWORTHINESS DIRECTIVE AGAINST IT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

1) To decrease the cure time, do this:

NOTE: The cure time may be decreased if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

NOTE: The cure time is dependent on both heat and humidity conditions. Cure time decreases with higher heat, only if the local humidity remains high. In low humidity conditions, the seal may take more time to cure.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

c) After 4 hours, do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

d) If after 4 hours the seal is not cured, check again every 4 hours until the durometer verifies that the sealant is cured. Do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

(b) Let sealant, A50096, cure at 72°F (22°C) to 82°F (28°C) for 14 hours.

SUBTASK 78-31-12-750-001-G00

(9) Do this task: Fire Seal Compression Check, TASK 78-31-12-800-801-G00.

J. Right Side Thrust Reverser Fire Seal Installation

SUBTASK 78-31-12-420-015-G00

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.

(1) Do these steps to install the forward firewall fire resistance blockseal [16] and forward firewall blockseal [17] on the right side thrust reverser (View B, Figure 402):

(a) Clean all the sealant residue from the fireseal retainer [18] with solvent, B00062.

(b) Slide the forward firewall fire resistance blockseal [16] and forward firewall blockseal [17] into the fireseal retainer [18] sections.

(c) Position the forward firewall blockseal [17] with end surface flush with the surface of forward firewall fire resistance blockseal [16].

(d) Make sure that the forward firewall fire resistance blockseal [16] and forward firewall blockseal [17] are flush.

(e) Apply sealant, A50096, along the forward firewall fire resistance blockseal [16] and forward firewall blockseal [17] to seal gaps.

NOTE: The indication of the fillet seal is not required.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-420-016-G00

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.

(2) Do these steps to install the upper fire seal [13] on the right side thrust reverser (Figure 402):

NOTE: The joint between the upper fire seal and barrel fire seal slips. Do not apply sealant in this area.

(a) Clean all the sealant residue from the fireseal retainer [18] with solvent, B00062.

(b) Compress the upper fire seal [13] foot into the fireseal retainer [18] along the length of the fireseal retainer [18].

1) Use a plastic scraper, STD-765, with a twisting motion to push the upper fire seal [13] foot into the fireseal retainer [18].

(c) Do these steps to seal the edges of the upper fire seal [13]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the upper fire seal [13] and fireseal retainer [18].

3) Completely fill all gaps between the fireseal retainer [18] sections to ensure a continuous seal.

SUBTASK 78-31-12-420-020-G00

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.

(3) Do these steps to install the barrel fire seal [14] on the right side thrust reverser (Figure 402):

NOTE: The joints between the barrel fire seal, upper fire seal, and lower fire seal slips. Do not apply sealant in these areas.

(a) Clean all the sealant residue from the fireseal retainer [18] with solvent, B00062.

(b) Compress the barrel fire seal [14] foot into the fireseal retainer [18] along the length of the fireseal retainer [18].

1) Use a plastic scraper, STD-765, with a twisting motion to push the barrel fire seal [14] foot into the fireseal retainer [18].

(c) Do these steps to seal the edges of the barrel fire seal [14]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the barrel fire seal [14] and fireseal retainer [18].

3) Completely fill all gaps between the fireseal retainer [18] sections to ensure a continuous seal.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-420-021-G00

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.

(4) Do these steps to install the lower fire seal [15] on the right side thrust reverser (Figure 402):

NOTE: The joint between the barrel fire seal and lower fire seal slips. Do not apply sealant in this area.

(a) Clean all the sealant residue from the fireseal retainer [18] with solvent, B00062.

(b) Compress the lower fire seal [15] foot into the fireseal retainer [18] along the length of the fireseal retainer [18].

1) Use a plastic scraper, STD-765, with a twisting motion to push the lower fire seal [15] foot into the fireseal retainer [18].

(c) Do these steps to seal the edges of the lower fire seal [15]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the lower fire seal [15] and fireseal retainer [18].

3) Completely fill all gaps between the fireseal retainer [18] sections to ensure a continuous seal.

(d) Apply RTV 106 adhesive, A00081, to mounting surface of the foam filler.

1) Completely seal all gaps under bond joint to ensure a continuous bond.

(e) Apply RTV 106 adhesive, A00081, or sealant, A50096, between the lower fire seal [15] and fire seal support (View C-C, Figure 402).

SUBTASK 78-31-12-420-022-G00

(5) Do these steps to install the fire seal [19] on the right side thrust reverser (View B-B, Figure 402):

(a) Clean all the sealant residue from the fireseal retainer [18] with solvent, B00062.

(b) Compress the fire seal [19] foot into the fireseal retainer [18] along the length of the fireseal retainer [18].

1) Use a plastic scraper, STD-765, with a twisting motion to push the fire seal [19] foot into the fireseal retainer [18].

(c) Apply RTV 106 adhesive, A00081, to mounting surface of fire seal [19] and fireseal retainer [18].

(d) Make sure that there are non-continuous gaps greater than 0.03 in. (0.76 mm) between the fire seal flange and Thrust Reverser structure.

(e) If continuous gap or non-continuous gap greater than 0.03 in. (0.76 mm) exist, trim 0.100 in. (2.54 mm) maximum of fire seal [19] at the contact of lower fire seal [15].

1) Apply lightly coat RTV 106 adhesive, A00081, on the trimmed edge.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-420-023-G00

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.

(6) Do these steps to install the forward latch beam fire seal [20] on the right side thrust reverser (View C, Figure 402):

(a) Apply RTV 106 adhesive, A00081, to the mating surface of the forward latch beam fire seal [20].

(b) Install the two bolts [21], two washers [22], and two collars [23].

1) Hand tighten the two collars [23] until two washers [22] is snug against the surface of seal.

2) Tighten the two collars [23] one half revolution.

3) Make sure that there is minimum amount of the squeeze-out.

(c) Make sure that each fastener is not loose.

(d) Make sure that the two bolts [21] show thread protrusion through the two collars [23].

SUBTASK 78-31-12-420-017-G00

(7) Let all the sealant cure as follows:

(a) Let RTV 106 adhesive, A00081, cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

WARNING

DO NOT USE DECREASED CURE TIME FOR A SERVICE BULLETIN WITH AN AIRWORTHINESS DIRECTIVE AGAINST IT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

1) To decrease the cure time to do this:

NOTE: The cure time may be decreased to 14 hours if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

NOTE: The cure time is dependent on both heat and humidity conditions. Cure time decreases with higher heat, only if the local humidity remains high. In low humidity conditions, the seal may take more time to cure.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

c) After 4 hours, do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

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SIA ALL; AIRPLANES WITH 3 PIECE FIRE SEAL (Continued)

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

d) If after 4 hours the seal is not cured, check again every 4 hours until the durometer verifies that the sealant is cured. Do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

(b) Let sealant, A50096, cure at 72°F (22°C) to 82°F (28°C) for 14 hours.

SUBTASK 78-31-12-750-008-G00

(8) Do this task: Fire Seal Compression Check, TASK 78-31-12-800-801-G00.

SIA ALL

K. Left Side Thrust Reverser Fire Seal Installation

SUBTASK 78-31-12-420-024-G00

(1) Check the type of the main fire seal [24] is installed.

(a) If the main fire seal [24] is replaced with new upper fire seal [1], new barrel fire seal [2], and new lower fire seal [3], refer to Paragraph I.

(b) If the main fire seal [24] is replaced with new main fire seal [24], continue the procedure.

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL

SUBTASK 78-31-12-420-003-G00

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.

(2) Do these steps to install the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] on the left side thrust reverser (View B, Figure 403):

(a) Clean all the sealant residue from the fireseal retainer [27] with solvent, B00062.

(b) Slide the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] into the fireseal retainer [27] sections.

(c) Position the forward fireseal blockseal [25] with end surface flush with the surface of forward firewall fire resistance blockseal [26].

(d) Make sure that the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] are flush.

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SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

(e) Apply sealant, A50096, along the forward fireseal blockseal [25] and forward firewall fire resistance blockseal [26] to seal gaps.

NOTE: The indication of the fillet seal is not required.

SUBTASK 78-31-12-420-011-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do these steps to install the main fire seal [24] on the left side thrust reverser (Figure 403):

(a) Clean all the sealant residue from the fireseal retainer [27] with solvent, B00062.

(b) Compress the main fire seal [24] foot into the fireseal retainer [27] along the length of the fireseal retainer [27].

1) Use a plastic scraper, STD-765, with a twisting motion to push the main fire seal [24] foot into the fireseal retainer [27].

(c) Do these steps to seal the edges of the main fire seal [24]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the main fire seal [24] and fireseal retainer [27].

3) Completely fill all gaps between the fireseal retainer [27] sections to ensure a continuous seal.

SUBTASK 78-31-12-420-004-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do these steps to install the fire seal [28] on the left side thrust reverser (View B-B, Figure 403):

NOTE: The joints between the main fire seal fire seal slips. Do not apply sealant in these areas.

(a) Clean all the sealant residue from the fireseal retainer [27] with solvent, B00062.

(b) Compress the fire seal [28] foot into the fireseal retainer [27] along the length of the fireseal retainer [27].

1) Use a plastic scraper, STD-765, with a twisting motion to push the fire seal [28] foot into the fireseal retainer [27].

(c) Apply RTV 106 adhesive, A00081, to form fillet seal between the fire seal [28] and fireseal retainer [27].

(d) Completely fill all gaps between the fireseal retainer [27] sections to ensure a continuous seal.

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SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-420-018-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do these steps to install the forward latch beam fire seal [29] on the left side thrust reverser (View C, Figure 403):

(a) Apply RTV 106 adhesive, A00081, to the mating surface of the forward latch beam fire seal [29].

(b) Install the two bolts [30], two washers [31], and two collars [32].

1) Hand tighten the two collars [32] until two washers [31] is snug against the surface of seal.

2) Tighten the two collars [32] one half revolution.

3) Make sure that there is minimum amount of the squeeze-out.

(c) Make sure that each fastener is not loose.

(d) Make sure that the two washers [31] show thread protrusion through the two collars [32].

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL COMPOSITE INNER WALL

SUBTASK 78-31-12-420-026-G00

(6) Do these steps to install the pressure seal [42] on the left side thrust reverser (View A, Figure 403):

(a) Clean all the sealant residue from the inner wall with solvent, B00062.

(b) Install the pressure seal [42] on the inner wall.

(c) Apply RTV 106 adhesive, A00081, to bond the mounting surface of the pressure seal [42] to inner wall.

1) Completely seal all gaps under bond joint to ensure a continuous bond.

(d) Apply RTV 106 adhesive, A00081, to form fillet seal around contour of pressure seal [42].

NOTE: Do not mix materials for the bonding and fillet sealing.

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL

SUBTASK 78-31-12-390-004-G00

(7) Let all the sealant cure as follows:

(a) Let RTV 106 adhesive, A00081, cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

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SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

WARNING DO NOT USE DECREASED CURE TIME FOR A SERVICE BULLETIN WITH AN AIRWORTHINESS DIRECTIVE AGAINST IT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

1) To decrease the cure time to do this:

NOTE: The cure time may be decreased to 14 hours if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

NOTE: The cure time is dependent on both heat and humidity conditions. Cure time decreases with higher heat, only if the local humidity remains high. In low humidity conditions, the seal may take more time to cure.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

c) After 4 hours, do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

d) If after 4 hours the seal is not cured, check again every 4 hours until the durometer verifies that the sealant is cured. Do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

(b) Let sealant, A50096 cure at 72°F (22°C) to 82°F (28°C) for 14 hours.

SUBTASK 78-31-12-750-006-G00

(8) Do this task: Fire Seal Compression Check, TASK 78-31-12-800-801-G00.

SIA ALL

L. Right Thrust Reverser Fire Seal Installation

SUBTASK 78-31-12-420-025-G00

(1) Check the type of the main fire seal [33] is installed.

(a) If the main fire seal [33] is replaced with new upper fire seal [13], new barrel fire seal [14], and new lower fire seal [15], refer to Paragraph J.

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(b) If the new main fire seal [33] is replaced with main fire seal [33], continue the procedure.

SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL

SUBTASK 78-31-12-420-005-G00

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.

(2) Do these steps to install the forward firewall fire resistance blockseal [34] and forward firewall blockseal [35] on the right side thrust reverser (View B, Figure 404):

(a) Clean all the sealant residue from the fireseal retainer [27] with solvent, B00062.

(b) Slide the forward firewall blockseal [35] and forward firewall fire resistance blockseal [34] into the fireseal retainer [27] sections.

(c) Position the forward firewall blockseal [35] with end surface flush with the surface of forward firewall fire resistance blockseal [34].

(d) Make sure that the forward firewall blockseal [35] and forward firewall fire resistance blockseal [34] are flush.

(e) Apply sealant, A50096, along the forward firewall fire resistance blockseal [34] and forward firewall blockseal [35] to seal gaps.

NOTE: The indication of the fillet seal is not required.

SUBTASK 78-31-12-420-012-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do these steps to install the main fire seal [33] on the right side thrust reverser (Figure 404):

(a) Clean all the sealant residue from the fireseal retainer [36] with solvent, B00062.

(b) Compress the main fire seal [33] foot into the fireseal retainer [36] along the length of the fireseal retainer [36].

1) Use a plastic scraper, STD-765, with a twisting motion to push the main fire seal [33] foot into the fireseal retainer [36].

(c) Do these steps to seal the edges of the main fire seal [33]:

1) Clean the areas to be sealed with solvent, B00062.

2) Apply RTV 106 adhesive, A00081, to form fillet seal between the main fire seal [33] and fireseal retainer [36].

3) Completely fill all gaps between the fireseal retainer [36] sections to ensure a continuous seal.

(d) Apply RTV 106 adhesive, A00081, or sealant, A50096, between the main fire seal [33] and fire seal support (View C-C, Figure 404).

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SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-420-006-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do these steps to install the fire seal [37] on the right side thrust reverser (View B-B, Figure 404):

NOTE: The joints between the main fire seal fire seal slips. Do not apply sealant in these areas.

(a) Clean all the sealant residue from the fireseal retainer [36] with solvent, B00062.

(b) Compress the fire seal [37] foot into the fireseal retainer [27] along the length of the fireseal retainer [27].

1) Use a plastic scraper, STD-765, with a twisting motion to push the fire seal [37] foot into the fireseal retainer [27].

(c) Apply RTV 106 adhesive, A00081, to the mating surface of the fire seal [37] and fireseal retainer [36].

(d) Make sure that there are non-continuous gaps greater than 0.03 in. (0.76 mm) between the fire seal flange and thrust reverser structure.

(e) If continuous gap or non-continuous gap greater than 0.03 in. (0.76 mm) exist, trim 0.100 in. (2.54 mm) maximum of fire seal [37] at the contact of main fire seal [33].

1) Apply lightly coat RTV 106 adhesive, A00081, on the trimmed edge.

SUBTASK 78-31-12-420-019-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do these steps to install the forward latch beam fire seal [38] on the right side thrust reverser (View C, Figure 404):

(a) Apply RTV 106 adhesive, A00081, to the mating surface of the forward latch beam fire seal [38].

(b) Install the two bolts [39], two washers [40], and two collars [41].

1) Hand tighten the two collars [41] until two washers [40] is snug against the surface of seal.

2) Tighten the two collars [41] one half revolution.

3) Make sure that there is minimum amount of the squeeze-out.

(c) Make sure that each fastener is not loose.

(d) Make sure that the two washers [40] show thread protrusion through the two collars [41].

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SIA ALL; AIRPLANES WITH 1 PIECE FIRE SEAL (Continued)

SUBTASK 78-31-12-390-003-G00

(6) Let all the sealant cure to the time limits as follows:

(a) Let RTV 106 adhesive, A00081, cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

WARNING DO NOT USE DECREASED CURE TIME FOR A SERVICE BULLETIN WITH AN AIRWORTHINESS DIRECTIVE AGAINST IT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

1) To decrease the cure time to do this:

NOTE: The cure time may be decreased to 14 hours if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

NOTE: The cure time is dependent on both heat and humidity conditions. Cure time decreases with higher heat, only if the local humidity remains high. In low humidity conditions, the seal may take more time to cure.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

c) After 4 hours, do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

d) If after 4 hours the seal is not cured, check again every 4 hours until the durometer verifies that the sealant is cured. Do these steps:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127, indication is more than 30, the seal is cured.

<3> Remove the test strip.

NOTE: The durometer indication of more than 30 is required to make sure the seal is cured.

(b) Let sealant, A50096, cure at 72°F (22°C) to 82°F (28°C) for 14 hours.

SUBTASK 78-31-12-750-005-G00

(7) Do this task: Fire Seal Compression Check, TASK 78-31-12-800-801-G00.

SIA ALL

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M. Put the Airplane Back to its Usual Condition

SUBTASK 78-31-12-410-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FIRE SEAL - INSPECTION/CHECK

1. General

A. This procedure has three tasks:

(1) A visual inspection of the fire seal.

(2) A detailed inspection of the fire seal.

(3) A compression check of the fire seal.

TASK 78-31-12-200-801-G00

2. Fire Seal Inspection (Visual Check)

(Figure 601)

A. General

(1) The fire seal is on the inner surface of each thrust reverser on an engine.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Preparation

SUBTASK 78-31-12-010-003-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Procedure

SUBTASK 78-31-12-210-001-G00

(1) Look for missing fire seal and for obvious damage.

(a) If you find damaged or missing fire seal, do this task: Fire Seal Inspection (Detailed), TASK 78-31-12-200-802-G00.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-12-410-002-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

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(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

TASK 78-31-12-200-802-G00

3. Fire Seal Inspection (Detailed)

(Figure 601)

A. General

(1) The fire seal is on the inner surface of each thrust reverser on an engine.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-12 P/B 401	FIRE SEAL - REMOVAL/INSTALLATION
78-31-12-300-801-G00	Fire Seal Repair (P/B 801)
78-31-12-400-801-G00	Fire Seal Installation (P/B 401)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Preparation

SUBTASK 78-31-12-010-004-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Procedure

SUBTASK 78-31-12-220-001-G00

(1) Visually examine the fire seal for the following types of damage:

(a) Cuts, frayed material, missing or loose fire seal, and missing sealant.

SUBTASK 78-31-12-960-002-G00

(2) If you find damage to the AFT area of the top section of the fire seal, replace the fire seal (Figure 602, TASK 78-31-12-300-801-G00).

SUBTASK 78-31-12-960-001-G00

(3) If you find damage or missing fire seal, replace the fire seal (PAGEBLOCK 78-31-12/401).

SUBTASK 78-31-12-211-001-G00

(4) If there is damage to the insulation at the fire seal at the upper bifurcation, do this task: Fire Seal Inspection (Visual Check), TASK 78-31-12-200-801-G00.

SUBTASK 78-31-12-390-002-G00

(5) If sealant is missing, replace the sealant (Fire Seal Installation, TASK 78-31-12-400-801-G00).

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SUBTASK 78-31-12-220-002-G00

(6) Visually examine the fire seal for loose, missing, or damaged fire seal retainers.

(a) If there is loose, missing, or damaged fire seal retainers, tighten or replace the fire seal retainers.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-12-410-003-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

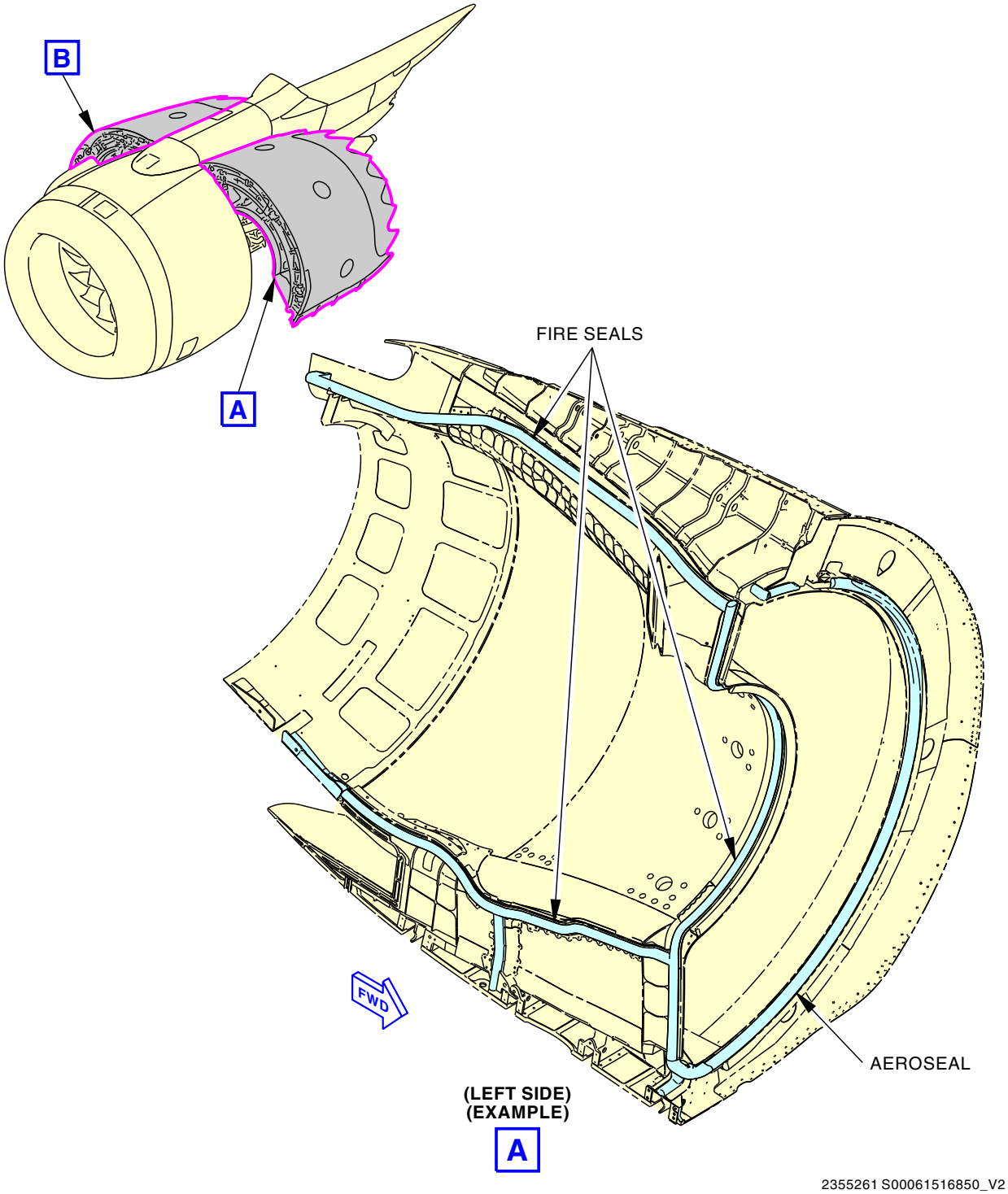
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

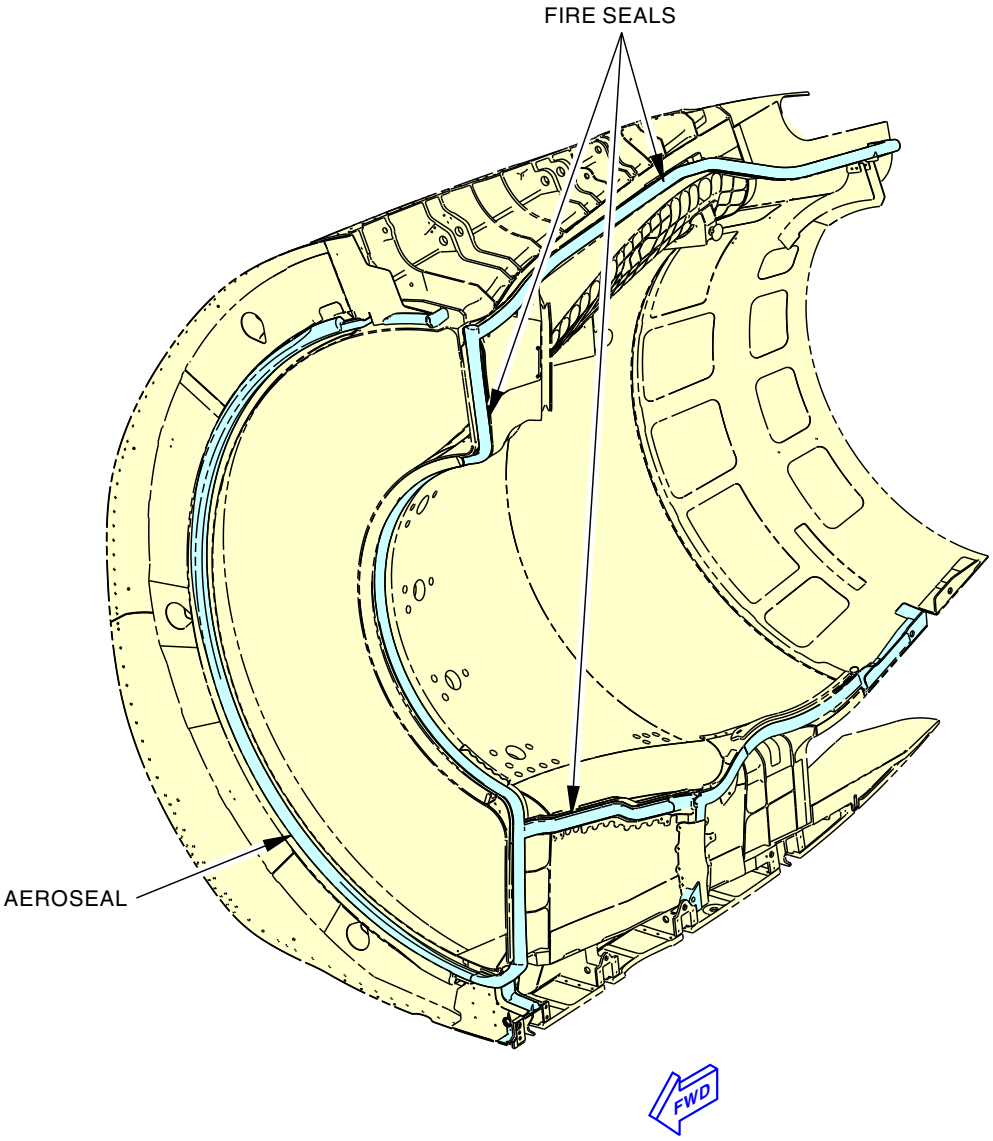
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Fire Seal Inspection
Figure 601/78-31-12-990-804-G00 (Sheet 1 of 2)

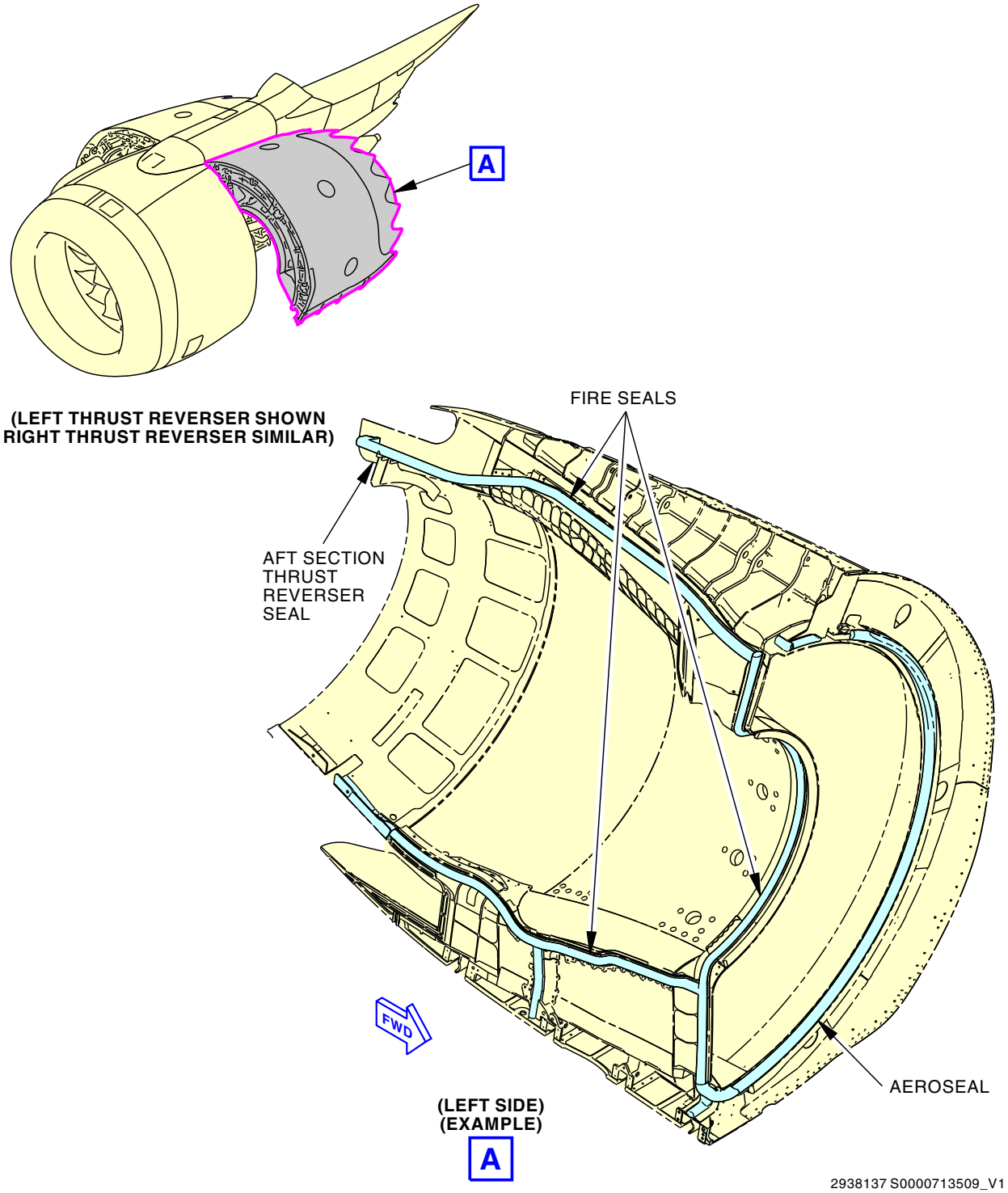
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Thrust Reverser Fire Seal Inspection
Figure 601/78-31-12-990-804-G00 (Sheet 2 of 2)

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Detailed Inspection of Engine Thrust Reverser
Figure 602/78-31-12-990-808-G00

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TASK 78-31-12-800-801-G00

4. Fire Seal Compression Check

(Figure 603)

A. General

(1) This task provides instruction to check the compression limits for the fire seal on the inner surface of each thrust reverser on an engine.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-01-820-801-G00	Thrust Reverser Adjustment (P/B 501)

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-4127	Durometer Part #: H-1000-A Supplier: 1GGG5

D. Consumable Materials

Reference	Description	Specification
A00081	Adhesive - Silicone Rubber - RTV 106	BAC5010 Type 74
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
G02380	Developer - Inspection - Met-L-Chek D-70	
G02415	Agent - Parting, Paste Wax (Johnson's Paste Wax or equivalent)	
G50146	Developer - Non-acqueous - Dubl-Check D-100	SAE AMS2644

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

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F. Prepare for the Fire Seal Compression Check

SUBTASK 78-31-12-010-005-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

> **WARNING** DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

> **WARNING** OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-31-12-750-002-G00

(2) Make sure that the fire seal sealant has cured to the time limits that follow:

(a) The RTV 106 adhesive, A00081 must cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

1) To decrease the cure time to do this:

NOTE: The cure time may be decreased to 4 hours if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

c) After 4 hours, do the following:

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<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

NOTE: When the type A durometer, COM-4127 indication is more than 30, the seal is cured.

<2> Remove the test strip.

(b) The sealant, A00160 must cure at 72°F (22°C) to 82°F (28°C) for these types and minimum times:

1) (Type I) 48 hours.

2) (Type II, Class -1/2) 4 hours.

SUBTASK 78-31-12-750-003-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do these steps to prepare for the fire seal compression check:

(a) Use solvent, B00062 to clean the fire seals on the left and right thrust reverser and the areas on the strut, engine, and lower edge of the right thrust reverser where the fire seals will compress when closed.

(b) For Zones I, II, and III, apply Met-L-Chek D-70 developer, G02380 or Dubl-Check D-100 developer, G50146 approximately 2.0 in. (50.8 mm) wide on the fire seal.

(c) For Zone IV (right hand side lower bifurcation fire seal), apply Met-L-Chek D-70 developer, G02380 or Dubl-Check D-100 developer, G50146 along the length of the fire seal (not on the engine side fire seal).

(d) Make sure that the developer is dry.

NOTE: The developer becomes a white powder with a dull finish when it is dry.

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(e) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00).

1) Close and latch the thrust reverser; but do not do the thrust reverser or leading edge activation at this time.

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(f) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00

G. Fire Seal Compression Check

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

SUBTASK 78-31-12-750-004-G00

(1) Measure the width of the developer that is on the fire seal. The minimum acceptable limits are:

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

(a) Zone I - 0.35 in. (8.89 mm)

(b) Zone II - 0.25 in. (6.35 mm)

(c) Zone III - 0.20 in. (5.08 mm)

(d) Zone IV - A continuous seal footprint is permitted (no limits).

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

SUBTASK 78-31-12-750-007-G00

(2) Measure the width of the developer that is on the fire seals.

(a) Make sure that the minimum width of the developer is 0.35 in. (8.89 mm) along the full length of the fire seals.

(b) If the above limit is not met, use the steps below to measure the developer in each section:

1) Divide the fire seal into four sections as follows (Figure 603):

a) The fire seal on the top edge of a thrust reverser where it compresses against the strut.

b) The fire seal on the forward edge of a thrust reverser where it compresses against the engine.

c) The fire seal on the bottom edge of the left thrust reverser where it compresses against the lower edge of the right thrust reverser.

d) The fire seal on the right hand side lower bifurcation.

2) For each section, areas where the developer is 0.20 in. (5.08 mm) to 0.35 in. (8.89 mm) wide is permitted with these conditions:

a) The length of each area is not more than 1.50 in. (38.1 mm).

b) The total length of all areas is not more that 3.00 in. (76.2 mm).

3) For each section, areas where the developer is less that 0.20 in. (5.08 mm) wide is permitted with these conditions:

a) The length of each area is not more than 0.25 in. (6.35 mm).

b) The total length of all areas is not more than 1.00 in. (25.4 mm).

SIA ALL

SUBTASK 78-31-12-390-005-G00

(3) If a section of the fire seal does not have an acceptable width of the developer (footprint), do the following steps:

(a) Apply paste wax parting agent, G02415, on the seal depressor surface.

(b) Extend paste wax parting agent, G02415, minimum of 3 in. (7.62 cm) beyond the noted discrepant area.

(c) Let the parting agent dry.

(d) Apply a continuous and uniform layer of the sealant, A00160, on the fire seal.

1) Make sure that layer is not more than 0.25 in. (0.64 cm) thick.

2) Make sure that sealant extends to 1 in. (2.54 cm) in each direction past the discrepant area.

(e) Close and latch the thrust reverser (TASK 78-31-00-010-802-G00).

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(f) Let the sealant fully dry.

(g) Open the thrust reverser (TASK 78-31-00-010-801-G00).

(h) Remove the parting agent.

(i) Make sure that width of the developer is acceptable.

1) Do the foot print verification setup to make sure that there are no remaining gaps at the discrepant location (TASK 78-31-01-820-801-G00).

SUBTASK 78-31-12-560-001-G00

(4) If the fire seal developer is not in the limits, do this task: Thrust Reverser Adjustment, TASK 78-31-01-820-801-G00.

(a) If the fire seal developer is in the limits, continue with this procedure.

NOTE: It is not necessary to clean off the developer.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-12-410-004-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

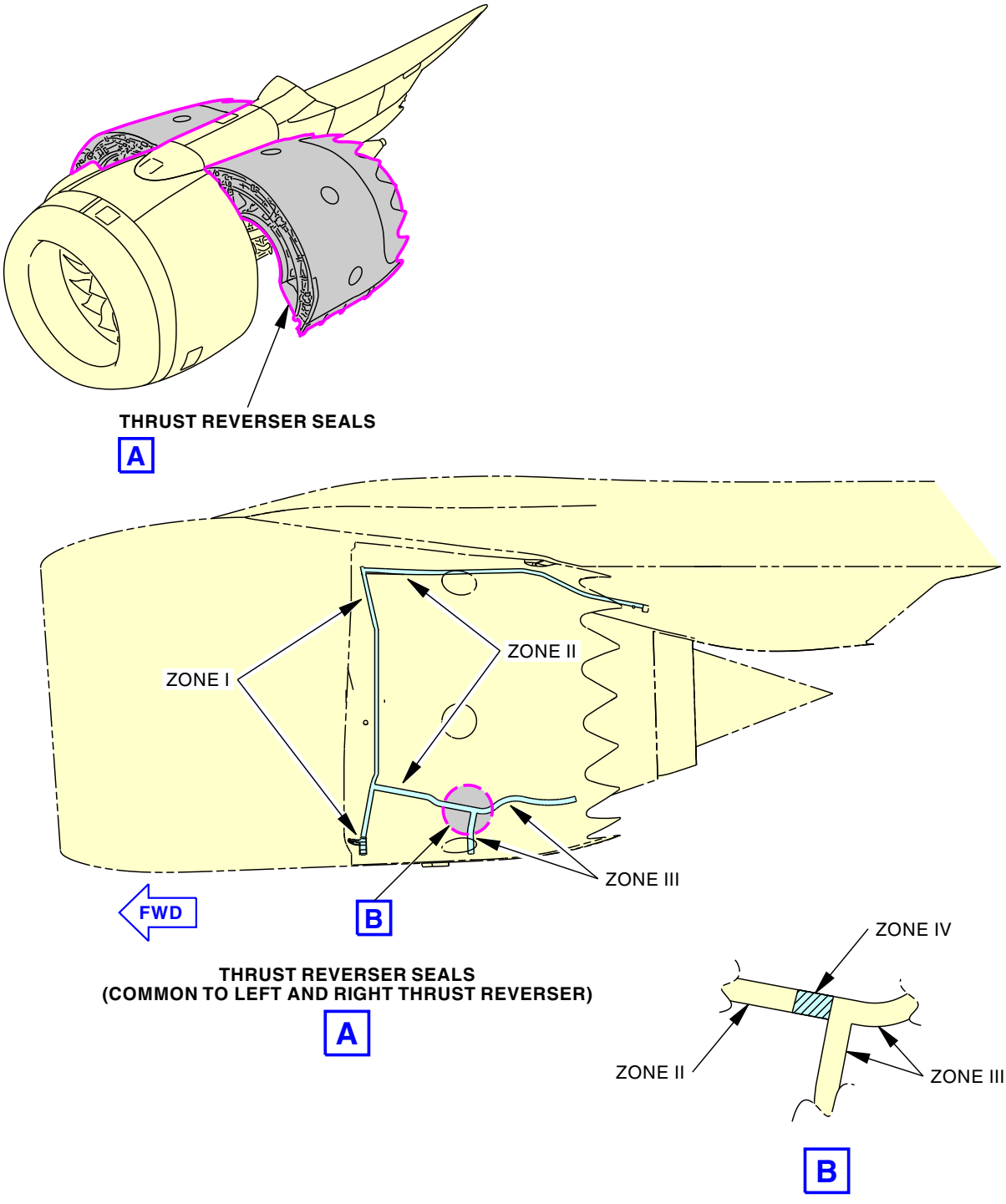
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

END OF TASK

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Fire Seal Compression Check
Figure 603/78-31-12-990-805-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FIRE SEAL - REPAIR

1. General

A. This procedure has one task:

(1) The repair of the fire seal on the thrust reverser.

TASK 78-31-12-300-801-G00

2. Fire Seal Repair

A. General

(1) This task gives the instructions for a repair of damage found on the aft area of the top section of the fire seal.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-12-800-801-G00	Fire Seal Compression Check (P/B 601)

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-4127	Durometer Part #: H-1000-A Supplier: 1GGG5
SPL-19243	Aid - Cutting Part #: C78044-1 Supplier: 81205
SPL-19244	Mandrel - Repair, Fire seal Part #: C78045-1 Supplier: 81205
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-551	Knife - Razor
STD-552	Knife - Utility
STD-625	Pen
STD-765	Scraper - Plastic

D. Consumable Materials

Reference	Description	Specification
A00081	Adhesive - Silicone Rubber - RTV 106	BAC5010 Type 74
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
G50527	Water	

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left

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(Continued)

Zone	Area
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Damage Limits for the Repair

SUBTASK 78-31-12-200-001-G00

(1) Do a detailed inspection of the thrust reverser fire seal (Figure 801).

NOTE: If the damage to the fire seal is within the damage limits, you can do a repair on the fire seal.

(a) Examples of damage that requires repair:

1) Torn fabric
2) Missing fabric
3) Holes worn through seal

(b) Examples of acceptable damage that do not require repair:

1) Surface whitening or surface wear
2) Labyrinth blade contact if not worn through the seal.

H. Prepare for the Repair

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER(S). IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

SUBTASK 78-31-12-010-006-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

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1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

I. Thrust Reverser Fire Seal Repair

NOTE: The repair procedures for the LH Thrust Reverser Fire Seal and the RH Thrust Reverser Fire Seal are the same. Make sure to use the appropriate repair seal, cutting aid and mandrel for the applicable Thrust Reverser Fire Seal.

SUBTASK 78-31-12-020-006-G00

CAUTION BE CAREFUL WHEN YOU REMOVE THE FIRE SEAL FROM THE RETAINER OR REMOVE SEALANT. DAMAGE TO THE FIRE SEALS CAN OCCUR.

(1) Do these steps to remove the damaged section of the thrust reverser seal (Figure 802).

NOTE: See the table below for a list of the parts necessary to complete the Thrust Reverser Fire Seal repair.

KIT 002A0077		
PART NUMBER	NAME	QUANTITY
002A0077–1	TOP KIT - REPAIR SEAL LH	
315A6001–1	FIRE SEAL REPAIR SPLICE LH	1
315A6001-3	SEAL PLUG LH	1
002A0077–2	TOP KIT - REPAIR SEAL RH	
315A6001-2	FIRE SEAL REPAIR SPLICE RH	1
315A6001-4	SEAL PLUG RH	1

(a) Use a plastic scraper, STD-765 to remove no more than 20 in. (508 mm) of the existing fire seal from the fire seal retainer.

(b) Remove the RTV 106 adhesive, A00081 between the existing fire seal and the seal retainer.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure no damage occurs to the fire seal retainer.

(c) Partially insert base of the repair seal into lower side of retainer.

1) Make sure seal block is flush with the support and the seal nub is aligned with the back up tab.

(d) Using marker pen, STD-625, or similar, draw a line on the seal retainer at the end of the repair seal.

(e) Partially reinstall the existing fire seal in the lower side of the retainer to mark cut line.

(f) Using a marker pen, STD-625, or similar, draw a line on the existing fire seal.

1) Draw the line around the crown of the seal.

(g) Do these steps to cut the existing fire seal:

1) Cut fire seal halfway between marked cut line and seal nub to allow the seal cutting aid, SPL-19243 to be installed.

2) Align the cutting aid, SPL-19243 to the cut line.

3) Make sure the cut line on the fire seal is perpendicular.

4) Using a utility knife, STD-552 or razor knife, STD-551, insert the blade tip into the cutting aid, SPL-19243 slot and pierce the crown of the seal.

NOTE: The crown must be pierced initially in order to obtain a clean cut.

(h) Clean any residual RTV 106 adhesive, A00081 from the existing fire seal and fire seal retainer with solvent, B00062.

SUBTASK 78-31-12-020-007-G00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER(S). IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these steps to remove a damaged repair seal (Figure 803).

(a) Use a plastic scraper, STD-765 to remove no more than 20 in. (508 mm) of the fire seal from the fire seal retainer.

(b) Remove the RTV 106 adhesive, A00081 between the fire seal and the seal retainer.

1) Make sure no damage occurs to the fire seal retainer.

(c) Fold the repair seal over the original fire seal at the split so that the crowns are touching.

(d) Insert a blunt tool into the space created at the bend in the seal splice.

(e) Pry the seal splice out of the original fire seal.

(f) Gently pull the fire seal down along the original fire seal until the seal flap separates from the original fire seal.

SUBTASK 78-31-12-420-007-G00

(3) Do these steps to verify that the repair seal splice joint will fit properly (Figure 804):

(a) Dip the first 4 inches of the mandrel, SPL-19244 into a 1 Quart (1 l) calibrated container, STD-194 of water, G50527 and insert it into the rear of the repair seal until the tip of the mandrel, SPL-19244 is flush with the end of the splice.

(b) Pinch the sides of the existing seal to create a circular opening to facilitate the insertion of the repair seal.

NOTE: Slight back and forth twisting of the repair seal and pinching of the existing seal will ease the insertion of the splice joint.

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(c) Make sure the block end of the repair seal is touching the end of the seal retainer and measure the gap between the repair seal and the existing seal.

NOTE: Maximum gap 0.10 inch.

SUBTASK 78-31-12-420-008-G00

(4) Do these steps to install the repair seal:

(a) Pull the repair seal out of the existing seal and fold the flap of the repair seal back to gain access to the OD (outside diameter) of the splice tube.

1) Apply a thin coat of RTV 106 adhesive, A00081 to the base (0.25-0.50 inches) of the OD of the splice tube and to the end face of the repair seal and existing seal.

NOTE: A thin coat of RTV 106 sealant is 1 to 5 mils thick.

2) Minimal adhesive should be used to fully cover the surface.

NOTE: Excessive sealant application to repair splice may lead to difficulty removing the seal end for a future repair.

(b) Pinch the sides of the existing seal to create a circular opening and insert the splice tube into the trimmed original seal such that the repair seal and original seal are butt joined.

NOTE: Maximum gap between repair seal and original seal is 0.10 inch.

1) Make sure repair seal is installed over cross tie strap.

2) Smooth RTV 106 adhesive, A00081 in the gap between the existing fire seal and repair seal and remove any excess RTV 106 adhesive, A00081.

3) Insert the base of modified seal into the upper retainer and work the other side of the base into the lower side of the retainer using a plastic scrapper as an aid.

(c) Secure repair seal flap.

1) Apply a thick coat of RTV 106 adhesive, A00081 to the underside of the flap. Use enough RTV 106 adhesive, A00081 to achieve squeeze out around the periphery of the flap.

2) Fold the seal flap down and bond it to the original fire seal.

a) Make sure there is squeeze out.

b) If the corners of the flap do not remain in contact with the OD of the fire seal, it may be necessary to apply pressure to flap during heat cure.

c) Fair RTV 106 adhesive, A00081 approximately 1 inch from edge of flap.

d) Make sure transition and surface of RTV 106 adhesive, A00081 is smooth.

NOTE: If RTV 106 adhesive, A00081 surface is not smooth, the repair may fail the compression check and require reapplication of RTV 106 adhesive, A00081.

3) Apply heat to the RTV 106 adhesive, A00081, between 120 degrees Fahrenheit (48.9 degrees Centigrade) and a maximum of 150 degrees Fahrenheit (65.6 degrees Centigrade) for 10 minutes to set and accelerate cure RTV 106 adhesive, A00081.

NOTE: It may be necessary to apply pressure to flap during heat cure.

(d) The mandrel, SPL-19244 can be removed immediately after heat cure is complete.

SUBTASK 78-31-12-700-001-G00

(5) Do a compression check on the thrust reverser fire seal in the repair area, do this task Fire Seal Compression Check, TASK 78-31-12-800-801-G00.

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(a) Make sure the RTV 106 adhesive, A00081 has a tack free surface before the compression check.

(b) Make sure there is continuous seal contact within the repair area.

(c) Areas of no seal contact (no developer transfer) up to 0.125 inches along the length are acceptable.

(d) If compression test does not pass, clean the developer off of the seal prior to the RTV 106 adhesive, A00081 re-application, re-fair RTV 106 adhesive, A00081 and repeat the inspection.

SUBTASK 78-31-12-420-009-G00

(6) Install the seal plug.

(a) Apply a thin coat of sealant, A00160 or RTV 106 adhesive, A00081 to the outside of the seal plug fully covering the bonding surface.

(b) Insert the seal plug into the open end of the fire seal repair splice until it is flush with the end of the fire seal repair splice.

1) Coat the remaining seal plug surface with sealant, A00160 or RTV 106 adhesive, A00081 such that the end of the seal plug is no longer visible.

SUBTASK 78-31-12-420-010-G00

(7) Apply sealant, A00160 or RTV 106 adhesive, A00081 to the following areas:

(a) Repair seal

(b) Areas where previous sealant, A00160 or RTV 106 adhesive, A00081 were broken for seal removal

(c) Bead of sealant, A00160 or RTV 106 adhesive, A00081 to the edge of the seal and the seal retainer

(d) Between the block end and upper skin strap

(e) Between the block end and the fire seal support stiffener

(f) Bead of sealant, A00160 or RTV 106 adhesive, A00081 around the base of the block end to upper skin strap and block end to seal support.

SUBTASK 78-31-12-860-001-G00

(8) Let all the sealant cure to the time limits that follow:

(a) Let the RTV 106 adhesive, A00081 cure a minimum of 24 hours at 65°F (18°C) to 100°F (38°C).

WARNING DO NOT USE DECREASED CURE TIME FOR A SERVICE BULLETIN WITH AN AIRWORTHINESS DIRECTIVE AGAINST IT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

1) To decrease the cure time to do this:

NOTE: The cure time may be decreased to 4 hours if the seal area can be locally heated to maximum of 140°F (60°C). Use low temperature heat lamps and a thermocouple to measure the temperature.

a) Make a test strip of sealant 0.25 in. (0.64 cm) minimum thickness and put adjacent to the repair.

b) Heat the seal area to a maximum of 140°F (60°C).

NOTE: Temperatures more than 140°F (60°C) will cause bubbles to be in the sealant.

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c) After 4 hours, do this:

<1> Measure the hardness of the test strip with a type A durometer, COM-4127.

<2> When the type A durometer, COM-4127 indication is more than 30, the seal is cured.

<3> Remove the test strip.

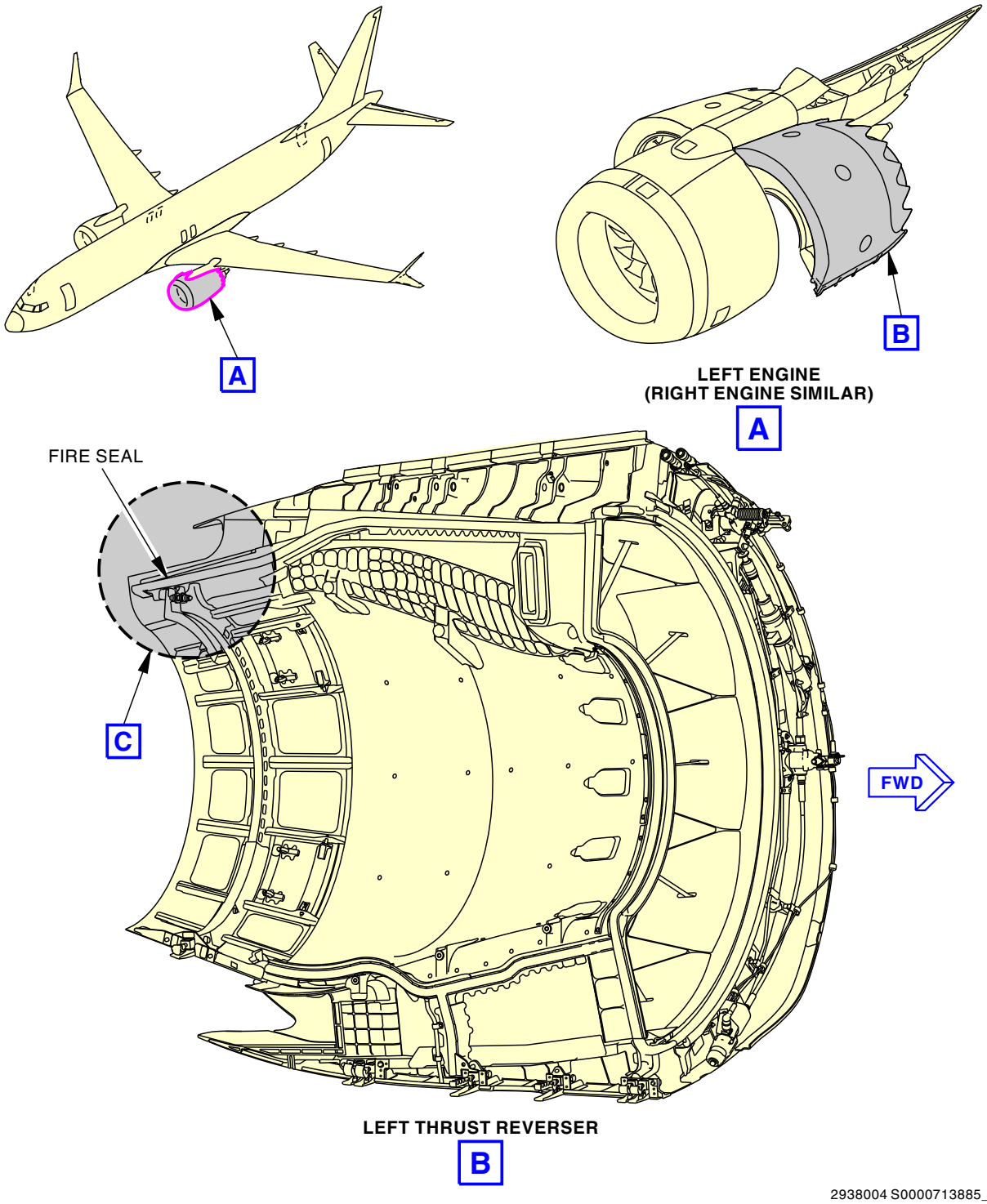
(b) Let the sealant, A00160 cure at 72°F (22°C) to 82°F (28°C) for these Types and minimum times:

1) (Type I) 48 hours.

2) (Type II, Class -1/2) 4 hours.

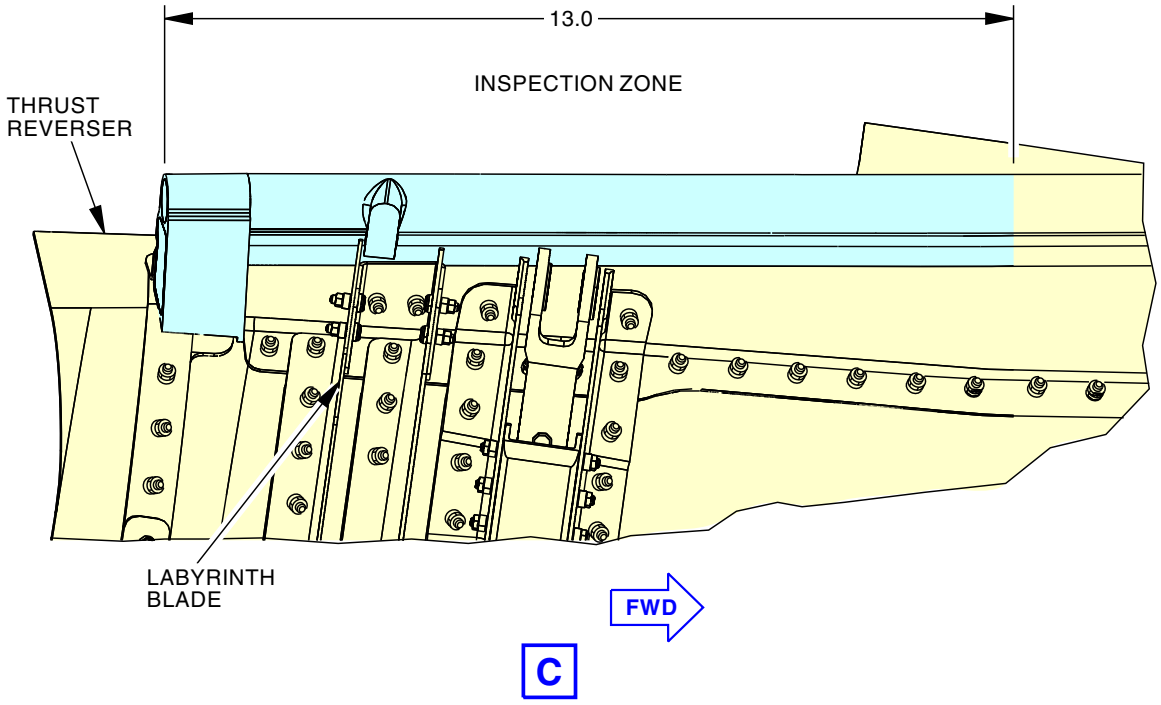
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Detailed Inspection (LH Shown, RH Similar)
Figure 801/78-31-12-990-809-G00 (Sheet 1 of 2)

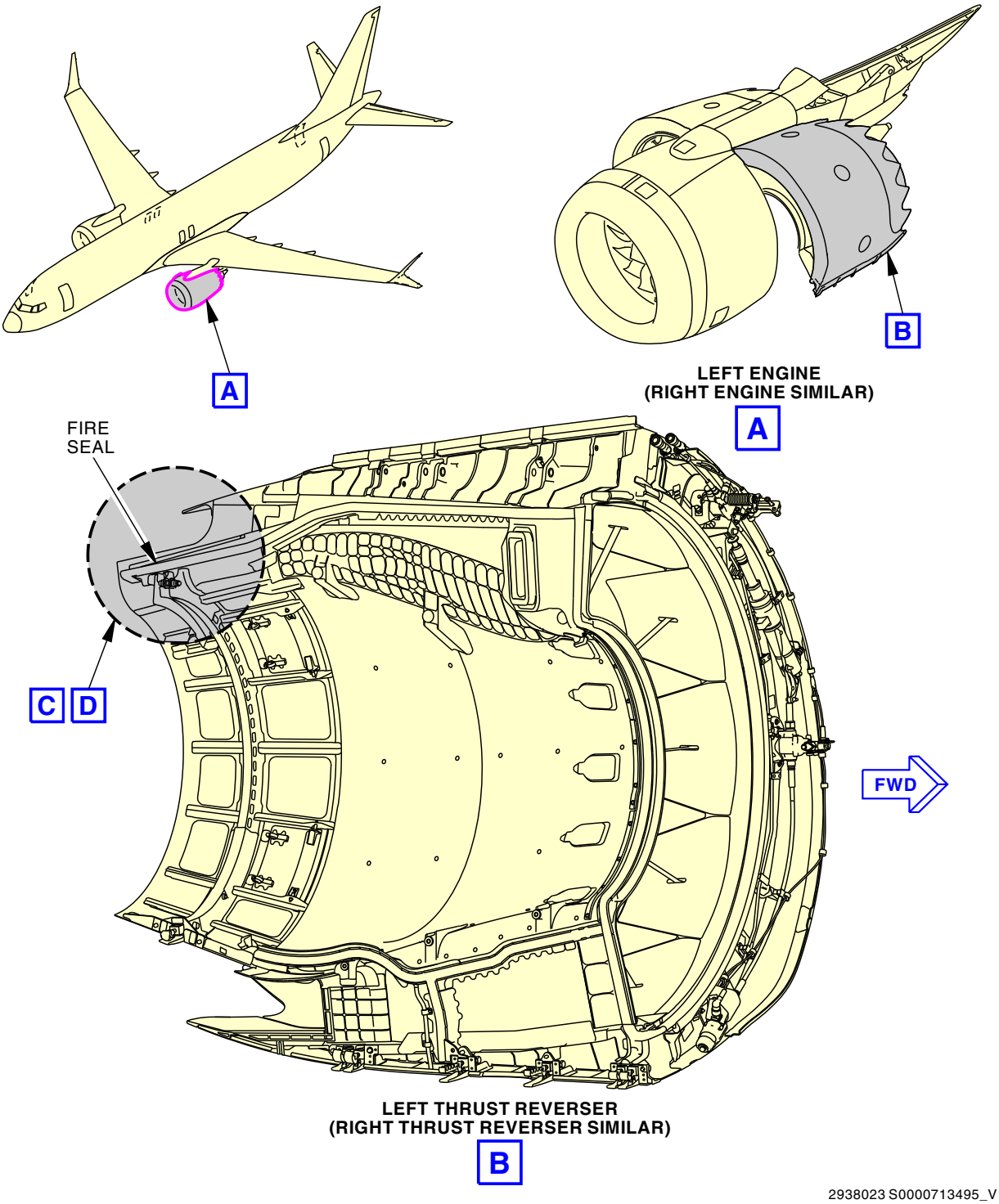
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Detailed Inspection (LH Shown, RH Similar)
Figure 801/78-31-12-990-809-G00 (Sheet 2 of 2)

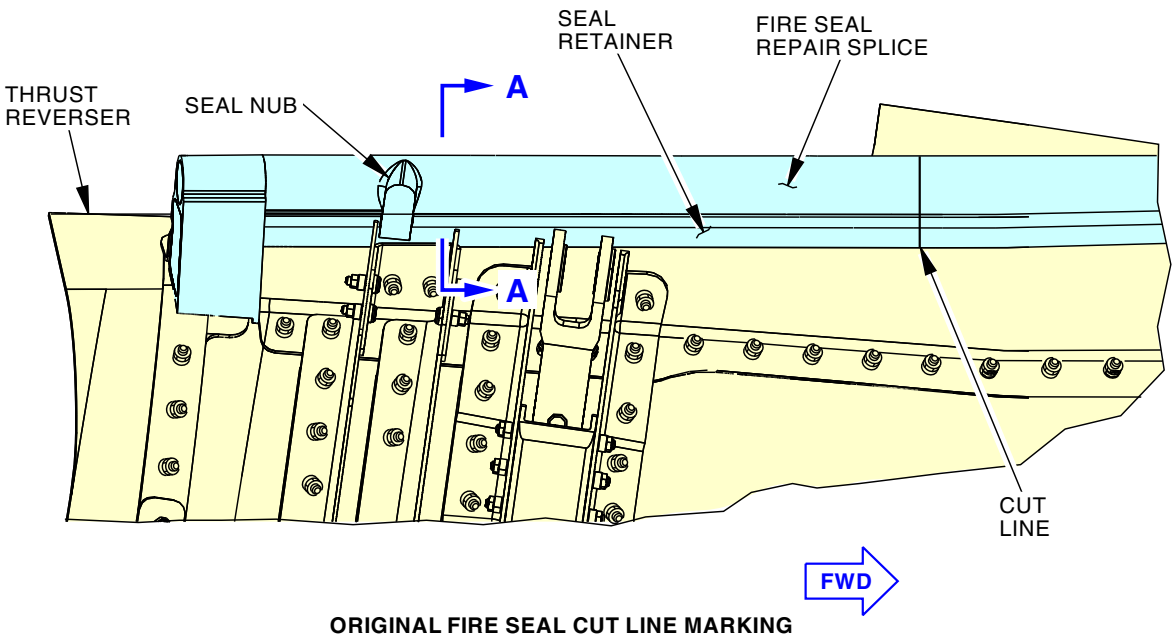
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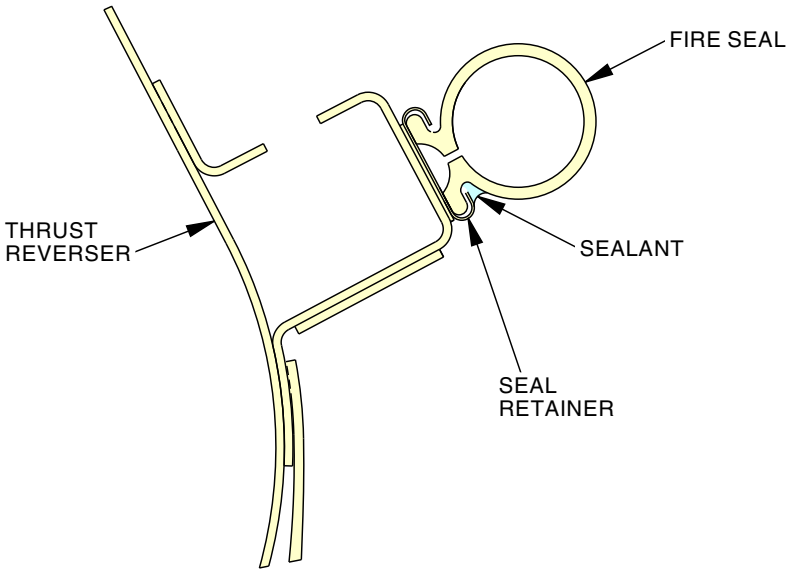
Thrust Reverser Damaged Fire Seal Removal
Figure 802/78-31-12-990-810-G00 (Sheet 1 of 4)

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ORIGINAL FIRE SEAL CUT LINE MARKING

C

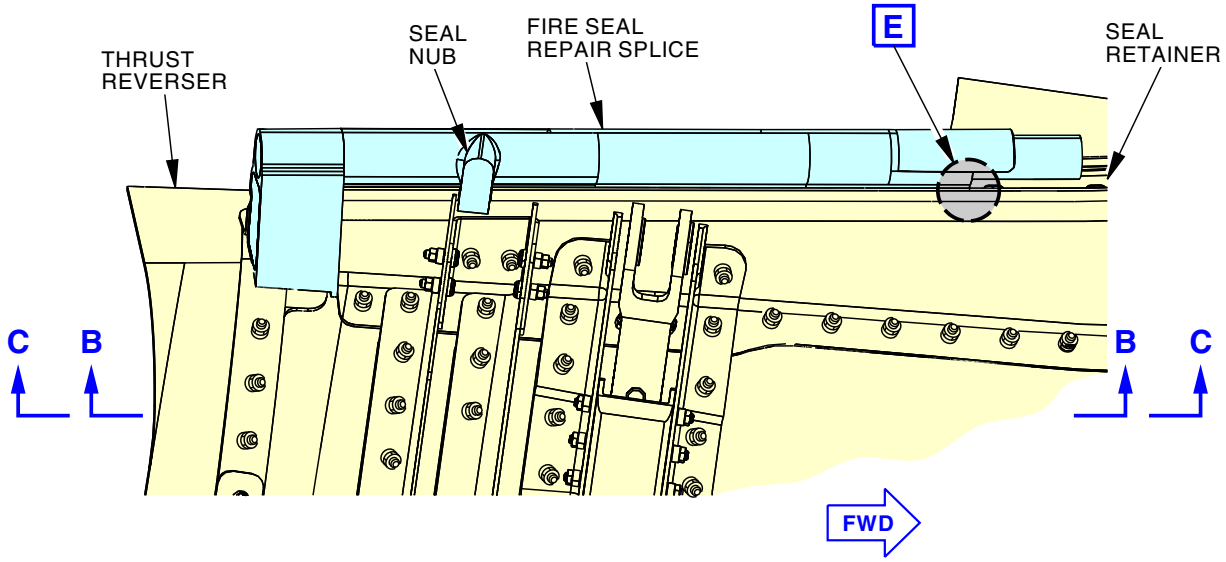


A-A

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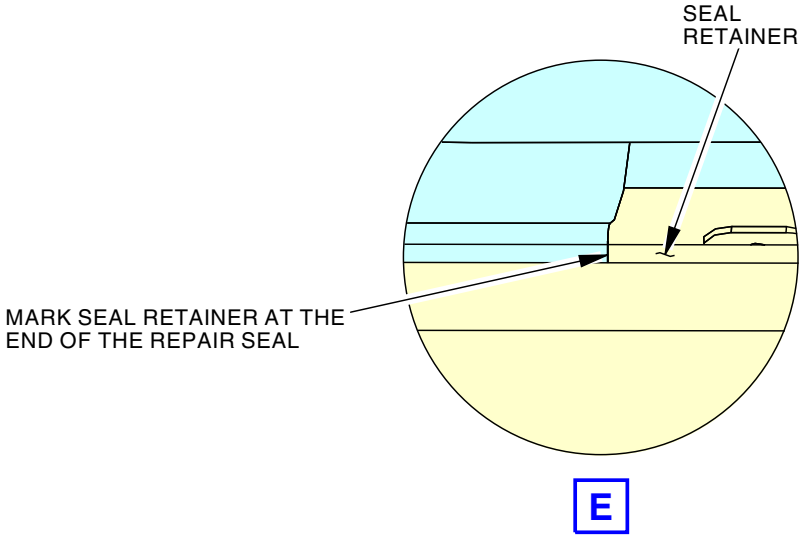
Thrust Reverser Damaged Fire Seal Removal
Figure 802/78-31-12-990-810-G00 (Sheet 2 of 4)

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TEMPORARY FIRE SEAL REPAIR SPLICE INSTALLATION FOR CUT LINE MARKING

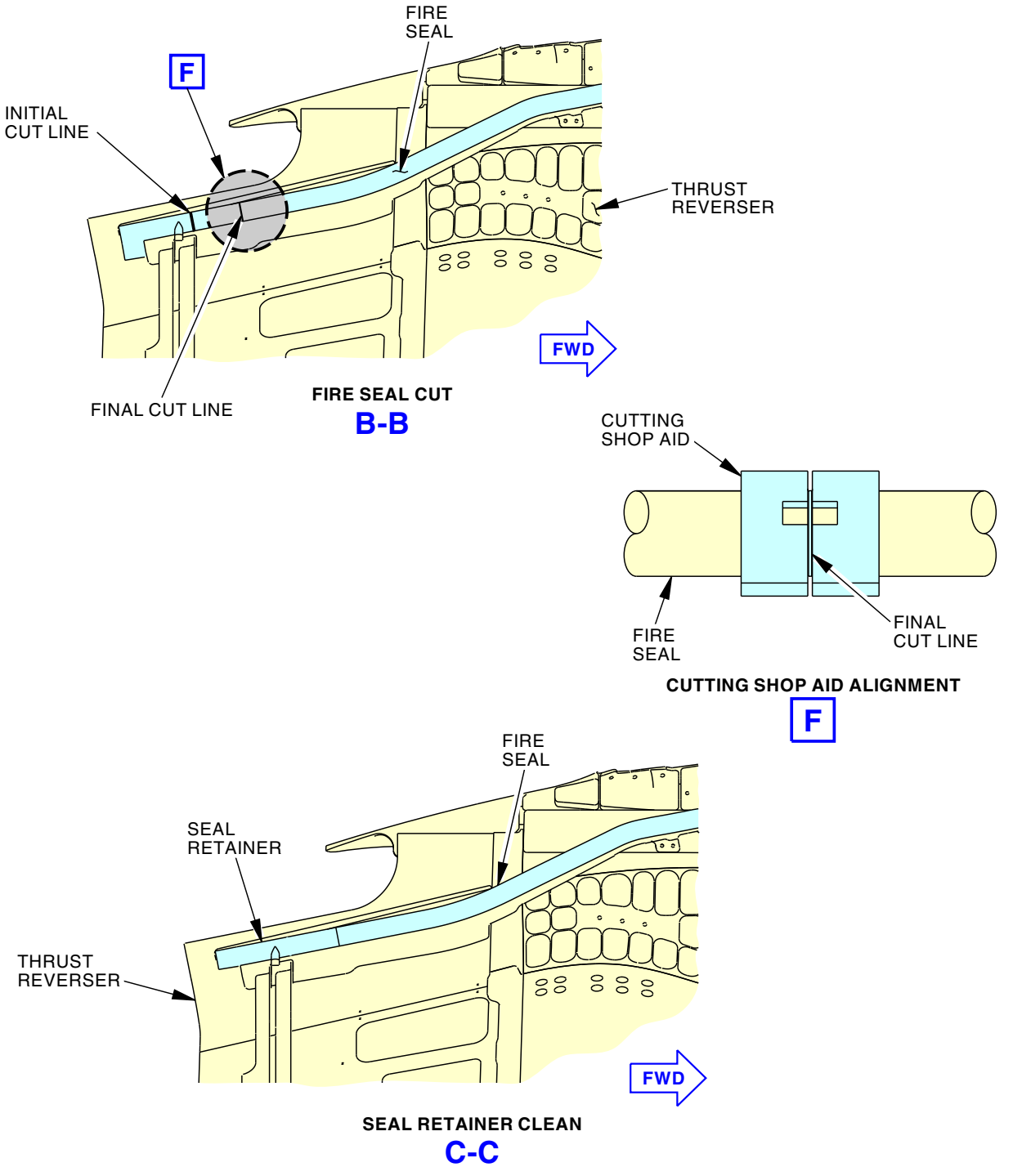
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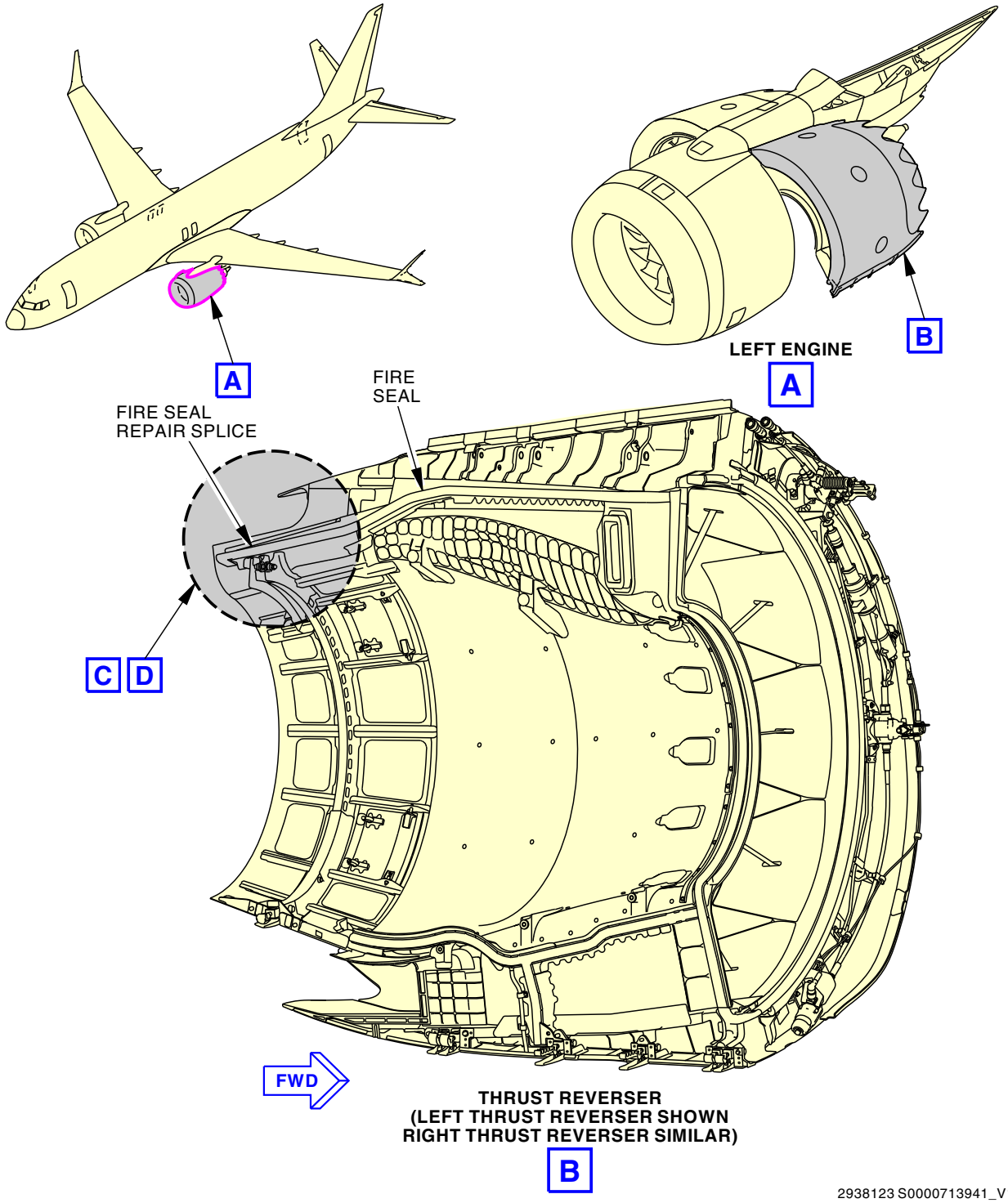
Thrust Reverser Damaged Fire Seal Removal
Figure 802/78-31-12-990-810-G00 (Sheet 3 of 4)

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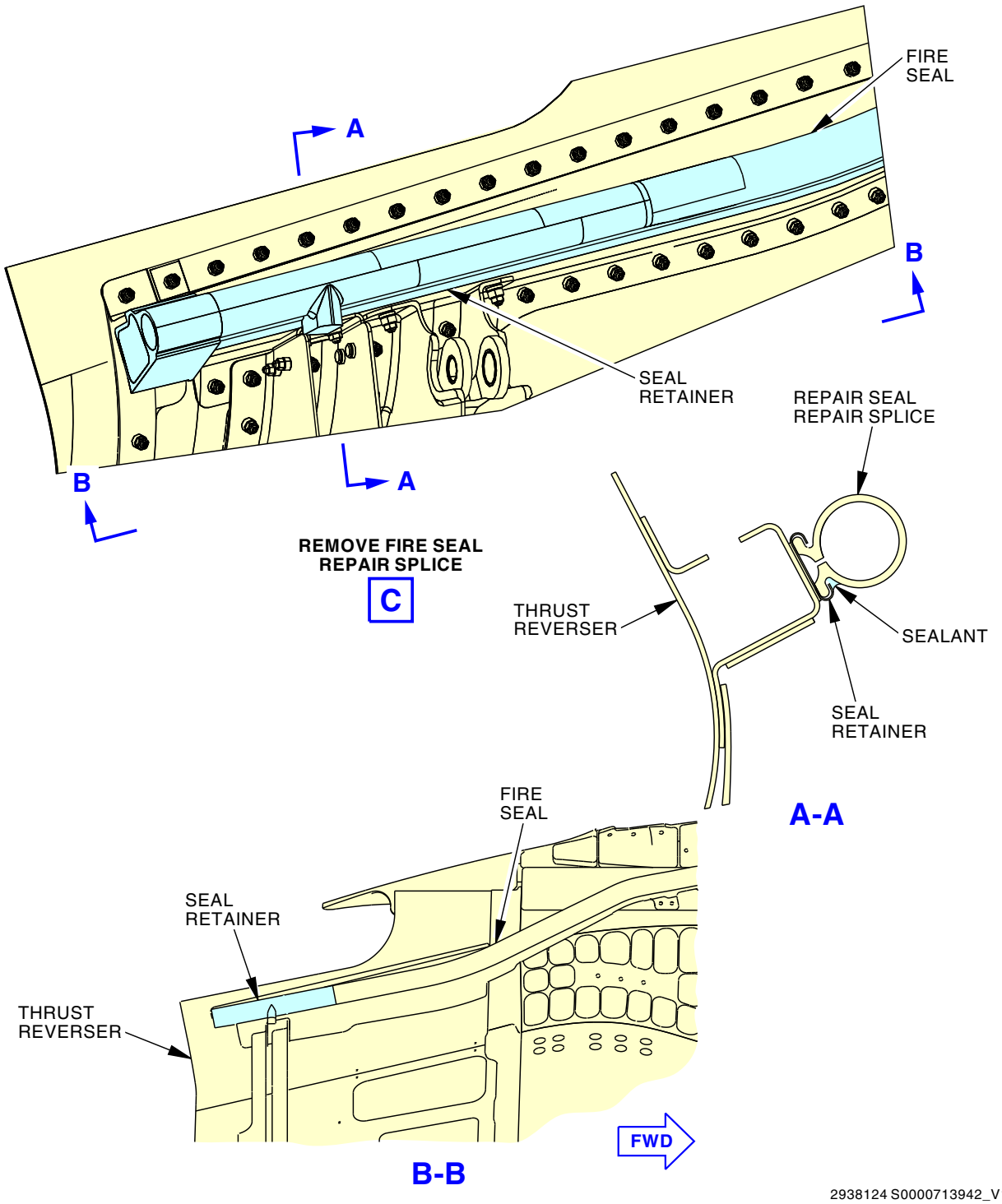
Thrust Reverser Damaged Fire Seal Removal
Figure 802/78-31-12-990-810-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



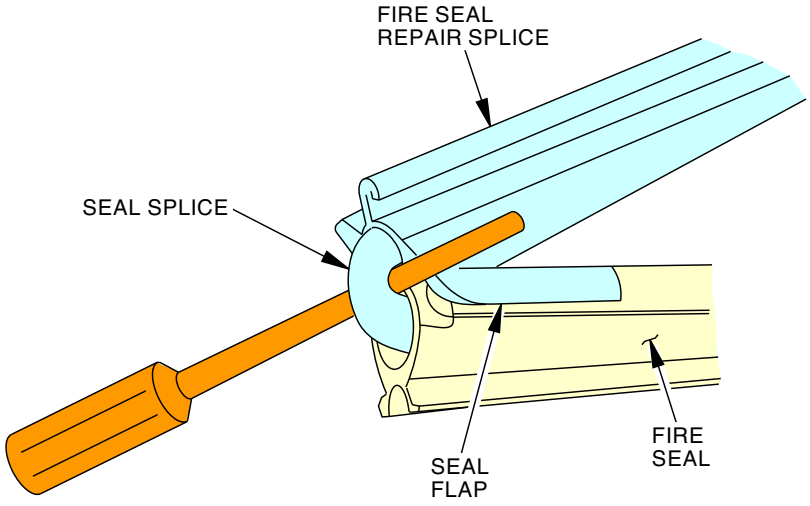
Thrust Reverser Damaged Repair Splice Removal
Figure 803/78-31-12-990-812-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



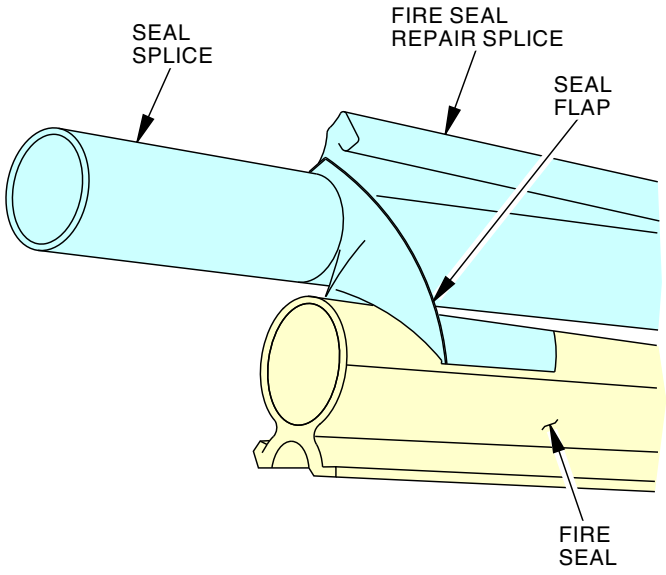
Thrust Reverser Damaged Repair Splice Removal
Figure 803/78-31-12-990-812-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**SEAL SPLICE REMOVAL
(BEFORE)**

D



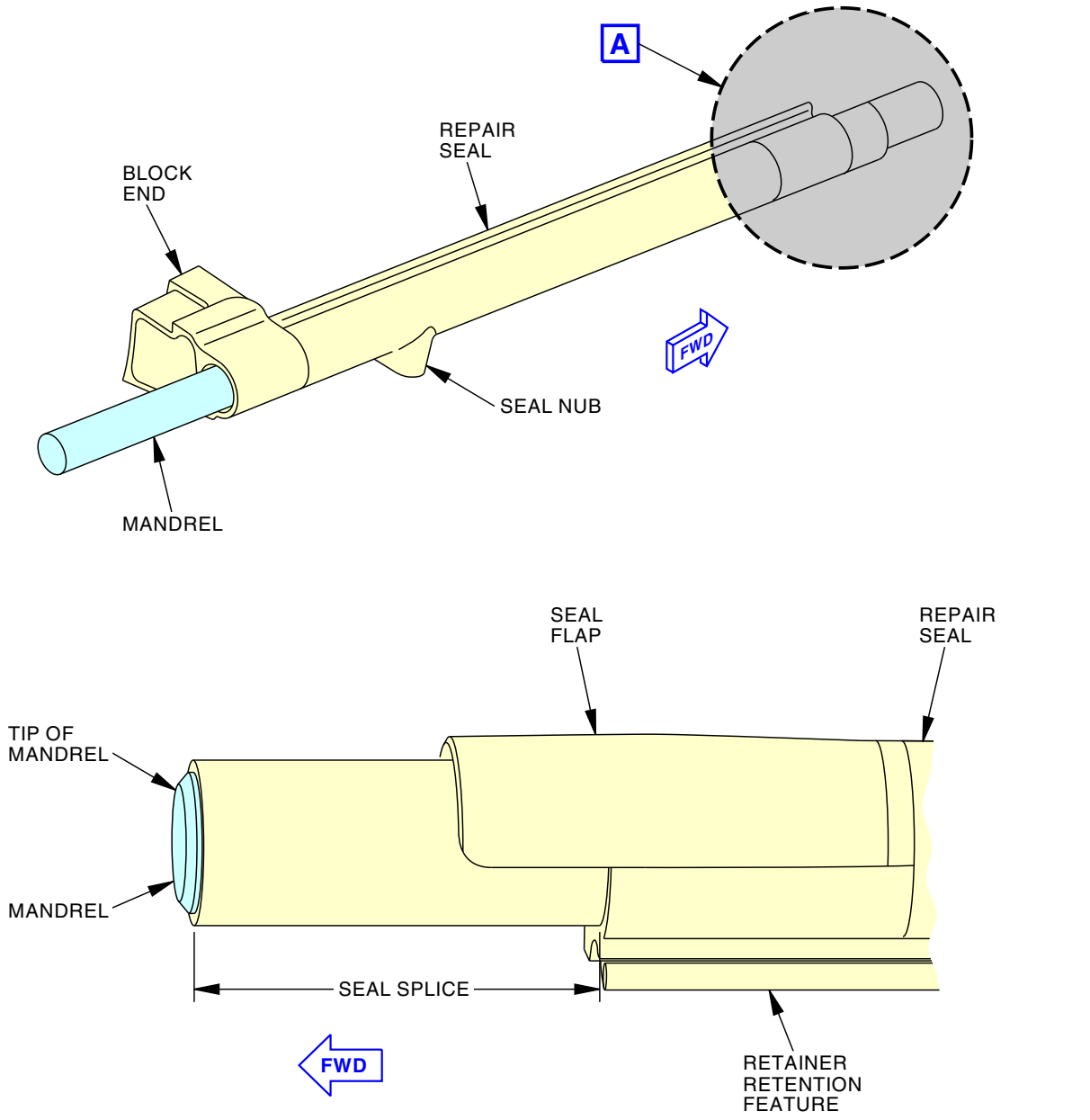
**SEAL SPLICE REMOVAL
(AFTER)**

D

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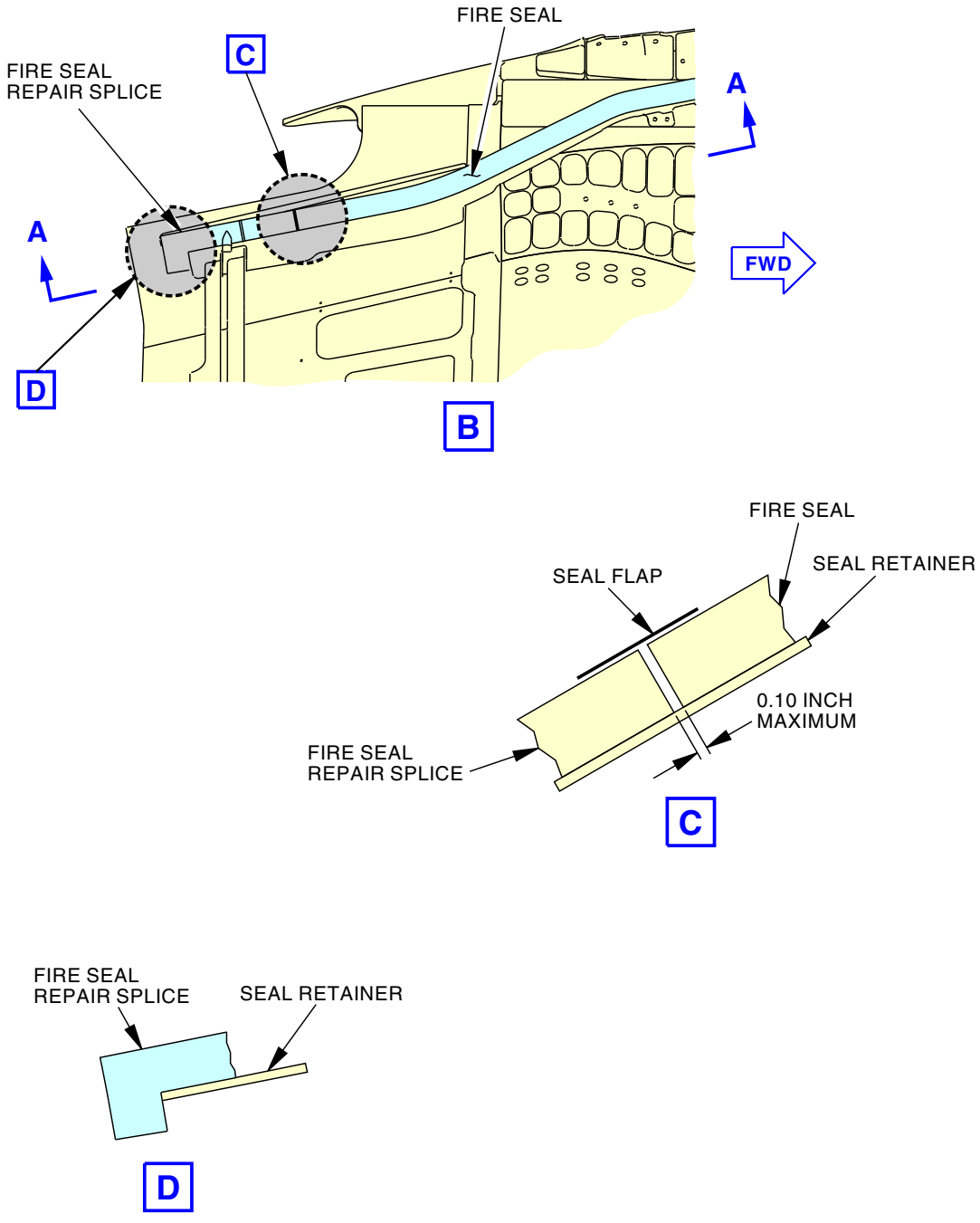
**Thrust Reverser Damaged Repair Splice Removal
Figure 803/78-31-12-990-812-G00 (Sheet 3 of 3)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Seal Repair Splice
Figure 804/78-31-12-990-813-G00 (Sheet 1 of 3)

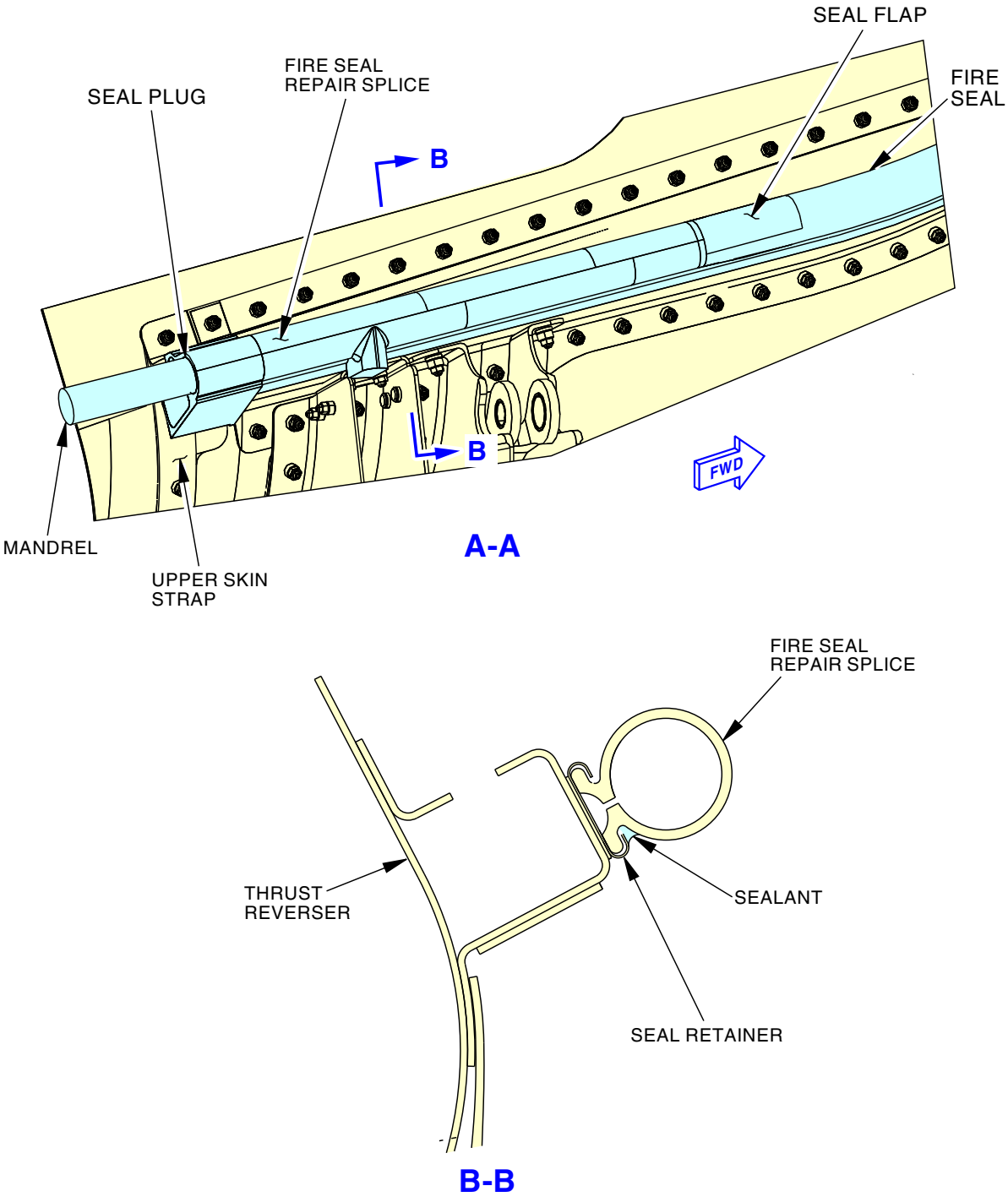
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Seal Repair Splice
Figure 804/78-31-12-990-813-G00 (Sheet 2 of 3)

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Seal Repair Splice
Figure 804/78-31-12-990-813-G00 (Sheet 3 of 3)

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INSULATION BLANKET - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the insulation blankets.

(2) The installation of the insulation blankets.

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

B. The thrust reversers have insulation blankets at the following locations:

(1) GSE thermal barrier.

(2) Precooler inlet duct at the forward upper bifurcation.

(3) Fire seal support along the lower bifurcation.

(4) Upper Inner wall.

(5) Lower Inner wall.

SIA ALL

TASK 78-31-13-000-801-G00

2. Insulation Blankets - Removal

(Figure 401)

A. General

(1) This task is for the removal of the insulation blankets from the left and right thrust reversers.

(2) The procedures are the same for the left and right thrust reversers.

CAUTION

REMOVE AND INSTALL THE INSULATION BLANKETS IN THE CORRECT ORDER GIVEN IN THESE PROCEDURES. IF THE ORDER OF REMOVAL AND INSTALLATION IS NOT FOLLOWED, DAMAGE TO EQUIPMENT CAN OCCUR.

(3) The insulation blankets are as follows:

(a) GSE Blanket

(b) Precooler Blanket

(c) Fire Seal Support Blanket

(d) Upper TPS Panel Blanket

(e) Lower TPS Panel Blanket.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7

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(Continued)

Reference	Description	Specification
B00634	Solvent - Stabilized Limonene Cleaner	BMS11-10 Type 1, 2, or 3
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
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-31-13-010-001-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Thrust Reverser GSE Insulation Blanket Removal

SUBTASK 78-31-13-020-003-G00

(1) Remove the GSE blanket [1] as follows:

(a) Remove the two screws [6], two washers [7], two screws [8], two washers [7], nut [11], and washer [7].

CAUTION HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(b) Remove the GSE blanket [1].

(c) Keep all removed hardware for installation.

SUBTASK 78-31-13-100-001-G00

(2) Clean the area and remove all contamination as follows:

(a) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

(b) Wipe the structure with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

(c) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

(d) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

H. Thrust Reverser Precooler Insulation Blanket Removal

SUBTASK 78-31-13-020-001-G00

(1) Remove the precooler blanket [2] as follows:

(a) Remove the two screws [8] and two washers [7].

(b) Remove the nut [10] and washer [7].

(c) Remove the receiver cup [29], washer [30] and up to five shims [31].

(d) Remove the screw [6] and washer [7] at two locations.

(e) Remove the screw [15] and washer [12].

(f) Remove the two screws [38] and two washers [7].

(g) Remove the precooler drain tube fitting [36].

(h) Remove the three screws [13] and three washers [12].

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(i) Remove the nut [10] and washer [14].

(j) Remove the three caps [22], three nuts [10], and three washers [12].

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(k) Remove the precooler blanket [2].

(l) Keep all removed hardware for installation.

SUBTASK 78-31-13-020-014-G00

(2) Clean the area and remove all contamination as follows:

(a) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

(b) Wipe the structure with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

(c) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

(d) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

I. Thrust Reverser Fire Seal Support Insulation Blanket Removal

SUBTASK 78-31-13-160-004-G00

(1) Remove the fireseal support blanket [3] as follows:

(a) Remove the screw [15] and washer [7] from the fireseal support blanket [3].

(b) Remove the three screws [13] and the three washers [12] from the fireseal support blanket [3].

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(c) Remove the fireseal support blanket [3].

(d) Keep all removed hardware for installation.

SUBTASK 78-31-13-160-011-G00

(2) Clean the area and remove all contamination as follows:

(a) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

(b) Wipe the structure with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

(c) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

(d) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

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J. Thrust Reverser Upper TPS Panel Blanket Removal

SUBTASK 78-31-13-020-004-G00

CAUTION

DO NOT INTERMIX LEFT AND RIGHT FLAME SHIELDS. MAKE SURE THAT YOU REMOVE AND INSTALL LEFT AND RIGHT FLAME SHIELDS ON THE CORRECT HALF OF THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Remove the two flame shields [17] and two flame shields [20] as follows:

(a) Remove five screws [6], five washers [7], screw [15] and washer [7] from the two flame shields [17].

(b) Remove the two flame shields [17].

(c) Remove the five nuts [10] and five washers [12] from the two flame shields [20].

(d) Remove the two flame shields [20].

SUBTASK 78-31-13-020-018-G00

CAUTION

DO NOT APPLY A SIDE LOAD WHEN YOU REMOVE THE SPACER FITTING. APPLY THE TORQUE TO THE FITTING. IF YOU DO NOT OBEY INSTRUCTIONS, DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Remove the spacer fitting [23], washer [24] and up to three shims [25] at two locations.

SUBTASK 78-31-13-020-006-G00

(3) Remove the upper TPS panel blanket [5] as follows:

(a) Remove the 26 caps [22], 26 nuts [10], and 26 washers [12] from the upper TPS panel blanket [5].

(b) Remove the four nuts [10] and four washers [7].

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(c) Remove the upper TPS panel blanket [5].

SUBTASK 78-31-13-020-019-G00

(4) Keep the all removed hardware for installation.

SUBTASK 78-31-13-160-005-G00

(5) Clean the area and remove all contamination as follows:

(a) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

(b) Wipe the structure with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

(c) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

(d) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

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K. Thrust Reverser Lower TPS Panel Blanket Removal

SUBTASK 78-31-13-020-008-G00

CAUTION

DO NOT APPLY A SIDE-LOAD TO THE MAST FITTING LUGS. BE CAREFUL TO REMOVE OR INSTALL THE BOLTS THAT ATTACH THE CONTROL RODS OF THE ELEVATOR TO THE MAST FITTING TO MAKE SURE NOT TO APPLY A SIDE-LOAD. IF YOU APPLY A SIDE-LOAD, DAMAGE WILL OCCUR AT THE BOTTOM OF THE MAST FITTING LUGS.

(1) Remove the spacer fitting [27], washer [26] and up to three shims [28] at two locations.

SUBTASK 78-31-13-020-009-G00

CAUTION

DO NOT INTERMIX LEFT AND RIGHT FLAME SHIELDS. MAKE SURE THAT YOU REMOVE AND INSTALL LEFT AND RIGHT FLAME SHIELDS ON THE CORRECT HALF OF THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Remove the lower TPS panel blanket [4] as follows:

(a) Remove four screws [6] and four washers [7] from the flame shield [18].

(b) Remove the flame shield [18].

(c) Remove the six nuts [10] and six washers [14].

(d) Remove the screw [6] and washer [14].

(e) Remove the screw [19] and washer [14].

(f) Remove the 12 caps [22], 12 nuts [10], and 12 washers [12].

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(g) Remove the lower TPS panel blanket [4].

SUBTASK 78-31-13-020-020-G00

(3) Keep the all removed hardware for installation.

SUBTASK 78-31-13-160-007-G00

(4) Clean the area and remove all contamination as follows:

(a) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

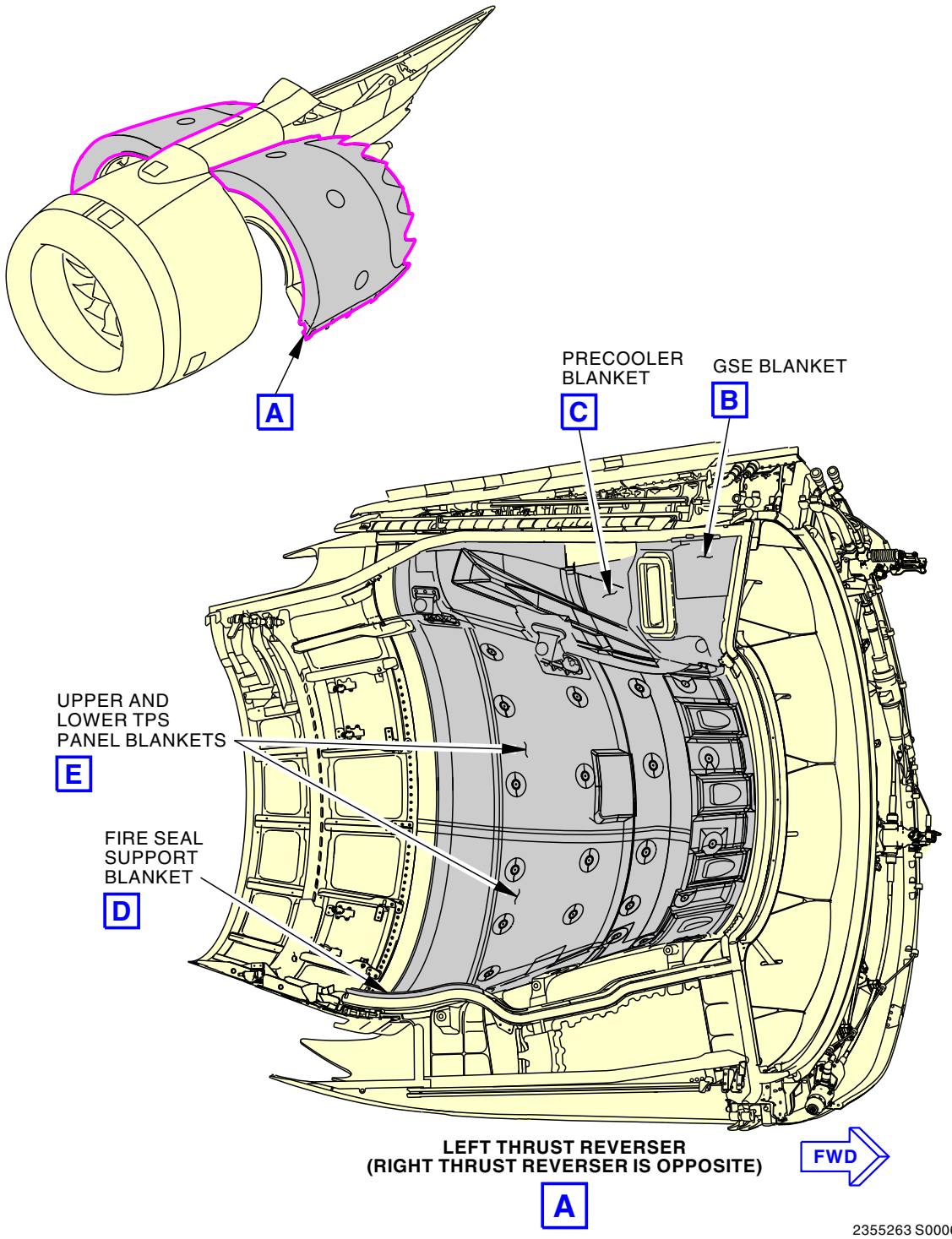
(b) Wipe the structure with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

(c) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

(d) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

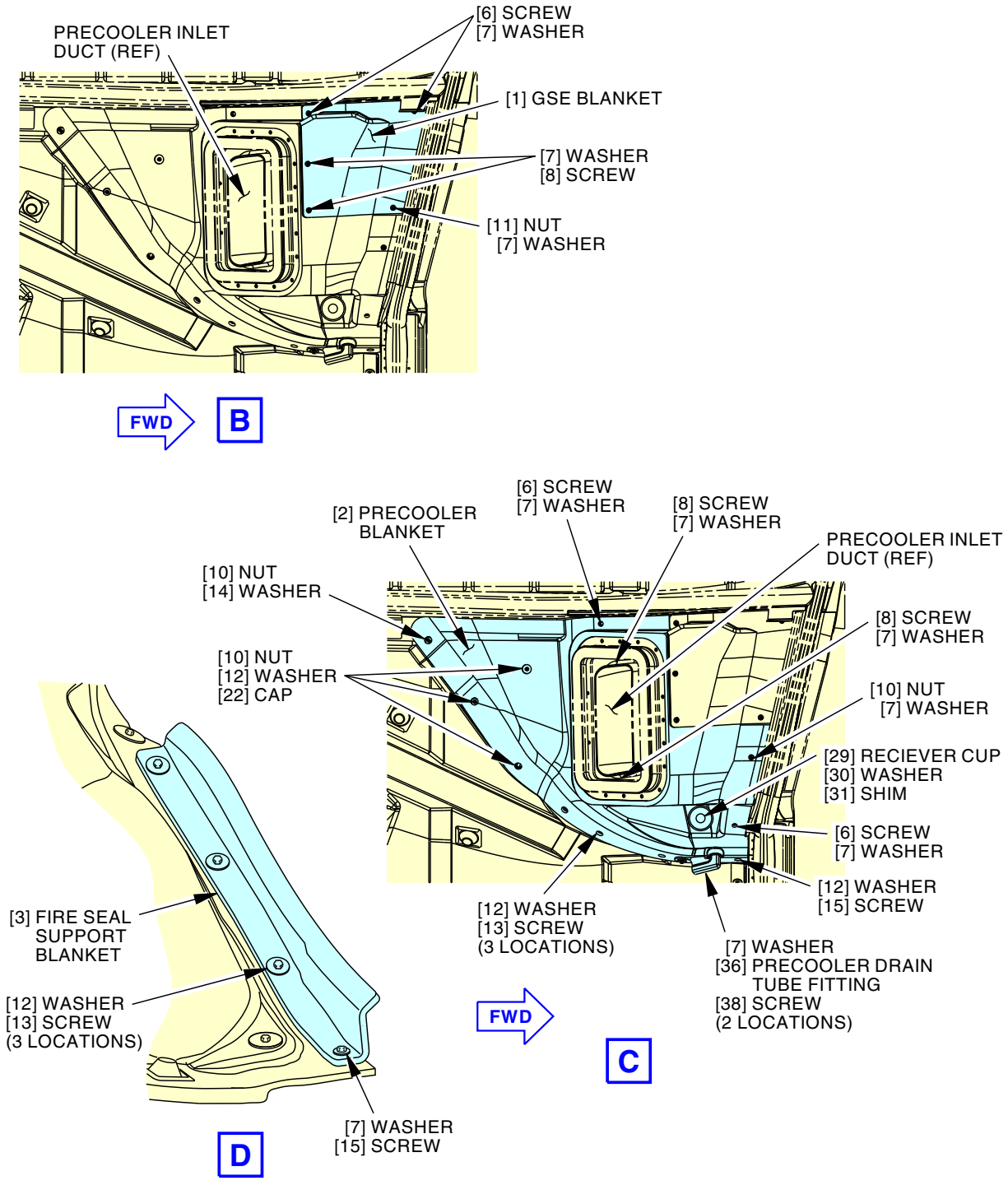
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



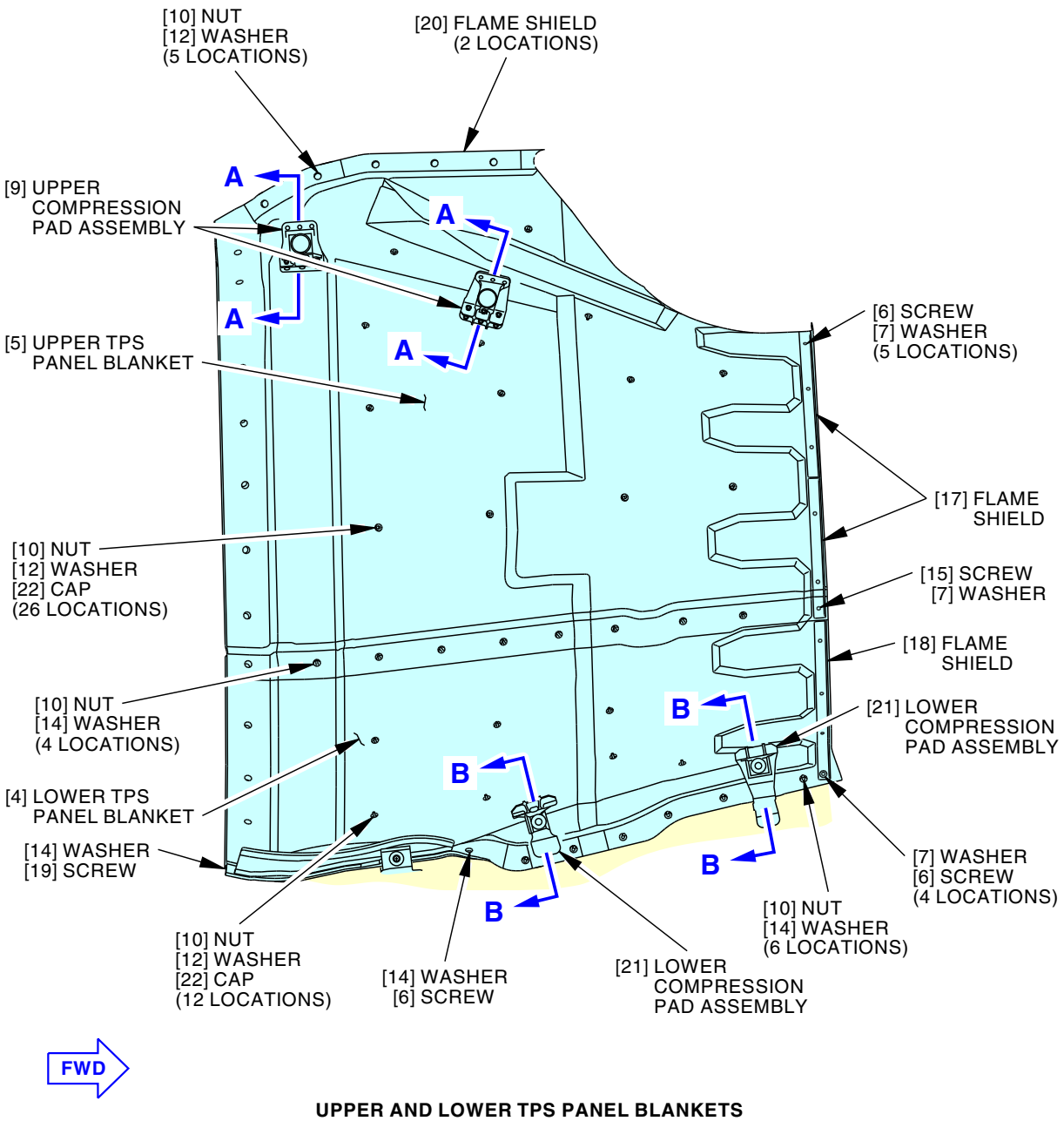
Thrust Reverser Insulation Blanket Installation
Figure 401/78-31-13-990-801-G00 (Sheet 1 of 4)

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Thrust Reverser Insulation Blanket Installation
Figure 401/78-31-13-990-801-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



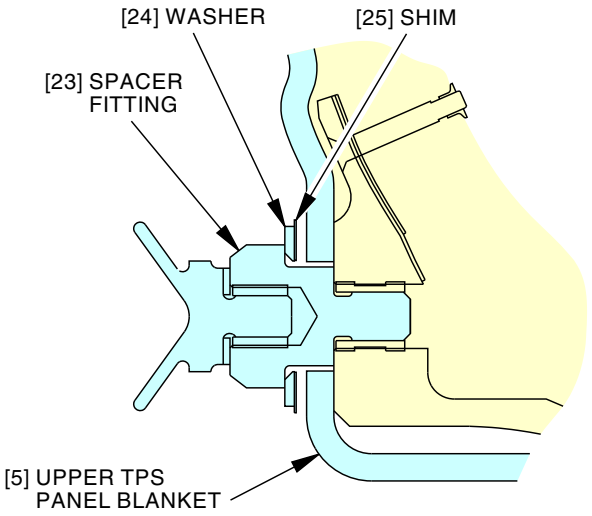
UPPER AND LOWER TPS PANEL BLANKETS

E

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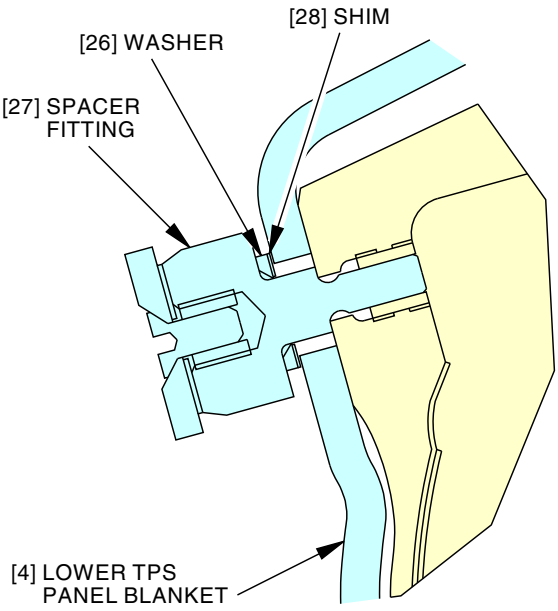
Thrust Reverser Insulation Blanket Installation
Figure 401/78-31-13-990-801-G00 (Sheet 3 of 4)

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UPPER COMPRESSION PAD ASSEMBLY

A-A



LOWER COMPRESSION PAD ASSEMBLY

B-B

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Thrust Reverser Insulation Blanket Installation
Figure 401/78-31-13-990-801-G00 (Sheet 4 of 4)

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TASK 78-31-13-400-801-G00

3. Insulation Blankets - Installation

(Figure 401)

A. General

CAUTION FASTENERS CAN BE DIFFERENT IN LENGTH. IF YOU USE THE INCORRECT FASTENERS, DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION REMOVE AND INSTALL THE INSULATION BLANKETS IN THE CORRECT ORDER GIVEN IN THESE PROCEDURES. IF THE ORDER OF REMOVAL AND INSTALLATION IS NOT FOLLOWED, DAMAGE TO EQUIPMENT CAN OCCUR.

(1) This task is for the installation of the insulation blankets on the left and right thrust reverser with a composite inner wall on an engine.

(2) The procedures are the same for the left and right thrust reversers.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-01-820-801-G00	Thrust Reverser Adjustment (P/B 501)

C. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B00634	Solvent - Stabilized Limonene Cleaner	BMS11-10 Type 1, 2, or 3
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	
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
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

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E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Installation

SUBTASK 78-31-13-410-004-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Thrust Reverser Lower TPS Panel Blanket Installation

SUBTASK 78-31-13-420-003-G00

(1) Make sure that the area of the lower TPS panel blanket [4] is clean from contamination.

(a) If it is necessary, remove all contamination as follows:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

SUBTASK 78-31-13-420-013-G00

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(2) Position the lower TPS panel blanket [4] on the applicable thrust reverser.

SUBTASK 78-31-13-420-014-G00

CAUTION

WHEN YOU INSTALL THE SPACER FITTING, DO NOT CROSS THREAD OR APPLY A SIDE LOAD. APPLY TORQUE TO THE FITTING. IF YOU DO NOT OBEY INSTRUCTIONS, DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Install up to three shims [28], washer [26] and spacer fitting [27] at two locations (TASK 78-31-01-820-801-G00).

SUBTASK 78-31-13-420-015-G00

(4) Install the lower TPS panel blanket [4] as follows:

(a) Install 12 caps [22] between 12 washers [12] and lower TPS panel blanket [4].

1) Orient hinged edge facing the forward direction.

(b) Install the 12 nuts [10].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the 12 nuts [10] prior to installation.

2) Tighten the 12 nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(c) Once final nut torque is met, fold cover over the 12 caps [22] and firmly fold flaps to secure cover.

(d) Install the screw [19] and washer [14].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of screw [19] prior to installation.

2) Tighten the screw [19] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(e) Install the screw [6] and washer [14].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of screw [6] prior to installation.

2) Tighten the screw [6] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(f) Install the six nuts [10], and six washers [14].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the six nuts [10] prior to installation.

2) Tighten the six nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

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SUBTASK 78-31-13-420-008-G00

(5) Make sure that the area of the flame shield [18] is clean of any contamination.

(a) If it is necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

SUBTASK 78-31-13-420-019-G00

CAUTION

DO NOT INTERMIX LEFT AND RIGHT FLAME SHIELDS. MAKE SURE THAT YOU REMOVE AND INSTALL LEFT AND RIGHT FLAME SHIELDS ON THE CORRECT HALF OF THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(6) Install the flame shield [18] as follows:

(a) Position the flame shield [18] on the applicable thrust reverser.

(b) Install the four screws [6] and four washers [7] through the flame shield [18].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the four screws [6] prior to installation..

2) Tighten the four screws [6] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

H. Thrust Reverser Upper TPS Panel Blanket Installation

SUBTASK 78-31-13-160-008-G00

(1) Make sure that the area of the upper TPS panel blanket [5] is clean from contamination.

(a) If it is necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-13-420-005-G00

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(2) Position the upper TPS panel blanket [5] on the applicable thrust reverser.

SUBTASK 78-31-13-420-021-G00

CAUTION

WHEN YOU INSTALL THE SPACER FITTING, DO NOT CROSS THREAD OR APPLY A SIDE LOAD. APPLY TORQUE TO THE FITTING. IF YOU DO NOT OBEY INSTRUCTIONS, DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Install up to three shims [25], the washer [24], and spacer fitting [23] at two locations (TASK 78-31-01-820-801-G00).

SUBTASK 78-31-13-420-022-G00

(4) Install the upper TPS panel blanket [5] as follows:

(a) Install the four nuts [10] and four washers [14].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the four nuts [10].

2) Tighten the four nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(b) Install the 26 caps [22] between 26 washers [12] and upper TPS panel blanket [5].

1) Orient hinged edge facing the forward direction.

(c) Install the 26 nuts [10].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the 26 nuts [10] prior to installation.

2) Tighten the 26 nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(d) Once final nut torque is met, fold cover over the 26 caps [22] and firmly fold flaps to secure cover.

SUBTASK 78-31-13-160-002-G00

(5) Make sure that the areas of the two flame shields [17] and two flame shields [20] are clean from all contamination.

(a) If it is necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-13-160-013-G00

CAUTION

DO NOT INTERMIX LEFT AND RIGHT FLAME SHIELDS. MAKE SURE THAT YOU REMOVE AND INSTALL LEFT AND RIGHT FLAME SHIELDS ON THE CORRECT HALF OF THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(6) Install the two flame shields [20] as follows:

(a) Position the two flame shields [20] on the applicable thrust reverser.

(b) Install the two flame shields [20], five nuts [10], and five washers [12].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the five nuts [10].

2) Tighten the five nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

SUBTASK 78-31-13-160-015-G00

CAUTION

DO NOT INTERMIX LEFT AND RIGHT FLAME SHIELDS. MAKE SURE THAT YOU REMOVE AND INSTALL LEFT AND RIGHT FLAME SHIELDS ON THE CORRECT HALF OF THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(7) Install the two flame shields [17] as follows:

(a) Position the two flame shields [17] on the applicable thrust reverser.

CAUTION

FASTENERS CAN BE DIFFERENT IN LENGTH. IF YOU USE THE INCORRECT FASTENERS, DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Install the two flame shields [17], five screws [6], five washers [12], screw [15], and washer [7].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the five screws [6] and screw [15].

2) Tighten the five screws [6] and screw [15] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

I. Thrust Reverser Fireseal Support Insulation Blanket Installation

SUBTASK 78-31-13-160-003-G00

(1) Make sure that the area of the fireseal support blanket [3] is clean from all contamination.

(a) If it is necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

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2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

SUBTASK 78-31-13-420-002-G00

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(2) Install the fireseal support blanket [3] as follows:

(a) Position the fireseal support blanket [3] on the applicable thrust reverser.

(b) Install the three screws [13] and three washers [12] on the fireseal support blanket [3].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the three screws [13] prior to installation.

2) Tighten the three screws [13] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(c) Install the screw [15] and washer [7] on the fireseal support blanket [3].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of thescrew [15] prior to installation.

2) Tighten the screw [15] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

J. Thrust Reverser Precooler Insulation Blanket Installation

SUBTASK 78-31-13-160-001-G00

(1) Make sure that the area of the precooler blanket [2] is free from all contamination.

(a) If it is necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

SUBTASK 78-31-13-420-001-G00

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(2) Install the precooler blanket [2] as follows:

(a) Position the precooler blanket [2] on the applicable thrust reverser.

(b) Install the three caps [22] between the three washers [12] and precooler blanket [2].

1) Orient hinged edge facing the forward direction.

(c) Install the three nuts [10].

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1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the three nuts [10] prior to installation.

2) Tighten the three nuts [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(d) Once final nut torque is met, fold cover over three caps [22] and firmly fold flaps to secure cover.

(e) Install the nut [10] and washer [14].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the nut [10] prior to installation.

2) Tighten the nut [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(f) Install the three screws [13] and three washers [12].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the three screws [13] prior to installation.

2) Tighten the three screws [13] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(g) Position the precooler drain tube fitting [36] on the applicable precooler blanket [2].

(h) Install the two screws [38] and two washers [7].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the two screws [38] prior to installation.

2) Tighten the two screws [38] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(i) Install the screw [15] and washer [12].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the screw [15] prior to installation.

2) Tighten the screw [15] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(j) Install the two screws [6] and two washers [7], at two locations.

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the two screws [6] prior to installation.

2) Tighten the two screws [6] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(k) Install up to five shims [31], washer [30], and receiver cup [29] (TASK 78-31-01-820-801-G00).

(l) Install the nut [10] and the washer [7].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the nut [10] prior to installation.

2) Tighten the nut [10] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

(m) Install the screw [8] and washer [7] at two locations.

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the screw [8] prior to installation.

2) Tighten the screw [8] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

K. Thrust Reverser GSE Insulation Blanket Installation

SUBTASK 78-31-13-160-006-G00

(1) Make sure that the area of the GSE blanket [1] is clean from contamination.

(a) If necessary, remove all contamination as follows:

1) Wipe or scrub the structure with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

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2) Wipe the structure with solvent, B00184, or solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the surface dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the surface with a new clean cloth and solvent until no contamination is shown on the cloth.

SUBTASK 78-31-13-420-007-G00

CAUTION

HANDLE THE INSULATION BLANKETS WITH CARE. IF YOU DO NOT FOLLOW THIS CAUTION, DAMAGE TO EQUIPMENT CAN OCCUR

(2) Install the GSE blanket [1] as follows:

(a) Position the GSE blanket [1] on the applicable thrust reverser.

(b) Install the two screws [6], two washers [7], two screws [8], two washers [7], nut [11], and washer [7] to the GSE blanket [1].

1) Apply a continuous and uniform layer of Never-Seez NSBT compound, D00006, to the threads of the two screws [6], two screws [8], and nut [11] prior to installation.

2) Tighten the two screws [6], two screws [8], and nut [11] to 20 in-lb (2.3 N·m) - 22 in-lb (2.5 N·m).

L. Put the Airplane Back to its Usual Condition

SUBTASK 78-31-13-410-001-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

INSULATION BLANKET - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) A detailed inspection of the insulation blankets on the thrust reversers.

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(2) A detailed inspection of the insulation blanket seals on the thrust reversers.

SIA ALL

B. The Insulation Blankets are sometimes referred to as the Thermal Protection System.

TASK 78-31-13-200-802-G00

2. Insulation Blankets Inspection

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to examine the insulation blankets and panels on the left and right thrust reversers.

(2) The procedures are the same for the left and right thrust reversers.

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

(3) The insulation blankets are as follows:

(a) GSE Blanket

(b) Precooler Blanket

(c) Fire Seal Support Blanket

(d) Upper TPS Panel

(e) Lower TPS Panel.

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

(4) The insulation blankets are as follows:

(a) Fireseal Precooler Blanket

(b) Fireseal Precooler Thermal Barrier

(c) Fireseal Support Blanket.

SIA ALL

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-13-000-801-G00	Insulation Blankets - Removal (P/B 401)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
78-31-13-300-801-G00	Insulation Blanket Repair (P/B 801)
78-31-13-400-801-G00	Insulation Blankets - Installation (P/B 401)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-13-010-005-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

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1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-31-13-010-008-G00

(2) Remove the insulation blankets, upper thermal protection system (TPS) panel, and lower TPS panel (TASK 78-31-13-000-801-G00).

F. Insulation Blankets Inspection

SUBTASK 78-31-13-210-008-G00

(1) Examine both sides of the insulation blanket and panels for damage (Figure 601):

(a) Missing insulation material or fluid contamination.

1) Not serviceable.

(b) Cracks and tears

1) Cracks and tears are not permitted.

2) A temporary repair can be done with these conditions:

NOTE: This damage can not be repaired in all locations (TASK 78-31-13-300-801-G00).

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a) The tear or crack in the outer metal sheet is not longer than 3.0 in. (76.2 mm).

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b) The maximum length of any damage is not more than 5.0 in. (127.0 mm).

SIA ALL

c) Around each damaged area in all directions, there is a minimum surface distance that is not damaged of not less than 0.5 in. (12.7 mm).

d) The damaged area is not less than 0.5 in. (12.7 mm) from a grommet, sharp bend, attaching parts or edge.

(c) Holes in the outer metal sheet

1) Holes are not permitted.

2) A temporary repair can be done with these conditions:

NOTE: This damage can not be repaired in all locations (TASK 78-31-13-300-801-G00).

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

a) The hole in the outer metal sheet is not more than 0.25 in. (6.4 mm) in diameter.

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

b) The maximum damage size is not more than 3 in^2 (19.4 cm^2).

SIA ALL

c) Around each damaged area in all directions, there is a minimum surface distance that is not damaged of not less than 0.5 in. (12.7 mm).

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d) The damaged area is not less than 0.5 in. (12.7 mm) from a grommet, sharp bend, attaching parts or edge.

SUBTASK 78-31-13-210-007-G00

(2) If the damage is in the limits and conditions, you can do a temporary repair of the insulation blanket and panels on the airplane.

(a) A temporary repair has a Continue-In-Service limit of not more than 500 hours.

NOTE: A temporary repair must be replaced in less than 500 hours with another temporary repair.

(b) Do this task: Insulation Blanket Repair, TASK 78-31-13-300-801-G00.

SUBTASK 78-31-13-210-006-G00

(3) If you find damage to the insulation blanket and panels outside the limits and conditions, unless you are given other instructions, replace the insulation blanket and panels.

(a) Do this task: Insulation Blankets - Removal, TASK 78-31-13-000-801-G00

(b) Do this task: Insulation Blankets - Installation, TASK 78-31-13-400-801-G00.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-13-410-013-G00

(1) Install the insulation blankets, upper thermal protection system (TPS) panel, and lower TPS panel (TASK 78-31-13-400-801-G00).

SUBTASK 78-31-13-410-009-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

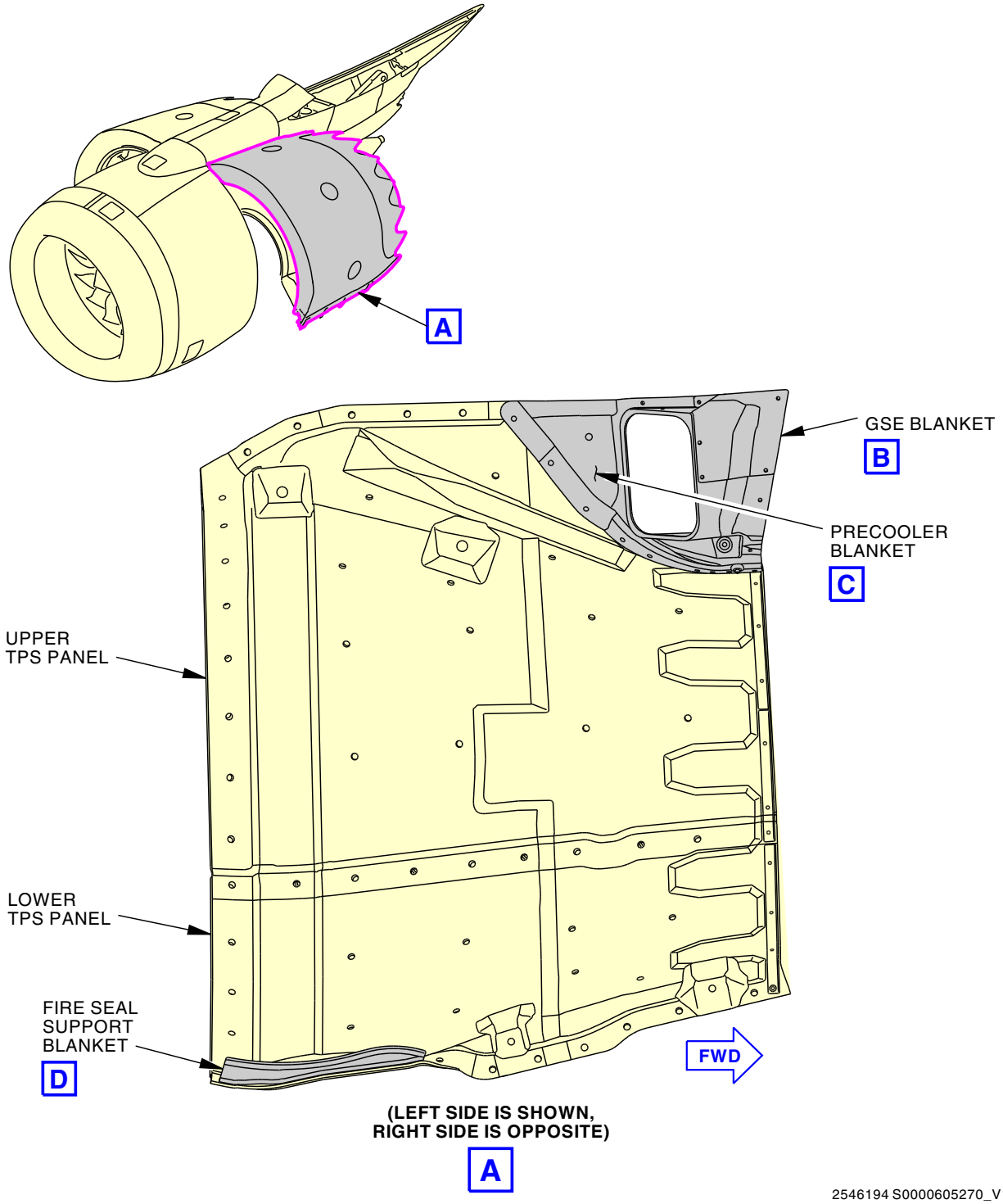
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

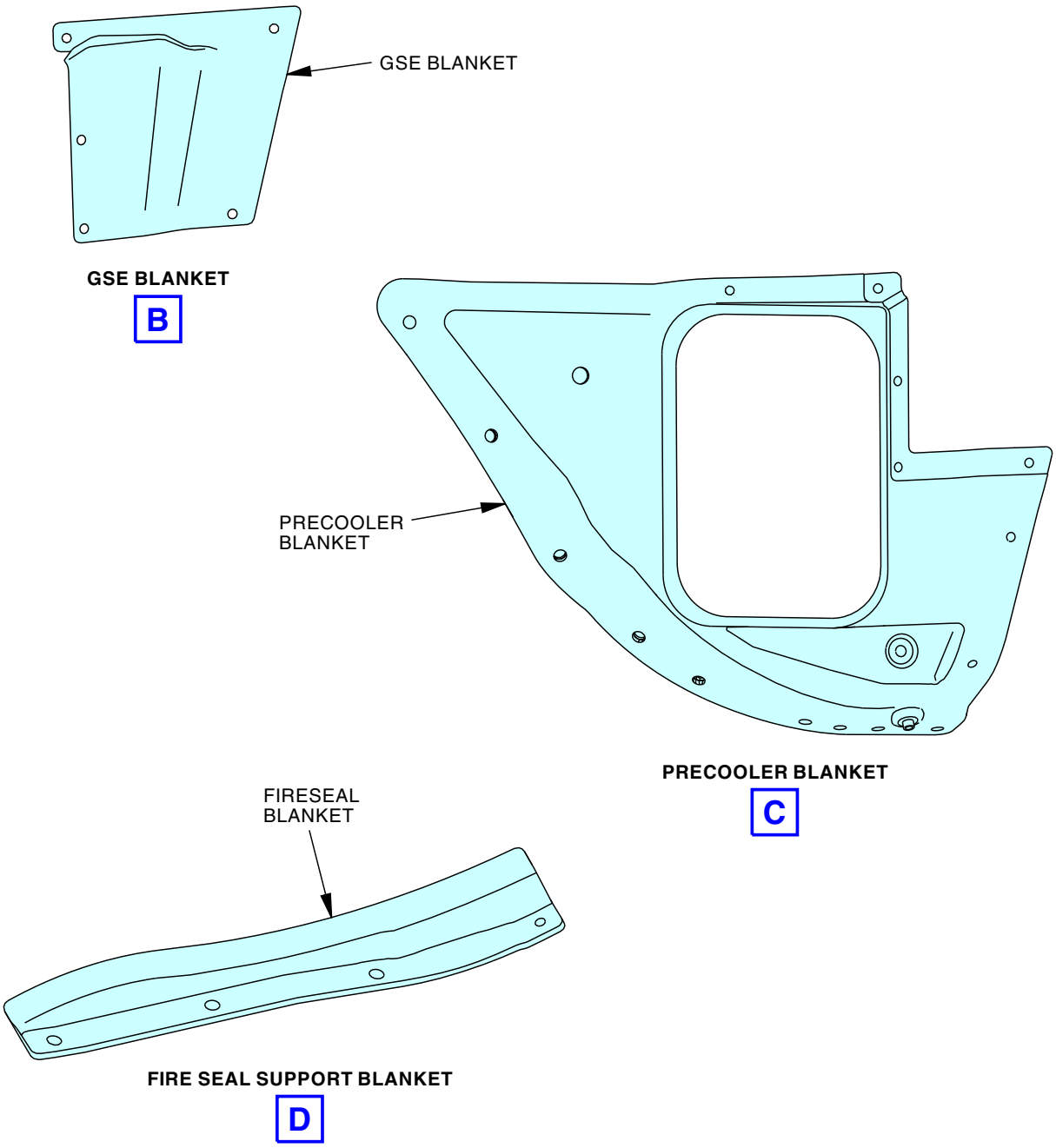
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Insulation Blankets Inspection
Figure 601/78-31-13-990-806-G00 (Sheet 1 of 4)

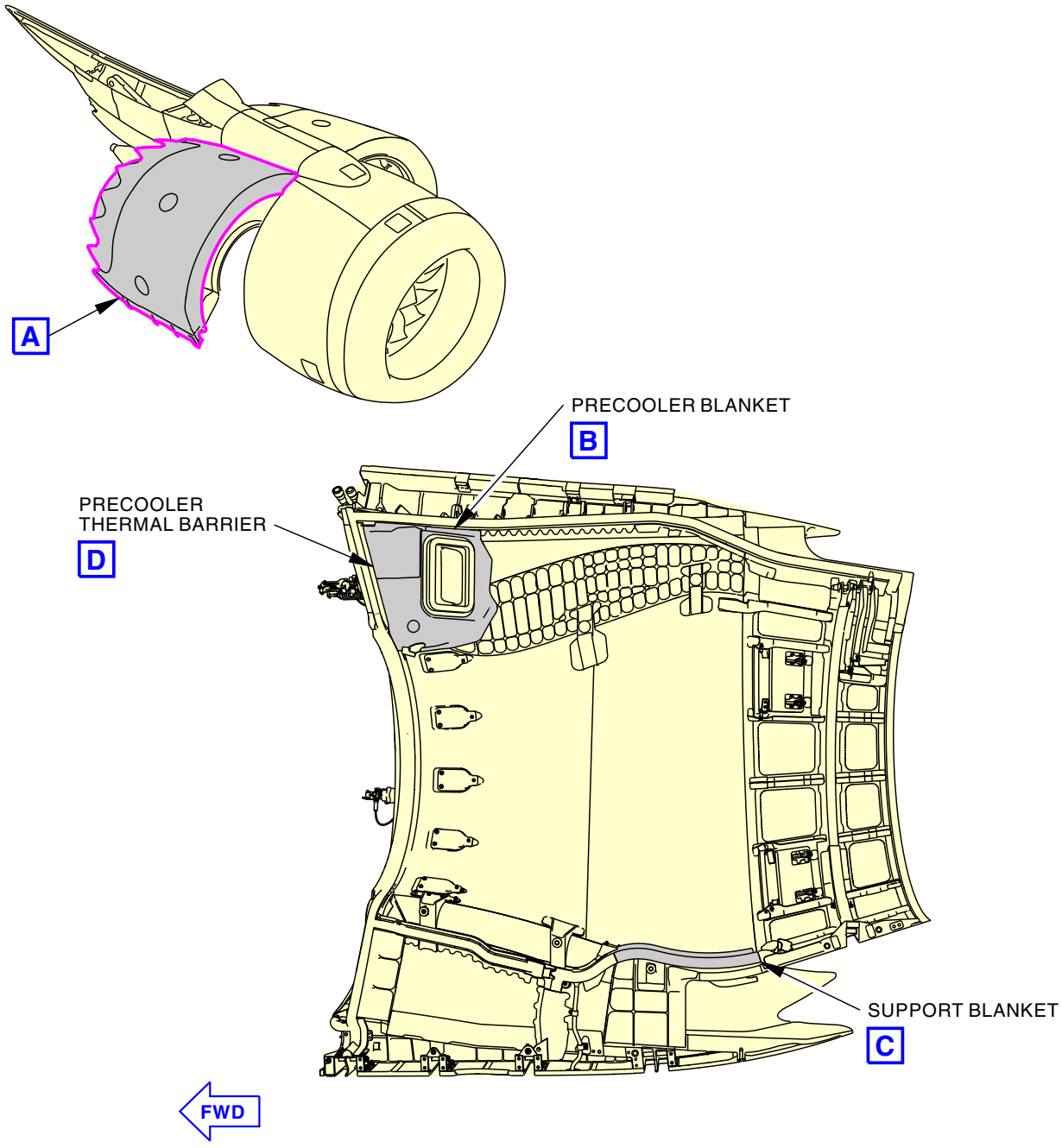
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Insulation Blankets Inspection
Figure 601/78-31-13-990-806-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



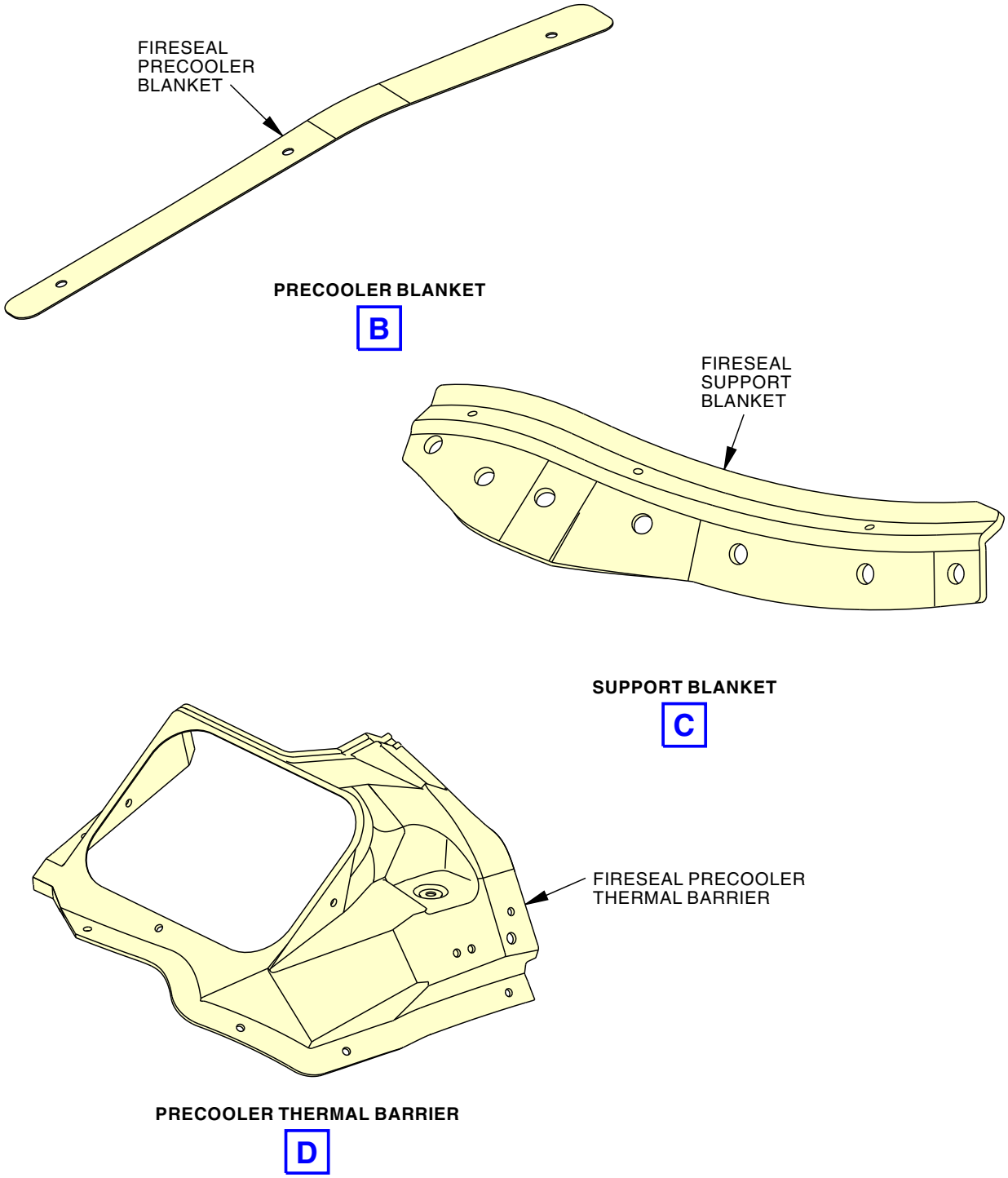
(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)

A

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Insulation Blankets Inspection
Figure 601/78-31-13-990-806-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Insulation Blankets Inspection
Figure 601/78-31-13-990-806-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

TASK 78-31-13-211-801-G00

3. Insulation Blanket Seal Inspection

(Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task is for a visual inspection of the seals on the thermal protection system (TPS) panels and insulation blankets on the left and right thrust reversers.

(2) The procedures are the same for the left and right thrust reversers.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-13 P/B 401	INSULATION BLANKET - REMOVAL/INSTALLATION
78-31-13-000-801-G00	Insulation Blankets - Removal (P/B 401)
78-31-13-400-801-G00	Insulation Blankets - Installation (P/B 401)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-13-010-006-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-31-13-010-007-G00

(2) Remove the insulation blankets, upper thermal protection system (TPS) panel, and lower TPS panel (TASK 78-31-13-000-801-G00).

F. Thrust Reverser Insulation Blanket Seal Inspection

SUBTASK 78-31-13-211-003-G00

(1) Inspect the insulation blanket seals for damage, missing seals, tears, creases, disbonds, and exposed sealant.

SUBTASK 78-31-13-960-001-G00

(2) If damage is found, replace the insulation blanket (PAGEBLOCK 78-31-13/401).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-13-410-011-G00

(1) Install the insulation blankets, upper thermal protection system (TPS) panel, and lower TPS panel (TASK 78-31-13-400-801-G00).

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

SUBTASK 78-31-13-410-012-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

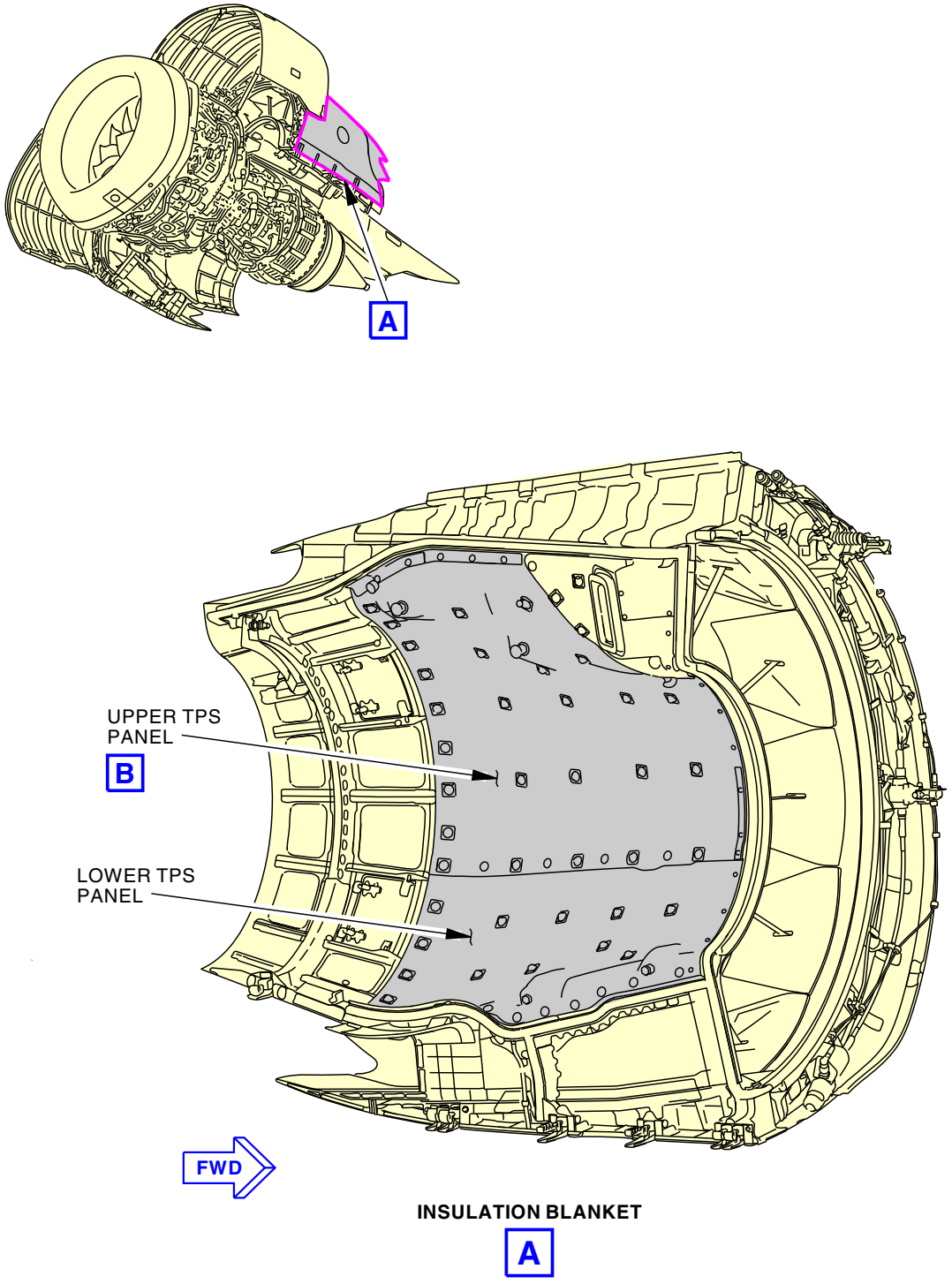
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

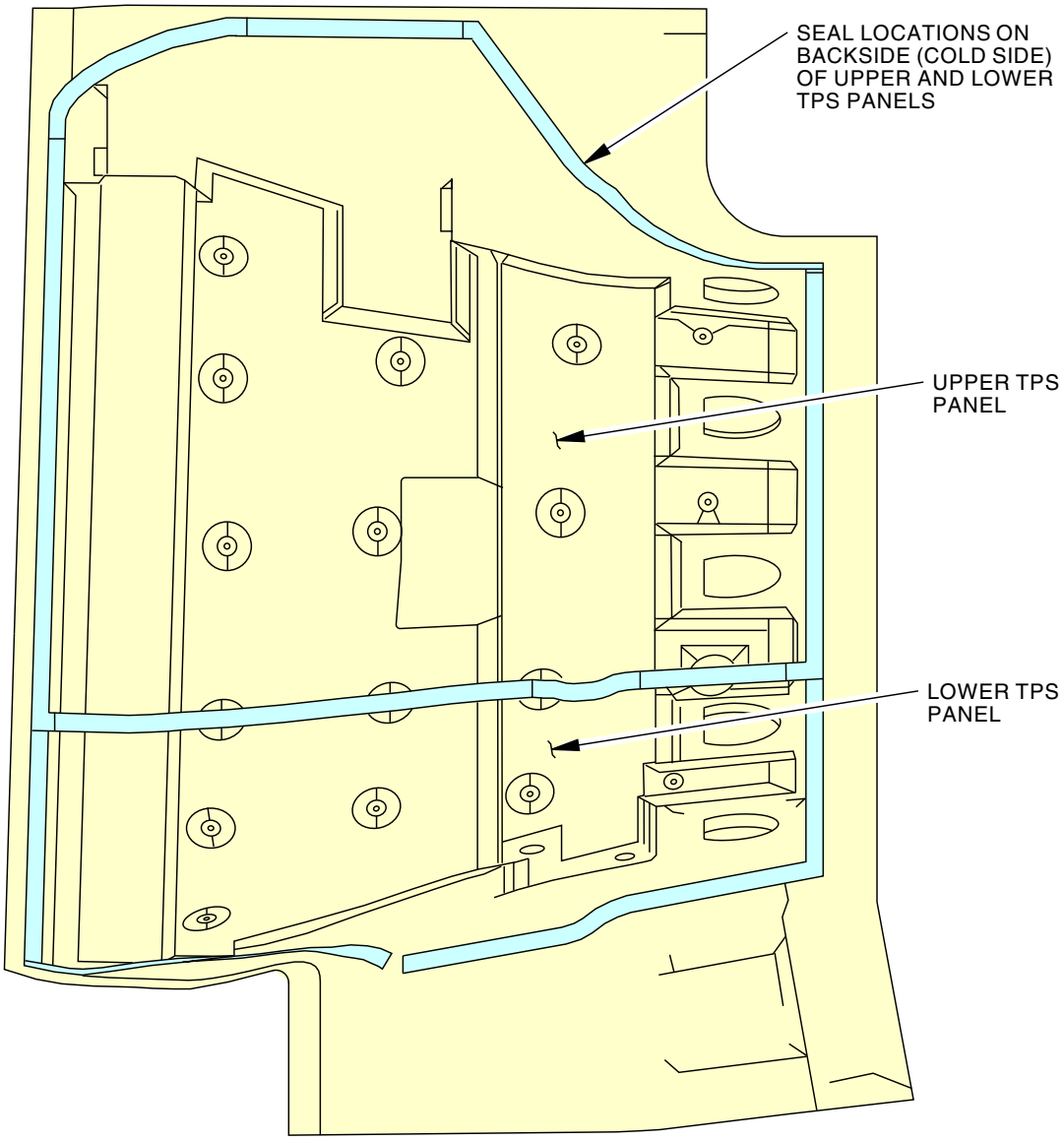
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Insulation Blanket Seals
Figure 602/78-31-13-990-813-G00 (Sheet 1 of 2)

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INSULATION BLANKET SEALS
(VIEW FROM THE OUTBOARD LOOKING IN)

B

2586423 S0000624840_V2

Insulation Blanket Seals
Figure 602/78-31-13-990-813-G00 (Sheet 2 of 2)

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INSULATION BLANKET - REPAIRS

1. General

A. This procedure has one task:

(1) The temporary repair of the insulation blankets on the thrust reverser.

TASK 78-31-13-300-801-G00

2. Insulation Blanket Repair

(Figure 801, Figure 802, Figure 803)

A. General

(1) This task gives the instructions for a temporary repair of the metal faced (CRES) thermal insulation blankets.

(a) The thermal insulation blanket can remain installed while you do this temporary repair procedure with the thrust reverser in the opened position for the hot side of the blanket.

(2) These blankets are a thermal insulation and fire barrier layer which is necessary to keep the thrust reverser structurally serviceable and can decrease the damage and repair costs from a duct burst or a fire.

(3) The function of the metal face sheets is to prevent fluid contamination of the blanket insulation and to provide a fire barrier.

(4) The function of the polymide sheets on the cold side is to prevent fluid contamination of the blanket insulation.

(5) The thermal performance of the insulation blanket will be reduced if the insulation is exposed to fluid (water, engine oil, hydraulic fluid). The performance is reduced even after the insulation dries after exposure to fluid. It is therefore very important to examine the blanket for fluid penetration in the damaged areas where the metal foil has been compromised.

(6) Clean surfaces are required to get the high strength bonds to hold the adhesive and patch to the blanket. All unwanted materials such as oils, greases, waxes or dirt must be removed.

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(7) The materials in the consumable materials list are used for factory production of the blanket assemblies. Small quantities of these materials from the material suppliers may not be available for a field repair. Substitution of other materials that are not on this consumable material list is not permitted because the substitution of materials could affect the performance of the insulation blanket.

(a) Refer to the supplier for the consumable materials, in the smaller quantities that are necessary, for a field or component repair.

1) Hi-Temp Insulation Inc, 4700 Calle Alto, Camarillo, California 93012, USA.

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(8) The insulation material is inside a quilted fiberglass fabric bag.

SIA ALL

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)

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(Continued)

Reference	Title
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-418	Gloves
STD-809	Spatula
STD-810	Spatula - Fillet Smoothing, Hardwood or Plastic

D. Consumable Materials

Reference	Description	Specification
A00081	Adhesive - Silicone Rubber - RTV 106	BAC5010 Type 74
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
A00803	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type I
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
C00944	Primer - Firewall - Dapco No. 1-100	BMS5-63 Type I
C00954	Primer - Adhesive Bonding - SS4004P RTV	BAC5010 Type 74
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)
G00744	Cloth - Emery	
G01306	Gloves - Lint-free	
G50117	Sheet - 301 series, CRES, 0.018 - 0.025 inch Thick	AMS5517, AMS5518, AMS5902, AMS5519
G50769	Insulation - High Temperature Low Thermal Conductivity	BMS9-20
G50797	Fabric - Glass Fabric Reinforcements For Laminated Plastics Products	BMS9-3 Type D Style 120

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1

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(Continued)

Number	Name/Location
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

G. Damage Limits for the Temporary Repair

SUBTASK 78-31-13-800-001-G00

(1) If the damage to the insulation blanket is within these damage limits, you can do a temporary repair on the airplane.

NOTE: Damage is defined as any penetration through the metal face sheet. Scratches and dents are not considered damage which require repair.

(a) Hot Side:

1) Damage to the inner metal sheet or hot side is less than 2.0 in^2 (1290.3 mm^2).

2) A tear in the inner metal sheet or hot side is shorter than 3.0 in. (76.2 mm).

3) The damaged area is more than 0.5 in. (12.7 mm) from a grommet, sharp bend or edge in the blanket.

4) Around each damaged area in all directions, there is at least 0.5 in. (12.7 mm) of undamaged blanket.

5) The damaged areas must be separated by more than 6.0 in. (152.4 mm).

SUBTASK 78-31-13-350-004-G00

(2) A temporary repair must be replaced within 500 hours with a permanent repair.

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H. Damage Limits for the Temporary Repair

SUBTASK 78-31-13-350-003-G00

(1) If the damage to the insulation blanket is in these limits, you can repair the insulation blanket on the airplane:

NOTE: Use of this repair is permitted in all locations forward of the No. 3 compression pad.

(a) There is no missing insulation material and the quilted fiberglass fabric bag is not damaged.

(b) The insulation material and the quilted fiberglass fabric bag are not wet or stained with hydraulic fluid or oil.

(c) The maximum damage size is not more than 3.0 in^2 (19.4 cm^2).

(d) The maximum length of any damage is not more than 5.0 in. (127.0 mm).

(e) There are no more than 2 temporary repairs within a 12.0 in. (304.8 mm) diameter.

(f) A maximum number of 8 temporary repairs are permitted on each blanket.

(g) Around each damaged area in all directions, there is a at least 0.5 in. (12.7 mm) of damaged blanket.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

(h) The damaged area is not less than 0.5 in. (12.7 mm) from a grommet, attaching parts or edge.

SIA ALL

I. Prepare for the Temporary Repair

SUBTASK 78-31-13-010-003-G00

(1) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL

J. Temporary Repair of the Inner Metal Sheet on the Hot Side of the Thermal Insulation Blanket

SUBTASK 78-31-13-220-001-G00

(1) Make sure that the damaged area of the blanket is within the given damage limits above.

SUBTASK 78-31-13-350-001-G00

(2) Repair the damaged area of the inner metal sheet on the hot side of the blanket, as follows (Figure 801):

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

WARNING MAKE SURE THAT YOU USE PROTECTIVE CLOTHING ON THE HAND AND ARM. THIS WILL PREVENT INJURY TO PERSONS.

WARNING USE PROTECTION WHEN YOU REMOVE THE SHARP METAL EDGES FROM THE DAMAGED AREA OF THE OUTER METAL SHEET. SHARP METAL EDGES CAN CAUSE INJURY TO PERSONS.

(a) Remove the sharp edges from the metal sheet and the loose insulation material from the damaged area.

(b) Remove a minimum of four installation fasteners and washers that surround the damage.

1) Keep the installation fasteners and washers for the installation.

(c) Examine the damaged area and find the size of repair patch required.

1) The repair patch must extend a minimum of 1.0 in. (25.4 mm) beyond the fasteners and in all directions around the damaged area by a minimum of 2.0 in. (50.8 mm).

2) Make a pattern for the repair patch with any clean paper.

NOTE: A paper pattern is used to find the size of the patch if the patch must cover a contoured surface.

3) Dry fit the paper pattern over the damaged area to make sure that the repair patch is the correct size and will cover the damaged area.

(d) Use the paper pattern to cut a repair patch from a 0.018 in. (0.457 mm) to 0.025 in. (0.635 mm) thick CRES sheet, G50117 that will overlap the surface repair area.

1) Deburr the edges of the repair patch.

2) Radius the corners of the repair patch a minimum of 0.12 in. (3.05 mm).

(e) Dry fit the repair patch at the repair location.

1) Make a mark of the locations of the fastener holes on the repair patch.

2) Shape the repair patch to match the inside contour of the blanket within 0.030 in. (0.762 mm).

(f) Drill 0.345 in. (8.8 mm) to 0.405 in. (10.3 mm) diameter holes (0.375 in. (9.525 mm) nominal) through the repair patch at the same locations as the fastener locations.

WARNING DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(g) Clean the repair patch.

1) Clean the repair patch with a clean cotton wiper, G00034 moist with solvent, B00062.

a) Continue to clean the surface again with a new, clean cotton wiper, G00034 moist with solvent, B00062 until no contamination is seen on the cloth.

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

2) Wipe the repair patch with a dry, clean cloth before the solvent evaporates.

(h) Make sure that the cleaned repair patch is kept clean.

NOTE: Apply primer to the cleaned surface within four hours.

1) Use clean lint-free gloves, G01306 when you handle the cleaned repair patch.

(i) Use a clean cotton wiper, G00034 to apply a thin layer of SS4004P RTV primer, C00954 to the cleaned repair patch.

1) Let the primer become dry for a minimum of 30 minutes at 65°F (18°C) to 100°F (38°C).

a) Do not exceed 72 hours to allow the primer to dry.

(j) Make sure that the primed repair patch is kept clean.

1) Use clean, lint-free gloves, STD-418 when you handle the primed repair patch.

(k) Prepare the adhesive.

1) If you use the RTV 106 adhesive, A00081 for the repair, this is a one-part silicone adhesive/sealant which is supplied ready to use.

NOTE: The maximum thickness for one application of RTV 106 adhesive, A00081 is 0.125 in. (3.18 mm), allow the adhesive to completely cure before a second application. If RTV 106 adhesive, A00081 is applied to a thickness of 0.25 in. (6.35 mm) in one application, the outside surface of the RTV 106 adhesive, A00081 forms a thick skin and the inside core of the RTV 106 adhesive, A00081 will not cure correctly.

NOTE: The RTV 106 adhesive, A00081 sealant has a short work life. Exposure to air for more than a few minutes will cause a skin to form which will prevent adhesion on the surfaces.

2) If you use the firewall sealant, A00160 for the repair, use the manufacturers instructions to mix the two-part sealant.

NOTE: After the firewall sealant, A00160 is mixed, there is a limited application time. Firewall sealant, A00160 application time is 4 hours. Do not use the sealant if it has exceeded the application time.

WARNING

DO NOT BREATHE THE DUST FROM THE INSULATION MATERIAL. PUT ON A DUST MASK. INJURIES TO PERSONS CAN OCCUR.

(l) Replace the damaged, contaminated or wet insulation material. (Figure 801)

1) Carefully cut the damaged or wet insulation material from the damaged area.

2) Make sure that you do not cut the polymide sheet on the outside surface of the blanket cold side.

3) Make a new insulation plug, as follows:

a) Cut a piece of quilted microporous insulation, G50769, BMS9-20 Type II Class 16 Grade 3, to the correct size.

b) Make sure that the insulation plug keeps as many stitch lines as possible.

c) Make the insulation plug larger than the hole in the blanket, approximately 0.05 in. (1.27 mm) to 0.15 in. (3.81 mm) more on each side.

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

4) Install the replacement insulation material with RTV 106 adhesive, A00081 or firewall sealant, A00160.
   a) Seal the edges and insulation material around the damaged area of the blanket with RTV 106 adhesive, A00081 or firewall sealant, A00160.
   b) Apply RTV 106 adhesive, A00081 or firewall sealant, A00160 to seal the blanket insulation.
   c) Make sure that there are no gaps between the replacement insulation material and the insulation in the blanket.
   d) Fill all gaps with adhesive.

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION

DO NOT GET SOLVENTS ON THE INSULATION MATERIAL. SOLVENTS AND OTHER FLUIDS WILL DECREASE THE PERFORMANCE AND MATERIAL PROPERTIES OF THE INSULATION BLANKET.

(m) Clean the damaged area plus a minimum of 0.5 in. (12.7 mm) in all directions around the damaged area.
   1) Clean the damaged area with a clean cotton wiper, G00034 moist with solvent, B00062.
      a) Continue to clean the surface again with a new, clean cotton wiper, G00034 moist with solvent, B00062 until no contamination is seen on the cloth.
   2) Wipe the repair area with a dry, clean cloth before the solvent evaporates.

(n) Make sure that the cleaned repair surface and the patch are kept clean.

   NOTE: Apply primer to the cleaned surface within four hours.

   1) Use clean lint-free gloves, G01306 when you handle the cleaned repair surface or the patch.

(o) Use a clean cotton wiper, G00034 to apply a thin layer of SS4004P RTV primer, C00954 to the cleaned repair surface and the patch.
   1) Let the primer become dry for a minimum of 30 minutes at 65°F (18°C) to 100°F (38°C).
      a) Do not exceed 72 hours to allow the primer to dry.

(p) Make sure that the primed repair surface and the patch are kept clean.
   1) Use clean, lint-free gloves, STD-418 when you handle the primed repair surface or the patch.

(q) Apply RTV 106 adhesive, A00081 or firewall sealant, A00160 to the primed repair surface of the inner metal sheet.

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SIA ALL; AIRPLANES WITH COMPOSITE INNER WALL (Continued)

1) Use a hardwood or plastic fillet smoothing spatula, STD-810 or spatula, STD-809 to apply a layer of adhesive or sealant.
2) Make sure that the adhesive is a maximum of 0.125 in. (3.18 mm) thick and extends to the edges of the repair patch in all directions.
3) Make sure that the adhesive is smooth.
4) Make sure that the repair patch is installed immediately after the adhesive or sealant is applied.

NOTE: Immediately after the adhesive is applied, the adhesive will begin to cure. Within a few minutes a skin on the surface of the adhesive will form. The patch will not bond correctly if a skin has formed on the adhesive before it is applied.

CAUTION DO NOT APPLY TOO MUCH PRESSURE WHEN YOU APPLY THE PATCH TO THE REPAIR AREA. THE ADHESIVE WILL COME OUT FROM BELOW THE PATCH.

(r) Position and apply the repair patch over the repair area.

1) Install the fasteners and washers.
2) Apply light pressure to the repair patch as the adhesive dries.
3) Remove all extra adhesive from the edges with a clean cotton wiper, G00034 or cloth.

(s) Let the sealant or adhesive cure.

1) Adhesive RTV 106 adhesive, A00081 will cure in a minimum of 24 hours at a minimum temperature of 65°F (18.3°C).

NOTE: The adhesive requires a minimum of 20 percent relative humidity to cure. Because the adhesive requires moisture from the air to cure, do not cover the adhesive. The smell of acetic acid will be present until the adhesive has cured.

2) Firewall sealant, A00803 cure time depends on the type used.

NOTE: Firewall sealant, A00803 cures in 48 hours. Lower temperatures will increase cure time. Higher temperatures will decrease cure time. As an example, at 120°F (49°C), the mixed sealant will cure within 4 hours.

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL

K. Temporary Insulation Blanket Repair

SUBTASK 78-31-13-350-002-G00

(1) Do these steps to repair the damaged area of the outer metal sheet Figure 802:

(a) Make sure that the damaged area is in the limits.

WARNING USE PROTECTION WHEN YOU REMOVE THE SHARP METAL EDGES FROM THE DAMAGED AREA OF THE OUTER METAL SHEET. SHARP METAL EDGES CAN CAUSE INJURY TO PERSONS.

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SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

(WARNING PRECEDES)

CAUTION

CAREFULLY REMOVE THE SHARP EDGES FROM THE DAMAGED AREA OF THE OUTER METAL SHEET. A TEMPORARY REPAIR AT THIS LOCATION IS NOT PERMITTED IF THE INSULATION MATERIAL OR THE FIBERGLASS FABRIC BAG IS DAMAGED. DAMAGE TO THE INSULATION MATERIAL OR FIBERGLASS FABRIC BAG CAN OCCUR.

(b) If necessary, deburr the edges of the damaged area of the outer metal sheet with a emery cloth, G00744 or equivalent.

(c) Cut a piece of fiberglass fabric, G50797 that will overlap the surface area in all directions around the damaged area by 1.0 in. (25.4 mm) to 1.5 in. (38.1 mm).

1) Trim any edge of the fiberglass patch that overlaps the edge of the blanket or covers a grommet.

2) Cut the corners to make a rounded edge that has a radius of 0.25 in. (6.4 mm).

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THESE MATERIALS. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION

DO NOT GET SOLVENTS ON THE INSULATION MATERIAL. SOLVENTS AND OTHER FLUIDS WILL DECREASE THE PERFORMANCE AND MATERIAL PROPERTIES OF THE INSULATION BLANKET.

(d) Clean the damaged area and a minimum of 3.0 in. (76.2 mm) in all directions around the damaged area with solvent, B00062, and a cotton wiper, G00034.

1) Make sure that you remove all contaminants (such as hydraulic fluid and oil) around the damaged area. This will make sure that the sealant will adhere properly. If necessary, use a Scotch-Brite or equivalent pad with solvent, E50001. Do not allow the solvent to come in contact with the quilted fiberglass fabric bag.

(e) Clean the surface again with a clean cloth that is moist with solvent and wipe dry with another clean dry cloth while the surface is still moist.

(f) Do the above steps again to clean the fiberglass patch.

(g) Make sure that the cleaned bonding surface and fiberglass patch are kept clean. Use lint-free gloves, G01306, when you touch the cleaned bonding surface or fiberglass patch.

(h) Use a clean piece of cotton wiper, G00034, to apply a thin layer of Dapco No. 1-100 primer, C00944, to the cleaned bonding surface of the outer metal sheet.

1) Let the primer dry for not less than 30 minutes, but for no more than 2 hours at 65°F (18.3°C) to 100°F (37.8°C).

(i) Make sure that the bonding surface and fiberglass patch are kept clean. Use lint-free gloves, G01306, when you touch the bonding surface or fiberglass patch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

(j) Use a hardwood or plastic fillet smoothing spatula, STD-810 to apply a continuous layer of sealant, A00803 to the primed bonding surface of the outer metal sheet.

1) Apply the sealant approximately 0.05 in. (1.3 mm) thick.

2) Make sure that the sealant extends to the edges of the fiberglass patch in all directions.

NOTE: It is acceptable to have the sealant extend slightly beyond the edges of the fiberglass patch.

3) Make sure that the sealant is smooth.

4) Apply the fiberglass patch immediately after the sealant is applied.

CAUTION

DO NOT APPLY TOO MUCH PRESSURE WHEN YOU APPLY THE PATCH TO THE REPAIR AREA. THE ADHESIVE WILL COME OUT FROM BELOW THE PATCH.

(k) Put the fiberglass patch in the correct position over the damaged area.

1) Make sure that you do not use too much pressure when the fiberglass patch is applied.

(l) Use a hardwood or plastic fillet smoothing spatula, STD-810 to make the fiberglass patch smooth over the sealant.

1) Work from side to side to remove air bubbles from under the fiberglass patch.

(m) Use a hardwood or plastic fillet smoothing spatula, STD-810 to apply a continuous layer of sealant, A00803 to the surface of the fiberglass patch.

1) Apply the sealant approximately 0.05 in. (1.3 mm) thick.

2) While you work from one side to the other, gently use a hardwood or plastic fillet smoothing spatula, STD-810 to smooth the sealant over the fiberglass patch.

3) Extend the sealant 0.25 in. (6.4 mm) beyond the edges of the fiberglass patch in all directions.

NOTE: If you use a pre-cured patch for the repair, apply sealant, A00803 over the patch edges, a minimum of 0.25 in. (6.4 mm) on both sides of the patch edge.

(n) Let the sealant dry for a minimum of 48 hours at a minimum of 65°F (18°C).

1) To cure the sealant faster, you can apply heat at a maximum temperature of 125°F (52°C) to the repair for a cure time of 4 hours.

L. Fiberglass Patch (Interim Repair) Inspection Procedure

SUBTASK 78-31-13-750-002-G00

(1) Fiberglass Patch Inspection Time Limits

(a) For Zone 1 (Forward Edge of Blanket to Compression Pad #2)

1) An Initial inspection after fiberglass patch installation must be done at or before 2000 hours.

2) If, after a total of 4000 hours, no deterioration of the fiberglass patch is found, further inspections can be done as part of the heavy maintenance check or equivalent maintenance procedures.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

3) If, after a total of 4000 hours, deterioration of the fiberglass patch is found, repeat inspections must be done at 2000 hour intervals thereafter.

4) If any deterioration of the fiberglass patch is found during any subsequent heavy maintenance check or equivalent inspection, revert back to the 2000 hour inspection interval.

(b) For Zone 2 (Compression Pad #2 to Compression Pad #3)

1) Initial inspection after fiberglass patch installation must be done at or before 1500 hours.

2) Repeat inspections must be done at 1500 hour intervals thereafter.

SUBTASK 78-31-13-750-003-G00

(2) Fiberglass Patch / Sealant Inspection Criteria

(Figure 803)

(a) Cracks in the sealant or the fiberglass patch are not permitted. Replace only the damaged sealant and the damaged fiberglass patch.

(b) If the sealant has hardened but is not cracked, continue with either the 2000 hour or the 1500 hour inspection time limits as specified in each zone, defined in the Fiberglass Patch Inspection Time Limits step above.

(c) For Zone 1 areas, if the sealant remains flexible / pliable / not hardened, inspections can be continued to the next heavy maintenance inspection interval.

(d) Examine the fiberglass patch for the following damage:

1) Peeling of fiberglass patch.

a) Peeling is not permitted.

2) Cracks

a) Cracks are not permitted in the fiberglass patch.

b) If cracks exist in the sealant, inspect the underlying fiberglass patch for indications of cracks. Cracks are not permitted in the fiberglass patch.

c) Micro-surface / superficial cracks in the sealant should be repaired as follows:

<1> Clean the sealant with solvent, B00062, and a cotton wiper, G00034.

<2> Lightly abrade the sealant using Scotch-Brite or equivalent pad.

<3> Reclean the sealant with solvent, B00062, and a cotton wiper, G00034.

<4> Use a brush to apply a light coat of sealant, A00803 to the area to make sure that the cracks are fully sealed.

3) Worn areas

a) Worn areas are permitted if the total depth does not exceed one-half of the Fiberglass Patch thickness. One-half of the fiberglass patch thickness is equivalent to 0.015 in. (0.381 mm).

b) The worn area is smooth (no rough or irregular surfaces).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITH TITANIUM INNER WALL (Continued)

CAUTION BE CAREFUL WHEN YOU REMOVE THE OLD OR USED SEALANT FROM THE INSULATION BLANKETS. DAMAGE TO THE BLANKETS CAN OCCUR.

4) If you find damage on the patch that is not permitted, carefully remove only the damaged portion of the patch and re-install with a new section of a fiberglass patch.

a) The newly installed repair patch section must overlap the existing patch by a minimum of 0.25 in. (6.4 mm) ((Figure 803)).

NOTE: The total maximum amount, i.e. thickness of sealant that can be present on a damaged portion must not exceed 0.125 in. (3.175 mm).

SIA ALL

M. Put the Airplane Back to its Usual Condition

SUBTASK 78-31-13-410-010-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

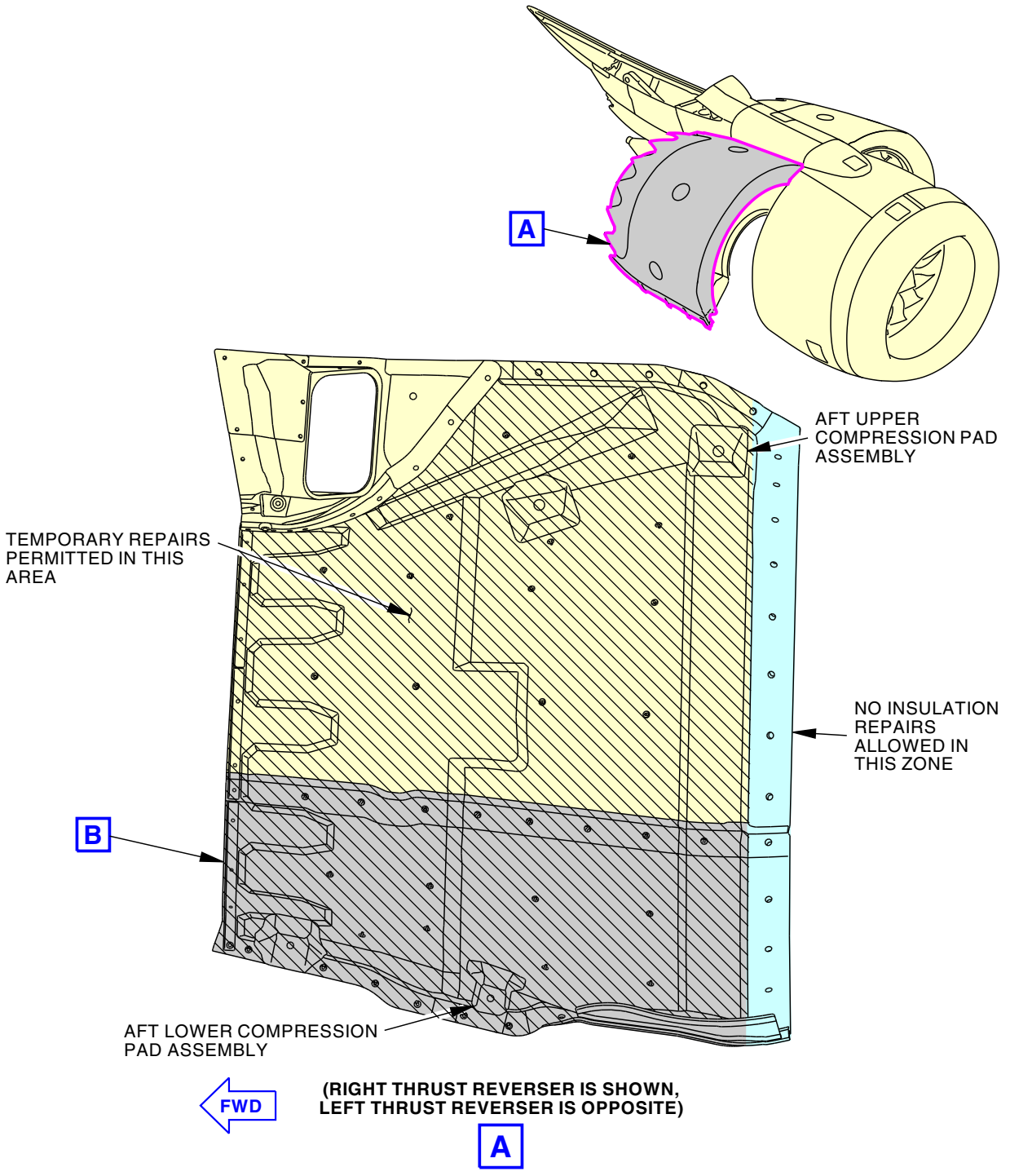
1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

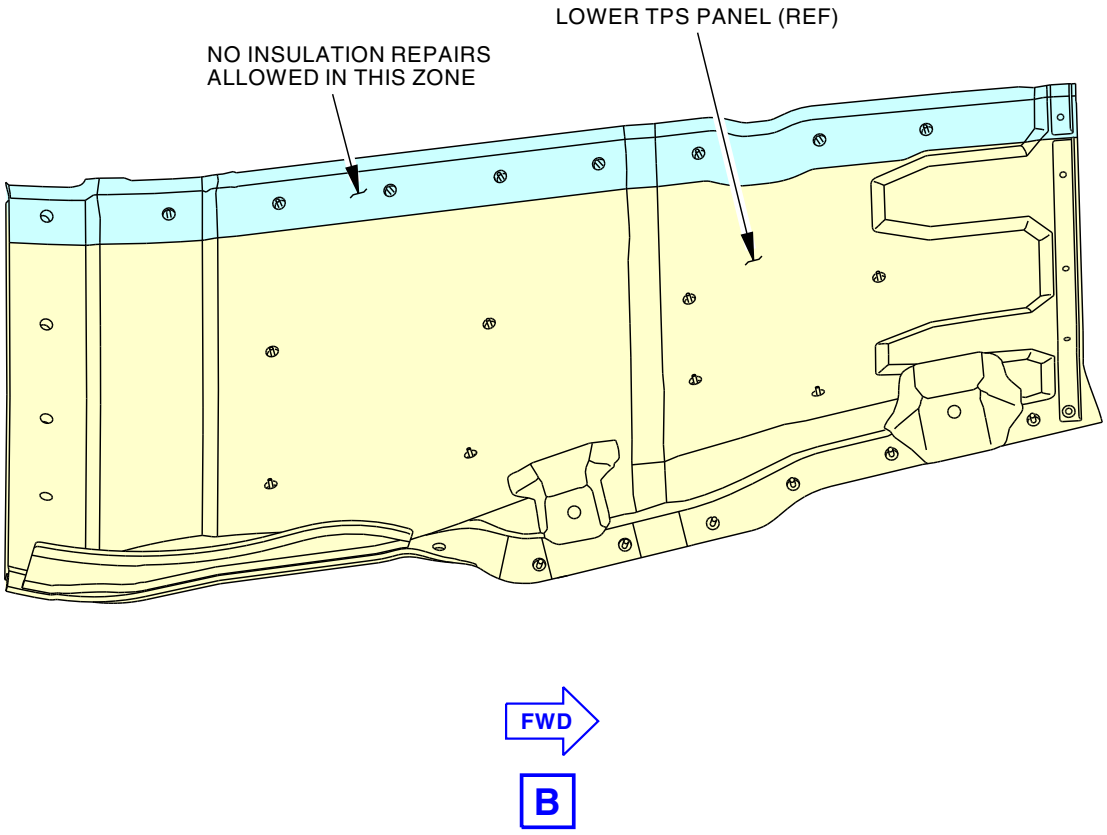
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Temporary Insulation Blanket Repair
Figure 801/78-31-13-990-805-G00 (Sheet 1 of 3)

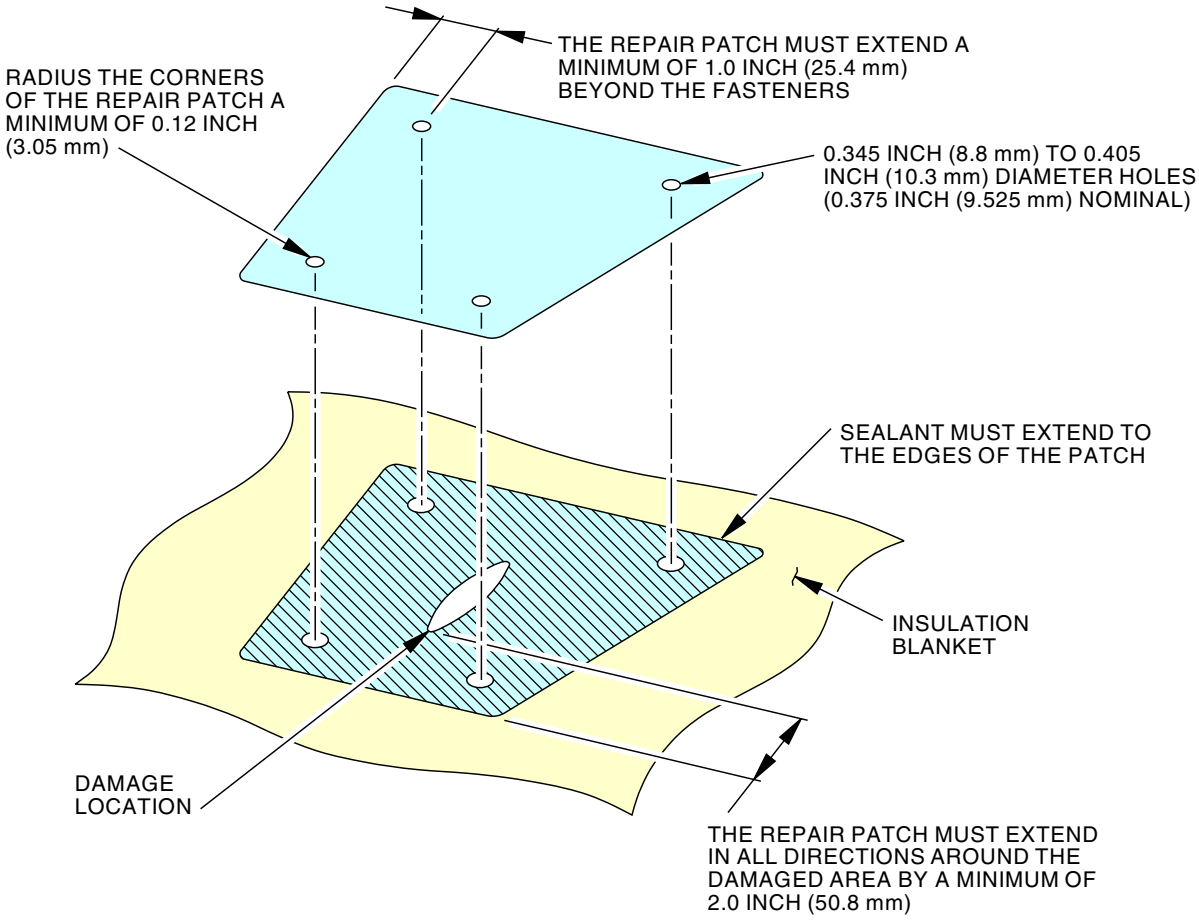
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2546141 S0000605486_V1

Temporary Insulation Blanket Repair
Figure 801/78-31-13-990-805-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

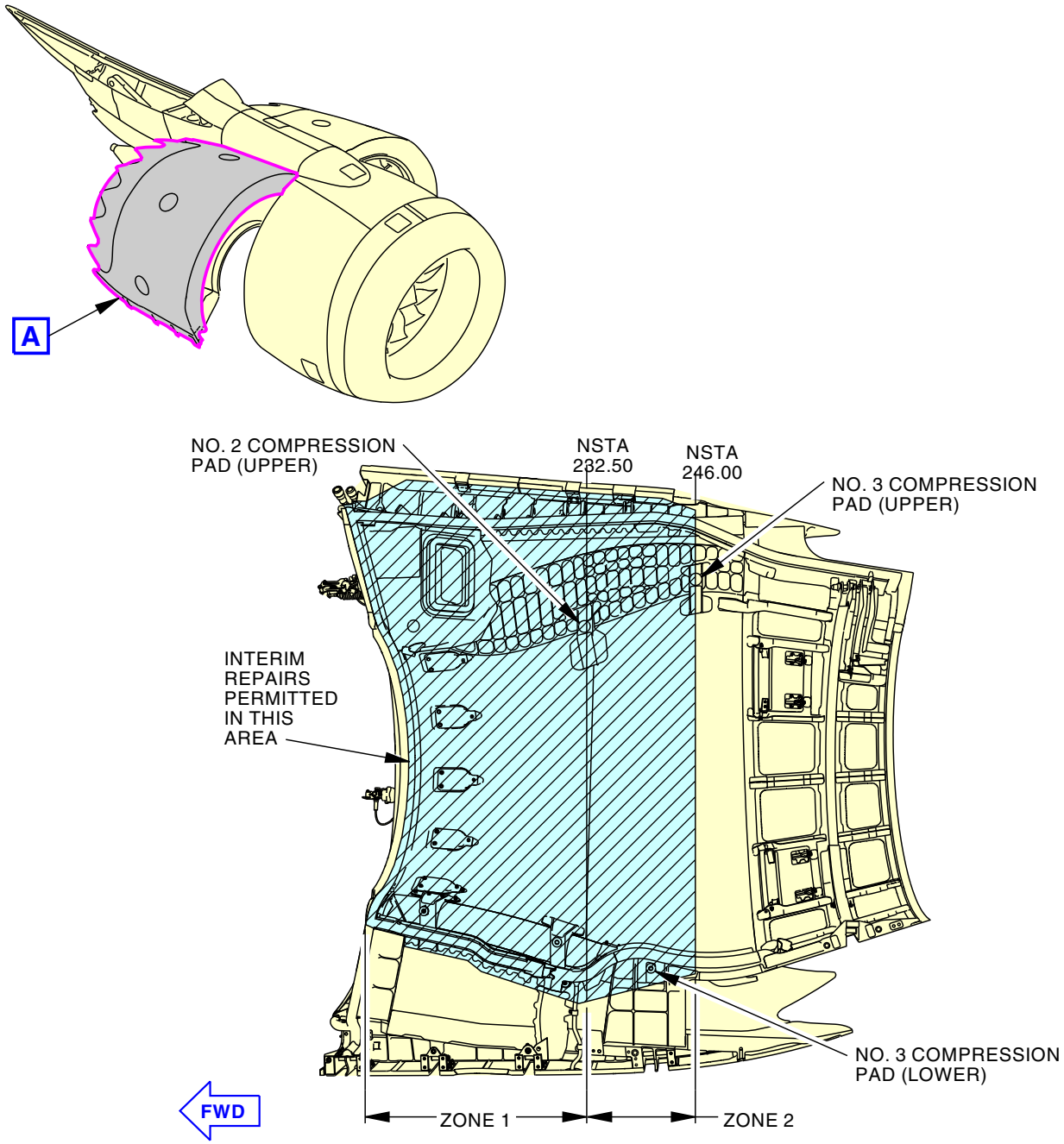


PATCH OVER TEAR OR CRACK

2355277 S00061516874_V1

Temporary Insulation Blanket Repair
Figure 801/78-31-13-990-805-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



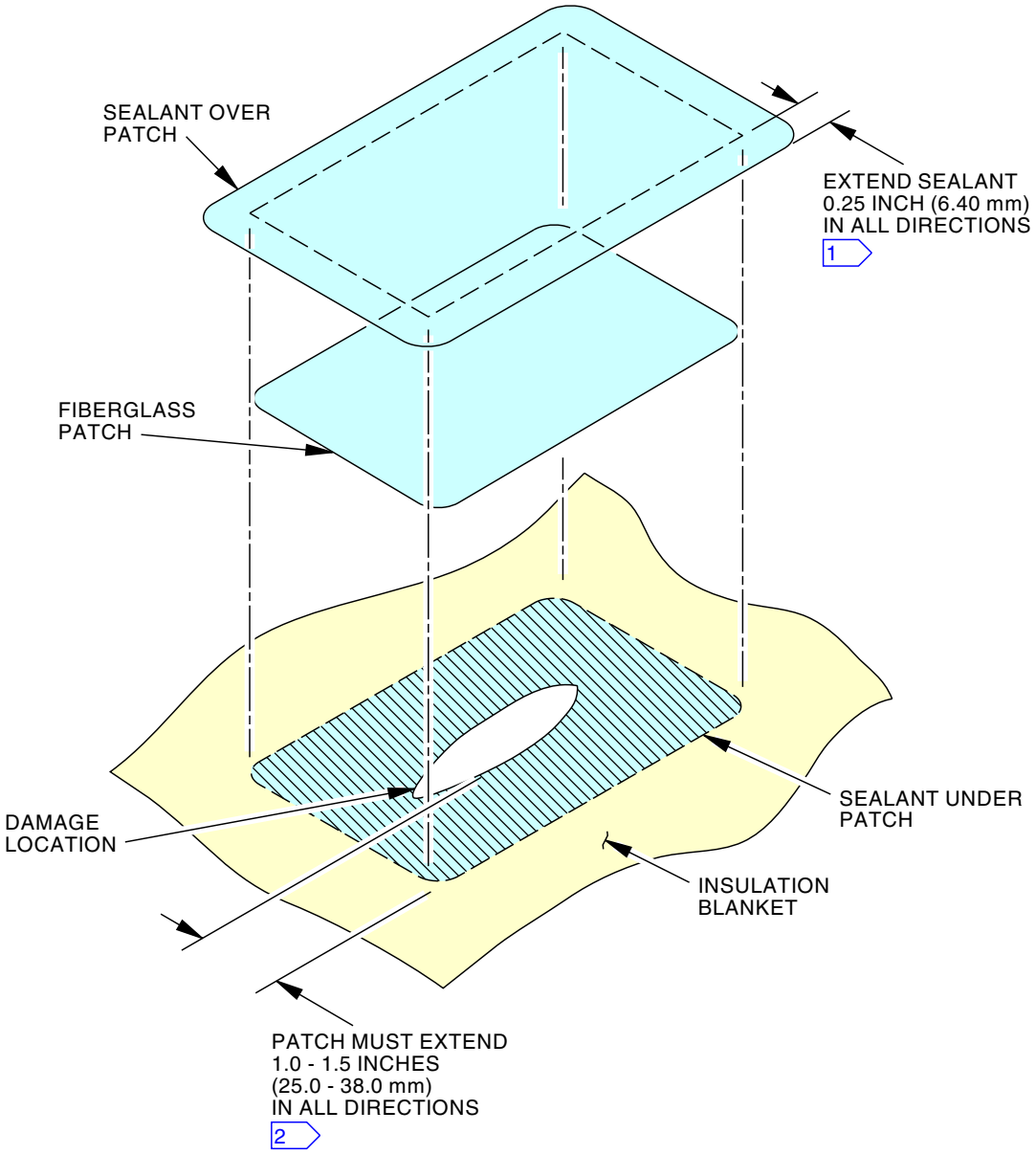
(RIGHT THRUST REVERSER IS SHOWN, LEFT THRUST REVERSER IS OPPOSITE)

A

2579367 S0000620810_V1

Temporary Insulation Blanket Repair
Figure 802/78-31-13-990-807-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



PATCH OVER TEAR OR CRACK

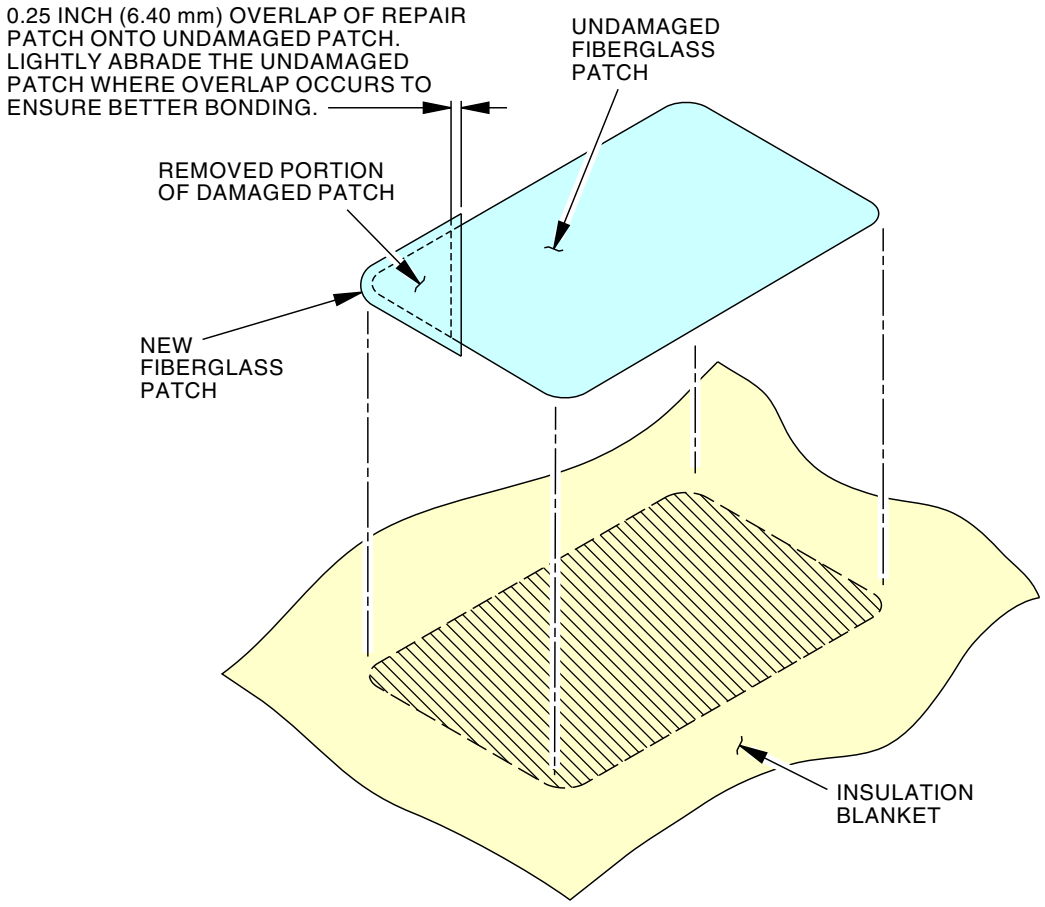
1 A MINIMUM OF 0.25 INCH (6.40 mm) IS ALLOWED WHEN ACCESS IS LIMITED.

2 A MINIMUM OF 0.5 INCH (12.0 mm) IS ALLOWED WHEN ACCESS IS LIMITED.

2579368 S0000620811_V1

Temporary Insulation Blanket Repair
Figure 802/78-31-13-990-807-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



REPAIR OF A DAMAGED PATCH

2579369 S0000620812_V1

Temporary Fiberglass Patch Blanket Repair
Figure 803/78-31-13-990-812-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRECOOLER INLET DUCT GUIDE VANE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Pre-cooler inlet duct guide vane removal.

(2) Pre-cooler inlet duct guide vane installation.

TASK 78-31-14-000-801-G00

2. Pre-cooler Inlet Duct Guide Vane Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the pre-cooler inlet duct guide vane.

(2) The pre-cooler inlet duct guide vane is referred to as the guide vane in this task.

(3) There are 2 guide vanes on each engine.

(4) The guide vanes are located at the top of the thrust reverser fan bypass duct on either side of the bifurcation at the front of the pre-cooler inlet.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-13-000-801-G00	Insulation Blankets - Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B00634	Solvent - Stabilized Limonene Cleaner	BMS11-10 Type 1, 2, or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Prepare for the Removal

SUBTASK 78-31-14-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-14-010-001-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

H. Pre-cooler Inlet Duct Guide Vane Removal

SUBTASK 78-31-14-020-001-G00

(1) Remove the GSE blanket [2] and the precooler blanket [3] from the applicable thrust reverser. Do this task: Insulation Blankets - Removal, TASK 78-31-13-000-801-G00.

SUBTASK 78-31-14-020-002-G00

(2) Remove the four nuts [6], four bolts [4], and four washers [5] from the guide vane [1] on the pre-cooler inlet.

(3) Remove theguide vane [1] from the pre-cooler inlet.

(a) Remove all shims from the pre-cooler inlet.

(b) Clean the pre-cooler inlet area, as follows:

1) Wipe or scrub the area with a clean cotton wiper, G00034, to remove all loose soil, grease, hydraulic fluid or oil.

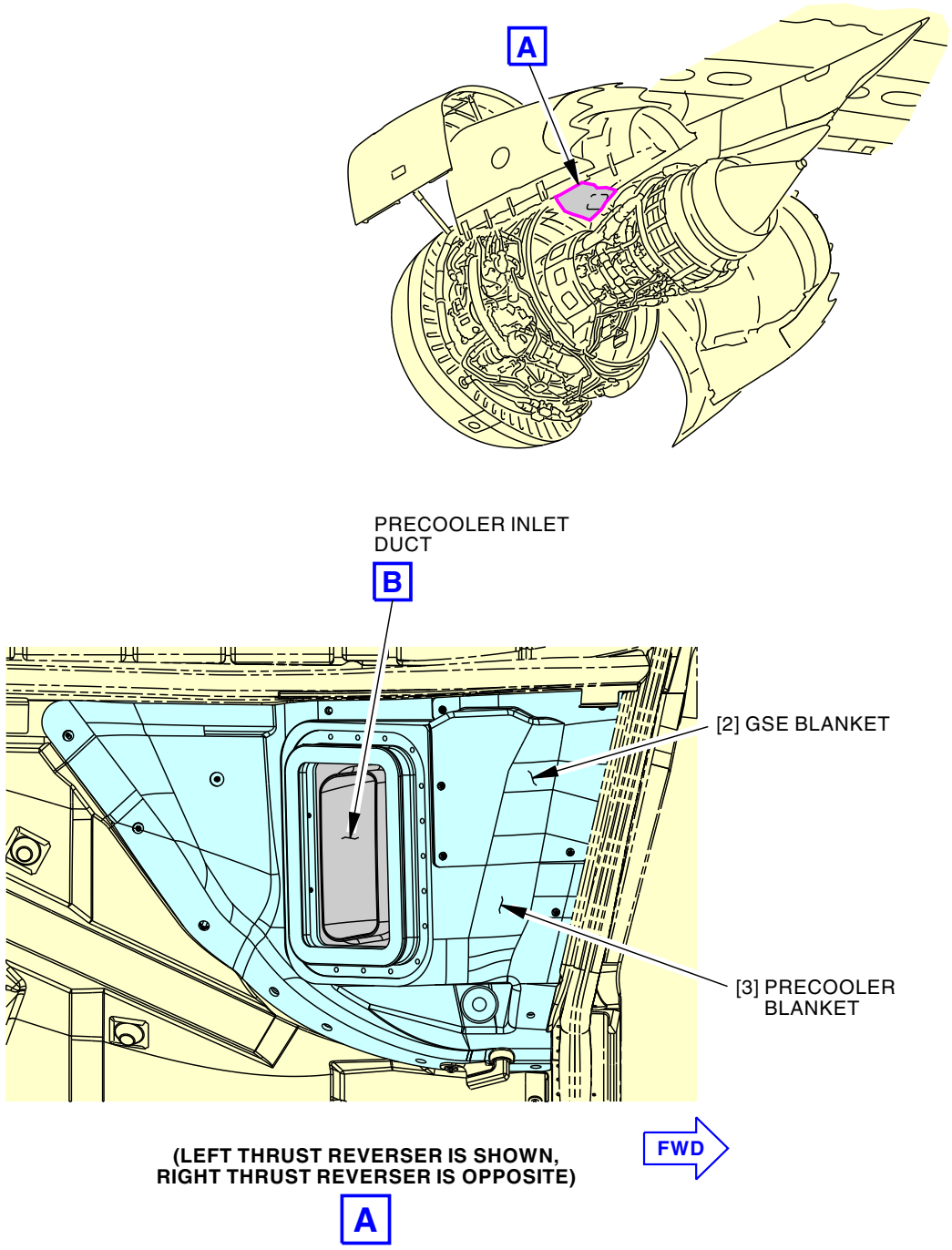
2) Wipe the area with solvent, B00184, solvent, B00148, or Limonene solvent, B00634, on a clean cotton wiper, G00034.

3) Wipe the area dry with a clean cotton wiper, G00034, before the solvent evaporates.

4) Continue to clean the area with a new clean cloth and solvent until no contamination is shown on the cloth.

END OF TASK

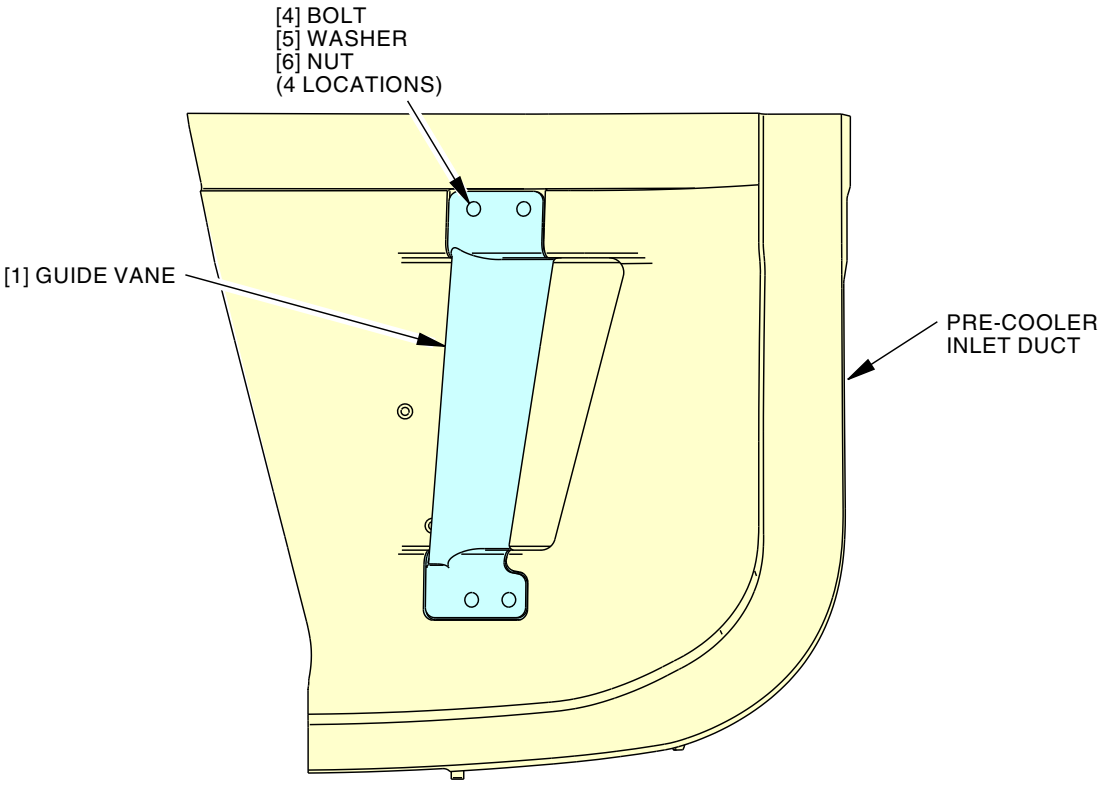
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2546554 S0000605716_V2

Pre-cooler Inlet Duct Guide Vane Installation
Figure 401/78-31-14-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



OUTBOARD SIDE SHOWN

B

2552990 S0000608484_V1

Pre-cooler Inlet Duct Guide Vane Installation
Figure 401/78-31-14-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-14-400-801-G00

3. Pre-cooler Inlet Duct Guide Vane Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the pre-cooler inlet duct guide vane.

(2) The pre-cooler inlet duct guide vane is referred to as the guide vane in this task.

(3) There are 2 guide vanes on each engine.

(4) The guide vanes are located at the top of the thrust reverser fan bypass duct on either side of the bifurcation at the front of the pre-cooler inlet.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-13-400-801-G00	Insulation Blankets - Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B50073	Alcohol - Isopropyl	ASTM D 770
G50262	Wiper - Cleaning	BMS15-5

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Guide vane	Not Specified	

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Pre-cooler Inlet Duct Guide Vane Installation

SUBTASK 78-31-14-160-001-G00

(1) If it is necessary, use alcohol, B50073, and a clean wiper, G50262, to remove any contamination from the installation surfaces of the pre-cooler inlet duct and the guide vane [1].

SUBTASK 78-31-14-420-001-G00

(2) Position the guide vane [1] onto the pre-cooler inlet.

(a) Make sure that the installed guide vane [1] will be flush with the pre-cooler inlet duct to ± 0.0050 in. (0.1270 mm).

1) Add shims to the guide vane [1] installation as necessary to meet the flushness requirement.

2) Make sure that the maximum shim thickness is 0.0125 in. (0.3175 mm) or less.

(3) Install the four bolts [4], four washers [5], and the four nuts [6] to attach the guide vane [1] to the pre-cooler inlet.

SUBTASK 78-31-14-400-001-G00

(4) Install the GSE blanket [2] and the precooler blanket [3]. Do this task: Insulation Blankets - Installation, TASK 78-31-13-400-801-G00.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-14-410-001-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-14-860-002-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRECOOLER INLET DUCT SEAL

1. General

A. This procedure has two tasks:

(1) The removal of the pre-cooler inlet duct seal.

(2) The installation of the pre-cooler inlet duct seal.

TASK 78-31-15-000-801-G00

2. Pre-cooler Inlet Duct Seal - Removal

Figure 401

A. General

(1) This task is the removal of the pre-cooler inlet duct seal.

(2) The pre-cooler inlet duct seal is referred to as the seal in this task.

(3) There are 2 seals on each engine.

(4) The seals are located on the inside of the left and right thrust reversers on the pre-cooler inlet duct on each engine.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-13-000-801-G00	Insulation Blankets - Removal (P/B 401)
78-31-14-000-801-G00	Pre-cooler Inlet Duct Guide Vane Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Removal

SUBTASK 78-31-15-040-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-15-010-001-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Seal Removal

SUBTASK 78-31-15-020-001-G00

(1) Remove the GSE blanket [2] and the precooler blanket [3] from the applicable thrust reverser. Do this task: Insulation Blankets - Removal, TASK 78-31-13-000-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-15-020-002-G00

(2) Remove the guide vane. Do this task: Pre-cooler Inlet Duct Guide Vane Removal, TASK 78-31-14-000-801-G00.

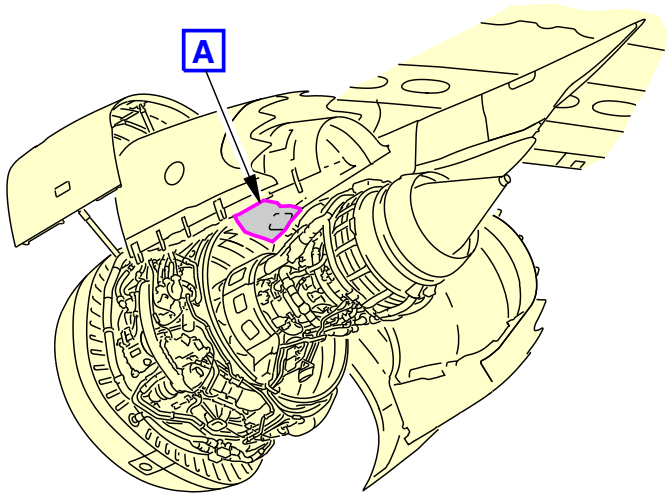
SUBTASK 78-31-15-020-003-G00

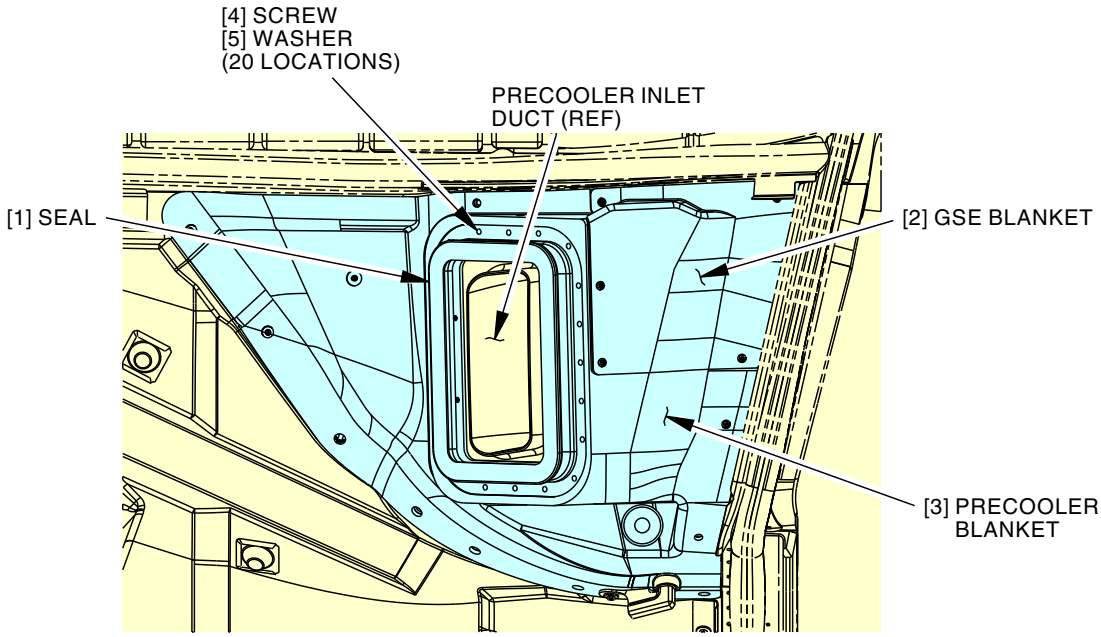
(3) Remove the 20 screws [4] and the 20 washers [5] from the pre-cooler inlet.

(4) Remove the seal [1] from the pre-cooler inlet.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





**(LEFT THRUST REVERSER IS SHOWN,
RIGHT THRUST REVERSER IS OPPOSITE)**

A

2461237 S0000572372_V3

**Precooler Inlet Duct Seal Installation
Figure 401/78-31-15-990-801-G00**

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-15-400-801-G00

3. Pre-cooler Inlet Duct Seal - Installation

Figure 401

A. General

(1) This task is the installation of the precooler inlet duct seal.

(2) The pre-cooler inlet duct seal is referred to as the seal in this task.

(3) There are 2 seals on each engine.

(4) The seals are located on the inside of the left and right thrust reversers on the precooler inlet duct on each engine.

(5) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 36-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 36-AWL-04.

B. References

Reference	Title
36-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-13-400-801-G00	Insulation Blankets - Installation (P/B 401)
78-31-14-400-801-G00	Pre-cooler Inlet Duct Guide Vane Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Seal	78-31-15-02-050	SIA ALL

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Seal Installation

SUBTASK 78-31-15-100-001-G00

36-AWL-04: CDCCL

(1) Make sure that the seal [1] is in good condition and does not have tears or holes that extend beyond one edge of the seal.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 36-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 36-AWL-04.

(2) Make sure that the installation surfaces are clean of contamination.

SUBTASK 78-31-15-420-001-G00

(3) Install the vain guide (TASK 78-31-14-400-801-G00).

SUBTASK 78-31-15-410-001-G00

(4) Put the seal [1] into position on the pre-cooler inlet duct.

(5) Install the 20 washers [5] and the 20 screws [4] on the pre-cooler inlet duct.

SUBTASK 78-31-15-410-002-G00

(6) Install the precooler blanket [3] and the GSE blanket [2] (TASK 78-31-13-400-801-G00).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-15-410-003-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-15-440-001-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRESSURE RELIEF DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Pressure relief door removal

(2) Pressure relief door installation.

TASK 78-31-16-000-801-G00

2. Pressure Relief Door Removal

Figure 401, Figure 402

A. General

(1) This task is the removal of the thrust reverser pressure relief door.

(2) There are four pressure relief doors on each engine.

(3) The pressure relief doors are installed on the thrust reverser aft cowl panel assembly, at the 2, 4, 8 and 10 o'clock positions.

(4) The removal procedures is the same for each of the pressure relief doors.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Removal

SUBTASK 78-31-16-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-31-16-860-002-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Pressure Relief Door Removal

SUBTASK 78-31-16-020-001-G00

(1) Remove the pressure relief door [1] as follows :

(a) Open the two pressure relief door latches [2].

(b) Remove the four nuts [3] that attach the two pressure relief door hinges [4] to the pressure relief door [1].

(c) Remove the two pressure relief door hinges [4], the shims under the hinges (if installed), and the shim washers [6] from the pressure relief door [1].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

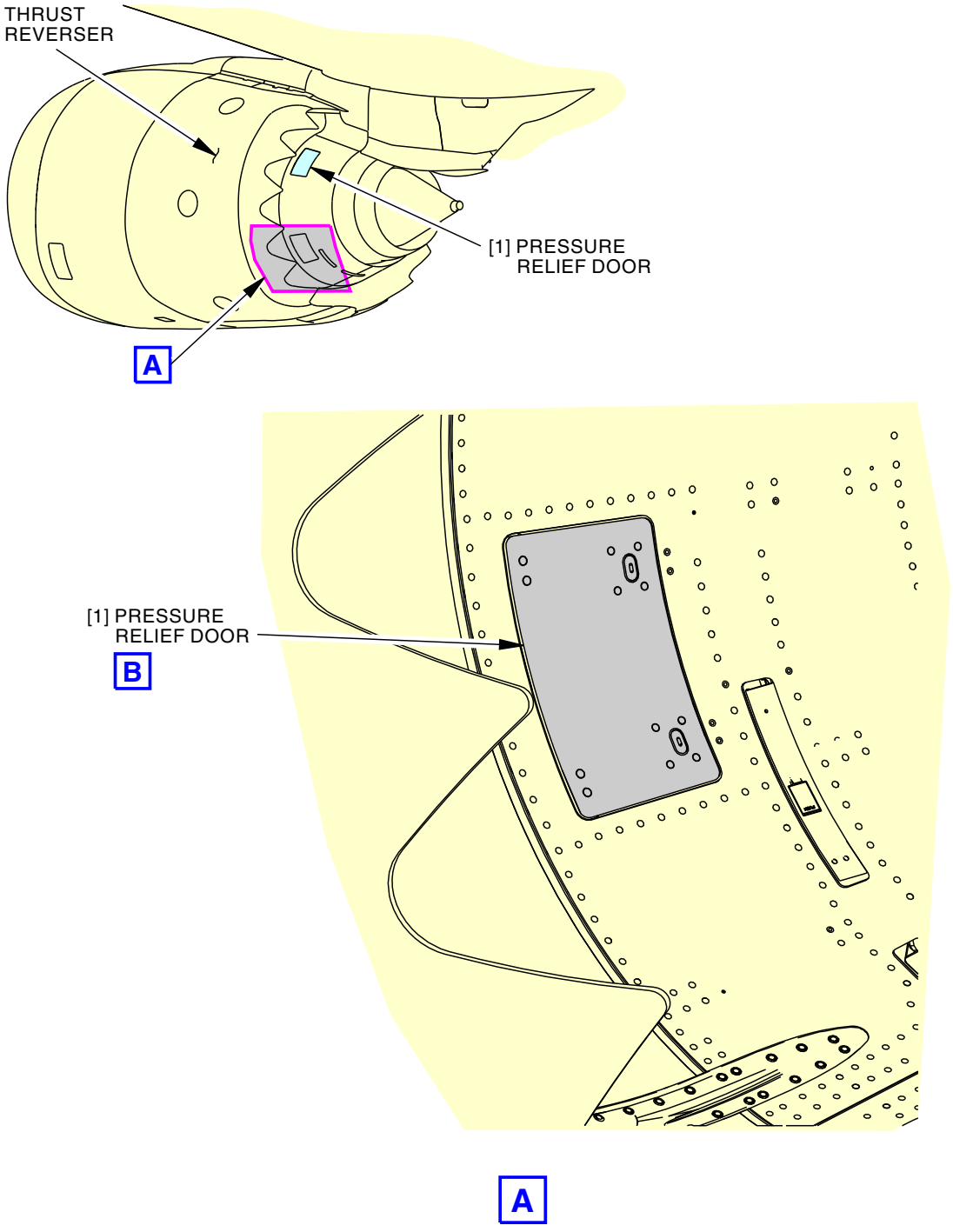
SUBTASK 78-31-16-020-002-G00

(2) If it is necessary, remove the eight nuts [7] that attach the two pressure relief door latches [2] to the pressure relief door [1], and remove the latches from the door.

NOTE: It may be necessary to remove the pressure relief latches so they may be re-installed onto the replacement pressure relief door.

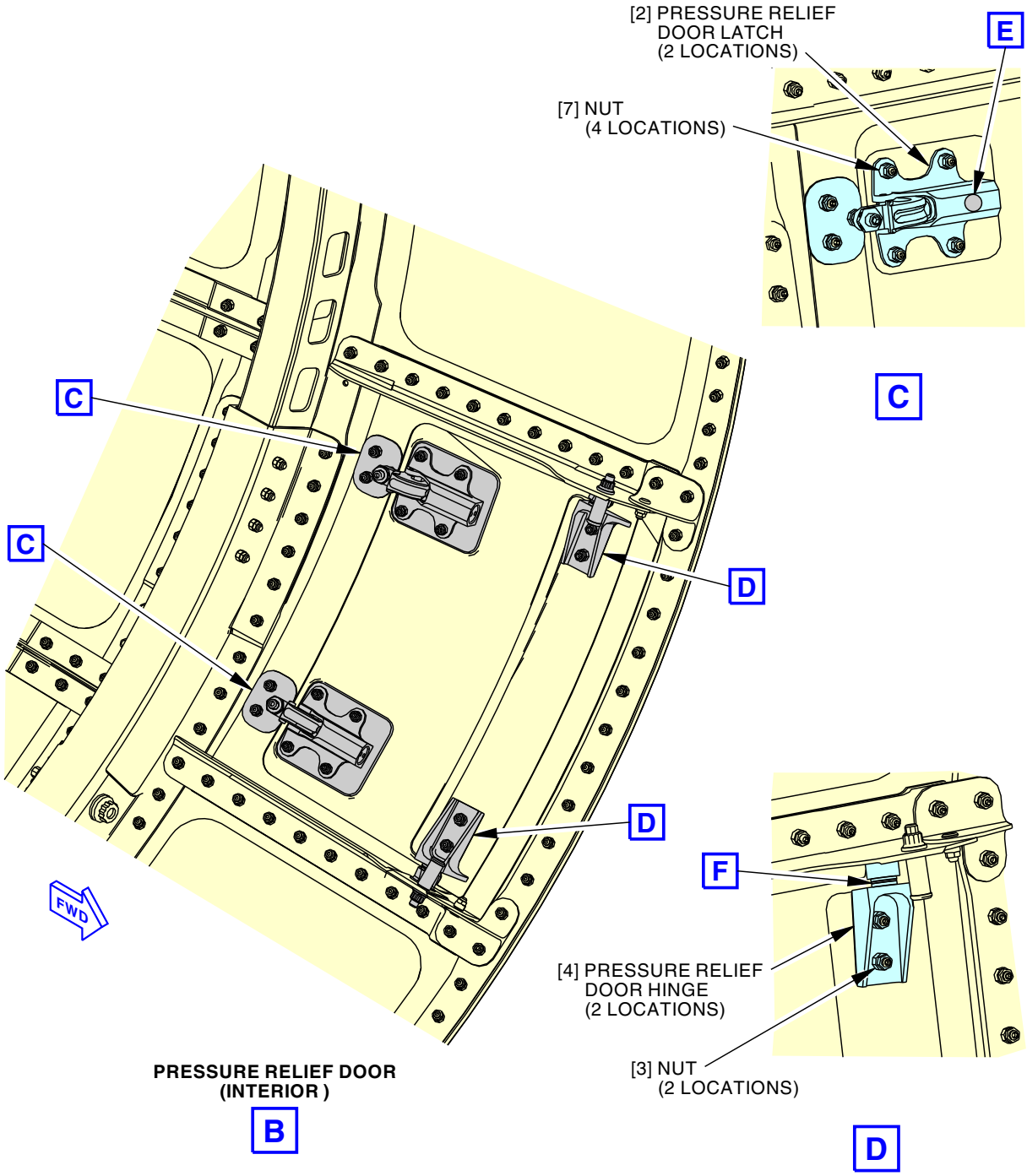
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



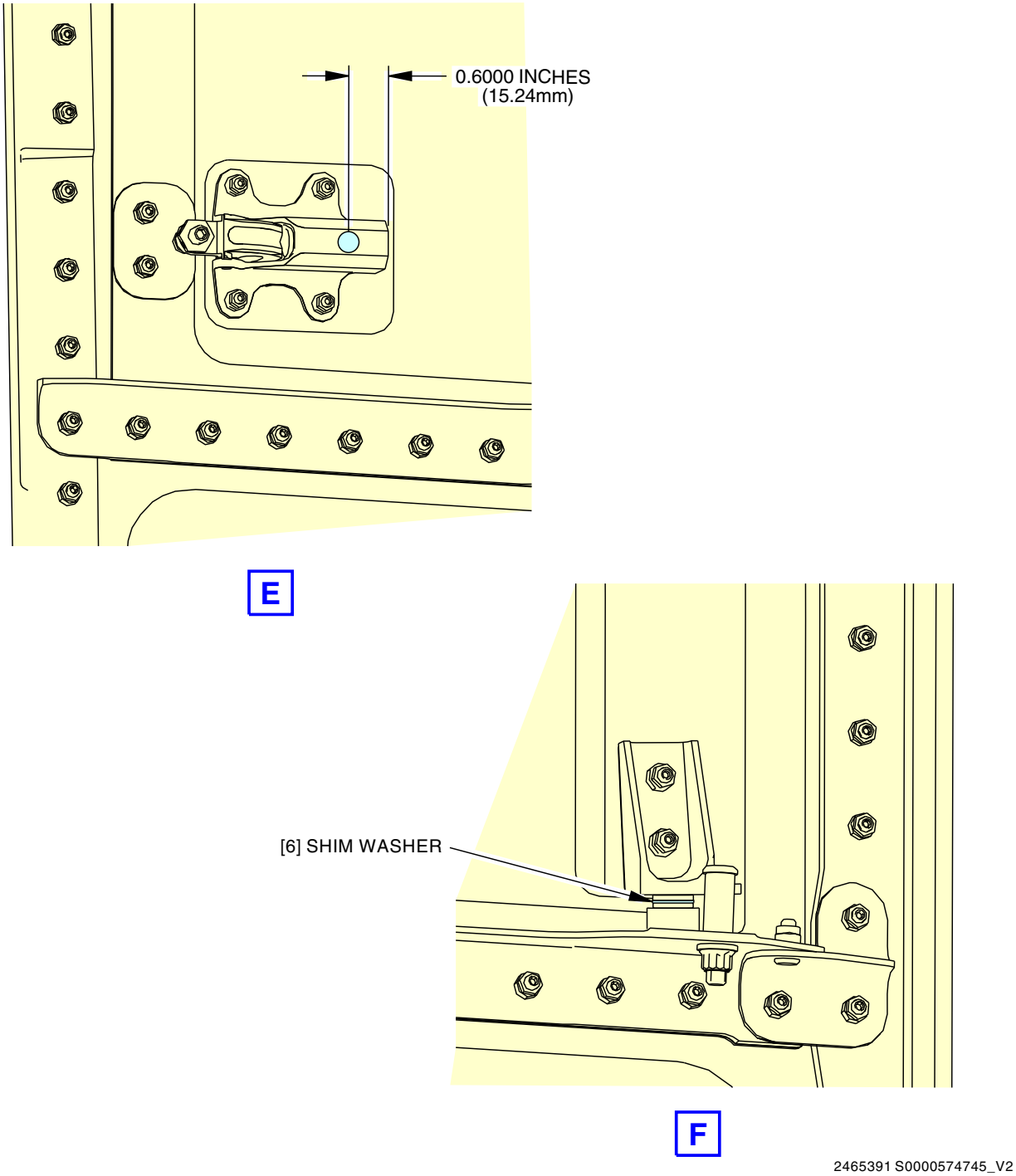
Pressure Relief Door Installation
Figure 401/78-31-16-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Relief Door Installation
Figure 401/78-31-16-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Relief Door Rigging
Figure 402/78-31-16-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-16-400-801-G00

3. Pressure Relief Door Installation

Figure 401 and Figure 402

A. General

(1) This task is the installation of the thrust reverser pressure relief door.

(2) There are four pressure relief doors on each engine.

(3) The pressure relief doors are installed on the thrust reverser aft cowl panel assembly, at the 2, 4, 8 and 10 o'clock positions.

(4) The installation procedure is the same for each of the pressure relief doors.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-755	Scale - Spring, Push/Pull Type, 0 - 150lbs (0 - 68kg) Capacity
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure relief door	78-31-16-01-120	SIA ALL

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Pressure Relief Door Installation

SUBTASK 78-31-16-420-001-G00

(1) If it is necessary, install the two pressure relief door latches [2] on the pressure relief door [1] as follows:

(a) Put the two pressure relief door latches [2] in position on the door.

(b) Install the eight nuts [7] and fasteners.

(c) Tighten the eight nuts [7] to 30 ±1 in-lb (3 ±1 N·m).

SUBTASK 78-31-16-420-002-G00

(2) Install the pressure relief door [1] onto the aft cowl assembly as follows:

(a) Make sure that the two pressure relief door latches [2] are in the open position.

(b) Put one pressure relief door hinge [4] and shim washers [6] in position on the aft cowl so that the hinge pin is engaged with the hinge bracket.

1) Adjust the number of shim washers [6] so that the gap between the pressure relief door [1] and the skin is 0.1000 in. (2.5400 mm) with the door in the closed position.

2) Adjust the number of shim washers [6] so that the end play of the door assembly is 0.001 in. (0.0254 mm) to 0.017 in. (0.4318 mm) with the door in the closed position.

(c) Install the two nuts [3] and fasteners, and tighten the nuts hand tight.

(d) Put the other pressure relief door hinge [4] and shim washers [6] in positions on the aft cowl so that the hinge pin is engaged with the hinge bracket.

1) Adjust the number of shim washers [6] so that the gap between the pressure relief door [1] and the skin is 0.1000 in. (2.5400 mm) with the door in the closed position.

2) Adjust the number of shim washers [6] so that the end play of the door assembly is 0.001 in. (0.0254 mm) to 0.017 in. (0.4318 mm) with the door in the closed position.

(e) Install the two nuts [3] and fasteners, and tighten the nuts hand tight.

SUBTASK 78-31-16-820-001-G00

(3) Adjust the pressure relief door as follows:

(a) Make a measurement of the fit and fair gap, and shim as necessary.

1) The maximum gap between the hinges and the door prior to fastener installation is 0.0050 in. (0.1270 mm).

2) The maximum shim thickness is 0.0500 in. (1.2700 mm).

(b) Tighten the four nuts [3] to 35 in-lb (4 N·m).

(c) Make a measurement of the end play on the door hinge, and shim as necessary.

1) Adjust the quantity of shim washers to adjust the gap between the cowl skin and the door assembly.

a) Make sure that there is a 0.1000 in. (2.5400 mm) gap between the pressure relief door [1] and the skins.

2) Make sure that the end play of the door assembly is 0.001 in. (0.025 mm) to 0.017 in. (0.432 mm) with the door in the closed position.

(d) When the adjustments to the pressure relief door are complete, make sure that you tighten the nuts [3] to 35 in-lb (4 N·m) and the nuts [7] to 30 in-lb (3 N·m).

SUBTASK 78-31-16-820-002-G00

(4) Adjust the two pressure relief door latches [2] as follows:

(a) Loosen the jam nut.

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(b) Adjust the bolt on the latch until the striker makes contact with the striker plate.

(c) Tighten the jam nut to 60 ±10 in-lb (7 ±1 N·m).

(d) Install MS20995N32 lockwire, G50177, or MS20995NC32 lockwire, G50347, on the jamnut, the striker, and the bolt.

SUBTASK 78-31-16-710-001-G00

(5) Do a test of the pressure relief door latch function as follows:

(a) Open one of the latches on the pressure relief door.

NOTE: You must perform a test on one latch at a time. The other latch must be in the open position when you test the latch.

(b) Position a spring scale, STD-755, so that you can apply pressure to the latch at the location indicated on Figure 402, View E.

(c) Apply a load to the latch, at a rate of 1 inch per second.

(d) If the latch opens prior to 61 lbf (271 N) or after 89 lbf (396 N) is applied, replace the latch.

(e) Repeat the test on the second latch.

(f) Close the pressure relief door.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-16-840-001-G00

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-16-840-002-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BULLNOSE SEAL - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the thrust reverser bullnose seal.

(2) The installation of the thrust reverser bullnose seal.

TASK 78-31-23-000-801-G00

2. Bullnose Seal Removal

(Figure 401)

A. General

(1) This task is the removal of the bullnose seal from the left or right thrust reverser half.

(2) To get access to the bullnose seal, you must remove the thrust reverser translating sleeve.

B. References

Reference	Title
78-31-02-000-801-G00	Translating Sleeve Removal (P/B 401)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Prepare for the Removal

SUBTASK 78-31-23-020-001-G00

(1) Do this task to remove the translating sleeve from the applicable thrust reverser, Translating Sleeve Removal, TASK 78-31-02-000-801-G00.

E. Bullnose Seal Removal

SUBTASK 78-31-23-020-002-G00

(1) Do the steps that follow to remove the bullnose seal [1] from the applicable thrust reverser translating sleeve:

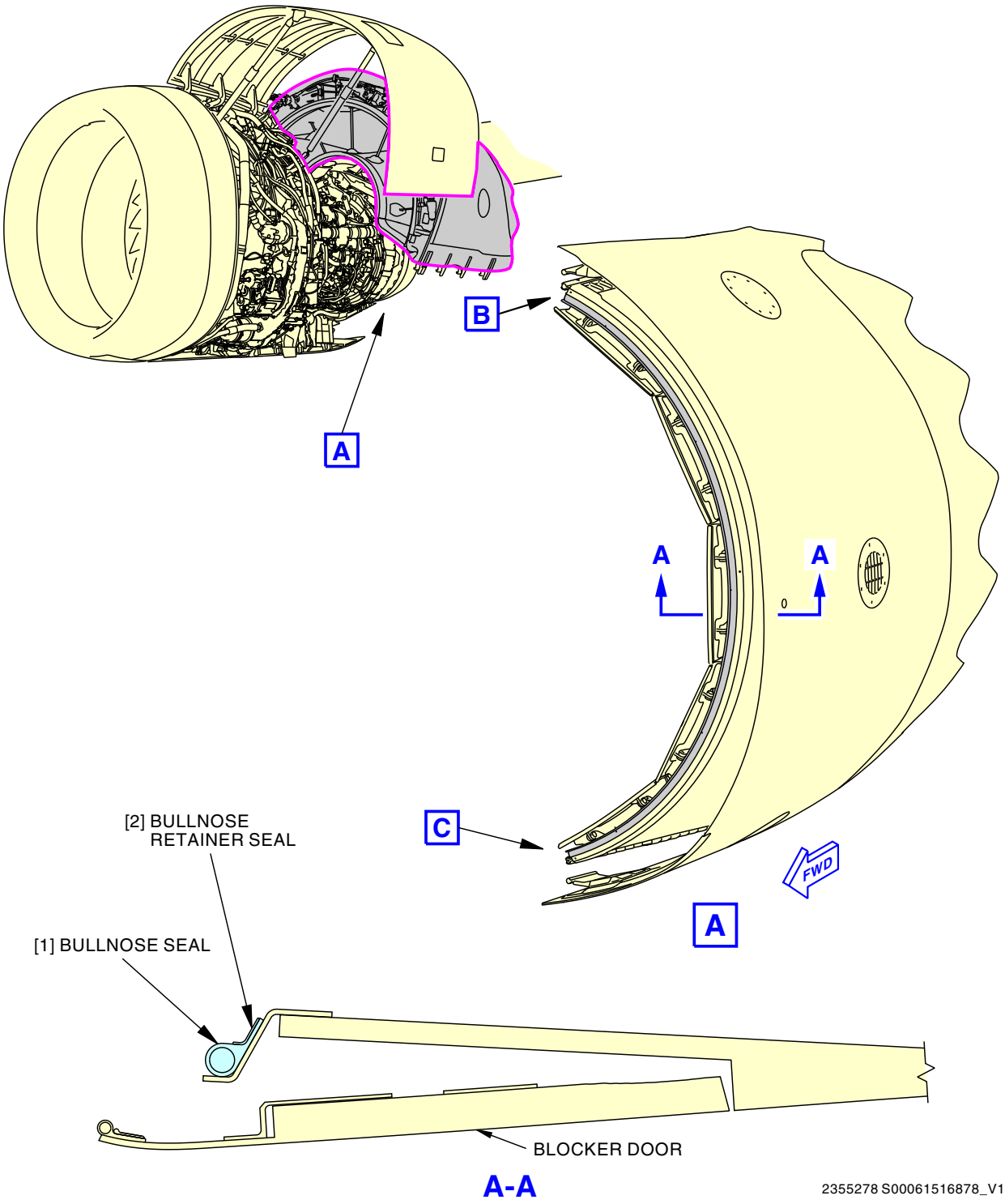
(a) Remove the 31 screws [3] that attach the seal retainer [2] and the bullnose seal [1] to the translating sleeve.

(b) Remove the seal retainer [2] from the translating sleeve.

(c) Remove the bullnose seal [1] from the translating sleeve.

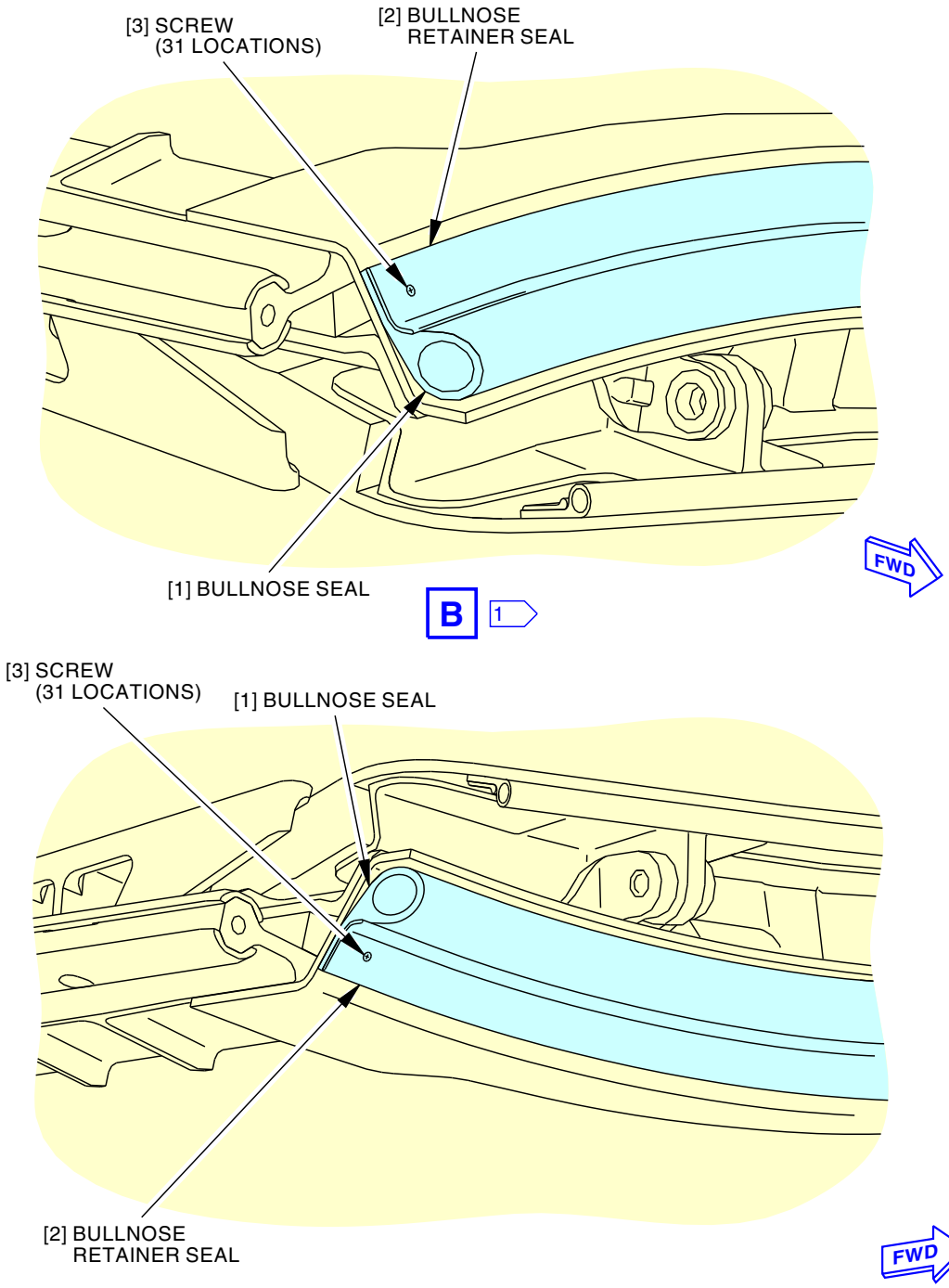
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Bullnose Seal Installation
Figure 401/78-31-23-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Bullnose Seal Installation
Figure 401/78-31-23-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-23-400-801-G00

3. Bullnose Seal Installation

(Figure 401)

A. General

(1) This task is the installation of the bullnose seal from the left or right thrust reverser on an engine.

(2) To get access to the bullnose seal, you must first remove the thrust reverser translating sleeve.

B. References

Reference	Title
78-31-02-400-801-G00	Translating Sleeve Installation (P/B 401)

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)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Bullnose seal	78-31-23-01-085	SIA ALL

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Bullnose Seal Installation

SUBTASK 78-31-23-020-003-G00

WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH, IN YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN YOU USE SOLVENTS. KEEP SOLVENTS AWAY FROM SPARKS, FLAME, AND TEMPERATURES ABOVE THE FLASH POINT. SOLVENTS ARE A POISONOUS AND FLAMMABLE MATERIAL WHICH CAN CAUSE INJURY PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do these steps to install the bullnose seal [1] on the applicable translating sleeve:

(a) Clean all contamination from the bullnose seal support ring with a clean cotton wiper, G00034, and solvent, B00062.

(b) Put the bullnose seal [1] into its position on the translating sleeve.

(c) Install the seal retainer [2] over the bullnose seal [1] with the 31 screws [3].

(d) Tighten the screws to 20 ±1 in-lb (2.3 ±0.2 N·m)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-23-410-001-G00

(1) Install the translating sleeve onto the thrust reverser half (TASK 78-31-02-400-801-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BULLNOSE SEAL - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) A visual check of the bullnose seal and retainer.

TASK 78-31-23-200-801-G00

2. Bullnose Seal Inspection

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions on how to examine the bullnose seal.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-31-23-000-801-G00	Bullnose Seal Removal (P/B 401)
78-31-23-400-801-G00	Bullnose Seal 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-14993	Lock - Thrust Reverser Opening Actuator, 15 degree open, LEAP-1B Part #: C78035-14 Supplier: 81205

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

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(Continued)

Number	Name/Location
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

E. Prepare for the Inspection

SUBTASK 78-31-23-040-001-G00

(1) Do this task: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 78-31-23-010-002-G00

(2) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 78-31-23-480-001-G00

(3) Install the actuator safety Lock Assembly, SPL-14993, on the inboard thrust reverser only.

NOTE: The part number of the actuator safety lock is C78035-14. The part number (C78035-14) is for the set of two actuator safety locks.

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SUBTASK 78-31-23-980-001-G00

CAUTION

DO NOT MANUALLY EXTEND THE INBOARD THRUST REVERSER SLEEVE MORE THAN 6 INCHES. MAKE SURE THAT THE SLEEVE DOES NOT TOUCH THE WING LEADING EDGE WHEN YOU EXTEND THE THRUST REVERSER. IF YOU DO NOT OBEY, DAMAGE CAN OCCUR.

(4) Do these steps to see the bullnose seal:

NOTE: The sleeve must be partially extended to see the bullnose seal.

(a) Do these steps to manually extend the thrust reverser sleeves:

1) Make sure that the leading edge flaps are completely retracted.

NOTE: Without hydraulics to hold the flaps in the retract position, the weight of the flaps can cause them to extend a small amount.

2) Manually extend the outboard thrust reverser sleeve no more than 10 in. (254.0 mm) and inboard thrust reverser sleeve 3 in. (76.2 mm) - 6 in. (152.4 mm) from the forward edge of the torque box (TASK 78-31-00-980-803-G00).

NOTE: Monitor the position of the thrust reverser sleeve as it extends to make sure that it does not touch the leading edge of the wing.

F. Bullnose Seal Inspection

SUBTASK 78-31-23-210-001-G00

(1) Look through the forward end of the thrust reverser to examine the bullnose seal for damage:

(a) Missing material, cuts, gouges and holes that extend through the bullnose seal

1) Not permitted.

2) Replace the bullnose seal (TASK 78-31-23-000-801-G00 and TASK 78-31-23-400-801-G00).

SUBTASK 78-31-23-210-002-G00

(2) Examine the bullnose seal retainer for damage.

(a) Missing metal or distortion

1) Not permitted, replace the seal retainer.

SUBTASK 78-31-23-210-003-G00

(3) Do a check for missing or loose screws and nuts that hold the seal retainer and blocker door hinge in their position.

(a) Missing or loose screws and nuts

1) Not permitted, replace or tighten the nuts that attach the blocker door hinge and the retainer.

a) Tighten the nuts to 25 ±5 in-lb (3 ±1 N·m).

2) Replace or tighten the screws that attach the retainer.

a) Tighten the nuts to 25 ±5 in-lb (3 ±1 N·m).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-23-840-001-G00

(1) Do this task: Thrust Reverser Operation - Retract (Manual Procedure), TASK 78-31-00-980-804-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-31-23-410-004-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the applicable thrust reverser (TASK 78-31-00-010-802-G00).

(a) Remove the actuator safety Lock Assembly, SPL-14993, from the inboard thrust reverser only.

SUBTASK 78-31-23-410-005-G00

(3) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-31-23-440-002-G00

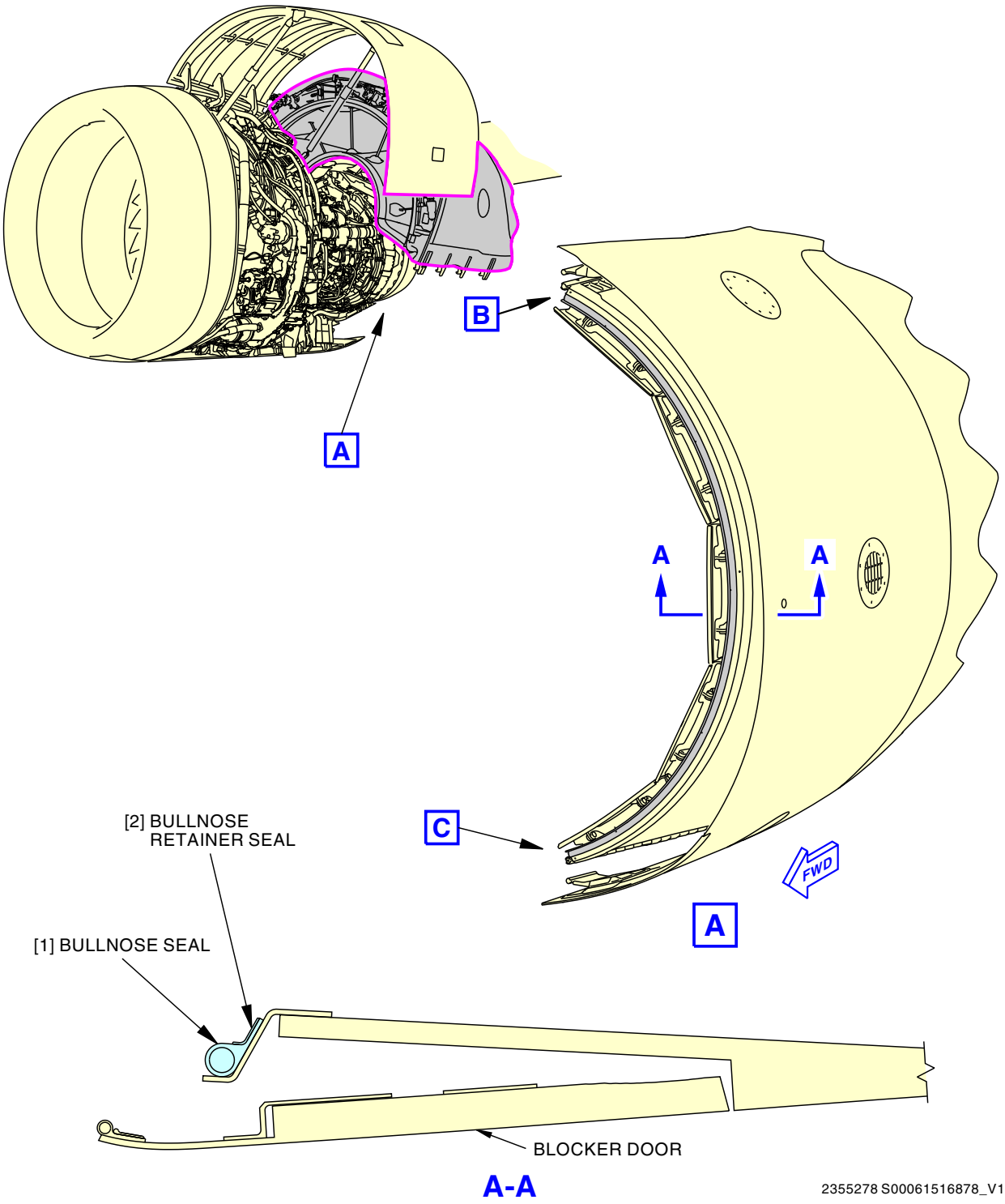
(4) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-31-23-440-003-G00

(5) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Bullnose Seal Inspection
Figure 601/78-31-23-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

BLOCKER DOOR AERO SEAL - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the blocker door aero seal.

(2) The installation of the blocker door aero seal.

TASK 78-31-24-000-801-G00

2. Blocker Door Aero Seal Removal

(Figure 401)

A. General

(1) This task removes the blocker door aero seal from the thrust reverser blocker door.

B. References

Reference	Title
78-31-06-000-801-G00	Blocker Door Removal (P/B 401)

C. Prepare for the Removal

SUBTASK 78-31-24-020-001-G00

(1) Remove the applicable blocker door (TASK 78-31-06-000-801-G00).

D. Blocker Door Aero Seal Removal

SUBTASK 78-31-24-020-002-G00

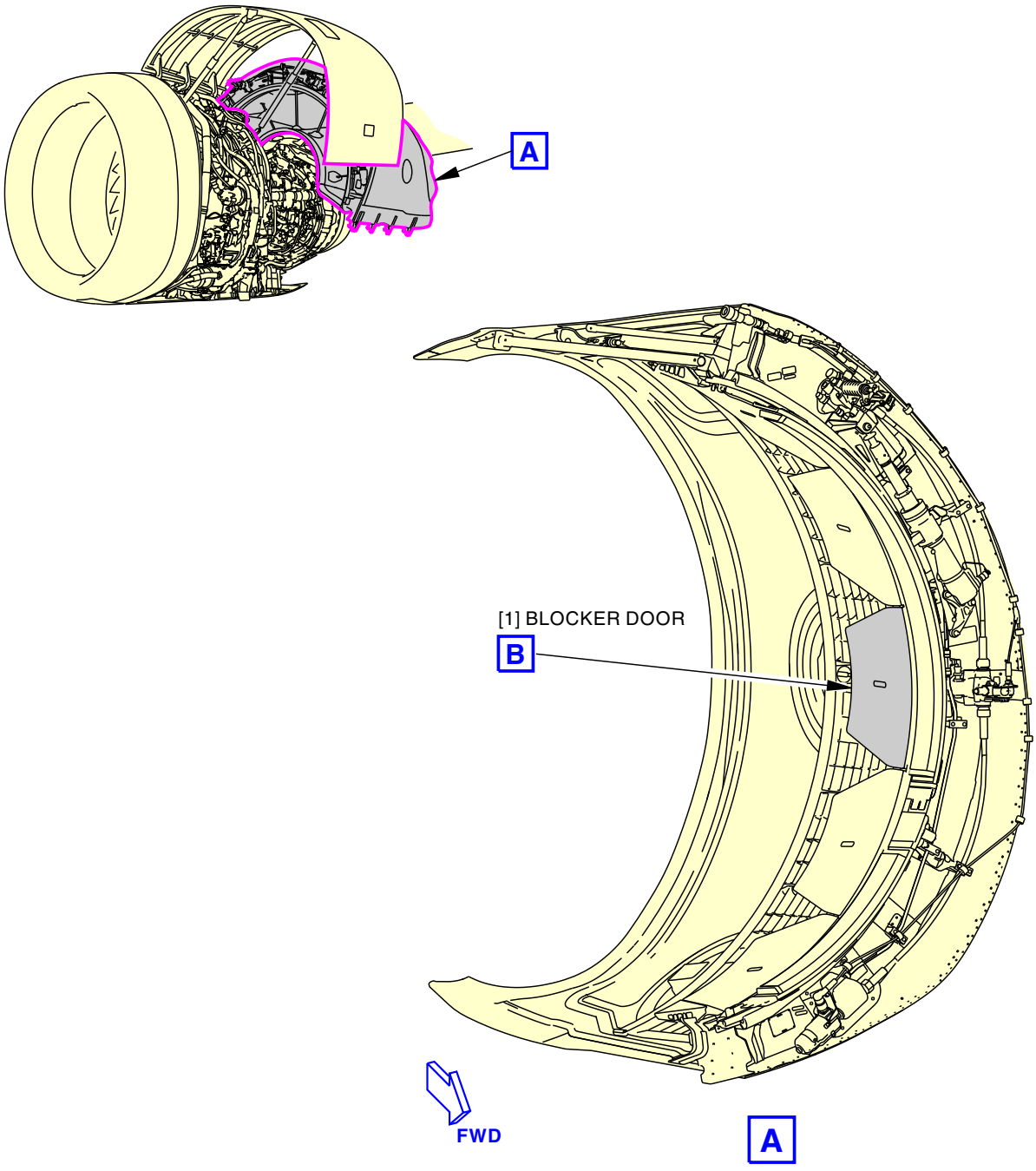
(1) Do the steps that follow to remove the blocker door aero seal [2] from the blocker door [1].

(a) Remove the eight nuts [5] from the bolts [4] that attach the seal retainer [3] and the blocker door aero seal [2] to the blocker door [1].

(b) Remove the seal retainer [3] and the blocker door aero seal [2] from the blocker door [1].

——— END OF TASK ———

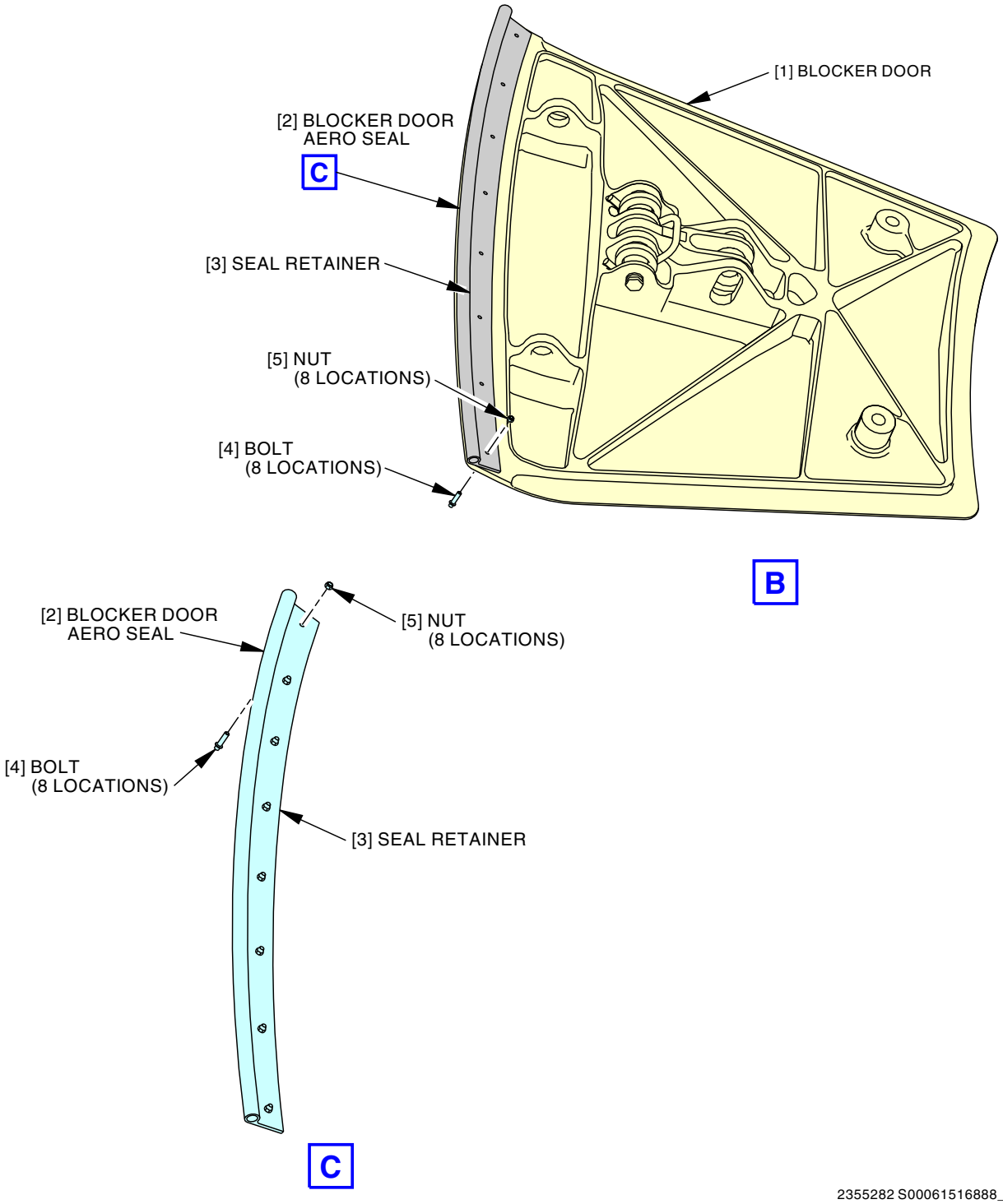
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Blocker Door Aero Seal Installation
Figure 401/78-31-24-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Blocker Door Aero Seal Installation
Figure 401/78-31-24-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-31-24-400-801-G00

3. Blocker Door Aero Seal Installation

(Figure 401)

A. General

(1) This task is the installation of the blocker door aero seal onto the thrust reverser blocker door.

B. References

Reference	Title
78-31-06-400-801-G00	Blocker Door Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)

D. Blocker Door Aero Seal Installation

SUBTASK 78-31-24-020-003-G00

(1) Do the steps that follow to install the blocker door aero seal [2] onto the blocker door [1]:

WARNING

DO NOT GET ACETONE, ISOPROPYL ALCOHOL OR CLEANING SOLVENT DESOCLEAN IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE GAS FROM ACETONE, ISOPROPYL ALCOHOL OR CLEANING SOLVENT DESOCLEAN. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE ACETONE, ISOPROPYL ALCOHOL OR CLEANING SOLVENT DESOCLEAN. KEEP ACETONE, ISOPROPYL ALCOHOL AND CLEANING SOLVENT DESOCLEAN AWAY FROM SPARKS, FLAME, AND HEAT. ACETONE, ISOPROPYL ALCOHOL AND CLEANING SOLVENT DESOCLEAN ARE POISONOUS AND FLAMMABLE SOLVENTS WHICH CAN CAUSE INJURY OR DAMAGE.

(a) Clean any contamination from the blocker door aero seal [2], seal retainer [3] and blocker door [1] with solvent, B00062.

(b) Put the seal retainer [3] and blocker door aero seal [2] into their positions on the blocker door [1].

(c) Install the blocker door aero seal [2] and seal retainer [3] onto the blocker door [1] with the eight bolts [4] and nuts [5].

(d) Tighten the eight nuts [5] to 17.5 ±2.5 in-lb (2.0 ±0.3 N·m).

E. Put the Airplane Back to Its Usual Condition

SUBTASK 78-31-24-860-001-G00

(1) Install the blocker door [1] onto the thrust reverser (TASK 78-31-06-400-801-G00).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER CONTROL VALVE MODULE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Control valve module removal

(2) Control valve module installation.

TASK 78-34-01-000-801-G00

2. Control Valve Module Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the control valve module.

(2) There are two control valve modules that control hydraulic power to the thrust reverser hydraulic actuators.

(3) The control valve modules are in the main gear wheel well on the keel beam.

(a) The control valve module for the Engine 1 thrust reverser is on the left side of the keel beam.

(b) The control valve module for the Engine 2 thrust reverser is on the right side of the keel beam.

(4) The thrust reverser control valve module is referred to as the control valve module.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Access Panels

Number	Name/Location
193B	Wheel Well Panel - Forward Inboard

F. Prepare for the Removal

SUBTASK 78-34-01-860-001-G00

(1) For Engine 1, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-01-860-002-G00

(2) For Engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-34-01-860-003-G00

(3) Make sure that the forward thrust lever is in the idle position.

(a) Install a DO NOT OPERATE tag, STD-858.

SUBTASK 78-34-01-860-004-G00

(4) Make sure that the reverse thrust lever is in the stow position (fully forward and down).

(a) Install a DO NOT OPERATE tag, STD-858.

SUBTASK 78-34-01-860-005-G00

(5) Remove power from the hydraulic systems A and B, do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-34-01-860-006-G00

(6) Remove power from the standby hydraulic power, do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-34-01-860-007-G00

(7) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-34-01-010-001-G00

(8) If necessary, open this access panel:

Number	Name/Location
193B	Wheel Well Panel - Forward Inboard

G. Control Valve Module Removal

SUBTASK 78-34-01-010-002-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTIONS ARE NOT DIRTY BEFORE YOU CONNECT OR DISCONNECT THEM. SOLID OR LIQUID CONTAMINATION OF THE ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Disconnect the electrical connector [9] from the applicable control valve module [5]:

(a) For Engine 1, disconnect the electrical connector, D3052.

(b) For Engine 2, disconnect the electrical connector, D3056.

(c) Install the protective covers on the electrical connector and the control valve module receptacles.

SUBTASK 78-34-01-010-003-G00

WARNING

DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION USE TWO WRENCHES TO LOOSEN THE FITTINGS. USE THE SECOND WRENCH TO HOLD THE FITTING IN ITS POSITION TO PREVENT DAMAGE TO THE FITTING.

(2) Do these steps to disconnect the hydraulic lines from the control valve module [5].

NOTE: The Thrust Reversers can still operate without the control valve module [5] installed.

CAUTION CATCH THE HYDRAULIC FLUID IN A CONTAINER OR CLOTH WHEN YOU DISCONNECT THE HYDRAULIC LINES. IMMEDIATELY CLEAN ALL SURFACES THAT HYDRAULIC FLUID FALLS ON. HYDRAULIC FLUID CAUSES DAMAGE TO EQUIPMENT.

(a) Use a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110 to catch the hydraulic fluid.

(b) For Engine 1 control valve module, disconnect the hydraulic power transfer unit return line (referred to as return hydraulic line) from the tee branch at the return port R.

(c) For Engine 1 and Engine 2 control valve module, disconnect the four hydraulic lines from the control valve module [5].

(d) Install the protective covers on the hydraulic lines.

SUBTASK 78-34-01-020-001-G00

(3) If the new control valve module [5] does not have the union [3] and union [6] or the restrictor check valve [7], do these steps:

NOTE: The new control valve module should have the union installed in the pressure port P.

(a) Remove the restrictor check valve [7], union [3], and union [6] from the control valve module [5] that was removed.

1) Keep the restrictor check valve and the two unions for installation on the new control valve module [5].

2) Remove and discard the packing [8] and the packing [4].

(b) Install the protective covers on the four hydraulic ports on the control valve module [5].

(c) Install the protective covers on the control valve module [5].

SUBTASK 78-34-01-020-002-G00

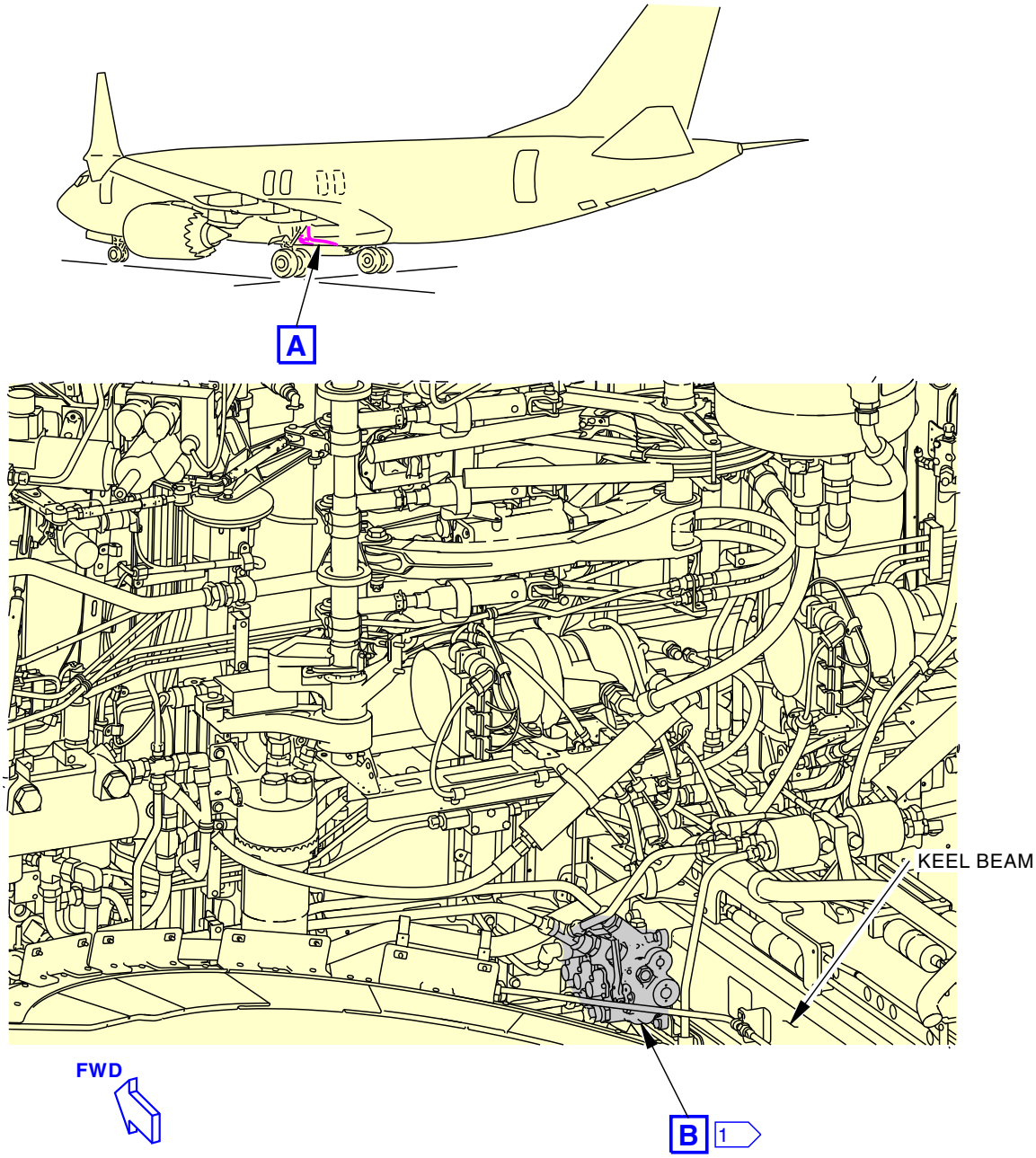
(4) Remove the four bolts [1] and washers [2] that attach the control valve module [5] to the attachment bracket on the keel beam.

SUBTASK 78-34-01-020-003-G00

(5) Remove the control valve module [5].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAIN LANDING GEAR WHEEL WELL

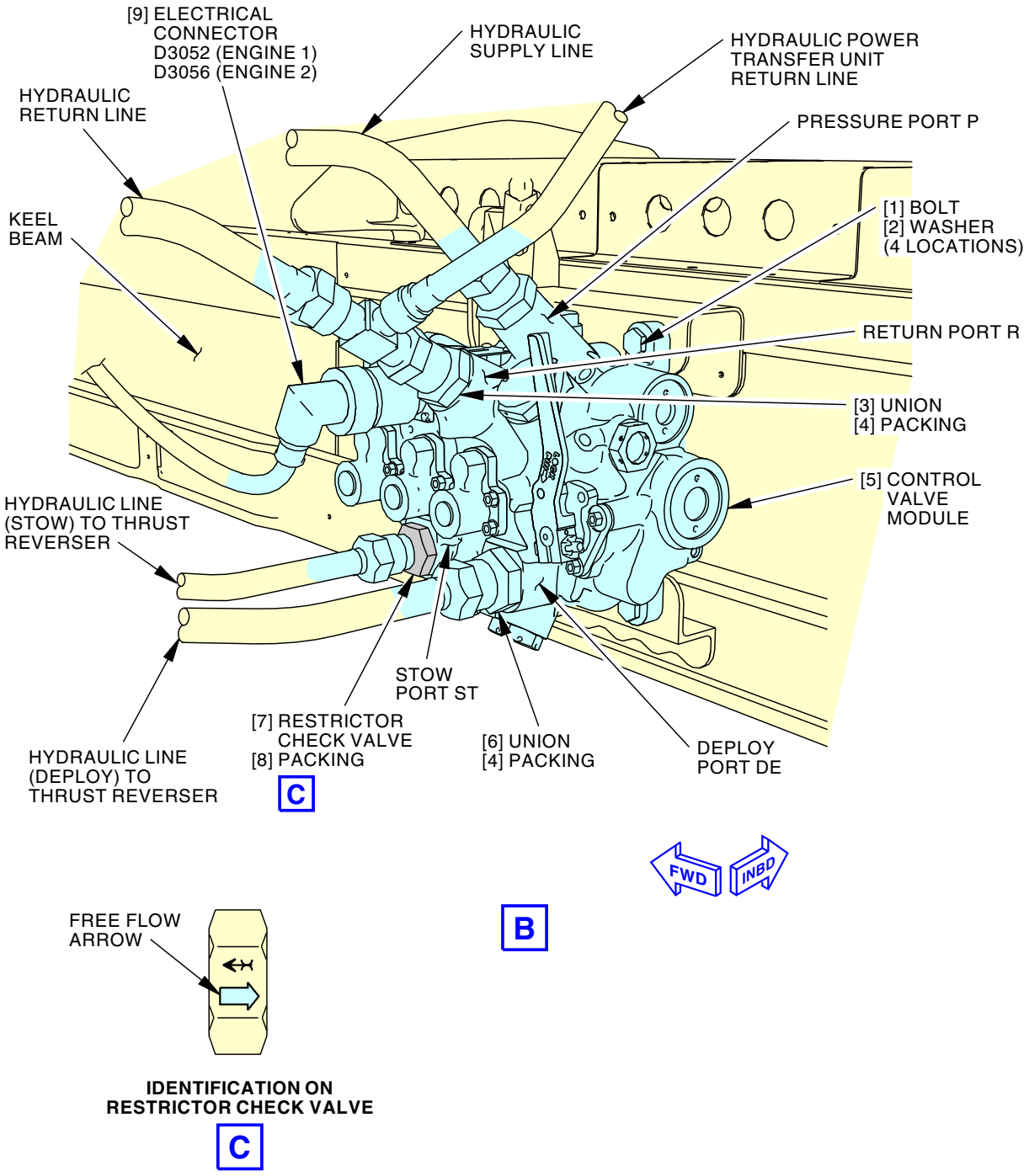
A

1 ENGINE 1 CONTROL VALVE MODULE IS SHOWN, ENGINE 2 CONTROL VALVE IS ON THE RIGHT SIDE OF THE KEEL BEAM.

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Thrust Reverser Control Valve Module Installation
Figure 401/78-34-01-990-801-G00 (Sheet 1 of 2)

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Thrust Reverser Control Valve Module Installation
Figure 401/78-34-01-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-01-400-801-G00

3. Control Valve Module Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the control valve module.

(2) The thrust reverser control valve module is referred to as the control valve module.

(3) After you install the control valve module, you must do the Thrust Reverser Normal Operation Test.

B. References

Reference	Title
12-12-00-610-801	Hydraulic Reservoir Servicing (P/B 301)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)

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). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	
D00153	Fluid - Hydraulic Fluid, Fire Resistant (Interchangeable And Intermixable With BMS 3-11 Type V)	BMS3-11 Type IV

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Packing	78-34-01-01-035	SIA ALL
5	Control valve module	78-34-01-01-050	SIA ALL
8	Packing	78-34-01-01-045	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

G. Access Panels

Number	Name/Location
193B	Wheel Well Panel - Forward Inboard

H. Control Valve Module Installation

SUBTASK 78-34-01-420-001-G00

(1) Do these steps to install the applicable control valve module [5]:

WARNING DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(a) Clean the sealant residue and the attachment surfaces on the control valve module [5] and the mounting bracket with solvent, B00062.

(b) Put the control valve module [5] in the correct position.

(c) Install the four bolts [1] and washers [2] that attach the control valve module [5] to the attachment bracket on the keel beam.

1) Hand tighten the bolts at this time.

(d) Make sure that there are protective covers on the electrical connector [9] and on the control valve module [5] receptacles.

CAUTION CATCH THE HYDRAULIC FLUID IN A CONTAINER OR CLOTH WHEN YOU DISCONNECT THE HYDRAULIC LINES. IMMEDIATELY CLEAN ALL SURFACES THAT HYDRAULIC FLUID FALLS ON. HYDRAULIC FLUID CAUSES DAMAGE TO EQUIPMENT.

(e) Remove the protective covers from the hydraulic lines on the control valve module [5].

(f) If the new control valve module [5] does not have the union [3] and union [6] or the restrictor check valve [7], do these steps:

1) Use the union [3], union [6], and the restrictor check valve [7] from the control valve module [5] that was removed.

2) Remove the protective covers from the new control valve module [5].

3) Lubricate the packing [8] and two packings [4] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

4) Install the packing [8] on the restrictor check valve [7].

5) Install a packing [4] on the union [3] and union [6].

6) Lubricate the threads of the restrictor check valve [7], union [3], and union [6] with hydraulic fluid, D00153 or MCS 352B fluid, D00054.

7) Install the union [6] in the deploy port DE.

a) Tighten the union to 665 in-lb (75.1 N·m) - 735 in-lb (83.0 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

8) Install the union [3] in the return port R.

NOTE: This is an aluminum alloy union.

a) Tighten the union to 342 in-lb (38.6 N·m) - 378 in-lb (42.7 N·m).

9) Install the restrictor check valve [7] in the stow port ST.

a) Make sure that the large free flow arrow on the restrictor check valve [7] points toward the control valve module [5].

b) Tighten the restrictor check valve [7] to 475 in-lb (53.7 N·m) - 525 in-lb (59.3 N·m).

(g) Loosen the four bolts [1].

(h) For Engine 1 and Engine 2 control valve module, loosely connect the four hydraulic lines to the control valve module [5].

(i) For Engine 1 control valve module, loosely connect the return hydraulic line for the hydraulic power transfer unit to the tee at the return port R.

(j) Tighten the bolts [1] to 135 in-lb (15.3 N·m) - 165 in-lb (18.6 N·m).

(k) Do a check of the electrical resistance through the bracket that the control valve module [5] is attached to.

1) With the intrinsically safe approved bonding meter, COM-1550, do a check of the electrical resistance between the control valve module and the structure where the attachment bracket attaches.

2) Make sure that the resistance is no more than 0.0025 ohm.

CAUTION

USE TWO WRENCHES TO TIGHTEN THE FITTINGS. USE THE SECOND WRENCH TO HOLD THE FITTING IN ITS POSITION TO PREVENT DAMAGE TO THE FITTING.

(l) For Engine 1 and Engine 2 control valve module, tighten the hydraulic lines on the control valve module [5] as follows:

1) Tighten the coupling nut at the deploy port DE to 665 in-lb (75.1 N·m) - 735 in-lb (83.0 N·m).

2) Tighten the coupling nut at the stow port ST to 475 in-lb (53.7 N·m) - 525 in-lb (59.3 N·m).

3) Tighten the coupling nut at the return port R to 342 in-lb (38.6 N·m) - 378 in-lb (42.7 N·m).

4) Tighten the coupling nut at the pressure port P to 665 in-lb (75.1 N·m) - 735 in-lb (83.0 N·m).

(m) For Engine 1 control valve module, tighten the coupling nut at the return port R tee branch to 475 in-lb (53.7 N·m) - 525 in-lb (59.3 N·m).

SUBTASK 78-34-01-390-001-G00

(2) Fillet seal around the bolt flange on the control valve module [5] and the attach bracket with sealant, A00247 or sealant, A02315.

SUBTASK 78-34-01-860-008-G00

(3) Remove the protective covers from the electrical connector [9] and the control valve module [5] receptacles.

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SUBTASK 78-34-01-410-001-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTIONS ARE NOT DIRTY BEFORE YOU CONNECT OR DISCONNECT THEM. SOLID OR LIQUID CONTAMINATION OF THE ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

(4) Connect the electrical connector [9] to the applicable control valve module [5] receptacles:

(a) For Engine 1, connect the electrical connector, D3052

(b) For Engine 2, connect the electrical connector, D3056.

SUBTASK 78-34-01-610-001-G00

(5) Check the hydraulic fluid level in the appropriate reservoir.

(a) For Engine 1, System A.

(b) For Engine 2, System B.

(c) If necessary, do this task: Hydraulic Reservoir Servicing, TASK 12-12-00-610-801.

I. Control Valve Module Installation Test

SUBTASK 78-34-01-440-001-G00

WARNING

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

(a) For Engine 1, System A.

(b) For Engine 2, System B.

SUBTASK 78-34-01-860-009-G00

(2) For Engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	5	C00276	ENGINE 1 THRUST REVERSER CONT

SUBTASK 78-34-01-860-010-G00

(3) For Engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

SUBTASK 78-34-01-860-011-G00

(4) Remove the DO-NOT-OPERATE tag from the thrust levers.

SUBTASK 78-34-01-860-012-G00

(5) Remove the DO-NOT-OPERATE tag from the reverse thrust levers.

SUBTASK 78-34-01-710-001-G00

(6) Do this task: TASK 78-31-00-700-801-G00.

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(a) Operate the thrust reverser through the deploy and stow cycle until all of the air is bled from the system and the thrust reverser sleeves move smoothly.

(b) Do a check of the control valve module and hydraulic lines for hydraulic leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-34-01-410-002-G00

(7) If necessary, close this access panel:

Number	Name/Location
193B	Wheel Well Panel - Forward Inboard

——— END OF TASK ———

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THRUST REVERSER SLEEVE LOCK PROXIMITY SENSOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The thrust reverser sleeve lock proximity sensor removal

(2) The thrust reverser sleeve lock proximity sensor installation.

TASK 78-34-03-000-801-G00

2. Thrust Reverser Sleeve Lock Proximity Sensor Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the thrust reverser sleeve lock proximity sensor and wire leads from the left or right thrust reverser on an engine.

(a) The lock sensor is a component of the wire bundle on the thrust reverser.

(2) For this procedure, the thrust reverser sleeve lock proximity sensor will be referred to as the lock sensor.

(3) The upper lock sensor equipment number for the left thrust reverser on an engine is S1200 and the wire bundle number is W1080.

(4) The middle lock sensor equipment number for the left thrust reverser on an engine is S1201 and the wire bundle number is W1080.

(5) The upper lock sensor equipment number for the right thrust reverser on an engine is S1202 and the wire bundle number is W1084.

(6) The middle lock sensor equipment number for the right thrust reverser on an engine is S1203 and the wire bundle number is W1084.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

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E. Prepare for the Removal

SUBTASK 78-34-03-860-001-G00

(1) For Engine 1, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-03-860-002-G00

(2) For Engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK

SUBTASK 78-34-03-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-34-03-860-007-G00

(4) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

F. Lock Sensor Removal

SUBTASK 78-34-03-010-002-G00

(1) Disconnect the electrical connectors from the applicable thrust reverser on an engine:

(a) For the left thrust reverser, disconnect these electrical connectors:

1) Disconnect the electrical connector, D30008, from the strut receptacle.

2) Disconnect the electrical connector, D30076, from the LVDT receptacle on the upper actuator.

3) Disconnect the electrical connector, D01008, from the sync lock on the lower actuator.

(b) For the right thrust reverser, disconnect these electrical connectors:

1) Disconnect the electrical connector, D30010, from the strut receptacle.

2) Disconnect the electrical connector, D30074, from the LVDT receptacle on the upper actuator.

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3) Disconnect the electrical connector, D01016, from the sync lock on the lower actuator.

SUBTASK 78-34-03-020-001-G00

(2) Remove the lock sensors [1] from the upper and middle actuators:

(a) Remove the jamnut [2] from the lock sensors [1].

NOTE: To remove the lock sensors [1], it is necessary to remove only the jamnut that is adjacent to the sensor target.

(b) Remove the lock sensor [1] and key washer [3] from the locking actuator.

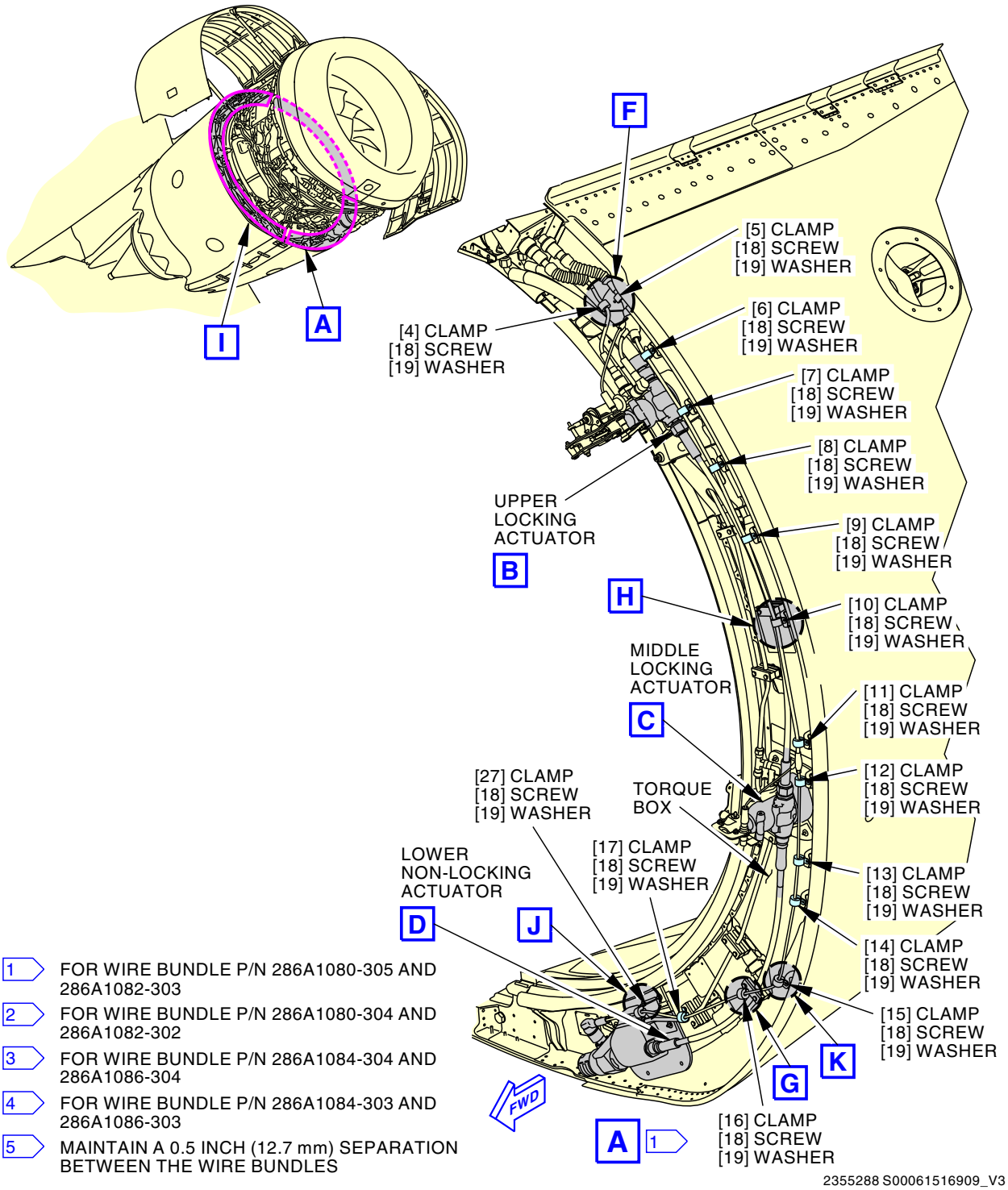
SUBTASK 78-34-03-020-002-G00

(3) Remove the wire bundle from the thrust reverser torque box.

(a) Remove the screws and clamps that attach the wire bundle to the torque box.

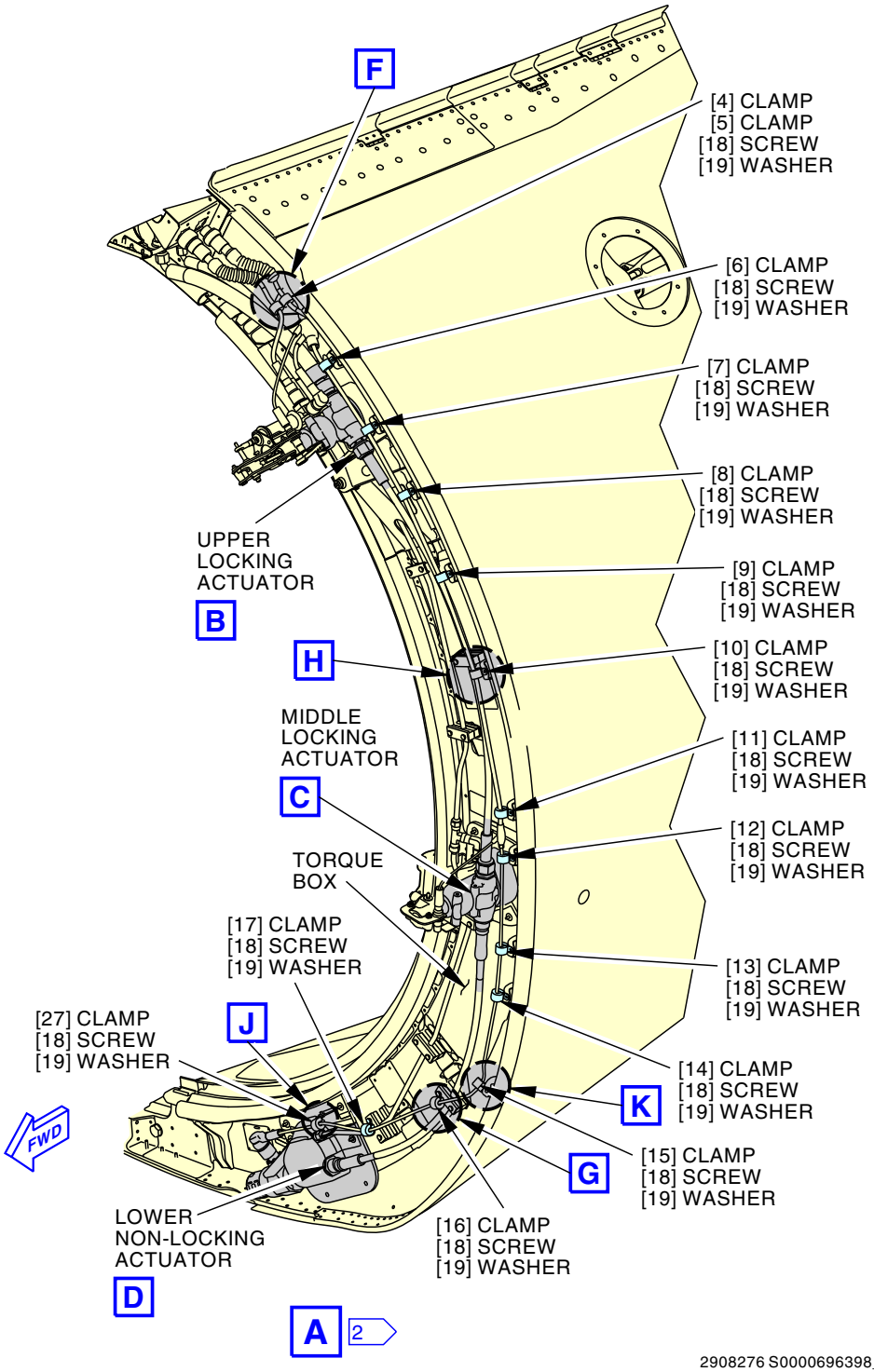
——— END OF TASK ———

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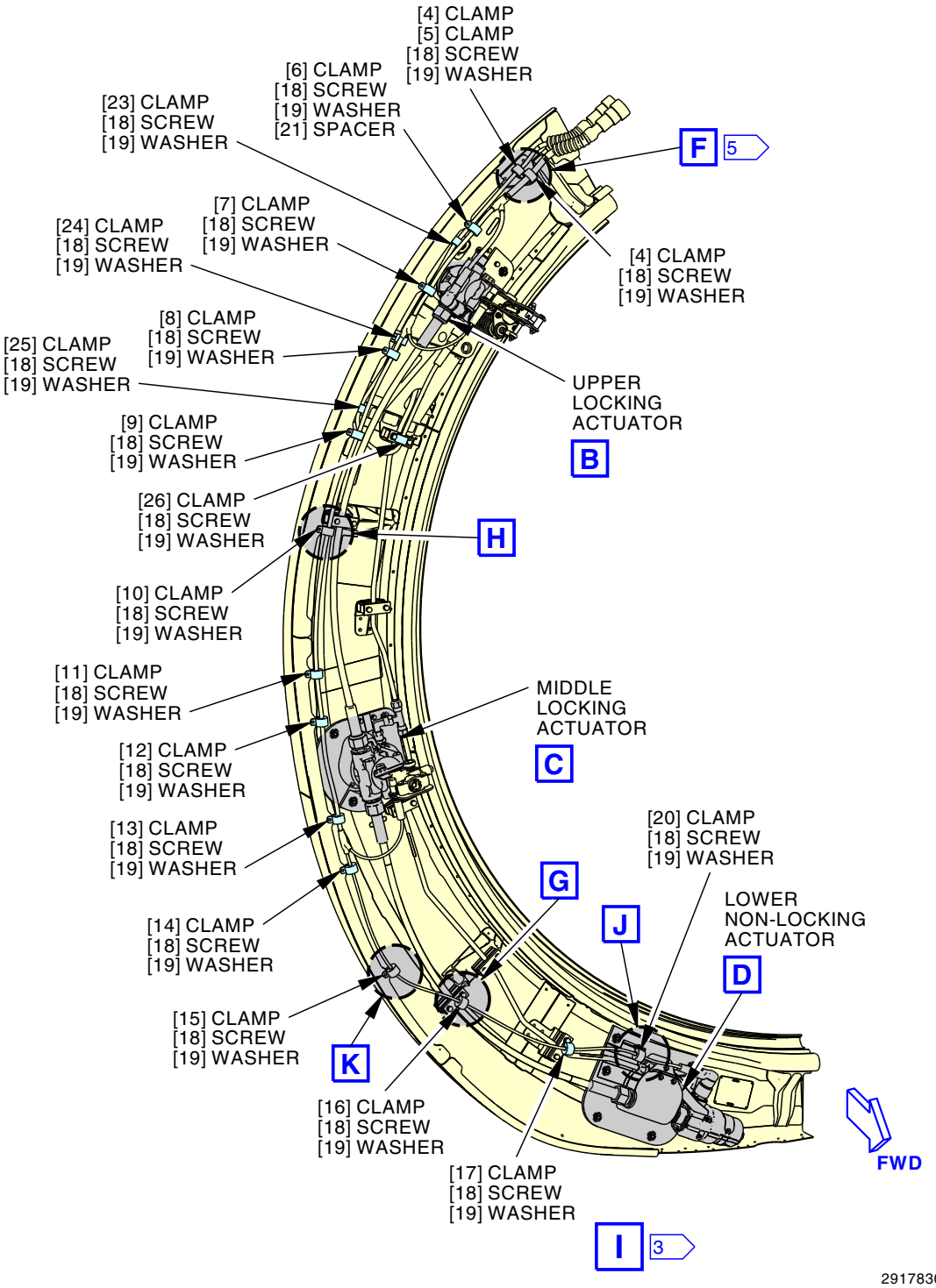
Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 1 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



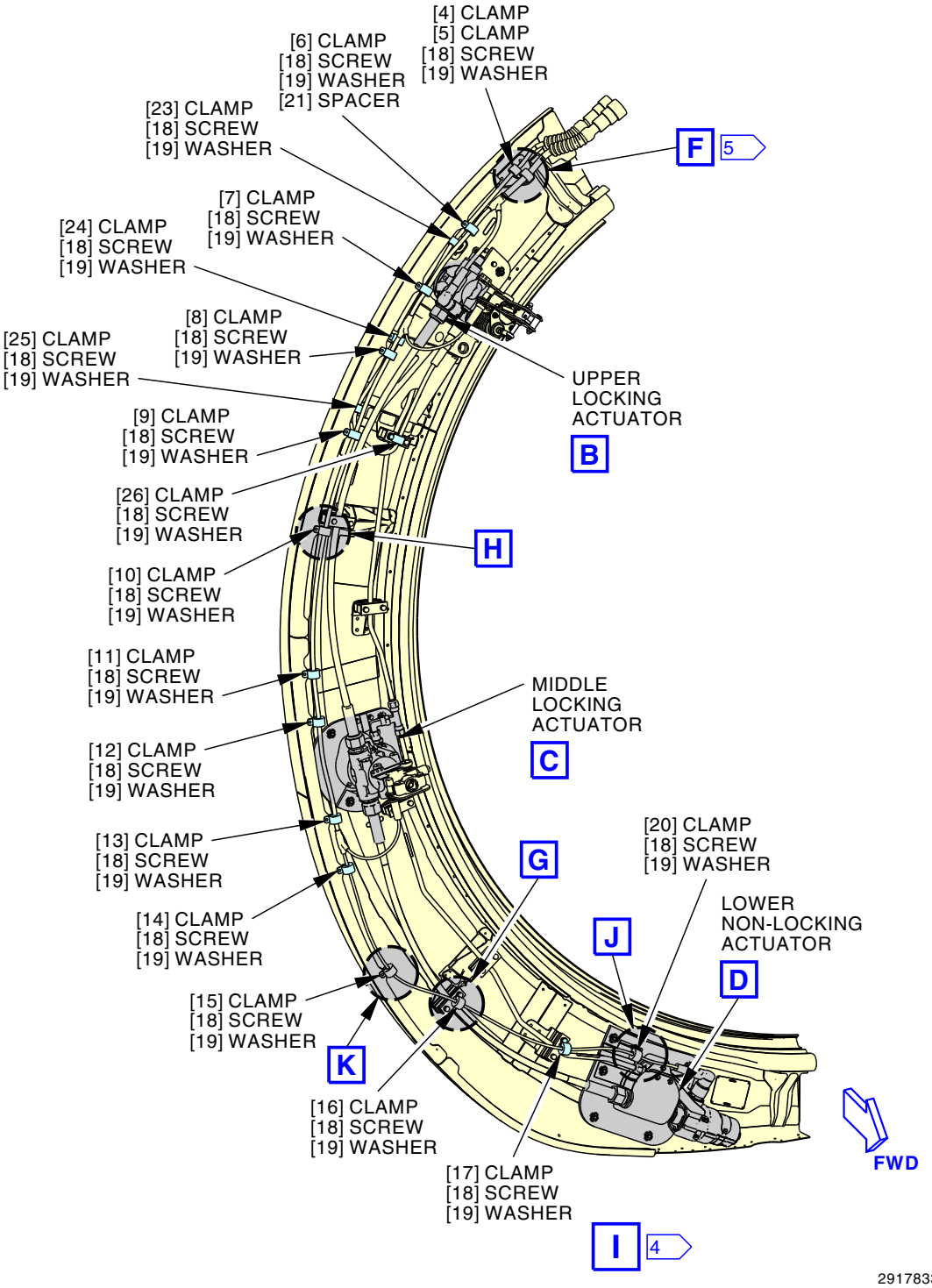
Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 2 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



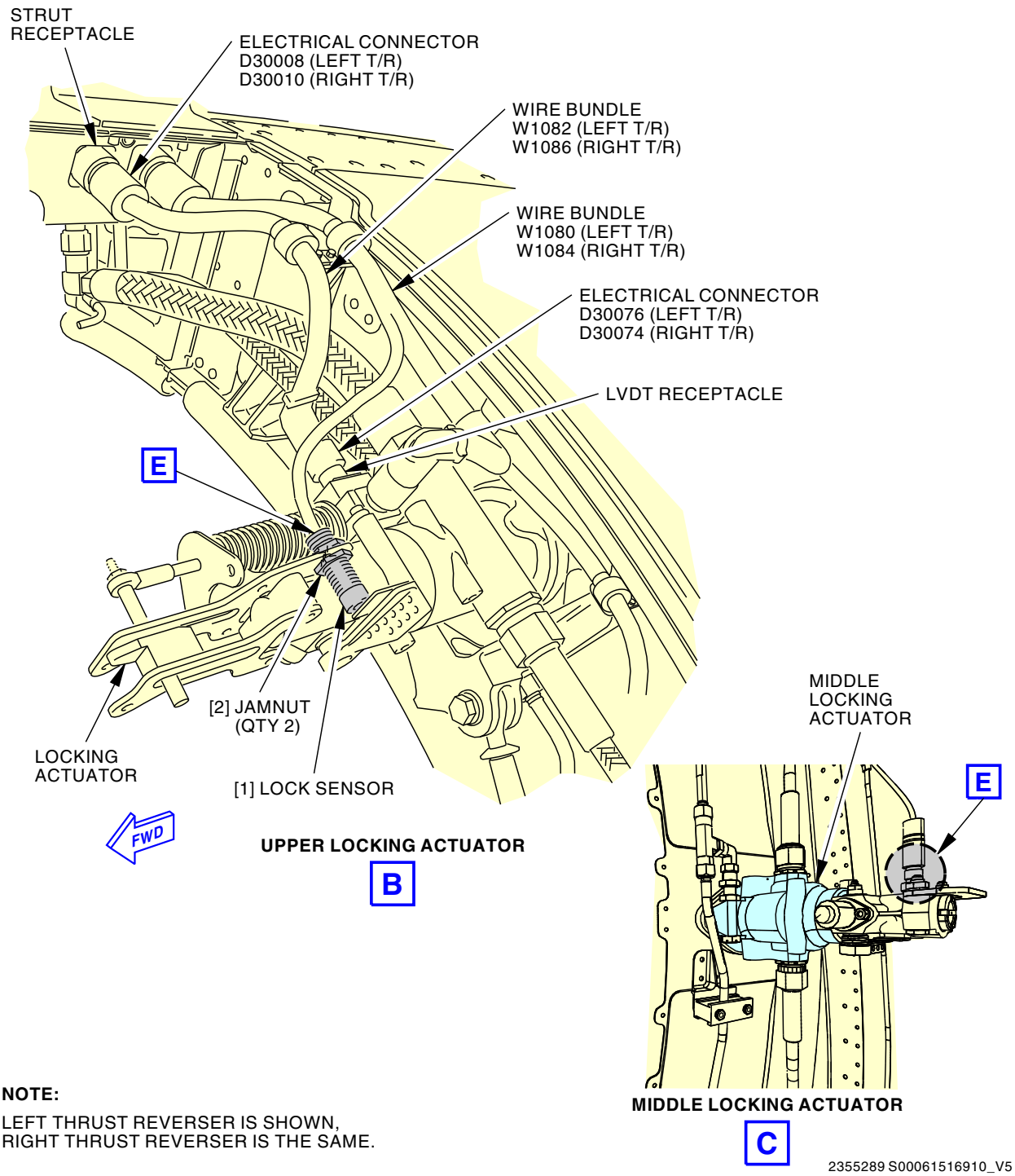
Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 3 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



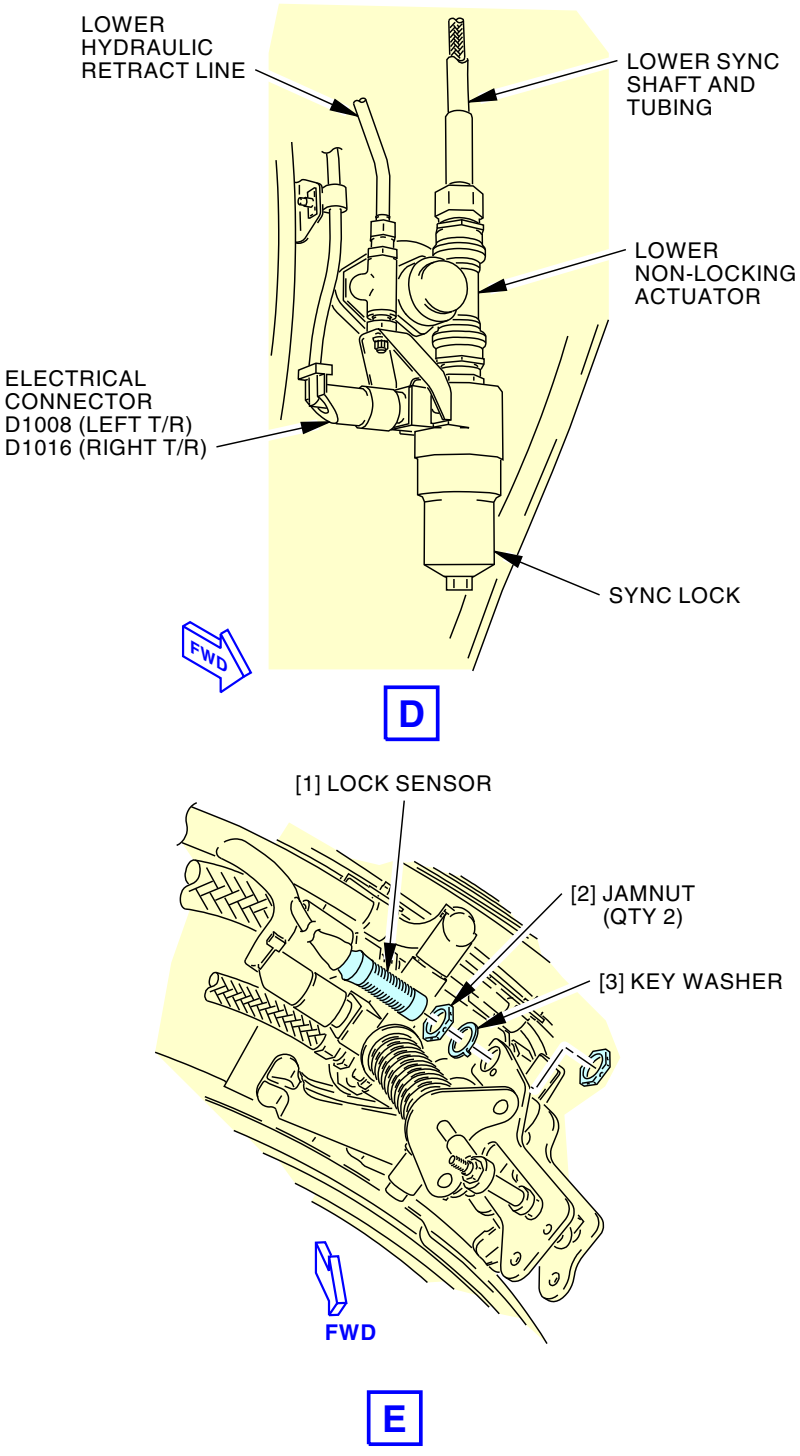
Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 4 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 5 of 8)

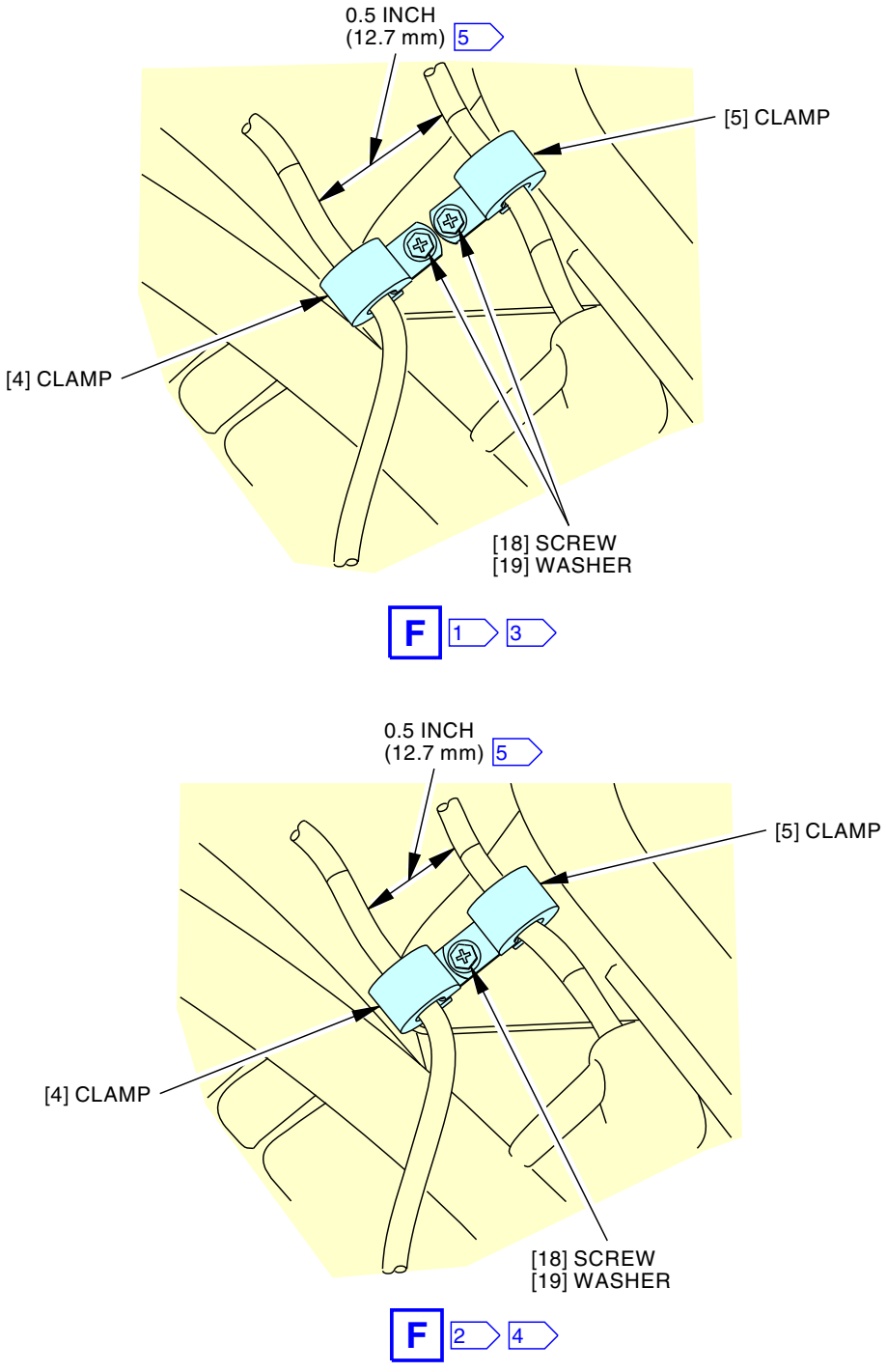
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2482670 S0000583542_V2

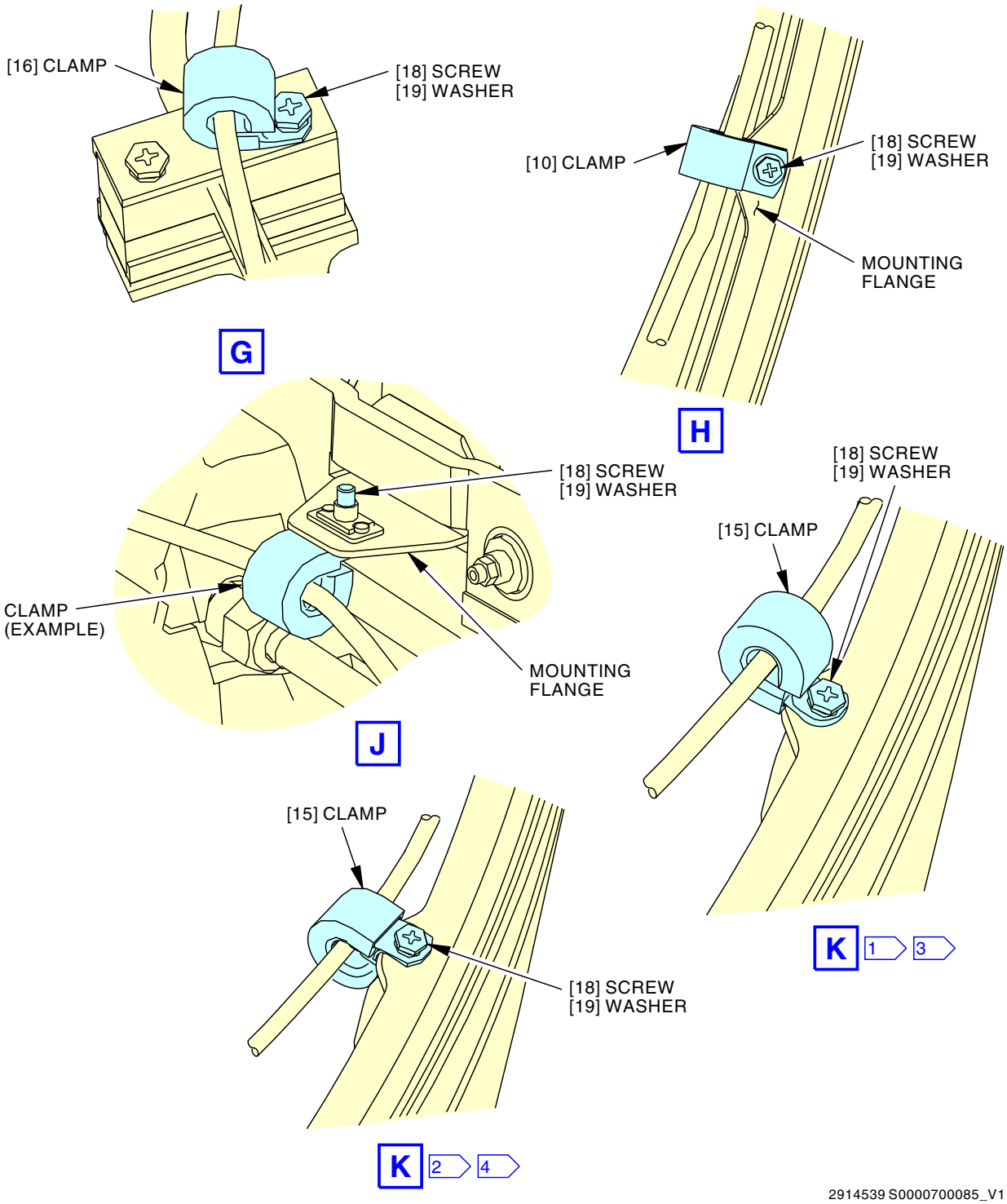
Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 6 of 8)

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Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 7 of 8)

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Thrust Reverser Sleeve Wire Bundles and Proximity Sensor Installation
Figure 401/78-34-03-990-801-G00 (Sheet 8 of 8)

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TASK 78-34-03-400-801-G00

3. Thrust Reverser Sleeve Lock Proximity Sensor Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the thrust reverser sleeve lock proximity sensors and wire bundle for the left or right thrust reverser on an engine.

B. References

Reference	Title
51-21-72-370-804	BMS10-11 Primer - Application (P/B 701)
51-21-95-300-801	Alodine Treatment Application (P/B 701)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-805-G00	Thrust Reverser Proximity Sensors Operational Test (P/B 501)
78-34-03-800-801-G00	Sleeve Lock Proximity Sensor Adjustment and Test (P/B 501)
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

C. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Lock Sensor Installation

SUBTASK 78-34-03-860-003-G00

(1) Connect the electrical connectors to the applicable thrust reverser:

(a) For the left thrust reverser, connect these electrical connectors:

1) Connect the electrical connector, D30008, to the strut receptacle.

2) Connect the electrical connector, D30076, to the LVDT receptacle on the upper actuator.

3) Connect the electrical connector, D01008, to the sync lock on the lower actuator.

(b) For the right thrust reverser, connect these electrical connectors:

1) Connect the electrical connector, D30010, to the strut receptacle.

2) Connect the electrical connector, D30074, to the LVDT receptacle on the upper actuator.

3) Connect the electrical connector, D01016, to the sync lock on the lower actuator.

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SUBTASK 78-34-03-420-001-G00

CAUTION DO NOT USE A SPLICE TO PUT THE LOCK SENSOR INTO THE WIRE BUNDLE. IF YOU USE A SPLICE TO ATTACH THE LOCK SENSOR INTO THE WIRE BUNDLE, THE EAU CAN RECEIVE INCORRECT INDICATIONS. NUISANCE FAULT MESSAGES CAN OCCUR.

(2) Install the lock sensors [1] and wire leads:

(a) Clean the bracket, key washer [3], and jamnut [2].

(b) Put the upper actuator lock sensor [1] into the bracket.

(c) Install the key washer [3] on the side of the bracket closest to the sensor target.

1) Align the key washer [3] with the index hole in the bracket.

(d) Install the other jamnut [2].

(e) Put the lock sensor [1] against the sensor target.

(f) Hand tighten the jamnut [2] at this time.

NOTE: This is a temporary installation only, the jamnuts will be tightened after the final adjustment of the lock sensor.

(g) Repeat the above steps with the middle actuator lock sensor.

SUBTASK 78-34-03-420-002-G00

(3) Attach the left hand wire bundles to the thrust reverser torque box with the clamps and screws (Figure 401).

(a) Make sure that you maintain a 0.5 in. (12.7 mm) separation between the wire bundles.

(b) Make sure that the wire bundles are installed with appropriate slack (SWPM 20-10-11).

(c) For left hand wire bundles P/N 286A1080-305 and P/N 286A1082-303 install the clamps as follow:

1) Install the clamp [4] for P/N 286A1082-303 with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

2) Install the clamp [5] for P/N 286A1080-305 with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

3) Install the clamp [6] through clamp [17], and clamp [27] for the P/N 286A1080-305 with the screws [18] and washers [19] to attach the wire bundle (View A, Figure 401).

(d) For left hand wire bundles P/N 286A1080-304 and P/N 286A1082-302 install the clamps as follow:

1) Install clamp [4] for P/N 286A1082-302 and clamp [5] for P/N 286A1080-304 in a butterfly configuration with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

2) For the aft hole, do these steps:

NOTE: The aft hole on mounting flange will remain open.

a) Do this task: Alodine Treatment Application, TASK 51-21-95-300-801.

b) Do this task: BMS10-11 Primer - Application, TASK 51-21-72-370-804.

3) For the P/N 286A1080-304, do these steps to install the clamp [15] (View K, Figure 401):

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a) Rotate the loop of the clamp [15] on 180 degrees.

NOTE: The clamp loop will be AFT facing.

b) Install the clamp [15] on the mounting flange with the screw [18] and washer [19] to attach the wire bundle.

4) Install the clamp [6] through clamp [14], and clamp [16], clamp [17], clamp [27] for the 286A1080-304 with the screws [18] and washers [19] to attach the wire bundle (View A, Figure 401).

SUBTASK 78-34-03-420-003-G00

(4) Attach the right hand wire bundles to the thrust reverser torque box with the clamps and screws (Figure 401).

(a) Make sure that you maintain a 0.5 in. (12.7 mm) separation between the wire bundles.

(b) Make sure that the wire bundles are installed with the appropriate slack (SWPM 20-10-11).

(c) For right hand wire bundles P/N 286A1084-304 and P/N 286A1086-304 install the clamps as follow:

1) Install the clamp [4] for P/N 286A1086-304 with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

2) Install the clamp [5] for P/N 286A1084-304 with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

3) Install the clamp [6] for the P/N 286A1084-304 with the screw [18], washer [19], and spacer [21] to attach the wire bundle (View I, Figure 401).

4) Install the clamp [7] through clamp [17], and clamp [20] for the P/N 286A1084-304 with the screws [18] and washers [19] to attach the wire bundle.

5) Install the clamp [23] through clamp [26] for the P/N 286A1086-304 with the screws [18] and washers [19] to attach the wire bundle.

(d) For right hand wire bundles P/N 286A1084-303 and P/N 286A1086-303 install the clamps as follow:

1) Install the clamp [4] for P/N286A1086-303 and clamp [5] for P/N 286A1084-303 in a butterfly configuration with the screw [18] and washer [19] to attach the wire bundle (View F, Figure 401).

2) For the aft hole, do these steps:

NOTE: The aft hole on mounting flange will remain open.

a) Do this task: Alodine Treatment Application, TASK 51-21-95-300-801.

b) Do this task: BMS10-11 Primer - Application, TASK 51-21-72-370-804.

3) For the P/N 286A1084-303, do these steps to install the clamp [15] (View K, Figure 401):

a) Rotate the loop of the clamp [15] on 180 degrees.

NOTE: The clamp loop will be AFT facing.

b) Install the clamp [15] on the mounting flange with the screw [18] and washer [19] to attach the wire bundle.

4) Install the clamp [6] for the P/N 286A1084-303 with the screw [18], washer [19] and spacer [21] to attach the wire bundle (View I, Figure 401).

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5) Install the clamp [7] through clamp [14], and clamp [16], clamp [17], clamp [20] for the P/N 286A1084-303 with the screws [18] and washers [19] to attach the wire bundle.

6) Install the clamp [23], clamp [24], clamp [25], and clamp [26] for the P/N 286A1086-303 with the screws [18] and washers [19] to attach the wire bundle.

SUBTASK 78-34-03-860-004-G00

(5) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-03-860-005-G00

(6) For Engine 2, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK

SUBTASK 78-34-03-820-001-G00

(7) Do this task: Sleeve Lock Proximity Sensor Adjustment and Test, TASK 78-34-03-800-801-G00.

SUBTASK 78-34-03-710-001-G00

(8) Do this task: Thrust Reverser Proximity Sensors Operational Test, TASK 78-31-00-700-805-G00.

NOTE: This check will make sure that the electrical connections for the LVDT's are correct.

(a) Make sure that no LVDT maintenance messages show.

1) If a maintenance message shows, do the applicable fault isolation task in the Fault Isolation Manual for that maintenance message.

2) If no maintenance messages show, the electrical connections for the LVDT's are correct.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-03-860-008-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-34-03-860-009-G00

(2) Do the activation procedure for the thrust reverser (TASK 78-31-00-440-801-G00).

——— END OF TASK ———

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THRUST REVERSER SLEEVE LOCK PROXIMITY SENSOR - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) Sleeve Lock Proximity Sensor Adjustment and Test.

TASK 78-34-03-800-801-G00

2. Sleeve Lock Proximity Sensor Adjustment and Test

(Figure 501 and Figure 502)

A. General

(1) This task gives the instructions to adjust the thrust reverser sleeve lock proximity sensor.

(2) The thrust reverser sleeve lock proximity sensor supplies a signal to the Electronic Engine Control (EEC) when the locking actuator is not in the locked position.

(3) To do the sensor adjustment, the manual unlock lever on the locking actuator must be in the unlocked position.

(4) The Thrust Reverser Normal Operation Test must be done after the adjustment(s).

(5) For this task, the thrust reverser sleeve lock proximity sensor will be referred to as the lock sensor.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-03-000-801-G00	Thrust Reverser Hydraulic Actuator Removal (Selection) (P/B 401)
78-31-03-400-801-G00	Thrust Reverser Hydraulic Actuator Installation (Selection) (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
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). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
SPL-15435	Gap Measurement Gauge - TRAS Locking Actuator Part #: C78030-18 Supplier: 81205

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D. Consumable Materials

Reference	Description	Specification
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

F. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

G. Prepare for the Adjustment

SUBTASK 78-34-03-040-002-G00

(1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-34-03-010-004-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 78-34-03-860-006-G00

(3) Make sure that the thrust reverser sleeve is in the stowed and locked position.

SUBTASK 78-34-03-980-001-G00

(4) Do these steps to manually unlock the locking actuator:

(a) Move the manual unlock lever forward.

(b) Hold the manual unlock lever in the forward position as the detent pin is pushed in.

(c) Release the manual unlock lever.

H. Lock Sensor Adjustment

SUBTASK 78-34-03-820-002-G00

(1) Do the steps that follow to adjust the lock sensor [3]:

(a) Loosen the two jamnuts [1].

1) Make sure that the key washer [2] tab does not come out of the index hole in the attach fitting.

NOTE: The key washer is installed with the tab in the index hole in the bracket. The key washer is installed on the side of the bracket closest to the target.

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(b) Adjust the jamnuts [1] to set the lock sensor [3] in the correct position.

1) Use a feeler gage to measure the distance between the end face of the lock sensor [3] and sensor target [4].

2) Make sure that the distance is 0.035 ±0.010 in. (0.889 ±0.254 mm).

(c) Tighten the jamnuts [1] to 45.0 in-lb (5.1 N·m) - 55.0 in-lb (6.2 N·m).

(d) Do a check of the distance again between the end face of the lock sensor [3] and sensor target [4].

1) Make sure that the distance is 0.035 ±0.010 in. (0.889 ±0.254 mm).

(e) With an intrinsically safe approved bonding meter, COM-1550, do a check of the electrical resistance between the bracket and lock sensor [3].

1) Make sure that the resistance is not more than 0.003 ohms.

2) If the resistance is more than 0.003 ohms, do the following steps:

a) Loosen the two jamnuts [1].

b) Do the steps above to loosen the jamnuts [1].

c) Clean the mating surfaces.

d) Tighten the jamnuts [1].

e) With an intrinsically safe approved bonding meter, COM-1550, do a check again of the electrical resistance between the bracket and the lock sensor [3].

(f) Install MS20995C32 lockwire, G01048, on the jamnuts [1] (Figure 501, View B).

(g) If it is necessary, install MS20995C32 lockwire, G01048, on the adapter and adjacent jamnut [1].

(h) Do these steps to lock the locking actuator:

1) Move the manual unlock lever forward.

NOTE: The detent pin will move out of the locked position.

2) Release the manual unlock lever.

I. Lock Sensor Target Check

SUBTASK 78-34-03-820-003-G00

(1) Do these steps to check the sensor target [4] distance from the proximity sensor:

(a) Install the gap gauge, SPL-15435, on the sensor to make sure that the target leading edge is at the correct distance.

1) Replace the actuator, if the larger cylinder will pass the target leading edge and the target is too far.

NOTE: The actuator is no longer serviceable.

a) Do this task: Thrust Reverser Hydraulic Actuator Removal (Selection), TASK 78-31-03-000-801-G00.

b) Do this task: Thrust Reverser Hydraulic Actuator Installation (Selection), TASK 78-31-03-400-801-G00.

2) Replace the actuator, if the smaller cylinder will not pass the target leading edge and the target is too close.

NOTE: The actuator is no longer serviceable.

a) Do this task: Thrust Reverser Hydraulic Actuator Removal (Selection), TASK 78-31-03-000-801-G00.

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b) Do this task: Thrust Reverser Hydraulic Actuator Installation (Selection), TASK 78-31-03-400-801-G00.

3) If the larger cylinder will not pass the target leading edge, the target is at the correct distance.

J. Lock Sensor Adjustment Test

SUBTASK 78-34-03-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-34-03-710-002-G00

(2) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

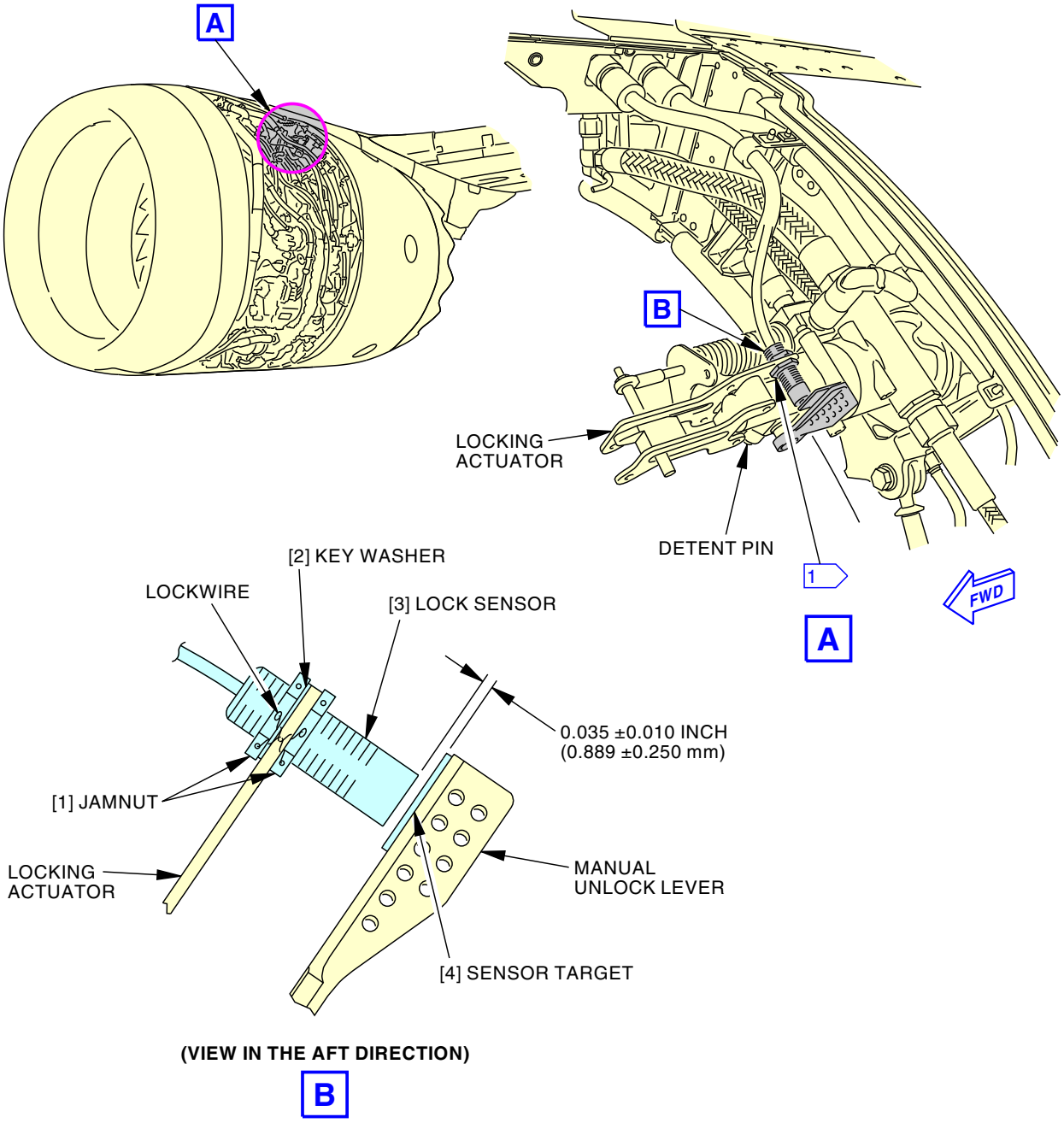
K. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-03-410-001-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

——— END OF TASK ———

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NOTE:

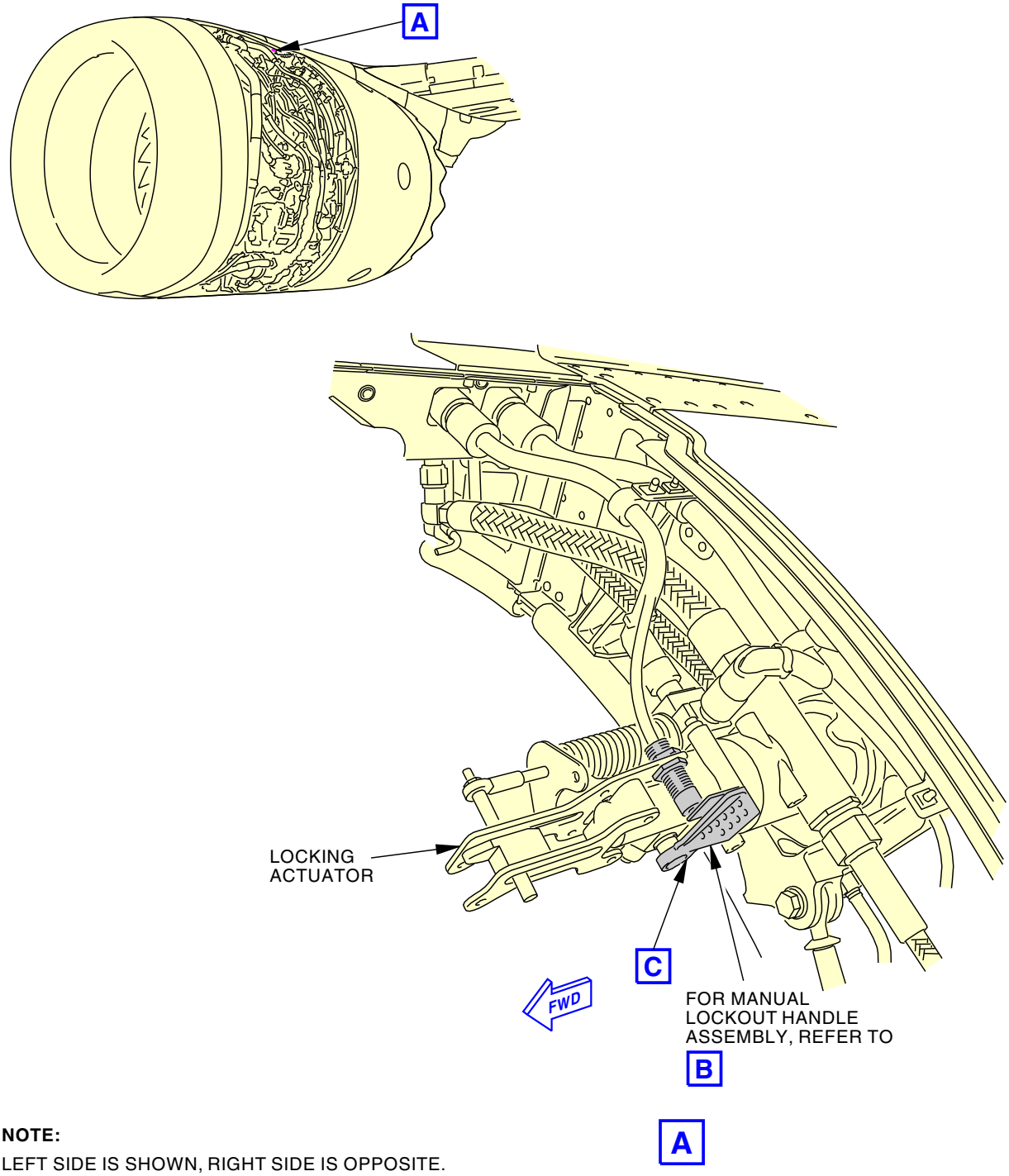
LEFT THRUST REVERSER UPPER LOCKING ACTUATOR IS SHOWN. ALL LOCKING ACTUATORS ARE EQUIVALENT.

1 ELECTRICALLY BOND THE STOW SENSOR TO THIS SIDE OF THE BRACKET. FILLET SEAL AROUND JAMNUT.

2355290 S00061516914_V2

Thrust Reverser Sleeve Lock Proximity Sensor Adjustment
Figure 501/78-34-03-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



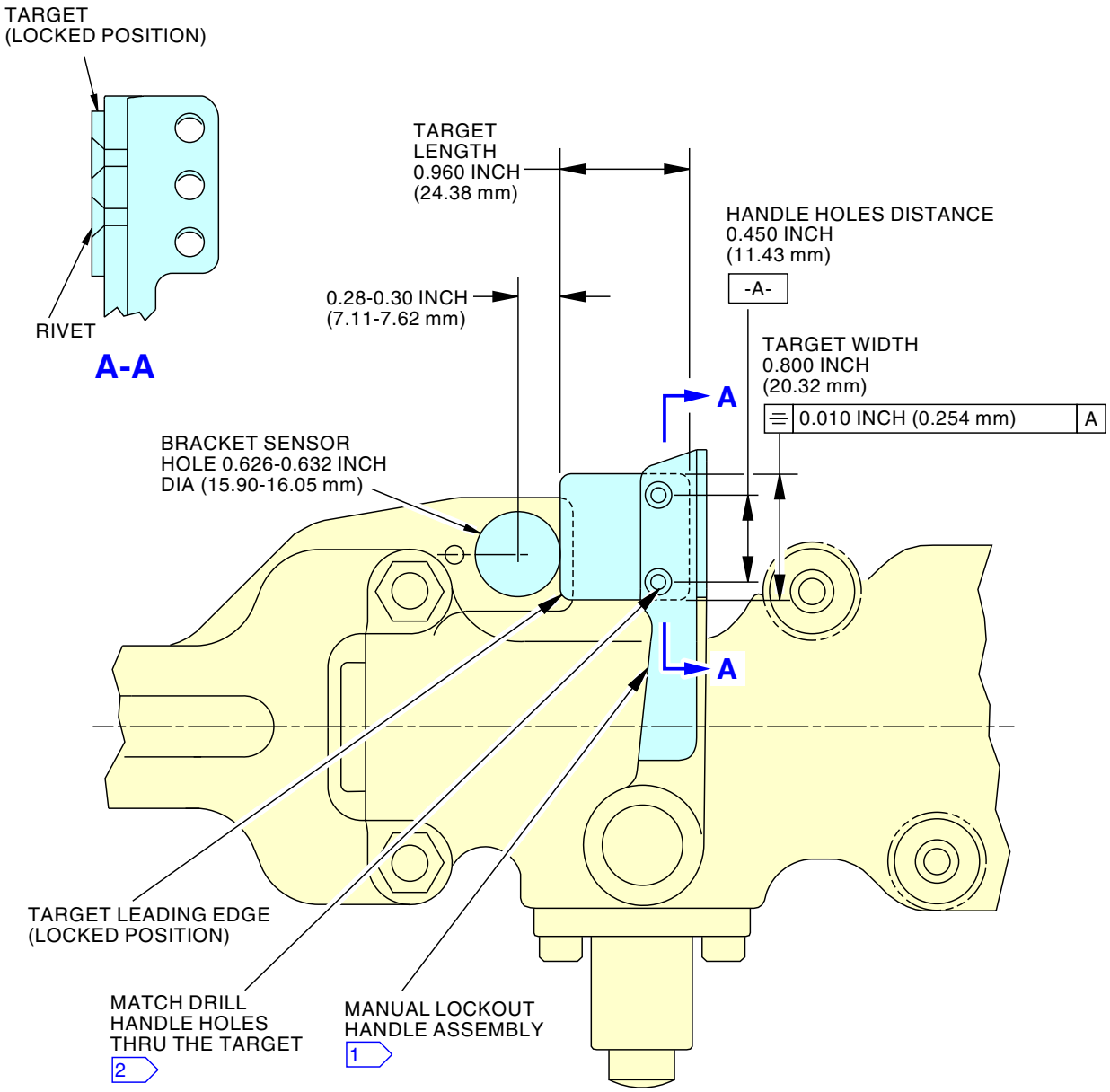
NOTE:

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE.
(TOOL NOT SHOWN)

2355292 S00061516915_V1

Thrust Reverser Sleeve Lock Proximity Sensor Target Adjustment
Figure 502/78-34-03-990-803-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MANUAL LOCKOUT HANDLE ASSEMBLY

B

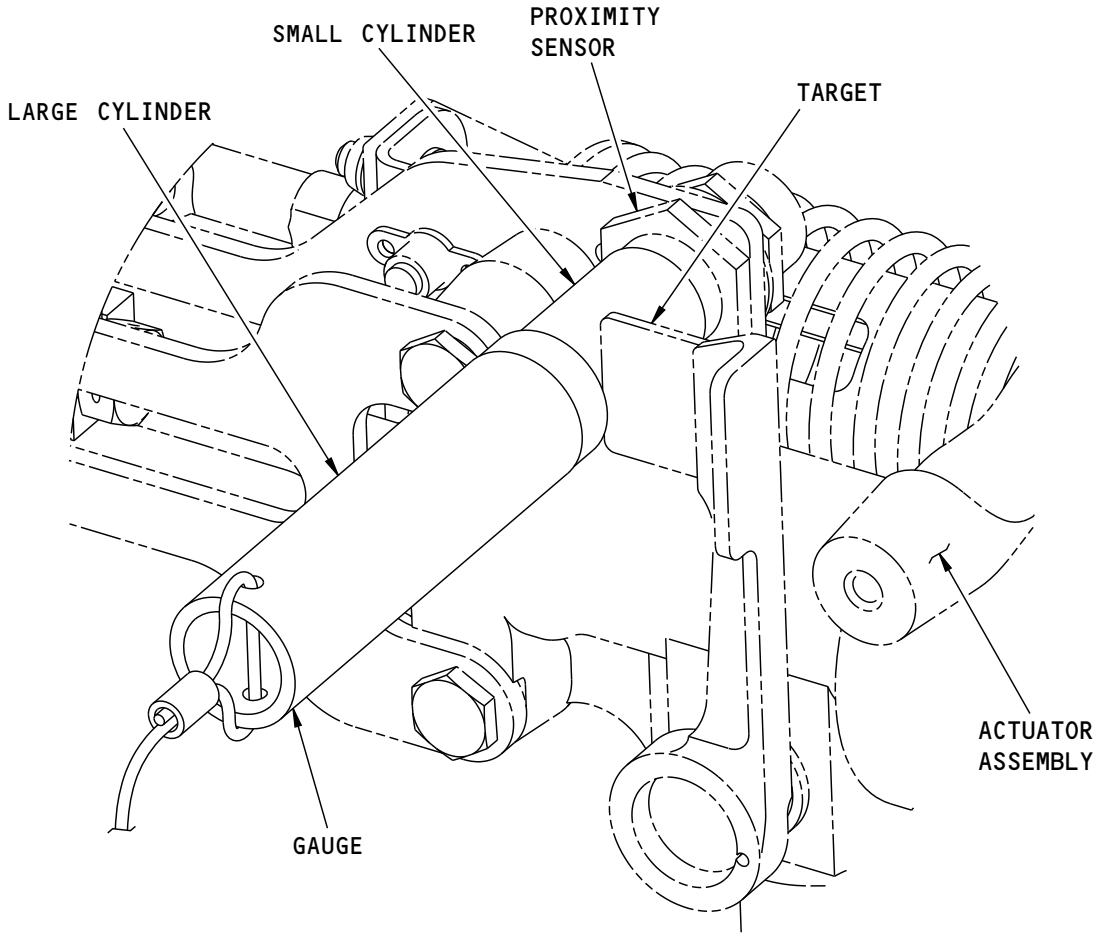
1 APPROXIMATELY PERPENDICULAR WITH ACTUATOR CENTERLINE WHEN PISTON IS IN FULLY LOCKED POSITION.

2 MARK TARGET HOLES AGAINST THE HANDLE. DRILL TARGET HOLES, INSTALL TARGET TO HANDLE ON BENCH.

2355293 S00061516916_V1

Thrust Reverser Sleeve Lock Proximity Sensor Target Adjustment
Figure 502/78-34-03-990-803-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2355294 S00061516917_V1

Thrust Reverser Sleeve Lock Proximity Sensor Target Adjustment
Figure 502/78-34-03-990-803-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER CONTROL SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Control switch removal

(2) Control switch installation.

TASK 78-34-04-000-801-G00

2. Control Switch Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the thrust reverser control switch.

(2) The thrust reverser control switch is referred to as the control switch.

B. References

Reference	Title
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)
SWPM 20	Standard Wiring Practices Manual

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 78-34-04-860-052-G00

(1) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-34-04-860-053-G00

(2) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-34-04-860-054-G00

(3) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-34-04-860-001-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-34-04-860-003-G00

WARNING

MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF A THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 78-34-04-860-004-G00

(6) For the applicable engine, make sure that the START LEVER switch is in the CUTOFF position.

(a) Attach a DO NOT OPERATE tag, STD-858.

SUBTASK 78-34-04-860-005-G00

(7) Make sure that the applicable thrust lever is in the idle position.

(a) Attach a DO NOT OPERATE tag, STD-858.

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SUBTASK 78-34-04-860-006-G00

(8) Make sure that the applicable reverse thrust lever is forward and down in the retract (stow) position.

SUBTASK 78-34-04-860-007-G00

(9) For the applicable engine, move the ENGINE START switch on the forward overhead P5 panel to the CONT position.

NOTE: This supplies power to the EEC which is necessary for the interlock to release.

SUBTASK 78-34-04-860-008-G00

(10) If the thrust reverser will power extend (deploy), do these steps:

NOTE: For the adjustment of the control switch, you must have movement through the full range of the reverse thrust lever. When the interlock releases and the thrust reverser is extended, the reverse thrust lever can move through its entire range.

(a) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00.

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-34-04-980-001-G00

(11) If the thrust reverser will not power extend (deploy), do these steps:

NOTE: For the adjustment of the control switch, you must have movement through the full range of the reverse thrust lever. When the interlock releases and the thrust reverser is extended, the reverse thrust lever can move through its entire range.

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Manually extend the thrust reverser (TASK 78-31-00-980-803-G00).

F. Control Switch Removal

SUBTASK 78-34-04-020-001-G00

(1) Do these steps to remove the control switch [1] from the applicable thrust lever:

(a) To get access to the applicable thrust lever cover, move the other thrust lever to the fully forward position.

(b) Remove the four screws [4] that attach the cover to the inboard side of the thrust lever.

(c) Remove the cover from the thrust lever.

(d) Remove the two screws [3] that attach the control switch [1] to the thrust lever.

(e) Remove the two switch plates [2] and the control switch [1].

NOTE: Some configurations of the control switch do not use switch plates.

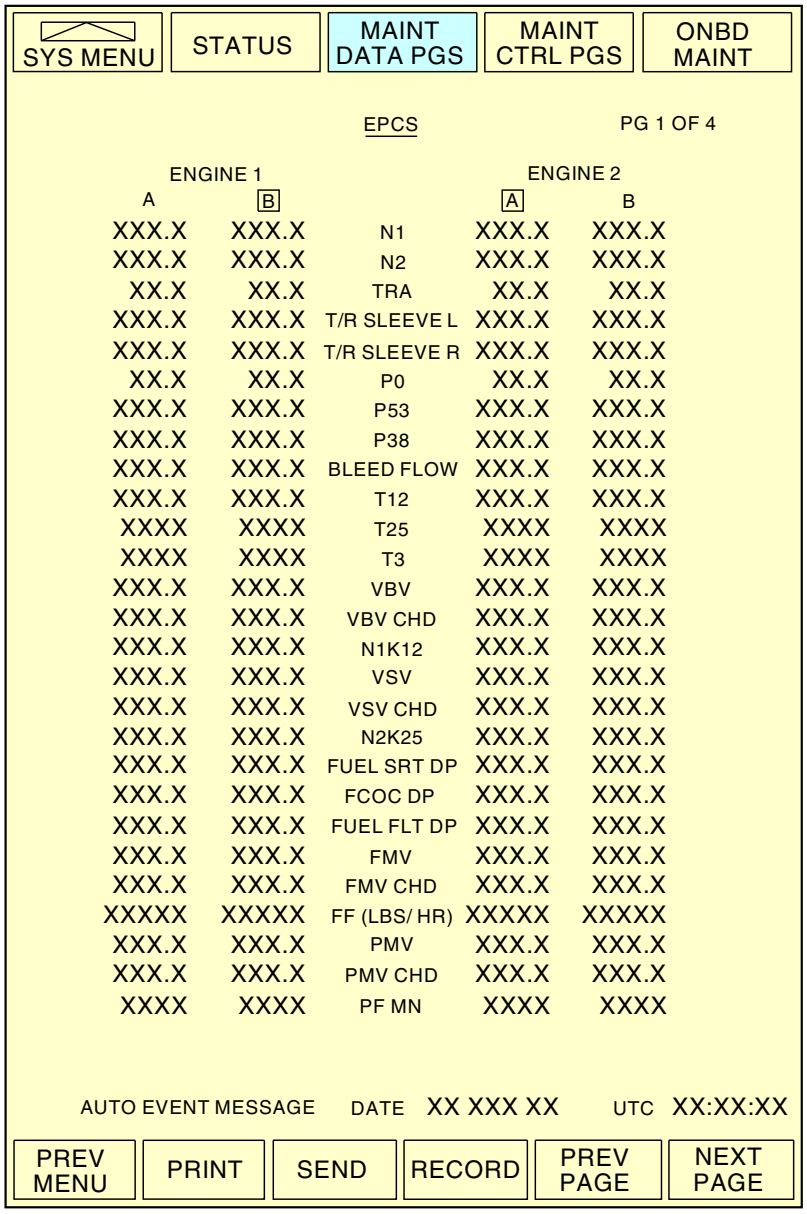
ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Keep the two switch plates [2] for the subsequent installation of the new control switch [1].

(f) Do the applicable tasks to disconnect the three wire socket contacts from the control switch [1] (SWPM 20).

——— END OF TASK ———

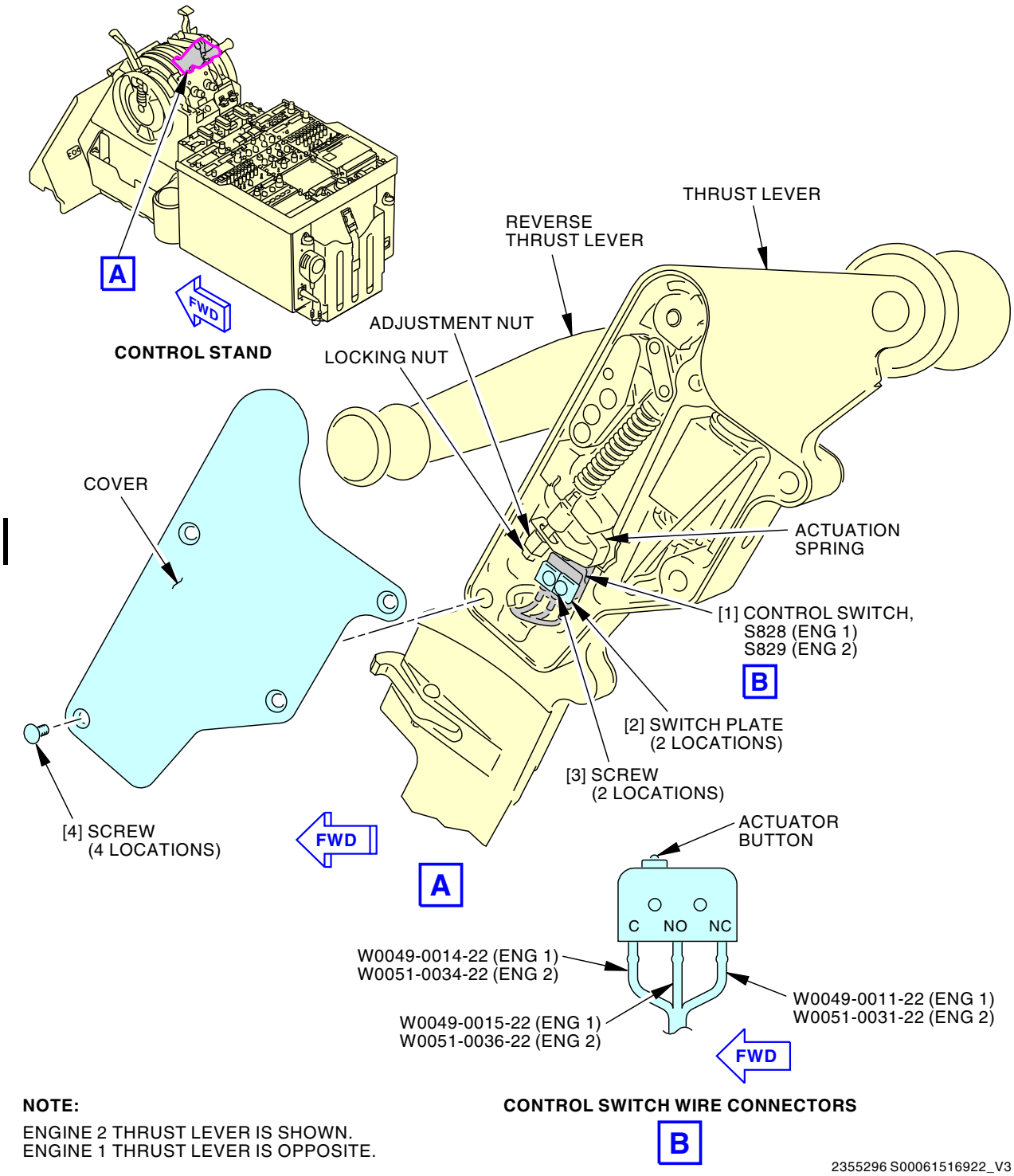
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354207 S00061514972_V2

Thrust Reverser Control Switch Installation
Figure 401/78-34-04-990-801-G00 (Sheet 1 of 2)

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Thrust Reverser Control Switch Installation
Figure 401/78-34-04-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-04-400-801-G00

3. Control Switch Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the thrust reverser control switch.

(2) The thrust reverser control switch is referred to as the control switch.

(3) The TRA (thrust lever resolver angle) values on the Multi-Function Display (MFD) will be used to adjust the control switch.

B. References

Reference	Title
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-980-806-G00	Thrust Reverser Operation - Retract (Power Procedure) (P/B 201)
78-34-04-700-801-G00	Control Switch Adjustment and Test (P/B 501)

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) Part #: 117 Supplier: 89536 Part #: 260-8XPI Supplier: 55026 Part #: 287 Supplier: 89536 Part #: 289 Supplier: 89536 Part #: 87V Supplier: 89536 Part #: FLUKE 27 II Supplier: 89536 Part #: FLUKE-77-4 Supplier: 89536 Opt Part #: 187 Supplier: 89536 Opt Part #: 189 Supplier: 89536 Opt Part #: 21 Supplier: 89536 Opt Part #: 27 Supplier: 89536 Opt Part #: 77 SERIES III Supplier: 89536 Opt Part #: 87 Supplier: 89536 Opt Part #: FLUKE 27 Supplier: 89536 Opt Part #: MODEL 27 Supplier: 89536
STD-442	Gun - Heat, 180 deg. F (82 deg. C) Maximum Output Temperature
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
G01148	Sleeve - Insulation, Electrical, Heat Shrinkable - RT-876	
G51210	Tubing - Highly Flame-Retardant, Low-Shrink Temperature, Polyolefin	AMS-DTL-23053/5 Class 1

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Control switch	78-34-04-02-040	SIA ALL
		78-34-04-02A-025	SIA ALL

F. Location Zones

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

G. Control Switch Installation

SUBTASK 78-34-04-420-001-G00

(1) Do these steps to install the control switch [1]:

(a) Put the control switch [1] in its correct position.

1) Make sure that the actuator button is in the correct position.

(b) Install the switch plates [2] on the control switch [1].

NOTE: Some configurations of the control switch do not use switch plates.

(c) Install the screws [3] that attach the switch plates [2] and control switch [1] to the thrust lever.

NOTE: The wire socket contacts are connected after the adjustment of the control switch.

(d) Operate the reverse thrust lever to make sure that the actuating spring does not lose contact or pop off the control switch [1] at the top of the throw.

1) If it is necessary, adjust the locking nut as follows:

a) Loosen the locking nut at the adjustment nut until the actuating spring stays actuated on the control switch [1].

b) Tighten the locking nut to 6 in-lb (0.7 N·m) - 8 in-lb (0.9 N·m).

H. Control Switch Test

SUBTASK 78-34-04-860-009-G00

(1) Make sure that the reverse thrust lever is fully forward and down in the retracted (stowed) position.

SUBTASK 78-34-04-720-001-G00

(2) To do a test of the control switch [1] use the Multi-Function Display (MFD) screen in the flight compartment to show the TRA (thrust lever resolver angle) position values:

NOTE: The relationship between RLA (actual reverse thrust lever angle as measured by a protractor) and TRA is also given in the task.

(a) Select the EPCS page 1 from the Maintenance Data Pages on the Multi-Function Display (MFD).

(b) Use a digital/analog multimeter, COM-1793, to do this continuity check:

1) Make sure that there is an open circuit between terminal C and terminal NO at 36 ±0.25 degrees TRA position value.

NOTE: This TRA position value is the same as 0 degrees RLA.

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(c) As you slowly move the reverse thrust lever toward the extend (deploy) position, do these continuity checks:

NOTE: There is a two second delay between the movement of the reverse thrust lever and the value that is displayed on the MFD.

1) Make sure that as the reverse thrust lever is moved, there is continuity between terminal C and terminal NC between a TRA position value of 36 ±0.25 degrees and 35.50 degrees.

NOTE: This range of TRA position values is the same as 0 to 16 degrees RLA.

2) Stop the movement of the reverse thrust lever when terminal NC to terminal C goes open.

a) Wait for at least 2 seconds.

b) Make sure that the TRA position value is between 35.50 degrees and 35.10 degrees.

NOTE: This range of TRA position values is the same as 16 to 19 degrees RLA.

3) Do a check between terminal C and terminal NO of the control switch:

a) Continue to slowly move the reverse thrust lever until the reverse thrust lever is at the extend (deploy) position.

b) Make sure that the continuity between terminal C and terminal NO is kept during the movement.

4) If the continuity check is not in the limits, do the steps that follow to adjust the control switch.

5) If the continuity check is in the limits, the control switch is serviceable.

I. Control Switch Adjustment

SUBTASK 78-34-04-820-001-G00

(1) Do the adjustment on the control switch [1] (TASK 78-34-04-700-801-G00).

J. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-04-860-011-G00

(1) For the Engine 1 thrust reverser, do these steps to connect the wire socket contacts to the control switch:

(a) Slide a piece of heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, that is approximately 0.60 in. (15.24 mm) over each of the three wire socket contacts.

(b) Connect the W0049-0014-22 socket contact to the C contact.

(c) Connect the W0049-0011-22 socket contact to the NC contact.

(d) Connect the W0049-0015-22 socket contact to the NO contact.

(e) Put the heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, in the correct position over the socket contact and wire.

NOTE: The sleeve must cover the entire socket contact and approximately 0.25 in. (6.35 mm) of the wire.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442, to make the heat shrink sleeve become tight on the socket contact.

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SUBTASK 78-34-04-860-012-G00

(2) For the Engine 2 thrust reverser, do these steps to connect the wire socket contacts to the control switch:

(a) Slide a piece of heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, that is approximately 0.60 in. (15.24 mm) over each of the three wire socket contacts.

(b) Connect the W0051-0034-22 socket contact to the C contact.

(c) Connect the W0051-0031-22 socket contact to the NC contact.

(d) Connect the W0051-0036-22 socket contact to the NO contact.

(e) Put the heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, in the correct position over the socket contact and wire.

NOTE: The sleeve must cover the entire socket contact and approximately 0.25 in. (6.35 mm) of the wire.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442, to make the heat shrink sleeve become tight on the socket contact.

SUBTASK 78-34-04-860-013-G00

(3) Install the cover on the thrust lever.

(a) Install the screws [4] that attach the cover.

SUBTASK 78-34-04-860-014-G00

(4) Make sure that the thrust levers are in the idle position.

SUBTASK 78-34-04-860-015-G00

WARNING

MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE AREA OF THE THRUST REVERSER. MOVEMENT OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Do these steps to retract (stow) the thrust reverser:

(a) Move the reverse thrust lever up and aft to the extended (deployed) position.

NOTE: The reverse thrust lever must be in the extended (deployed) position to unlock the sync locks. The sync locks will unlock and the thrust reverser will move as soon as the thrust reverser is activated.

(b) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

(c) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00.

SUBTASK 78-34-04-710-001-G00

(6) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

SUBTASK 78-34-04-860-016-G00

(7) If it is not already done, move the ENGINE START switch to the AUTO position.

SUBTASK 78-34-04-860-017-G00

(8) If it is not already done, remove the DO NOT OPERATE tag, STD-858, from the thrust lever.

SUBTASK 78-34-04-860-018-G00

(9) If it is not already done, remove the DO NOT OPERATE tag, STD-858, from the START LEVER switch.

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SUBTASK 78-34-04-860-019-G00

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 78-34-04-860-039-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-34-04-860-040-G00

(12) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-34-04-860-041-G00

(13) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-34-04-860-042-G00

(14) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER CONTROL SWITCH - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) Control switch adjustment and test.

TASK 78-34-04-700-801-G00

2. Control Switch Adjustment and Test

(Figure 501)

A. General

(1) This task gives the instructions for the check and adjustment of the thrust reverser control switch.

(2) The thrust reverser control switch is referred to as the control switch.

B. References

Reference	Title
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-980-803-G00	Thrust Reverser Operation - Extend (Manual Procedure) (P/B 201)
78-31-00-980-805-G00	Thrust Reverser Operation - Extend (Power Procedure) (P/B 201)
78-31-00-980-806-G00	Thrust Reverser Operation - Retract (Power Procedure) (P/B 201)
78-34-04-000-801-G00	Control Switch Removal (P/B 401)
78-34-04-400-801-G00	Control 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.

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Reference	Description
COM-1793	Multimeter - Digital/Analog (or equivalent meter meets task requirements) Part #: 117 Supplier: 89536 Part #: 260-8XPI Supplier: 55026 Part #: 287 Supplier: 89536 Part #: 289 Supplier: 89536 Part #: 87V Supplier: 89536 Part #: FLUKE 27 II Supplier: 89536 Part #: FLUKE-77-4 Supplier: 89536 Opt Part #: 187 Supplier: 89536 Opt Part #: 189 Supplier: 89536 Opt Part #: 21 Supplier: 89536 Opt Part #: 27 Supplier: 89536 Opt Part #: 77 SERIES III Supplier: 89536 Opt Part #: 87 Supplier: 89536 Opt Part #: FLUKE 27 Supplier: 89536 Opt Part #: MODEL 27 Supplier: 89536
SPL-706	Protractor - Thrust Reverser Levers, Digital Readout Part #: G76002-42 Supplier: 81205 Opt Part #: G76002-19 Supplier: 81205 Opt Part #: G76002-37 Supplier: 81205
STD-442	Gun - Heat, 180 deg. F (82 deg. C) Maximum Output Temperature
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
G01148	Sleeve - Insulation, Electrical, Heat Shrinkable - RT-876	
G51210	Tubing - Highly Flame-Retardant, Low-Shrink Temperature, Polyolefin	AMS-DTL-23053/5 Class 1

E. Location Zones

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

F. Prepare for the Procedure

SUBTASK 78-34-04-860-049-G00

(1) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-34-04-860-050-G00

(2) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-34-04-860-051-G00

(3) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-34-04-860-022-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-34-04-860-024-G00

WARNING

MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF A THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 78-34-04-860-025-G00

(6) Make sure that the start lever for the applicable engine is in the CUTOFF position.

SUBTASK 78-34-04-860-026-G00

(7) Make sure that the applicable thrust lever is in the idle position.

SUBTASK 78-34-04-480-002-G00

(8) Attach a DO NOT OPERATE tag, STD-858 to the start lever and the thrust lever.

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SUBTASK 78-34-04-860-027-G00

(9) Make sure that the applicable reverse thrust lever is forward and down in the retract (stow) position.

SUBTASK 78-34-04-860-029-G00

(10) If the thrust reverser will power extend (deploy), do these steps:

NOTE: For the adjustment of the control switch, you must have movement through the full range of the reverse thrust lever. When the interlock releases and the thrust reverser is extended, the reverse thrust lever can move through its entire range.

(a) Do this task: Thrust Reverser Operation - Extend (Power Procedure), TASK 78-31-00-980-805-G00.

(b) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-34-04-980-002-G00

(11) If the thrust reverser will not power extend (deploy), do these steps:

NOTE: For the adjustment of the control switch, you must have movement through the full range of the reverse thrust lever. When the interlock releases and the thrust reverser is extended, the reverse thrust lever can move through its entire range.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Manually extend the thrust reverser (TASK 78-31-00-980-803-G00).

SUBTASK 78-34-04-860-055-G00

(12) Set the applicable EEC MAINT POWER to NORM on the MISC SYSTEM CTRLS page (TASK 73-21-00-800-801-G00)

SUBTASK 78-34-04-720-002-G00

(13) Do these steps to get access to the control switch [1] in the applicable thrust lever:

NOTE: Consider the option of performing the continuity check for engine 1 at connector D10171P and for engine 2 at connector D10173. The connectors are in the aft panel of the control stand. The connectors are accessible through the fwd access hatch (Figure 501 (Sheet 2)).

(a) To get access to the applicable thrust lever cover, move the other thrust lever to the fully forward position.

(b) Remove the screws [4] that attach the cover to the inboard side of the thrust lever.

(c) Remove the cover from the thrust lever.

(d) Disconnect the three wire socket contacts from the control switch [1].

SUBTASK 78-34-04-480-001-G00

(14) Install the thrust reverser lever protractor, SPL-706, on the reverse thrust lever.

(a) Adjust the protractor to show zero degrees with the reverse thrust lever fully forward and down, in the retracted (stowed) position.

G. Control Switch Test

SUBTASK 78-34-04-860-030-G00

(1) Make sure that the reverse thrust lever is fully forward and down in the retracted (stowed) position.

SUBTASK 78-34-04-720-003-G00

(2) Use a digital/analog multimeter, COM-1793, to do these continuity checks:

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(a) Make sure that there is an open circuit between the C and NO terminals and a closed circuit between C and NC terminals of the control switch.

NOTE: If you will do the continuity check at the connector D10171P or connector D10173P, Pin 1 connects to the NC contact, Pin 4 connects to the C contact, Pin 5 connects to the NO contact. All three contacts are on the control switch [1]. Make sure that there is solid connection for the three wires to the control switch [1].

1) If you do not find the open circuit, then do the steps below to adjust the control switch.

2) If you find the open circuit, then continue.

(b) As you slowly move the reverse thrust lever toward the extend (deploy) position, make sure that the circuit between C and NO closes with a protractor angle of 16 to 19 degrees.

1) If the circuit does not close in the limits, then do the steps below to adjust the control switch.

2) If the circuit closes in the limits, then continue.

(c) Make sure that the reverse thrust lever is fully forward and down in the retracted (stowed) position.

(d) Move the reverse thrust lever to 19 degrees protractor angle.

1) Make sure that there is an closed circuit between the C and NO terminals and a open circuit between C and NC terminals of the control switch.

(e) Slowly move the reverse thrust lever from 19 degrees to the fully extended (109 ± 2 degrees protractor angle) position, make sure that the circuit between C and NO stays closed (continuity) through the full range of movement.

(f) Slowly move the reverse thrust lever from 109 ± 2 degrees to 46 to 50 degrees protractor angle, make sure that the circuit between C and NO stays closed (continuity) through the full range of movement.

1) If the continuity is not in the limits, then do the steps below to adjust the control switch.

2) If the continuity is in the limits, then continue.

(g) Move the reverse thrust lever to 19 degrees protractor angle.

(h) Slowly move the reverse thrust lever from 19 degrees to the fully extended (109 ± 2 degrees protractor angle) position, make sure that the circuit between C and NC stays open the full range of movement.

(i) Slowly move the reverse thrust lever from 109 ± 2 degrees to 46 to 50 degrees protractor angle, make sure that the circuit between C and NC stays open (continuity) through the full range of movement.

1) If the continuity is not in the limits, then do the steps below to adjust the control switch.

2) If the continuity is in the limits, then do the step below to put the airplane in its usual condition.

H. Adjust the Control Switch

SUBTASK 78-34-04-820-002-G00

(1) Do these steps to adjust the control switch [1]:

(a) Make sure that the reverse thrust lever is in the stow position (fully forward and down).

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(b) Loosen the lock nut at the adjustment nut.

(c) Do the Test above again and turn the adjustment nut until the continuity checks are in the limits.

1) If you cannot adjust the control switch to operate in the limits, replace the control switch (TASK 78-34-04-000-801-G00 and TASK 78-34-04-400-801-G00).

(d) Tighten the lock nut to 7.0 ±1.0 in-lb (0.79 ±0.11 N·m) .

(e) Do the Test again to make sure that the adjustment did not change.

1) If the continuity check is in the limits, the control switch is serviceable.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-04-080-001-G00

(1) Remove the thrust reverser lever protractor, SPL-706, from the reverse thrust lever.

(a) Disconnect the digital/analog multimeter, COM-1793, from the control switch.

SUBTASK 78-34-04-860-031-G00

(2) For the Engine 1 thrust reverser, do these steps to re-connect the wire socket contacts to the control switch:

(a) Slide a piece of heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, that is approximately 0.60 in. (15.24 mm) over each of the three wire socket contacts.

(b) Connect the W0049-0014-22 socket contact to the C contact.

(c) Connect the W0049-0011-22 socket contact to the NC contact.

(d) Connect the W0049-0015-22 socket contact to the NO contact.

(e) Put the heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, in the correct position over the socket contact and wire.

NOTE: The sleeve must cover the entire socket contact and approximately 0.25 in. (6.35 mm) of the wire.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442, to make the heat shrink sleeve become tight on the socket contact.

SUBTASK 78-34-04-860-032-G00

(3) For the Engine 2 thrust reverser, do these steps to re-connect the wire socket contacts to the control switch:

(a) Slide a piece of heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, that is approximately 0.60 in. (15.24 mm) over each of the three wire socket contacts.

(b) Connect the W0051-0034-22 socket contact to the C contact.

(c) Connect the W0051-0031-22 socket contact to the NC contact.

(d) Connect the W0051-0036-22 socket contact to the NO contact.

(e) Put the heat shrinkable RT-876 sleeve, G01148, or Versafit heat shrink tubing, G51210, in the correct position over the socket contact and wire.

NOTE: The sleeve must cover the entire socket contact and approximately 0.25 in. (6.35 mm) of the wire.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442, to make the heat shrink sleeve become tight on the socket contact.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-04-860-033-G00

(4) Install the cover on the thrust lever.

(a) Install the screws [4] that attach the cover.

SUBTASK 78-34-04-860-034-G00

(5) Make sure that the thrust levers are in the idle position.

SUBTASK 78-34-04-860-045-G00

(6) Remove the DO NOT OPERATE tag, STD-858, from the thrust levers and the start lever.

SUBTASK 78-34-04-860-035-G00

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 78-34-04-860-036-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	7	C00210	FLIGHT CONTROL FLAP SHUTOFF VALVES
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-34-04-860-046-G00

(9) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-34-04-860-047-G00

(10) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-34-04-860-048-G00

(11) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-34-04-860-038-G00

WARNING MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE AREA OF THE THRUST REVERSER. MOVEMENT OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(12) Do these steps to retract (stow) the thrust reverser:

(a) Move the reverse thrust lever up and aft to the extended (deployed) position.

NOTE: The reverse thrust lever must be in the extended (deployed) position to unlock the sync locks. The sync locks will unlock and the thrust reverser will move as soon as the thrust reverser is activated.

(b) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

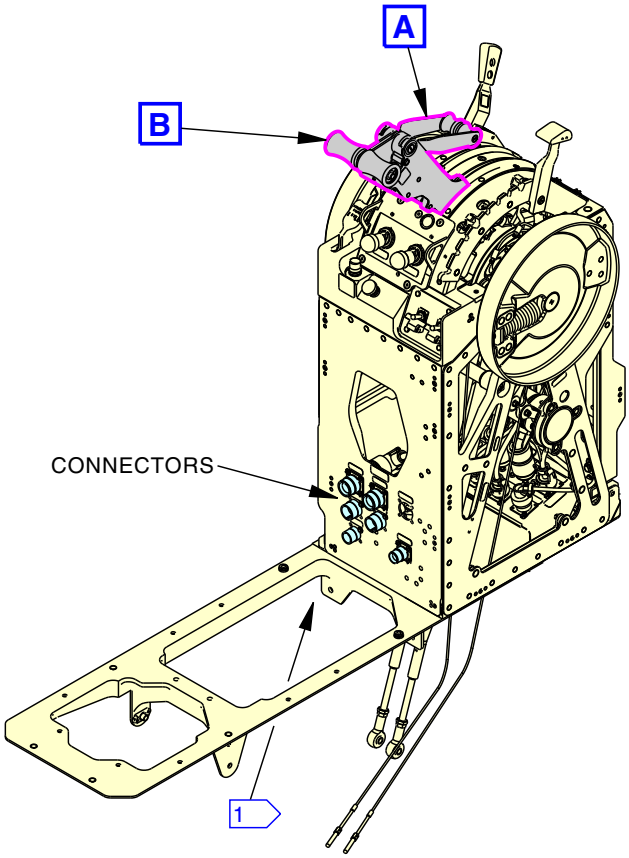
(c) Do this task: Thrust Reverser Operation - Retract (Power Procedure), TASK 78-31-00-980-806-G00.

SUBTASK 78-34-04-710-002-G00

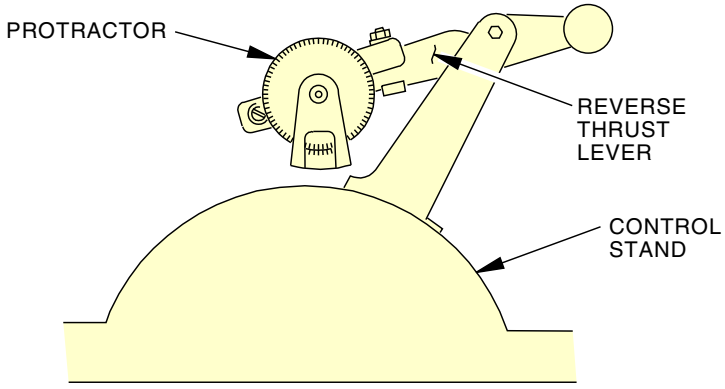
(13) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CONTROL STAND



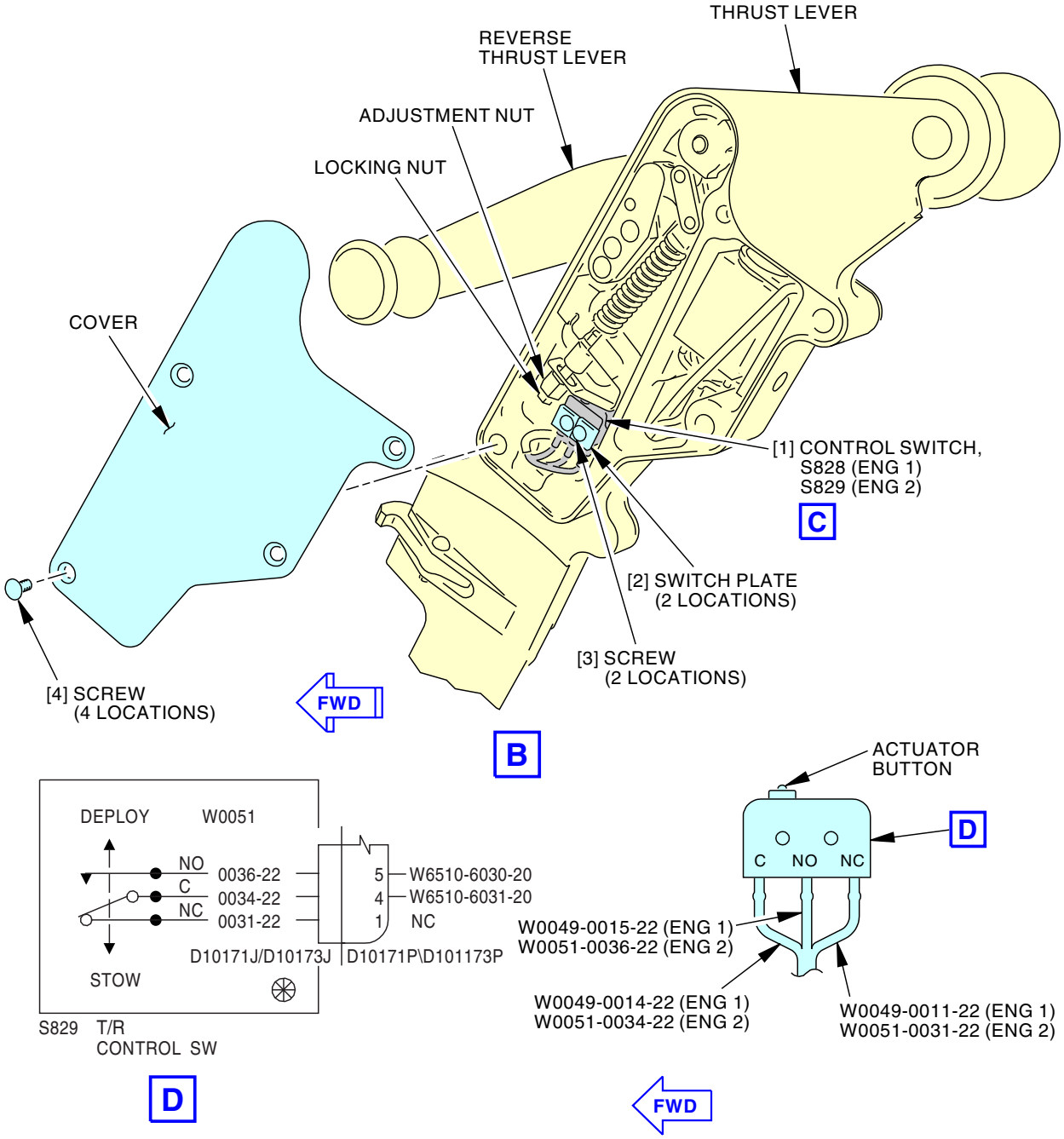
1 ACCESS TO THE CONNECTORS D10171P AND D10173P

A

2355297 S00061516926_V2

Thrust Reverser Control Switch Adjustment
Figure 501/78-34-04-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

ENGINE 2 THRUST LEVER IS SHOWN.
ENGINE 1 THRUST LEVER IS OPPOSITE.

2355298 S00061516927_V2

Thrust Reverser Control Switch Adjustment
Figure 501/78-34-04-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER ARM, STOW AND SYNC LOCK SWITCHES - REMOVAL/INSTALLATION

1. General

A. The thrust reverser arm, stow and sync lock switches are on the autothrottle switchpack.

B. The switches for Engine 1 are on the left switchpack and the switches for Engine 2 are on the right switchpack.

C. For Engine 1 and Engine 2, the switch identification numbers are as follows:

(1) The sync lock switch identification number is S4.

(2) The arm switch identification number is S5.

(3) The stow switch identification number is S6.

TASK 78-34-05-000-801-G00

2. Thrust Reverser Arm, Stow and Sync Lock Switches Removal

A. General

(1) For the removal and installation procedures for the thrust reverser arm, stow and sync lock switches, refer to these tasks:

(a) Do this task: Autothrottle Switchpack Assembly Removal, TASK 76-11-07-020-801-G00.

(b) Do this task: Autothrottle Switchpack Assembly Installation, TASK 76-11-07-400-802-G00.

(2) After the installation of the thrust reverser arm, stow or sync lock switches, do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

B. References

Reference	Title
76-11-07-020-801-G00	Autothrottle Switchpack Assembly Removal (P/B 401)
76-11-07-400-802-G00	Autothrottle Switchpack Assembly Installation (P/B 401)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

VOLUMETRIC HYDRAULIC FUSES - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) The standby system volumetric hydraulic fuse removal.

(2) The standby system volumetric hydraulic fuse installation.

B. If a leak occurs, the volumetric hydraulic fuses close and stop hydraulic fluid flow to prevent a complete loss of system hydraulic fluid.

C. Two of the volumetric hydraulic fuses are in the supply lines from the hydraulic standby system and are in the main gear wheel well on the keel beam.

(1) The left fuse is in the supply line to the Engine 1 thrust reverser and the right fuse is in the supply line to the Engine 2 thrust reverser.

(2) For this procedure, the volumetric hydraulic fuses for the standby system will be referred to as the left fuse and the right fuse.

D. There is no on-airplane test for the volumetric hydraulic fuses for the thrust reversers.

(1) The volumetric hydraulic fuses may be tested after removal from the airplane to find if the fuses are functional. Use the functional test procedures contained in the vendor component maintenance instructions.

TASK 78-34-07-000-802-G00

2. Standby System Volumetric Hydraulic Fuse Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task contains these topics:

(a) The removal of the standby system left fuse and the right fuse.

(b) The off-wing functional test of the fuses.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Prepare for the Removal

SUBTASK 78-34-07-864-001-G00

(1) Remove power from the hydraulic system A and B.

(a) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-07-864-002-G00

(2) Remove power from the standby hydraulic system.

(a) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-34-07-864-003-G00

(3) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

F. Standby System Left or Right Fuse Removal

SUBTASK 78-34-07-020-001-G00

WARNING

DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. PUT ON EYE PROTECTION (GOGGLES, OR OTHER APPROVED PROTECTION) AND GLOVES WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(1) Do these steps to remove the left or right hydraulic fuse [5] from the standby pressure system.

(a) Remove the four screws [2], the four washers [3], the four spacers [4], the two channels [1], the clampblock [6] and the clampblock [7] from the ends of the fuse.

(b) Use a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110 to catch the hydraulic fluid.

CAUTION

USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(c) Disconnect the coupling nuts at each end of the applicable hydraulic fuse [5].

(d) Remove the hydraulic fuse [5].

(e) Install protective covers on the hydraulic lines and the hydraulic fuse [5].

G. Test the Volumetric Hydraulic Fuses

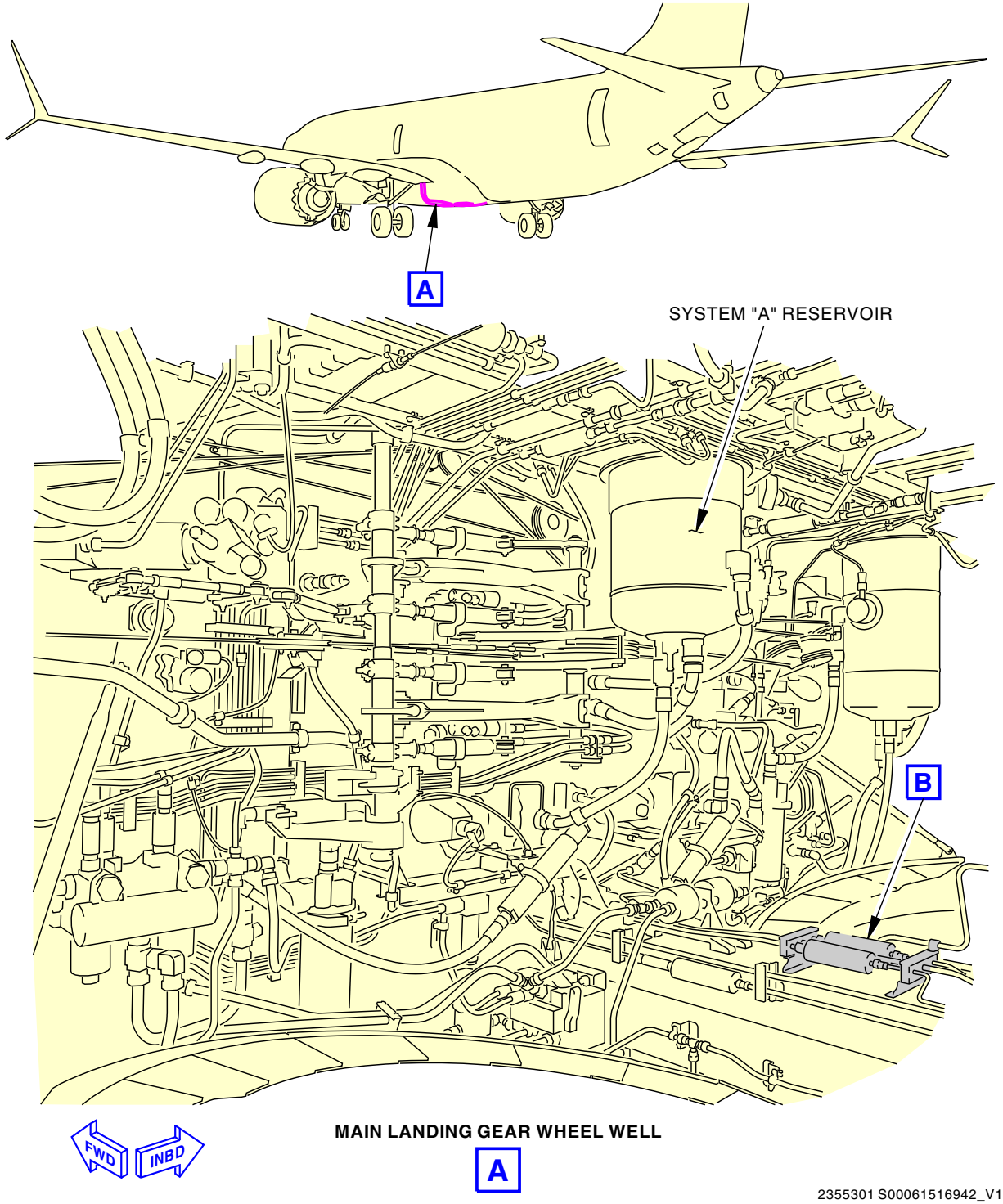
SUBTASK 78-34-07-720-001-G00

(1) Do the functional test of the volumetric hydraulic fuses with the suppliers recommended component maintenance test instructions and test equipment.

NOTE: The suppliers instructions give a reverse flow test, internal leakage test, pressure drop test, volumetric capacity test and reset test for the fuses. This is an off-wing bench test.

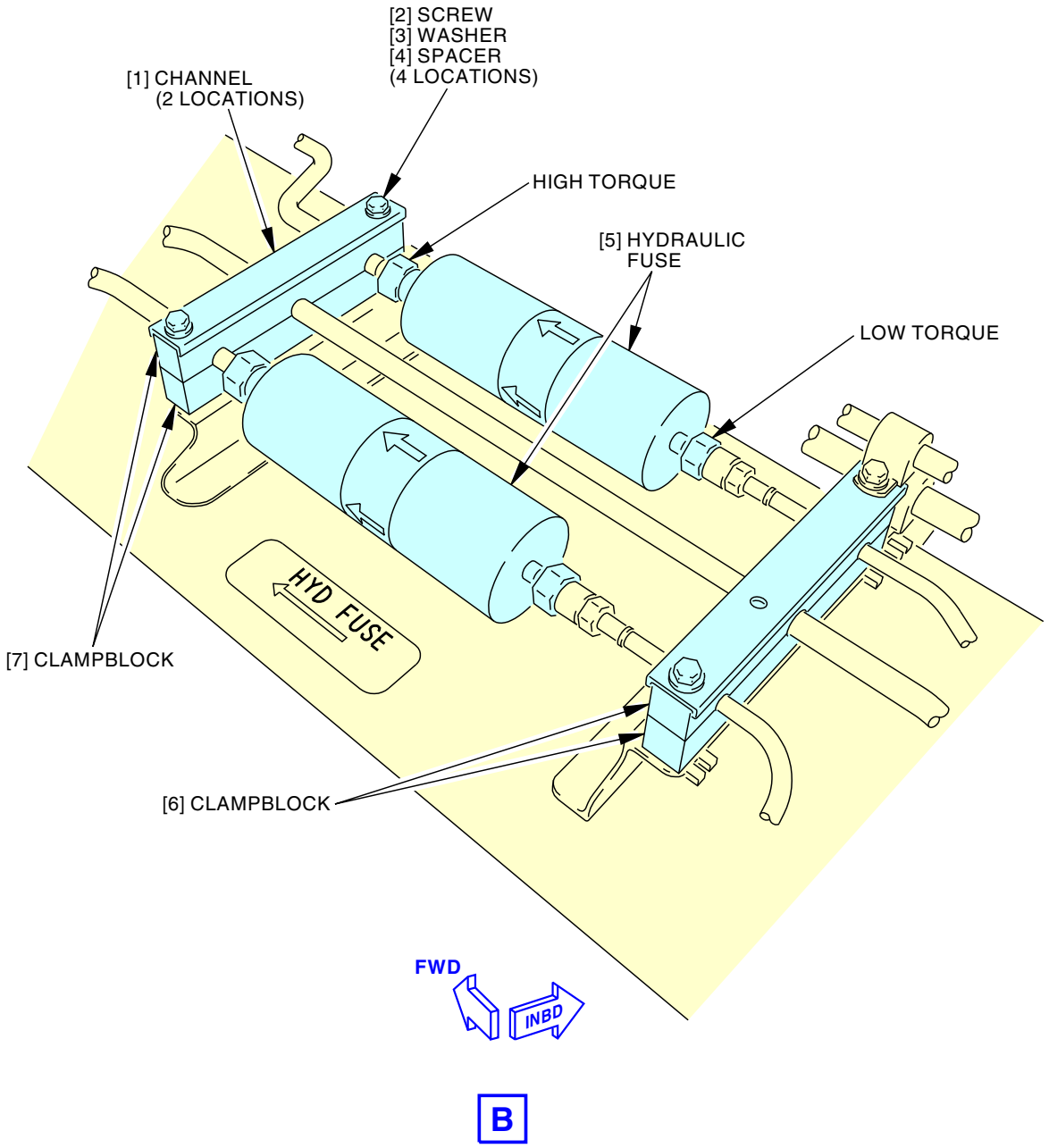
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Standby System Left and Right Volumetric Hydraulic Fuses Installation
Figure 401/78-34-07-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Standby System Left and Right Volumetric Hydraulic Fuses Installation
Figure 401/78-34-07-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-07-400-802-G00

3. Standby System Volumetric Hydraulic Fuse Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task contains the installation of the standby system left and right fuse.

B. References

Reference	Title
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-09-00-860-801	Hydraulic Reservoirs Pressurization (P/B 201)
78-31-00-700-803-G00	Thrust Reverser Operational Test (Standby Hydraulic System) (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Hydraulic fuse	78-34-07-01-085	SIA ALL

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Standby System Left and Right Fuse Installation

SUBTASK 78-34-07-420-001-G00

WARNING

DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. PUT ON EYE PROTECTION (GOGGLES, OR OTHER APPROVED PROTECTION) AND GLOVES WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Do these steps to install the left or right hydraulic fuse [5]:

(a) Remove the protective covers from the hydraulic lines and the hydraulic fuse [5].

(b) Put the applicable hydraulic fuse [5] in the correct position.

CAUTION

USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(c) Connect the tube coupling nut at the forward end of the fuse.

1) Tighten the coupling nut to 257.0 in-lb (29.0 N·m) to 284.0 in-lb (32.1 N·m).

(d) Connect the tube coupling nut at the aft end of the fuse.

1) Tighten the coupling nut to 133.0 in-lb (15.0 N·m) to 147.0 in-lb (16.6 N·m).

(e) Install the clampblock assembly at the forward end of the fuse.

1) Install the two screws [2], the two washers [3], the two spacers [4], the channel [1] and the clampblock [7].

a) Tighten the screws [2] to 25.0 in-lb (2.8 N·m) to 35.0 in-lb (4.0 N·m).

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(f) Install the clampblock assembly at the aft end of the fuse.

1) Install the two screws [2], the two washers [3], the two spacers [4], the channel [1] and the clampblock [6].

a) Tighten the screws [2] to 25.0 in-lb (2.8 N·m) to 35.0 in-lb (4.0 N·m).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-07-863-001-G00

WARNING

MAKE SURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT

(1) Do this task: Hydraulic Reservoirs Pressurization, TASK 29-09-00-860-801.

(a) Do a check of the fuses and hydraulic lines for hydraulic leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-34-07-710-001-G00

(2) Do this task: Thrust Reverser Operational Test (Standby Hydraulic System), TASK 78-31-00-700-803-G00.

(a) Operate the thrust reverser a minimum of three cycles.

(b) Do a check of the fuses and hydraulic lines for hydraulic leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

——— END OF TASK ———

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THRUST REVERSER SHUTTLE VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Thrust Reverser Shuttle Valve Removal

(2) Thrust Reverser Shuttle Valve Installation.

TASK 78-34-08-000-801-G00

2. Thrust Reverser Shuttle Valve Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the thrust reverser shuttle valves.

(2) If the primary hydraulic system pressure goes low, the shuttle valve changes the thrust reverser hydraulic operating pressure supply to the standby system.

(3) The shuttle valves are in the main gear wheel well on the forward bulkhead. The shuttle valve for the Engine 1 thrust reverser is on the left side and the Engine 2 thrust reverser shuttle valve is on the right side.

(4) For this procedure, the shuttle valve for the Engine 1 thrust reverser will be referred to as the left shuttle valve and the shuttle valve for the Engine 2 thrust reverser will be referred to as the right shuttle valve.

(5) The left and right shuttle valves are not interchangeable.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)

D. Prepare for the Removal

SUBTASK 78-34-08-860-001-G00

(1) Remove power from the hydraulic systems A and B Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-34-08-860-002-G00

(2) Remove power from the standby hydraulic system Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-34-08-860-003-G00

(3) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

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E. Left Shuttle Valve Removal

SUBTASK 78-34-08-020-001-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these steps to remove the left shuttle valve [1] from the left side of the forward bulkhead in the main gear wheel well:

(a) Use a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110 to catch the hydraulic fluid.

(b) Disconnect the three hydraulic lines from the shuttle valve [1].

1) Disconnect the hydraulic line from the IN B port.

2) Disconnect the hydraulic line from the OUT port.

3) Disconnect the hydraulic line from the IN A port.

(c) Remove the two bolts [2] and two washers [3] that attach the shuttle valve [1] to the forward bulkhead.

(d) Remove the shuttle valve [1].

F. Right Shuttle Valve Removal

SUBTASK 78-34-08-020-002-G00

WARNING DO NOT INSTALL PRESSURE CAPS TO THE HYDRAULIC LINES THAT CONNECT TO CONTROL VALVE MODULE PORTS TO DEACTIVATE THE THRUST REVERSER. THE THRUST REVERSER CAN OPERATE WHEN PRESSURIZED. IF YOU DO NOT OBEY, INJURY TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU WEAR PROTECTIVE CLOTHES AND GLOVES WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM. HYDRAULIC FLUID CAN CAUSE A LEAK FROM THE OPEN PORTS OF THE COMPONENT OR FROM THE HYDRAULIC LINES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do these steps to remove the right shuttle valve [4] from the right side of the forward bulkhead in the main gear wheel well:

(a) Use a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110 to catch the hydraulic fluid.

(b) Disconnect the three hydraulic lines from the shuttle valve [4].

1) Disconnect the hydraulic line from the IN A port.

2) Disconnect the hydraulic line from the OUT port.

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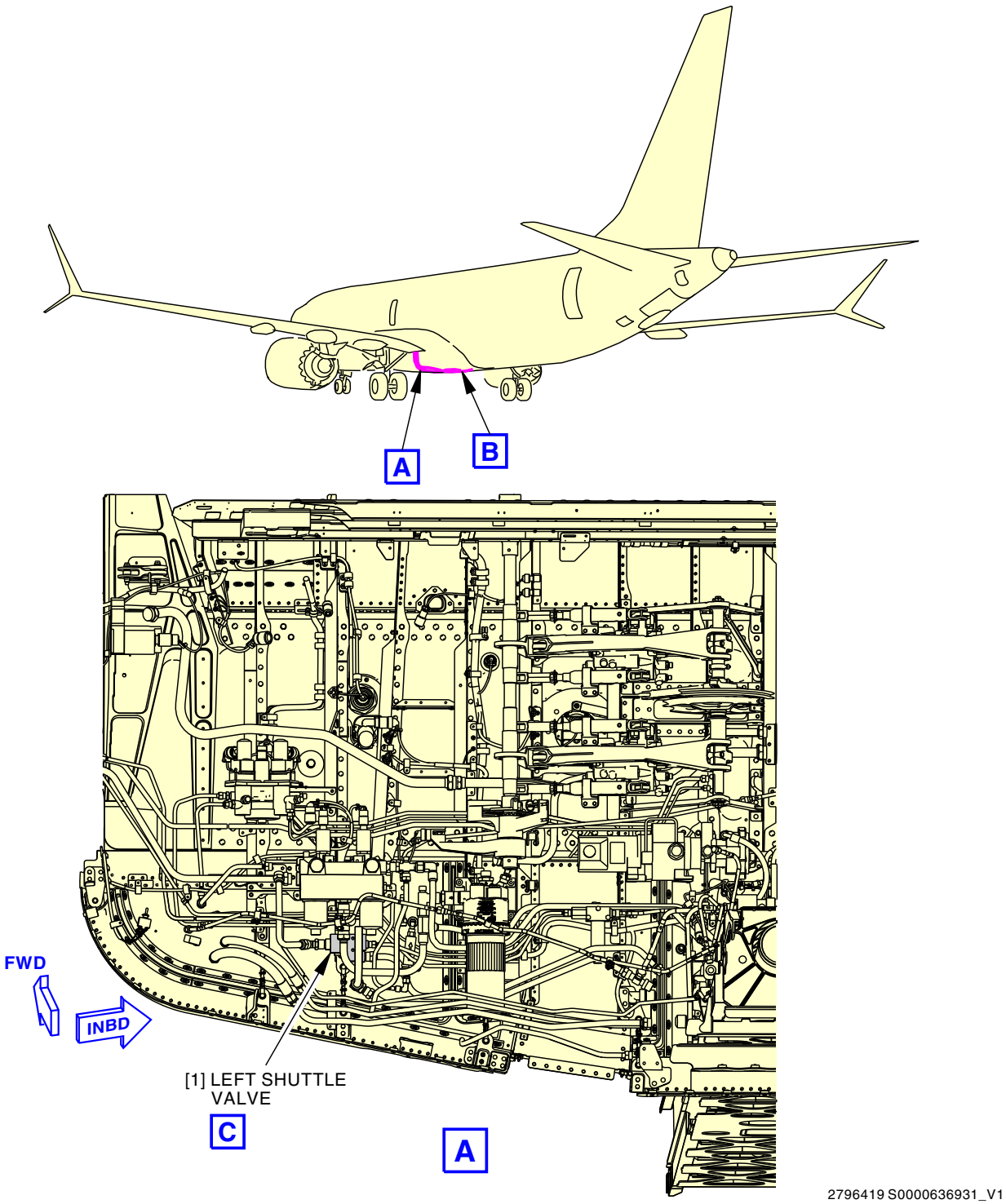
3) Disconnect the hydraulic line from the IN B port.

(c) Remove the two bolts [5] and two washers [6] that attach the shuttle valve [4] to the forward bulkhead.

(d) Remove the shuttle valve [4].

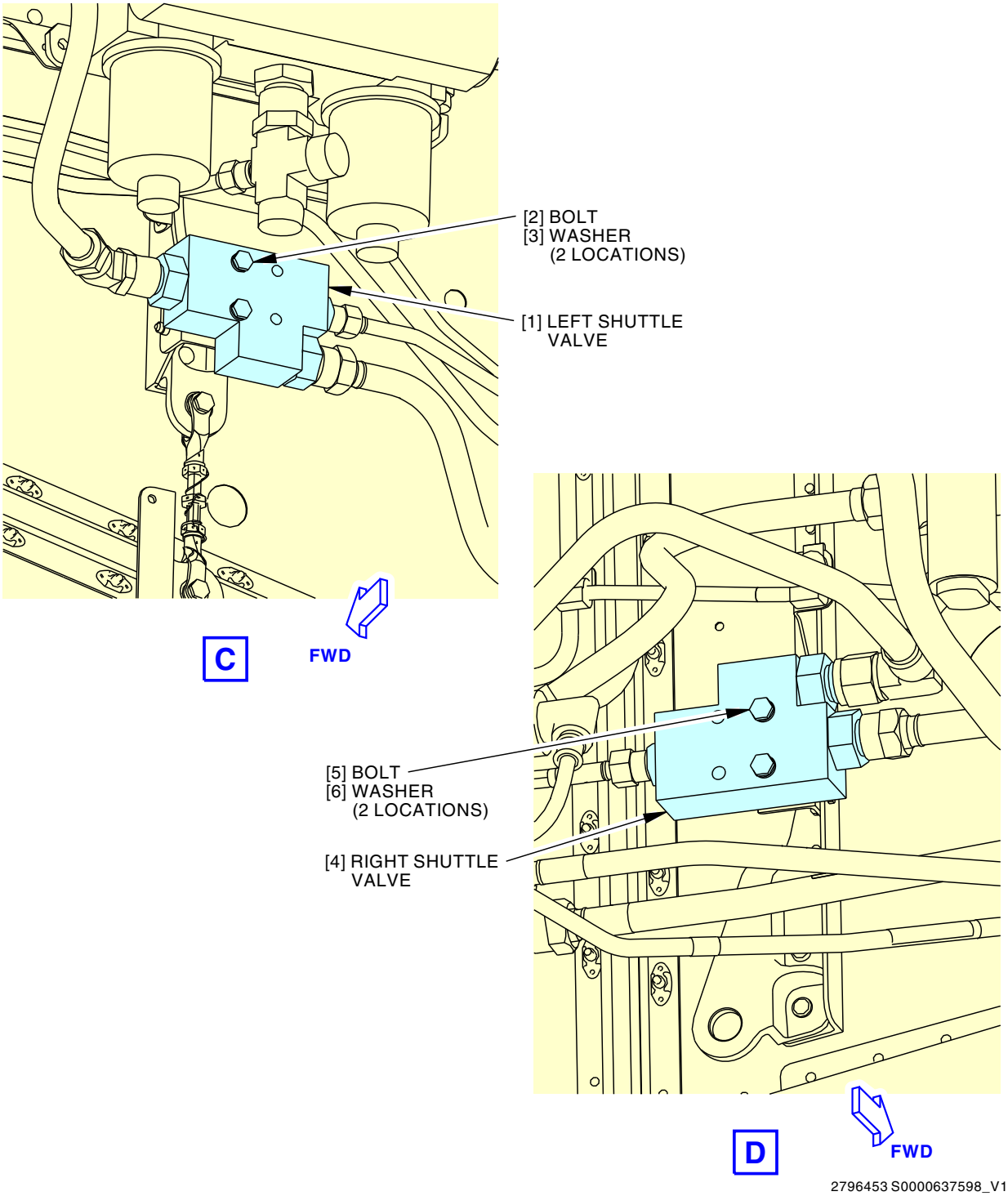
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



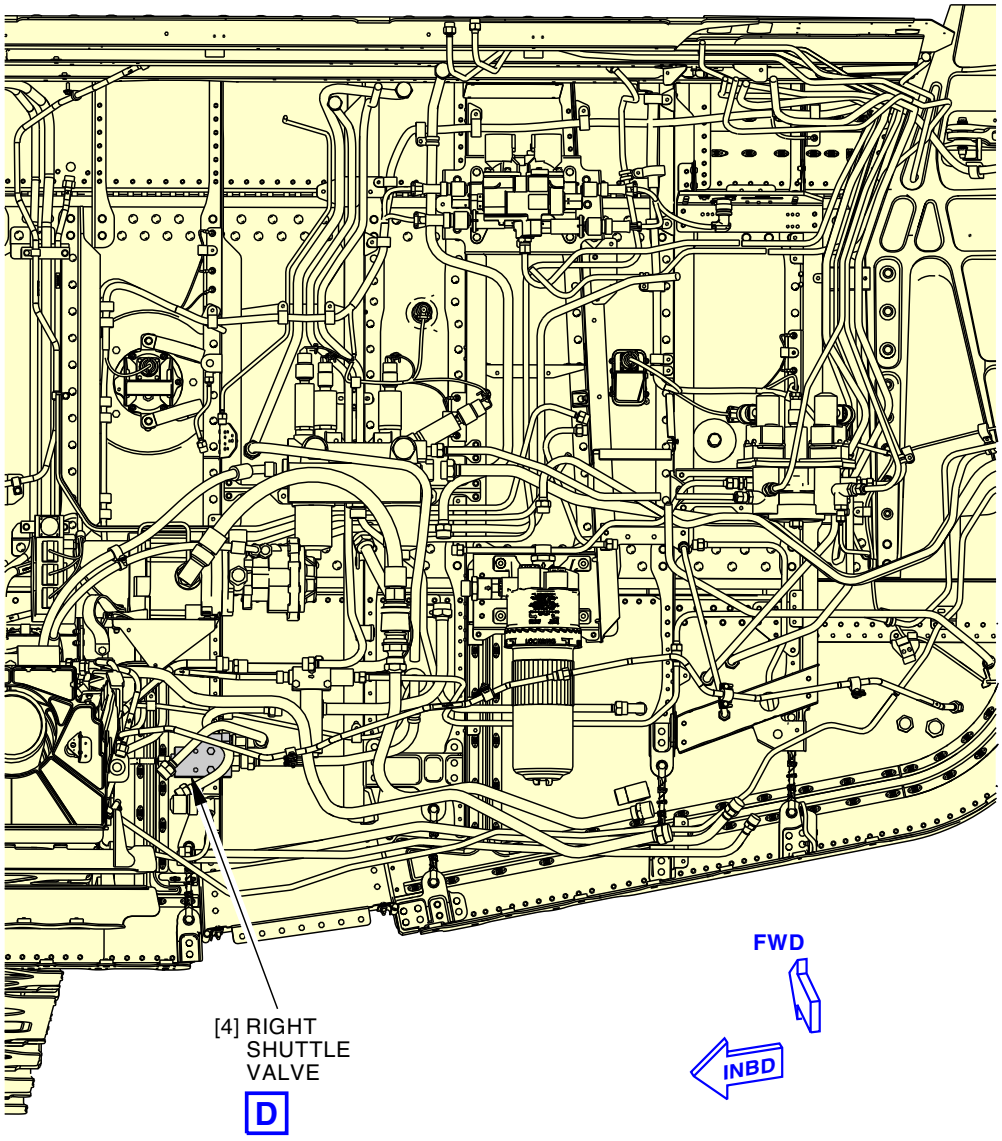
Shuttle Valve Installation
Figure 401/78-34-08-990-801-G00 (Sheet 1 of 3)

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Shuttle Valve Installation
Figure 401/78-34-08-990-801-G00 (Sheet 2 of 3)

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Shuttle Valve Installation
Figure 401/78-34-08-990-801-G00 (Sheet 3 of 3)

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TASK 78-34-08-400-801-G00

3. Thrust Reverser Shuttle Valve Installation

(Figure 401)

A. General

(1) This task gives the instructions to install thrust reverser shuttle valves.

(2) The left and right shuttle valves are not interchangeable.

B. References

Reference	Title
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
78-31-00-700-802-G00	Thrust Reverser System Normal Operational Test (P/B 501)
78-31-00-700-803-G00	Thrust Reverser Operational Test (Standby Hydraulic System) (P/B 501)

C. Left Shuttle Valve Installation

SUBTASK 78-34-08-400-001-G00

(1) Do these steps to install the left shuttle valve [1] on the left side of the forward bulkhead in the main gear wheel well:

(a) Put the left shuttle shuttle valve [1] in the correct position.

(b) Install the two washers [3] and two bolts [2] that attach the left shuttle valve [1] to the forward bulkhead.

1) Tighten the bolt [2] to 80 ±8 in-lb (9 ±1 N·m).

SUBTASK 78-34-08-400-002-G00

(2) Do these steps to connect the hydraulic lines to the left shuttle valve [1]:

(a) Remove the protective covers from the hydraulic lines.

(b) Connect the hydraulic line at the OUT port of the left shuttle valve [1].

1) Tighten the coupling nut to 695 ±40 in-lb (79 ±5 N·m).

(c) Connect the hydraulic line at the IN B port of the left shuttle valve [1].

1) Tighten the coupling nut to 270 ±13 in-lb (31 ±1 N·m).

(d) Connect the hydraulic line at the IN A port of the left shuttle valve [1].

1) Tighten the coupling nut to 695 ±40 in-lb (79 ±5 N·m).

D. Right Shuttle Valve Installation

SUBTASK 78-34-08-400-003-G00

(1) Do these steps to install the right shuttle valve [4] on the right side of the forward bulkhead:

(a) Put the right shuttle valve [4] in the correct position.

(b) Install the two washers [6] and two bolts [5] that attach the right shuttle valve [4] to the forward bulkhead.

1) Tighten the bolt [5] to 80 ±8 in-lb (9 ±1 N·m).

SUBTASK 78-34-08-400-004-G00

(2) Do these steps to connect the hydraulic lines to the right shuttle valve [4]:

(a) Remove the protective covers from the hydraulic lines.

(b) Connect the hydraulic line at the OUT port of the right shuttle valve [4].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Tighten the coupling nut to 695 ±40 in-lb (79 ±5 N·m)).

(c) Connect the hydraulic line at the IN B port of the right shuttle valve [4].

1) Tighten the coupling nut to 270 ±13 in-lb (31 ±1 N·m).

(d) Connect the hydraulic line at the IN A port of the right shuttle valve [4].

1) Tighten the coupling nut to 695 ±40 in-lb (79 ±5 N·m).

E. Shuttle Valve Installation Check

SUBTASK 78-34-08-790-001-G00

WARNING MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Supply system A hydraulic power for the left shuttle valve or system B hydraulic power for the right shuttle valve Hydraulic System A or B Pressurization, TASK 29-11-00-860-801.

(a) Do a check of the hydraulic lines and connections for hydraulic fluid leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-34-08-790-002-G00

(2) Do this task: Thrust Reverser Operational Test (Standby Hydraulic System), TASK 78-31-00-700-803-G00.

(a) Do a check of the hydraulic lines and connections for hydraulic fluid leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-34-08-720-001-G00

(3) Do this task: Thrust Reverser System Normal Operational Test, TASK 78-31-00-700-802-G00.

(a) Operate the thrust reverser through the deploy and stow cycles at least 3 times until the TR sleeves move smoothly.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER CONTROL SWITCH ACTUATION SPRING - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the thrust reverser control switch actuation spring

(2) An installation of the thrust reverser control switch actuation spring.

B. The thrust reverser control switch actuation spring is referred to as the actuation spring.

TASK 78-34-09-000-801-G00

2. Actuation Spring Removal

(Figure 401)

A. References

Reference	Title
78-34-04-000-801-G00	Control Switch Removal (P/B 401)

B. Location Zones

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

C. Prepare for the Removal

SUBTASK 78-34-09-020-001-G00

(1) Remove the thrust reverser control switch from the applicable thrust lever.

(a) Do this task: Control Switch Removal, TASK 78-34-04-000-801-G00.

SUBTASK 78-34-09-980-001-G00

(2) Raise the applicable reverse thrust lever to the fully extended (deployed) position.

D. Actuation Spring Removal

SUBTASK 78-34-09-020-002-G00

(1) To remove the actuation spring [1] from the applicable thrust lever, do these steps:

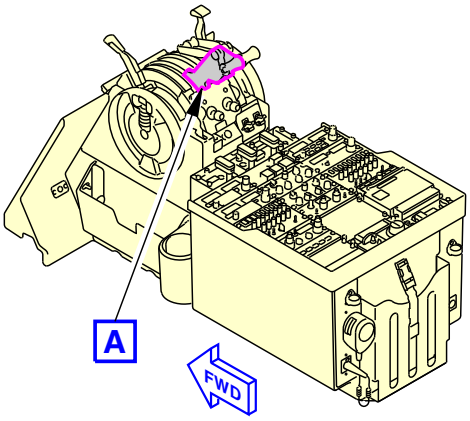
(a) Remove the locking nut [2] from the plunger.

(b) Remove the adjustment nut [3] from the plunger.

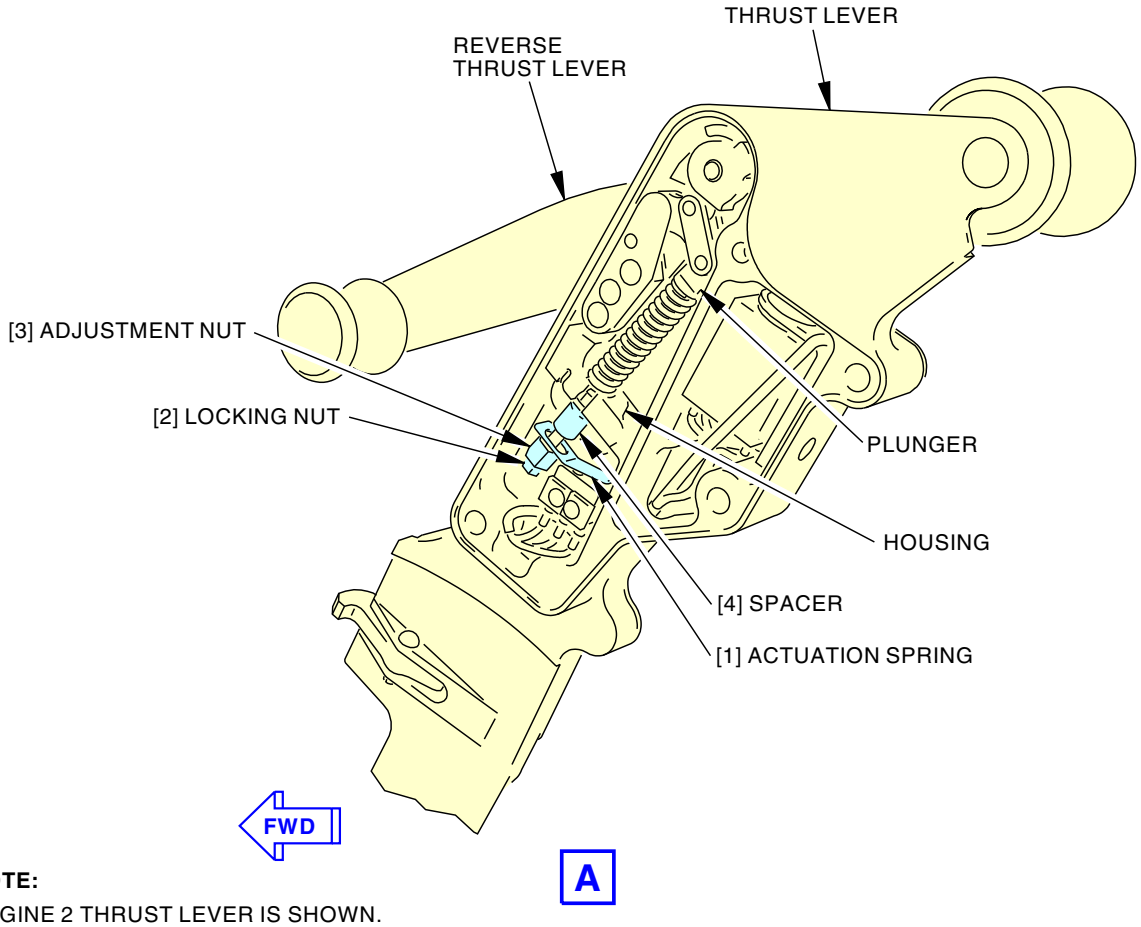
(c) Remove the actuation spring [1] and spacer [4] from the plunger.

——— END OF TASK ———

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CONTROL STAND



NOTE:

ENGINE 2 THRUST LEVER IS SHOWN.
ENGINE 1 THRUST LEVER IS OPPOSITE.

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Thrust Reverser Control Switch Actuation Spring Installation
Figure 401/78-34-09-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-09-400-801-G00

3. Actuation Spring Installation

(Figure 401)

A. References

Reference	Title
78-34-04-400-801-G00	Control Switch Installation (P/B 401)

B. Location Zones

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

C. Actuation Spring Installation

SUBTASK 78-34-09-420-001-G00

(1) To install the actuation spring [1], do these steps:

(a) Install the actuation spring [1] and spacer [4] on the plunger.

1) Make sure that the spacer [4] is inside the actuation spring [1].

2) Make sure that the actuation spring [1] is flat against the bottom surface of the housing.

(b) Install the adjustment nut [3] on the plunger.

(c) Install the locking nut [2] on the plunger.

SUBTASK 78-34-09-420-002-G00

(2) Install the thrust reverser control switch.

(a) Do this task: Control Switch Installation, TASK 78-34-04-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER CONTROL SWITCH ACTUATION SPRING - INSPECTION/CHECK

1. General

A. This procedure checks the free angle of the thrust reverser control switch actuation spring. The free angle occurs when the spring is not installed in the thrust lever and no load is applied to the spring.

B. This procedure can be used as part of a thrust reverser deploy fault isolation task. Intermittent thrust reverser control switch actuation may occur if the actuation spring free angle is below the minimum tolerance.

C. The thrust reverser control switch actuation spring is referred to as the actuation spring.

TASK 78-34-09-200-801-G00

2. Actuation Spring Free Angle Check

(Figure 601)

A. References

Reference	Title
78-34-09-000-801-G00	Actuation Spring Removal (P/B 401)
78-34-09-400-801-G00	Actuation Spring Installation (P/B 401)

B. Location Zones

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

C. Prepare for the Check

SUBTASK 78-34-09-020-003-G00

(1) Remove the actuation spring from the applicable thrust lever.

(a) Do this task: Actuation Spring Removal, TASK 78-34-09-000-801-G00.

D. Actuation Spring Free Angle Check

SUBTASK 78-34-09-980-002-G00

(1) Make sure that the actuation spring free angle (Angle A) is within the tolerance (Table 601).

Table 601/78-34-09-993-801-G00 Actuation Spring Free Angle

Part Number	Angle A	Dimension B*[1]	Dimension C*[1]
69-78782-3	46 ±2°arc (0.80 ±0.03 rad)	0.86 in. (21.84 mm)	0.45 in. (11.43 mm)

*[1] Use dimension only to determine the part number.

E. Put the Airplane Back to Its Usual Condition

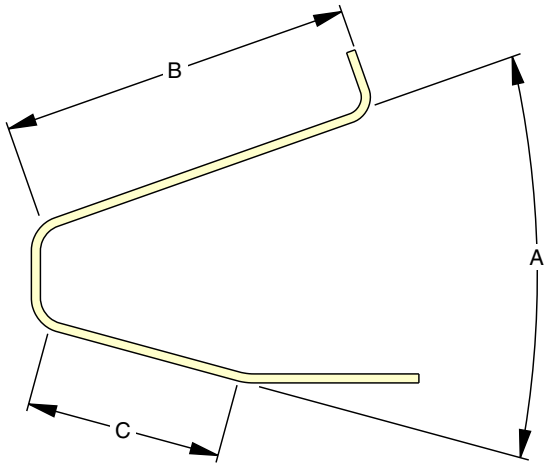
SUBTASK 78-34-09-420-003-G00

(1) Install the actuation spring.

(a) Do this task: Actuation Spring Installation, TASK 78-34-09-400-801-G00.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Actuation Spring Free Angle Check
Figure 601/78-34-09-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER SYNC LOCK - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the thrust reverser sync lock.

(2) The installation of the thrust reverser sync lock.

TASK 78-34-10-000-801-G00

2. Thrust Reverser Sync Lock Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the sync lock from the left or right thrust reverser on the applicable engine.

(2) There is a sync lock on the left and right thrust reversers on each engine.

(a) The sync locks are installed on the lower actuators.

(3) The sync locks are interchangeable between the left and right thrust reversers.

(4) The thrust reverser sync lock is referred to as the sync lock and the sync lock bracket is referred to as the bracket.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1110	Container - Hydraulic Fluid Resistant, 5 Gallon (19 Liter)

D. Prepare for the Removal

SUBTASK 78-34-10-860-001-G00

(1) For engine 1, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-10-860-002-G00

(2) For engine 2, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-10-040-001-G00

WARNING DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

SUBTASK 78-34-10-040-002-G00

(4) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-34-10-040-003-G00

(5) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-34-10-040-004-G00

(6) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-34-10-010-001-G00

(7) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

E. Thrust Reverser Sync Lock Removal

SUBTASK 78-34-10-020-001-G00

(1) Disconnect the electrical connector from the sync lock [1]:

(a) For the left thrust reverser, disconnect electrical connector D1008 from the sync lock receptacle.

(b) For the right thrust reverser, disconnect electrical connector D1016 from the sync lock receptacle.

SUBTASK 78-34-10-020-002-G00

(2) Do these steps to remove the sync lock [1] and the bracket [5]:

(a) Put a 5 gallon (19 liter) hydraulic fluid resistant container, STD-1110, below the sync lock [1] to catch the hydraulic fluid.

WARNING MAKE SURE THAT YOU WEAR THE PERSONAL PROTECTIVE EQUIPMENT WHEN YOU DO THIS TASK. PERSONAL PROTECTIVE EQUIPMENT WILL PREVENT INJURIES TO PERSONNEL.

CAUTION USE TWO WRENCHES TO DISCONNECT OR CONNECT TUBES. IF YOU DO NOT USE A WRENCH ON EACH SIDE OF THE CONNECTION, DAMAGE TO THE TUBES CAN OCCUR.

(b) Loosen the coupling nut on the sync lock [1].

1) Wrap a cloth rag around the sync lock [1] and the wrench to catch the hydraulic spray.

2) Let the hydraulic fluid drain into the container.

(c) Remove the nut [2] and washer [3] that attach the bracket [5] to the adapter plug [4].

(d) Remove the sync lock [1] and the bracket [5].

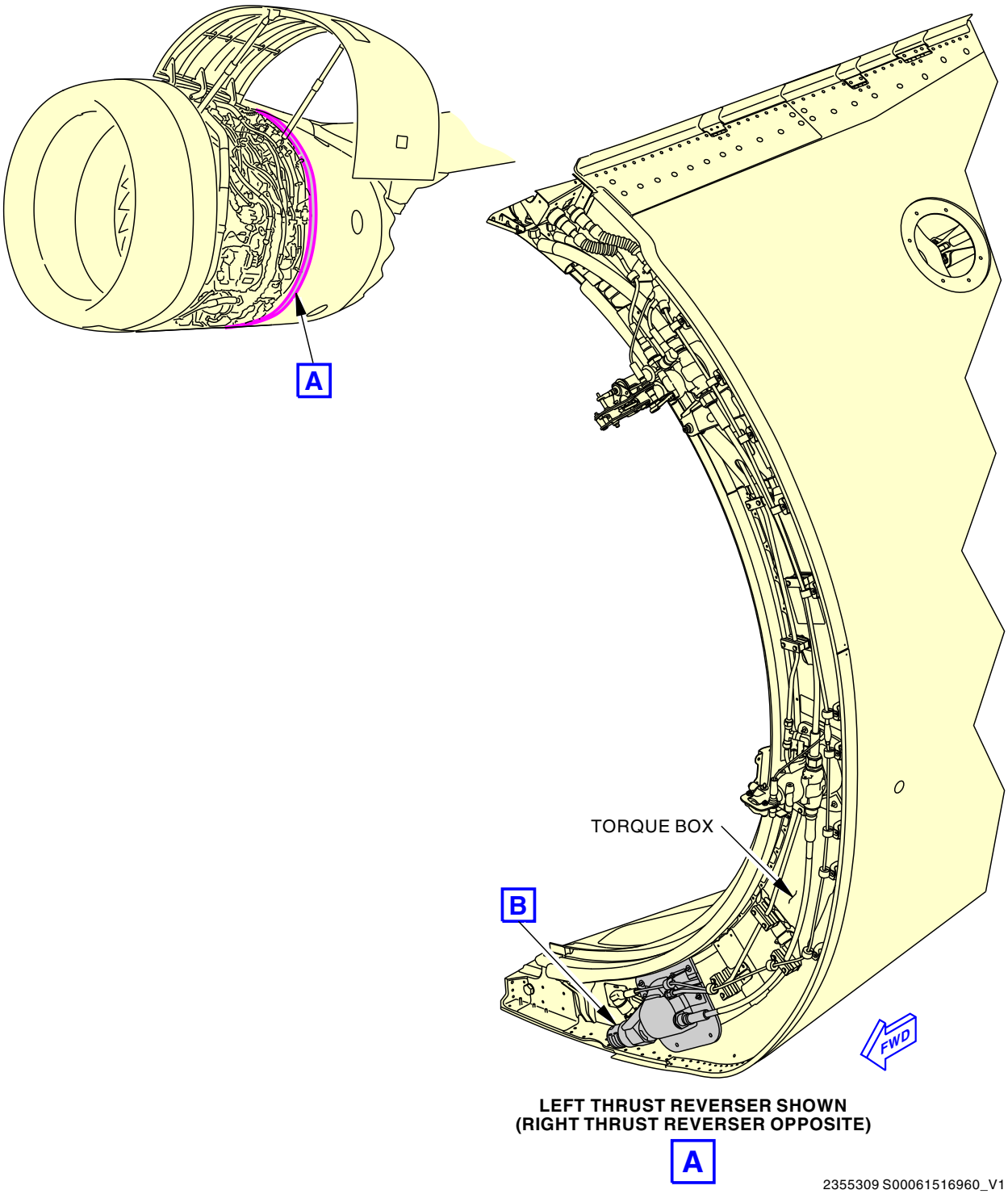
(e) Remove the two bolts [6] and two washers [7] that attach the bracket [5] to the sync lock [1].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(f) Install protective covers on the ports of the sync lock [1] and the hydraulic actuator.

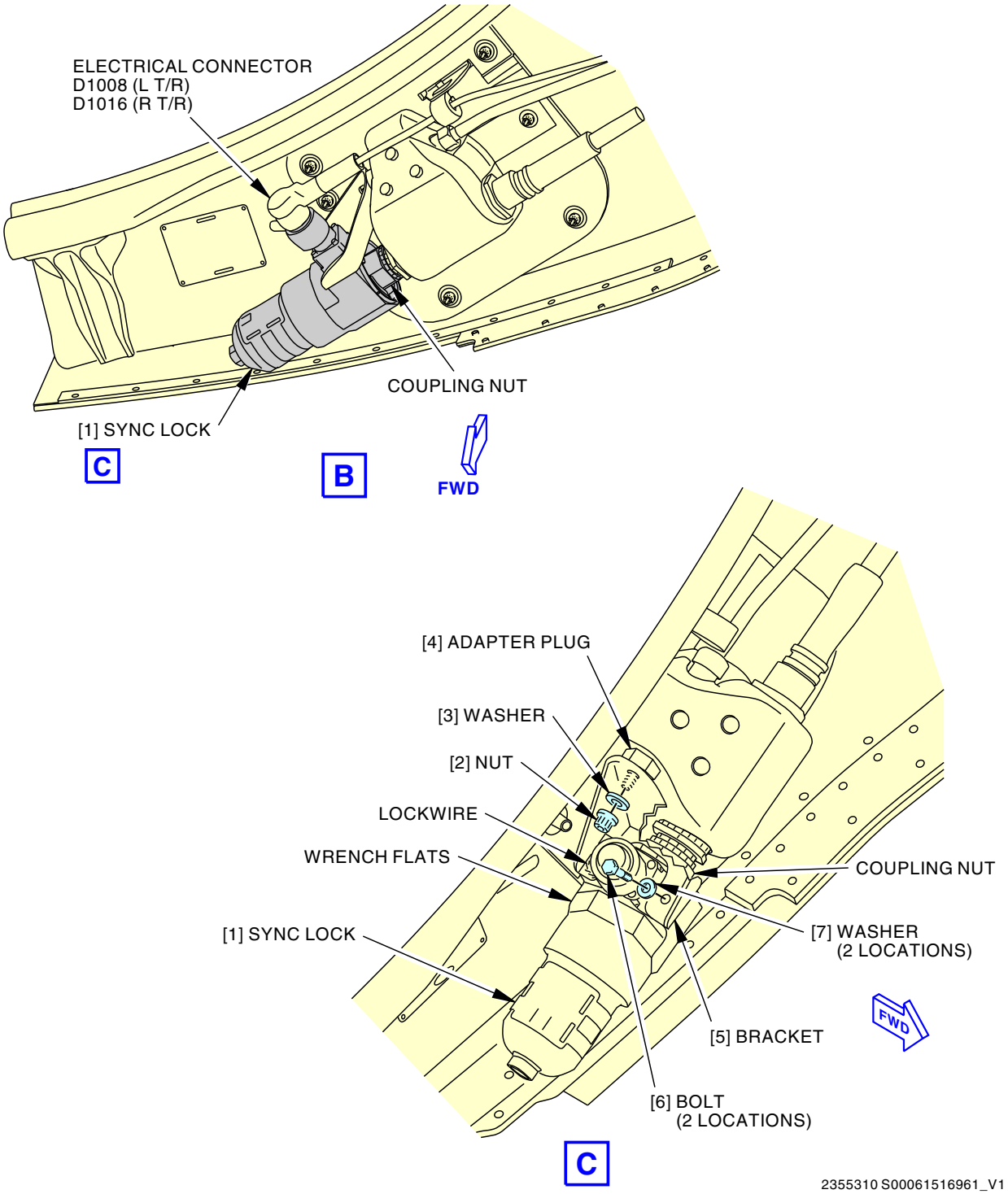
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Sync Lock Installation
Figure 401/78-34-10-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Sync Lock Installation
Figure 401/78-34-10-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-10-400-801-G00

3. Thrust Reverser Sync Lock Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the sync lock to the left or right thrust reverser on the applicable engine.

(2) After you install the sync lock, you must do these tasks: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00, and Thrust Reverser Operational Test (Standby Hydraulic System), TASK 78-31-00-700-803-G00.

(3) The left and the right sync locks are identical and interchangeable.

B. References

Reference	Title
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
29-09-00-860-801	Hydraulic Reservoirs Pressurization (P/B 201)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
29-21-00-000-801	Standby Hydraulic System Pressurization (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-801-G00	Thrust Reverser Operational Test (Selection) (P/B 501)
78-31-00-700-803-G00	Thrust Reverser Operational Test (Standby Hydraulic System) (P/B 501)

C. Consumable Materials

Reference	Description	Specification
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Sync lock	78-34-10-01-055	SIA ALL
		78-34-10-02-055	SIA ALL

E. Prepare for the Installation

SUBTASK 78-34-10-420-001-G00

(1) Do these steps to install the bracket [5] on the sync lock [1]:

(a) Align the fastener holes.

(b) Install the two washers [7] and two bolts [6].

1) Tighten the two bolts [6] to 32.5 ±2.5 in-lb (3.7 ±0.3 N·m).

2) Install the MS20995NC32 lockwire, G01912.

F. Thrust Reverser Sync Lock Installation

SUBTASK 78-34-10-420-002-G00

(1) Do these steps to install the sync lock [1]:

(a) Remove the protective covers from the sync lock [1] and the hydraulic actuator.

(b) Put the sync lock [1] in the correct position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure the fastener hole in the bracket [5] aligns with the stud on the adapter plug [4].

(c) Hand tighten the coupling nut on the sync lock [1].

(d) Install the washer [3] and nut [2] that connect the bracket [5] to the adapter plug [4] stud.

1) Tighten the nut [2] to 82.5 ±17.5 in-lb (9.3 ±2.0 N·m).

CAUTION USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(e) Do these steps to tighten the coupling nut:

1) Tighten the coupling nut to 900 ±45 in-lb (102 ±5 N·m).

2) Loosen the coupling nut.

3) Tighten the coupling nut again to 900 ±45 in-lb (102 ±5 N·m).

SUBTASK 78-34-10-420-003-G00

(2) Connect the electrical connectors to the sync lock [1] receptacle:

(a) For the left thrust reverser, connect the electrical connector, D1008, to the sync lock [1] receptacle.

(b) For the right thrust reverser, connect the electrical connector, D1016, to the sync lock [1] receptacle.

G. Thrust Reverser Sync Lock Installation Test

SUBTASK 78-34-10-440-001-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-34-10-860-003-G00

(2) For engine 1, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

For engine 2, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-10-860-016-G00

(3) Make sure that the hydraulic reservoirs are pressurized. If not, do this task: Hydraulic Reservoirs Pressurization, TASK 29-09-00-860-801.

SUBTASK 78-34-10-860-004-G00

(4) Do this task: Hydraulic System A or B Pressurization, TASK 29-11-00-860-801

SUBTASK 78-34-10-860-005-G00

(5) Do this task: Standby Hydraulic System Pressurization, TASK 29-21-00-000-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-10-860-006-G00

WARNING OBEY ALL OF THE WARNINGS AND CAUTIONS IN THE REFERENCED PROCEDURE. IF YOU DO NOT OBEY THE WARNINGS AND CAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Do this task: Thrust Reverser Operational Test (Selection), TASK 78-31-00-700-801-G00.

(a) Operate the thrust reverser through the extend (deploy) and retract (stow) cycle until the sleeves move smoothly.

(b) Examine the thrust reverser area for hydraulic fluid leaks.

1) If you find leaks, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

NOTE: Refer to the Tube Connections, Static Seals, and Other Dynamic Seals sections of the procedure for the leakage limits.

SUBTASK 78-34-10-860-007-G00

(7) Do this task: Thrust Reverser Operational Test (Standby Hydraulic System), TASK 78-31-00-700-803-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-10-860-008-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER SYNC LOCK - ADJUSTMENT/TEST

1. General

A. This procedure has two task:

(1) Sync Lock Manual Integrity Test When Hydraulic Power Is Not Available

(2) Sync Lock Manual Integrity Test When Hydraulic Power Is Available.

TASK 78-34-10-700-801-G00

2. Sync Lock Manual Integrity Test When Hydraulic Power Is Not Available

(Figure 501 and Figure 502)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to do a manual test of the locking ability of the sync lock.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-980-804-G00	Thrust Reverser Operation - Retract (Manual Procedure) (P/B 201)
78-34-10-000-801-G00	Thrust Reverser Sync Lock Removal (P/B 401)
78-34-10-400-801-G00	Thrust Reverser Sync Lock Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-6839	Wrench - Torque (0-150 in-lbs) with Dial Indicator or Digital Readout

D. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

E. Prepare for the Test

SUBTASK 78-34-10-010-002-G00

(1) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-10-910-001-G00

WARNING

DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

F. Sync Lock Manual Integrity Test When Hydraulic Power Is Not Available

SUBTASK 78-34-10-860-010-G00

(1) Unlock the upper and middle actuators as follows:

(a) On the upper thrust reverser actuator, move the manual unlock handle forward to the unlock position.

NOTE: The manual unlock handle moves forward approximately 30 degree.

(b) Hold the manual unlock handle in the forward position as you push the detent pin in.

(c) Release the manual unlock handle.

(d) Do the above 3 steps again for the middle thrust reverser actuator.

SUBTASK 78-34-10-720-002-G00

(2) Do a test of the sync lock locking feature as follows:

(a) Partially depress the manual drive pin on the end of the sync lock until the top of the pin is even with the counterbore in the manual drive.

NOTE: You partially depress the manual drive pin to engage the manual drive feature without releasing the sync lock locking feature.

NOTE: Do not fully depress the manual drive pin. If you fully depress the manual drive pin, you will release the sync lock locking mechanism.

1) Make sure that the manual drive teeth do not interfere with the clutch teeth.

NOTE: You may need to rotate the hex nut slightly (quarter turn).

(b) Use a torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (15 cm) extension to apply 50 in-lb (6 N·m) to the hex nut on the end of the sync lock as follows:

1) For the left side thrust reverser sleeve (aft looking forward), apply the torque on the hex nut in the counter-clockwise direction.

2) For the right side thrust reverser sleeve (aft looking forward), apply the torque on the hex nut in the clockwise direction.

3) If you are unable to turn the sync shaft, then the sync lock unit is serviceable.

4) If the sync shaft turns when you apply 50 in-lb (5.6 N·m) or less, then the sync lock unit is not serviceable.

a) Replace the sync lock unit, do these tasks:

- Thrust Reverser Sync Lock Removal, TASK 78-34-10-000-801-G00,
- Thrust Reverser Sync Lock Installation, TASK 78-34-10-400-801-G00.

SUBTASK 78-34-10-720-005-G00

(3) Do these steps to check for the connection between the sync lock and the actuator shaft:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION DO NOT HIT THE END OF THE SYNC LOCK OR THE 3/8 INCH DRIVE WRENCH TO PUSH THE LOCK RELEASE PIN. DAMAGE TO THE SYNC LOCK CAN OCCUR.

(a) Unlock the sync lock and engage the manual drive:

1) Make sure that the manual drive teeth do not interfere with the clutch teeth.

NOTE: You may need to rotate the hex nut slightly (quarter turn).

2) Put an open end wrench on the hex nut at end of the sync lock.

3) Put a 3/8-inch square drive ratchet into the 3/8-inch square opening.

4) Apply continuous inward pressure on the lock release pin with the ratchet.

5) Slowly move the open end wrench a small amount at a time in one or opposite direction until the lock release pin goes in.

WARNING MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Use a torque wrench (0-150 in-lbs), STD-6839, with a 6 in. (15 cm) extension to apply 50 in-lb (6 N·m) to the hex nut on the end of the sync lock as follows:

1) For the left side thrust reverser sleeve (aft looking forward), apply the torque on the hex nut in the counter-clockwise direction.

2) For the right side thrust reverser sleeve (aft looking forward), apply the torque on the hex nut in the clockwise direction.

3) If you are able to manually extend the thrust reverser sleeve, then the sync lock unit is serviceable.

4) If the sync shaft turns freely when you try to manually extend the thrust reverser with 50 in-lb (5.6 N·m) or less, the sync lock unit is not serviceable.

a) Replace the sync lock unit, do these tasks:

- Thrust Reverser Sync Lock Removal, TASK 78-34-10-000-801-G00,
- Thrust Reverser Sync Lock Installation, TASK 78-34-10-400-801-G00.

SUBTASK 78-34-10-980-002-G00

(4) Lock the upper and middle actuators as follows:

NOTE: If the thrust reverser sleeve is in the extended position, the manual unlock handle will not move to the locked position until the thrust reverser sleeve is fully stowed.

(a) On the upper thrust reverser actuator, move the manual unlock handle forward.

(b) Make sure that the detent pin returns to the extended position.

(c) Release the manual unlock handle.

(d) Repeat the previous 3 steps on the middle thrust reverser actuator.

SUBTASK 78-34-10-980-001-G00

(5) If it is necessary, manually retract the thrust reverser sleeve (TASK 78-31-00-980-804-G00).

(a) Make sure that the manual unlock handle on the upper actuator and middle actuator move back to the normal, locked position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-10-860-011-G00

(1) Do the activation procedure for the thrust reverser (TASK 78-31-00-440-801-G00).

SUBTASK 78-34-10-410-001-G00

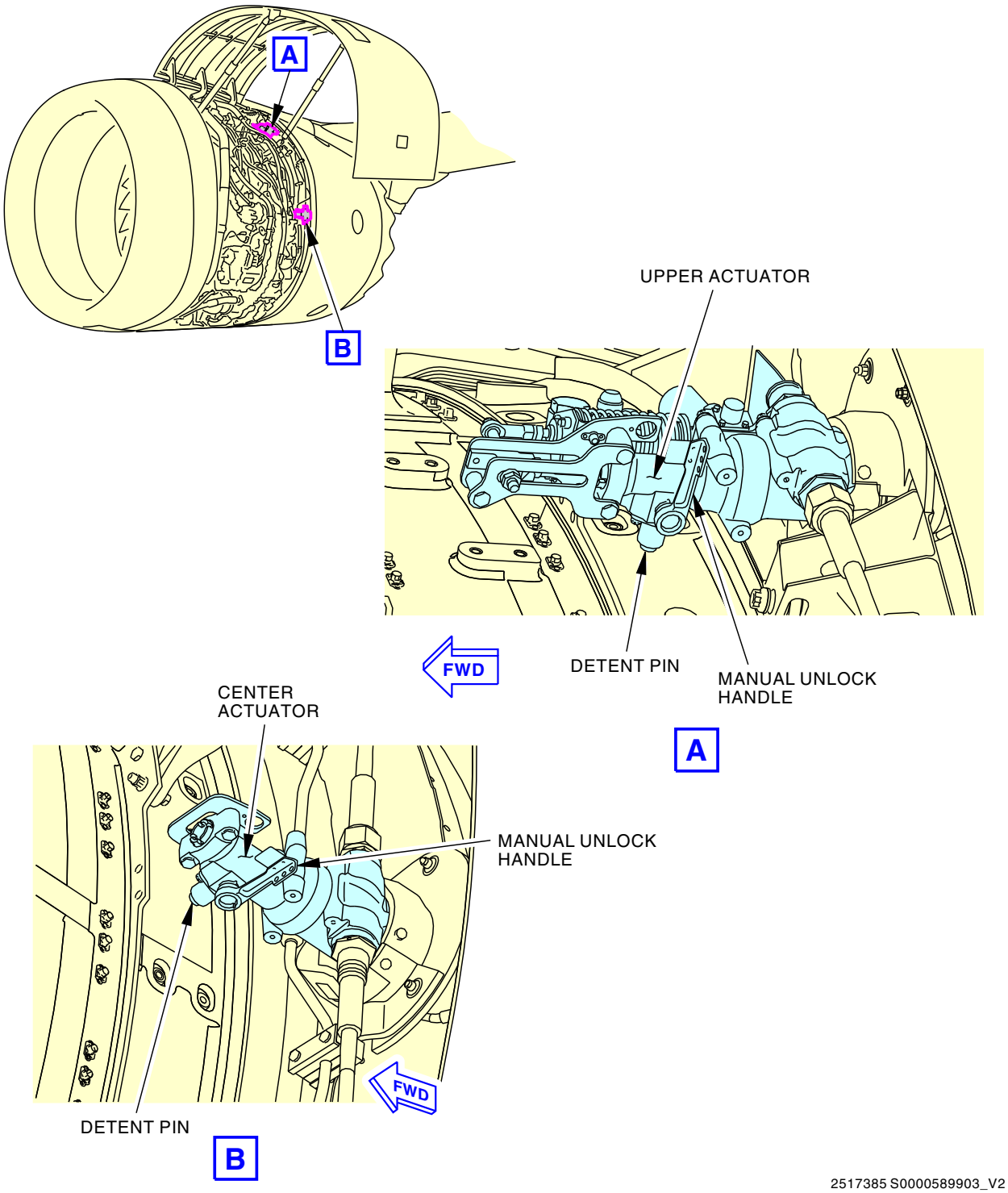
(2) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

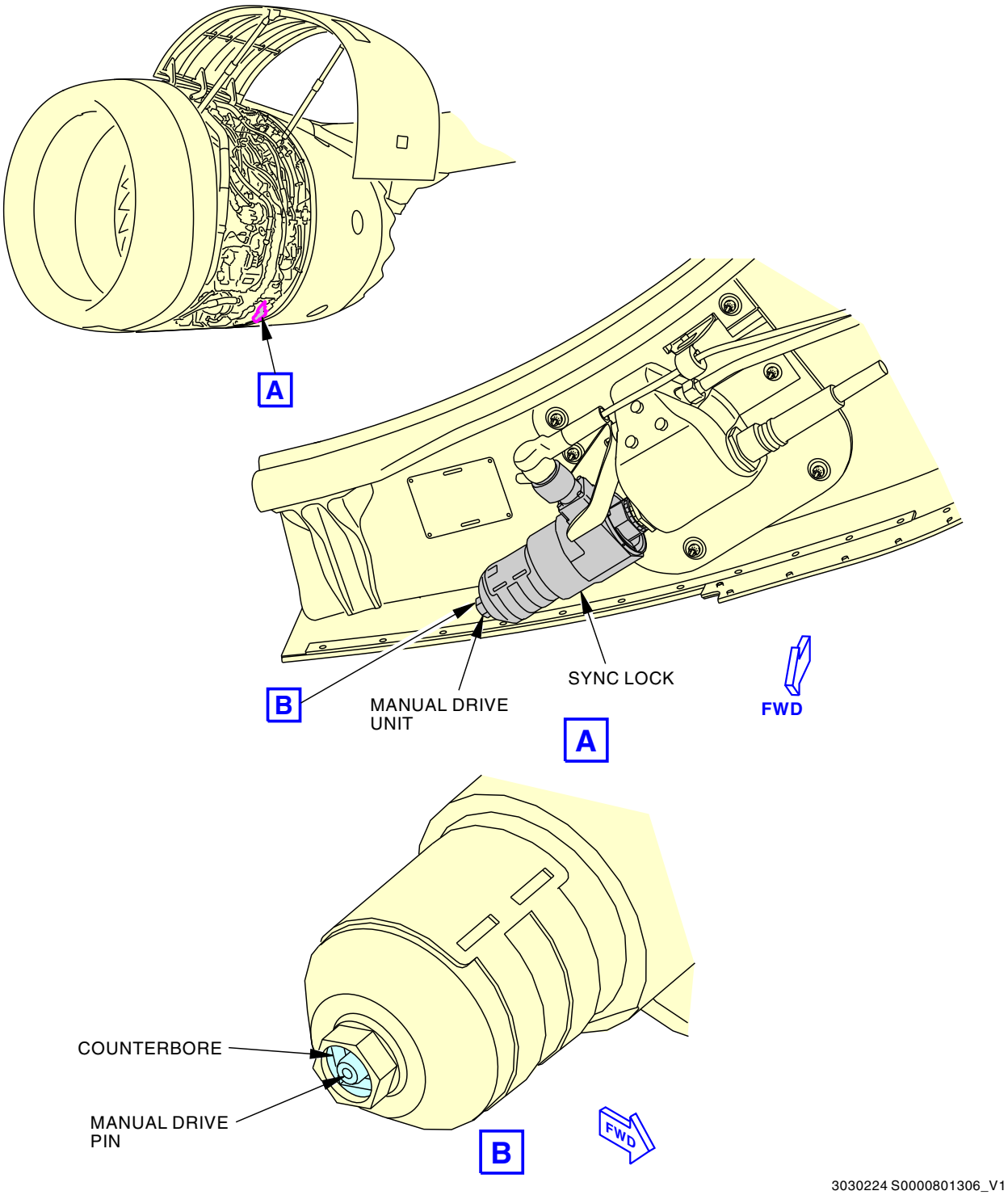
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Hydraulic Actuator Lock
Figure 501/78-34-10-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser Manual Drive Unit
Figure 502/78-34-10-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-10-700-802-G00

3. Sync Lock Manual Integrity Test When Hydraulic Power Is Available

A. General

(1) This task gives the instructions to do a manual test of the locking ability of the sync lock.

B. References

Reference	Title
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)
71-00-00-700-816-G00	Test No. 38 - Thrust Reverser Cycle Special Functions (P/B 501)

C. Sync Lock Manual Integrity Test When Hydraulic Power Is Available

SUBTASK 78-34-10-860-017-G00

(1) Do this task: Test No. 38 - Thrust Reverser Cycle Special Functions, TASK 71-00-00-700-816-G00.

NOTE: This task will permit ground operation of the thrust reverser.

SUBTASK 78-34-10-860-018-G00

WARNING

MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Move the applicable reverse thrust lever up and aft to fully deploy the thrust reverser.

SUBTASK 78-34-10-860-019-G00

(3) For the left engine, open this circuit breaker and install a safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(4) For the right engine, open this circuit breaker and install a safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-10-860-020-G00

(5) Move the applicable reverse thrust lever down and forward to the stow position.

(a) Make sure that the thrust reverser sleeves do not move to the stowed position.

NOTE: This is the indication that the sync locks are in the locked position.

SUBTASK 78-34-10-860-021-G00

CAUTION

MAKE SURE THAT YOU PUT THE THRUST REVERSER LEVER TO THE DEPLOY POSITION BEFORE YOU CLOSE THE CIRCUIT BREAKERS. IF YOU DO NOT PUT THE THRUST REVERSER LEVER TO THE DEPLOY POSITION, YOU CAN CAUSE DAMAGE THE SYNC LOCK UNIT.

(6) Move the applicable reverse thrust lever up and aft to the deploy position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-10-860-022-G00

(7) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(8) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-10-860-023-G00

(9) Move the applicable reverse thrust lever down and forward to move the thrust reverser to the fully stowed position.

SUBTASK 78-34-10-860-024-G00

(10) After you stow the thrust reverser, select the STOP FUNCTION to complete the special function (TASK 46-13-02-860-802).

SUBTASK 78-34-10-860-025-G00

(11) Check the Onboard Maintenance Function (OMF) for any new fault messages, and, if present, clear the faults (TASK 31-65-00-750-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST REVERSER SYNC LOCK - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has this task:

(1) Sync Lock Control Relay Hot Short Protection Check.

TASK 78-34-10-710-801-G00

2. Sync Lock Control Relay Hot Short Protection Check

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides the instructions on how to ensure the functionality of the hot short protection for the sync lock control relay.

B. References

Reference	Title
53-14-01-020-801	Nose Wheel Well Access Panels Removal (P/B 401)
53-14-01-420-801	Nose Wheel Well Access Panels Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-603	Multimeter

D. Location Zones

Zone	Area
115	Nose Landing Gear Wheel Well - Left
116	Nose Landing Gear Wheel Well - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
113AW	Forward Nose Wheel Well Panel
114AW	Forward Nose Wheel Well Panel

F. Prepare for the Operational Check

SUBTASK 78-34-10-860-012-G00

(1) For engine 1 do these steps:

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

(b) Position the engine 1 thrust reverser lever in the stowed position.

1) Wait 10 seconds.

SUBTASK 78-34-10-860-013-G00

(2) For engine 2 do these steps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

(b) Position the engine 2 thrust reverser lever in the stowed position.

1) Wait 10 seconds.

SUBTASK 78-34-10-010-003-G00

(3) For engine 1 open this access panel:

(Nose Wheel Well Access Panels Removal, TASK 53-14-01-020-801)

Number	Name/Location
113AW	Forward Nose Wheel Well Panel

SUBTASK 78-34-10-010-004-G00

(4) For engine 2 open this access panel:

(Nose Wheel Well Access Panels Removal, TASK 53-14-01-020-801)

Number	Name/Location
114AW	Forward Nose Wheel Well Panel

G. Sync Lock Control Relay Operational Check

SUBTASK 78-34-10-710-001-G00

(1) Do these steps to do the operational check for engine 1:

(a) Remove the T/R Sync Lock Control Relay, R1158, located in the J22 Junction Box inside of the nose landing gear wheel well.

(b) Use a multimeter, STD-603, to measure the resistance between pin D16046–C1 and pin D16046–X2.

1) The measured resistance should be between 0 and 5 ohms.

(c) Install the T/R Sync Lock Control Relay, R1158, back into the J22 Junction Box.

SUBTASK 78-34-10-710-002-G00

(2) Do these steps to do the operational check for engine 2:

(a) Remove the T/R Sync Lock Control Relay, R1159, located in the J24 Junction Box inside of the nose landing gear wheel well.

(b) Use a multimeter, STD-603, to measure the resistance between pin D16048–C1 and pin D16048–X2.

1) The measured resistance should be between 0 and 5 ohms.

(c) Install the T/R Sync Lock Control Relay, R1159, back into the J24 Junction Box.

H. Put the Airplane Back to its Usual Condition

SUBTASK 78-34-10-410-002-G00

(1) For engine 1 close this access panel:

(Nose Wheel Well Access Panels Installation, TASK 53-14-01-420-801)

Number	Name/Location
113AW	Forward Nose Wheel Well Panel

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-34-10-410-003-G00

(2) For engine 2 close this access panel:

(Nose Wheel Well Access Panels Installation, TASK 53-14-01-420-801)

Number	Name/Location
114AW	Forward Nose Wheel Well Panel

SUBTASK 78-34-10-860-014-G00

(3) For engine 1 remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	7	C01266	ENGINE 1 THRUST REVERSER SYNC LOCK

SUBTASK 78-34-10-860-015-G00

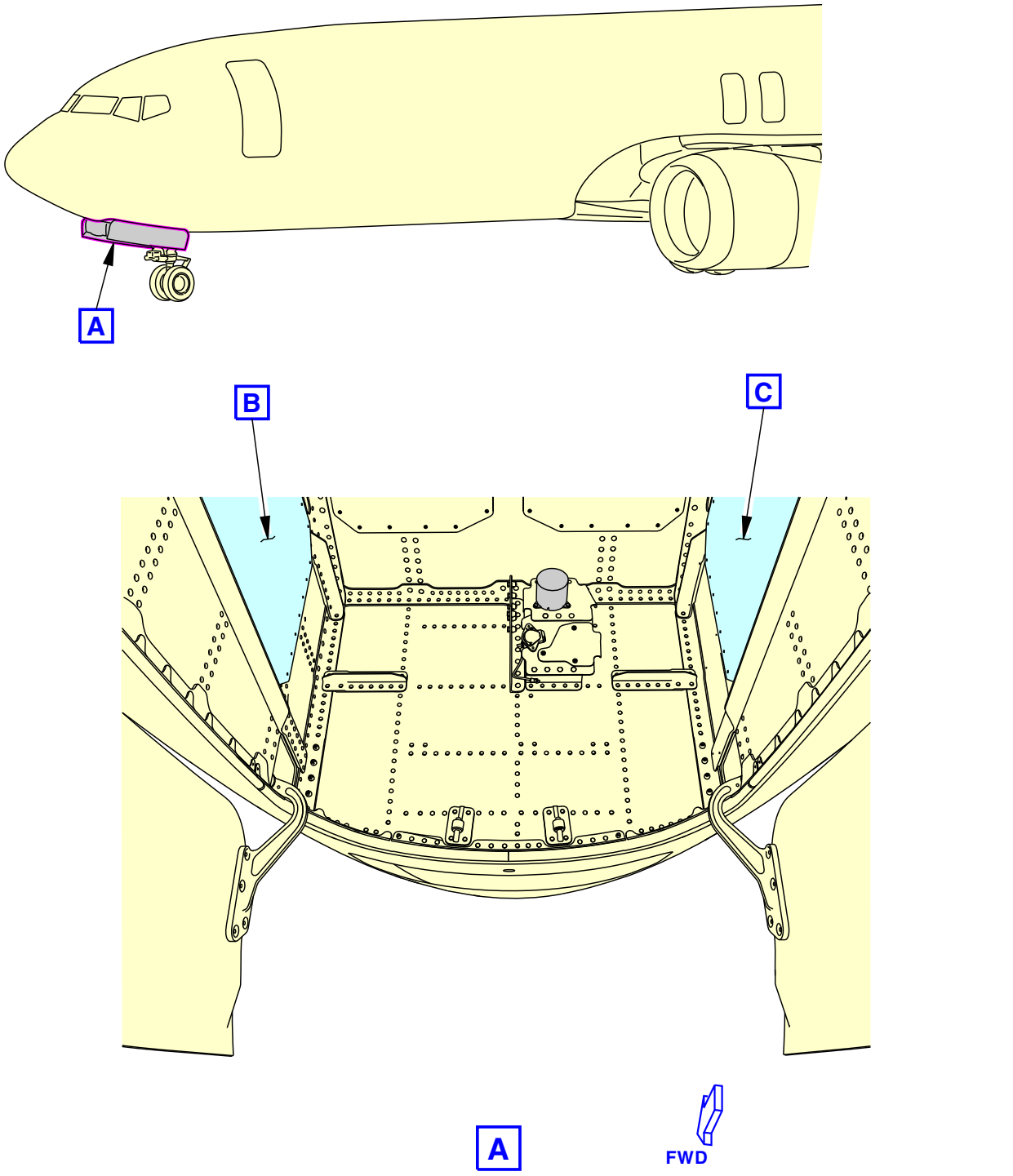
(4) For engine 2 remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	5	C01267	ENGINE 2 THRUST REVERSER SYNC LOCK

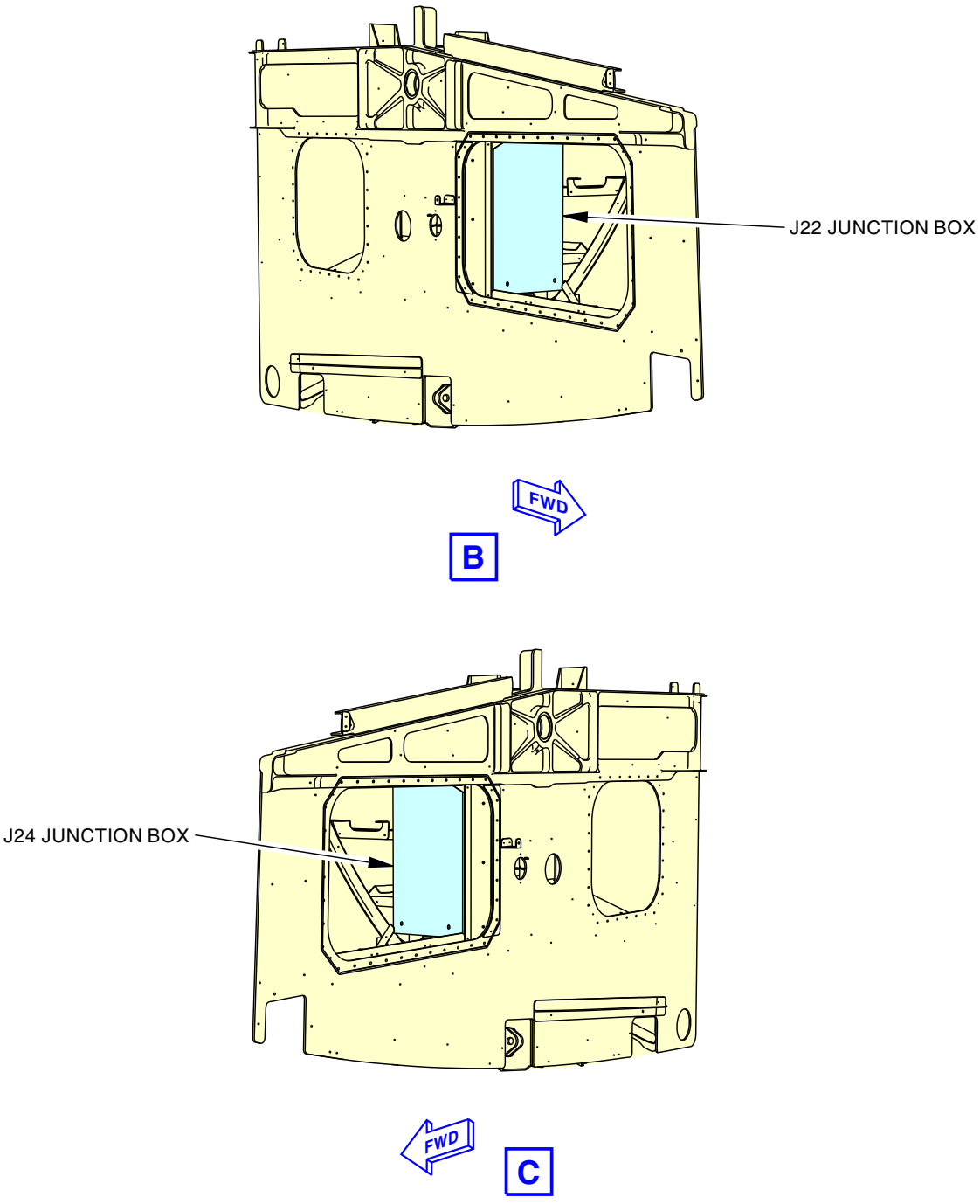
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Junction Box Location
Figure 601/78-34-10-990-804-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Junction Box Location
Figure 601/78-34-10-990-804-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

STOW HYDRAULIC PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the stow hydraulic pressure switch.

(2) The installation of the stow hydraulic pressure switch.

TASK 78-34-11-000-801-G00

2. Stow Hydraulic Pressure Switch Removal

(Figure 401)

A. General

(1) This task is the removal of the stow hydraulic pressure switch.

(2) The stow hydraulic pressure switch is located in the forward area of the engine fan cowl support beam.

(3) There is one stow hydraulic pressure switch for each engine.

B. References

Reference	Title
29-09-00-860-802	Hydraulic Reservoirs Depressurization (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
29-21-00-000-802	Standby Hydraulic System Power Removal (P/B 201)
54-52-01-010-801	Forward Fairing Removal (P/B 401)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE
STD-7394	Cap - Dust, Electrical Connector
STD-14686	Fittings - Hydraulic, Caps/Plugs (ref. AMM 20-10-XX)

D. Prepare for the Removal

SUBTASK 78-34-11-040-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

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SUBTASK 78-34-11-040-002-G00

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do the thrust reverser deactivation for ground maintenance (TASK 78-31-00-040-801-G00).

SUBTASK 78-34-11-860-001-G00

(3) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 78-34-11-860-002-G00

(4) Do this task: Standby Hydraulic System Power Removal, TASK 29-21-00-000-802.

SUBTASK 78-34-11-860-003-G00

(5) Do this task: Hydraulic Reservoirs Depressurization, TASK 29-09-00-860-802.

SUBTASK 78-34-11-860-004-G00

(6) Do this task: Forward Fairing Removal, TASK 54-52-01-010-801.

E. Stow Hydraulic Pressure Switch Removal

SUBTASK 78-34-11-020-001-G00

(1) Remove the stow hydraulic pressure switch [1]:

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTIONS ARE NOT DIRTY BEFORE YOU CONNECT OR DISCONNECT THEM. SOLID OR LIQUID CONTAMINATION OF THE ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

(a) Disconnect the electrical connector [11] from the stow hydraulic pressure switch [1].

(b) Put dust caps, STD-7394, on the electrical connector [11] and the electrical receptacle on the stow hydraulic pressure switch [1].

WARNING MAKE SURE THAT YOU WEAR THE PERSONAL PROTECTIVE EQUIPMENT WHEN YOU DO THIS TASK. PERSONAL PROTECTIVE EQUIPMENT WILL PREVENT INJURIES TO PERSONNEL.

CAUTION USE TWO WRENCHES TO DISCONNECT OR CONNECT TUBES. IF YOU DO NOT USE A WRENCH ON EACH SIDE OF THE CONNECTION, DAMAGE TO THE TUBES CAN OCCUR.

(c) Loosen the B-nut that attaches the stow hydraulic pressure switch [1] to the thrust reverser stow hydraulic pressure line.

1) Wrap a cloth rag around the B-nut and the wrench to catch any hydraulic fluid.

(d) Remove the screw [3], nut [5], two washers [4], and bonding clamp [6] from the bonding adapter [2] on the stow hydraulic pressure switch [1].

(e) Loosen the four screws [9] that attach the two clamps [8] to the fan cowl support beam bracket.

(f) Remove the stow hydraulic pressure switch [1].

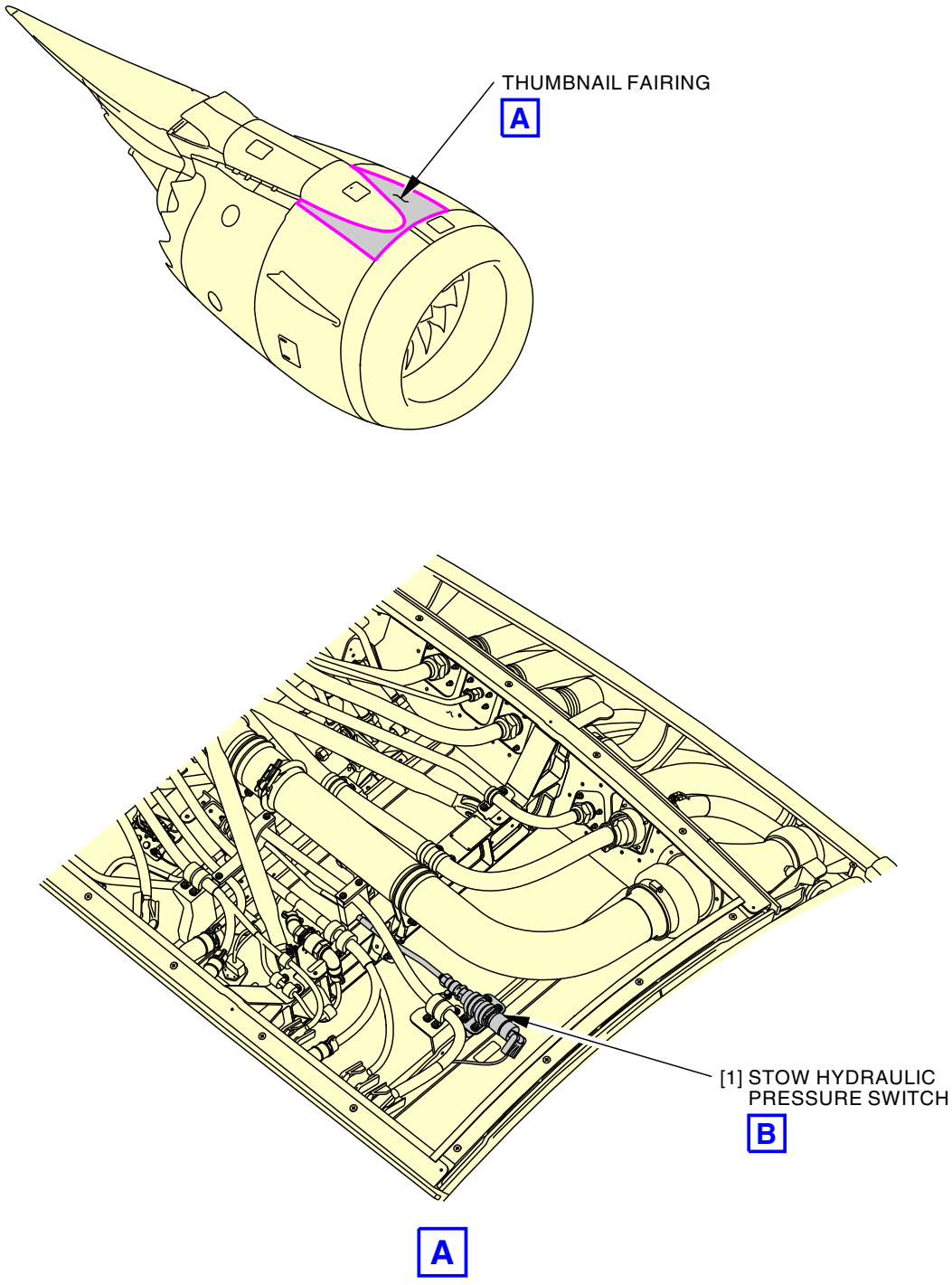
(g) If it is necessary, remove the bonding adapter [2] and packing [7] from the stow hydraulic pressure switch [1].

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(h) Put caps/plugs, STD-14686, on the open hydraulic line and the open ports on the stow hydraulic pressure switch [1] and bonding adapter [2].

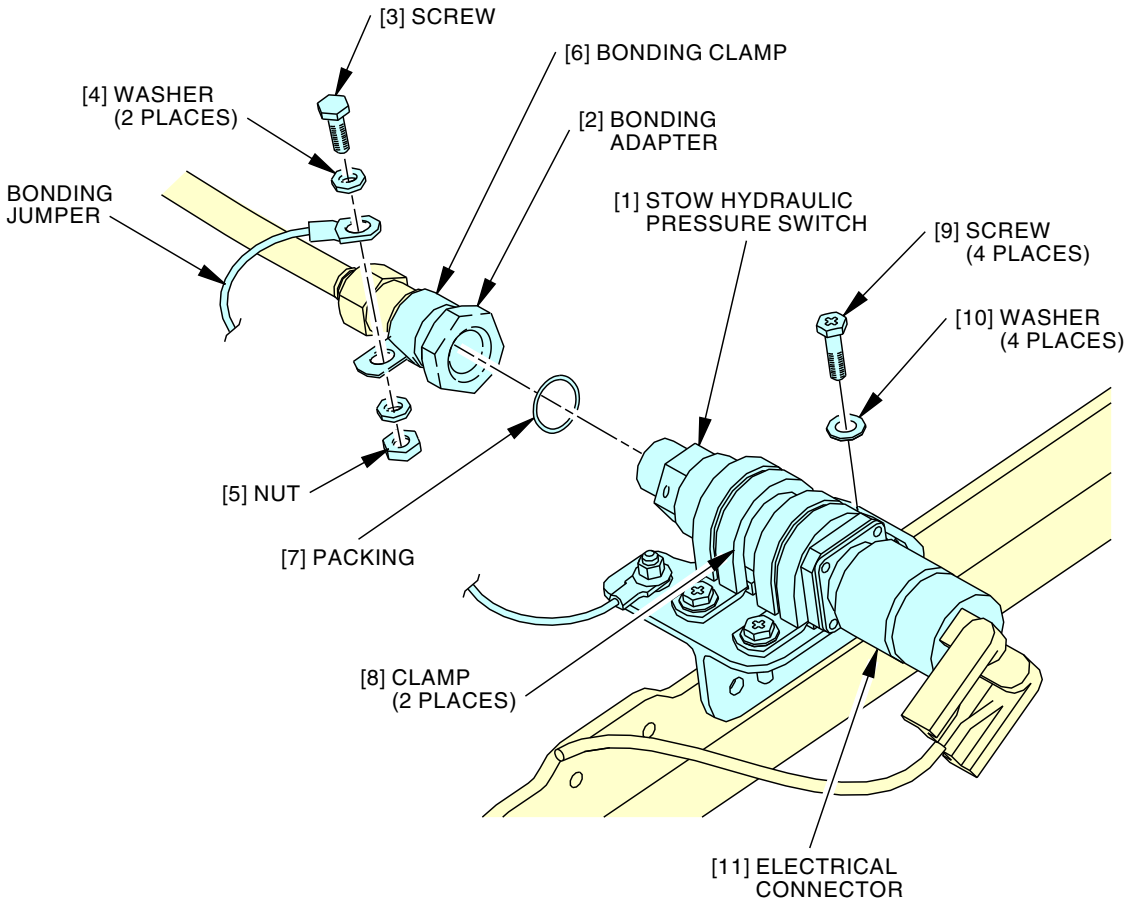
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Stow Hydraulic Pressure Switch Installation
Figure 401/78-34-11-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Stow Hydraulic Pressure Switch Installation

B

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Stow Hydraulic Pressure Switch Installation
Figure 401/78-34-11-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-34-11-400-801-G00

3. Stow Hydraulic Pressure Switch Installation

(Figure 401)

A. General

(1) This task is the installation of the stow hydraulic pressure switch.

(2) The stow hydraulic pressure switch is located in the forward area of the engine fan cowl support beam.

(3) There is one stow hydraulic pressure switch for each engine.

B. References

Reference	Title
29-00-00-800-802	Hydraulic Power System - Activation (P/B 201)
54-52-01-410-801	Forward Fairing Installation (P/B 401)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-700-802-G00	Thrust Reverser System Normal Operational 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). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A50096	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63 Type II
B50073	Alcohol - Isopropyl	ASTM D 770

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Stow hydraulic pressure switch	54-51-51-11-315	SIA ALL
7	Packing	54-51-51-11-325	SIA ALL

F. Stow Hydraulic Pressure Switch Installation

SUBTASK 78-34-11-420-001-G00

(1) Do these steps to install the stow hydraulic pressure switch [1]:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

(a) If it is necessary, install the bonding adapter [2] and packing [7] to the stow hydraulic pressure switch [1]:

1) Make sure that the interfacing surfaces of the bonding adapter [2] and the stow hydraulic pressure switch [1] are free of oil, grease or other contaminants.

WARNING DO NOT GET ISOPROPYL ALCOHOL (IPA) IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM IPA. PUT ON GOGGLES, AND GLOVES WHEN YOU USE IPA. KEEP IPA AWAY FROM SPARKS, FLAME, AND HEAT. IPA IS POISONOUS AND FLAMMABLE. IT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

2) If it is necessary, clean the interfacing surfaces with alcohol, B50073.

3) Install the packing [7] onto the stow hydraulic pressure switch [1].

4) Apply sealant, A50096, to the threads and interfacing surfaces of the stow hydraulic pressure switch [1] and the bonding adapter [2].

5) Install the bonding adapter [2] onto the stow hydraulic pressure switch [1] and tighten to 170 ±17 in-lb (19 ±2 N·m).

6) Use an intrinsically safe approved bonding meter, COM-1550, to do a check of the bonding resistance between the stow hydraulic pressure switch [1] and the bonding adapter [2] (SWPM 20-20-00).

7) Make sure that the bonding resistance between the stow hydraulic pressure switch [1] and the bonding adapter [2] is 0.0025 ohm (2.5 milliohms) or less.

8) Loosely attach the stow hydraulic pressure switch [1] to the bracket with the two clamps [8], four washers [10] and four screws [9].

9) Orient the so that the master key clocking of the electrical connector [11] is at the 12 o'clock position.

10) Make sure that the interfacing surfaces of the bonding adapter [2] and the bonding clamp [6] and the bonding jumper are free of oil, grease or other contaminants.

WARNING DO NOT GET ISOPROPYL ALCOHOL (IPA) IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM IPA. PUT ON GOGGLES, AND GLOVES WHEN YOU USE IPA. KEEP IPA AWAY FROM SPARKS, FLAME, AND HEAT. IPA IS POISONOUS AND FLAMMABLE. IT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

11) If it is necessary, clean the interfacing surfaces with alcohol, B50073.

12) Put the bonding clamp [6], screw [3], two washers [4], bonding jumper and nut [5] into their position on the bonding adapter, but do not tighten the screw [3] at this time.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUTS. USE ONE TO HOLD THE MATING PART, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBES AND MATING PART CAN OCCUR.

13) Install the hydraulic tube onto the stow hydraulic pressure switch [1].

14) Make sure to maintain the orientation of the stow hydraulic pressure switch [1], and tighten the hydraulic tube B-nut to 130 ±6 in-lb (14.7 ±0.7 N·m).

15) Loosen the B-nut so that it can be turned by hand, then retighten the B-nut to 130 ±6 in-lb (14.7 ±0.7 N·m) and apply a torque stripe.

16) Tighten the screws [9] to 35.0 ±3.5 in-lb (4.0 ±0.4 N·m).

17) Make sure that the bonding clamp [6] is in the correct position, and tighten the screw [3] to 35.0 ±3.5 in-lb (4.0 ±0.4 N·m).

18) Use an intrinsically safe approved bonding meter, COM-1550, to do a check of the bonding resistance between the bonding jumper terminal and the bonding adapter [2] (SWPM 20-20-00).

19) Make sure that the bonding resistance between the bonding jumper terminal and the bonding adapter [2] is 0.0017 ohm (1.70 milliohms) or less.

20) Connect the electrical connector [11] to the stow hydraulic pressure switch [1].

G. Stow Hydraulic Pressure Switch Installation Test

SUBTASK 78-34-11-860-005-G00

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 78-34-11-210-001-G00

(2) Do this task: Hydraulic Power System - Activation, TASK 29-00-00-800-802.

(a) Do a check of the stow hydraulic pressure switch [1] for hydraulic leaks.

SUBTASK 78-34-11-710-001-G00

(3) Do this task: Thrust Reverser System Normal Operational Test, TASK 78-31-00-700-802-G00.

(a) Operate the thrust reverser a minimum of three cycles.

(b) Do a check of the stow hydraulic pressure switch [1] for hydraulic leaks.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 78-34-11-860-006-G00

(1) Do this task: Forward Fairing Installation, TASK 54-52-01-410-801.

SUBTASK 78-34-11-440-001-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT) - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the LVDT

(2) An installation of the LVDT.

TASK 78-36-02-000-801-G00

2. LVDT Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the linear variable differential transformer (LVDT).

(2) There is one LVDT on each of the upper locking actuators on the torque box of the left and right thrust reversers on an engine.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Removal

SUBTASK 78-36-02-010-001-G00

(1) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 78-36-02-040-001-G00

WARNING

DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(2) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 78-36-02-860-001-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C04008	ENGINE 1 ALTN PWR CHAN B
A	5	C04007	ENGINE 1 ALTN PWR CHAN A
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK

SUBTASK 78-36-02-860-002-G00

(4) For Engine 2, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
D	7	C04010	ENGINE 2 ALTN PWR CHAN B
D	8	C04009	ENGINE 2 ALTN PWR CHAN A

F. LVDT Removal

SUBTASK 78-36-02-020-001-G00

(1) Disconnect the two electrical connectors from the LVDT [5] on the applicable engine.

(a) For the left thrust reverser, disconnect the electrical connectors D30072 and D30076.

(b) For the right thrust reverser, disconnect the electrical connectors D30074 and D30078.

(c) Install the protective caps on the electrical connectors.

SUBTASK 78-36-02-020-002-G00

(2) Remove the LVDT [5].

(a) Remove the nut [2] and washer [1] that attaches the LVDT rod end to the actuator feedback spindle.

(b) Remove the two lockbolts [8], washers [4], and nuts [3] that attach the LVDT [5] to the bracket [13].

(c) Remove and discard the safety cable or lockwire from the three screws [6].

(d) Remove the three screws [6] and the washers [7] that attach the LVDT [5] to the actuator.

(e) Remove the LVDT [5] from the actuator.

(f) Install the protective covers on the LVDT [5] receptacles.

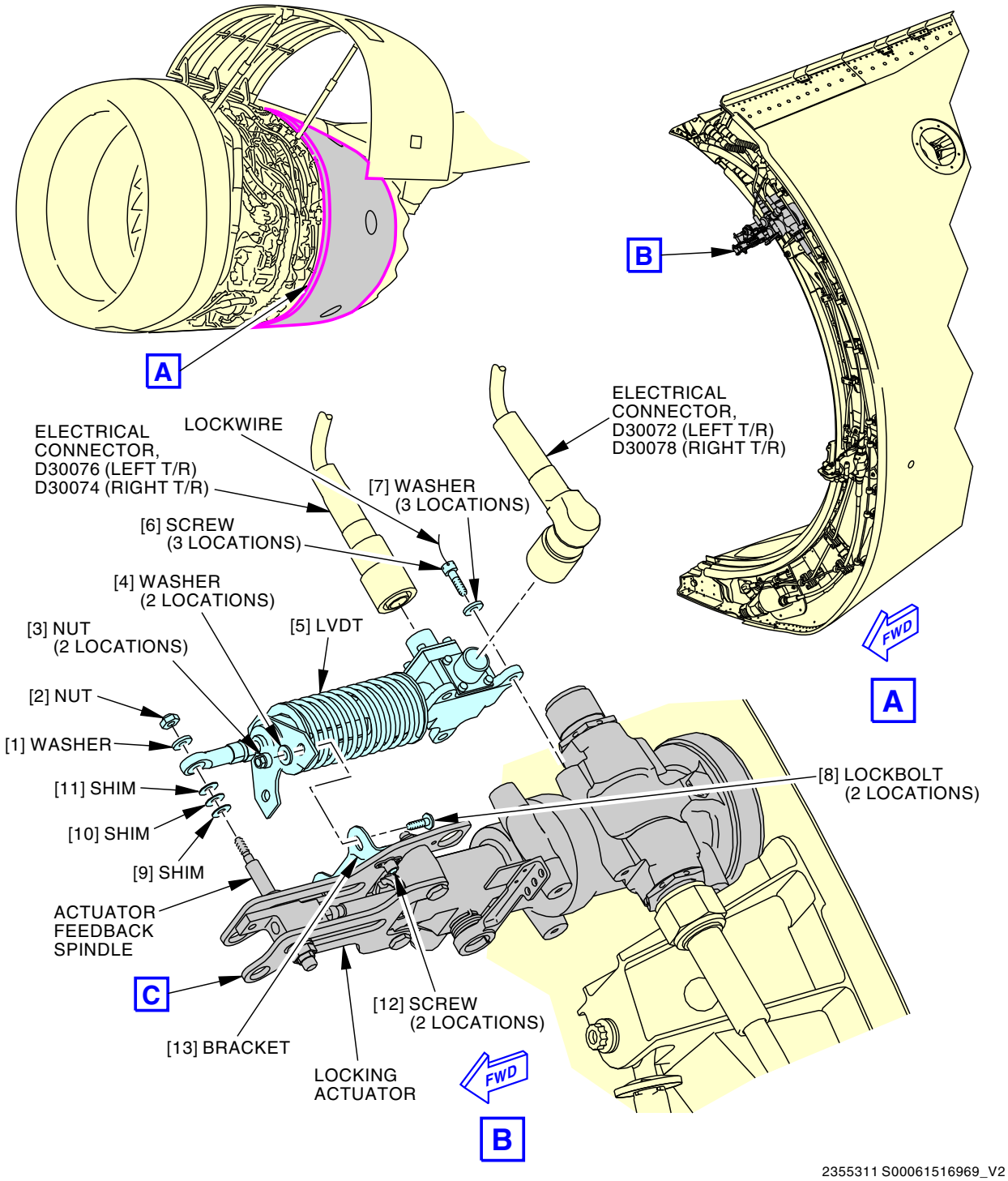
(g) Remove the shim [9], shim [10] or shim [11] from the actuator feedback spindle.

NOTE: It is important to note the quantity and the configuration of the shims for the subsequent installation.

(h) Clean all the remaining sealant off the bracket [13] with solvent, B00062.

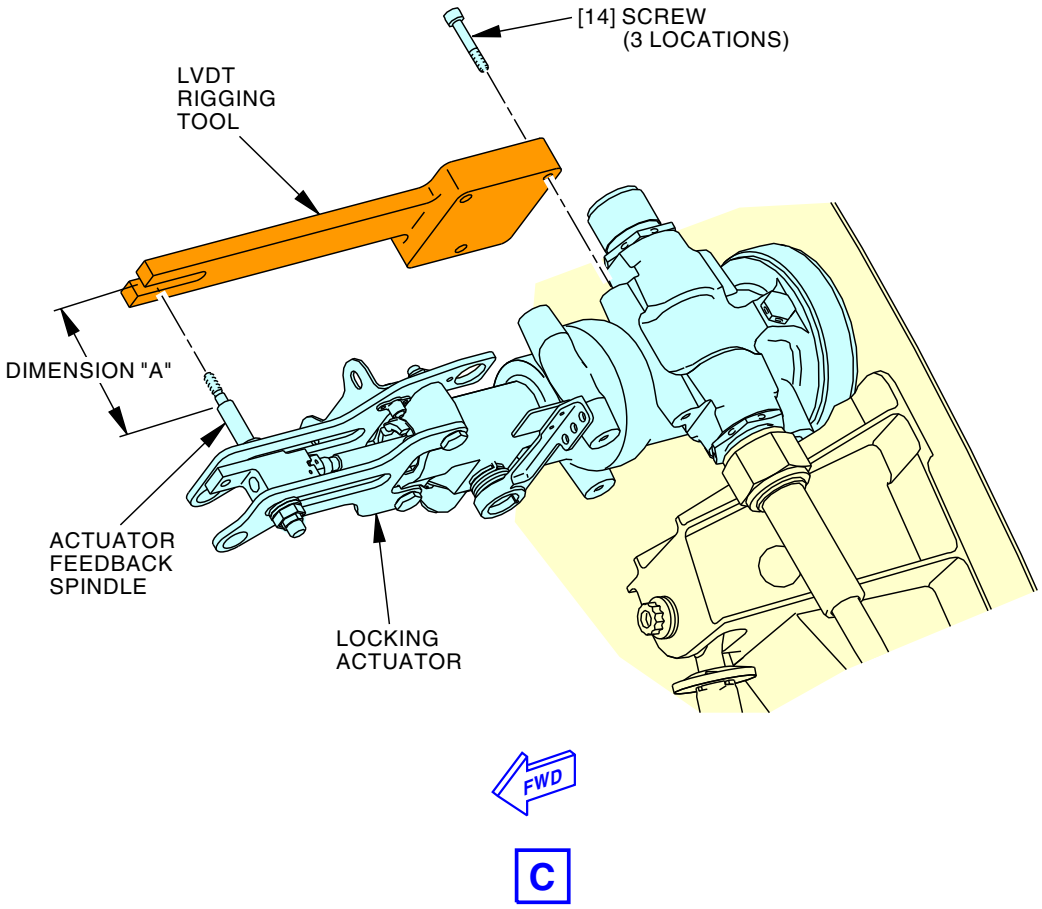
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Thrust Reverser LVDT Installation
Figure 401/78-36-02-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Thrust Reverser LVDT Installation
Figure 401/78-36-02-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 78-36-02-400-801-G00

3. LVDT Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the linear variable differential transformer (LVDT).

B. References

Reference	Title
71-00-00-710-806-G00	Test No. 17 - Electronic Engine Control (EEC) System Test (P/B 501)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (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-7480	Rigging Bar - Thrust Reverser, Position Feedback LVDT Part #: B78006-7 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50375	Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule)	BACC13AT3K, AMS 5689

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	LVDT	78-36-02-01-065	SIA ALL

F. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

G. Prepare for the Installation

SUBTASK 78-36-02-420-001-G00

(1) Do these steps to find the correct thickness of the shims to be installed on the actuator feedback spindle:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Install the LVDT rigging bar, SPL-7480, on the actuator using three 10-32 X 1 inch screws [14].

(b) Examine the actuator feedback spindle for axial free-play.

1) If free-play exists, set the actuator feedback spindle at the approximate middle position of the free-play.

(c) Measure the distance between the shoulder of the actuator feedback spindle and the rigging tool with a feeler gauge to get dimension A.

(d) Record dimension A that you measured.

NOTE: This dimension will be used to calculate the correct shim thickness.

(e) Remove the three screws [14] and the rigging bar, SPL-7480.

H. LVDT Installation

SUBTASK 78-36-02-390-001-G00

(1) Install the LVDT [5].

(a) Remove the protective caps from the electrical connectors.

(b) Remove the protective covers from the LVDT [5] receptacles.

(c) To prepare the area for the sealant, clean the bracket [13] and LVDT flange areas, that will touch when you install the LVDT, with solvent, B00062.

(d) Apply sealant, A00247, to the area that was cleaned.

(e) Identify the quantity and configuration of the shim [9], shim [10], and shim [11] that will equal dimension A ±0.002 in. (0.051 mm) that you recorded above.

NOTE: The shim [9] is 0.010 in. (0.254 mm) thick, the shim [10] is 0.005 in. (0.127 mm) thick and the shim [11] is 0.003 in. (0.076 mm) thick.

1) If the thickness of the shim [9], shim [10], or shim [11] that you removed during the removal task equals dimension A ±0.002 in. (0.051 mm), use the shims.

2) If the removed shims do not give the correct thickness, use the minimum quantity and configuration of shims that is necessary to give a thickness that is equal to dimension A ±0.002 in. (0.051 mm).

(f) Install the shim [9], shim [10] or shim [11] on the actuator feedback spindle.

CAUTION

MAKE SURE THAT YOU DO NOT BEND THE ROD END ON THE LVDT OR SHAFT WHEN YOU INSTALL THE LVDT. IF YOU BEND THE ROD END OR SHAFT, AN INCORRECT INDICATION OR DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Install the LVDT [5] on the locking actuator with the rod end on the actuator feedback spindle.

(h) Install the three screws [6] and the washers [7] that attach the LVDT [5] to the actuator.

1) Tighten the screws to 27 in-lb (3.1 N·m) - 30 in-lb (3.4 N·m).

2) Install the safety cable kit, G50375, or MS20995NC32 lockwire, G50347.

(i) Push the bracket to make sure that the flange on the LVDT [5] is firmly against the bracket [13].

1) If the flange is not firmly against the bracket [13], loosen the two screws [12] and move the bracket.

2) Re-tighten the two screws [12] to 27 in-lb (3.1 N·m) - 33 in-lb (3.7 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(j) Install the two lockbolts [8], washers [4], and nuts [3] that attach the LVDT [5] to the bracket [13].

NOTE: One extra washer can be used under each nut if it is necessary to adjust the grip length of the lockbolts.

1) Remove the unwanted sealant from the bracket.

(k) Install the nut [2] and washer [1] that attaches the LVDT rod end to the actuator feedback spindle.

1) Tighten the nut to 20 in-lb (2.3 N·m) - 30 in-lb (3.4 N·m).

SUBTASK 78-36-02-420-002-G00

(2) Connect the two electrical connectors to the LVDT [5] receptacles.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 78-36-02-440-001-G00

(1) Do this task: TASK 78-31-00-040-801-G00.

SUBTASK 78-36-02-860-003-G00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C04008	ENGINE 1 ALTN PWR CHAN B
A	5	C04007	ENGINE 1 ALTN PWR CHAN A
B	6	C01412	ENGINE 1 THRUST REVERSER INTLK

SUBTASK 78-36-02-860-004-G00

(3) Close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	6	C01413	ENGINE 2 THRUST REVERSER INTLK
D	7	C04010	ENGINE 2 ALTN PWR CHAN B
D	8	C04009	ENGINE 2 ALTN PWR CHAN A

SUBTASK 78-36-02-710-001-G00

(4) Do this task: Test No. 17 - Electronic Engine Control (EEC) System Test, TASK 71-00-00-710-806-G00.

SUBTASK 78-36-02-410-001-G00

(5) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT) - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) Linear Variable Differential Transformer (LVDT) - Adjustment.

TASK 78-36-02-820-801-G00

2. Linear Variable Differential Transformer (LVDT) - Adjustment

(Figure 502)

A. General

(1) This task gives the instructions to adjust the thrust reverser linear variable differential transformer (LVDT).

(2) There is one LVDT on each of the upper locking actuators on the torque box of the left and right thrust reversers on an engine.

(3) Use the display values on the Multi-Function Display (MFD) screen in the flight compartment to adjust the LVDT's one at a time.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-980-801-G00	Thrust Reverser Operation - Extend (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
415	Engine 1 - Thrust Reverser, Left
416	Engine 1 - Thrust Reverser, Right
425	Engine 2 - Thrust Reverser, Left
426	Engine 2 - Thrust Reverser, Right

E. Prepare for the Adjustment

SUBTASK 78-36-02-860-005-G00

CAUTION

DO NOT OPERATE THE THRUST REVERSER WHEN ELECTRICAL-POWER INTERRUPTIONS CAN OCCUR (FOR MORE THAN A NORMAL BUS-TRANSFER). IF YOU INTERRUPT THE ELECTRICAL POWER WHILE THE THRUST REVERSER IS IN TRANSIT, DAMAGE TO THE SYNC LOCKS CAN OCCUR. IF THAT OCCURS, YOU MUST COMPLETE THE SYNC-LOCK OPERATIONAL TEST.

(1) Do not operate the thrust reverser if there will be electrical power interruptions (for more than a normal bus transfer) while the thrust reverser is in transit.

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SUBTASK 78-36-02-860-019-G00

(2) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 78-36-02-860-020-G00

(3) For the applicable engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-36-02-860-021-G00

(4) For the left engine, open this circuit breaker and install safety tag:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-36-02-860-022-G00

(5) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-36-02-860-023-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-36-02-860-007-G00

(7) Make sure that the applicable thrust reverser is closed.

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(a) If it is necessary, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 78-36-02-860-029-G00

(8) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 78-36-02-860-030-G00

(9) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 78-36-02-860-008-G00

(10) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 78-36-02-860-011-G00

(11) Make sure that the applicable thrust lever is in the idle position.

(a) Attach a DO NOT OPERATE tag, STD-858.

SUBTASK 78-36-02-860-012-G00

(12) Make sure that the applicable reverse thrust lever is in the retract (stow) position.

(a) Make sure that the thrust reverser is in the retracted (stowed) position.

SUBTASK 78-36-02-860-024-G00

(13) Make sure that the EEC Data Load and Trim Balance Functions are inactive.

SUBTASK 78-36-02-860-006-G00

WARNING

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. THE AILERONS, RUDDER, ELEVATORS, FLAPS, SLATS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(14) Put the applicable HYD PUMPS A ENG 1 or HYD PUMPS B ENG 2 switch to the ON position.

F. Linear Variable Differential Transformer (LVDT) - Adjustment

SUBTASK 78-36-02-710-002-G00

(1) Use the Multi-Function Display (MFD) screen to do a check of the LVDT position values with the thrust reverser in the retracted (stowed) position:

(a) Select the EPCS page 1 from the Maintenance Data Pages on the Multi-Function Display (MFD).

(b) Make sure that the position values that are shown for the applicable thrust reverser sleeve are in the limits that follow:

NOTE: The range limit is -5.0% to 112.0%. If the indication is out of range, less than -5.0% or greater than 112.0%, the field will be blank.

1) The position channel A limit, is 0.0 ±4%.

2) The position channel B limit, is 0.0 ±4%.

(c) If the position values are not in the limits, do the steps that follow to adjust the LVDT in the retracted (stowed) position.

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(d) If the position values are in the limits, continue at the steps below to do a check of the position values with the thrust reverser in the extended (deployed) position.

SUBTASK 78-36-02-820-001-G00

(2) Do these steps to adjust the LVDT on the applicable thrust reverser in the retracted (stowed) position:

(a) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(b) Loosen the jamnut [1] on the LVDT transducer.

(c) Turn the rod a small amount in one direction or the other to get the correct value.

NOTE: After the rod is turned, the new value will show on the MFD in approximately two seconds.

1) Wait for approximately two seconds.

2) Make sure that the position channel A limit, for the applicable thrust reverser sleeve, is 0.0 ±4%.

3) Make sure that the position channel B limit, for the applicable thrust reverser sleeve, is 0.0 ±4%.

(d) If the position values are not in the limits, continue to turn the rod until the values are correct.

(e) If the position values are in the limits, tighten the jamnut [1] to 20 in-lb (2.3 N·m)-30 in-lb (3.4 N·m).

1) Make sure that the position values are still in the limits.

SUBTASK 78-36-02-710-003-G00

WARNING MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION DO NOT EXTEND THE THRUST REVERSER SLEEVE IF THE THRUST REVERSER IS OPEN. DAMAGE TO THE THRUST REVERSER AND ADJACENT STRUCTURES CAN OCCUR.

(3) Do these steps to do a check of the LVDT position values with the thrust reverser in the extended (deployed) position:

(a) Do this task: Thrust Reverser Operation - Extend (Selection), TASK 78-31-00-980-801-G00.

(b) Make sure that the REV light turns amber when the thrust reverser sleeves are in transit and then turns green when the thrust reverser is fully extended.

(c) Make sure that the position values that are shown for the left and right thrust reversers are in the limits that follow:

NOTE: The range limit is -5.0% to 112.0%. If the indication is out of range, less than -5.0% or more than 112.0%, the field will be blank.

1) Make sure that the position channel A limit, is 100.0 ±5%.

2) Make sure that the position channel B limit, is 100.0 ±5%.

(d) If the position values are in the limits, continue at the steps below to do a check that the position values are still in the limits in the retracted (stowed) position.

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(e) If the position values are not in the limits, do the steps that follow to adjust the LVDT in the extended (deployed) position.

SUBTASK 78-36-02-710-004-G00

(4) Do these steps to adjust the LVDT on the applicable thrust reverser in the extended (deployed) position:

(a) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(b) Loosen the jamnut [1] on the LVDT transducer.

(c) Turn the rod a small amount in one direction or the other to get the correct value.

NOTE: After the rod is turned, the new value will show on the MFD in approximately two seconds.

1) Wait for approximately two seconds.

2) Make sure that the position channel A limit, is 100.0 ±5%.

3) Make sure that the position channel B limit, is 100.0 ±5%.

(d) If the position values are not in the limits, continue to turn the rod until the values are correct.

(e) If the thrust reverser sleeve is in the limits, tighten the jamnut [1] to 20 in-lb (2.3 N·m)-30 in-lb (3.4 N·m).

1) Make sure that the position values are still in the limits.

SUBTASK 78-36-02-820-002-G00

(5) Do these steps to make sure that the position values for the applicable thrust reverser sleeve are still in the limits in the retracted (stowed) position:

NOTE: If the TR Special Function has timed out because there was no movement of the throttle levers for greater than 5 minutes, the TR Special Function will have to be restarted.

(a) Move the applicable reverse thrust lever to the retract (stow) position.

(b) Make sure that the position channel A limit, is 0.0 ±4%.

(c) Make sure that the position channel B limit, is 0.0 ±4%.

(d) If the position values are not in the limits, do the adjustments at the retracted (stowed) and extended (deployed) positions again.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 78-36-02-410-002-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 78-36-02-860-031-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 78-36-02-860-032-G00

(3) Set the GND TEST switch on the maintenance BITE panel, P61-4, to the NORM position.

SUBTASK 78-36-02-860-013-G00

(4) Put the applicable HYD PUMPS A ENG 1 or HYD PUMPS B ENG 2 switch to the OFF position.

SUBTASK 78-36-02-860-016-G00

(5) Remove the DO NOT OPERATE tag, STD-858, from the applicable thrust lever.

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SUBTASK 78-36-02-860-018-G00

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	9	C00440	FLIGHT CONTROL AUTO SPEED BRAKE

SUBTASK 78-36-02-860-025-G00

(7) For the left engine, remove the safety tag and close this circuit breaker:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

SUBTASK 78-36-02-860-026-G00

(8) For the right engine, remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 78-36-02-860-027-G00

(9) For the applicable engine, remove the safety tags and close these applicable circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 78-36-02-860-028-G00

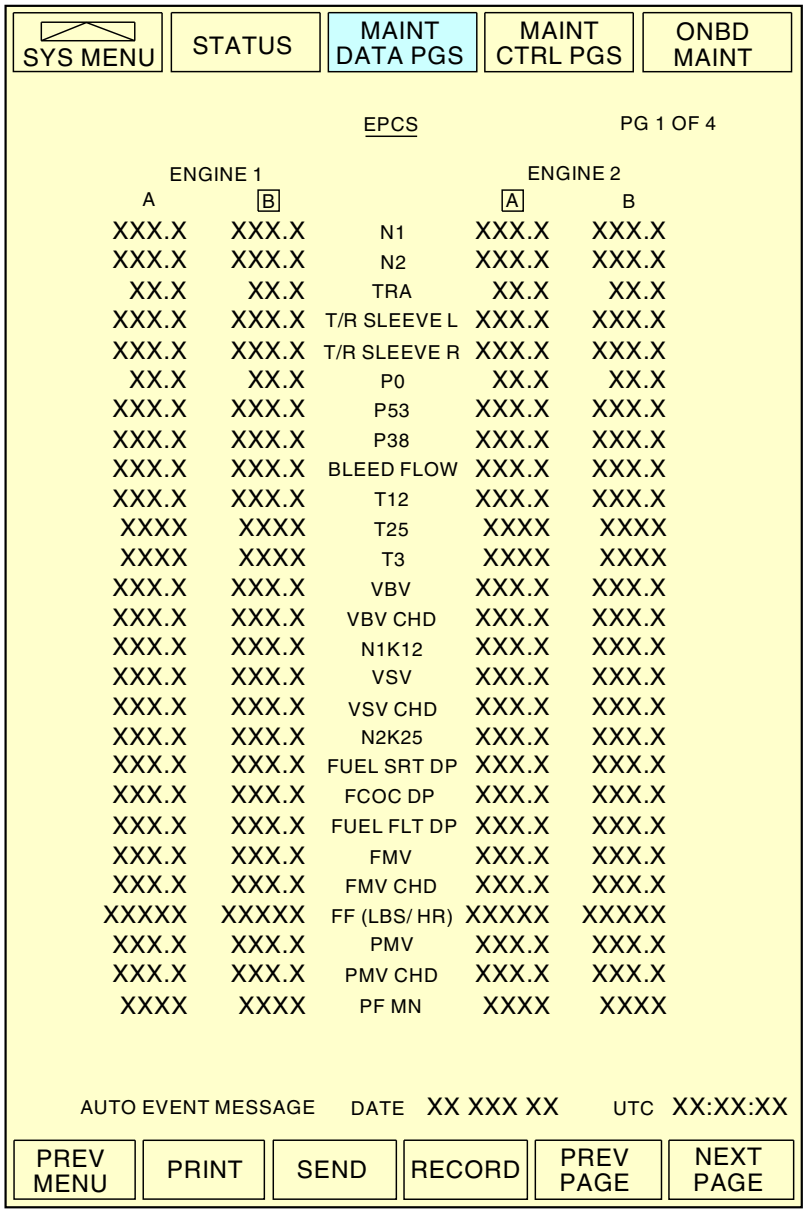
(10) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

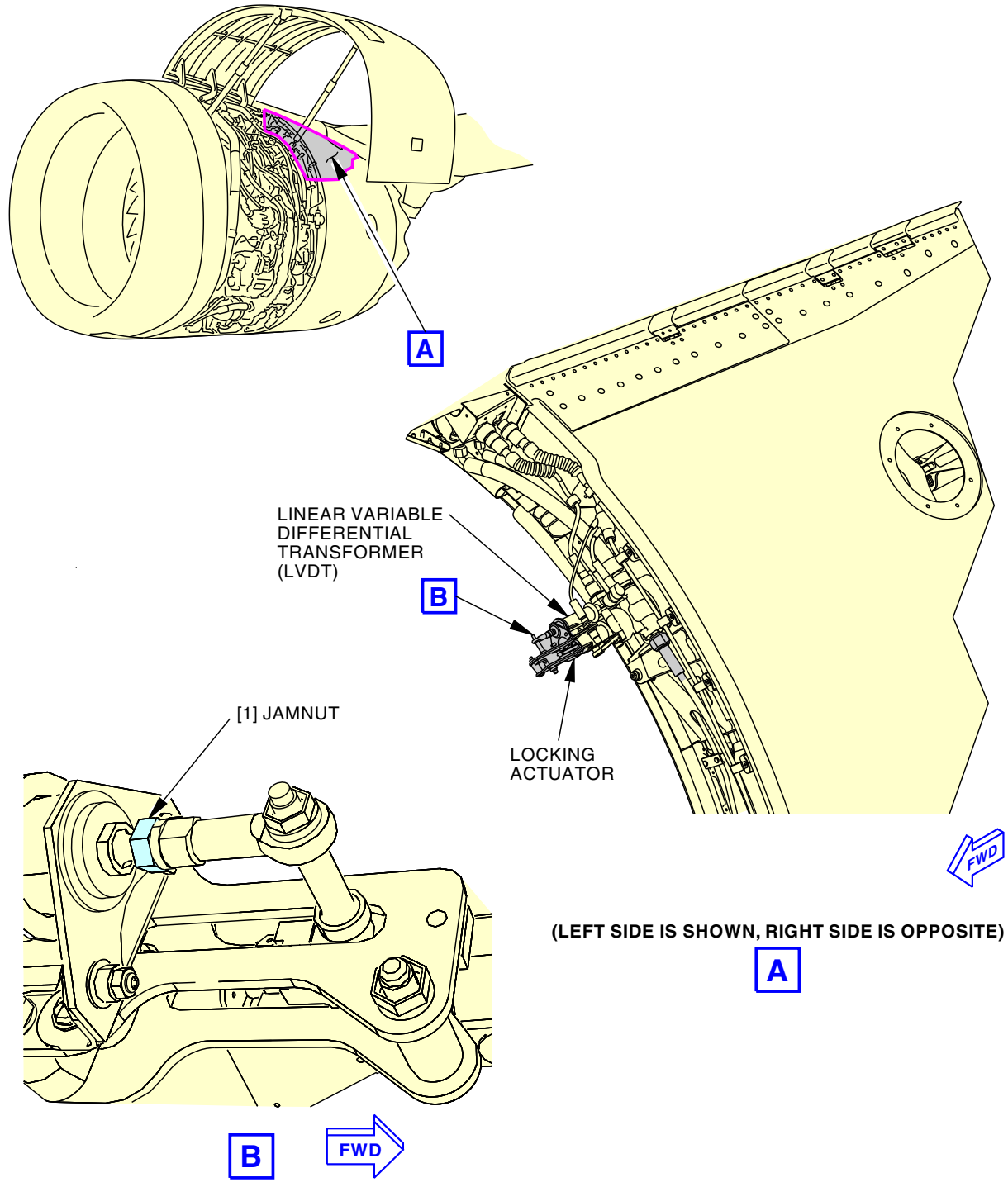
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EPCS Page 1 Status Display
Figure 501/78-36-02-990-804-G00

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Linear Variable Differential Transformer Adjustment
Figure 502/78-36-02-990-803-G00

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