# **CHAPTER**

# 4

# INERT GAS SYSTEM



# CHAPTER 47 INERT GAS SYSTEM

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47-EFFECTIV	E PAGES		47-00-00			47-11-02	(cont)	
1 thru 5	SEP 05/2018		601	May 05/2015		410	May 05/2017	
6	BLANK		602	Jan 05/2015		47-11-03		
47-CONTENT	S		603	Sep 05/2017		401	Sep 05/2017	
1	Sep 05/2017		604	Sep 05/2017		402	Jul 25/2018	
2	Jan 05/2017		605	Sep 05/2017		403	Sep 05/2017	
3	Sep 05/2017		606	Sep 05/2017		404	Sep 05/2016	
4	May 05/2017		607	Jan 05/2015		405	Sep 05/2016	
5	Jan 05/2018		608	BLANK		406	Jul 25/2018	
6	Jan 05/2017		47-00-00			407	Sep 05/2017	
7	Sep 05/2017		901	Sep 05/2017		408	Jul 25/2018	
8	BLANK		902	Sep 05/2017		409	Sep 05/2017	
47-00-00			903	Sep 05/2016		410	BLANK	
201	Jan 05/2016		904	Sep 05/2016		47-21-00		
202	Sep 05/2017		905	Sep 05/2017		201	Jan 05/2016	
203	Sep 05/2017		906	Sep 05/2016		202	BLANK	
204	Sep 05/2017		47-11-01			47-21-00		
205	Sep 05/2017		401	Sep 05/2015		601	May 05/2015	
206	Sep 05/2017		402	Sep 05/2017		602	May 05/2015	
207	Sep 05/2017		403	Sep 05/2017		603	Sep 05/2017	
208	Sep 05/2017		404	Sep 05/2016		604	May 05/2015	
209	Sep 05/2017		405	Sep 05/2016		605	May 05/2015	
210	Sep 05/2017		406	Sep 05/2016		606	May 05/2015	
211	Sep 05/2017		407	Sep 05/2017		607	Sep 05/2017	
212	Sep 05/2017		408	Sep 05/2017		608	Sep 05/2017	
213	Sep 05/2017		409	Sep 05/2017		609	May 05/2015	
214	Sep 05/2017		410	BLANK		610	BLANK	
215	Sep 05/2017		47-11-02			47-21-01		
216	Sep 05/2017		401	Sep 05/2017		201	May 05/2018	
217	Sep 05/2017		402	Sep 05/2017		202	Jan 05/2015	
218	Sep 05/2017		403	Jan 05/2015		203	Jan 05/2015	
219	Sep 05/2017		404	Sep 05/2016		204	Jan 05/2015	
220	Sep 05/2017		405	Sep 05/2016		205	Jan 05/2015	
221	Sep 05/2017		406	May 05/2018		206	May 05/2018	
222	Sep 05/2017		407	Sep 05/2017		207	Jan 05/2015	
223	Sep 05/2017		408	Sep 05/2017		208	Jan 05/2015	
224	Sep 05/2017		409	Sep 05/2017		209	Jan 05/2015	

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47-21-01	(cont)		47-21-05			47-31-02	(cont)	
210	Jan 05/2015		401	May 05/2018		205	Jan 05/2016	
211	Jan 05/2015		402	Sep 05/2017		206	Jan 05/2016	
212	BLANK		403	Sep 05/2016		207	Jan 05/2016	
47-21-02			404	Sep 05/2016		208	Jan 05/2016	
401	May 05/2018		405	May 05/2018		209	Jan 05/2016	
402	Sep 05/2017		406	Sep 05/2017		210	Jan 05/2015	
403	Sep 05/2017		47-21-05			211	Jan 05/2015	
404	May 05/2017		601	Sep 05/2017		212	Jan 05/2015	
405	May 05/2017		602	Sep 05/2017		213	Jan 05/2015	
406	May 05/2017		603	Sep 05/2017		214	Jan 05/2016	
407	May 05/2018		604	Sep 05/2016		215	Sep 05/2016	
408	May 05/2015		47-21-06			216	Sep 05/2016	
47-21-03			401	May 05/2018		217	Sep 05/2016	
401	Sep 05/2017		402	Sep 05/2017		218	Jan 05/2015	
402	Sep 05/2017		403	Sep 05/2017		219	Sep 05/2016	
403	Sep 05/2016		404	Sep 05/2017		220	Jan 05/2015	
404	Sep 05/2016		405	Sep 05/2017		221	Jan 05/2015	
405	Sep 05/2017		406	May 05/2018		222	May 05/2016	
406	Sep 05/2017		407	Sep 05/2017		223	Jan 05/2015	
47-21-04	·		408	Sep 05/2017		224	Jan 05/2015	
401	Sep 05/2017		409	Sep 05/2017		225	Jan 05/2016	
402	Sep 05/2017		410	Sep 05/2017		226	Jan 05/2016	
403	Sep 05/2016		47-31-01			227	Sep 05/2016	
404	Sep 05/2016		401	May 05/2016		228	Sep 05/2016	
405	May 05/2018		402	Jan 05/2015		229	Jan 05/2016	
406	May 05/2015		403	Sep 05/2016		230	Sep 05/2016	
407	Sep 05/2017		404	Sep 05/2016		231	Sep 05/2016	
408	Sep 05/2017		405	May 05/2018		232	Sep 05/2016	
409	Sep 05/2016		406	May 05/2017		233	Jan 05/2015	
410	Sep 05/2017		407	May 05/2017		234	Jan 05/2015	
411	May 05/2018		408	BLANK		235	Jan 05/2015	
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413	Sep 05/2017		201	Sep 05/2017		237	Jan 05/2015	
414	BLANK		202	Jan 05/2015		238	Jan 05/2015	
	52 WW		203	Jan 05/2015		239	Jan 05/2015	
			204	Jan 05/2015		240	Jan 05/2017	

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47-31-02	(cont)		47-32-02			47-32-05		
241	Jan 05/2015		401	May 05/2018		401	Sep 05/2017	
242	Jan 05/2015		402	May 05/2018		402	Sep 05/2017	
243	Jan 05/2015		403	May 05/2018		403	Sep 05/2016	
244	Jan 05/2016		404	Sep 05/2016		404	Sep 05/2016	
245	Sep 05/2016		405	Sep 05/2016		R 405	Sep 05/2018	
246	Jan 05/2015		406	Sep 05/2016		406	Sep 05/2017	
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250	Jan 05/2017		410	May 05/2018		401	Sep 05/2015	
251	Jan 05/2017		411	May 05/2018		402	Sep 05/2017	
252	Jan 05/2015		412	BLANK		403	Sep 05/2017	
253	Jan 05/2015		47-32-03			404	Sep 05/2016	
254	Sep 05/2016		401	Sep 05/2015		405	Sep 05/2016	
255	Sep 05/2016		402	Sep 05/2017		406	Sep 05/2016	
256	Sep 05/2016		403	Jul 25/2018		407	May 05/2018	
47-31-02			404	May 05/2017		408	Sep 05/2017	
401	Jan 05/2015		405	May 05/2017		409	Sep 05/2017	
402	Jan 05/2015		406	May 05/2017		410	Sep 05/2017	
403	Sep 05/2016		407	Jul 25/2018		47-32-11		
404	Sep 05/2016		408	Jul 25/2018		401	Jan 05/2018	
405	Jul 25/2018		409	Jul 25/2018		402	Jan 05/2018	
406	Jan 05/2018		410	Jul 25/2018		403	Jan 05/2018	
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401	Sep 05/2017		412	Jul 25/2018		405	Jan 05/2018	
402	Sep 05/2017		47-32-04			406	May 05/2018	
403	Sep 05/2017		401	Sep 05/2017		407	Jan 05/2018	
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408	Sep 05/2017		406	May 05/2018		401 402	Jul 25/2018 Jul 25/2018	
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47-32-14	(cont)		47-32-18			47-42-05		
406	Sep 05/2016		401	May 05/2016		401	Sep 05/2017	
407	Sep 05/2016		402	Jan 05/2015		402	Sep 05/2017	
408	Jul 25/2018		403	Sep 05/2016		403	Sep 05/2017	
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412	BLANK		407	Sep 05/2017		407	Sep 05/2017	
47-32-15			408	Sep 05/2017		408	Sep 05/2017	
401	Sep 05/2015		47-42-02			47-43-01		
402	Sep 05/2017		401	May 05/2015		401	Sep 05/2015	
403	Sep 05/2017		402	Sep 05/2017		402	Sep 05/2017	
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406	Sep 05/2016		405	Sep 05/2017		405	Sep 05/2017	
407	Sep 05/2017		406	Sep 05/2017		406	Sep 05/2017	
408	Sep 05/2017		47-42-03			407	Sep 05/2017	
409	Sep 05/2017		401	Sep 05/2017		408	Sep 05/2017	
410	Sep 05/2017		402	Sep 05/2017		47-43-02		
47-32-16			403	Sep 05/2016		401	Sep 05/2017	
401	Sep 05/2017		404	Sep 05/2016		402	Sep 05/2017	
402	Sep 05/2017		405	May 05/2018		403	Sep 05/2017	
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405	Sep 05/2017		408	BLANK		406	Sep 05/2017	
406	May 05/2017		47-42-04			407	Sep 05/2017	
47-32-17			401	Sep 05/2015		408	Sep 05/2017	
401	Sep 05/2015		402	Sep 05/2017		47-43-03	COP 00/2011	
402	Sep 05/2017		403	Sep 05/2017		401	Sep 05/2017	
403	Sep 05/2017		404	Sep 05/2016		401	-	
404	Sep 05/2016		405	Sep 05/2016		402	Sep 05/2017 Sep 05/2016	
405	Sep 05/2016		406	Jul 25/2018			·	
406	May 05/2018		407	Sep 05/2017		404	Sep 05/2016	
407	Sep 05/2017		408	May 05/2015		405	Sep 05/2017	
408	Sep 05/2017		47-42-04			406	Sep 05/2017	
409	Sep 05/2017		501	May 05/2015		407	Sep 05/2017	
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47-43-04								
401	Sep 05/2017							
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Nitrogen Generation System - Deactivation TASK 47-00-00-040-802		218	ARO ALL
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MEL 47-11-1 Reactivation Procedure - Nitrogen Generation System TASK 47-00-00-440-801		905	ARO ALL
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Overtemperature Shutoff Valve (OTSOV) Removal TASK 47-11-03-000-801		401	ARO ALL
Overtemperature Shutoff Valve (OTSOV) Installation TASK 47-11-03-400-801		406	ARO ALL
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Nitrogen Enriched Air Distribution System (NEADS) Line - Visual Inspection TASK 47-21-00-700-802		603	ARO ALL
Nitrogen Enriched Air Distribution System Line - Leak Inspection TASK 47-21-00-700-803		606	ARO ALL
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Connect the Threaded Closure Coupling TASK 47-21-01-900-802		206	ARO ALL
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DRAIN VALVE - REMOVAL/INSTALLATION	47-21-03	401	ARO ALL
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Nitrogen Generation System (NGS) Controller Installation TASK 47-31-01-400-801		405	ARO ALL



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BDU Existing Fault Menu TASK 47-31-02-740-802		210	ARO ALL
BDU Fault History Menu TASK 47-31-02-740-803		220	ARO ALL
BDU Ground Test Menu TASK 47-31-02-740-804		233	ARO ALL
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BITE Display Unit Installation TASK 47-31-02-400-801		405	ARO ALL
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NGS Shutoff Valve Installation TASK 47-32-01-400-801		406	ARO ALL
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Ozone Converter Installation TASK 47-32-02-400-801		407	ARO ALL
HEAT EXCHANGER - REMOVAL/INSTALLATION	47-32-03	401	ARO ALL
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Temperature Control Valve Installation TASK 47-32-09-400-801			407	ARO ALL
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Fan Installation TASK 47-32-11-400-801			406	ARO ALL
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Regenerative Heat Exchanger Installation TASK 47-32-14-400-801			408	ARO ALL
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Turbo Compressor Installation TASK 47-32-15-400-801			407	ARO ALL



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Turbo Compressor Check Valve Installation TASK 47-32-16-400-801		405	ARO ALL
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Turbo Compressor Shutoff Valve Removal TASK 47-32-17-000-801		401	ARO ALL
Turbo Compressor Shutoff Valve Installation TASK 47-32-17-400-801		406	ARO ALL
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Differential Pressure Sensor Removal TASK 47-42-02-000-801		401	ARO ALL
Differential Pressure Sensor Installation TASK 47-42-02-400-801		405	ARO ALL
OXYGEN SENSOR - REMOVAL/INSTALLATION	47-42-03	401	ARO ALL
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Oxygen Sensor Installation TASK 47-42-03-400-801		405	ARO ALL
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Filter Differential Pressure Switch Installation TASK 47-43-01-400-801		406	ARO ALL
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Thermal Switch Installation TASK 47-43-02-400-801		406	ARO ALL
TEMPERATURE SENSOR - REMOVAL/INSTALLATION	47-43-03	401	ARO ALL
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Temperature Sensor Installation TASK 47-43-03-400-801		405	ARO ALL
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Pressure Sensor Installation TASK 47-43-04-400-801		406	ARO ALL



### **NITROGEN GENERATION SYSTEM - MAINTENANCE PRACTICES**

### 1. General

- A. This procedure has these tasks:
  - (1) Airworthiness Limitation Precautions
  - (2) Nitrogen Generation System Precautions
  - (3) Ground Operation of the Nitrogen Generation System
  - (4) Nitrogen Generation System Deactivation
  - (5) Nitrogen Generation System Activation

### TASK 47-00-00-910-801

### 2. Airworthiness Limitation Precautions

### A. General

- (1) Critical Design Configuration Control Limitations (CDCCLs)
  - (a) All occurrences of CDCCLs found in this chapter of the AMM are identified by this note after each applicable CDCCL design feature:
    - NOTE: CDCCL Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
  - (b) Design features that are identified as CDCCLs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Section 9 of the Maintenance Planning Data (MPD) document. These design features are a means of identifying certain design configuration features intended to preclude a fuel tank ignition source for the operational life of the airplane. CDCCLs are mandatory and cannot be changed or deleted without the approval of the FAA Oversight Office that is responsible for the airplane model Type Certificate. A critical fuel tank ignition source prevention feature may exist in the fuel system and its related installation or in systems that, if a failure condition were to develop, could interact with the fuel system in such a way that an unsafe condition would develop without this limitation. Strict adherence to configuration, methods, techniques, and practices as prescribed is required to ensure the CDCCL is complied with. Any use of parts, methods, techniques or practices not contained in the applicable CDCCL must be approved by the FAA Oversight Office that is responsible for the airplane model Type Certificate.
- (2) Airworthiness Limitation Instructions (ALIs)
  - (a) All occurrences of fuel tank system ALIs found in this chapter of the AMM are identified by this note after each applicable ALI inspection feature:
    - NOTE: ALI Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

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(b) Inspection features that are ALIs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Section 9 of the Maintenance Planning Data (MPD) document. These ALIs identify inspection features related to fuel tank ignition source prevention which must be done to maintain the design level of safety for the operational life of the airplane. These inspection features are mandatory and cannot be changed or deleted without the approval of the FAA Oversight Office that is responsible for the airplane model Type Certificate. Strict adherence to methods, techniques and practices as prescribed is required to ensure the ALI is complied with. Any use of methods, techniques or practices not contained in these ALIs must be approved by the FAA Oversight Office that is responsible for the airplane model Type Certificate.

### B. Location Zones

Zone	Area
100	Lower Half of Fuselage
200	Upper Half of Fuselage
300	Empennage and Body Section 48
400	Powerplants and Nacelle Struts
500	Left Wing
600	Right Wing

### C. Critical Design Configuration Control Limitations (CDCCLs)

SUBTASK 47-00-00-910-001



OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO MAINTENANCE THAT HAS AN EFFECT ON A CDCCL. IF YOU DO NOT OBEY THE PROCEDURES, IT CAN INCREASE THE RISK OF A SOURCE OF FUEL TANK IGNITION. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR IF THERE IS A FIRE OR EXPLOSION.

- (1) Make sure you follow the procedures for items identified as CDCCLs.
- D. Airworthiness Limitation Instructions (ALIs)

SUBTASK 47-00-00-910-002



OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO ANY MAINTENANCE THAT MAY AFFECT AN ALI. IF YOU DO NOT FOLLOW THE PROCEDURES, IT CAN INCREASE THE RISK OF A FUEL TANK IGNITION SOURCE.

(1) Make sure you follow the procedures for the items identified as ALIs.

——— END OF TASK ———

### TASK 47-00-00-910-802

### 3. Nitrogen Generation System Precautions

(Figure 201)

### A. References

Reference	Title
28-11-00-650-801	Purging and Fuel Tank Entry Precautions (P/B 201)

### B. Location Zones

Zone	Area	
134	Wing Center Section, Right	

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### (Continued)

Zone	Area
192	Forward Wing-to-Body Fairings, Right
531	Center Fuel Tank - Rib 1 to Rib 8 - Left Wing
542	Main Tank - rib 32 to rib 34 - WS 1021.5 to WS 1074
631	Center Fuel Tank - Rib 1 to Rib 8 - Right Wing

### C. General

### SUBTASK 47-00-00-910-003

- (1) This task has these procedures:
  - (a) Physiological Effects of a Low Oxygen Content Environment
  - (b) Fuel Tank Entry Precautions
  - (c) Air Conditioning Compartment Precautions
  - (d) Nitrogen Generation System Maintenance Precautions
  - (e) Air Separation Module Precautions
- (2) The NGS is an inert gas system that decreases the flammability of the center tank. Fresh air contains approximately 78% nitrogen and 21% oxygen. The NGS separates the nitrogen and oxygen into nitrogen-enriched air (NEA) and oxygen-enriched air (OEA). NEA increases the nitrogen content and displaces the oxygen of the air. If you breathe air that does not have sufficient oxygen, health problems can occur. Obey the precautions in this procedure if you do maintenance in an area where you could breathe air that does not have sufficient oxygen.
- (3) The NGS components are found in the forward wing-to-body fairing on the left and right side of the airplane. Access to the thermal control unit (TCU) is through access door 191QL, while access to the air separation unit (ASU) is through access door 192QR. A 1.5 in. (3.8 cm) NEA duct is attached to the outlet side of the ASU. The distribution duct sends NEA from the ASU to the center tank.
- (4) The usual operation of the NGS causes the air in the fuel tanks to have decreased oxygen for 24 hours. Do not breathe the air in a fuel tank unless that tank has sufficient air flow. Follow the procedures for fuel tank purging and entry in Chapter ATA 28, Fuel Systems. Stencils and placards tell you that it is dangerous to breathe air with low oxygen content. These are adjacent to fuel tank access doors, and areas where there could be air without sufficient oxygen.
- (5) NEA that is generated by the ASU is routed safely to the center tank. The usual operation of the nitrogen generation system outside of the fuel tanks is free from concentrations of NEA. However, a duct leak, or component failure can cause NEA to go into areas outside of the fuel tanks. An NEA leak can cause a condition where the oxygen content of the air is decreased. Caution stencils and placards are installed on access doors adjacent to areas where potential NEA leakage can occur.
- (6) If you make a decision not to do this recommended procedure, you must have an approved alternate procedure. Make sure the conditions during maintenance operations give sufficient protection to the persons and equipment used in this procedure. It is possible that local fire codes, and standards make it necessary to use more restrictive procedures or more procedures than those given in this procedure.

### D. Physiological Effects of a Low Oxygen Content Environment

SUBTASK 47-00-00-910-004

(1) NEA increases the nitrogen content and decreases the oxygen of the air. If you breathe air without sufficient oxygen, it can have dangerous and immediate effects.

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Make sure that you read and obey the warning placard in areas where you can find nitrogen enriched air. Read and obey the warnings in the maintenance instructions. The NGS equipment is dangerous because you cannot see or smell nitrogen. The equipment decreases the oxygen in the air to a condition that is not health-safe. It can cause hypoxia. Hypoxia can make you dizzy, nauseous, unconscious, and can kill you.

- (a) A person that breathes air with a low oxygen content cannot sense that the oxygen level is too low. The victim can become unconscious before the person is aware of the low oxygen content air.
- (b) An organic vapor filter respirator will not help you breathe in a low oxygen environment.

### E. Fuel Tank Entry Precautions

SUBTASK 47-00-00-920-001



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

(1) For NGS related fuel tank purging and entry precautions obey the steps in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-650-801.

### F. Forward Wing to Body Fairing Precautions

SUBTASK 47-00-00-910-009



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.



WHEN YOU DO A TEST OF THE SYSTEM, MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW IN THE AREA. USE LIFE SUPPORT EQUIPMENT IF YOU THINK THAT THERE IS A HIGH NITROGEN CONCENTRATION. LOW OXYGEN LEVELS IN THE AIR ARE DANGEROUS TO PERSONNEL.

- (1) Obey these precautions for maintenance tasks in the Forward Wing to Body Fairing Panels:
  - (a) Make sure that a person is present to help you if necessary.
  - (b) Use extreme caution when you go into any of the forward wing to body fairing panels.
  - (c) Do not go into the forward wing to body fairing panels more than to waist level.
  - (d) If there is an obvious NGS or NEADS leak, get out of the area and shut down the NGS.
  - (e) There are no restrictions if the NGS system is locked out.

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### G. Nitrogen Generation System Maintenance Precautions

SUBTASK 47-00-00-910-005



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

- (1) Obey these precautions:
  - (a) Use caution and sufficient protection when you are near the NGS components.

NOTE: The nitrogen generation equipment gets air from the wing bleed crossover duct. The heat exchanger decreases the air temperature from 300°F (149°C) - 400°F (204°C) to 170°F (76.7°C). A temperature of170°F (76.7°C) will burn you if you touch the components.

SUBTASK 47-00-00-910-006



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(2) Make sure that you remove the bleed air source and release pressure before you disconnect the system components or ducts.

NOTE: The bleed air source gives high pressure air to the ASU and filter components.

### H. Air Separation Module Precautions

SUBTASK 47-00-00-910-007



DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES TOUCH THE FIBERS IN THE AIR SEPARATION MODULE (ASM). CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS, AND DECREASE THE LIFE OF THE ASM.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Make sure the maintenance area is free from solvents, fuel, dust and lubricants that can contaminate the ASM fibers.

NOTE: The ASM fibers are easily contaminated.

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SUBTASK 47-00-00-910-008



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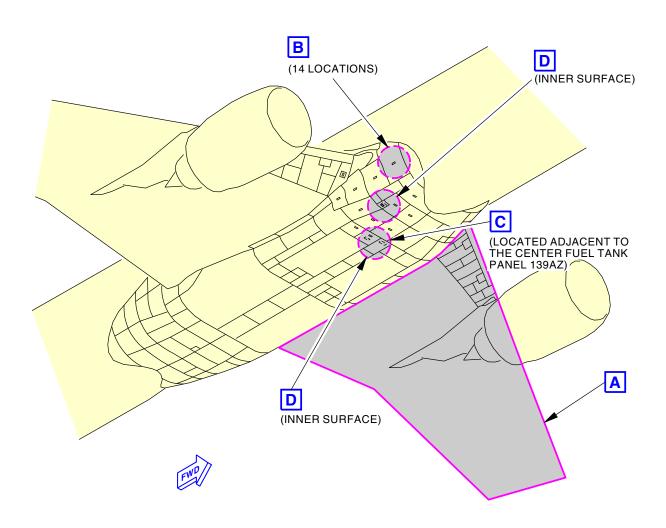
USE ONLY THE SPECIFIED GREASE WHEN YOU INSTALL THE COMPONENTS FOR THE NITROGEN GENERATION SYSTEM. OTHER LUBRICANTS, OR THEIR FUMES, CAN FLOW THROUGH THE NGS DUCTS AND CAUSE DAMAGE TO THE FIBERS IN THE ASM. DAMAGED FIBERS WILL DECREASE THE LIFE OF THE ASM.

(2) Use only approved lubricant for the ASM and TCU.

NOTE: Unapproved lubricants can damage the fibers in the ASM.

----- END OF TASK -----





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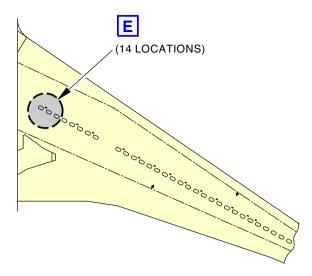
### Nitrogen Gas System Markings Figure 201/47-00-00-990-801 (Sheet 1 of 3)

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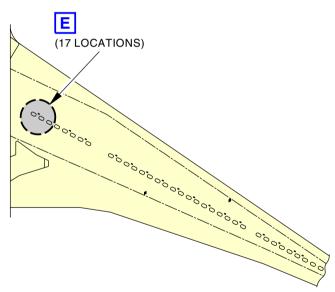
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# LOWER SURFACE OF LEFT WING (RIGHT WING IS OPPOSITE)





LOWER SURFACE OF LEFT WING (RIGHT WING IS OPPOSITE)



1 777-200, 777-200ER AIRPLANES

2 777-200LR, 777-300, 777-300ER AIRPLANES

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Nitrogen Gas System Markings Figure 201/47-00-00-990-801 (Sheet 2 of 3)

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LOW OXYGEN CONTENT POSSIBLE **DURING NITROGEN GENERATION** SYSTEM OPERATION. **OBEY EMPLOYER SAFETY PROCEDURES** FAILURE TO OBEY MAY CAUSE INJURY.



Low Oxygen or Flammable Contents. Nitrogen Generation System Installed. Obey Fuel Tank Entry Procedures. Refer to AMM 28-11-00. Failure to Obey Will Cause Serious Injury or Death.



# **!** CAUTION

Low Oxygen Content Possible **During Nitrogen Generation** System Operation. Obey Employer Safety Procedures. Failure to Obey May Cause Injury.





# DANGER

LOW OXYGEN OR FLAMMABLE CONTENTS. NITROGEN GENERATION SYSTEM INSTALLED. OBEY FUEL TANK ENTRY PROCEDURES. REFER TO AMM 28-11-00. FAILURE TO OBEY WILL CAUSE SERIOUS INJURY OR DEATH.



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**Nitrogen Gas System Markings** Figure 201/47-00-00-990-801 (Sheet 3 of 3)

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### TASK 47-00-00-910-803

### 4. Ground Operation of the Nitrogen Generation System

### A. General

- (1) This task contains these procedures:
  - (a) Prepare for the Ground Operation of the Nitrogen Generation System
  - (b) Electrical Test of the Nitrogen Generation System
  - (c) System Test for the Nitrogen Generation System
  - (d) Ground Operation of the Nitrogen Generation System (Non-Boosted Mode)
  - (e) Ground Operation of the Nitrogen Generation System (Boosted Mode)
  - (f) Put the Airplane Back to the Usual Condition

### B. References

Reference	Title	
24-22-00-860-805	Supply Electrical Power (P/B 201)	
32-09-00-040-801	Air Mode Simulation - Preparation (P/B 201)	
32-09-00-440-801	Air Mode Simulation - Restoration (P/B 201)	
32-09-00-860-801	Air/Ground Mode Simulation (P/B 201)	
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)	
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)	
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)	
47-31-02 P/B 201	BITE DISPLAY UNIT - MAINTENANCE PRACTICES	

### C. Location Zones

Zone	Area
195	Underwing Wing-to-Body Fairings, Left
196	Underwing Wing-to-Body Fairings, Right

### D. Access Panels

Number	Name/Location
195CL	ECS Low Pressure Connection Door
196CR	ECS Low Pressure Connection Door
521DB	Refueling Station Door
621DB	Refueling Station Door

### E. Prepare for the Ground Operation of the Nitrogen Generation System

### SUBTASK 47-00-00-860-001

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-805.

### SUBTASK 47-00-00-860-002

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

<u>Number</u>	Name/Location
521DB	Refueling Station Door
621DB	Refueling Station Door

### SUBTASK 47-00-00-860-003

- (3) Make sure that the airplane is in the ground mode.
  - (a) If the airplane is in the air mode, do these tasks:
    Air Mode Simulation Preparation, TASK 32-09-00-040-801

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Air/Ground Mode Simulation, TASK 32-09-00-860-801

### SUBTASK 47-00-00-860-012

(4) Make sure the GND TEST switch on the P61 panel is in the ENABLE position.

### SUBTASK 47-00-00-860-004

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

### SUBTASK 47-00-00-010-003

(6) Open these access panels:

<u>Number</u>	Name/Location
195CL	ECS Low Pressure Connection Door
196CR	ECS Low Pressure Connection Door

### F. Electrical Test of the Nitrogen Generation System

NOTE: This procedure does a test of the nitrogen generation system (NGS) power and initiated built-in-test (IBIT) equipment.

NOTE: The maintenance access terminal (MAT) or the NGS Bite Display Unit (BDU) is used to do the electrical test.

### SUBTASK 47-00-00-760-001

- (1) If you plan to do the electrical test from the MAT, do the steps that follow:
  - (a) Make these selections on the MAT:
    - ONBOARD MAINTENANCE
    - 2) LINE MAINTENANCE
    - 3) GROUND TESTS
    - 4) 47 Nitrogen Gas System
    - 5) SYSTEM TEST
    - 6) Nitrogen Generation System Electrical
  - (b) Do the instructions that show on the MAT and then make these selections:
    - 1) CONTINUE
    - 2) START TEST
  - (c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.
  - (d) If FAILED shows, select the maintenance message and select MAINTENANCE MESSAGE DATA, or refer to the applicable Maintenance Message Index in the FIM.
  - (e) When done with the electrical test from the MAT, do the steps that follow:

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Open and close this circuit breaker:

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-00-00-760-002

- (2) If you plan to do the electrical test from the BDU, do the steps that follow:
  - (a) Go to the NGS BDU location.
  - (b) Use the BDU keys to set up the applicable BITE initiated tests.
  - (c) Push the ON/OFF button on the BDU to energize the unit.

NOTE: If there is no activity for 5 minutes, the BDU will automatically go into the standby mode. If the BDU goes into the standby mode, push the ON/OFF button to go to the main menu.

- (d) Make sure that the BDU is in the main menu mode.
- (e) The BDU will show one of these functions:

NOTE: If the BDU does not show one of these functions, then push the MENU button until one of these functions shows:

- 1) EXISTING FAULTS?
- 2) FAULT HISTORY?
- 3) GROUND TESTS?
- 4) OTHER FUNCTIONS?
- (f) Push the up or down arrow until the BDU shows "GROUND TESTS?".
- (g) Push the YES button on the BDU.
- (h) Make sure that the BDU shows "ELECTRICAL TEST?"

NOTE: If the BDU does not show "ELECTRICAL TEST?", push the up or down arrow until "ELECTRICAL TEST?" shows.

- (i) Push the YES button on the BDU.
- (i) The BITE test will start.

NOTE: TEST IN PROGRESS XXX% COMPLETE will show on the display during the test.

- (k) Make sure that the BDU shows ELECTRICAL TEST PASS at the end of the test.
- (I) If the test fails, look at the BDU test results for the list of fault messages.

### G. System Test for the Nitrogen Generation System

NOTE: This procedure does an electrical check of the valves and sensors before the NGS shutoff valve opens and the NGS pressurizes.

NOTE: The maintenance access terminal (MAT) or the NGS Bite Display Unit (BDU) is used to do the system test.

### SUBTASK 47-00-00-860-014

(1) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

### SUBTASK 47-00-00-760-003

- (2) If you plan to do the system test from the MAT, do the steps that follow:
  - (a) Make these selections on the MAT:

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- 1) ONBOARD MAINTENANCE
- 2) LINE MAINTENANCE
- GROUND TESTS
- 4) 47 Nitrogen Gas System
- 5) SYSTEM TEST
- 6) Nitrogen Generation System
- (b) Do the instructions that show on the MAT and then make these selections:
  - 1) CONTINUE
  - 2) START TEST
- (c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.
- (d) If FAILED shows, select the maintenance message and select MAINTENANCE MESSAGE DATA, or refer to the applicable Maintenance Message Index in the FIM.
- (e) When done with the system test from the MAT, do the steps that follow:
  - 1) Open and close this circuit breaker:

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-00-00-760-004

- (3) If you plan to do the system test from the BDU, do the steps that follow:
  - (a) Go to the NGS BDU location.
  - (b) Use the BDU keys to set up the applicable BITE initiated tests.

NOTE: Refer to BITE DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 47-31-02/201 for information on the BDU menus.

(c) Push the ON/OFF button on the BDU to energize the unit.

NOTE: If there is no activity for 5 minutes, the BDU will automatically go into the standby mode. If the BDU goes into the standby mode, push the ON/OFF button to go to the main menu.

- (d) Make sure that the BDU is in the MAIN MENU mode.
- (e) The BDU will show one of these functions:

NOTE: If the BDU does not show one of these functions, then push the MENU button until one of these functions shows.

- 1) EXISTING FAULTS?
- 2) FAULT HISTORY?
- 3) GROUND TESTS?
- 4) OTHER FUNCTIONS?
- (f) Push the up or down arrow until the BDU shows GROUND TESTS?.
- (g) Push the YES button on the BDU.
- (h) Make sure that the BDU shows SYSTEM TEST?.

NOTE: If the BDU does not show SYSTEM TEST?, push the up or down arrow until SYSTEM TEST? shows.

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- (i) Push the YES button on the BDU.
- (i) The BITE test will start.

NOTE: TEST IN PROGRESS XXX% COMPLETE will show during the test.

- (k) Wait until the test is complete.
  - NOTE: The test will take two to three minutes.
- (I) If the test is satisfactory, "SYSTEM TEST PASS" shows on the display.
- (m) If the test fails, look at the BDU test results for the list of fault messages.

### SUBTASK 47-00-00-860-015

(4) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

### H. Ground Operation of the Nitrogen Generation System (Non-Boosted Mode)

NOTE: This procedure opens the NGS shutoff valve and pressurizes the NGS and NGS ducts.

### SUBTASK 47-00-00-860-007

(1) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

### SUBTASK 47-00-00-740-024

(2) Make sure that the BDU initiated SYSTEM TEST? is complete.

### SUBTASK 47-00-00-740-025

(3) Make sure that the BDU is on.

NOTE: If there is no activity for 5 minutes, the BDU will automatically go off. If the BDU goes off, push the ON/OFF button to start the test again.

### SUBTASK 47-00-00-740-026

(4) Make sure that the BDU is in the MAIN MENU mode.

### SUBTASK 47-00-00-740-027

(5) The BDU will show one of these functions:

NOTE: If the BDU does not show one of these functions, push the MENU button until one of these functions shows.

- (a) EXISTING FAULTS?
- (b) FAULT HISTORY?
- (c) GROUND TESTS?
- (d) OTHER FUNCTIONS?

### SUBTASK 47-00-00-740-028

(6) Push the up or down arrow until GROUND TESTS? shows.

### SUBTASK 47-00-00-740-029

(7) Push the YES button on the BDU.

### SUBTASK 47-00-00-740-030

(8) Make sure that the BDU shows the NGS PERF NON-BOOSTED? function.

NOTE: If the BDU does not show NGS PERF NON-BOOSTED?, push the up or down arrow until NGS PERF NON-BOOSTED? shows.

### SUBTASK 47-00-00-740-031

(9) Push the YES button on the BDU.



### SUBTASK 47-00-00-740-032

(10) The NGS shutoff valve will open and the test will start.

NOTE: During the tests the BDU will display TEST IN PROGRESS.

- (a) The display on the BDU will show these messages:
  - 1) NGS O2 SNS: XX.X% (or NGS O2 SNS: WARM during warmup mode)

NOTE: xx.x is the O2% reading from the Oxygen Sensor.

2) P: YY PSIA

NOTE: YY = current pressure

3) T: SZZZ F

NOTE: ZZZ = current temperature

S = negative sign for negative values of temperature

### SUBTASK 47-00-00-740-033

(11) Look at the manual locking hex bolt on the NGS shutoff valve.

NOTE: The NGS shutoff valve is located above the 195CL Underwing Fairing Panel.

NOTE: The locking pin hole in the manual lock arm of the manual locking hex bolt aligns with the threaded hole in the boss of the valve when the valve is closed. The holes will not align if the valve is not fully closed.

### SUBTASK 47-00-00-740-034

(12) Make sure that the slot moves from the CLOSED position toward the OPEN position.

NOTE: The manual lock arm turns 90 degrees in the counterclockwise direction when the NGS shutoff valve is fully open.

### SUBTASK 47-00-00-740-035

(13) Make sure that the NGS shutoff valve stays open during the test.

NOTE: You can go out of the Ground Operation task from the FUNCTIONAL TEST task.

Otherwise go to the subsequent step.

### SUBTASK 47-00-00-740-036

(14) To stop the test, push the MENU button, then the NO button on the BDU.

NOTE: Make sure that you push the MENU button, then the NO button on the BDU. If you do not push the NO button after you push the MENU button, the NGS shutoff valve will stay in the incorrect open position.

NOTE: If there are no faults detected, then the BDU will display SYSTEM OK.

NOTE: If there is a fault detected, the BDU will display nn EXIST FAULTS for two seconds, and then go to the EXISTING FAULTS? menu.

### SUBTASK 47-00-00-210-001

(15) Make sure that the slot in the manual locking hex bolt aligns with the word CLOSED on the NGS shutoff valve.

### SUBTASK 47-00-00-860-008

(16) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

### SUBTASK 47-00-00-790-009

(17) If the NGS does not pass this test, then do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

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I. Ground Operation of the Nitrogen Generation System (Boosted Mode)

NOTE: This procedure opens the NGS shutoff valve and pressurizes the NGS and NGS ducts.

SUBTASK 47-00-00-710-002

(1) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

SURTASK 47-00-00-740-048

(2) Make sure that the BDU initiated SYSTEM TEST? is complete.

SUBTASK 47-00-00-740-049

(3) Make sure that the BDU is on.

NOTE: If there is no activity for 5 minutes, the BDU will automatically go off. If the BDU goes off, push the ON/OFF button to start the test again.

### SUBTASK 47-00-00-740-050

(4) Make sure that the BDU is in the MAIN MENU mode.

### SUBTASK 47-00-00-740-051

(5) The BDU will show one of these functions:

NOTE: If the BDU does not show one of these functions, push the MENU button until one of these functions shows.

- (a) EXISTING FAULTS?
- (b) FAULT HISTORY?
- (c) GROUND TESTS?
- (d) OTHER FUNCTIONS?

### SUBTASK 47-00-00-740-052

(6) Push the up or down arrow until GROUND TESTS? shows.

### SUBTASK 47-00-00-740-053

(7) Push the YES button on the BDU.

### SUBTASK 47-00-00-740-054

(8) Make sure that the BDU shows the NGS PERF BOOSTED? function.

NOTE: If the BDU does not show NGS PERF BOOSTED?, push the up or down arrow until NGS PERF BOOSTED? shows.

### SUBTASK 47-00-00-740-055

(9) Push the YES button on the BDU.

### SUBTASK 47-00-00-740-056

(10) The NGS shutoff valve will open and the test will start.

NOTE: During the tests the BDU will display TEST IN PROGRESS.

- (a) The display on the BDU will show these messages:
  - 1) NGS O2 SNS: XX.X% (or NGS O2 SNS: WARM during warmup mode)

NOTE: xx.x is the O2% reading from the Oxygen Sensor.

2) P: YY PSIA

NOTE: YY = current pressure

3) T: SZZZ F

NOTE: ZZZ = current temperature

S = negative sign for negative values of temperature

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### SUBTASK 47-00-00-710-003

(11) Look at the manual locking hex bolt on the NGS shutoff valve.

NOTE: The NGS shutoff valve is located above the 195CL Underwing Fairing Panel.

NOTE: The locking pin hole in the manual lock arm of the manual locking hex bolt aligns with the threaded hole in the boss of the valve when the valve is closed. The holes will not align if the valve is not fully closed.

### SUBTASK 47-00-00-710-004

(12) Make sure that the slot moves from the CLOSED position toward the OPEN position.

NOTE: The manual lock arm turns 90 degrees in the counterclockwise direction when the NGS shutoff valve is fully open.

### SUBTASK 47-00-00-710-005

(13) Make sure that the NGS shutoff valve stays open during the test.

NOTE: You can go out of the Ground Operation task from the FUNCTIONAL TEST task. Otherwise go to the subsequent step.

### SUBTASK 47-00-00-740-057

To stop the test, push the MENU button, then the NO button on the BDU.

NOTE: Make sure that you push the MENU button, then the NO button on the BDU. If you do not push the NO button after you push the MENU button, the NGS shutoff valve will stay in the incorrect open position.

NOTE: If there are no faults detected, then the BDU will display SYSTEM OK.

NOTE: If there is a fault detected, the BDU will display nn EXIST FAULTS for two seconds, and then go to the EXISTING FAULTS? menu.

### SUBTASK 47-00-00-710-006

(15) Make sure that the slot in the manual locking hex bolt aligns with the word CLOSED on the NGS shutoff valve.

### SUBTASK 47-00-00-710-007

(16) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

### SUBTASK 47-00-00-710-008

(17) If the NGS does not pass this test, then do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

### J. Put the Airplane Back to the Usual Condition

### SUBTASK 47-00-00-840-001

(1) If it is necessary, do this task: Air Mode Simulation - Restoration, TASK 32-09-00-440-801.

### SUBTASK 47-00-00-860-013

(2) Put the GND TEST switch on the P61 panel to NORM.

### SUBTASK 47-00-00-410-002

(3) Close these access panels:

<u>Number</u>	Name/Location
195CL	ECS Low Pressure Connection Door
196CR	ECS Low Pressure Connection Door

——— END OF TASK ———

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### TASK 47-00-00-040-802

### 5. Nitrogen Generation System - Deactivation

### A. General

(1) This task will deactivate the nitrogen generation system.

### B. References

Reference	Title
24-22-00-860-805	Supply Electrical Power (P/B 201)

### C. Location Zones

Zone	Area
134	Wing Center Section, Right
195	Underwing Wing-to-Body Fairings, Left
196	Underwing Wing-to-Body Fairings, Right

### D. Access Panels

Number	Name/Location
195BL	ECS High Pressure Connection Door

### E. Procedure

SUBTASK 47-00-00-420-001

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-805.

SUBTASK 47-00-00-210-002



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(2) Make sure that the airplane is in ground mode.

NOTE: NGS IBIT will be stopped if the Air/Ground status is set to AIR.

SUBTASK 47-00-00-210-003

(3) Make sure that the airplane is not being refueled.

NOTE: NGS IBIT will be stopped if one of the two Center Wing L or R refuel valves are open.

SUBTASK 47-00-00-020-001

(4) Turn off all pneumatic sources that could pressurize the airplane pneumatic circuit.

SUBTASK 47-00-00-020-002

(5) Release the pressure in the pneumatic system.

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### SUBTASK 47-00-00-210-004

(6) Make sure that the Manifold Duct Pressure is less than 5.0 psig from the ECS supply maintenance page.

### SUBTASK 47-00-00-020-003

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

### SUBTASK 47-00-00-020-004

(8) Open this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door

SUBTASK 47-00-00-210-005



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

(9) Go to the nitrogen generation system (NGS) shutoff valve.

NOTE: The NGS shutoff valve is located aft of the thermal control unit (TCU) attached to the bleed air inlet duct.

### SUBTASK 47-00-00-020-005

- (10) Do these steps to close and lock the NGS shutoff valve:
  - (a) Use a wrench to rotate the manual lock arm [2] to the CLOSED position.
  - (b) Align the hole in the manual lock arm [2] with the threaded boss [5] on the NGS shutoff valve.
  - (c) Remove the manual lock bolt [4] from the NGS shutoff valve body.
    - NOTE: The manual lock bolt [4] is attached with a lanyard [3].
  - (d) Install the manual lock bolt [4] through the hole in the manual lock arm [2].
  - (e) Tighten the bolt to 25 ±5 in-lb (3 ±1 N·m).

### SUBTASK 47-00-00-020-006

(11) Close this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door

### F. Nitrogen Generation System - Tryout

NOTE: This tryout is to make sure that the nitrogen generation system is in a zero energy state.

SUBTASK 47-00-00-210-006

(1) Go to the nitrogen generation system Bite Display Unit (BDU) location.

SUBTASK 47-00-00-210-007

(2) Push the ON/OFF button on the BDU control panel.

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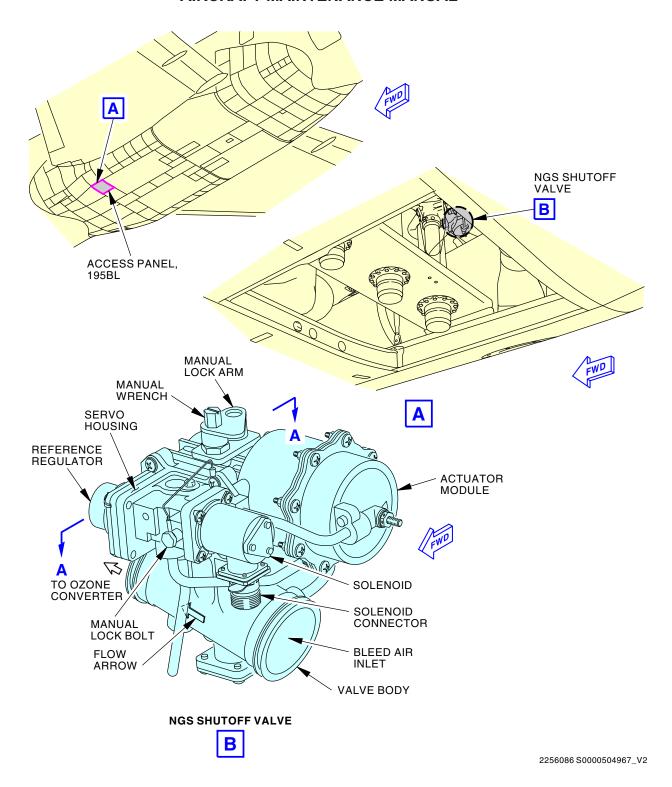


(a)	Make sure that the BDU display stays off.

——— END OF TASK ———

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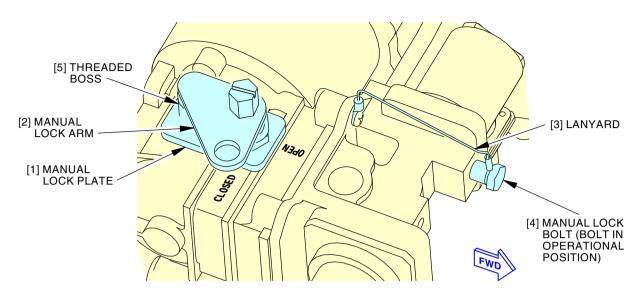


Nitrogen Generation System Figure 202/47-00-00-990-803 (Sheet 1 of 2)

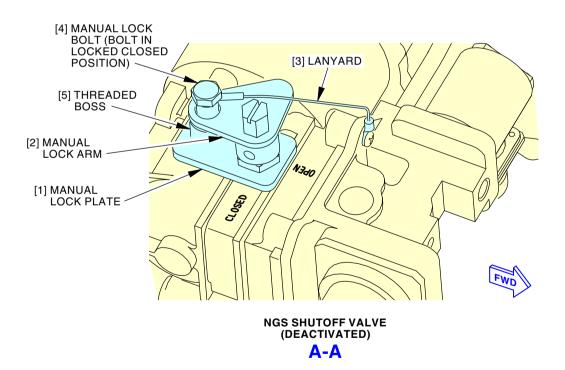
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NGS SHUTOFF VALVE (OPERATIONAL)



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Nitrogen Generation System Figure 202/47-00-00-990-803 (Sheet 2 of 2)

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### TASK 47-00-00-440-802

### 6. Nitrogen Generation System - Activation

(Figure 202)

### A. General

(1) This task will activate the nitrogen generation system.

### B. References

Reference	Title
24-22-00-860-805	Supply Electrical Power (P/B 201)

### C. Location Zones

Zone	Area
134	Wing Center Section, Right
195	Underwing Wing-to-Body Fairings, Left
196	Underwing Wing-to-Body Fairings, Right

### D. Access Panels

Number	Name/Location	
195BL	ECS High Pressure Connection Door	

### E. Procedure

SUBTASK 47-00-00-420-002

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-805.

SUBTASK 47-00-00-210-008



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(2) Make sure that the airplane is in ground mode.

NOTE: NGS IBIT will be stopped if the Air/Ground status is set to AIR.

SUBTASK 47-00-00-210-009

(3) Make sure that the airplane is not being refueled.

NOTE: NGS IBIT will be stopped if one of the two Center Wing L or R refuel valves are open.

SUBTASK 47-00-00-020-008

(4) Turn off all pneumatic sources that could pressurize the airplane pneumatic circuit.

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#### SUBTASK 47-00-00-210-010

(5) Make sure that the Manifold Duct Pressure is less than 5.0 psig from the ECS supply maintenance page.

#### SUBTASK 47-00-00-420-005

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-00-00-020-010

(7) Open this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door

#### SUBTASK 47-00-00-210-012



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

(8) Go to the nitrogen generation system (NGS) shutoff valve.

NOTE: The NGS shutoff valve is located aft of the thermal control unit (TCU) attached to the bleed air inlet duct.

#### SUBTASK 47-00-00-420-003

- (9) Do these steps to activate the NGS shutoff valve:
  - (a) Remove the manual lock bolt [4] from the manual lock arm [2].

NOTE: The manual lock bolt [4] is attached with a lanyard [3].

- (b) Install the manual lock bolt [4] into the NGS shutoff valve body.
- (c) Tighten the bolt to 25 ±5 in-lb (3 ±1 N·m).
- (d) Use a wrench to rotate the manual lock arm [2] to the OPEN position.

#### SUBTASK 47-00-00-420-004

(10) Close this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door
	END OF TASK

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# **NITROGEN GENERATION SYSTEM - INSPECTION/CHECK**

## 1. General

- A. This procedure will make sure the nitrogen generation system (NGS) is within permitted leak limits. Do this procedure as a general leak check for the NGS or as a post-installation leak check after you replace an NGS component or duct.
- B. This procedure pressurizes the NGS and does a leak check of these components:
  - (1) Thermal Control Unit (TCU)
  - (2) Air Separation Module (ASM)
  - (3) Nitrogen-Enriched Air Distribution System (NEADS) line from the ASM to the rear spar penetration on the center wing tank
  - (4) Tubes and ducts that connect the NGS components

# TASK 47-00-00-790-801

# 2. Leak Check of the Nitrogen Generation System

#### A. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-10792	Plug - Flareless Tube, BACP20AU8D

## C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

## D. Location Zones

Zone	Area	
191	Forward Wing-to-Body Fairings, Left	
192	Forward Wing-to-Body Fairings, Right	
195	Underwing Wing-to-Body Fairings, Left	
196	Underwing Wing-to-Body Fairings, Right	

## E. Access Panels

Number	Name/Location
191HL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel
192HR	Forward Wing To Body Fairing Panel
192LR	Ram Air Inlet Actuator Door
192QR	Forward Wing To Body Fairing Panel
195CL	ECS Low Pressure Connection Door
196BR	Underwing Fairing Panel
196CR	ECS Low Pressure Connection Door

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### (Continued)

Number	Name/Location
196ER	Environmental Control Systems (ECS) Access Door

## F. Prepare for the Leak Check

#### SUBTASK 47-00-00-010-009

(1) Open these access panels:

<u>Number</u>	Name/Location
191HL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel
192HR	Forward Wing To Body Fairing Panel
192LR	Ram Air Inlet Actuator Door
192QR	Forward Wing To Body Fairing Panel
195CL	ECS Low Pressure Connection Door
196BR	Underwing Fairing Panel
196CR	ECS Low Pressure Connection Door
196ER	Environmental Control Systems (ECS) Access Door

#### SUBTASK 47-00-00-010-010

(2) Go to the NGS BITE display (BDU) location.

NOTE: The BDU is located above the 196CR Underwing Fairing Panel.

#### SUBTASK 47-00-00-860-010

(3) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

#### SUBTASK 47-00-00-740-037

(4) Push the MENU button on the BITE display unit (BDU).

## SUBTASK 47-00-00-740-039

(5) Push the up or down arrows until the BDU shows the GROUND TESTS? function.

#### SUBTASK 47-00-00-740-040

(6) Push the YES button on the BDU.

## SUBTASK 47-00-00-740-041

- (7) Push the up or down arrows on the BDU until one of these functions shows:
  - (a) NGS PERF NON-BOOSTED?

NOTE: Use this function to do a leak check of the NGS components in the low flow mode, upstream of the ASM.

(b) NGS PERF BOOSTED?

NOTE: Use this function to do a leak check between the ASM and the flame arrestor at the right wing front spar. Do not use the NGS PERF BOOSTED? function if the ambient temperature is above 118°F (48°C). On the ground, the NGS can get too hot when you pressurize the NGS in the high flow mode.

#### SUBTASK 47-00-00-740-042

(8) Push the YES button to start the applicable test.

#### SUBTASK 47-00-00-740-043

- (9) Make sure the NGS shutoff valve opens and pressurizes the NGS.
  - (a) Make sure the display on the BDU shows these messages:

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1) NGS O2 SNS: XX.X% (or NGS O2 SNS: WARM during warmup mode)

NOTE: xx.x is the O2% reading from the Oxygen Sensor.

2) P: YY PSIA

NOTE: YY = current pressure

T: SZZZ F

NOTE: ZZZ = current temperature

S = negative sign for negative values of temperature

## G. Leak Check of the Nitrogen Generation System

#### SUBTASK 47-00-00-790-001

- (1) Do a check for leaks at the joints of these components:
  - (a) Thermal Control Unit (TCU)
  - (b) Air Separation Module (ASM)
  - (c) Oxygen-Enriched Air (OEA) duct

#### SUBTASK 47-00-00-360-002

- (2) If you find a leak, do these steps:
  - (a) Put your hand 12 in. (30 cm) above the leak source.
  - (b) If you can feel the airflow, then stop the operation of the NGS system and repair the leak immediately.
  - (c) If you cannot feel the airflow, then the leak is permitted.
  - (d) Several small leaks are permitted, if all the leaks are not concentrated in one area.

#### SUBTASK 47-00-00-360-001



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



WHEN YOU DO A TEST OF THE SYSTEM, MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW IN THE AREA. USE LIFE SUPPORT EQUIPMENT IF YOU THINK THAT THERE IS A HIGH NITROGEN CONCENTRATION. LOW OXYGEN LEVELS IN THE AIR ARE DANGEROUS TO PERSONNEL.



TO STOP THE GROUND TEST, PUSH THE MENU BUTTON THEN THE NO BUTTON ON THE BDU. IF THE SHUTOFF VALVE STAYS OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) To repair a leak, do these steps:
  - (a) Push the MENU button on the BDU.
  - (b) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.
  - (c) Examine the manual locking arm on the NGS shutoff valve.

NOTE: When the valve is closed, the hole in the manual locking arm aligns with the hole on the valve body, and you can insert the locking pin. If the valve is not fully closed, the holes will not align, and you cannot fully insert the locking pin.

(d) Make sure that the valve goes to the CLOSED position.

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

- (f) Examine the connections to do a check for leak(s).
- (g) Repair the leaks that you find.
- (h) Make sure that the parts align correctly.
- (i) Remove the safety tags and close these circuit breakers:

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-00-00-790-004

- (4) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.
  - (a) Do the leak check again to make sure that you repaired the problem.

#### SUBTASK 47-00-00-740-044

(5) Push the YES button to start the applicable test.

#### SUBTASK 47-00-00-790-005

- (6) Do a check for leaks at the NGS switches, sensors, and sense lines:
  - (a) Apply a small quantity of leak detector, G50135, to the applicable switch, sensor or sense line connection.
  - (b) Examine the component or connection for a leak.
  - (c) No leaks are permitted.
  - (d) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

#### SUBTASK 47-00-00-360-003



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



WHEN YOU DO A TEST OF THE SYSTEM, MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW IN THE AREA. USE LIFE SUPPORT EQUIPMENT IF YOU THINK THAT THERE IS A HIGH NITROGEN CONCENTRATION. LOW OXYGEN LEVELS IN THE AIR ARE DANGEROUS TO PERSONNEL.

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# (WARNING PRECEDES)



TO STOP THE GROUND TEST, PUSH THE MENU BUTTON THEN THE NO BUTTON ON THE BDU. IF THE SHUTOFF VALVE STAYS OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

- (7) If you find a leak, do these steps:
  - (a) Push the MENU button on the BDU.
  - (b) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.
  - (c) Look at the manual locking hex bolt on the NGS shutoff valve.
    - 1) Make sure that the slot goes to the CLOSED position.
  - (d) Open these circuit breakers and install safety tags:

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

- (e) Examine the component or sense line to find the cause of the leak.
- (f) Repair the problems that you find.
- (g) Connect the component or sense line.
- (h) Remove the safety tags and close these circuit breakers:

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-00-00-790-007

- (8) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.
  - (a) Do the leak check again to make sure that you repaired the problem.

#### SUBTASK 47-00-00-790-008

- (9) Do these steps to do a check for leaks in the NEADS line between the ASM and the flame arrestor at the front spar.
  - (a) Disconnect the tube from the flame arrestor.
  - (b) Put a flareless tube plug, STD-10792, (or equivalent) on the dielectric hose.
    - 1) Make sure that the plug is air tight.
  - (c) Apply a small quantity of leak detector, G50135, to the applicable coupling or drain line connection.
  - (d) Examine the NEADS coupling or connection for a leak.
  - (e) No air leaks are permitted.
  - (f) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

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#### SUBTASK 47-00-00-360-004



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



WHEN YOU DO A TEST OF THE SYSTEM, MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW IN THE AREA. USE LIFE SUPPORT EQUIPMENT IF YOU THINK THAT THERE IS A HIGH NITROGEN CONCENTRATION. LOW OXYGEN LEVELS IN THE AIR ARE DANGEROUS TO PERSONNEL.



TO STOP THE GROUND TEST, PUSH THE MENU BUTTON THEN THE NO BUTTON ON THE BDU. IF THE SHUTOFF VALVE STAYS OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

- (10) If you find a leak, do these steps:
  - (a) Push the MENU button on the BDU.
  - (b) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.
  - (c) Examine the manual locking arm on the NGS shutoff valve.
    - 1) Make sure that the valve goes from the OPEN position to the CLOSED position.
  - (d) Examine the component to find the cause of the leak(s).
  - (e) Repair the problems that you find.
  - (f) Remove the flareless tube plug, STD-10792, from the dielectric hose.
  - (g) Connect the dielectric hose to the flame arrestor.
  - (h) Make sure that the components are aligned.
  - (i) Tighten the connections.

# SUBTASK 47-00-00-740-045

- (11) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.
  - (a) Do the leak check again to make sure that you repaired the problem.

## SUBTASK 47-00-00-740-046



TO STOP THE GROUND TEST, MAKE SURE YOU PRESS THE MENU BUTTON ON THE NITROGEN GENERATION SYSTEM BDU. IF YOU DO NOT PRESS THE MENU BUTTON, THEN THE NGS SHUTOFF VALVE WILL REMAIN IN THE INCORRECT OPEN POSITION.

(12) To stop the test, push the MENU button on the BDU.

#### SUBTASK 47-00-00-740-047

- (13) Examine the manual locking arm on the NGS shutoff valve.
  - (a) Make sure that the valve goes from the OPEN position to the CLOSED position.

#### SUBTASK 47-00-00-860-011

(14) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

47-00-00

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# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-00-00-410-006

(1) Close these access panels:

<u>Number</u>	Name/Location
191HL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel
192HR	Forward Wing To Body Fairing Panel
192LR	Ram Air Inlet Actuator Door
192QR	Forward Wing To Body Fairing Panel
195CL	ECS Low Pressure Connection Door
196BR	Underwing Fairing Panel
196CR	ECS Low Pressure Connection Door
196ER	Environmental Control Systems (ECS) Access Door



ARO ALL 47-00-00



## **NITROGEN GENERATION SYSTEM - DDG MAINTENANCE PROCEDURES**

## 1. General

- A. This procedure has the mandatory maintenance tasks that prepare the airplane for flight for Master Minimum Equipment List (MMEL) requirements.
- B. The procedure also contains the maintenance tasks to put the airplane back to its usual condition after operation under MEL specifications.
- C. These are the tasks:
  - (1) MEL 47-11-1 Deactivation Procedure Nitrogen Generation System Inoperative
  - (2) MEL 47-11-1 Reactivation Procedure Nitrogen Generation System Inoperative

## TASK 47-00-00-040-801

# 2. <u>MEL 47-11-1 Deactivation Procedure - Nitrogen Generation System Inoperative</u> (Figure 901)

#### A. General

(1) This task contains the maintenance instructions to prepare the airplane for operation under MEL requirement 47–11–1, Nitrogen Generation System Inoperative.

## **B.** Location Zones

Zone	Area
195	Underwing Wing-to-Body Fairings, Left

# C. Access Panels

Number	Name/Location
195BI	FCS High Pressure Connection Door

## D. Nitrogen Generation System Deactivation

SUBTASK 47-00-00-860-016

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

## Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-00-00-010-006

(2) Open this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door

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SUBTASK 47-00-00-860-005



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

(3) Go to the nitrogen generation system (NGS) shutoff valve (View A).

NOTE: The NGS shutoff valve is located aft of the thermal control unit (TCU) attached to the bleed air inlet duct.

#### SUBTASK 47-00-00-040-001

- (4) Do these steps to close and lock the NGS shutoff valve (View A-A):
  - (a) Use a wrench to rotate the manual lock arm [2] to the CLOSED position.
  - (b) Align the hole in the manual lock arm [2] with the threaded boss [5] on the NGS shutoff valve.
  - (c) Remove the manual lock bolt [4] from the NGS shutoff valve body. NOTE: The manual lock bolt [4] is attached with a lanyard [3].
  - (d) Install the manual lock bolt [4] through the hole in the manual lock arm [2].
  - (e) Tighten the bolt to 25 ±5 in-lb (3 ±1 N·m).

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

SUBTASK 47-00-00-410-003

· EFFECTIVITY

**ARO ALL** 

(1) Close this access panel:

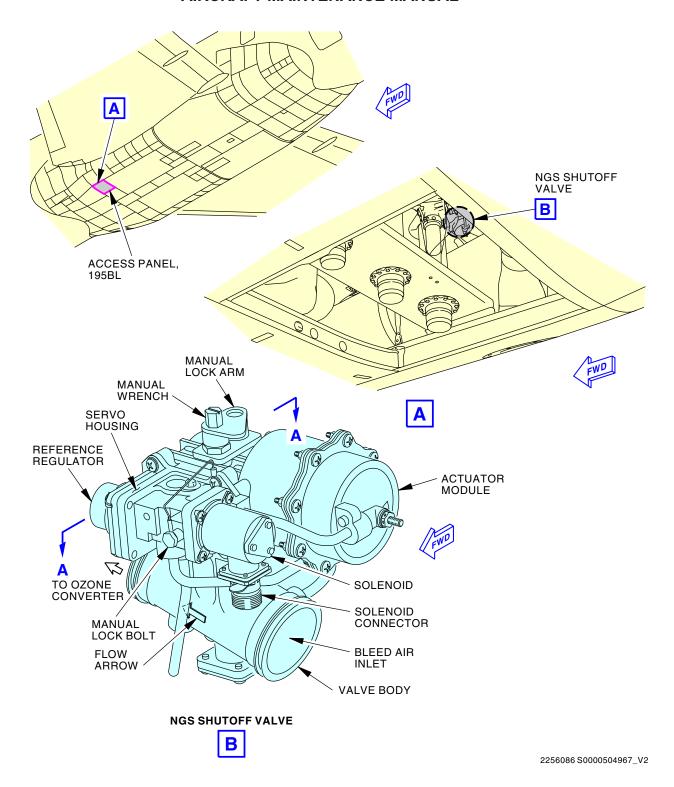
NumberName/Location195BLECS High Pressure Connection Door

— END OF TASK —

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Nitrogen Generation System - Deactivation/Reactivation Figure 901/47-00-00-990-802 (Sheet 1 of 2)

EFFECTIVITY

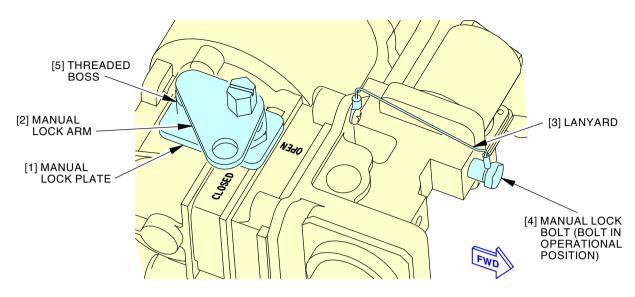
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Page 903

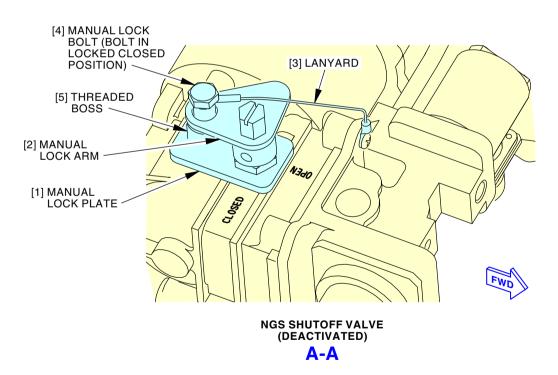
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NGS SHUTOFF VALVE (OPERATIONAL)



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Nitrogen Generation System - Deactivation/Reactivation Figure 901/47-00-00-990-802 (Sheet 2 of 2)

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#### TASK 47-00-00-440-801

3. MEL 47-11-1 Reactivation Procedure - Nitrogen Generation System

(Figure 901)

#### A. General

(1) This task contains the instructions to put the airplane back to its usual condition after operation under MEL requirement 47–11–1, Nitrogen Generation System Inoperative.

#### B. Location Zones

Zone	Area
195	Underwing Wing-to-Body Fairings, Left

#### C. Access Panels

Number	Name/Location
195BL	ECS High Pressure Connection Door

# D. Nitrogen Generation System Reactivation

SUBTASK 47-00-00-010-007

(1) Open this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door

SUBTASK 47-00-00-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

(2) Go to the nitrogen generation system (NGS) shutoff valve (View A).

NOTE: The NGS shutoff valve is found aft of the thermal control unit (TCU) attached to the bleed air inlet duct.

#### SUBTASK 47-00-00-440-001

- (3) Do these steps to reactivate the NGS shutoff valve (View A-A):
  - (a) Remove the manual lock bolt [4] from the manual lock arm [2]. NOTE: The manual lock bolt [4] is attached with a lanyard [3].
  - (b) Install the manual lock bolt [4] into the NGS shutoff valve body.
  - (c) Tighten the bolt to 25  $\pm$ 5 in-lb (2.8  $\pm$ 0.6 N·m).
  - (d) Use a wrench to rotate the manual lock arm [2] to the OPEN position.

#### SUBTASK 47-00-00-860-017

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

47-00-00

ARO ALL

EFFECTIVITY .



# E. Put the Airplane Back to the Usual Condition

SUBTASK 47-00-00-410-004

(1) Close this access panel:

Number195BLECS High Pressure Connection Door

——— END OF TASK ———

ARO ALL

47-00-00



# AIR SEPARATION MODULE - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) Air Separation Module Removal
  - (2) Air Separation Module Installation
- B. Access to the air separation module (ASM) is through the Forward Wing to Body Fairing Panel, 192QR.

# TASK 47-11-01-000-801

# 2. Air Separation Module (ASM) Removal

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK

# D. Location Zones

Zone	Area	
192	Forward Wing-to-Body Fairings, Right	

# E. Access Panels

Number	Name/Location
192QR	Forward Wing To Body Fairing Panel

## F. Prepare for the Removal

SUBTASK 47-11-01-860-003

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-11-01-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
192QR	Forward Wing To Body Fairing Panel

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## G. Remove the Air Separation Module

SUBTASK 47-11-01-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-11-01-010-002

(2) Go to the air separation unit (ASU) location.

#### SUBTASK 47-11-01-020-009

- (3) Do these steps to remove the insulation blanket from the air separation module [1]:
  - (a) Remove the ties.
  - (b) Remove the tape, G50789.
  - (c) Remove and keep the insulation blanket for the air separation module [1] installation.

#### SUBTASK 47-11-01-020-001

(4) Do these steps to remove the applicable air separation module [1]:

NOTE: Remove the coupling body only. The sleeves and o-rings will be removed later.

- (a) Disconnect and remove the applicable coupling [5] between the air separation module [1] and the air supply duct.
- (b) Disconnect and remove the applicable coupling [9] between the air separation module [1] and the nitrogen enriched air (NEA) outlet port.

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ARO ALL

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(c) Disconnect and remove the applicable coupling [9] between the air separation module [1] and the oxygen enriched air (OEA) outlet port.

#### SUBTASK 47-11-01-020-002

(5) Move the sleeves away from the applicable air separation module [1] (3 locations).

#### SUBTASK 47-11-01-020-003

- (6) Remove any ducts for access.
  - (a) Discard the o-rings.

#### SUBTASK 47-11-01-020-004

(7) Loosen the nut [6] from the t-bolt [7].

NOTE: Make sure the nut [6] remains on the t-bolt [7].

#### SUBTASK 47-11-01-010-005

(8) Move the t-bolt [7] away from the swing clamp [3] (View B).

NOTE: Support the air separation module [1] when moving the t-bolt [7] away from the swing clamp [3].

#### SUBTASK 47-11-01-010-004

(9) Open the swing clamp [3]

### SUBTASK 47-11-01-020-005

(10) Remove the air separation module [1].

#### SUBTASK 47-11-01-420-006

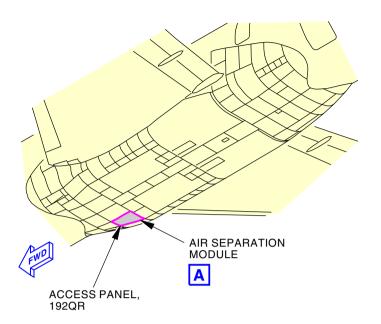
(11) Install protective covers, STD-7423, on the air supply duct, NEA duct, and OEA duct.

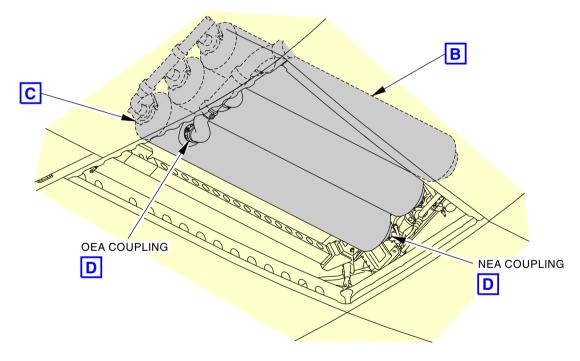
#### SUBTASK 47-11-01-020-008

(12) Repeat these steps to remove the other air separation modules [1] as necessary.

------ END OF TASK ------







**AIR SEPARATION MODULE** 



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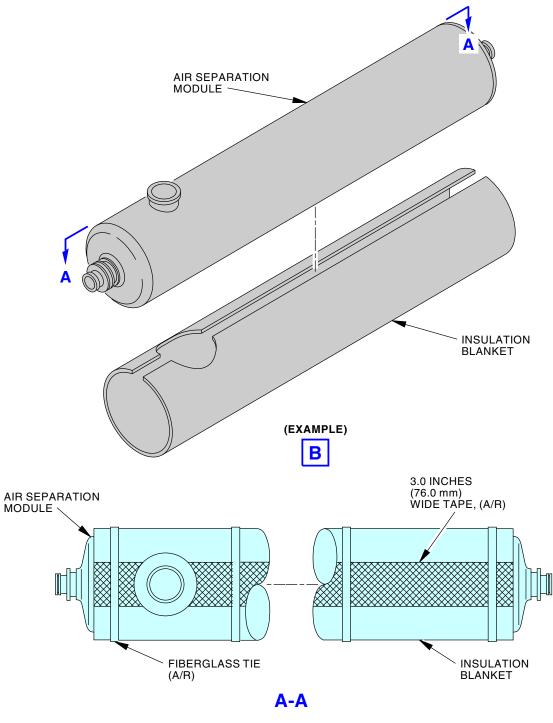
Air Separation Module (ASM) - Removal and Installation Figure 401/47-11-01-990-801 (Sheet 1 of 3)

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# Air Separation Module (ASM) - Removal and Installation Figure 401/47-11-01-990-801 (Sheet 2 of 3)

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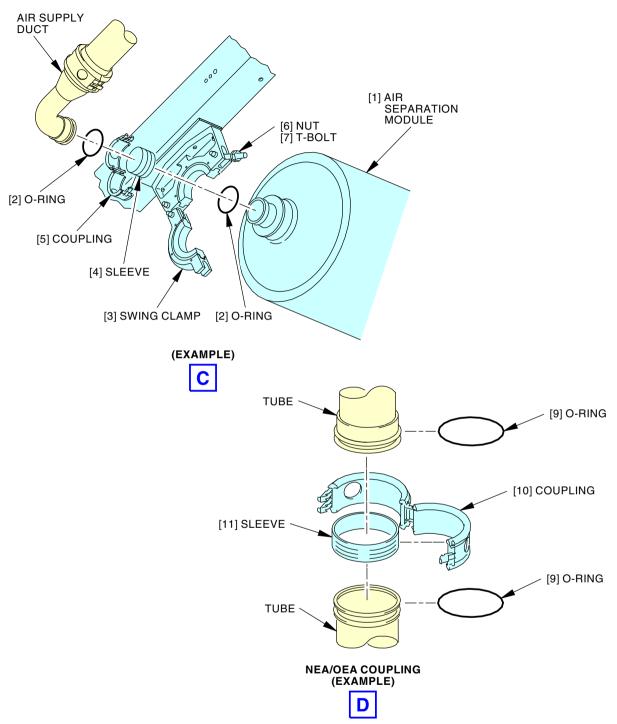
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Air Separation Module (ASM) - Removal and Installation Figure 401/47-11-01-990-801 (Sheet 3 of 3)

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## TASK 47-11-01-400-801

# 3. Air Separation Module (ASM) Installation

(Figure 401)

## A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

## D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

#### E. Access Panels

Number	Name/Location
192QR	Forward Wing To Body Fairing Panel

## F. Install the Air Separation Module

SUBTASK 47-11-01-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

ARO ALL 47-11-01



### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE, CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

Obey the precautions in this task: Nitrogen Generation System Precautions, (1) TASK 47-00-00-910-802.

#### SURTASK 47-11-01-640-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new o-rings [2] and o-rings [8] and install the new o-rings [2] and o-rings [8] on the applicable air separation module [1] and duct.

## SUBTASK 47-11-01-010-003

(3) Go to the applicable air separation module [1] location on the ASU.

#### SUBTASK 47-11-01-020-007

Remove the protective covers, STD-7423, from the air supply duct, NEA duct, and OEA duct. SUBTASK 47-11-01-210-001

(5) Make sure the sleeve [4] and sleeves [10] are in position on the applicable ducts.

## SUBTASK 47-11-01-420-001

Put the applicable air separation module [1] in its position between the air supply duct, OEA duct, and the NEA duct.

#### SUBTASK 47-11-01-410-003

(7) Close the swing clamp [3].

## SUBTASK 47-11-01-420-002

(8) Move the t-bolt [7] into the swing clamp [3] channel.

#### SUBTASK 47-11-01-420-008

Tighten the nut [6] on the t-bolt [7].

#### SUBTASK 47-11-01-420-003

(10) Install any ducts removed for access.

#### SUBTASK 47-11-01-420-005

(11) Move the sleeve [4] and sleeves [10] into position.

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EFFECTIVITY



#### SUBTASK 47-11-01-420-004

- (12) Do these steps to install the applicable air separation module [1]:
  - (a) Install and connect the applicable air supply coupling [5].
  - (b) Install and connect the applicable NEA coupling [9].
  - (c) Install and connect the applicable OEA coupling [9].

#### SUBTASK 47-11-01-420-007

(13) Repeat these steps to install the other air separation modules [1] as necessary.

#### SUBTASK 47-11-01-420-009

- (14) Install the insulation blanket on the air separation module [1]:
  - (a) Use ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the air separation module [1].
  - (b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.

# G. Operational Test for the Air Separation Module

SUBTASK 47-11-01-410-002

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

# Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-11-01-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the applicable air separation module [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

## H. Put the Airplane Back to the Usual Condition

SUBTASK 47-11-01-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
192QR	Forward Wing To Body Fairing Panel
	——— FND OF TASK ———



### HIGH FLOW VALVE - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) High Flow Valve Removal
  - (2) High Flow Valve Installation
- B. The high flow valve is found forward of the air separation unit (ASU) pallet. The high flow valve is attached to the ASU pallet via a mounting bracket.
- C. Access to the high flow valve is through the Forward Wing to Body Fairing Panel, 192HR.

# TASK 47-11-02-000-801

# 2. High Flow Valve Removal

(Figure 401)

## A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
Reference	Description	
STD-7423	Cover - Protective Tube	

# C. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

## D. Access Panels

Number	Name/Location
192HR	Forward Wing To Body Fairing Panel

# E. Prepare for the Removal

SUBTASK 47-11-02-860-003

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

# Left Power Management Panel, P110

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Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-11-02-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
192HR	Forward Wing To Body Fairing Panel

# F. Remove the High Flow Valve

SUBTASK 47-11-02-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

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## (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-11-02-010-002

(2) Go to the high flow valve [1] location.

NOTE: The high flow valve [1] is located on the air separation unit (ASU) forward of the center and outboard air separation modules (ASMs).

## SUBTASK 47-11-02-020-001

(3) Disconnect the electrical connector [8].

#### SUBTASK 47-11-02-020-002

- (4) Do these steps to remove the bonding jumper [11]:
  - (a) Remove the used sealant from the high flow valve [1] at the bonding jumper tab (View C).
  - (b) Remove the bolt [9], two washers [10], bonding jumper [11], and the nut [12] from the high flow valve [1].

#### SUBTASK 47-11-02-020-003

- (5) Do these steps to disconnect the pilot tube [3]:
  - (a) Mark the position of the wire loop clamp on the pilot tube [3].
  - (b) Disconnect the wire bundle loop clamp.
  - (c) Disconnect the pilot tube [3] from the high flow valve [1].

NOTE: Use a backup wrench on the nut attached to the high flow valve [1] when you loosen the pilot tube [3].

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#### SUBTASK 47-11-02-020-004

- (6) Do these steps to remove the high flow valve [1]:
  - (a) Disconnect the clamp [4] (two locations).
  - (b) Hold the high flow valve [1] in its position.
  - (c) Remove the bolts [6] and the washers [7] (four locations) to disconnect the high flow valve [1].
  - (d) Remove the brackets [2] from the high flow valve [1] (two locations).
    - 1) Keep the brackets [2] that hold the high flow valve [1] to the mounting bracket for the installation.
  - (e) Remove the o-rings [5] from the inlet and outlet ducts.
    - 1) Discard the o-rings [5].

## SUBTASK 47-11-02-420-001

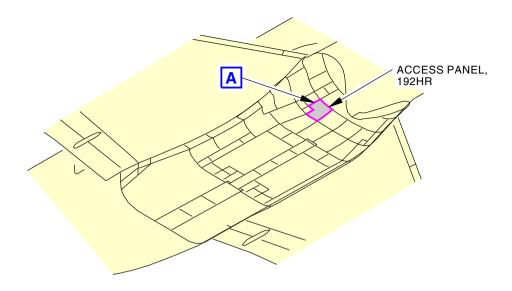
(7) Install protective covers, STD-7423, on the inlet and outlet ducts.

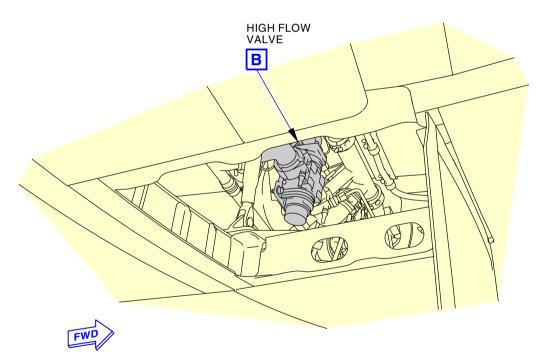
——— END OF TASK ———

47-11-02

- EFFECTIVITY -







# NITROGEN GENERATION SYSTEM



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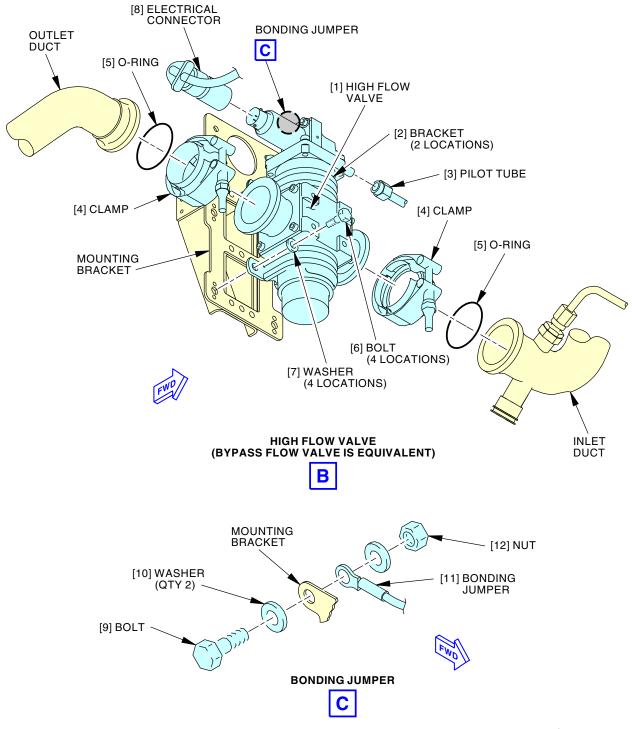
High Flow Valve - Removal and Installation Figure 401/47-11-02-990-801 (Sheet 1 of 2)

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47-11-02

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High Flow Valve - Removal and Installation Figure 401/47-11-02-990-801 (Sheet 2 of 2)

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# TASK 47-11-02-400-801

# 3. High Flow Valve Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual
SWPM 20-20-10	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-3906	Mallet - Rubber
STD-7423	Cover - Protective Tube

#### C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

# D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

## E. Access Panels

Number	Name/Location	
192HR	Forward Wing To Body Fairing Panel	

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## F. Install the High Flow Valve

SUBTASK 47-11-02-860-009



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-11-02-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-11-02-860-005

(3) Make sure that the replacement valve open/close indicator is in the retracted (closed) position.

## SUBTASK 47-11-02-860-006

(4) Go to the high flow valve [1] location on the ASU.

#### SUBTASK 47-11-02-020-005

(5) Remove the protective covers, STD-7423, from the inlet and outlet ducts.

#### SUBTASK 47-11-02-110-001

(6) Clean the used sealant from the bonding jumper [11], fasteners, and the bonding jumper tab on the high flow valve [1] (if re-usable).

## SUBTASK 47-11-02-820-001

(7) Do these steps to check the alignment of the high flow valve [1] with the inlet and outlet ducts:

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- (a) Put the high flow valve [1] in its position between the inlet and outlet ducts.
- (b) Make sure the flanges for the inlet and outlet ducts and the high flow valve [1] make full contact with no gaps around the periphery of the flanges.
- (c) Make sure the alignment along the centerline of the inlet and outlet ducts and high flow valve [1] is not misaligned by more than 0.06 in. (1.52 mm).
- (d) Align the inlet and outlet ducts if it is necessary.
- (e) After the alignment is satisfactory, remove the high flow valve [1].

#### SUBTASK 47-11-02-210-001

(8) Make sure that the high flow valve [1], clamps [4], inlet duct, and outlet duct are clean and free from grease and unwanted material.

#### SUBTASK 47-11-02-110-002

(9) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-11-02-110-003

- (10) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surfaces of the bonding jumper [11].
  - (b) Contact surfaces of the bonding jumper tab on the high flow valve [1].

#### SUBTASK 47-11-02-420-002

- (11) Do these steps to install the o-rings [5]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-rings [5].
  - (b) Install the o-rings [5] in the o-ring cavities of the inlet and outlet ducts.

#### SUBTASK 47-11-02-420-003

- (12) Do these steps to install the high flow valve [1]:
  - (a) Put the high flow valve [1] in its position between the inlet and outlet ducts.
    - 1) Make sure the arrow on the backside of the high flow valve [1] is pointed outboard.
  - (b) Position the two brackets [2] on the high flow valve [1].
  - (c) Install, but do not fully tighten, the four bolts [6] and washers [7].
  - (d) Install the clamps [4] on each side of the high flow valve [1] (two locations).
  - (e) Tighten the two clamps [4] to  $47.5 \pm 2.5$  in-lb  $(5.4 \pm 0.3 \text{ N} \cdot \text{m})$ .
    - NOTE: This torque value is in addition to the torque necessary to overcome the self-locking devices.
  - (f) Lightly tap around each clamp [4] with a rubber mallet, STD-3906.
    - NOTE: Start at a point opposite the T-bolt and tap toward the T-bolt on one side. Do the steps again for the other side. The coupling will seat on the flanges and the lock-nut will loosen. This will make sure that you engage the clamp [4] and flanges correctly.
  - (g) Tighten each clamp [4] again to 47.5 ±2.5 in-lb (5.4 ±0.3 N·m).
  - (h) Do the above steps again until the locking nut on each clamp [4] needs less than a half turn to get to the necessary torque value.

 $\underline{\text{NOTE}}$ : The length of exposed threads on the T-bolt should be a minimum of 0.5 in.

(1.3 cm) when the clamp [4] is torqued and seated correctly. If less than 0.5 in.

(1.3 cm) of thread is exposed, re-torque and reseat or replace the clamp [4].

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#### SUBTASK 47-11-02-420-004

- (13) Do these steps to install the pilot tube [3]:
  - (a) Connect the pilot tube [3] to the high flow valve [1].
    - NOTE: Use a backwrench on the nut for the high flow valve [1] when you tighten the pilot tube [3].
  - (b) Tighten the nut for the pilot tube [3] to 230 ±15 in-lb (26 ±2 N·m).
    - NOTE: This torque value is in addition to the torque necessary to overcome the self-locking devices.
  - (c) Position and install the wire bundle loop clamp on the pilot tube [3].

#### SUBTASK 47-11-02-420-005

- (14) Do these steps to install the high flow valve [1] to the mounting bracket:
  - (a) Tighten the bolts [6] to 52 ±3 in-lb (5.9 ±0.3 N·m) (four locations).
    - NOTE: This torque value is in addition to the torque necessary to overcome the self-locking devices.

#### SUBTASK 47-11-02-420-006

- (15) Do these steps to install the bonding jumper [11] to the bonding jumper tab:
  - (a) Apply a thin layer of antiseize compound, C00852, to the bolt [9].
  - (b) Install the bolt [9], two washers [10], bonding jumper [11], and nut [12] to the bonding jumper tab on the high flow valve [1] (SWPM 20-20-00 and SWPM 20-20-10).
  - (c) Tighten the bolt [9] to 48.5 ±2.5 in-lb (5.5 ±0.3 N·m).

#### SUBTASK 47-11-02-760-001

- (16) Measure the electrical resistance between the high flow valve [1] and the ASU frame with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the resistance is 0.0055 ohm (5.5 milliohms) or less.

#### SUBTASK 47-11-02-390-001

(17) Apply P/S 890 Class B sealant, A50051, to fully cover the terminal on the bonding jumper [11], fasteners, and the exposed conversion coating on the bonding jumper tab.

#### SUBTASK 47-11-02-420-007

- (18) Reconnect the electrical connector [8].
- G. Operational Test for the High Flow Valve

#### SUBTASK 47-11-02-860-007

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

#### Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-11-02-790-001

- 2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the high flow valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

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# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-11-02-420-008

(1) Close this access panel:

Number192HRName/LocationForward Wing To Body Fairing Panel

——— END OF TASK ———

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## **OVERTEMPERATURE SHUTOFF VALVE - REMOVAL/INSTALLATION**

## 1. General

- A. This procedure has these tasks:
  - (1) Overtemperature Shutoff Valve Removal
  - (2) Overtemperature Shutoff Valve Installation
- B. The overtemperature shutoff valve (OTSOV) is found aft of the outboard air separation unit (ASU). The OTSOV is attached to the ASU inlet duct.
- C. Access to the OTSOV is through the Underwing Fairing Panel, 196BR.

## TASK 47-11-03-000-801

# 2. Overtemperature Shutoff Valve (OTSOV) Removal

(Figure 401)

## A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## C. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

## D. Access Panels

Number	Name/Location
196BR	Underwing Fairing Panel

# E. Prepare for the Removal

SUBTASK 47-11-03-860-003

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

# Left Power Management Panel, P110

	*****	anagomone	. a,
Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-11-03-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
196BR	Underwing Fairing Panel

# F. Remove the Overtemperature Shutoff Valve (OTSOV)

SUBTASK 47-11-03-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

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### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802

#### SUBTASK 47-11-03-010-002

(2) Go to the overtemperature shutoff valve [1] location.

NOTE: The overtemperature shutoff valve [1] is on the aft end of the air separation unit (ASU), near the outboard air separation module (ASM).

## SUBTASK 47-11-03-020-001

(3) Do these steps to remove the overtemperature shutoff valve [1]:

NOTE: Keep the clamp [5] and coupling [16] for installation.

- (a) Disconnect the electrical connector [17] from the overtemperature shutoff valve [1].
- (b) Remove the bolt [3], two washers [2], and nut [11] to disconnect the bonding jumper [4].
  - 1) Keep the bolt [3], two washers [2], and nut [11] for the installation.
- (c) Disconnect the coupling [16] from between the inlet duct [15] and the overtemperature shutoff valve [1].
  - 1) Keep the sleeve [13] for the installation.
  - 2) Discard the o-ring [14] and o-ring [12].
- (d) Hold the overtemperature shutoff valve [1] in its position.
- (e) Disconnect the clamp [5] from between the overtemperature shutoff valve [1] and the outlet duct.
  - 1) Discard the o-ring [6].
- (f) Remove the overtemperature shutoff valve [1].

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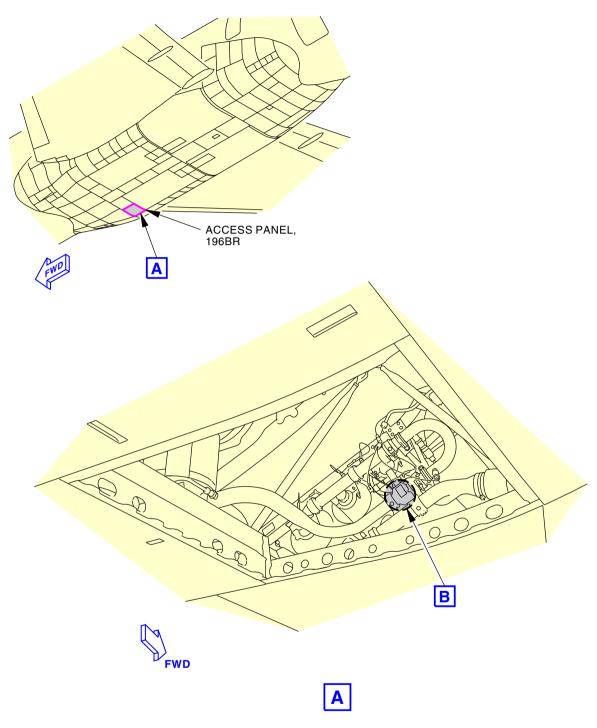


SUBTASK 47-11-03-420-001

(4)	Install protective covers, STD-7423, on the inlet duct [15] and outlet duct.
	END OF TASK

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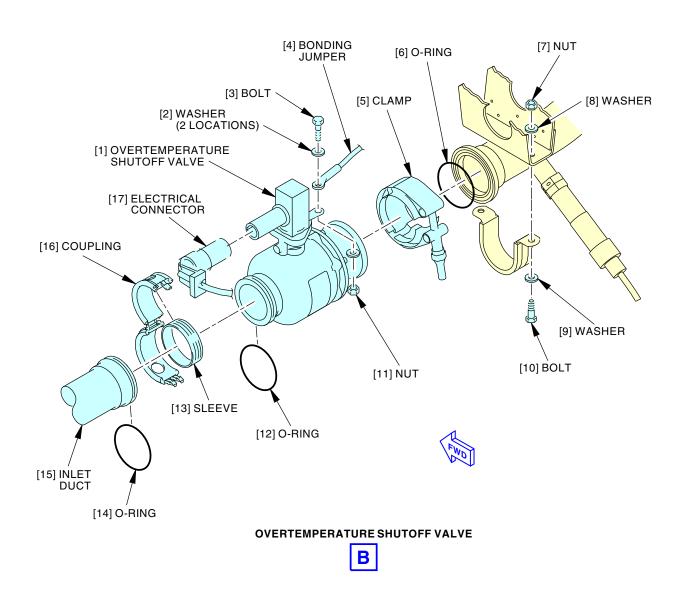
# Overtemperature Shutoff Valve - Removal and Installation Figure 401/47-11-03-990-801 (Sheet 1 of 2)

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# Overtemperature Shutoff Valve - Removal and Installation Figure 401/47-11-03-990-801 (Sheet 2 of 2)

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## TASK 47-11-03-400-801

## 3. Overtemperature Shutoff Valve (OTSOV) Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

## 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	iption
COM-1550	ng Meters - Approved, Intrinsically Safe (Approved for use in I, Divisions I & II hazardous (classified) locations. Outside hazardous locations, COM-614 can be used in lieu of 1550).
STD-7423	t: 620LK Supplier: 1CRL2 t: M1 Supplier: 3AD17 t: T477W Supplier: 01014 tart #: M1B Supplier: 3AD17 - Protective Tube
STD-7423	#: T477W Supplier: 01014

## C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

# D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Overtemperature shutoff valve	47-11-03-01-110	ARO ALL
6	O-ring	47-11-03-01-065	ARO ALL
12	O-ring	47-11-52-01B-270	ARO ALL
14	O-ring	47-32-01-01-045	ARO ALL

## E. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

## F. Access Panels

Number	Name/Location	
196BR	Underwing Fairing Panel	

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## G. Prepare for the Installation

SUBTASK 47-11-03-860-008



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-11-03-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-11-03-860-005

(3) Go to the overtemperature shutoff valve [1] location on the ASU.

### SUBTASK 47-11-03-020-002

(4) Remove the protective covers, STD-7423, from the outlet duct and from the inlet duct [15].

#### SUBTASK 47-11-03-160-001

(5) Remove the sealant from the bonding jumper [4], fasteners, and the bonding jumper tab.

#### SUBTASK 47-11-03-110-001

(6) Make sure that the inlet duct [15], outlet duct, bonding jumper [4], coupling [16], and clamp [5] are clean and free from grease and unwanted material (TASK 20-30-80-910-801).

#### SUBTASK 47-11-03-760-001

(7) Prepare the contact surfaces of these components for an electrical faying surface bond (SWPM 20-20-00):

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- (a) bonding jumper tab
- (b) outlet duct
- (c) inlet duct [15]
- (d) overtemperature shutoff valve [1]

#### SUBTASK 47-11-03-420-002

- (8) Do these steps to install the two new o-rings on the inlet side of the overtemperature shutoff valve [1]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new o-ring [12] and the new o-ring [14].
  - (b) Put the o-ring [12] in the cavity on the overtemperature shutoff valve [1].
  - (c) Put the o-ring [14] in the cavity on the inlet duct [15].

#### SUBTASK 47-11-03-420-003

- (9) Do these steps to install the new o-ring [6] on the outlet side of the overtemperature shutoff valve [1]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-ring [6].
  - (b) Put the o-ring [6] in the cavity on the outlet duct.

## H. Install the Overtemperature Shutoff Valve (OTSOV)

### SUBTASK 47-11-03-420-004

- (1) Do these steps to install the overtemperature shutoff valve [1]:
  - (a) Hold the overtemperature shutoff valve [1] in its position.
  - (b) Attach, but do not fully tighten the overtemperature shutoff valve [1] to the outlet duct with the clamp [5].
  - (c) Align the overtemperature shutoff valve [1] with the inlet duct [15].
  - (d) Install the coupling [16].
  - (e) Tighten the clamp [5] to  $47.5 \pm 2.5$  in-lb  $(5.4 \pm 0.3 \text{ N} \cdot \text{m})$ .
  - (f) Connect the bonding jumper [4] to the overtemperature shutoff valve [1] with the bolt [3], two washers [2], and nut [11].

## SUBTASK 47-11-03-760-002

- (2) Measure the electrical bonding resistance between the overtemperature shutoff valve [1] and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the resistance is 0.008 ohm (8 milliohms) or less.
  - (b) Apply a cap seal of P/S 890 Class B sealant, A50051, to the terminal, fasteners, and bare conversion coated areas.

#### SUBTASK 47-11-03-420-005

(3) Connect the electrical connector [17] to the overtemperature shutoff valve [1].

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## I. Operational Test for the Overtemperature Shutoff Valve (OTSOV)

SUBTASK 47-11-03-860-006

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

## Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-11-03-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the overtemperature shutoff valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

## J. Put the Airplane Back to the Usual Condition

SUBTASK 47-11-03-410-001

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(1) Close this access panel:

NumberName/Location196BRUnderwing Fairing Panel

----- END OF TASK -----

47-11-03



## **NITROGEN ENRICHED AIR DISTRIBUTION - MAINTENANCE PRACTICES**

## 1. General

- A. If the nitrogen enriched air distribution system (NEADS) tubing is damaged and can be repaired, refer to this procedure: Fuel Tube Damage Criteria Inspection/Check, TASK 28-22-15-700-802-001.
- B. If the NEADS tubing must be replaced, refer to this procedure: FLARELESS TUBING ASSEMBLY REMOVAL/INSTALLATION, PAGEBLOCK 20-10-09/401.

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#### NITROGEN ENRICHED AIR DISTRIBUTION - INSPECTION/CHECK

## 1. General

- A. This procedure has scheduled maintenance task data.
- B. This procedure has these tasks:
  - (1) Drain Valve Fuel Leak Check
  - (2) Nitrogen Enriched Air Distribution System Line Leak Inspection
  - (3) Nitrogen Enriched Air Distribution System Line Leak Pressurized Inspection
- C. The fibers in the air separation module (ASM) cylinders are damaged by fuel or fuel vapor. Protection from fuel contamination is supplied by two backflow protection check valves in the nitrogen-enriched air distribution system (NEADS) line. If there is a problem with a check valve or a leak in the NEADS line, fuel leakage can be detected at the drain valve attached to the NEADS drain line.
- D. The drain valve is installed forward of the air separation unit (ASU) and can be found above the Ram Air Inlet Actuator Door, 192LR. The drain line is at the lowest area of the NEADS line where fluid will collect. You must periodically inspect the NEADS line to make sure that the line does not have fuel.

#### TASK 47-21-00-700-801

## 2. Drain Valve - Fuel Leak Check

(Figure 47-21-03-990-801)

NOTE: This procedure is a scheduled maintenance task.

#### A. References

Reference	Title
12-33-01-600-803	Cold Weather Maintenance Procedure (P/B 301)
47-21-03-990-801	Figure: Drain Valve - Removal and Installation (P/B 401)

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description	
COM-1535	Equipment - Sampling, Fuel	
	Part #: 100-0128-04 Supplier: 5N582	
	Part #: A12001-15 Supplier: 81205	

## C. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

## D. Access Panels

Number	Name/Location
192I R	Ram Air Inlet Actuator Door

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## E. Prepare for the Procedure

SUBTASK 47-21-00-790-001

(1) If the ambient air temperature is less than 32°F (0°C), do this task: Cold Weather Maintenance Procedure, TASK 12-33-01-600-803.

NOTE: Supply heat before you open the drain valve to make sure any fluid drains freely.

SUBTASK 47-21-00-010-003

(2) Open this access panel:

Number Name/Location

192LR Ram Air Inlet Actuator Door

#### F. Drain the Fluid from the Drain Valve

SUBTASK 47-21-00-010-001

(1) Go to the drain valve for the NEA distribution system.

NOTE: The drain valve is located forward of the ASU, above the Ram Air Inlet Actuator Door, 192LR.

SUBTASK 47-21-00-790-002

(2) Put the top end of the receptacle assembly, from the fuel sampling equipment, COM-1535, against the drain valve poppet.

SUBTASK 47-21-00-790-003

(3) Put the container below the drain valve.

SUBTASK 47-21-00-790-004

(4) Push up on the drain valve.

SUBTASK 47-21-00-790-005

(5) Collect any fluid from the drain line.

SUBTASK 47-21-00-790-006

(6) Remove the sample container from the drain valve and permit the valve to close.

SUBTASK 47-21-00-790-007

(7) If the container is fluid free, then the NEA distribution system is satisfactory.

SUBTASK 47-21-00-790-008

(8) If there is fluid in the container, then there is a leak in the NEADS line.

SUBTASK 47-21-00-790-009

- (9) To find the leak in the NEADS line, do this task: Nitrogen Enriched Air Distribution System (NEADS) Line Visual Inspection, TASK 47-21-00-700-802.
  - (a) Repair any problems that you find.

## G. Put the Airplane Back to the Usual Condition

SUBTASK 47-21-00-410-001

(1) Close this access panel:

NumberName/Location192LRRam Air Inlet Actuator Door

----- END OF TASK -----

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#### TASK 47-21-00-700-802

## 3. Nitrogen Enriched Air Distribution System (NEADS) Line - Visual Inspection

NOTE: This procedure is a scheduled maintenance task.

#### A. General

- (1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.
  - NOTE: This is applicable to Airworthiness Limitation 47-AWL-06.
- (2) 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 47-00-00-910-801.
    - NOTE: This is applicable to Airworthiness Limitation 47-AWL-02.
- (3) This task does a visual/tactile inspection of the nitrogen enriched air distribution system (NEADS) line, exterior to the fuel tank. The inspection is a non-pressurized inspection. The inspection looks for obvious damage and leaks from the air separation modules (ASMs) to the fuel tank front spar penetration.

## B. References

Reference	Title
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## C. Access Panels

Number	Name/Location
192NR	Forward Wing To Body Fairing Panel
192PR	Forward Wing To Body Fairing Panel
192QR	Forward Wing To Body Fairing Panel
611AB	Inboard Fixed Leading Edge Panel
611CB	Inboard Fixed Leading Edge Panel

## D. Prepare for the Removal

SUBTASK 47-21-00-210-005



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-21-00-860-003

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-21-00-010-002

(3) Open these access panels:

<u>Number</u>	Name/Location
192NR	Forward Wing To Body Fairing Panel
192PR	Forward Wing To Body Fairing Panel
192QR	Forward Wing To Body Fairing Panel
611AB	Inboard Fixed Leading Edge Panel
611CB	Inboard Fixed Leading Edge Panel

## E. NEA Distribution System Inspection

SUBTASK 47-21-00-210-001

- (1) Do these steps to inspect the NEADS line from the ASMs to the fuel tank penetration (front spar) for damage and leaks:
  - (a) Do these steps during the inspection:
    - 1) Visually inspect the NEADS lines and connections for security and possible leak paths.
    - 2) Visually inspect the NEADS line for interference or contact conditions.
    - Use your hand to feel for damage that could cause external Nitrogen Enriched Air (NEA) leakage in the NEADS line.
    - 4) Make sure that the couplings are secure and latched.

### 47-AWL-06: ALI

(b) Make sure there are no loose clamps for the NEADS couplings, drain line connection, or joints.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-06.

#### 47-AWL-06: ALI

(c) Make sure there are no disconnections for the NEADS couplings, drain line connection, or joints.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions,
TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-06.

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## 47-AWL-06: ALI

(d) Make sure there are no damaged tubes from the ASMs to the fuel tank penetration (front spar).

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions,

TASK 47-00-00-910-801, for important information on airworthiness limitation

instructions (ALIs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-06.

#### SUBTASK 47-21-00-210-003

- (2) Do an inspection of the following NEADS line components from the ASU to the front spar penetration:
  - (a) NEADS tubes
  - (b) NEADS line couplings
  - (c) NEADS drain line
  - (d) NEADS drain valve
  - (e) Secondary backflow prevention check valve

#### SUBTASK 47-21-00-360-001

(3) If you find damage or a condition that could cause external NEA leakage, repair the component(s).

## 47-AWL-02: CDCCL

(a) If the dielectric isolator hose or attached tubing is replaced or repaired, make sure the dielectric isolator hose is correctly installed on the NEA tubing and in good condition.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions,

TASK 47-00-00-910-801, for important information on Critical Design Control

Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-02.

## F. Put the Airplane Back to the Usual Condition

## SUBTASK 47-21-00-420-001

(1) Close these access panels:

<u>Number</u>	Name/Location
192NR	Forward Wing To Body Fairing Panel
192PR	Forward Wing To Body Fairing Panel
192QR	Forward Wing To Body Fairing Panel
611AB	Inboard Fixed Leading Edge Panel
611CB	Inboard Fixed Leading Edge Panel

### SUBTASK 47-21-00-860-004

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

## Left Power Management Panel, P110

<u>Row</u>	Col	<u>number</u>	<u>name</u>	
L	9	C47601	NGS CONTROL	

------ END OF TASK -----

ARO ALL



#### TASK 47-21-00-700-803

## 4. Nitrogen Enriched Air Distribution System Line - Leak Inspection

#### A. General

- (1) 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 47-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 47-AWL-02.

(2) This task inspects the NEADS lines between the ASM and the flame arrestor at the front spar for damage and does a check for leaks in the NEADS lines between the ASM and the flame arrestor at the front spar.

#### B. References

Reference	Title
21-00-00-800-801	Supply Conditioned Air to the Airplane (P/B 201)
21-00-00-800-802	Remove Conditioned Air from the Airplane (P/B 201)
24-22-00-860-806	Remove Electrical Power (P/B 201)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

#### C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

## D. Location Zones

Zone	Area
531	Center Fuel Tank - Rib 1 to Rib 8 - Left Wing

## E. Access Panels

Number	Name/Location	
192NR	Forward Wing To Body Fairing Panel	
192PR	Forward Wing To Body Fairing Panel	
192QR	Forward Wing To Body Fairing Panel	
196CR	ECS Low Pressure Connection Door	
521DB	Refueling Station Door	
611AB	Inboard Fixed Leading Edge Panel	
611CB	Inboard Fixed Leading Edge Panel	

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## F. Prepare for the Leak Inspection

SUBTASK 47-21-00-860-006



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-00-700-001

(2) Do this task: Drain Valve - Fuel Leak Check, TASK 47-21-00-700-801.

#### SUBTASK 47-21-00-780-003

(3) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

#### SUBTASK 47-21-00-800-001

(4) Do this task: Supply Conditioned Air to the Airplane, TASK 21-00-00-800-801.

#### SUBTASK 47-21-00-410-002

(5) Make sure that this access panel is closed:

<u>Number</u>	Name/Location
521DB	Refueling Station Door

#### SUBTASK 47-21-00-010-004

(6) Open these access doors:

<u>Number</u>	Name/Location
192NR	Forward Wing To Body Fairing Panel
192PR	Forward Wing To Body Fairing Panel
192QR	Forward Wing To Body Fairing Panel
196CR	ECS Low Pressure Connection Door
611AB	Inboard Fixed Leading Edge Panel
611CB	Inboard Fixed Leading Edge Panel

#### SUBTASK 47-21-00-010-005

(7) Go to the BITE display unit (BDU).

## SUBTASK 47-21-00-740-001

(8) Push the MENU button on the BDU.

#### SUBTASK 47-21-00-740-002

(9) Push the up and down arrows until the BDU shows the GROUND TESTS? function.

#### SUBTASK 47-21-00-740-003

(10) Push the YES button on the BDU.

### SUBTASK 47-21-00-740-004

- (11) Push the up and down arrows on the BDU until this function shows:
  - (a) NGS PERF BOOSTED?

## SUBTASK 47-21-00-740-005

(12) Push YES button to start the test.

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## G. NEADS Lines Leak Inspection

SUBTASK 47-21-00-700-003



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



WHEN YOU DO A TEST OF THE SYSTEM, MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW IN THE AREA. USE LIFE SUPPORT EQUIPMENT IF YOU THINK THAT THERE IS A HIGH NITROGEN CONCENTRATION. LOW OXYGEN LEVELS IN THE AIR ARE DANGEROUS TO PERSONNEL.



TO STOP THE GROUND TEST, PUSH THE MENU BUTTON THEN THE NO BUTTON ON THE BDU. IF THE SHUTOFF VALVE STAYS OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do these steps to do a check for leaks in the NEADS lines between the ASM and the flame arrestor at the front spar penetration.
  - (a) Apply a small quantity of leak detector, G50135, to the couplings and drain line connection.
  - (b) Examine the NEADS couplings and drain line connection for a leak.
  - (c) No air leaks are permitted.
  - (d) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

#### SUBTASK 47-21-00-780-001

- (2) If you find a leak, do these steps:
  - (a) Push the MENU button, then the NO button, on the BDU to stop the Ground Test.
  - (b) Do the steps in this task to depressurize the ECS air supply system: Depressurize the Pneumatic System, TASK 36-00-00-860-801.
  - (c) Examine the component to find the cause of the leak(s).
  - (d) Repair the problems that you find.
  - (e) Make sure that the components are aligned.
  - (f) Tighten the connections.
  - (g) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.
  - (h) Do the leak check again to make sure that you repaired the problem.

#### SUBTASK 47-21-00-740-006



TO STOP THE GROUND TEST, MAKE SURE YOU PRESS THE MENU BUTTON ON THE NITROGEN GENERATION SYSTEM BDU. IF YOU DO NOT PRESS THE MENU BUTTON, THEN THE NGS SHUTOFF VALVE WILL REMAIN IN THE INCORRECT OPEN POSITION.

(3) Push the MENU button, then the NO button, on the BDU to stop the Ground Test.

#### SUBTASK 47-21-00-360-002

(4) If you find damage or a condition that could cause external NEA leakage, repair the component(s).

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47-AWL-02: CDCCL

(a) If the dielectric isolator hose or attached tubing is replaced or repaired, make sure the dielectric isolator hose is correctly installed on the NEA tubing and in good condition.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions,

TASK 47-00-00-910-801, for important information on Critical Design Control

Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-02.

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

SUBTASK 47-21-00-780-002

(1) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

SUBTASK 47-21-00-740-007

(2) Do this task: Remove Conditioned Air from the Airplane, TASK 21-00-00-800-802.

SUBTASK 47-21-00-760-001

(3) Remove electrical power if it is not necessary for another task (TASK 24-22-00-860-806).

SUBTASK 47-21-00-410-003

(4) Close these access panels:

<u>Number</u>	Name/Location
192NR	Forward Wing To Body Fairing Panel
192PR	Forward Wing To Body Fairing Panel
192QR	Forward Wing To Body Fairing Panel
196CR	ECS Low Pressure Connection Door
611AB	Inboard Fixed Leading Edge Panel
611CB	Inboard Fixed Leading Edge Panel

----- END OF TASK --

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### **COUPLING ASSEMBLY - MAINTENANCE PRACTICES**

## 1. General

- A. This procedure has these tasks:
  - (1) Connect the Clam-Shell Closure Coupling
  - (2) Connect the Threaded Closure Coupling

#### TASK 47-21-01-900-801

## 2. Connect the Clam-Shell Closure Coupling

(Figure 201)

## A. General

- (1) Do this procedure to connect the fixed cavity type coupling with a threadless clam-shell closure (Hydraflow 14J34).
- (2) The clam-shell closure locks automatically when the coupling halves are snapped together. The coupling cannot be opened accidentally. The coupling uses three spring loaded latch pawls that must be opened simultaneously before the coupling will unlatch.
- (3) The coupling also has a secondary latch as a safety device to stop mis-alignment. The coupling can easily be inspected at a distance to determine if the coupling is correctly latched.
- (4) Four bonding springs attached to the coupling provide continuity across the gap in the tube or component.

#### B. References

Reference	Title
SWPM 20-20-00	Standard Wiring Practices Manual

#### C. Consumable Materials

Reference	Description	Specification
B00316	Solvent - Aliphatic Naphtha (For Organic	TT-N-95 Type I, ASTM
	Coatings)	D-3735 Type I
B00722	Solvent - Stoddard	MIL-PRF-680 Type I or II
		(Supersedes P-D-680
		Type I or II)
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

## D. Clam-Shell Coupling Installation

SUBTASK 47-21-01-210-001

- (1) Examine these coupling components for damage:
  - (a) Coupling body
  - (b) Sleeve
  - (c) Latch pawls
  - (d) Secondary latch strap
  - (e) Secondary latch ball (on latch pawl)
  - (f) Bonding springs.

SUBTASK 47-21-01-960-001

(2) If you find damage, replace the component.

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#### SUBTASK 47-21-01-420-001

- (3) Do these steps to align the tubes or components:
  - (a) Make sure the axial mis-alignment is not more than  $\pm 4^{\circ}$ .
  - (b) Adjust the distance (gap) between the two mating parts to make sure that the distance is not more than  $0.15 \pm 0.05$  in.  $(0.38 \pm 0.13 \text{ cm})$ .

#### SUBTASK 47-21-01-100-001

- (4) Do these steps to clean the O-rings:
  - (a) Clean all O-rings before the installation.
  - (b) Make sure that the O-ring is new, free of nicks, cuts, grooves, too much flash or other unwanted conditions.
  - (c) Wipe the O-ring with a clean cotton wiper, G00034, dampened with stoddard solvent, B00722, or aliphatic naphtha solvent, B00316.
  - (d) Immediately wipe the O-ring dry with a clean cotton wiper, G00034.
    - NOTE: Do not allow the solvent to evaporate dry.
  - (e) Do these steps again until the O-ring is free from unwanted material.

#### SUBTASK 47-21-01-110-001

- (5) Do these steps to clean the O-ring cavity surfaces:
  - (a) Clean all sealing surfaces before you install the O-ring.
  - (b) Make sure that the O-ring cavity is free of scratches, dents, distortions or unwanted material.
  - (c) Rub the sealing surfaces with a clean cotton wiper, G00034, dampened with aliphatic naphtha solvent, B00316.
  - (d) Immediately rub the sealing surface dry with a clean cotton wiper, G00034.
    - NOTE: Do not let the solvent evaporate dry.
  - (e) Do these steps again until the sealing surface is free from unwanted material.

## SUBTASK 47-21-01-640-001

- (6) Do these steps to lubricate the O-ring:
  - (a) Apply a thin layer of grease, D00504, to the O-ring and the sleeve.
  - (b) If there is too much lubricant, remove it with a clean cotton wiper, G00034, after the installation.

#### SUBTASK 47-21-01-420-002

- (7) Do these steps to install the coupling sleeve:
  - (a) Slide the sleeve over one of the two O-ring cavities.
  - (b) Use a rocking movement to slide the sleeve over the two O-ring cavities.
  - (c) Make sure that the sleeve fully covers the two cavities.
  - (d) If you cannot easily slide the sleeve over the O-rings, then you have one or more of these problems:
    - 1) The distance between the duct ends is too large
    - 2) The axial misalignment between the duct centerlines is too large.
  - (e) If necessary, adjust the distance between ducts or the axial alignment to get the correct installation of the sleeve.

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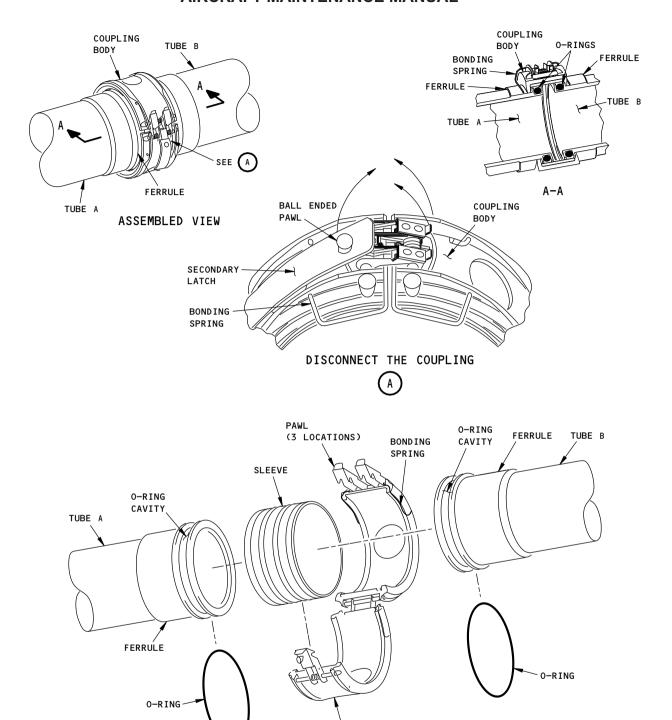
#### SUBTASK 47-21-01-420-003

- (8) Do these steps to connect the clam-shell coupling:
  - (a) Clean the exposed surfaces on the ferrules for an electrical faying surface bond (SWPM 20-20-00).
    - NOTE: Electrical continuity for the coupling is supplied by bonding springs installed on the coupling body. The contact surface for the bonding spring is the ferrule skirt (flat surface of the tube ferrule behind the O-ring cavity). If applicable, the contact surface is also the area behind the O-ring cavity on the mating component.
  - (b) Install the clam-shell coupling body over the sleeve and snap the coupling to the closed position.
    - NOTE: With all three pawls fully engaged, the clam-shell coupling is automatically locked. The coupling will not open unless you lift all three pawls at the same.
  - (c) Install the secondary latch on the pawl with a ball end.
    - NOTE: When the secondary latch is engaged on the ball end, the coupling is correctly installed.
  - (d) Adjust and tighten the duct support clamps after you install the coupling.

	<b>END</b>	OF	<b>TASK</b>	
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Install the Clamshell Coupling Figure 201/47-21-01-990-801 (Sheet 1 of 2)

COUPLING BODY EXPLODED VIEW

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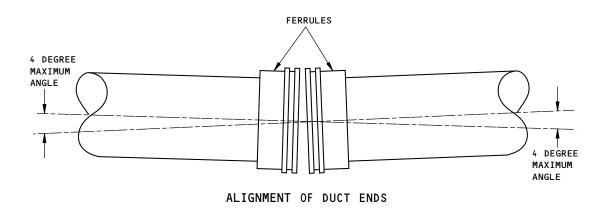
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# Install the Clamshell Coupling Figure 201/47-21-01-990-801 (Sheet 2 of 2)

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#### TASK 47-21-01-900-802

## 3. Connect the Threaded Closure Coupling

(Figure 202)

#### A. General

- (1) Do this procedure to connect the fixed cavity type coupling with a threaded closure (Hydraflow 15J15).
- (2) The coupling is connected when you engage the coupling nut with the coupling body. The coupling is correctly installed when the nut is hand tight against the stop on the coupling body. A ratchet self-locking feature is provided by a spring inside the coupling nut and detents along the face of the coupling body. A yellow band on the coupling body also gives a visual indication to find out if the coupling is installed correctly.
- (3) Electrical continuity across the coupling is provided by wire springs mounted in grooves on the inside diameter of the retaining ring.

### B. References

Reference	Title
SWPM 20-20-00	Standard Wiring Practices Manual

### C. Consumable Materials

Reference	Description	Specification
B00316	Solvent - Aliphatic Naphtha (For Organic Coatings)	TT-N-95 Type I, ASTM D-3735 Type I
B00722	Solvent - Stoddard	MIL-PRF-680 Type I or II (Supersedes P-D-680 Type I or II)
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

## D. Threaded Coupling Installation

SUBTASK 47-21-01-210-002

- (1) Examine these coupling components for damage:
  - (a) Coupling body
  - (b) Coupling nut
  - (c) Retaining ring
  - (d) Bonding springs (inside diameter of the retaining ring)

## SUBTASK 47-21-01-960-002

(2) If you find damage, replace the component.

#### SUBTASK 47-21-01-420-004

- (3) Do these steps to align the ducts or components:
  - (a) Make sure the axial misalignment is not more than  $\pm 4^{\circ}$ .
  - (b) Adjust the distance (gap) between the two mating parts to make sure that the gap is not more than 0.15 ±0.05 in. (0.38 ±0.13 cm).

#### SUBTASK 47-21-01-110-002

- (4) Do these steps to clean the O-rings:
  - (a) Clean all O-rings before the installation.

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- (b) Make sure that the O-ring is new, free of nicks, cuts, grooves, too much flash or other unwanted conditions.
- (c) Wipe the O-ring with a clean cotton wiper, G00034, dampened with stoddard solvent, B00722, or aliphatic naphtha solvent, B00316.
- (d) Immediately wipe the O-ring dry with a clean cotton wiper, G00034.
  - NOTE: Do not allow the solvent to evaporate dry.
- (e) Do these steps again until the O-ring is free from unwanted material.

#### SUBTASK 47-21-01-110-003

- (5) Do these steps to prepare the O-ring cavity:
  - (a) Clean all sealing surfaces before you install the O-ring.
  - (b) Make sure that the O-ring cavity is free of scratches, dents, distortions or unwanted material.
  - (c) Wipe the sealing surfaces with a clean cotton wiper, G00034, dampened with aliphatic naphtha solvent, B00316.
  - (d) Immediately wipe the sealing surface dry with a clean cotton wiper, G00034.NOTE: Do not allow the solvent to evaporate dry.
  - (e) Do these steps again until the sealing surface is free from unwanted material.

#### SUBTASK 47-21-01-110-004

- (6) Do these steps to prepare the electrical bond surfaces:
  - NOTE: Electrical continuity for the coupling is supplied by bonding springs installed on the inside diameter of the retaining rings. The contact surface for the bonding spring is the ferrule skirt (flat surface of the tube ferrule behind the O-ring cavity). If applicable, the contact surface is also the area behind the O-ring cavity on the mating component.
  - (a) Make sure that the electrical bonding contact surfaces are free of scratches, dents, distortions or unwanted material.
  - (b) Clean the contact surface on the ferrule skirt adjacent to the O-ring cavity (SWPM 20-20-00).
  - (c) If applicable, clean the contact surface on the valve body or component adjacent to the O-ring cavity (SWPM 20-20-00).

#### SUBTASK 47-21-01-420-005

- (7) Do these steps to install the retaining rings:
  - (a) Spirally deflect one split end of the retaining ring.
  - (b) Install the retaining ring over the two lands on the O-ring cavity flange.
  - (c) Trace around the ring circumference with a finger to make sure that the entire ring is in the correct position.

#### SUBTASK 47-21-01-420-006

- (8) Do these steps to install the coupling body:
  - (a) Slide the unthreaded side of the coupling body over the O-ring cavity.
  - (b) Continue to slide the coupling body away from O-ring cavity until the groove on the inside diameter of the coupling body is beyond the end of the ferrule skirt.
  - (c) Spirally deflect one split end of the retaining ring.
  - (d) Install the retaining ring into its position in the groove on the inside diameter of the coupling body.

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(e) Trace around the ring circumference with a finger to make sure that the entire retaining ring is positioned into the groove of the coupling body.

#### SUBTASK 47-21-01-420-007

- (9) Do these steps to install the coupling nut:
  - (a) Slide the coupling nut, knurled end first, over the O-ring cavity.
  - (b) Continue to slide the coupling nut away from O-ring cavity until the groove on the inside diameter of the coupling nut is beyond the end of the ferrule skirt.
  - (c) Spirally deflect one split end of the retaining ring.
  - (d) Position the retaining ring into position in the groove on the inside diameter of the coupling nut.
  - (e) Trace around the ring circumference with a finger to make sure the entire retaining ring is positioned into the groove of the coupling nut.

#### SUBTASK 47-21-01-420-008

- (10) Do these steps to install the O-rings:
  - (a) Apply a thin layer of grease, D00504, to the O-ring.
  - (b) Do not stretch the O-ring more than 50% during the installation.
  - (c) Install the O-ring into the O-ring cavity.
  - (d) Realign the O-ring if necessary, to make sure that the O-ring is not twisted.
  - (e) If there is too much lubricant, remove it with a clean cotton wiper, G00034.

#### SUBTASK 47-21-01-420-009

- (11) Do these steps to connect the coupling:
  - (a) Apply a thin layer of grease, D00504, to the inside diameter of the coupling body.
  - (b) With a slight rocking movement, slide the coupling body over the O-ring.
  - (c) At the same time, the retaining ring will slide on the ferrule skirt.
  - (d) Slightly rotate and rock the coupling nut to allow the retaining ring to slide over the ferrule skirt.
  - (e) Continue until the retaining ring is against the O-ring cavity.
  - (f) Slide the coupling nut into its position.
  - (g) Hand tighten the coupling nut and coupling body.
    - NOTE: Do not use tools to tighten the coupling.
  - (h) Continue to hand tighten the coupling until the coupling nut is against the stop on the coupling body.
    - NOTE: When the coupling nut is against the stop, the coupling is locked. The ratchet action between the nut and body is a self-locking mechanism that will not allow the coupling to loosen.

#### SUBTASK 47-21-01-210-003

- (12) Do a check of the coupling installation
  - (a) Make sure the coupling nut is hand tightened against the stop on the coupling body.
  - (b) Make sure the yellow inspection band on the coupling body does not show.
  - (c) If the yellow inspection band shows or you cannot easily hand tighten the nut until it is against the stop on the coupling body, then you have one or more of these problems:
    - 1) The distance (gap) between the duct ends is too large

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- 2) The axial misalignment between the duct centerlines is too large.
- (d) If necessary, adjust the distance between ducts or the axial alignment to get the correct installation of the coupling.

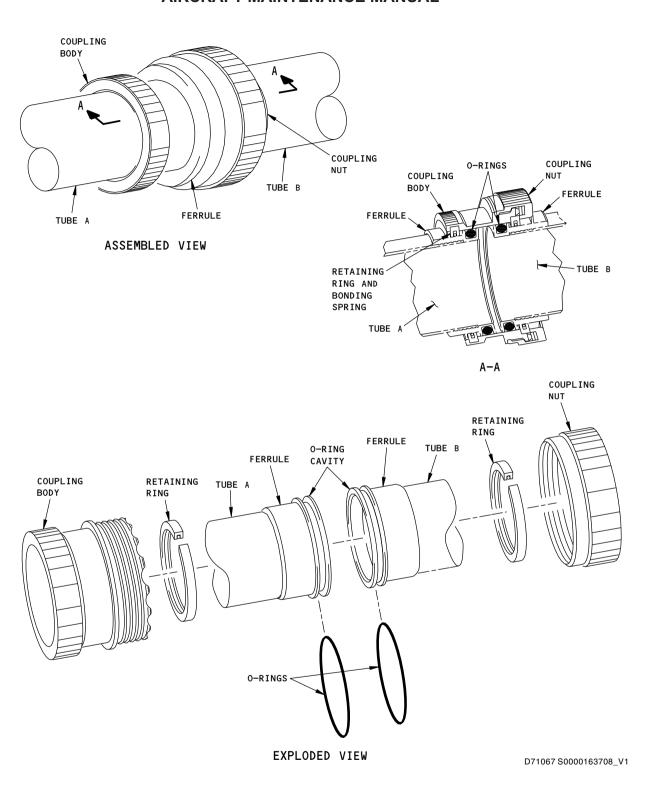
SUBTASK 47-21-01-820-001

(13)	Adjust and tighter	the duct support	clamps after you	install the coupling.
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\_\_\_\_\_ END OF TASK \_\_\_\_\_

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Install the Threaded Coupling Figure 202/47-21-01-990-802 (Sheet 1 of 2)

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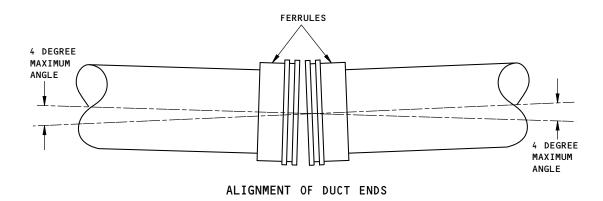
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# Install the Threaded Coupling Figure 202/47-21-01-990-802 (Sheet 2 of 2)

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## FLOAT VALVE - REMOVAL/INSTALLATION

## 1. General

- This procedure contains these tasks:
  - (1) Float Valve Removal
  - (2) Float Valve Installation
- The float valve is located in the center wing tank, between rib 1 and rib 2.
- To get access to the float valve, open access door 531AB.

#### TASK 47-21-02-000-801

## 2. Float Valve Removal

(Figure 401)

### A. References

Reference	Title
28-11-00-010-801	Purging and Fuel Tank Entry (P/B 201)
28-11-00-300-802	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-02-000-801	Center Tank Access Door - Removal (P/B 401)
28-26-00-650-801	Pressure Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Transfer (P/B 201)

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved
	Part #: 1-6390-A Supplier: 63318
	Part #: 10810 Supplier: \$0855
	Part #: 234350 Supplier: \$0857
	Part #: 311 Supplier: F6892
	Part #: 411B60 Supplier: 3DN12
	Part #: 411B90 Supplier: 3DN12
	Part #: DAD5013 Supplier: \$0856
	Part #: DFD5019 Supplier: \$0856
	Part #: J5-0275-2010 Supplier: 435R8
	Part #: SCD5019 Supplier: \$0856
	Part #: ST982LF-9 Supplier: 62176
	Part #: TS1275-4 Supplier: 1DWR5
SPL-768	Sealant Removal Tool, Hardwood or Plastic
	Part #: ST982 Supplier: 81205
STD-7423	Cover - Protective Tube
<b>Location Zones</b>	

## C.

Zone	Area
531	Center Fuel Tank - Rib 1 to Rib 8 - Left Wing

# D. Access Panels

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## E. Prepare for the Removal

SUBTASK 47-21-02-650-001

 Defuel or transfer fuel from the center tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 47-21-02-616-001



OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-010-801.

SUBTASK 47-21-02-010-001



DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

- (3) To get access to the center tank, do this task: Center Tank Access Door Removal, TASK 28-11-02-000-801.
  - (a) Open this access panel:

Number Name/Location
531AB Access Door

SUBTASK 47-21-02-010-002

(4) Go into the center tank.

SUBTASK 47-21-02-010-003

(5) Go to the float valve [1] location.

NOTE: The float valve [1] is on the left vent stringer [4] (vent stringer No. 15) of the center wing tank, between body rib No. 1 and No. 2.

#### F. Remove the Float Valve

SUBTASK 47-21-02-100-001

(1) Use the sealant removal tool, SPL-768 (sealant removal tool, COM-2481, or equivalent), to remove the old sealant from around the float valve [1].

NOTE: Do not remove the sealant from around the cover plate. Do not remove the cover plate or the adapter [7].

NOTE: The sealant removal/application tools are shown in this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-802.

SUBTASK 47-21-02-020-001

(2) Do these steps to remove the float valve [1]:

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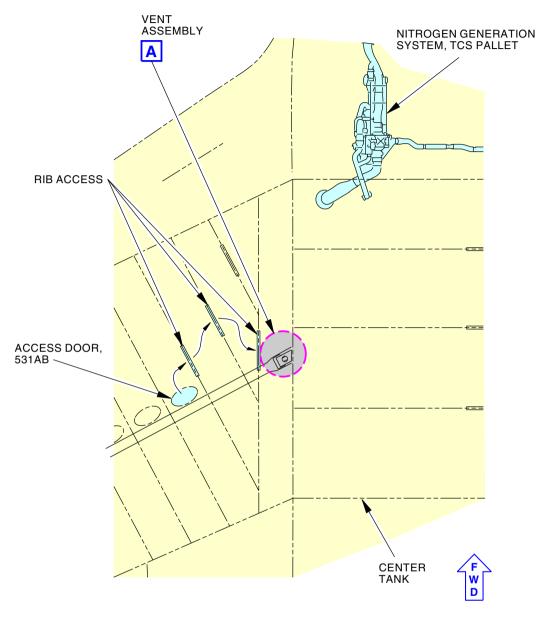


- (a) Hold the float valve [1] in its position.
- (b) Remove the four nuts [3] and washers [2] from the bolts [5].
- (c) Remove the float valve [1] from the adapter [7] and the cover plate.
- (d) Discard the used o-ring [6].
- (e) Install a protective cover, STD-7423, in the vent stringer [4] (vent stringer No. 15).

——— END OF TASK ———

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LEFT WING (TOP VIEW)

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Float Valve - Removal and Installation Figure 401/47-21-02-990-801 (Sheet 1 of 3)

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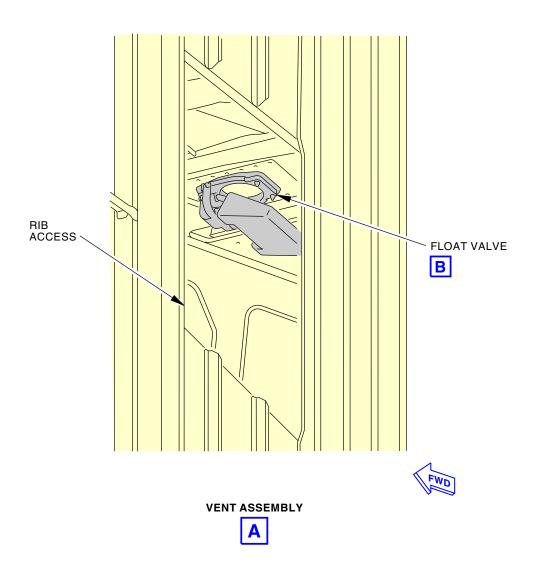
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Float Valve - Removal and Installation Figure 401/47-21-02-990-801 (Sheet 2 of 3)

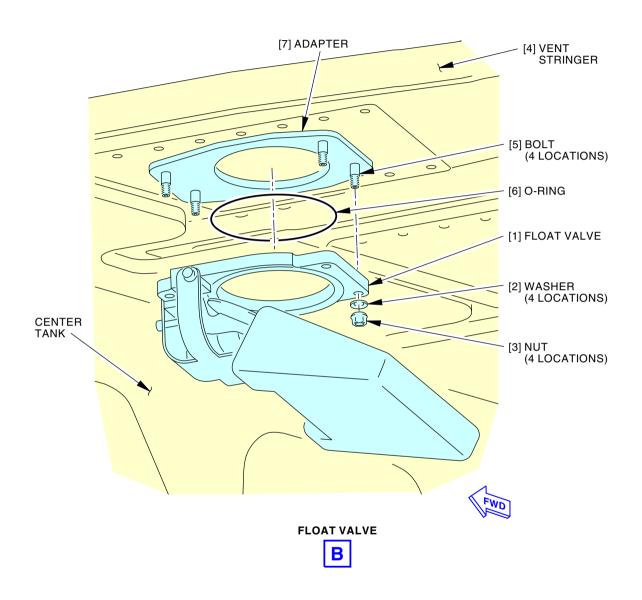
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Float Valve - Removal and Installation Figure 401/47-21-02-990-801 (Sheet 3 of 3)

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#### TASK 47-21-02-400-801

#### 3. Float Valve Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

#### C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
D00128	Grease - Silicone	A-A-59173
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

### D. Location Zones

Zone	Area
531	Center Fuel Tank - Rib 1 to Rib 8 - Left Wing

## E. Access Panels

Number	Name/Location	
531AB	Access Door	

## F. Prepare for the Installation

SUBTASK 47-21-02-010-004

(1) Go into the center tank in the left wing.

SUBTASK 47-21-02-010-005

(2) Remove the protective cover, STD-7423, from the vent stringer [4].

SUBTASK 47-21-02-100-002

- (3) Make sure that the mating surfaces between the float valve [1] and the adapter [7] are free of sealants, grease, and unwanted material.
  - (a) Make sure that the new o-ring cavity in the float valve [1] is clean and free of sealants and unwanted material.

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#### SUBTASK 47-21-02-110-001

(4) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-21-02-110-002

- (5) Prepare the contact surfaces of these components for a faying surface bond (SWPM 20-20-00):
  - (a) float valve [1]
  - (b) adapter [7]

## G. Install the Float Valve

#### SUBTASK 47-21-02-640-001

- (1) Do these steps to install the new o-ring [6]:
  - (a) Apply a thin coat of grease, D00128, to the new o-ring [6].
  - (b) Put the new o-ring [6] in the cavity on the float valve [1].
  - (c) Remove excess grease, D00128, with a cotton wiper, G00034.

#### SUBTASK 47-21-02-420-001

- (2) Do these steps to install the float valve [1]:
  - (a) Put the float valve [1] in its position on the adapter [7].
  - (b) Install the four washers [2] and nuts [3].

#### SUBTASK 47-21-02-210-001

- (3) Do a check of the float valve [1]:
  - (a) Make sure that the float valve [1] is in the fully open position.
  - (b) Make sure that the float valve [1] moves freely.
  - (c) Make sure that the float valve [1] is not limited by the adjacent structure.

## SUBTASK 47-21-02-390-001

(4) Apply a fillet seal of sealant, A00767, around the float valve [1] and the adapter [7].

#### SUBTASK 47-21-02-760-001

- (5) Use an intrinsically safe approved bonding meter, COM-1550, to measure the bonding resistance between the base of the float valve [1] and the vent stringer [4] (SWPM 20-20-00).
  - (a) Make sure the total resistance is 0.01 ohm (10 milliohms or less).

## H. Put the Airplane Back to the Usual Condition

#### SUBTASK 47-21-02-410-001

- (1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.
- (2) Close this access panel:

<u>Number</u>	Name/Location
531AB	Access Door

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### **DRAIN VALVE - REMOVAL/INSTALLATION**

## 1. General

- A. This procedure has these tasks:
  - (1) Drain Valve Removal
  - (2) Drain Valve Installation
- B. The drain valve is found forward of the Air Separation Unit (ASU) above the Ram Air Inlet Actuator Door, 192LR.
- C. A drain port and line connect the drain valve to the Nitrogen-Enriched Air Distribution System (NEADS) line.

## TASK 47-21-03-000-801

### 2. Drain Valve Removal

(Figure 401)

#### A. General

(1) The drain valve for the nitrogen-enriched air distribution system (NEADS) is referred to as the drain valve in this task.

## B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-21-00-700-801	Drain Valve - Fuel Leak Check (P/B 601)

## C. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

## E. Access Panels

Number	Name/Location	
192LR	Ram Air Inlet Actuator Door	

## F. Prepare for the Removal

SUBTASK 47-21-03-860-001



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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### (WARNING PRECEDES)



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-03-680-001

(2) Drain all fluid from the NEA distribution system at the drain valve [4] (TASK 47-21-00-700-801).

#### SUBTASK 47-21-03-010-001

(3) Open this access panel:

Number Name/Location

192LR Ram Air Inlet Actuator Door

#### SUBTASK 47-21-03-010-002

(4) Get access to the drain valve [4].

NOTE: The drain valve is found forward of the air separation unit, above the Ram Air Inlet Actuator Door, 192LR.

#### G. Remove the Drain Valve

#### SUBTASK 47-21-03-030-001

- (1) Do these steps to remove the drain valve [4]:
  - (a) Disconnect the drain hose [1] from the drain valve [4].

NOTE: Use two wrenches on the drain valve [4] to stop the rotation of the drain hose [1].

- (b) Disconnect the jam nut [2] and the washer [3].
- (c) Remove the drain valve [4].

#### SUBTASK 47-21-03-490-001

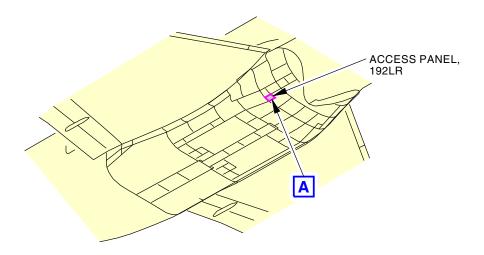
(2) Put a protective cover, STD-7423, on the end of the drain hose [1].

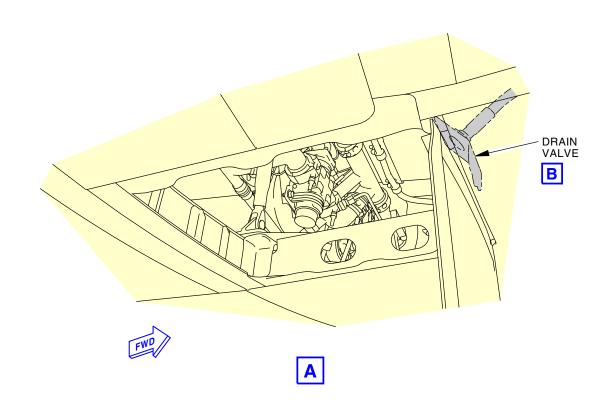
----- END OF TASK -----

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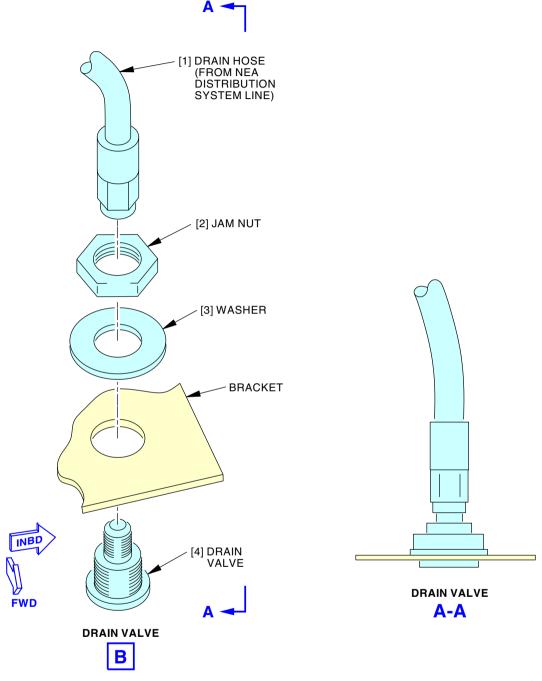
Drain Valve - Removal and Installation Figure 401/47-21-03-990-801 (Sheet 1 of 2)

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Drain Valve - Removal and Installation Figure 401/47-21-03-990-801 (Sheet 2 of 2)

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### TASK 47-21-03-400-801

# 3. Drain Valve Installation

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

#### C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

#### E. Access Panels

Number	Name/Location
192LR	Ram Air Inlet Actuator Door

### F. Install the Drain Valve

SUBTASK 47-21-03-860-002



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.

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# (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-03-410-001

(2) Go to the drain valve [4] location, above the Ram Air Inlet Actuator Door, 192LR.

#### SUBTASK 47-21-03-090-001

(3) Remove the protective cover, STD-7423, from the drain hose [1].

#### SUBTASK 47-21-03-420-001

- (4) Do these steps to install the drain valve [4]:
  - (a) Put the drain valve [4] in its position through the hole in the forward fairing panel.
  - (b) Connect the drain valve [4], washer [3], and jam nut [2].
  - (c) Tighten the jam nut [2] to 70 in-lb (8 N·m) 85 in-lb (10 N·m).
  - (d) Connect the drain hose [1] and the drain valve [4].NOTE: Use two wrenches on the drain valve [4] to stop the rotation of the drain hose [1].

#### G. Leak Check of the Drain Valve

SUBTASK 47-21-03-790-002

(1) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.

# SUBTASK 47-21-03-790-003

- (2) With the NGS pressurized, use the leak detector, G50135, to do a check for air leaks around the drain valve [4].
  - (a) Use a clean cotton wiper, G00034, to remove all the leak detector, G50135.
  - (b) Repair all leaks that you find.

# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-21-03-410-002

(1) Close this access panel:

<u>Number</u>	Name/Location	
192LR	Ram Air Inlet Actuator Door	

——— END OF TASK ———

47-21-03

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#### **BACKFLOW PREVENTION CHECK VALVE - REMOVAL/INSTALLATION**

# 1. General

- A. This procedure contains these tasks:
  - (1) Primary Backflow Prevention Check Valve Removal
  - (2) Primary Backflow Prevention Check Valve Installation
  - (3) Secondary Backflow Prevention Check Valve Removal
  - (4) Secondary Backflow Prevention Check Valve Installation
- B. The primary backflow prevention check valve is located in the center tank (right side). You will need to go into the center tank to remove and install the check valve.
- C. The secondary backflow prevention check valve is located in the Forward Wing to Body Fairing Panel, 192HR, forward of the Air Separation Unit (ASU).

#### TASK 47-21-04-000-801

# 2. Primary Backflow Prevention Check Valve Removal

(Figure 401)

# A. General

(1) The primary backflow prevention check valve will be referred to as the check valve in this task.

#### B. References

Reference	Title
28-11-00-010-801	Purging and Fuel Tank Entry (P/B 201)
28-11-02-000-801	Center Tank Access Door - Removal (P/B 401)
28-26-00-650-801	Pressure Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Transfer (P/B 201)

# C. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### D. Location Zones

Zone	Area
631	Center Fuel Tank - Rib 1 to Rib 8 - Right Wing

# E. Access Panels

Number	Name/Location			
631CB	Access Door			

### F. Prepare for the Removal

SUBTASK 47-21-04-650-001

(1) Defuel or transfer fuel from the center tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 47-21-04-910-001



OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-010-801.

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#### SUBTASK 47-21-04-010-001



DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

(3) To get access to the center tank, do this task: Center Tank Access Door - Removal, TASK 28-11-02-000-801.

Open this access panel:

Number Name/Location
631CB Access Door

#### SUBTASK 47-21-04-010-002

(4) Go into the right center wing tank (TASK 28-11-00-010-801).

#### SUBTASK 47-21-04-010-003

(5) Go to the check valve [1] location.

NOTE: The check valve [1] is installed in the center tank, right side, outboard of Rib 7.

# G. Remove the Check Valve

### SUBTASK 47-21-04-020-001

- (1) Do these steps to remove the check valve [1]:
  - (a) Disconnect the coupling nut [2], two retainers [5], two o-rings [3], and the coupling body [4].
    - 1) Discard the two o-rings [3].
  - (b) Loosen the nut [7] to disconnect the NEADS tube [8] from the check valve [1].

NOTE: Use a second wrench on the check valve [1] to prevent the check valve [1] from rotating while loosening the nut [7].

- (c) Remove the check valve [1].
  - 1) Turn the NEADS tube [8] slowly to remove the check valve [1].

NOTE: The NEADS tube [8] is not flexible.

### SUBTASK 47-21-04-420-001

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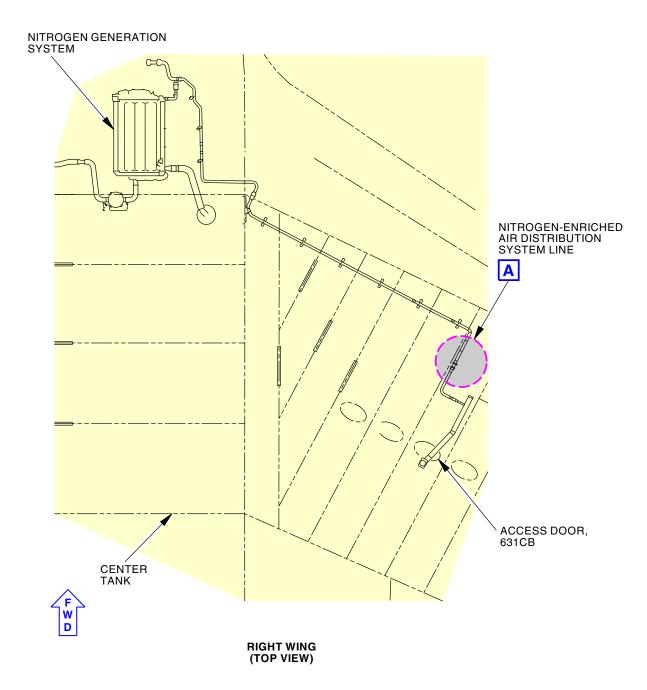
(2) Install protective covers, STD-7423, on the exposed ends of the NEADS tube [6] and NEADS tube [8].

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Primary Backflow Prevention Check Valve - Removal and Installation Figure 401/47-21-04-990-801 (Sheet 1 of 2)

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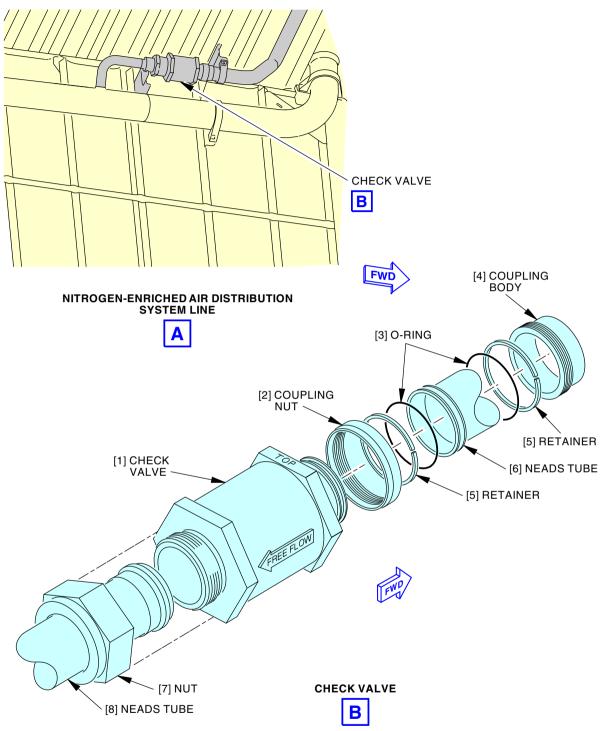
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Primary Backflow Prevention Check Valve - Removal and Installation Figure 401/47-21-04-990-801 (Sheet 2 of 2)

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#### TASK 47-21-04-400-801

# 3. Primary Backflow Prevention Check Valve Installation

(Figure 401)

### A. References

Reference	Title
20-41-00-760-801	Electrical Bonding (P/B 201)
28-11-00-010-801	Purging and Fuel Tank Entry (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-21-08-400-803	Coupling and Clamp Installation (General Procedures) (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

# C. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236

### D. Location Zones

Zone	Area
631	Center Fuel Tank - Rib 1 to Rib 8 - Right Wing

### E. Access Panels

Number	Name/Location	
631CB	Access Door	

### F. Prepare for the Installation

SUBTASK 47-21-04-010-004

(1) Go into the right center wing tank (TASK 28-11-00-010-801).

SUBTASK 47-21-04-010-005

(2) Remove the protective covers, STD-7423, from the NEADS tube [6] and NEADS tube [8].

SUBTASK 47-21-04-110-001

- (3) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surface of the check valve [1], where the check valve [1] attaches to the coupling.
  - (b) Contact surface of the ferrule on the NEADS tube [6].

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#### G. Install the Check Valve

#### SUBTASK 47-21-04-420-002

- (1) Do these steps to install the check valve [1]:
  - (a) Align the check valve [1] to make sure that the FLOW ARROW is visible and the arrow is pointing toward the rear spar.
  - (b) Make sure that the text "TOP" (stamped into the check valve [1] wrench flat) is facing up.
  - (c) Install, but do not fully tighten, the check valve [1] and the nut [7] on the NEADS tube [8].
  - (d) Align the check valve [1] and the NEADS tube [6].
  - (e) Lubricate the two o-rings [3] with grease, D00504.
  - (f) Install the coupling nut [2], two retainers [5], two o-rings [3], and coupling body [4] to install the flexible coupling assembly (TASK 28-21-08-400-803).
  - (g) Put a back wrench on the check valve [1] wrench flat, adjacent to the nut [7].
  - (h) Tighten the nut [7] to 900  $\pm$ 45 in-lb (102  $\pm$ 5 N·m).

#### SUBTASK 47-21-04-760-001

- (2) Measure the electrical resistance between each of these components and the nearest primary structure with an intrinsically safe approved bonding meter, COM-1550, approved for use in fuel vapor areas (TASK 20-41-00-760-801).
  - (a) check valve [1]
  - (b) NEADS tube [6]
  - (c) NEADS tube [8]

#### SUBTASK 47-21-04-760-002

(3) Make sure that the electrical resistance between each of the components and the structure is 1.0 ohm or less (SWPM 20-20-00).

# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-21-04-860-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 47-21-04-410-001

(2) Close this access panel:

<u>Number</u>	Name/Location
631CB	Access Door

——— END OF TASK ———

# TASK 47-21-04-000-802

# 4. Secondary Backflow Prevention Check Valve Removal

(Figure 402)

# A. General

(1) The secondary backflow prevention check valve is referred to as the check valve in this procedure.

#### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-21-00-700-801	Drain Valve - Fuel Leak Check (P/B 601)

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C. Tools/Equipment

Reference Description

STD-7423 Cover - Protective Tube

D. Location Zones

Zone Area

192 Forward Wing-to-Body Fairings, Right

E. Access Panels

Number Name/Location

192HR Forward Wing To Body Fairing Panel

F. Prepare for the Removal

SUBTASK 47-21-04-860-004

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

Left Power Management Panel, P110

Row Col Number Name

L 9 C47601 NGS CONTROL

SUBTASK 47-21-04-010-006

(2) Open this access panel:

Number Name/Location

192HR Forward Wing To Body Fairing Panel

SUBTASK 47-21-04-680-001

(3) Drain all fluid from the NEA distribution system (NEADS) at the drain valve (TASK 47-21-00-700-801).

SUBTASK 47-21-04-010-010

(4) Go to the check valve [1] location.

NOTE: The check valve [1] is found above the ram air duct in the Forward Wing to Body Fairing Panel, 192HR.

### G. Remove the Secondary Backflow Prevention Check Valve

SUBTASK 47-21-04-860-005



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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# (WARNING PRECEDES)

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-04-020-002

- (2) Do these steps to remove the check valve [1] from the ASU outlet duct [9]:
  - (a) Disconnect the coupling [11].
    - 1) Slide the sleeve [10] away from the check valve [1].
    - 2) Discard the two o-rings [3].
  - (b) Loosen the nut [7] to disconnect the NEADS tube [8] from the check valve [1].

NOTE: Use a second wrench on the check valve [1] to prevent the check valve [1] from turning while you loosen the nut [7].

- (c) Remove the check valve [1].
  - 1) Turn the NEADS tube [8] slowly to remove the check valve [1].

NOTE: The NEADS tube [8] is not flexible.

#### SUBTASK 47-21-04-420-003

(3) Install protective covers, STD-7423, on the exposed ends of the NEADS tube [8] and the ASU outlet duct [9].

 <b>END</b>	OF	TASK	
	UE	IASN	

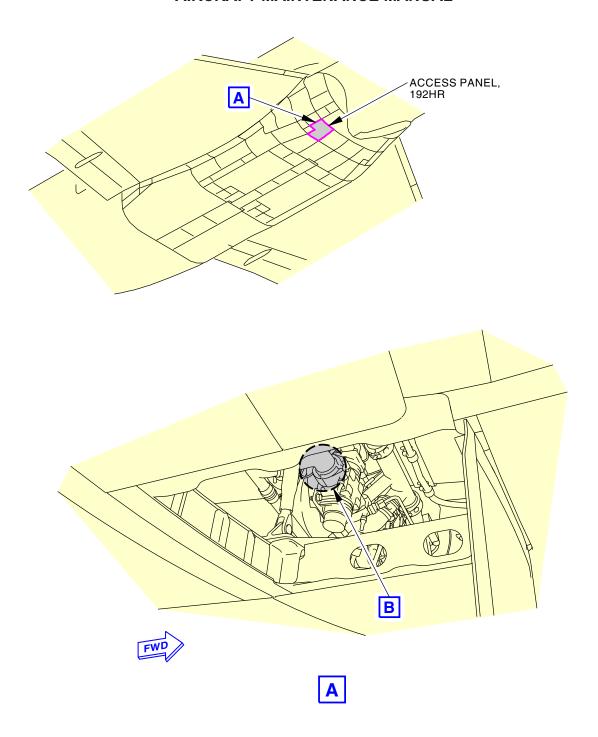
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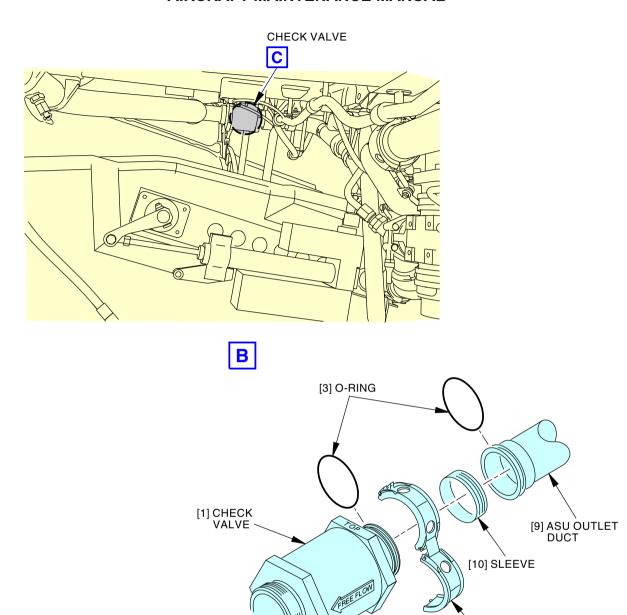
Secondary Backflow Prevention Check Valve - Removal and Installation Figure 402/47-21-04-990-802 (Sheet 1 of 2)

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Secondary Backflow Prevention Check Valve - Removal and Installation Figure 402/47-21-04-990-802 (Sheet 2 of 2)

- [7] NUT

[8] NEADS TUBE

**CHECK VALVE** 

[11] COUPLING

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#### TASK 47-21-04-400-802

# 5. Secondary Backflow Prevention Check Valve Installation

(Figure 402)

### A. References

Reference	Title
20-41-00-760-801	Electrical Bonding (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550  Bonding Meters - Approved, Intrinsically Safe (Approved of Class I, Divisions I & II hazardous (classified) locations. Cotthese hazardous locations, COM-614 can be used in lieu COM-1550).	
	Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

# E. Access Panels

Number	Name/Location
192HR	Forward Wing To Body Fairing Panel

### F. Prepare for the Installation

SUBTASK 47-21-04-010-008

(1) Go to the check valve [1] location.

NOTE: The check valve [1] is found above the ram air duct in the Forward Wing to Body Fairing Panel, 192HR.

SUBTASK 47-21-04-010-009

(2) Remove the protective covers, STD-7423, from the exposed ends of the NEADS tube [8] and the ASU outlet duct [9].

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#### SUBTASK 47-21-04-110-002

- (3) Prepare these components for an electrical surface bond (SWPM 20-20-00):
  - (a) Contact surface of the check valve [1], where the valve attaches to the coupling [11].
  - (b) Contact surface of the ferrule on the ASU outlet duct [9].
  - (c) Contact surface of the check valve [1], where the valve attaches to the nut [7].
  - (d) Contact surface of the ferrule on the NEADS tube [8].

#### G. Install the Check Valve

SUBTASK 47-21-04-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-04-420-004

- (2) Do these steps to install the check valve [1]:
  - (a) Align the check valve [1] to make sure that the FLOW ARROW is visible and the arrow is pointing toward the front of the aircraft.
  - (b) Make sure that the text "TOP" (stamped into the check valve wrench flat) is on the top surface of the check valve [1].
  - (c) Install, but do not fully tighten, the nut [7] on the NEADS tube [8] to the check valve [1].

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(d) Align the check valve [1] with the ASU outlet duct [9].

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- (e) Lubricate the two o-rings [3] with Krytox 240AC perfluoropolyether grease, D50063.
- (f) Install the two o-rings [3] into the o-ring cavities on the check valve [1] and the ASU outlet duct [9].
- (g) Slide the sleeve [10] into position between the check valve [1] and the ASU outlet duct [9].
- (h) Connect the coupling [11].
- (i) Put a back wrench on the check valve [1] wrench flat, adjacent to the nut [7].
- (j) Tighten the nut [7].

#### SUBTASK 47-21-04-760-003

- (3) Measure the electrical resistance between each of these components and the nearest primary structure with an intrinsically safe approved bonding meter, COM-1550 (TASK 20-41-00-760-801).
  - (a) check valve [1]
  - (b) ASU outlet duct [9]
  - (c) NEADS tube [8]

#### SUBTASK 47-21-04-760-004

(4) Make sure that the electrical resistance between each of these components and the structure is 0.010 ohm (10 milliohms) or less (SWPM 20-20-00).

# H. Operational Test for the Secondary Backflow Prevention Check Valve

SUBTASK 47-21-04-860-007

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

#### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

# SUBTASK 47-21-04-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the check valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

#### I. Put the Airplane Back to the Usual Condition

SUBTASK 47-21-04-410-002

(1) Close this access panel:

<u>Number</u>	Name/Location
192HR	Forward Wing To Body Fairing Panel
	——— END OF TASK ———

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# **CROSS VENT CHECK VALVE - REMOVAL/INSTALLATION**

# 1. General

- A. This procedure contains these tasks:
  - (1) Cross Vent Check Valve Removal
  - (2) Cross Vent Check Valve Installation
- B. The cross vent check valve is located in the left surge tank, above the pressure relief door.
- C. The valve is attached to the number 15 vent stringer and fuel dam with a bolt, screws, and a clamping device.

# TASK 47-21-05-000-801

### 2. Cross Vent Check Valve Removal

(Figure 401)

### A. References

Reference	Title	
28-11-03-000-801	Surge Tank Access Door - Removal (P/B 401)	

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved
	Part #: 1-6390-A Supplier: 63318
	Part #: 10810 Supplier: \$0855
	Part #: 234350 Supplier: \$0857
	Part #: 311 Supplier: F6892
	Part #: 411B60 Supplier: 3DN12
	Part #: 411B90 Supplier: 3DN12
	Part #: DAD5013 Supplier: \$0856
	Part #: DFD5019 Supplier: \$0856
	Part #: J5-0275-2010 Supplier: 435R8
	Part #: SCD5019 Supplier: \$0856
	Part #: ST982LF-9 Supplier: 62176
	Part #: TS1275-4 Supplier: 1DWR5
SPL-768	Sealant Removal Tool, Hardwood or Plastic
	Part #: ST982 Supplier: 81205

### C. Location Zones

Zone	Area
543	Main Tank - Rib 34 - Rib 37, WS 1074 - WS 1155; and Surge Tank - Rib 37 - Rib 38
	- WS 1155 - WS 1182

#### D. Access Panels

Number Name/Location	
543DB	Pressure Relief Door

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# E. Prepare for the Removal

SUBTASK 47-21-05-650-001



DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

(1) Do this task to open this access door:

Surge Tank Access Door - Removal, TASK 28-11-03-000-801

Number Name/Location
543DB Pressure Relief Door

SUBTASK 47-21-05-010-001

(2) Go into to the left surge tank.

#### F. Remove the Cross Vent Check Valve

SUBTASK 47-21-05-020-003

(1) Remove the sealant from these components:

NOTE: Do not remove the sealant from the nutplate [3] on the fuel dam.

- (a) Fillet seal around the periphery of the cross vent check valve [1].
- (b) Cap seal from the two bolts [5] and bolt [8].

SUBTASK 47-21-05-910-001

(2) Hold the cross vent check valve [1] in its position.

SUBTASK 47-21-05-020-001

(3) Remove the two bolts [5] and washers [4] that attach the cross vent check valve [1] to the fuel dam [2].

SUBTASK 47-21-05-030-001

(4) Loosen the bolt [8] and washer [7] on the clamping device.

NOTE: Loosen the bolt [8] enough to relieve the spring tension on the clamping device.

SUBTASK 47-21-05-020-002

- (5) Remove the cross vent check valve [1].
  - (a) Discard the gasket [6].

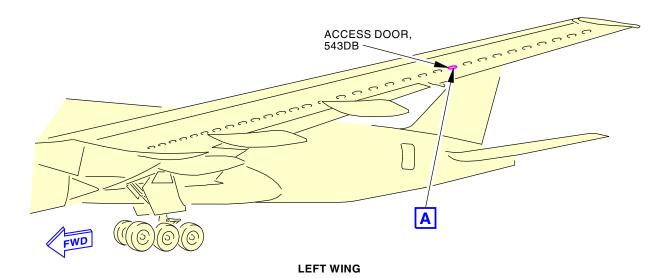
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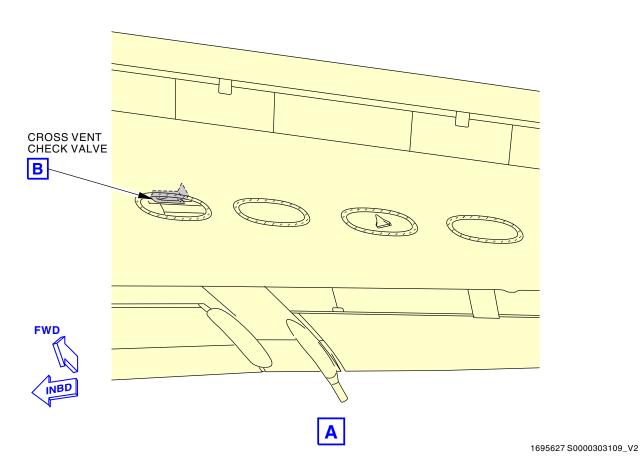
(6) Use sealant removal tool, COM-2481 ,sealant removal tool, SPL-768, or equivalent to remove the sealant from the fuel dam [2] and the vent stringer.

NOTE: Do not remove sealant from the nutplate [3] on the fuel dam.

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Cross Vent Check Valve - Removal and Installation Figure 401/47-21-05-990-801 (Sheet 1 of 2)

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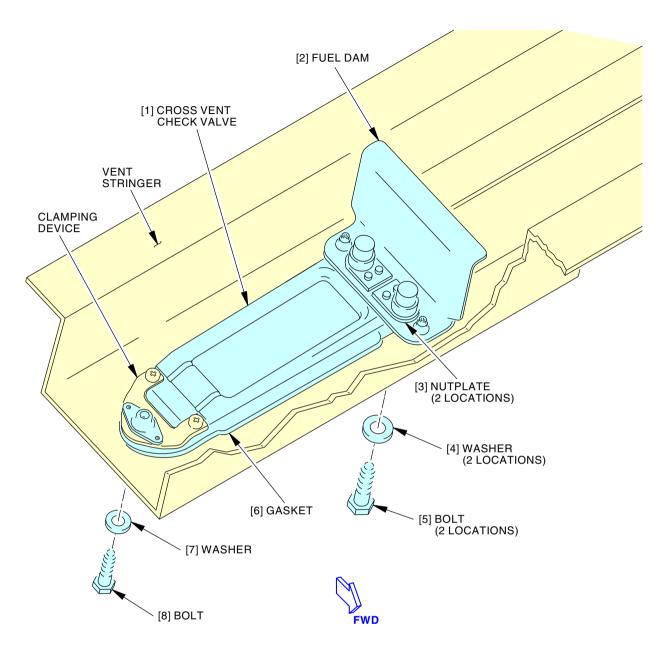
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**CROSS VENT CHECK VALVE** 



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Cross Vent Check Valve - Removal and Installation Figure 401/47-21-05-990-801 (Sheet 2 of 2)

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#### TASK 47-21-05-400-801

### 3. Cross Vent Check Valve Installation

(Figure 401)

### A. References

Reference	Title
28-11-03-000-801	Surge Tank Access Door - Removal (P/B 401)
28-11-03-400-801	Surge Tank Access Door - Installation (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

<u>NOTE</u>: 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 Meters - Approved, Intrinsically Safe (Approved Class I, Divisions I & II hazardous (classified) locations. these hazardous locations, COM-614 can be used in lie COM-1550).	
	Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17

#### C. Location Zones

Zone	Area
543	Main Tank - Rib 34 - Rib 37, WS 1074 - WS 1155; and Surge Tank - Rib 37 - Rib 38
	- WS 1155 - WS 1182

# D. Access Panels

Number	Name/Location		
543DB	Pressure Relief Door		

### E. Prepare for the Installation

SUBTASK 47-21-05-010-002



DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

- (1) Go into the left surge tank (TASK 28-11-03-000-801).
  - (a) Go to the cross vent check valve [1] location.

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#### SUBTASK 47-21-05-760-001

- (2) Prepare the faying surfaces of these components for a mating surface bond (SWPM 20-20-00).
  - (a) cross vent check valve [1]
  - (b) fuel dam [2]

### F. Install the Cross Vent Check Valve

#### SUBTASK 47-21-05-420-002

- (1) Do these steps to install the cross vent check valve [1]:
  - (a) Put the gasket [6] on the top side of the valve face.
  - (b) Install the cross vent check valve [1] in the vent stringer.

NOTE: The valve flange and gasket [6] must be below the No. 15 vent stringer. The clamping device must be in the vent channel.

- 1) Make sure that the clamping device engages the stringer.
- (c) Hold the cross vent check valve [1] in its position.
- (d) Install, but do not fully tighten, the bolts [5] and washers [4] into the fuel dam [2] nutplate [3].
- (e) Make sure that the bolt [8] and washer [7] are attached to the clamping device.
- (f) Make sure that the gasket [6] is between the cross vent check valve [1] and the bottom side of the No. 15 vent stringer.
- (g) Make sure that you align the cross vent check valve [1] with the vent stringer and the fuel dam [2].

### SUBTASK 47-21-05-420-001

(2) Fully tighten the two bolts [5] and the bolt [8] to 55  $\pm$ 4 in-lb (6.2  $\pm$ 0.5 N·m).

#### SUBTASK 47-21-05-280-001

- (3) Use a intrinsically safe approved bonding meter, COM-1550, to measure the resistance between the cross vent check valve [1] and the airplane structure (SWPM 20-20-00).
  - (a) Make sure that the total resistance is 0.010 ohm (10 milliohms) or less.

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

#### SUBTASK 47-21-05-410-001

(1) Do this task to close this access door:

Surge Tank Access Door - Installation, TASK 28-11-03-400-801

NumberName/Location543DBPressure Relief Door

------ END OF TASK ------

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EFFECTIVITY

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### CROSS VENT CHECK VALVE - INSPECTION/CHECK

# 1. General

A. This procedure contains scheduled maintenance task data.

#### TASK 47-21-05-280-801

# 2. Cross Vent Check Valve Operational Check

NOTE: This procedure is a scheduled maintenance task.

#### A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 47-AWL-05.

(2) The cross vent check valve opens during overfuel conditions to relieve fuel tank pressure. The cross vent check valve is normally closed to prevent ambient air from going into the center tank

#### B. References

Reference	Title
28-11-03-000-801	Surge Tank Access Door - Removal (P/B 401)
28-11-03-400-801	Surge Tank Access Door - Installation (P/B 401)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-21-05-000-801	Cross Vent Check Valve Removal (P/B 401)
47-21-05-400-801	Cross Vent Check Valve Installation (P/B 401)

# C. Tools/Equipment

Reference	Description	
STD-1153	Wire - Stiff, Single Strand, 16 Gauge	

### D. Location Zones

Zone	Area
543	Main Tank - Rib 34 - Rib 37, WS 1074 - WS 1155; and Surge Tank - Rib 37 - Rib 38
	- WS 1155 - WS 1182

### E. Access Panels

Number	Name/Location	
543DB	Pressure Relief Door	

# F. Prepare for the Test

SUBTASK 47-21-05-010-003



DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.

47-21-05

**EFFECTIVITY** 



# (WARNING PRECEDES)



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

(1) Do this task to open this access door:

Surge Tank Access Door - Removal, TASK 28-11-03-000-801

Number Name/Location
543DB Pressure Relief Door

#### SUBTASK 47-21-05-010-004

(2) Go to the cross vent check valve location

NOTE: The cross vent check valve is found in the left surge tank, above the pressure relief door. The cross vent check valve is attached to the number 15 vent stringer and fuel dam with bolts and a clamping device.

# G. Cross Vent Check Valve Operational Check

SUBTASK 47-21-05-710-001

- (1) Make a hook from a piece of 16 gauge wire, STD-1153, or equivalent.
  - (a) Insert the hook into the hole in the tang on the lower side of the flapper valve.

NOTE: Do not scratch or mar the surface of the valve flapper.

# 47-AWL-05: ALI

(b) Gently pull on the wire until the flapper opens.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-05.

# 47-AWL-05: ALI

(c) Release the wire to let the flapper close.

NOTE: The flapper should seat in the valve body.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-05.

- 1) If the cross vent check valve does not open or seat correctly, do these tasks:
  - a) Cross Vent Check Valve Removal, TASK 47-21-05-000-801.
  - b) Cross Vent Check Valve Installation, TASK 47-21-05-400-801.
- 2) If the cross vent check valve operation is satisfactory, remove the wire from the tang on the cross vent check valve.
- 3) Make sure that the surface of the cross vent check valve is not scratched or marred.

ARO ALL 47-21-05



# H. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-05-410-002

(1) Do this task to close this access door:

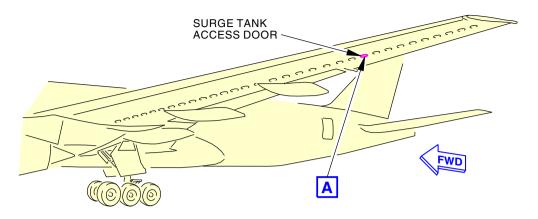
Surge Tank Access Door - Installation, TASK 28-11-03-400-801

Number Name/Location
543DB Pressure Relief Door

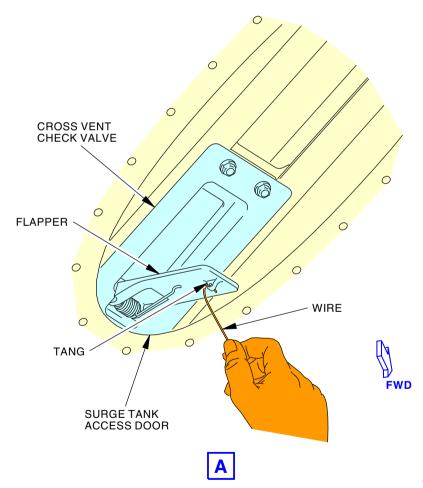
----- END OF TASK -----

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**LEFT WING** 



1828199 S0000323313\_V2

Cross Vent Check Valve - Check Figure 601/47-21-05-990-802

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# FLAME ARRESTOR - REMOVAL/INSTALLATION

# 1. General

- A. This procedure has these tasks:
  - (1) Flame Arrestor Removal
  - (2) Flame Arrestor Installation
- B. The flame arrestor is installed on the front spar of the right side of the center tank. It acts like a bulkhead fitting and requires one person in the center tank and one person on the front side of the spar to replace it.

#### TASK 47-21-06-000-801

# 2. Flame Arrestor Removal

(Figure 401)

### A. General

(1) Two persons are necessary to do this task.

#### B. References

Reference	Title
20-30-93-910-801	Final Cleaning Prior to Fuel Tank Sealing (Series 93) (P/B 201)
28-11-00-010-801	Purging and Fuel Tank Entry (P/B 201)
28-11-00-300-802	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-02-000-801	Center Tank Access Door - Removal (P/B 401)
47-00-00-910-802	Nitrogen Generation System Precautions (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-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved
	Part #: 1-6390-A Supplier: 63318
	Part #: 10810 Supplier: \$0855
	Part #: 234350 Supplier: \$0857
	Part #: 311 Supplier: F6892
	Part #: 411B60 Supplier: 3DN12
	Part #: 411B90 Supplier: 3DN12
	Part #: DAD5013 Supplier: \$0856
	Part #: DFD5019 Supplier: \$0856
	Part #: J5-0275-2010 Supplier: 435R8
	Part #: SCD5019 Supplier: \$0856
	Part #: ST982LF-9 Supplier: 62176
	Part #: TS1275-4 Supplier: 1DWR5
SPL-768	Sealant Removal Tool, Hardwood or Plastic
	Part #: ST982 Supplier: 81205
STD-133	Brush - Stiff Bristle, Non-metallic
STD-7423	Cover - Protective Tube

ARO ALL



### D. Consumable Materials

Reference	Description	Specification
B01013	Solvent - Final Cleaning Prior To Fuel Tank Sealing - Series 93	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

#### E. Location Zones

Zone	Area
611	Leading Edge to Front Spar - Inboard of Nacelle Strut - Right Wing
631	Center Fuel Tank - Rib 1 to Rib 8 - Right Wing

#### F. Access Panels

Number	Name/Location
611AB	Inboard Fixed Leading Edge Panel
631AB	Access Door

# G. Prepare for the Removal

SUBTASK 47-21-06-860-001



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-910-802).

SUBTASK 47-21-06-860-002

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-21-06-010-001

(3) Do this task: Center Tank Access Door - Removal. TASK 28-11-02-000-801.

SUBTASK 47-21-06-010-002



DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

(4) Open these access panels:

Number Name/Location
611AB Inboard Fixed Leading Edge Panel

ARO ALL



(Continued)

Number Name/Location
631AB Access Door

#### H. Remove the Flame Arrestor

SUBTASK 47-21-06-940-002



OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Have one person go into the fuel tank (TASK 28-11-00-010-801).

#### SUBTASK 47-21-06-940-001

(2) Go to the flame arrestor [1] location.

<u>NOTE</u>: The flame arrestor [1] is installed on the front spar.

#### SUBTASK 47-21-06-020-001

(3) Disconnect the NEADS tubes from the flame arrestor [1].

NOTE: The flame arrestor [1] is connected to the in-tank and out-tank ends of the NEADS tube.

(a) Put protective covers, STD-7423, on both NEADS tubes.

#### SUBTASK 47-21-06-020-002

- (4) Do these steps to remove the flame arrestor [1]:
  - (a) Remove the lockwire from the nut [5].
  - (b) Use the sealant removal tool, SPL-768 (sealant removal tool, COM-2481, or equivalent), to remove the sealant from the flame arrestor [1] in the center tank.
  - (c) Use the sealant removal tool, SPL-768 (sealant removal tool, COM-2481, or equivalent), to remove the sealant from the nut [5] and flame arrestor [1] in the wheel well.
    - NOTE: The sealant removal/application tools are shown in this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-802.
  - (d) Disconnect the nut [5] and the washer [4] from out-tank side of the center tank.

NOTE: Use a second wrench on the flame arrestor [1] on the in-tank side to stop it from turning

- 1) Keep the nut [5] and the washer [4] for the installation.
- (e) Remove the flame arrestor [1].
- (f) Discard the o-ring [3].

#### SUBTASK 47-21-06-100-001



EFFECTIVITY

**ARO ALL** 

DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(5) Do these steps to remove the remaining sealant:

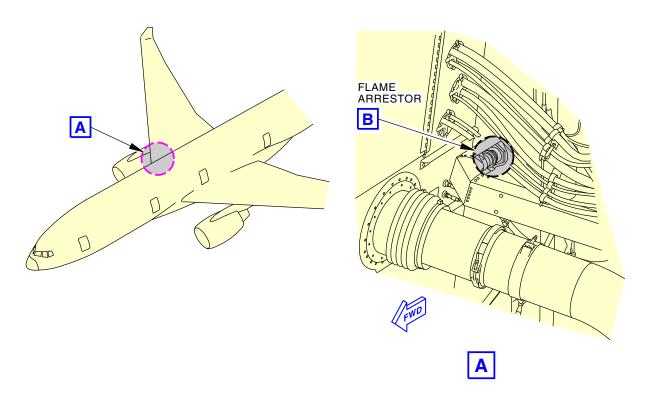


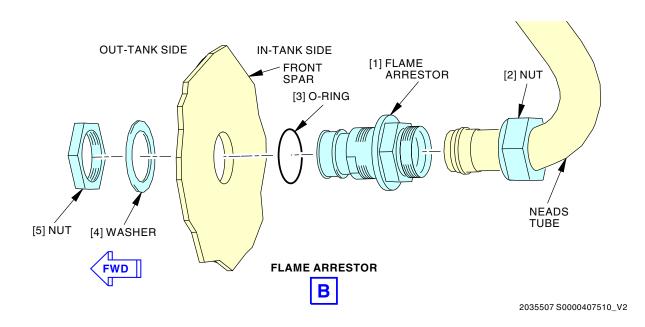
- (a) Use the sealant removal tool, SPL-768, (or equivalent) to remove the used sealant.
- (b) Clean the surface with a clean brush, STD-133, a cotton wiper, G00034, and Series 93 solvent, B01013 (Final Cleaning Prior to Fuel Tank Sealing (Series 93), TASK 20-30-93-910-801).
- (c) Rub the area with a clean, dry cotton wiper, G00034.

FND OF TASK				
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Flame Arrestor Installation Figure 401/47-21-06-990-801

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#### TASK 47-21-06-400-801

### 3. Flame Arrestor Installation

(Figure 401)

#### A. General

- (1) 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 47-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

(2) Two persons are necessary to do this task.

### B. References

Reference	Title
28-11-02-400-801	Center Tank Access Door - Installation (P/B 401)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

# C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

#### D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### E. Location Zones

Zone	Area
611	Leading Edge to Front Spar - Inboard of Nacelle Strut - Right Wing

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# (Continued)

Zone	Area
631	Center Fuel Tank - Rib 1 to Rib 8 - Right Wing

#### F. Access Panels

Number	Name/Location
611AB	Inboard Fixed Leading Edge Panel
631AB	Access Door

### G. Prepare for the Installation

SUBTASK 47-21-06-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-21-06-940-003

(2) Go to the flame arrestor [1] location.

#### SUBTASK 47-21-06-020-003

(3) Remove the protective covers, STD-7423, from the NEADS tube.



> 47-AWL-01: CDCCL

### SUBTASK 47-21-06-210-002

(4) Make sure the integral honeycomb flame arrestor [1] (bulkhead fitting) is installed.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions.

TASK 47-00-00-910-801, for important information on Critical Design Configuration

Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

# SUBTASK 47-21-06-100-002

(5) Make sure the NEADS tube, flame arrestor [1], nut [5], and washer [4] are clean and free from grease and unwanted material.

#### SUBTASK 47-21-06-760-001

- (6) Prepare these components for a fillet sealed fay surface bond (SWPM 20-20-00):
  - (a) flame arrestor [1]
  - (b) front spar of the center tank where the flame arrestor will attach

ARO ALL



- (c) washer [4]
- (d) nut [5]

# H. Install the Flame Arrestor

#### SUBTASK 47-21-06-420-001

- (1) Do these steps to install the o-ring [3] in the flame arrestor [1]:
  - (a) Put a thin layer of Krytox 240AC perfluoropolyether grease, D50063, on a new o-ring [3].
  - (b) Put the new o-ring [3] in the cavity on the flame arrestor [1].

#### SUBTASK 47-21-06-420-002

- (2) Do these steps to install the flame arrestor [1]:
  - (a) Put the flame arrestor [1] in its position on the front spar.

# 28-AWL-01: ALI

(b) Install a fillet sealed fay surface bond between the flame arrestor [1] (bulkhead fitting) flange and the front spar structure inside the tank (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

- (c) Put the washer [4] and the nut [5] on the flame arrestor [1] from outside the center tank.
- (d) Make sure the flame arrestor [1] is aligned correctly.
- (e) Tighten the nut [5] to 600  $\pm$ 30 in-lb (68  $\pm$ 4 N·m).

NOTE: Use a second wrench on the in-tank side to make sure the flame arrestor [1]f does not turn.

### SUBTASK 47-21-06-420-003

- (3) Do these steps to connect the flame arrestor [1] to the in-tank NEADS tube:
  - (a) Connect the NEADS tube in the center tank to the flame arrestor [1].
  - (b) Tighten the nut [2] on the flareless fitting.

# SUBTASK 47-21-06-420-004

- (4) From outside of the center tank, connect the NEADS tube to the flame arrestor [1].
  - (a) Tighten the nut on the NEADS tube.

### SUBTASK 47-21-06-760-003

EFFECTIVITY

# 47-AWL-01: CDCCL

(5) Measure the electrical bonding resistance between the flame arrestor [1] (bulkhead fitting) and the front spar structure inside the center tank (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions,
TASK 47-00-00-910-801, for important information on Critical Design Configuration
Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

(a) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance.

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→ 47-AWL-01: CDCCL

(b) Make sure the electrical bonding resistance is 0.0005 ohm (0.5 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions,

TASK 47-00-00-910-801, for important information on Critical Design

Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

#### SUBTASK 47-21-06-390-001

## → 47-AWL-01: CDCCL

(6) Apply a full-bodied fillet seal between the flame arrestor [1] (bulkhead fitting) flange and the front spar structure inside the tank.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions,

TASK 47-00-00-910-801, for important information on Critical Design Configuration

Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 47-AWL-01.

(a) Use sealant, A00767, to apply the fillet seal.

#### SUBTASK 47-21-06-390-002

- (7) Apply a full-bodied fillet seal encapsulating the first coupling interface inside the tank at the flame arrestor [1] between the flareless fitting nut [2] and tube and between the flareless fitting nut [2] and flame arrestor [1].
  - (a) Use sealant, A00767, to apply the fillet seal.

#### SUBTASK 47-21-06-760-002

- (8) Measure the electrical resistance between the structure inside the tank and the first tube that mates with the flame arrestor [1] (bulkhead fitting) (SWPM 20-20-00).
  - (a) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance.
  - (b) Make sure the resistance is 1.0 ohm (1000 milliohms) or less.

## SUBTASK 47-21-06-420-007

(9) Install the lockwire to the nut [5].

#### SUBTASK 47-21-06-390-003

(10) Apply a full-bodied fillet seal of sealant, A00767, to the outside surface of the front spar around the perimeter of the flame arrestor [1].

#### I. Operational Test for the Flame Arrestor

#### SUBTASK 47-21-06-860-003

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-21-06-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the flame arrestor [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.
  - (c) Repair all leaks that you find.

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## J. Put the Airplane Back to the Usual Condition

SUBTASK 47-21-06-420-006

(1) Close these access panels:

Number	Name/Location

611AB Inboard Fixed Leading Edge Panel

631AB Access Door

SUBTASK 47-21-06-420-005

(2) Do this task: Center Tank Access Door - Installation, TASK 28-11-02-400-801.

----- END OF TASK -----

ARO ALL 47-21-06



## NITROGEN GENERATION SYSTEM (NGS) CONTROLLER - REMOVAL/INSTALLATION

#### 1. General

- A. This procedure has these tasks:
  - (1) Nitrogen Generation System (NGS) Controller Removal
  - (2) Nitrogen Generation System (NGS) Controller Installation
- B. The nitrogen generation system (NGS) controller is found in the forward cargo bay, on the right side.
- C. To get access to the NGS controller, open the forward large cargo door, 821.

#### TASK 47-31-01-000-801

## 2. Nitrogen Generation System (NGS) Controller Removal

(Figure 401)

#### A. General

(1) The NGS controller is referred to as the controller in this task.

## **B.** Location Zones

Zone	Area
122	Forward Cargo Compartment, Right

#### C. Access Panels

Number	Name/Location
821	Forward Large Cargo Door

#### D. Prepare for the Removal

SUBTASK 47-31-01-860-003

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	Name
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-31-01-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
821	Forward Large Cargo Door

#### SUBTASK 47-31-01-010-002

(3) To get access to the controller [1], remove the sidewall liner located between STA 951 and STA 993.

## E. Remove the NGS Controller

SUBTASK 47-31-01-020-001

- (1) Do these steps to remove the controller [1]:
  - (a) Disconnect the two electrical connectors [2] from the controller [1].
    - 1) Move the electrical connectors [2] out of the way.

NOTE: The two electrical connectors [2] have ground wires attached to them. These are for electrical bonding. Use caution to not damage the ground wires or their connections to the airplane structure.

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- (b) Remove the nut [3], washer [4], and bonding jumper [5] from the ground stud (two locations).
  - 1) Hold the controller [1] in its position.
  - 2) Remove the screws [8] and washers [7] (four locations).
  - 3) Remove the controller [1] and the attached mounting bracket [6].

#### SUBTASK 47-31-01-020-002

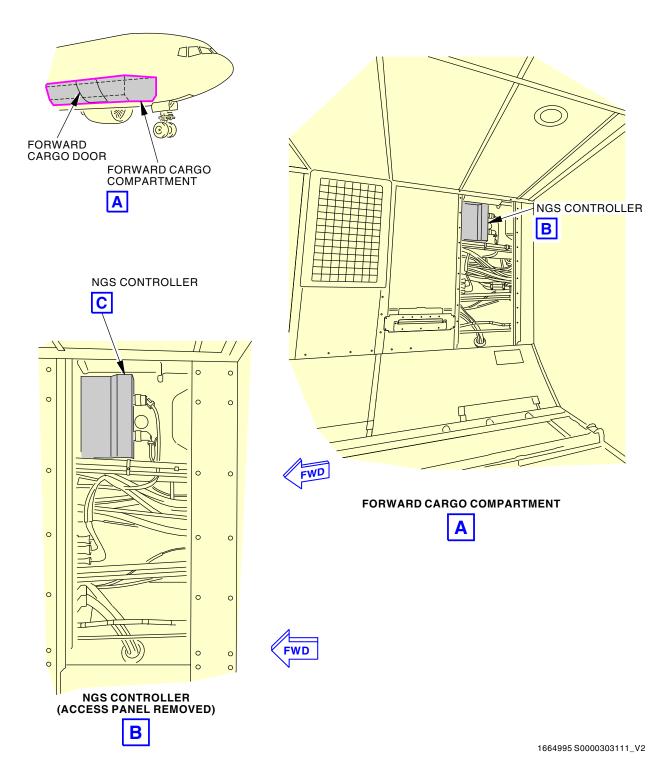
- (2) Do these steps to remove the mounting bracket [6]:
  - (a) Remove the screws [11] and the washers [12] from the mounting bracket [6] (four locations).
  - (b) Remove the controller [1] with the attached bonding jumpers [5].
  - (c) Keep the mounting bracket [6] for the installation.

#### SUBTASK 47-31-01-020-003

- (3) Do these steps to remove the bonding jumpers [5] (two locations):
  - (a) Remove the screw [9], washer [10], and bonding jumper [5] from the controller [1].
  - (b) Keep the screws [9], washers [10], and bonding jumpers [5] for the installation.







Nitrogen Generation System (NGS) Controller - Removal and Installation Figure 401/47-31-01-990-801 (Sheet 1 of 2)

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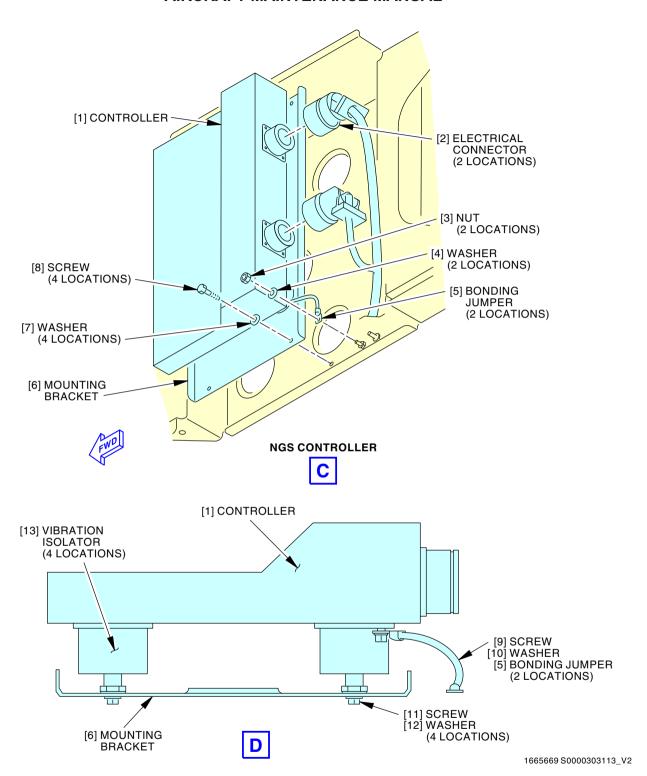
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Nitrogen Generation System (NGS) Controller - Removal and Installation Figure 401/47-31-01-990-801 (Sheet 2 of 2)

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#### TASK 47-31-01-400-801

## 3. Nitrogen Generation System (NGS) Controller Installation

(Figure 401)

### A. General

(1) The NGS controller is referred to as the controller in this task.

#### B. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

## C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17

#### D. Consumable Materials

Reference	Description	Specification
A50006	Compound - Sealing, Thread-Locking, MIL-S-46163 T Anaerobic, Single-Component (100-200 Grade M	
	In-Lbs)	Grade IVI

#### E. Location Zones

Zone	Area
122	Forward Cargo Compartment, Right

## F. Access Panels

Number	Name/Location		
821	Forward Large Cargo Door		

## G. Install the NGS Controller

SUBTASK 47-31-01-420-001

- (1) Do these steps to pre-install the controller [1] and the mounting bracket [6]:
  - (a) Remove the used retaining compound from the screws [11] and vibration isolators [13] (four locations).
  - (b) Prepare this component for an electrical faying surface bond (SWPM 20-20-00):
    - Contact surface of the bonding jumper [5] that mates with the controller [1] (two locations).
  - (c) Install the screw [9], washer [10], and bonding jumper [5] to the controller [1].

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- (d) Apply retaining compound, A50006, to the four screws [11] and the threaded cavity on the vibration isolators [13] (four locations).
- (e) Align the four vibration isolators [13] on the controller [1] to the holes on the mounting bracket [6].
- (f) Install the four screws [11] and washers [12] that attach the controller [1] to the mounting bracket [6].
- (g) To tighten the screws [11], do these steps:
  - 1) Use a backwrench (1/2 inch open-ended wrench) on the vibration isolator [13] stem.
  - 2) Tighten the screws [11] to 14 in-lb (2 N·m)

#### SUBTASK 47-31-01-410-001

(2) Go to the controller [1] location in the forward cargo compartment

#### SUBTASK 47-31-01-210-001

(3) Make sure that the mating surfaces of the mounting bracket [6] are clean and free from grease and unwanted material.

#### SUBTASK 47-31-01-160-001

(4) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-31-01-420-004

- (5) Do these steps to install the controller [1] and the attached mounting bracket [6]:
  - (a) Align the four holes on the mounting bracket [6] to the four holes on the controller bracket.
    - 1) Install the screws [8] and washers [7] (four locations).

#### SUBTASK 47-31-01-110-001

- (6) Prepare this component for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surface of the bonding jumper [5] (two locations).
  - (b) Contact surface of the ground stud.

#### SUBTASK 47-31-01-420-002

(7) Install the bonding jumper [5], washer [4], and nut [3] to the ground stud (two locations).

#### SUBTASK 47-31-01-760-001

- (8) Measure the electrical resistance across the bonding jumper to the airplane structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure that the electrical resistance is 0.001 ohm (1 milliohm) or less (SWPM 20-20-00).

#### SUBTASK 47-31-01-420-003

(9) Connect the two electrical connectors [2] to the controller [1].

### H. Operational Test for the NGS Controller

#### SUBTASK 47-31-01-860-004

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

#### Left Power Management Panel, P110

Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

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#### SUBTASK 47-31-01-740-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) Make sure that the test passes and the BITE message for the NGS controller does not show.
- I. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-01-410-003

(1) Install the sidewall liner located between STA 951 and STA 993.

SUBTASK 47-31-01-410-002

(2) Close this access panel:

<u>Number</u>	Name/Location
821	Forward Large Cargo Door
	——— FND OF TASK ———

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### **BITE DISPLAY UNIT - MAINTENANCE PRACTICES**

#### 1. General

- A. This procedure has these tasks:
  - (1) BDU Main Menu
  - (2) BDU Existing Fault Menu
  - (3) BDU Fault History Menu
  - (4) BDU Ground Test Menu
  - (5) Other Function Menu

#### TASK 47-31-02-740-801

#### 2. BDU Main Menu

(Figure 201 or Figure 202 or Figure 203 or Figure 204 or Figure 205)

#### A. General

- (1) This task gives the instructions to operate the main menu for the BDU control panel.
- (2) To help you navigate through the NGS BDU menu structure, refer to Figure 201 or Figure 202 or Figure 203 or Figure 204 or Figure 205.
- (3) The NGS BDU control panel has a two line message display and six push button controls. Use the message display and applicable push buttons to navigate through the BDU menu structure. The BDU structure map gives an overview of the available menu item lists and their relationship to other menu items.

## B. References

Reference	Title
32-09-00-440-801	Air Mode Simulation - Restoration (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## C. Location Zones

Zone	Area	
196	Underwing Wing-to-Body Fairings, Right	

## D. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door
521DB	Refueling Station Door
621DB	Refueling Station Door

## E. Prepare to Use the BDU

SUBTASK 47-31-02-010-004



OBEY THE SUBSEQUENT STEPS FOR ACCESS PANELS IDENTIFIED WITH A NITROGEN GENERATION SYSTEM PLACARD. IF THERE IS A LEAK IN THE NITROGEN GENERATION SYSTEM, IT WILL DECREASE THE OXYGEN IN THE AIR THAT YOU BREATHE. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-31-02-010-005

(2) Make sure these access panels are closed:

<u>Number</u>	Name/Location
521DB	Refueling Station Door
621DB	Refueling Station Door

#### SUBTASK 47-31-02-860-006

(3) Make sure that the airplane is in the ground mode (TASK 32-09-00-440-801).

#### SUBTASK 47-31-02-860-007

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

#### SUBTASK 47-31-02-010-006

(5) Open this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door

#### SUBTASK 47-31-02-010-007

(6) Go to the NGS BDU location.

NOTE: The BDU is found in the ECS Low Pressure Connection Door.

## F. Standby Mode

## SUBTASK 47-31-02-740-002

- (1) The BDU is in the standby mode during these conditions:
  - (a) NGS controller cold start (approximately 5 minutes)
  - (b) No BDU input for 5 minutes.

NOTE: The BDU will not go into the standby mode if a BDU test is in progress.

## SUBTASK 47-31-02-740-003

(2) When the BDU is in the standby mode, the message display will not show.

#### SUBTASK 47-31-02-740-004

(3) Push the ON/OFF button on the control panel to start the operation of the BDU.

#### SUBTASK 47-31-02-740-005

(4) Make sure the main menu item, "Existing Faults?" shows.

## SUBTASK 47-31-02-740-006

- (5) If the BDU is inhibited, these display messages will show:
  - (a) In Air

NOTE: The airplane is in the air mode.

(b) Switch Inactive

NOTE: You pushed a control button that is not on.

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(6) Inhibited: CMCS Active

NOTE: The CMCS Active mode is active.

# G. Power Off Mode

SUBTASK 47-31-02-740-007

(1) Push the ON/OFF button again to stop the BDU.

NOTE: This puts the BDU in standby.

SUBTASK 47-31-02-740-008

(2) When you push the ON/OFF button, TURN OFF DISPLAY? will show.

NOTE: When you push the ON/OFF button, you stop the display. The BDU will not stop when DISPLAY TEST? shows during a BDU initiated test.

- (a) If you push the YES button, the BDU will go to standby, and show no text.
- (b) If you push the NO button, the BDU will go to the previous mode.

## H. Main Menu Items

SUBTASK 47-31-02-740-009

- (1) These are the main menu items:
  - (a) Existing Faults?
  - (b) Fault History?
  - (c) Ground Tests?
  - (d) Other Functions?

#### SUBTASK 47-31-02-740-010

- (2) Push these buttons to move through the main menu:
  - (a) up arrow
  - (b) down arrow
  - (c) NO

#### SUBTASK 47-31-02-740-011

- (3) You can find more data about the main menu in these tasks:
  - (a) BDU Existing Fault Menu, TASK 47-31-02-740-802
  - (b) BDU Fault History Menu, TASK 47-31-02-740-803
  - (c) BDU Ground Test Menu, TASK 47-31-02-740-804
  - (d) Other Function Menu, TASK 47-31-02-740-805

### SUBTASK 47-31-02-740-012

(4) After you do the necessary maintenance tasks, go to the subsequent procedure.

# I. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-02-740-013

(1) Make sure that all the BDU initiated tests are done.

SUBTASK 47-31-02-740-014

(2) Push the ON/OFF button.

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## SUBTASK 47-31-02-410-002

(3) Close this access panel:

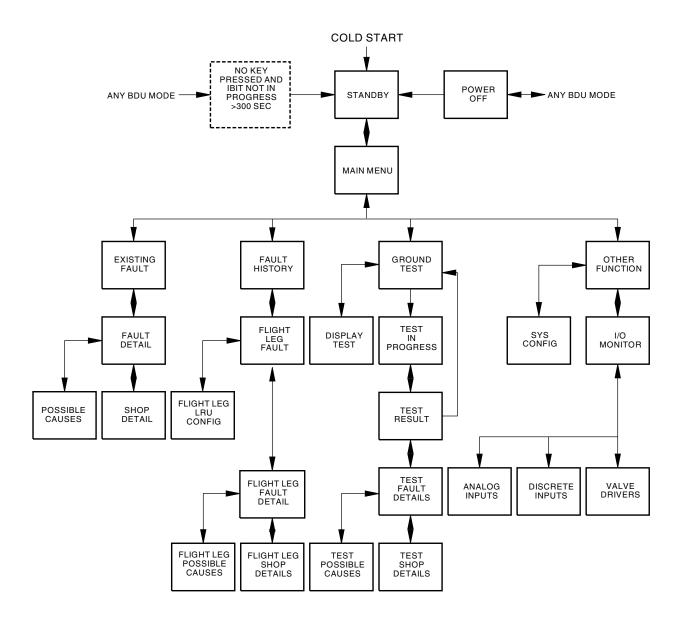
Number Name/Location

196CR ECS Low Pressure Connection Door

——— END OF TASK ———

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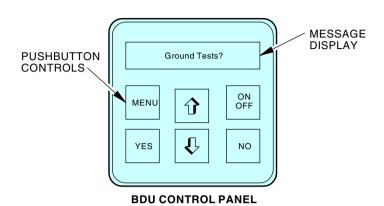


1500583 S0000273105\_V3

# BDU Structure Map Figure 201/47-31-02-990-807







#### LEGEND:



PRESS THE ON/OFF PUSHBUTTON TO START AND STOP THE BITE DISPLAY. THE ON/OFF PUSHBUTTON CAN ALSO BE USED TO IMMEDIATELY STOP THE BDU GROUND TESTS.



PRESS THE MENU PUSHBUTTON TO NAVIGATE THROUGH THE BDU MENUS (REF THE BDU MENU DISPLAY MAP). WHEN YOU PRESS THE MENU PUSHBUTTON THE BDU WILL DISPLAY THE PREVIOUS MENU. THE MENU PUSHBUTTON IS ALSO USED TO IMMEDIATELY STOP THE BDU GROUND TESTS.



PRESS THE YES PUSHBUTTON TO REPLY TO THE MESSAGE DISPLAY QUESTION (?). THE YES PUSHBUTTON IS ALSO USED TO START THE BDU GROUND TEST.



PRESS THE NO PUSHBUTTON TO REPLY TO THE MESSAGE DISPLAY QUESTION (?).



PRESS THE DOWN ARROW PUSHBUTTON TO SCROLL DOWNWARD THROUGH THE LIST OF ITEMS AVAILABLE FOR A SPECIFIC MENU.



PRESS THE UP ARROW PUSHBUTTON TO SCROLL UPWARD THROUGH THE LIST OF ITEMS AVAILABLE FOR A SPECIFIC MENU.



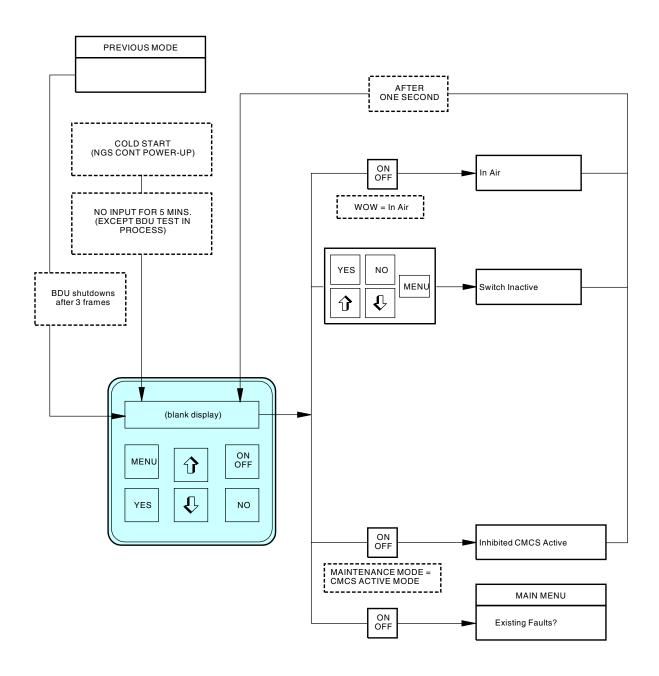
THE PUSHBUTTON CONTROL AND ARROW SHOW THE RESPONSE TO AN EVENT, SUCH AS WHAT HAPPENS WHEN YOU PRESS THE YES PUSHBUTTON.

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BDU Pushbutton Control Figure 202/47-31-02-990-808

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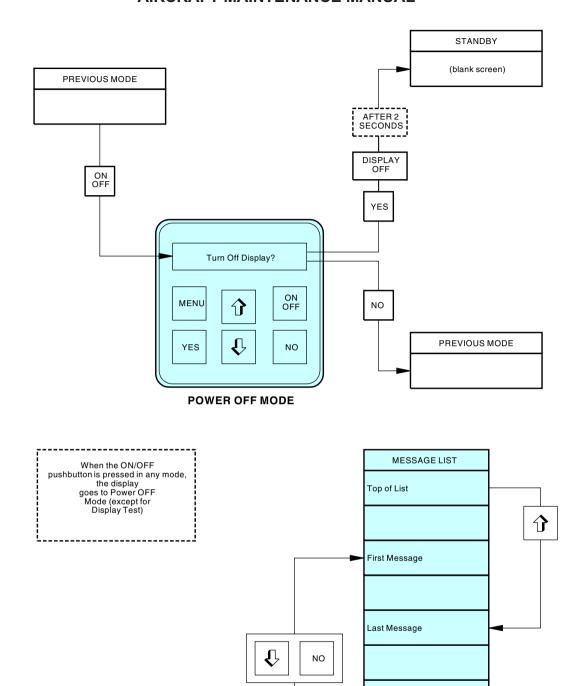
# BDU Standby Mode Figure 203/47-31-02-990-809



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J85819 S0000180483\_V4

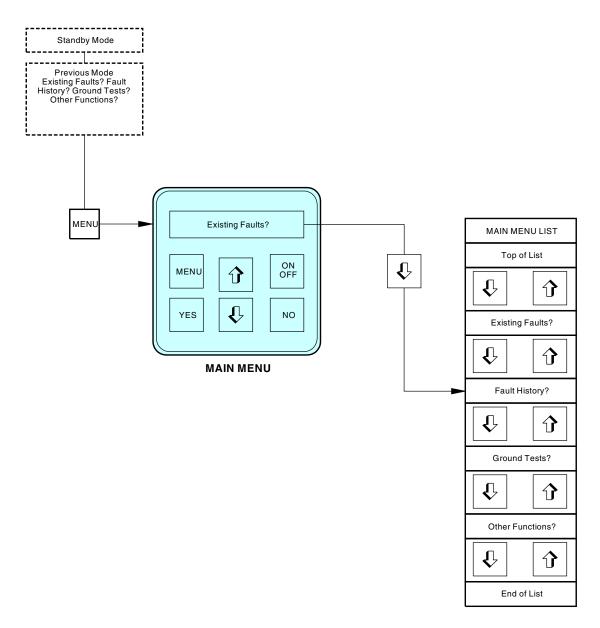
## BDU Power Off Mode Figure 204/47-31-02-990-810

End of List

**ANY MENU LIST** 







**BDU MAIN MENU** 

2016107 S0000396634\_V2

BDU Main Menu Figure 205/47-31-02-990-802

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#### TASK 47-31-02-740-802

## 3. BDU Existing Fault Menu

(Figure 206)

#### A. General

- This task gives the instructions to operate the BDU control panel for the EXISTING FAULT menu.
- (2) To help you move through the EXISTING FAULT menu, refer to Figure 206.
- (3) The existing faults menu lets you find all NGS faults. Existing faults for all flight phases will show. Existing faults that show might not show the real time fault status. To find out if a fault is currently active, a menu item, ACTIVE: YES/NO, is provided.
- (4) Existing faults show in sequence, with the most recent fault shown first.

#### B. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### C. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

#### D. Main Menu

SUBTASK 47-31-02-740-015

(1) Do this task: BDU Main Menu, TASK 47-31-02-740-801.

SUBTASK 47-31-02-740-016

(2) Push the BDU control panel up or down arrows or the NO button until EXISTING FAULTS? shows.

## E. Existing Fault

SUBTASK 47-31-02-740-017

- (1) Make sure that the display shows EXISTING FAULTS?.
  - (a) Push the YES button.

SUBTASK 47-31-02-740-018

(2) The display message, "XXX Faults Found" will show.

NOTE: XXX shows the number of existing faults found.

- (a) If 000 FAULTS FOUND shows, then there are no existing faults recorded.
- (b) If 001 FAULTS FOUND shows, then push the down arrow to show the existing fault.
- (c) If 002 FAULTS FOUND (or more) shows, then push the down arrow to show the most recent existing fault.
  - Continue to push the down arrow to see all of the existing faults.

## F. Fault Details List

SUBTASK 47-31-02-740-019

- (1) Do these steps to see the fault details:
  - (a) Make sure that the applicable fault shows.
  - (b) Push the down arrow.
    - 1) MORE DETAILS? shows.

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- (c) Push the YES button.
  - 1) The FAULT DETAILS list shows.

#### SUBTASK 47-31-02-740-020

- (2) These are the fault details items:
  - (a) INDICATOR LAMP: < lamp indication > shows the lamp indication messages
  - (b) POSSIBLE CAUSES? a list of possible causes, in most probable to least probable sequence
  - (c) LATCHED: YES (NO) data on the latched status of the existing fault
  - (d) UNLATCH: the necessary action to be done to unlatch the existing fault
    - <u>NOTE</u>: Refer to the existing fault menu figure for a list of steps necessary to unlatch the applicable fault.
  - (e) ACTIVE: YES (NO) data on the active status of the existing fault
  - (f) SHOP DETAILS? data on the configuration of the various systems when the existing fault was set.

#### SUBTASK 47-31-02-740-021

(3) Push the up and down arrows to see the menu items for the fault details list.

#### G. Possible Causes

#### SUBTASK 47-31-02-740-022

- (1) Make sure the applicable existing fault shows.
  - (a) Push the down arrow.
    - 1) More Details? shows.
  - (b) Push the YES button.
    - 1) The fault details list shows.
  - (c) Push the down arrow.
    - 1) POSSIBLE CAUSES? shows.
  - (d) Push the YES button.
    - 1) The most probable cause of the existing fault will show.
  - (e) Push the down arrow.
    - 1) The second most probable cause of the existing fault will show.

NOTE: The list will continue to show possible causes, ranked by probability, until the end of list shows.

#### H. Shop Details List

#### SUBTASK 47-31-02-740-023

- (1) Make sure the applicable existing fault shows.
  - (a) Push the down arrow.
    - 1) More Details? shows.
  - (b) Push the YES button.
    - 1) The fault details list items shows.
  - (c) Continue to push the down arrow.
    - 1) SHOP DETAILS? shows.

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- (d) Push the YES button.
  - 1) The shop details list shows.

#### SUBTASK 47-31-02-740-024

- (2) These are the menu items for the shop details list:
  - (a) SHOP CODE: XXXX
  - (b) NGS STATE: (NGS ON, NGS OFF, NGS STARTBIT, NGS IBIT, NGS COOLDOWN, NGS PRE-SHUTDOWN)
  - (c) IBIT STATE: (ELECTRICAL, SYSTEM, NGS PERF NON-BOOSTED, NGS PERF BOOSTED, OFF)
  - (d) AIRCRAFT STATE: (GROUND, CLIMB, CRUISE, DESCENT, IN AIR)
  - (e) FLOW MODE: (LOW FLOW, BOOSTED LOW FLOW, HIGH FLOW, BOOSTED HIGH FLOW, IBIT FLOW)
  - (f) TASMI 1: SXXX F

TASMI 2: SYYY F

(g) TCOMP 1: SXXX F

TCOMP 2: SYYY F

(h) DPHI: SXXX.X psid

PCOMP: SYYY.Y psig

(i) PALT: XXXXX ft

PB: SYYY.Y psig

(j) TCV T/M

I: XXX mA V: YY.Y V

(k) NGS SOV SOL

I: XXXX mA V: YY.Y V

(I) OTSOV SOL

I: XXXX mA V: YY.Y V

(m) ASM HFV SOL

I: XXXX mA V: YY.Y V

(n) TC SOV SOL

I: XXXX mA V: YY.Y V

(o) NGS FAN REL

I: XXXX mA V: YY.Y V

(p) NGS RAD REL

I: XXXX mA V: YY.Y V

#### SUBTASK 47-31-02-740-025

(3) Use the up and down arrows to see all the menu items for the shop details list.

#### SUBTASK 47-31-02-740-026

(4) After you do the necessary maintenance tasks, continue.

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I. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-02-740-027

- (1) Make sure all BDU initiated tests are complete.
  - (a) Push the ON/OFF button.

SUBTASK 47-31-02-410-003

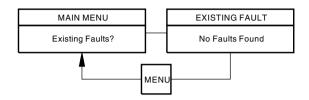
(2) Close this access panel:

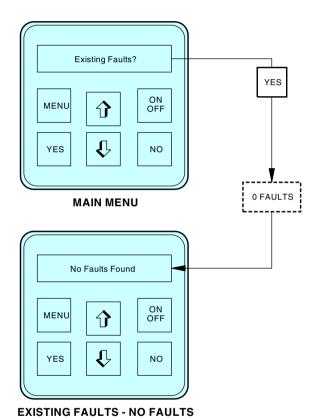
NumberName/Location196CRECS Low Pressure Connection Door

——— END OF TASK ———

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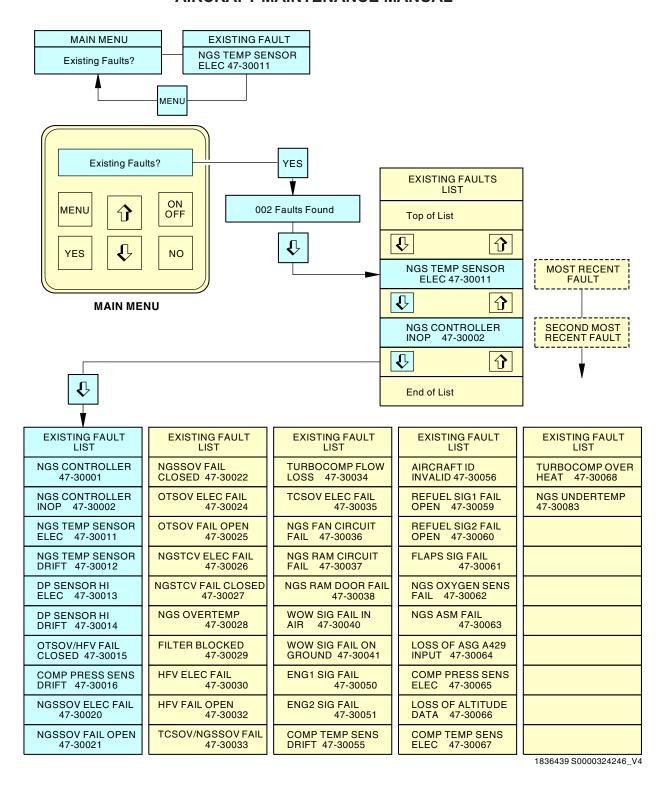
# Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 1 of 6)

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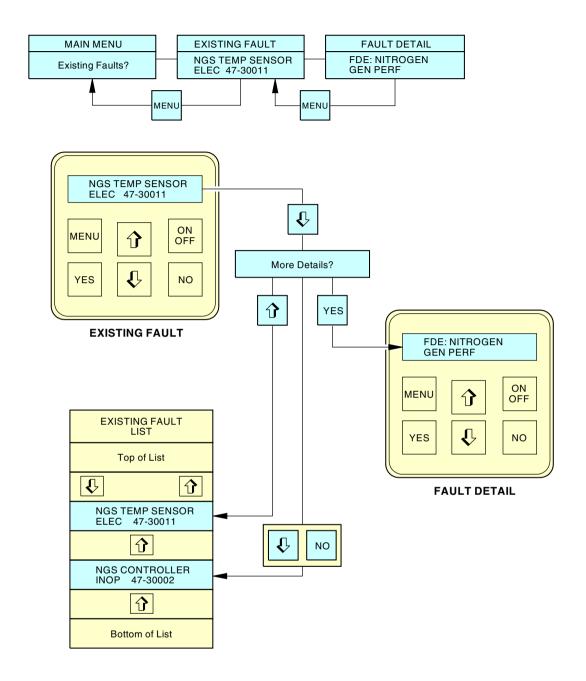




Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 2 of 6)

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1836877 S0000324247\_V2

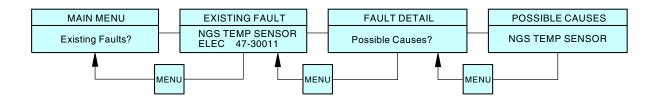
# **Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 3 of 6)**

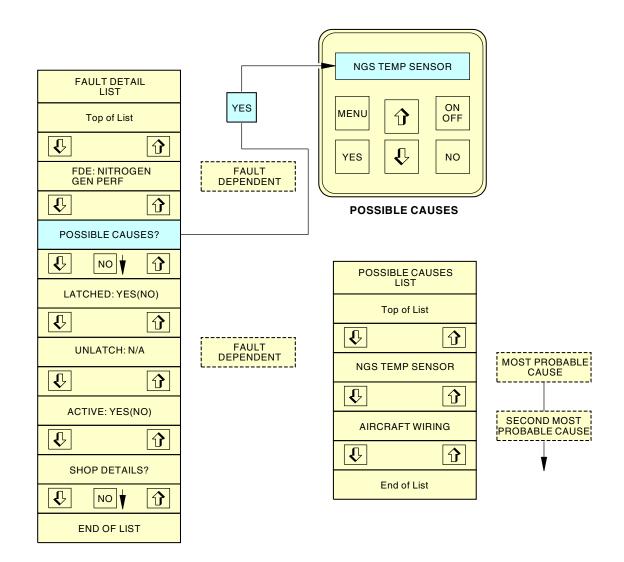
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1836882 S0000324248\_V3

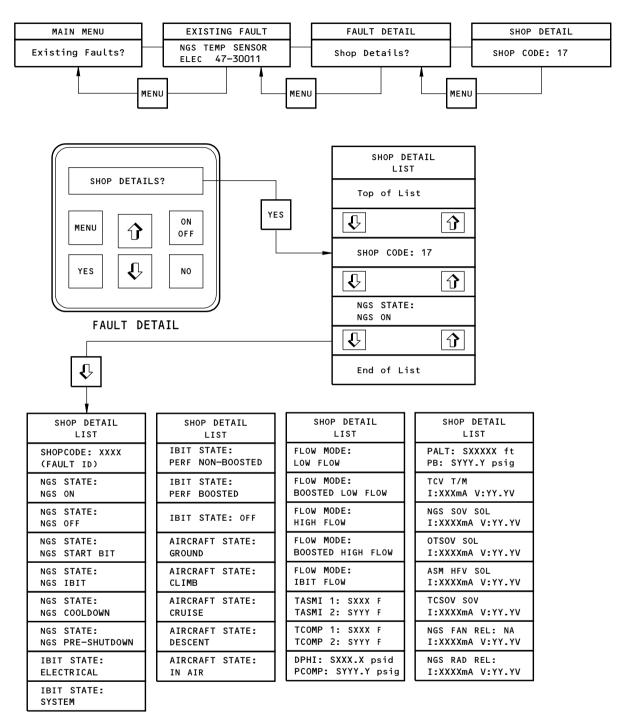
Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 4 of 6)

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1732351 S0000313225\_V3

## Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 5 of 6)

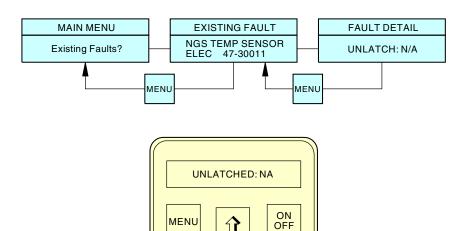
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**FAULT DETAIL** 

YES

NO

FAULT DETAIL UNLATCH LIST	FAULT DETAIL UNLATCH LIST
UNLATCH: ELECTRICAL TEST	UNLATCH: SEE FIM
UNLATCH: CYCLE CONTROLLER PWR	UNLATCH: N/A
UNLATCH: SYSTEM TEST	

THE APPLICATION MESSAGE FROM THE UNLATCH LIST WILL SHOW FOR THE FLIGHT LEG FAULT MESSAGE.

1836912 S0000324250\_V3

# Existing Fault Menu Figure 206/47-31-02-990-803 (Sheet 6 of 6)

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#### TASK 47-31-02-740-803

## 4. BDU Fault History Menu

(Figure 207)

#### A. General

- (1) This task gives the instructions to operate the BDU control panel for the Fault History Menu.
- (2) To help you navigate through the NGS BDU fault history structure, refer to Figure 207.
- (3) The fault history menu allows you to look at NGS faults and correlated flight deck effects that occurred during the last 99 flight legs. The flight leg is updated during the ground to air (WOW) transition.
- (4) Fault history can store up to 256 messages. No more than 25% of the fault history can be allocated to a single flight leg. If a single flight leg fault allocation is full, no additional fault records can be recorded for that flight leg. When the total allocation of faults is full, new faults will replace the oldest fault.

#### B. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### C. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

#### D. Main Menu

SUBTASK 47-31-02-740-028

- (1) Do this task: BDU Main Menu, TASK 47-31-02-740-801
  - (a) Push the BDU control panel up or down arrows or the NO button until FAULT HISTORY? shows.

### E. Fault History

SUBTASK 47-31-02-740-029

(1) Make sure that the display message, FAULT HISTORY? shows on the display.

SUBTASK 47-31-02-740-030

- (2) Push the YES button.
  - (a) If NO FAULT HISTORY? shows on the display, then there are no flight leg faults recorded.
  - (b) If the display message, IN PROGRESS shows on the display, followed by INVALID FAULT HISTORY, then the BDU timed-out or the search was complete with no valid records found.
  - (c) If FLIGHT LEG 0? shows on the display, then the search was successful.

SUBTASK 47-31-02-740-031

- (3) When FLIGHT LEG 0? shows on the display, push the up or down arrows or the NO button.
  - (a) The display moves up or down the fault history list from flight leg 0, to flight leg -99.

SUBTASK 47-31-02-740-032

(4) Use the push button controls to get to the applicable flight leg.

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### F. Flight Leg Fault List

SUBTASK 47-31-02-740-033

(1) Make sure FLIGHT LEG 0? or the applicable flight leg shows on the display.

#### SUBTASK 47-31-02-740-034

- (2) Push the YES button.
  - (a) The most recent flight leg fault for the applicable flight leg will show on the display.

#### SUBTASK 47-31-02-740-035

- (3) Push the down arrow.
  - (a) MORE DETAILS? shows on the display.

#### SUBTASK 47-31-02-740-036

(4) Push the down arrow again or the NO button to show the second most recent flight leg fault.

#### SUBTASK 47-31-02-740-037

(5) Continue to push the down arrow or the NO button to see all of the flight leg faults.

#### SUBTASK 47-31-02-740-038

- (6) After the last flight leg fault, continue to push the down arrow.
  - (a) LRU CONFIG? shows on the display.

#### SUBTASK 47-31-02-740-039

- (7) Push the YES button.
  - (a) The menu item for the flight leg LRU configuration, "HARDWARE PART NO:" will show on the display.

#### SUBTASK 47-31-02-740-040

- (8) These are the menu items for the flight leg LRU configuration list:
  - (a) HARDWARE PART NO:
  - (b) BOOT LOADER PART NO:
  - (c) SOFTWARE PART NO:
  - (d) CONFIG DATA PART NO:
  - (e) AIRCRAFT ID:

## SUBTASK 47-31-02-740-041

(9) Push the up and down arrows to see the menu items for the LRU configuration list.

## G. Flight Leg Fault Details

### SUBTASK 47-31-02-740-042

- (1) Make sure the applicable flight leg fault shows.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display.
  - (b) Push the YES button.

#### SUBTASK 47-31-02-740-043

- (2) The menu item for the flight leg fault details, POSSIBLE CAUSES? will show on the display.
  - (a) Push the up and down arrows to move through the menu items for the flight leg fault details list.

#### SUBTASK 47-31-02-740-044

(3) These are the menu items for the flight leg fault details list:

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- (a) INDICATOR LAMP: <lamp indication>
- (b) POSSIBLE CAUSES? a list of possible causes, in most probable, to least probable sequence
- (c) TYPE: HARD (INTERMITTENT or MODE DEPENDENT) type of fault recorded
- (d) ACTIVE: YES (NO) data on the active status of the flight leg fault
- (e) LATCHED?: YES data on the latched status of the flight leg fault
- (f) <unlatch method>
- (g) UNLATCH: NA the necessary action to be done to unlatch the flight leg fault
  - NOTE: Reference the flight leg fault menu figure for a list of actions necessary to unlatch the applicable fault..
- (h) PHASE: GROUND (CLIMB, CRUISE, DESCENT) flight phase when the fault was recorded
- (i) DAY:HR:MIN:SEC The date and time that the fault occurred.
- (j) SHOP DETAILS? data on the configuration of the various systems when the flight leg fault was set.

## H. Flight Leg Possible Causes

SUBTASK 47-31-02-740-045

- (1) Make sure the applicable flight leg fault shows.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display.
  - (b) Push the YES button.
    - 1) The flight leg fault details list will show on the display.
  - (c) Push the down arrow.
    - 1) POSSIBLE CAUSES? shows on the display.
  - (d) Push the YES button.
    - 1) The most probable cause of the flight leg fault will show on the display.
  - (e) Push the down arrow.
    - 1) The second most probable cause of the flight leg fault will show on the display.
      - NOTE: The list will continue to show possible causes, ranked by probability, until the end of list shows.

## I. Flight Leg Shop Details

SUBTASK 47-31-02-740-046

- (1) Make sure the applicable flight leg fault shows.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display.
  - (b) Push the YES button.
    - 1) The flight leg fault details list will show.
  - (c) Continue to push the down arrow.
    - 1) SHOP DETAILS? shows on the display.
  - (d) Push the YES button.



1) The flight leg shop details list will show.

#### SUBTASK 47-31-02-740-047

- (2) Push the up and down arrows to see the menu items for the flight leg shop details list.
- (3) After you complete the necessary maintenance tasks, continue.

#### SUBTASK 47-31-02-740-048

- (4) These are the menu items for the shop details list:
  - (a) SHOP CODE: XXXX
  - (b) NGS STATE: (NGS ON, NGS OFF, NGS STARTBIT, NGS IBIT, NGS COOLDOWN, NGS PRE-SHUTDOWN)
  - (c) IBIT STATE: (ELECTRICAL, SYSTEM, NGS PERF NON-BOOSTED, NGS PERF BOOSTED, OFF)
  - (d) AIRCRAFT STATE: (GROUND, CLIMB, CRUISE, DESCENT, IN AIR)
  - (e) FLOW MODE: (LOW FLOW, BOOSTED LOW FLOW, HIGH FLOW, BOOSTED HIGH FLOW, IBIT FLOW)
  - (f) TASMI 1: SXXX F

TASMI 2: SYYY F

(g) TCOMP 1: SXXX F

TCOMP 2: SYYY F

(h) DPHI: SXXX.X psid

PCOMP: SYYY.Y psig

(i) PALT: XXXXX ft

PB: SYYY.Y psig

(j) TCV T/M

I: XXX mA V: YY.Y V

(k) NGS SOV SOL

I: XXXX mA V: YY.Y V

(I) OTSOV SOL

I: XXXX mA V: YY.Y V

(m) ASM HFV SOL

I: XXXX mA V: YY.Y V

(n) TC SOV SOL

I: XXXX mA V: YY.Y V

(o) NGS FAN REL

I: XXXX mA V: YY.Y V

(p) NGS RAD REL

I: XXXX mA V: YY.Y V

## J. Put the Airplane Back to the Usual Condition

## SUBTASK 47-31-02-740-049

- (1) Make sure all BDU initiated tests are complete.
  - (a) Push the ON/OFF button.

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## SUBTASK 47-31-02-410-004

(2) Close this access panel:

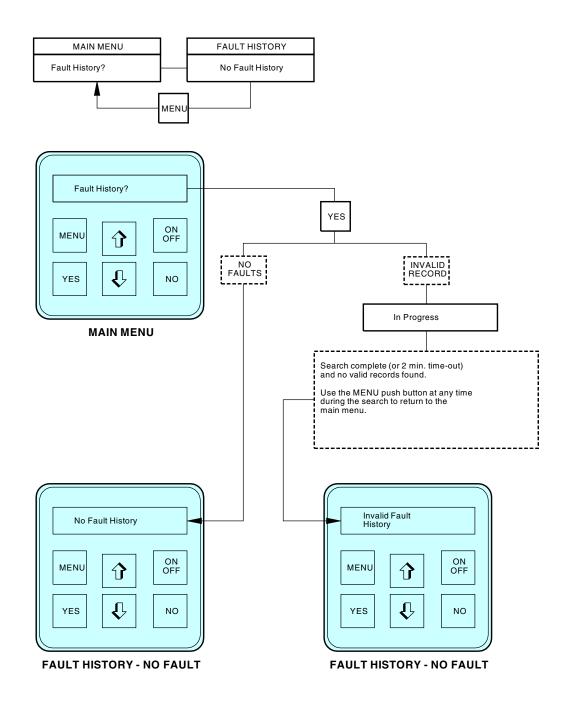
Number Name/Location

196CR ECS Low Pressure Connection Door

——— END OF TASK ———

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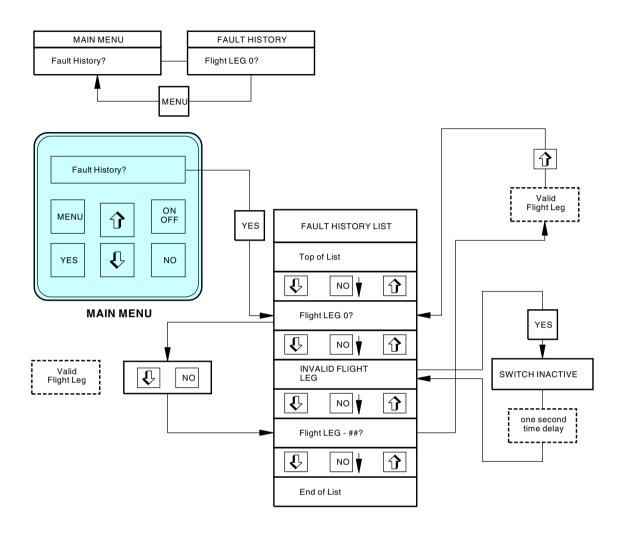


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Fault History Menu Figure 207/47-31-02-990-804 (Sheet 1 of 8)

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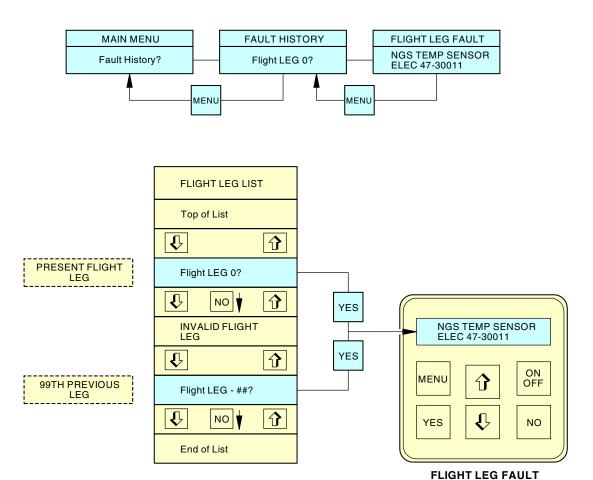
## Fault History Menu Figure 207/47-31-02-990-804 (Sheet 2 of 8)

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1835443 S0000324330\_V2

## Fault History Menu Figure 207/47-31-02-990-804 (Sheet 3 of 8)

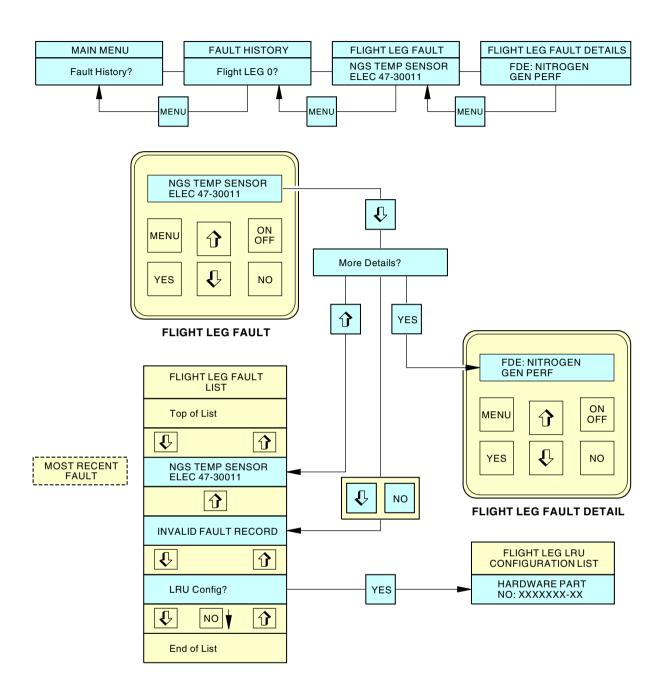
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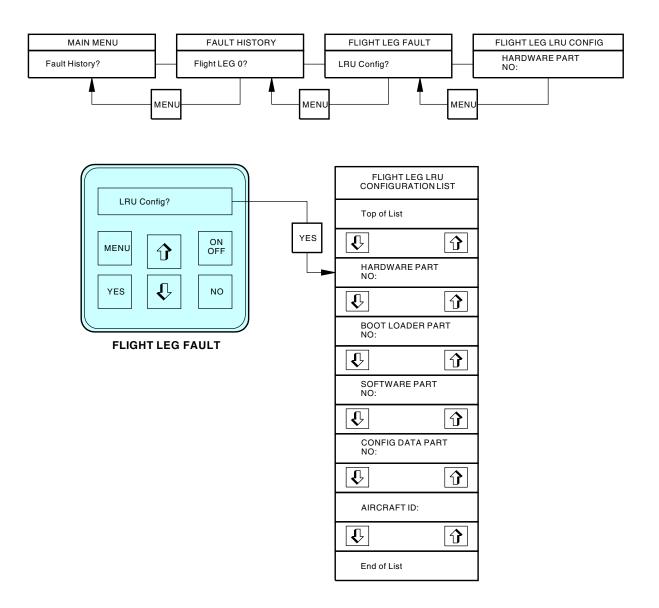


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# **Fault History Menu** Figure 207/47-31-02-990-804 (Sheet 4 of 8)

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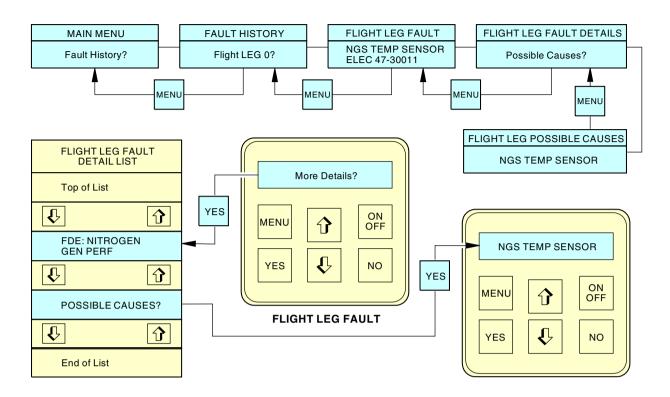
# Fault History Menu Figure 207/47-31-02-990-804 (Sheet 5 of 8)

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FLIGHT LEG FAULT DETAIL LIST
INDICATOR LAMP: <lamp indication=""></lamp>
POSSIBLE CAUSES?
TYPE: HARD
TYPE: INTERMITTENT
TYPE: MODE DEPENDENT
ACTIVE: YES
ACTIVE: NO

FLIGHT LEG FAULT DETAIL LIST
LATCHED: YES
<unlatched method=""></unlatched>
UNLATCHED: NA
PHASE: <phase name=""></phase>
DAY:HR:MIN:SEC: DDDDD:HH:MM:SS
SHOP DETAILS?

1835532 S0000324336\_V3

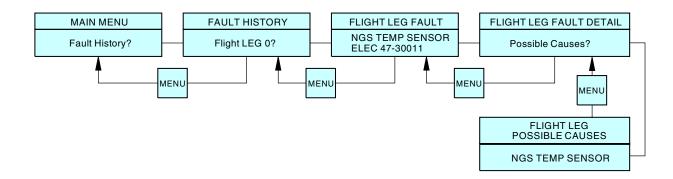
# Fault History Menu Figure 207/47-31-02-990-804 (Sheet 6 of 8)

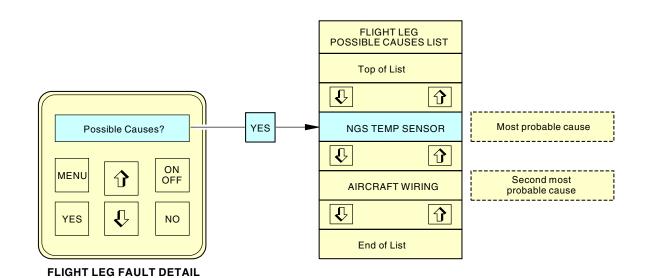
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1835541 S0000324337\_V3

# Fault History Menu Figure 207/47-31-02-990-804 (Sheet 7 of 8)

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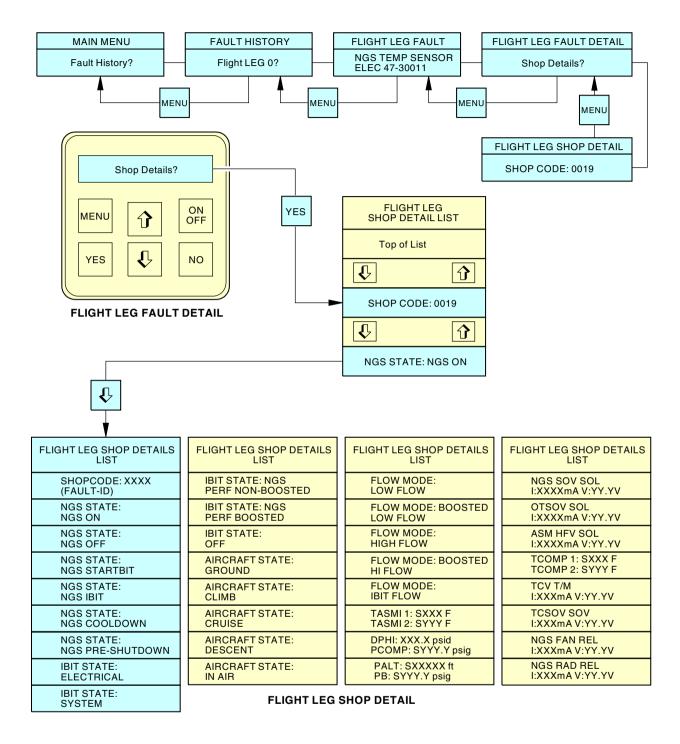
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# Fault History Menu Figure 207/47-31-02-990-804 (Sheet 8 of 8)

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### TASK 47-31-02-740-804

### 5. BDU Ground Test Menu

(Figure 208)

#### A. General

- (1) This task gives the instructions to operate the BDU control panel for the BDU Ground Test
- (2) To help you scroll through the BDU ground test structure, refer to Figure 208.
- (3) The BDU ground test menu supplies the controls to do three types of BDU manually initiated built-in-tests (IBIT). The IBIT tests include these ground tests:
  - (a) Electrical IBIT
  - (b) System IBIT
  - (c) NGS performance IBIT
- (4) BDU Electrical IBIT (Electrical Test?)
  - (a) The BDU electrical test is a manually initiated test done by the NGS controller to test the controller valve drivers (on and off conditions), sensor interfaces, sensor open/short conditions, solenoid or torque motor open/short conditions and airplane discrete inputs. The electrical test can be done with the NGS system in a pressurized or non-pressurized condition. The electrical test opens and closes the NGS shutoff and overtemperature shutoff valves in a timed sequence to stop the pressurization of the NGS system.
  - (b) The NGS controller will not start the test (test inhibited) or once started, will stop the test (test aborted), if the airplane configuration is incorrect. This includes: the airplane in air mode, a different BDU ground test in progress, or an invalid aircraft ID.
  - (c) When the electrical test is started, the NGS controller monitors the NGS system performance. The NGS controller will stop the test if there is a change in the airplane configuration as noted previously. The electrical test can also be stopped manually if the MENU or ON/OFF push button controls are pushed during the test. If the electrical test is stopped before the test is fully done, all latched electrical faults that were present prior to the start of the test will continue to be recorded as latched faults.
- (5) BDU System IBIT (System Test?)
  - (a) The BDU system test is a manually initiated test done by the NGS controller when the NGS system is pressurized. To do the system test, it is necessary to pressurize the NGS with bleed air pressure. The system test is a timed sequence test that does a check of the open and closed position of all of the electrically controlled valves. This includes the NGS shutoff valve, overtemperature shutoff valve and the ASM high-flow valve. The system test also does a test of the filter pressure switch and a test for sensor drift for the NGS bleed pressure sensor.
  - (b) The NGS controller will not start the test (test inhibited) or once started, will stop the test (test aborted), if the airplane configuration is incorrect. This includes: NGS inlet pressure less than 18 psig (124 kPa), the airplane in air mode, or an invalid aircraft ID.
  - (c) The NGS controller will also not start the test if an NGS sensor that is used to control the open/closed position of a valve is out of limits. The test will not start if there are critical fault messages. The NGS controller will also inhibit the test if a controller valve driver, or valve solenoid/torque motor is inoperative.

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- (d) When the system test is started, the NGS controller monitors the NGS system performance. The NGS controller will stop the test if there is a change in the airplane configuration as noted in the previous step. Other events that will cause the test to stop include an overtemperature condition or an NGS fault is detected by the controller. The test can also be stopped manually if the MENU or ON/OFF push button controls are pushed during the test. If the system test is stopped before the test is fully done, all latched system faults that were present prior to the start of the system test will continue to be recorded as latched faults.
- (6) NGS Performance
  - (a) There are two manually initiated BDU tests done by the NGS controller to test the NGS performance:
    - 1) NGS PERF NON-BOOSTED?
    - 2) NGS PERF BOOSTED?
  - (b) The two tests are done when the NGS system is pressurized. The NGS PERF NON-BOOSTED test, does a check of the NGS in the non-boosted flow mode. The NGS PERF BOOSTED test, does a check of the NGS in the boosted flow mode. To do the NGS performance tests, it is necessary to pressurize the NGS with bleed air pressure. It is necessary to warm up the ASM to the operating temperature of 170 ±10°F (77 ±6°C). To do a check the performance of the ASM, a GSE Oxygen Analyzer is attached to Nitrogen-Enriched Air Distribution System (NEADS) line. The oxygen analyzer records the % oxygen against the system pressure to check the purity of the Nitrogen-Enriched Air (NEA) produced by the ASMs.
  - (c) When the BDU starts the NGS PERF NON-BOOSTED test, the NGS controller commands the NGS shutoff valve and overtemperature valve to ON. The high-flow valve is commanded closed. The NGS fan and ram air door control the ASM inlet temperature within the standard temperature range limits. The test continues until the MENU or ON/OFF control push-buttons are pushed.
  - (d) When the BDU starts the NGS PERF BOOSTED test, the NGS controller commands the NGS shutoff valve and overtemperature valve to ON. The high-flow valve is commanded open. The NGS fan and ram air door controls the ASM inlet temperature within the standard temperature range limits. The test continues until the MENU or ON/OFF control push-buttons are pushed.
  - (e) The NGS controller will not start the test or stop the test if the airplane configuration is incorrect. This includes NGS inlet pressure less than 18 psig (124 kPa), the airplane is in air mode, or an invalid aircraft ID is set. The NGS controller will also not start the test if another BDU ground test is in-progress.
  - (f) If an existing fault is recorded for one or more of these LRUs', the NGS controller will not start the test:
    - 1) NGS controller (drivers and sensor interfaces)
    - 2) NGS shutoff valve
    - 3) Overtemperature shutoff valve
    - 4) ASM High-flow valve
    - 5) NGS bleed air pressure sensor
    - 6) NGS Temperature sensor
    - 7) ASM differential pressure sensor.

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- (g) When the performance test is started, the NGS controller monitors the NGS system performance. The NGS controller will stop the test if there is a change in the airplane configuration as noted in the previous steps. Other events that will cause the test to stop include an overtemperature condition or an NGS fault is recorded by the controller.
- (h) The test can also be stopped manually if the MENU or ON/OFF push button controls are pushed during the test.
- (i) If the performance test does not start, or the test is stopped by the NGS controller, one of these BDU display messages will show:
  - 1) INHIBITED: SYS PRESS LOW/INVLD
  - 2) INHIBITED: A/C ID INVALID
  - 3) INHIBITED: SEE EXISTING FAULTS
  - 4) INHIBITED: WOW = IN AIR

#### B. References

Reference	Title
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

#### C. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### D. Access Panels

Number	Name/Location	
196CR	FCS Low Pressure Connection Door	

#### E. Main Menu

SUBTASK 47-31-02-740-050

- Do this task: BDU Main Menu, TASK 47-31-02-740-801.
  - (a) Push the BDU control panel up or down arrows or the NO button until the display message, GROUND TESTS? shows.

### F. Ground Test List

SUBTASK 47-31-02-740-051

- Make sure GROUND TESTS? shows on the display.
  - (a) Push the YES button.
    - 1) The menu items for the ground test list will show on the display.
- (2) These are the ground test list items:
  - (a) ELECTRICAL TEST?
  - (b) SYSTEM TEST?
  - (c) NGS PERF NON-BOOSTED?
  - (d) NGS PERF BOOSTED?
  - (e) DISPLAY TEST?

### SUBTASK 47-31-02-740-052

(3) When DISPLAY TEST? shows, push the YES button.

NOTE: The BDU will do a 10 second test display routine. All of the buttons are disabled except for the MENU button.

(a) Push the MENU button to stop the test.

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#### SUBTASK 47-31-02-740-053

- (4) Procedures are supplied to do the BDU ground tests. These are the tasks:
  - (a) Electrical Test: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803
  - (b) System Test: Ground Operation of the Nitrogen Generation System, TASK 47-00-910-803

### G. BDU Test in Progress

#### SUBTASK 47-31-02-740-054

- (1) Make sure that the applicable ground test item shows.
  - (a) Push the YES button to start the ground test.

#### SUBTASK 47-31-02-740-055

- (2) TEST IN PROGRESS shows on the first line of the message display.
  - (a) The second line of the display shows this data:
    - 1) For the electrical test:
      - XXX% COMPLETE
    - 2) For the system test XXX% COMPLETE
- (3) For the NGS PERF NON-BOOSTED:
  - NGS O2 SNS: ZZZZZ
  - P: XX PSIA T:SYYYF
- (4) For the NGS PERF BOOSTED:
  - NGS O2 SNS: ZZZZZ
  - P: XX PSIA T:SYYYF

### SUBTASK 47-31-02-740-056

(5) To stop the test, push the MENU or ON/OFF buttons.

#### SUBTASK 47-31-02-740-057

- (6) The NGS controller will not start the test (inhibited) if there is an incorrect aircraft configuration. If the test is inhibited, one of these inhibited list items will show:
  - (a) SYS PRESS LOW/INVLD
  - (b) A/C ID INVALID
  - (c) WOW = IN AIR
  - (d) SEE EXISTING FAULTS

NOTE: The NGS controller has detected a fault that you must repair before you can do the test.

### SUBTASK 47-31-02-740-058

(7) If the ground test is satisfactory, TEST PASS shows on the display when the test is complete.

## SUBTASK 47-31-02-740-059

- (8) If the ground test is not satisfactory, a BDU test result fault message will show.
  - NOTE: The fault messages for the BDU test results are shown in sequence. The first fault message is the most recent. The second fault message is the second most recent fault.

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#### H. BDU Test Results

#### SUBTASK 47-31-02-740-060

- (1) Make sure that a BDU test result fault message shows on the display.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display
  - (b) Push the down arrow.
    - 1) The second most recent fault message will show (if applicable).
  - (c) Continue to push the down arrow to see all of the fault messages for the applicable BDU ground test.

### I. BDU Test Fault Details

#### SUBTASK 47-31-02-740-061

- (1) Push the up or down arrows to get to the applicable fault message that you want to troubleshoot.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display.
  - (b) Push the YES button.
    - 1) The menu items for the BDU test fault details list shows.

#### SUBTASK 47-31-02-740-062

- (2) These are the menu items for the BDU test fault details list:
  - (a) POSSIBLE CAUSES?
  - (b) SHOP DETAILS?

#### SUBTASK 47-31-02-740-063

(3) Push the up or down arrows to see all of the menu items for the BDU test fault details list.

#### J. BDU Test Possible Causes

#### SUBTASK 47-31-02-740-064

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- Make sure that the applicable fault message for the BDU test result shows.
  - (a) Push the down arrow.
    - 1) MORE DETAILS? shows on the display.
  - (b) Push the YES button.
    - 1) The menu items for the BDU test fault details list shows on the display.
  - (c) Push the down arrow.
    - 1) POSSIBLE CAUSES? shows on the display.
  - (d) Push the YES button.
    - 1) The most probable cause of the fault will show.
  - (e) Push the down arrow.
    - 1) The second most probable cause of the fault will show.

NOTE: The list will continue to show possible causes, ranked by probability, until the end of list shows.



### K. BDU Test Shop Details List

#### SUBTASK 47-31-02-740-065

- (1) Make sure that the applicable fault message for the BDU test result shows.
  - (a) Push the down arrow.
    - 1) MORE DETAILS?
  - (b) Push the YES button.
    - 1) The menu items for the BDU test fault details list will show on the display.

#### SUBTASK 47-31-02-740-066

- (2) Continue to push the down arrow until SHOP DETAILS? shows on the display.
  - (a) Push the YES button.
    - 1) The BDU test shop details list will show on the display.

#### SUBTASK 47-31-02-740-067

- (3) These are the menu items for the BDU test shop details list:
  - (a) SHOP CODE: XXXX
  - (b) NGS STATE: NGS ON (NGS OFF, NGS STARTBIT, NGS IBIT, NGS COOLDOWN)
  - (c) IBIT STATE: ELECTRICAL (SYSTEM, NGS PERF NON-BOOSTED, NGS PERF BOOSTED, OFF)
  - (d) AIRCRAFT STATE: GROUND (CLIMB, CRUISE, DESCENT, IN AIR)
  - (e) ASM STATE: ASM LOW (ASM MID1, ASM MID2, ASM HIGH, ASM IBIT)
  - (f) TASMI 1: XXX F

TASMI 2: YYY F

(g) DPHI: XXX.X psid

DPMID: NA

(h) PALT: XXXXXX ft

PB: YYY.Y psig

(i) NGS SOV SOL

I:XXXXmA V:YY.YV

(i) OTSOV SOL

I:XXXXmA V:YY.YV

(k) ASM HFV SOL

I:XXXXmA V:YY.YV

- (I) ASM FBV SOL: NA
- (m) NGS FAN REL: NA
- (n) NGS RAD REL: NA
- (4) Push the up and down arrows to see the menu items for the BDU test shop details list.

## SUBTASK 47-31-02-740-068

(5) After you do the necessary maintenance tasks, do the subsequent procedure.

## L. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-02-740-069

(1) Make sure all BDU initiated tests are complete.

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SUBTASK 47-31-02-740-070

(2) Push the ON/OFF button.

SUBTASK 47-31-02-410-005

(3) Close this access panel:

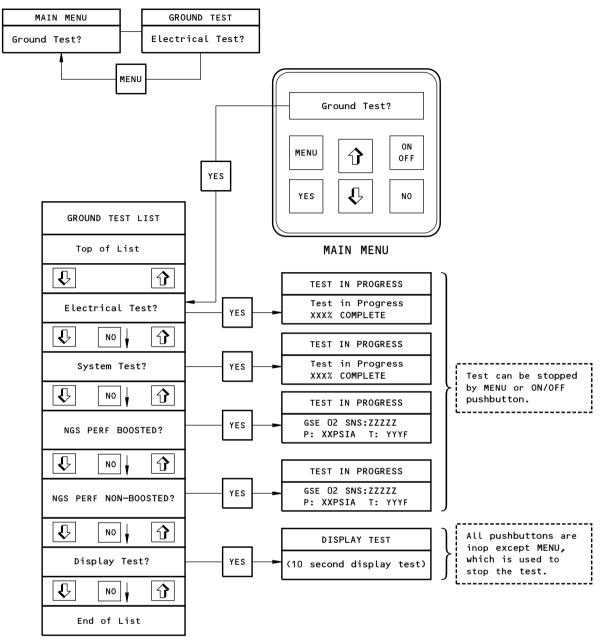
Number Name/Location

196CR ECS Low Pressure Connection Door

----- END OF TASK -----

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NOTE: THE FOLLOWING METHOD SHOULD BE USED TO CONVERT PSIG TO PSIA:

DETERMINE THE FIELD ATMOSPHERIC PRESSURE (IN INCHES OF MERCURY).

DIVIDE THE FIELD ATMOSPHERIC PRESSURE BY 2.036 AND ADD THE RESULT TO THE GAUGE PRESSURE (PSIG) TO GIVE THE ABSOLUTE PRESSURE (PSIA). FOR EXAMPLE: IF THE FIELD ATMOSPHERIC PRESSURE IS 29.86 inHg and the GAUGE PRESSURE IS 4.0 PSIG, DIVIDE 29.86 BY 2.036 WHICH EQUALS 14.67 PSI. ADD THE GAUGE PRESSURE (PSIG) TO THE FIELD PRESSURE TO OBTAIN AN ABSOLUTE PRESSURE OF 18.67 PSIA (4.0 PSIG+14.67 PSI = 18.67 PSIA).

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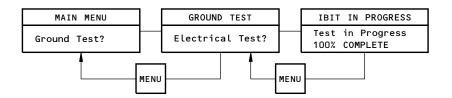
# Ground Test Menu Figure 208/47-31-02-990-805 (Sheet 1 of 6)

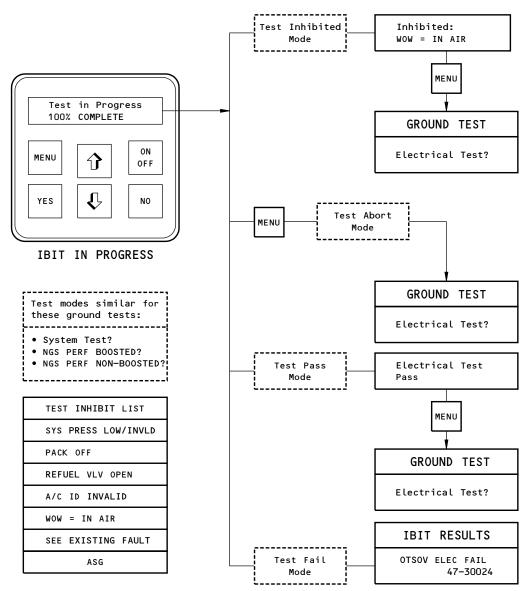
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1732214 S0000313257\_V2

Ground Test Menu Figure 208/47-31-02-990-805 (Sheet 2 of 6)

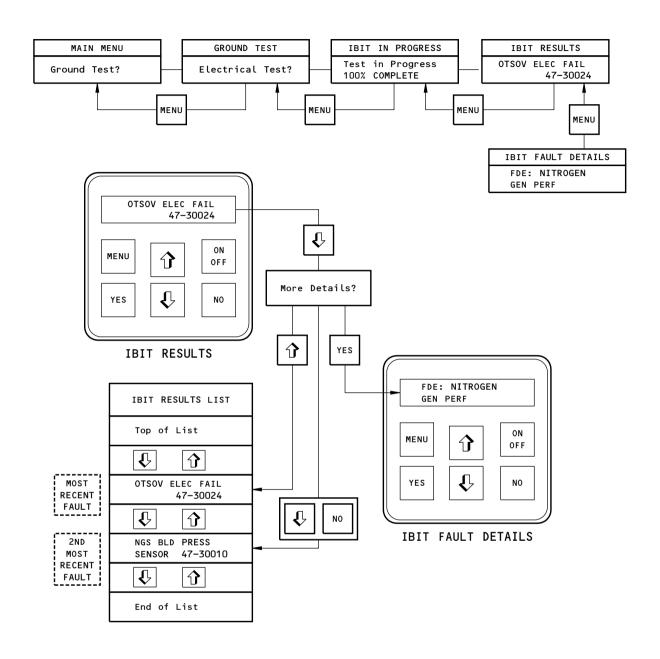
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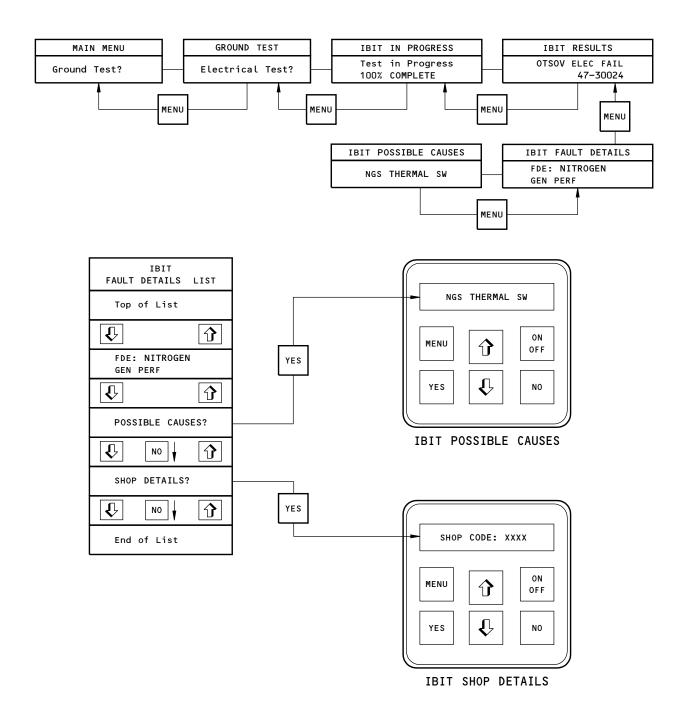
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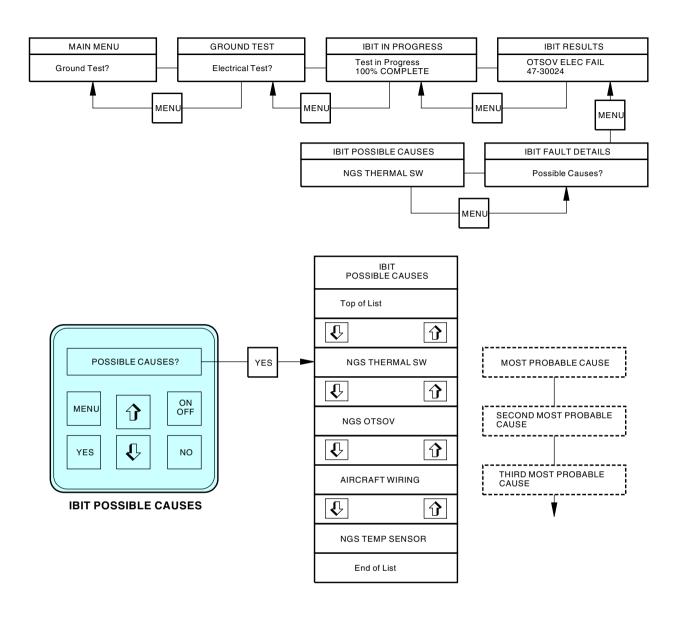


1732286 S0000313259\_V2

Ground Test Menu Figure 208/47-31-02-990-805 (Sheet 4 of 6)







1501317 S0000273558\_V3

# Ground Test Menu Figure 208/47-31-02-990-805 (Sheet 5 of 6)

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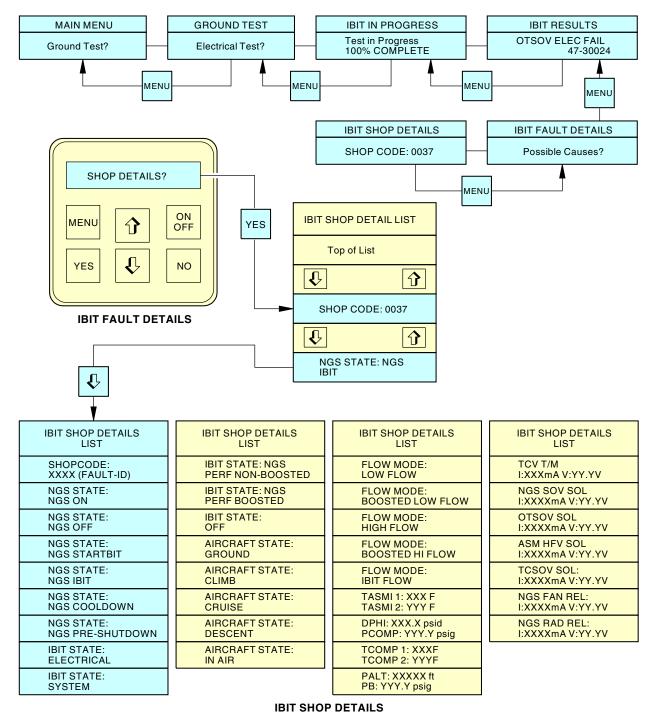
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Ground Test Menu Figure 208/47-31-02-990-805 (Sheet 6 of 6)

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1835747 S0000324406\_V3



#### TASK 47-31-02-740-805

### 6. Other Function Menu

(Figure 209)

#### A. General

- (1) This task gives the instructions to operate the BDU control panel for the OTHER FUNCTION menu.
- (2) To help you move through the BDU OTHER FUNCTION menu structure, refer to Figure 209.
- (3) The OTHER FUNCTION menu lets you do a check of the NGS system configuration. The OTHER FUNCTION menu also lets you monitor the input signals and the condition of the NGS controller valve drivers.

#### B. Location Zones

Δrea

7one

C.

_0	71104	
196	Underwing Wing-to-Body Fairings, Right	
Access Pa	nels	
Number	Name/Location	
196CR	ECS Low Pressure Connection Door	

#### D. Main Menu

SUBTASK 47-31-02-740-071

- (1) Do this task: BDU Main Menu, TASK 47-31-02-740-801.
  - (a) Push the BDU control panel up or down arrows or the NO button until Other Functions? shows on the display.

#### E. Other Function List

SUBTASK 47-31-02-740-072

- (1) Make sure that Other Functions? shows on the display.
  - (a) Push the YES button.
    - 1) Make sure that System Config? shows on the display.

SUBTASK 47-31-02-740-073

- (2) These are the menu items from the Other Function list:
  - (a) System Config?
  - (b) I/O Monitor?

SUBTASK 47-31-02-740-074

(3) Push the up and down arrows or NO button to get to the applicable Other Function menu item.

#### F. System Configuration List

SUBTASK 47-31-02-740-075

- (1) Make sure that SYSTEM CONFIG? shows on the display.
  - (a) Push the YES button.
    - 1) Make sure that HARDWARE PART NO: shows on the display.

SUBTASK 47-31-02-740-076

- (2) These are the menu items from the System Configuration list:
  - (a) HARDWARE PART NO:
  - (b) BOOT LOADER PART NO:

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- (c) SOFTWARE PART NO:
- (d) CONFIG PART NO:
- (e) AIRCRAFT ID: (777)

#### SUBTASK 47-31-02-740-077

(3) Continue to push the down arrow to see all of the System Configuration items.

#### G. I/O Monitor List

#### SUBTASK 47-31-02-740-078

- (1) Push the down arrow or NO button on the other function list until I/O Monitor? shows on the display.
  - (a) Push the YES button.
    - 1) Make sure that the menu item from the I/O monitor list Analog Inputs? shows on the display.

#### SUBTASK 47-31-02-740-079

- (2) These are the menu items for the I/O Monitor list:
  - (a) Analog Inputs?
  - (b) Discrete Inputs?
  - (c) Outputs?
  - (d) Oxygen Sensor?

#### SUBTASK 47-31-02-740-080

(3) Continue to push the down arrow to see all of menu items for the I/O Monitor list.

# H. Analog Inputs List

SUBTASK 47-31-02-740-081

- (1) Make sure that ANALOG INPUTS? from the I/O monitor list shows.
  - (a) Push the YES button.
    - 1) Make sure that TASMI 1: XXX F from the Analog Input list shows on the display.

#### SUBTASK 47-31-02-740-082

- (2) These are the menu items from the Analog Input list:
  - (a) TASMI 1: XXX F

TASMI 2: XXX F

(b) DPHI: XXX.Xpsid

DPMID: NA

(c) PALT: XXXXX ft

PB: YYY.Y psig

(d) TOTAL AIR TEMP:

NA

#### SUBTASK 47-31-02-740-083

(3) Continue to push the down arrow to see all of menu items for the Analog Input list.

### I. Discrete Inputs List

SUBTASK 47-31-02-740-084

(1) Push the down/up arrow or the NO button on the I/O Monitor list.

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(a) Make sure that Discrete Inputs? shows on the display.

#### SUBTASK 47-31-02-740-085

- (2) Push the YES button.
  - (a) Make sure that FLIGHT DECK SMOKE1: NOT EVAC (EVAC) shows on the display.

#### SUBTASK 47-31-02-740-086

(3) Continue to push the down arrow to see all of the menu items for Discrete Input list.

NOTE: For the complete list of discrete input items, refer to Figure 209.

### J. Outputs List

#### SUBTASK 47-31-02-740-087

- (1) Push the down/up arrow or the NO button on the I/O Monitor list.
  - (a) Make sure that Outputs? shows on the display.

#### SUBTASK 47-31-02-740-089

(2) Continue to push the down arrow to see all of the menu items for the Outputs list.

#### SUBTASK 47-31-02-740-090

- (3) These are the menu items from the Outputs list:
  - (a) NGS SOV SOL CMD: OPEN (CLOSED)
  - (b) OTSOV SOL CMD: OPEN (CLOSED)
  - (c) ASM HFV SOL CMD: OPEN (CLOSED)
  - (d) ASM FBV SOL CMD: NA
  - (e) NGS FAN REL CMD: NA
  - (f) NGS RAD REL CMD: NA

### SUBTASK 47-31-02-740-091

(4) After you do the necessary maintenance tasks, continue.

### K. Outputs List

### SUBTASK 47-31-02-740-092

- (1) Push the down/up arrow or the NO button on the I/O Monitor list.
  - (a) Make sure that Oxygen Sensor? shows on the display.
  - (b) Push the YES button.

#### SUBTASK 47-31-02-740-093

- (2) These are the items from the Oxygen Sensor list:
  - (a) O2: XX.X%

PO2: YY.YPSIA

(b) O2: OFF

PO2: OFF

(c) O2: WARMING

PO2: WARMING

(d) O2: FAILED

PO2: FAILED

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## L. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-02-740-094

- (1) Make sure all BDU initiated tests are complete.
- (2) Push the ON/OFF button.

SUBTASK 47-31-02-410-006

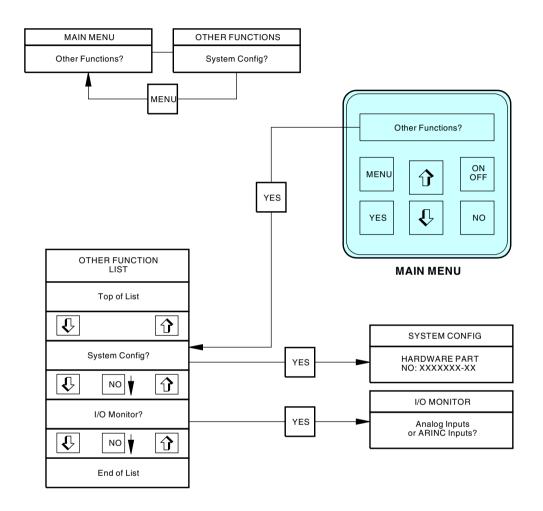
(3) Close this access panel:

NumberName/Location196CRECS Low Pressure Connection Door

----- END OF TASK -----

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# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 1 of 7)

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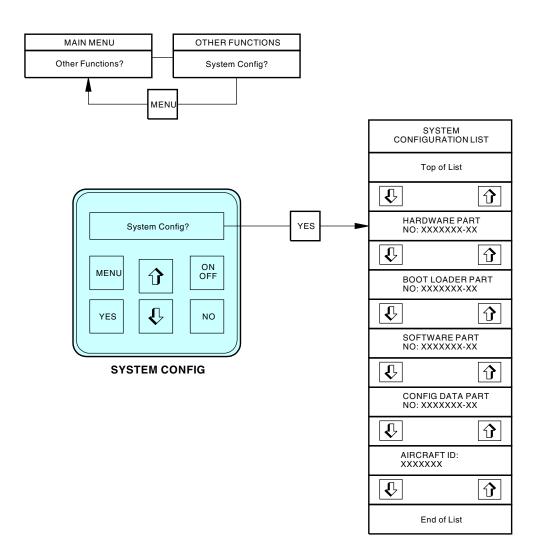
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J86054 S0000180643\_V5

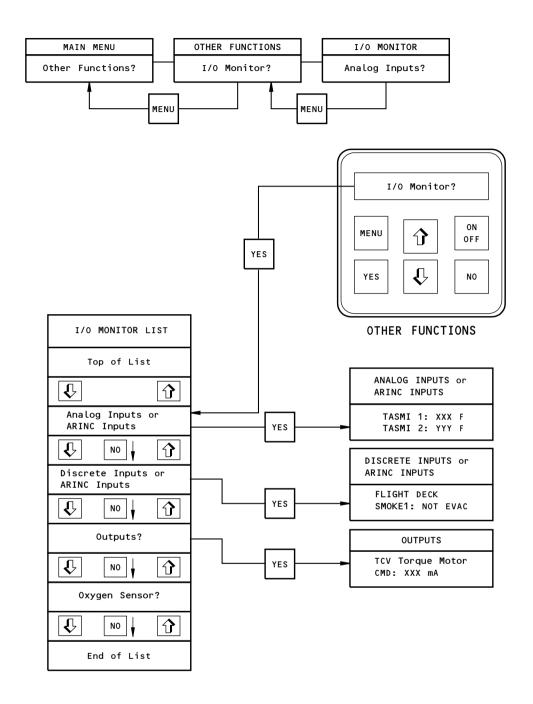
# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 2 of 7)

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1732321 S0000313306\_V2

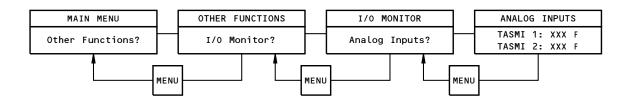
# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 3 of 7)

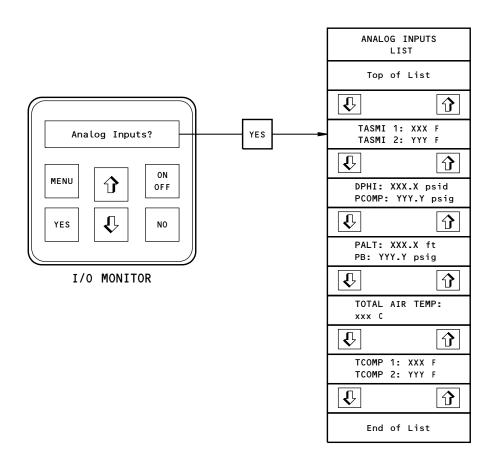
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# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 4 of 7)

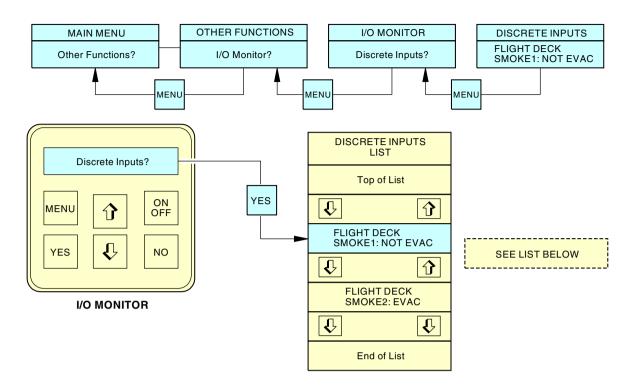
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DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST
FLIGHT DECK SMOKE1: NOT EVAC	FWD CARGO FIRE: ARMED	ID PIN 1: OPEN	ENGINE 1 SIG: ON	REFUEL VLV SIG2: Valve Closed	FAN ON IND: OFF
FLIGHT DECK SMOKE1: EVAC	FWD CARGO FIRE: NOT ARMED	ID PIN 1: GROUND	ENGINE 1 SIG: OFF	FILTER DP SW: High Pressure	FAN ON IND: ON
FLIGHT DECK SMOKE2: NOT EVAC	TEST MODE 1: OPEN	ID PIN 2: OPEN	ENGINE 2 SIG: ON	FILTER DP SW: Normal	RAD M1 IND: OPEN
FLIGHT DECK SMOKE2: EVAC	TEST MODE 1: GROUND	ID PIN 2: GROUND	ENGINE 2 SIG: OFF	FLAPS: DEPLOYED	RAD M1 IND: CLOSE
WOW: ON GROUND	TEST MODE 2: OPEN	ID PIN 3: OPEN	REFUEL VLV SIG1: Valve Open	FLAPS: NOT DEPLOYED	RIGHT ENGINE START: TRUE
WOW: IN AIR	TEST MODE 2: GROUND	ID PIN 3: GROUND	REFUEL VLV SIG1: Valve Closed		RIGHT ENGINE START: FALSE
MAIN CARGO FIRE: ARMED	TEST MODE 3: OPEN	ID PIN 4: OPEN	REFUEL VLV SIG2: Valve Open		LEFT ENGINE START: TRUE
MAIN CARGO FIRE: NOT ARMED	TEST MODE 3: GROUND	ID PIN 4: GROUND			LEFT ENGINE START: FALSE
AFT CARGO FIRE: ARMED	TEST MODE 4: OPEN	ID PIN 5: OPEN			APUSOV ACTUAL POSITION: TRUE
AFT CARGO FIRE: NOT ARMED	TEST MODE 4: GROUND	ID PIN 5: GROUND			APUSOV ACTUAL POSITION: FALSE

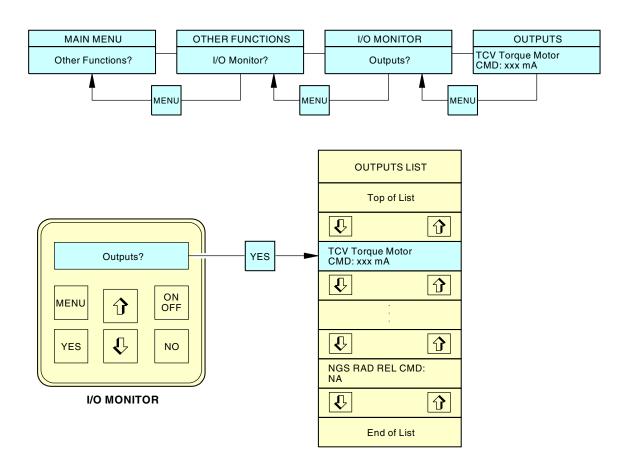
# DISCRETE INPUTS

1835703 S0000324484\_V3

Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 5 of 7)

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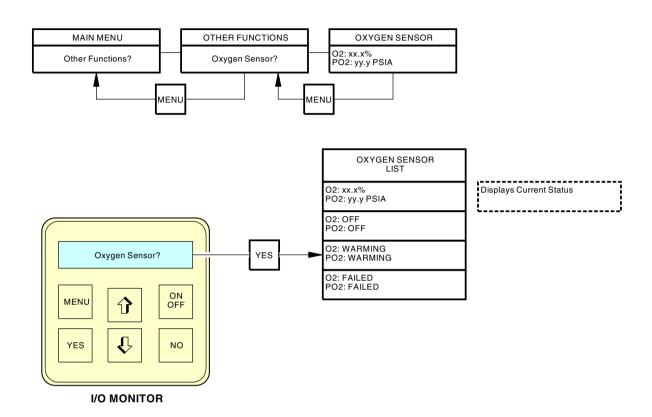
OUTPUTS	OUTPUTS	OUTPUTS
LIST	LIST	LIST
TCV Torque Motor	ASM HFV SOL CMD:	NGS FAN REL CMD:
CMD: XXX mA	OPEN	ON
NGS SOV SOL CMD:	ASM HFV SOL CMD:	NGS FAN REL CMD:
OPEN	CLOSED	OFF
NGS SOV SOL CMD:	TCSOV SOL CMD:	NGS RAD REL CMD:
CLOSED	OPEN	OPEN
OTSOV SOL CMD:	TCSOV SOL CMD:	NGS RAD REL CMD:
OPEN	CLOSED	CLOSED
OTSOV SOL CMD: CLOSED		

1835705 S0000324485\_V3

# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 6 of 7)

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### NOTE:

THE FOLLOWING METHOD SHOULD BE USED TO CONVERT PSIG TO PSIA: DETERMINE THE FIELD ATMOSPHERIC PRESSURE (IN INCHES OF MERCURY). DIVIDE THE FIELD ATMOSPHERIC PRESSURE BY 2.036 AND ADD THE RESULT TO THE GAUGE PRESSURE (PSIG) TO GIVE THE ABSOLUTE PRESSURE (PSIA). FOR EXAMPLE: IF THE FIELD ATMOSPHERIC PRESSURE IS 29.86 inHg AND THE GAUGE PRESSURE IS 4.0 PSIG, DIVIDE 29.86 BY 2.036 WHICH EQUALS 14.67 PSI. ADD THE GAUGE PRESSURE (PSIG) TO THE FIELD PRESSURE TO OBTAIN AN ABSOLUTE PRESSURE OF 18.67 PSIA (4.0 PSIG+14.67 PSI = 18.67 PSIA).

1503967 S0000273990\_V4

# Other Functions Menu Figure 209/47-31-02-990-806 (Sheet 7 of 7)

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## **BITE DISPLAY UNIT - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure contains these tasks:
  - (1) BITE Display Unit Removal
  - (2) BITE Display Unit Installation
- B. Access to the BITE display unit is through the ECS Low Pressure Connection Door, 196CR.

#### TASK 47-31-02-000-801

### 2. BITE Display Unit Removal

(Figure 401)

## A. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### B. Access Panels

Number	Name/Location	
196CR	FCS Low Pressure Connection Door	

### C. Prepare for the Removal

SUBTASK 47-31-02-860-002

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

### Left Power Management Panel, P110

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-31-02-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door

SUBTASK 47-31-02-010-002

(3) Go to the BITE display unit [1] location.

### D. Remove the BITE Display Unit

SUBTASK 47-31-02-020-001

(1) Disconnect the electrical connector [2] from the BITE display unit [1].

SUBTASK 47-31-02-020-002

(2) Remove the screw [3], split washer [4], washer [5], and washer [7] to disconnect the bonding jumper [6].

NOTE: Keep the hardware for the installation.

SUBTASK 47-31-02-860-003

(3) Hold the BITE display unit [1] in its position.

SUBTASK 47-31-02-020-003

(4) Remove the remaining three screws [8], split washers [9], and washers [10].

NOTE: Keep the hardware for the installation.

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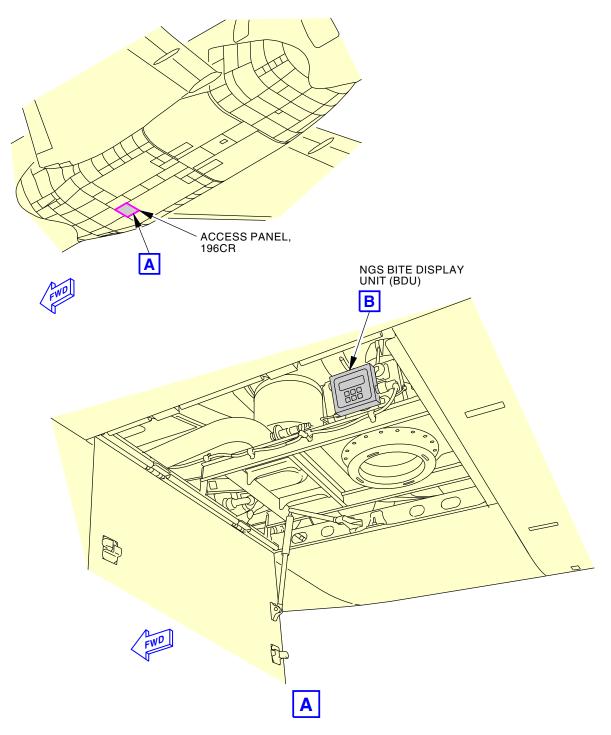


SUBTASK 47-31-02-020-004

(5)	Remove the BITE display unit [1] from the vibration isolators [11].
	END OF TASK

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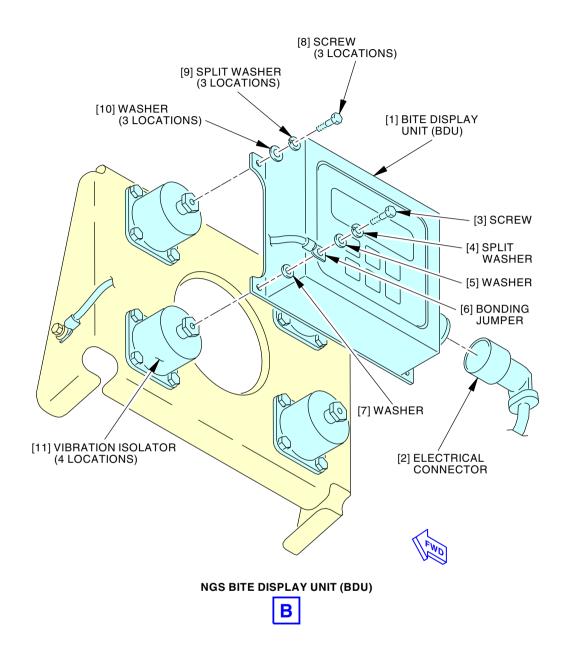
# BITE Display Unit - Removal and Installation Figure 401/47-31-02-990-801 (Sheet 1 of 2)

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BITE Display Unit - Removal and Installation Figure 401/47-31-02-990-801 (Sheet 2 of 2)

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### TASK 47-31-02-400-801

## 3. BITE Display Unit Installation

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
51-21-04-620-801	Alodine 600, 1000, 1200, and 1200S Coating Application (P/B 701)
SWPM 20-20-00	Standard Wiring Practices Manual
SWPM 20-20-10	Standard Wiring Practices Manual

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17

### C. Consumable Materials

Reference	Description	Specification
C00862	Coating - Chemical Conversion - Bonderite	
	M-CR 600 Aero (Formerly Alodine 600)	

### D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	BITE display unit	Not Specified	

### E. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

## F. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

### G. Install the BITE Display Unit

SUBTASK 47-31-02-010-003

(1) Go to the BITE display unit [1] location.

SUBTASK 47-31-02-100-001

- (2) Make sure that the mating surfaces of the BITE display unit [1] and the vibration isolators [11] are clean and free from grease and unwanted material.
  - (a) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

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#### SUBTASK 47-31-02-110-001

- (3) Prepare these components for an electrical mating surface bond (SWPM 20-20-00):
  - (a) Contact surface of the bottom left BITE display unit [1]
  - (b) screw [3]
  - (c) split washer [4]
  - (d) washer [5]
  - (e) bonding jumper [6]
  - (f) washer [7]

#### SUBTASK 47-31-02-420-001

- (4) Do these steps to install the BITE display unit [1]:
  - (a) Align the BITE display unit [1] to the four vibration isolators [11].
  - (b) Install, but do not tighten, the three screws [8], split washers [9], and washers [10].
  - (c) Install the screw [3], split washer [4], washer [5], and washer [7] to attach the bonding jumper [6] (SWPM 20-20-00 and SWPM 20-20-10).
  - (d) Tighten the screw [3] and three screws [8] to 13  $\pm$ 1 in-lb (1.47  $\pm$ 0.11 N·m).

### SUBTASK 47-31-02-760-001

- (5) Use a intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance across the bonding jumper [6] between the BITE display unit [1] and the airplane structure at the vibration isolator [11] (SWPM 20-20-00).
  - (a) Make sure that the electrical resistance between the BITE display unit [1] and the airplane structure is 0.008 ohm (8 milliohms) or less (SWPM 20-20-00).

#### SUBTASK 47-31-02-110-002

(6) Apply a layer of Bonderite M-CR 600 Aero coating, C00862, to all bare areas of the BITE display unit [1] near the bonding jumper [6] location (TASK 51-21-04-620-801).

#### SUBTASK 47-31-02-420-002

(7) Connect the electrical connector [2].

#### H. Operational Test for the BITE Display Unit

SUBTASK 47-31-02-860-004

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

# Left Power Management Panel, P110

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-31-02-740-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) Make sure that the test passes and the BITE message for the BITE display unit [1] does not show.
- I. Put the Airplane Back to its Usual Condition.

#### SUBTASK 47-31-02-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door

------ END OF TASK ------

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# **NGS SHUTOFF VALVE - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure has these tasks:
  - (1) NGS Shutoff Valve Removal
  - (2) NGS Shutoff Valve Installation
- B. The NGS shutoff valve is found aft of the thermal control unit (TCU), between the bleed air inlet duct and the ozone converter.
- C. To get to the NGS shutoff valve, open the ECS low pressure connection door, 195BL.

## TASK 47-32-01-000-801

## 2. NGS Shutoff Valve Removal

(Figure 401)

### A. General

(1) The NGS shutoff valve is referred to as the shutoff valve in this procedure.

### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## C. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

#### D. Consumable Materials

Reference	Description	Specification
D50063	Grease - Perfluoropolyether, fuel and oxygen	MIL-PRF- 27617 Type III
	resistant - Krvtox 240AC	

## E. Location Zones

Zone	Area
195	Underwing Wing-to-Body Fairings, Left

# F. Access Panels

Number	Name/Location
195BL	ECS High Pressure Connection Door

FFFECTIVITY 47-32-01



## G. Prepare for the Removal

SUBTASK 47-32-01-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (1) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

SUBTASK 47-32-01-860-003

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

## Left Power Management Panel, P110

	****	anagomone	. a,
Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-01-010-001

(3) Open this access panel:

Number Name/Location

195BL ECS High Pressure Connection Door

## H. Remove the NGS Shutoff Valve

SUBTASK 47-32-01-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802

— EFFECTIVITY — 47-32-01



#### SUBTASK 47-32-01-010-002

(2) Go to the shutoff valve [1] location.

NOTE: The shutoff valve [1] is in the forward part of the left ECS Bay, aft of the TCU.

#### SUBTASK 47-32-01-020-003

(3) Disconnect the electrical connector [7] from the shutoff valve [1].

#### SUBTASK 47-32-01-020-005

- (4) Do these steps to remove the bonding jumper [12]:
  - (a) Remove the bolt [8], washer [9], washer [11], bonding jumper [12], washer [13], and nut [14] from the bracket [10].
  - (b) Remove the used sealant from the bracket [10].

#### SUBTASK 47-32-01-020-001

- (5) Do these steps to disconnect the shutoff valve [1] from the ozone converter duct:
  - (a) Disconnect the coupling [4].
  - (b) Move the sleeve [3] away from the shutoff valve [1] onto the ozone converter duct.
  - (c) Discard the o-rings [2].

#### SUBTASK 47-32-01-020-002

- (6) Do these steps to disconnect the shutoff valve [1] from the bleed air inlet duct:
  - (a) Disconnect the coupling [4].
  - (b) Move the sleeve [3] away from the shutoff valve [1] onto the bleed air inlet duct.
  - (c) Discard the o-rings [2].

#### SUBTASK 47-32-01-020-007

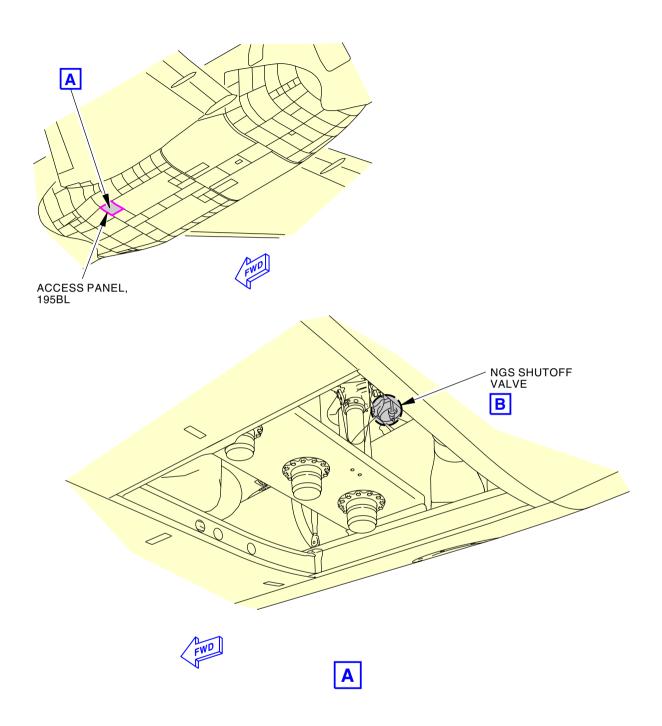
- (7) Do these steps to remove the shutoff valve [1] from the high pressure ground connect platform:
  - (a) Remove the old sealant at the three bolts [6].
  - (b) Hold the shutoff valve [1] in its position.
  - (c) Remove the bolts [6] and washers [5] (three locations).
  - (d) Remove the shutoff valve [1].
  - (e) Remove and keep the sleeves [3] (two locations) for the installation.

## SUBTASK 47-32-01-420-001

(8) Install a protective cover, STD-7423, on the bleed air inlet duct and the ozone converter duct.

----- END OF TASK -----





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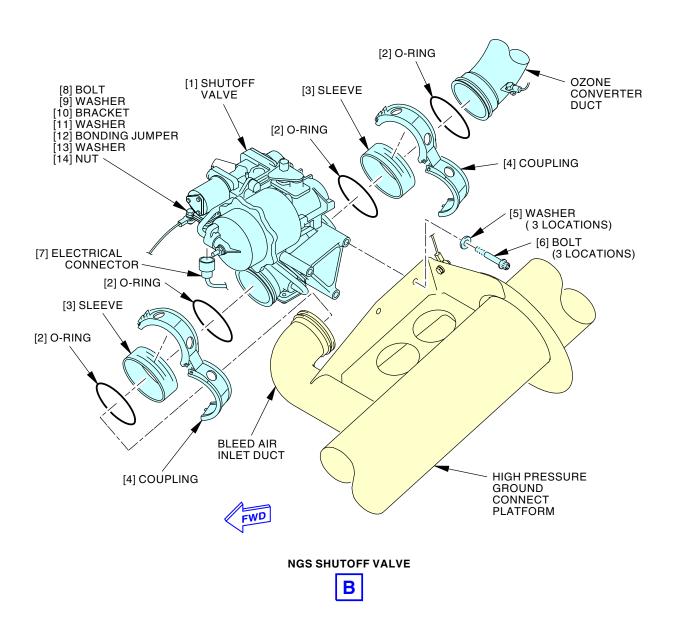
NGS Shutoff Valve - Removal and Installation Figure 401/47-32-01-990-801 (Sheet 1 of 2)

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NGS Shutoff Valve - Removal and Installation Figure 401/47-32-01-990-801 (Sheet 2 of 2)

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## TASK 47-32-01-400-801

## 3. NGS Shutoff Valve Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual
SWPM 20-20-10	Standard Wiring Practices Manual

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

## D. Location Zones

Zone	Area
195	Underwing Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
195BL	ECS High Pressure Connection Door

# F. Prepare for the Installation

SUBTASK 47-32-01-860-005

(1) Do these steps to prepare the shutoff valve [1] for the installation:

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- (a) Make sure that the manual locking hex bolt is installed in the pressure regulator housing and fully tightened.
- (b) Make sure the manual lock is in the CLOSED position.

#### SUBTASK 47-32-01-010-003

(2) Go to the shutoff valve [1] location aft of the TCU, between the bleed air inlet duct and the ozone converter duct.

## SUBTASK 47-32-01-010-004

(3) Remove the protective cover, STD-7423, from the bleed air inlet duct and the ozone converter duct.

#### SUBTASK 47-32-01-100-001

(4) Make sure that the shutoff valve [1], sleeves [3], and couplings [4] are clean and free from grease and unwanted materials.

#### SUBTASK 47-32-01-110-001

(5) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-01-110-002

- (6) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) bracket [10] of the shutoff valve [1]
  - (b) mating surface of the TCU pallet frame at the three bolt [6] locations
  - (c) mating surface of the shutoff valve [1] at the three bolt [6] locations
  - (d) loose end of the bonding jumper [12]

## G. Install the NGS Shutoff Valve

## SUBTASK 47-32-01-860-009



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

## SUBTASK 47-32-01-420-002

(2) Do these steps to install the o-rings [2]:

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KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-rings [2].
- (b) Install the o-rings [2] in the o-ring cavities of these components.
  - 1) shutoff valve [1] (two locations)
  - 2) ozone converter duct
  - 3) bleed air inlet duct

#### SUBTASK 47-32-01-420-003

- (3) Do these steps to install the shutoff valve [1]:
  - (a) Put the sleeves [3] on the ozone converter duct and the bleed air inlet duct.
  - (b) Align the shutoff valve [1] with the bleed air inlet duct and ozone converter duct.
  - (c) Apply a thin layer of compound, C00852, to the three bolts [6].
  - (d) Install, but do not fully tighten, the bolts [6] and washers [5] (three locations).
  - (e) Move the sleeves [3] into their positions on the shutoff valve [1].
  - (f) Connect the two couplings [4].
  - (g) Fully tighten the three bolts [6] to 126 ±6 in-lb (14.2 ±0.7 N·m).
    - <u>NOTE</u>: This torque value is in addition to the torque necessary to overcome the self-locking devices.

### SUBTASK 47-32-01-420-004

- (4) Do these steps to install the bonding jumper [12] to the shutoff valve [1].
  - (a) Apply a thin layer of compound, C00852, to the bolt [8].
  - (b) Install the bolt [8], washer [9], washer [11], bonding jumper [12], washer [13], and nut [14] to the bracket [10] (SWPM 20-20-00 and SWPM 20-20-10).
  - (c) Tighten the bolt [8] to 48  $\pm$ 2 in-lb (5.4  $\pm$ 0.2 N·m).

#### SUBTASK 47-32-01-430-001

(5) Connect the electrical connector [7].

## SUBTASK 47-32-01-760-001

- (6) Measure the electrical resistance between the electrical connector shell and the airplane structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the electrical resistance between the electrical connector shell and the airplane structure is 0.0055 ohm (5.5 milliohms) or less.



#### SUBTASK 47-32-01-420-006

(7) Apply P/S 890 Class B sealant, A50051, to fully cover the terminal on the bonding jumper [12] fasteners, and the exposed conversion coating on the bracket [10].

#### SUBTASK 47-32-01-420-007

(8) Apply P/S 890 Class B sealant, A50051, to fully cover the bolts [6], washers [5] (three locations), and the exposed conversion coating on the shutoff valve [1] mounting frame.

## H. Operational Test for the NGS Shutoff Valve Installation

SUBTASK 47-32-01-860-007

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

Left Power Management Panel, P110	<b>Left Power</b>	Management	Panel,	P110
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Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

## SUBTASK 47-32-01-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the shutoff valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

## I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-01-420-008

(1) Close this access panel:

<u>Number</u>	Name/Location
195BL	ECS High Pressure Connection Door
	——— FND OF TASK ———



## **OZONE CONVERTER - REMOVAL/INSTALLATION**

## 1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
  - (1) Ozone Converter Removal
  - (2) Ozone Converter Installation
- C. The location of the ozone converter is on the thermal control unit (TCU), between the NGS shutoff valve and the heat exchanger.
- D. To get to the ozone converter on the aft section of the TCU, open the forward wing to body fairing panel, 191NL.

## TASK 47-32-02-000-801

## 2. Ozone Converter Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

#### A. References

Reference	Title	
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)	

# B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## D. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel

## E. Prepare for the Removal

SUBTASK 47-32-02-860-003

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-02-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191NL	Forward Wing To Body Fairing Panel

ARO ALL



## F. Remove the Ozone Converter

SUBTASK 47-32-02-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-02-010-002

(2) Go to the ozone converter [1] location.

NOTE: The location of the ozone converter [1] is on the TCU between the Nitrogen Generation System (NGS) shutoff valve and the heat exchanger.

#### SUBTASK 47-32-02-020-005

(3) Remove the insulation blanket from ozone converter [1]:

NOTE: Insulation blanket is not shown in Figure 1.

- (a) Remove the fiberglass tie(s) and/or tape from the insulation blanket.
- (b) Remove and keep the insulation blanket for the ozone converter [1] installation.

#### SUBTASK 47-32-02-020-004

- (4) Remove the bolt [14], washers [15], bonding jumper [16] and nut [17].
  - (a) Keep the fasteners for the installation.

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#### SUBTASK 47-32-02-020-001

- (5) Do these steps to disconnect the ozone converter [1]:
  - (a) Disconnect the coupling [4].
  - (b) Move the sleeve [5] away from the ozone converter [1] to the duct.
  - (c) Disconnect the coupling [11].
  - (d) Move the sleeve [13] away from the ozone converter [1] to the duct.

## SUBTASK 47-32-02-020-003

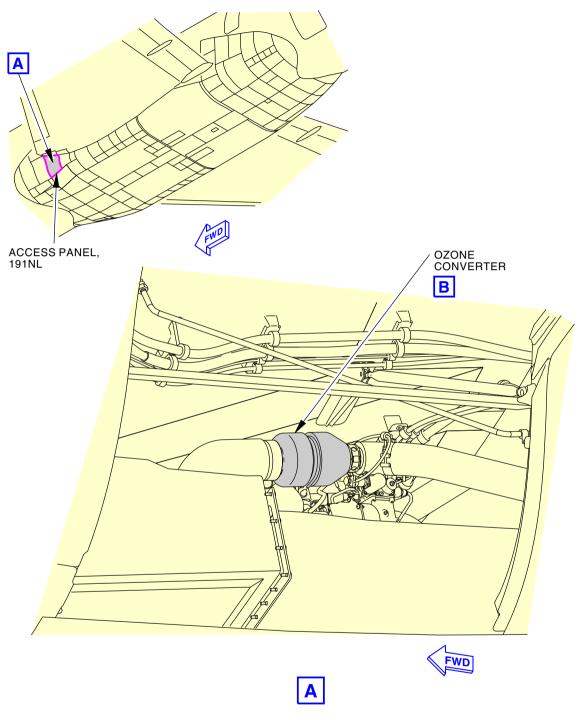
- (6) Do these steps to remove the ozone converter [1]:
  - (a) Hold the ozone converter [1] in position.
  - (b) Remove the bolts [6], washers [7], nuts [10] and washers [9] (two locations).
  - (c) Remove the ozone converter [1], clamp [2] and clamp [8].
  - (d) Keep the coupling [4], sleeve [5], coupling [11], sleeve [13] and fasteners for the installation.
  - (e) Remove and discard the o-rings [3] and o-rings [12].

## SUBTASK 47-32-02-490-001

(7) Install protective covers, STD-7423 on the ozone converter [1] inlet and outlet ducts.

----- END OF TASK -----





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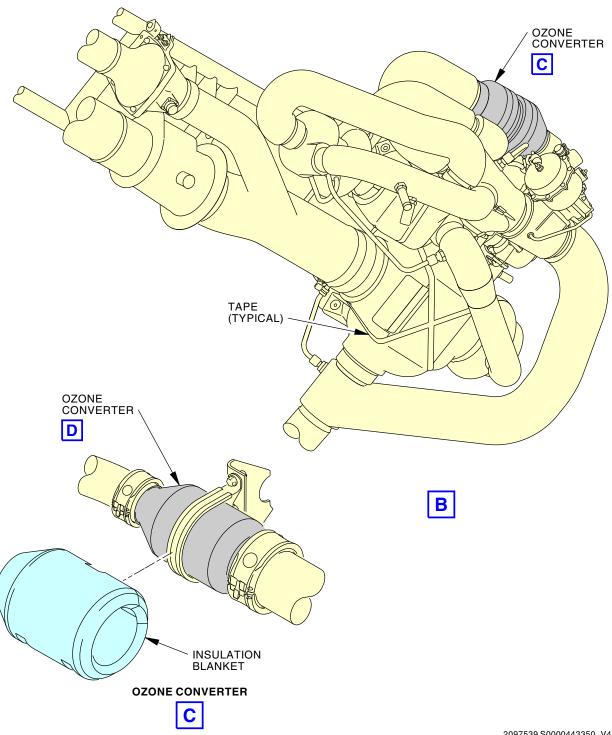
Ozone Converter - Removal and Installation Figure 401/47-32-02-990-801 (Sheet 1 of 3)

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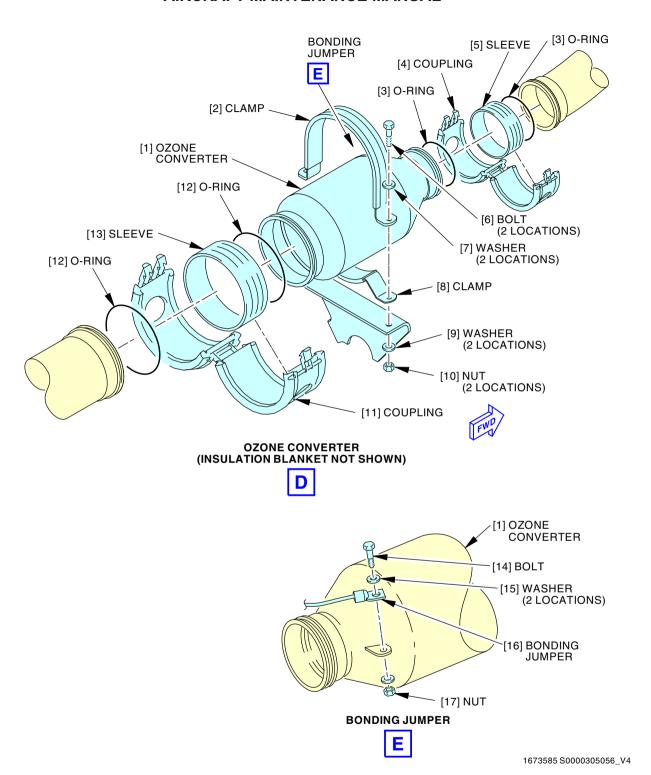
Ozone Converter - Removal and Installation Figure 401/47-32-02-990-801 (Sheet 2 of 3)

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Ozone Converter - Removal and Installation Figure 401/47-32-02-990-801 (Sheet 3 of 3)

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## TASK 47-32-02-400-801

# 3. Ozone Converter Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual
SWPM 20-20-10	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G00431	Tape - Fiberglass, ECC-A	MIL-Y-1140 Class C Form 5
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G51066	Tape - ECC-B fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5
G51484	Tape - Pressure Sensitive (3 inch (76 mm) wide) - KB23	

## D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Ozone converter	47-32-02-01-245	ARO ALL

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## (Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	47-11-52-01B-265	ARO ALL
12	O-ring	47-32-02-01-200	ARO ALL

#### E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### F. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel

#### G. Install the Ozone Converter

SUBTASK 47-32-02-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-32-02-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063 precautions when you assemble and disassemble Nitrogen Generation System (NGS) components.

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#### SUBTASK 47-32-02-410-001

(3) Go to the ozone converter [1] location on the TCU.

#### SUBTASK 47-32-02-090-001

(4) Remove the protective covers, STD-7423 from the ozone converter [1] inlet and outlet ducts.

#### SUBTASK 47-32-02-110-003

(5) Remove the used sealant from the bonding jumper [16], fasteners and the bonding jumper tab on the ozone converter [1] (if re-usable).

#### SUBTASK 47-32-02-110-001

(6) Make sure that the ozone converter [1], coupling [4], sleeve [5], coupling [11], sleeve [13] and duct sections are clean and free from grease and unwanted material.

#### SUBTASK 47-32-02-110-002

(7) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-02-110-004

- (8) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surface of the bonding jumper tab
  - (b) Contact surface of the bonding jumper [16]
  - (c) Contact surfaces of the washers [15]

#### SUBTASK 47-32-02-420-001

- (9) Do these steps to install the o-rings [3]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063 to o-rings [3].
  - (b) Install the two o-rings [3] on the ozone converter [1] and the inlet duct.

## SUBTASK 47-32-02-420-005

- (10) Do these steps to install the o-rings [12]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063 to o-rings [12].
  - (b) Install the two o-rings [12] on the ozone converter [1] and the outlet duct.

## SUBTASK 47-32-02-420-002

- (11) Do these steps to install the ozone converter [1]:
  - (a) Position the sleeve [5] and sleeve [13] on the ozone converter [1].
  - (b) Put the clamp [8] and the ozone converter [1] in their positions on the TCU pallet frame.
  - (c) Put the clamp [2] on the ozone converter [1].
  - (d) Apply a thin layer of compound, C00852 to the bolts [6].
  - (e) Install, but do not fully tighten, the bolt [6], washer [7], washer [9], and nut [10] (two locations).
  - (f) Move the sleeve [5] and the sleeve [13] into their positions on the ozone converter [1].
  - (g) Connect the coupling [4] and the coupling [11].
  - (h) Tighten the two bolts [6] to 48  $\pm$ 2 in-lb (5.4  $\pm$ 0.2 N·m).

## SUBTASK 47-32-02-400-001

(12) Install the insulation blanket on the ozone converter [1]:

NOTE: Insulation blanket is not shown in Figure 1.

ARO ALL



- (a) Place the insulation blanket on the ozone converter [1].
  - NOTE: Align the openings in the insulation blanket with the nameplates.
- (b) Butt the edges of the insulation blanket together and apply KB23 tape, G51484 tape to the foam seam.
- (c) Apply additional KB23 tape, G51484 tape to the insulation blanket so that it completely covers the outside edge. Foam must not be exposed on any outside edge.
  - NOTE: Gaps larger than 0.25 in. (6.35 mm) are not permitted. KB23 tape, G51484 can be used to compress the foam and reduce the gaps. Small gaps no greater than 0.25 in. (6.35 mm) are acceptable along the outside diameter of the insulation blanket as long as the gap does not extend through the entire seam and is covered by tape

NOTE: The ozone converter [1] must not be visible through the gaps.

(d) Install the ECC-A fiberglass tape, G00431 or ECC-B fiberglass tape, G51066 around the exterior surface of the insulation.

#### SUBTASK 47-32-02-420-003

- (13) Do these steps to install the bonding jumper [16] to the ozone converter [1]:
  - (a) Apply a thin layer of lubrication compound, C00852 to the bolt [14].
  - (b) Install the bolt [14], two washers [15], nut [17], and bonding jumper [16] to the bonding jumper tab (SWPM 20-20-00 and SWPM 20-20-10).
  - (c) Tighten the bolt [14] to 48 ±2 in-lb (5.4 ±0.2 N·m).
    - <u>NOTE</u>: This torque value is in addition to the torque necessary to overcome the self-locking devices.

#### SUBTASK 47-32-02-760-001

- (14) Measure the electrical resistance between the ozone converter [1] and the TCU pallet structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the electrical resistance between the ozone converter [1] and structure is 0.0075 ohm (7.5 milliohms) or less (SWPM 20-20-00).

#### SUBTASK 47-32-02-420-004

(15) Apply sealant - P/S 890 Class B sealant, A50051 to fully cover the terminal on the bonding jumper [16], bonding jumper fasteners, and the exposed conversion coating on the bonding jumper tab.

## H. Operational Test for the Ozone Converter

## SUBTASK 47-32-02-860-005

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-32-02-790-001

- (2) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
  - (a) With the NGS pressurized, use the leak detector, G50135 compound to do a check for leaks around the ozone converter [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

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- (c) Repair any leaks that you find.
- I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-02-410-002

(1) Close this access panel:

NumberName/Location191NLForward Wing To Body Fairing Panel

----- END OF TASK -----

ARO ALL



## **HEAT EXCHANGER - REMOVAL/INSTALLATION**

## 1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
  - (1) Heat Exchanger Removal
  - (2) Heat Exchanger Installation
- C. The location of the heat exchanger is on the thermal control unit (TCU), between the ram air inlet duct, ram air outlet duct, bleed air inlet duct, and heat exchanger outlet duct.
- D. To get to the heat exchanger and the TCU, open the Forward Wing to Body Fairing Panel, 191QL.

## TASK 47-32-03-000-802

# 2. Heat Exchanger Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

## A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class
		2 Grade C Composition
		MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches	MIL-Y-1140 Class C
	(0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	Form 5

## D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel

## F. Prepare for the Removal

SUBTASK 47-32-03-860-003

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

Left	Power	Ma	anaç	gemen	t Panel,	P110
_	_					

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

ARO ALL



#### SUBTASK 47-32-03-010-001

(2) Open these access panels:

Number	Name/Location

191NL Forward Wing To Body Fairing Panel191QL Forward Wing To Body Fairing Panel

## G. Remove the Heat Exchanger

SUBTASK 47-32-03-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-03-010-002

(2) Go to the heat exchanger [1] location.

NOTE: The location of the heat exchanger [1] is on the thermal control unit (TCU) aft of the ram air check valve and inboard of the ozone converter.

#### SUBTASK 47-32-03-020-005

- (3) Do these steps to remove the insulation blanket from the heat exchanger [1]:
  - (a) Remove the ECC-A fiberglass tape, G51019.
  - (b) Remove the tape, G50789.
  - (c) Remove and keep the insulation blanket for the heat exchanger [1] installation.

ARO ALL



#### SUBTASK 47-32-03-020-006

- (4) Do these steps to disconnect the ejector inlet duct [13].
  - (a) If necessary, disconnect the tube assembly [18] from the adapter [20].
  - (b) Disconnect the coupling [14] and the coupling [15] from the ejector inlet duct [13].
    - 1) Keep the coupling [14] and the coupling [15] for the installation.
  - (c) Remove the ejector inlet duct [13].
    - 1) Discard the packing [16] and the packing [17] from the ejector inlet duct [13].
  - (d) Remove and discard the packing [16] from the ejector duct assembly [21].
  - (e) Remove and discard the packing [17] from the regen heat exchanger [22].

#### SUBTASK 47-32-03-020-001

- (5) Do these steps to disconnect the heat exchanger [1]:
  - (a) Disconnect the clamp [2] from the ram air outlet duct.
  - (b) Disconnect the two couplings [6] from the bleed air inlet duct and the bleed air outlet duct.

    NOTE: The couplings [6] and sleeves [5] are parts of a top level coupling assembly.
  - (c) Move the two sleeves [5] away from the heat exchanger [1].
  - (d) Disconnect the two couplings [9] from the ram air inlet duct.
  - (e) Move the sleeve [8] away from the heat exchanger [1].

#### SUBTASK 47-32-03-020-002

- (6) Do these steps to remove the heat exchanger [1] from the TCU frame:
  - (a) Remove the used sealant from the fasteners at the inboard-forward and outboard-aft heat exchanger attachment points.
  - (b) Remove the bolt [12], flat washer [7], and the three belleville washers [11] (two locations).
  - (c) Remove the bolt [12], three believille washers [11], and the bushing [10] (two locations).
  - (d) Remove the heat exchanger [1].

## SUBTASK 47-32-03-020-003

- (7) Discard or keep these components:
  - (a) Remove and keep the two bushings [10] from the heat exchanger [1].
  - (b) Remove and discard the four o-rings [4].
  - (c) Remove and discard the o-ring [3].
  - (d) Keep the couplings [6], couplings [9], sleeves [5], sleeve [8], and fasteners for the installation.

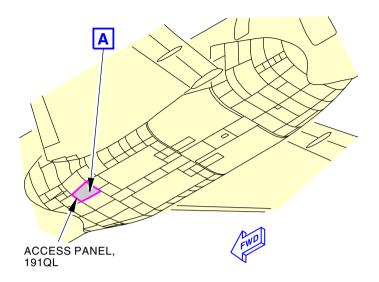
#### SUBTASK 47-32-03-490-001

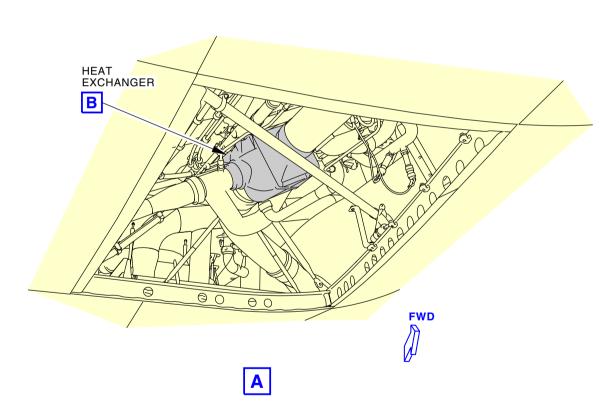
- (8) Install protective covers, STD-7423, on these components:
  - (a) Ram air inlet duct
  - (b) Ram air outlet duct
  - (c) Bleed air outlet duct
  - (d) Bleed air inlet duct

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ARO ALL 47-32-03







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Heat Exchanger - Removal and Installation Figure 401/47-32-03-990-801 (Sheet 1 of 4)

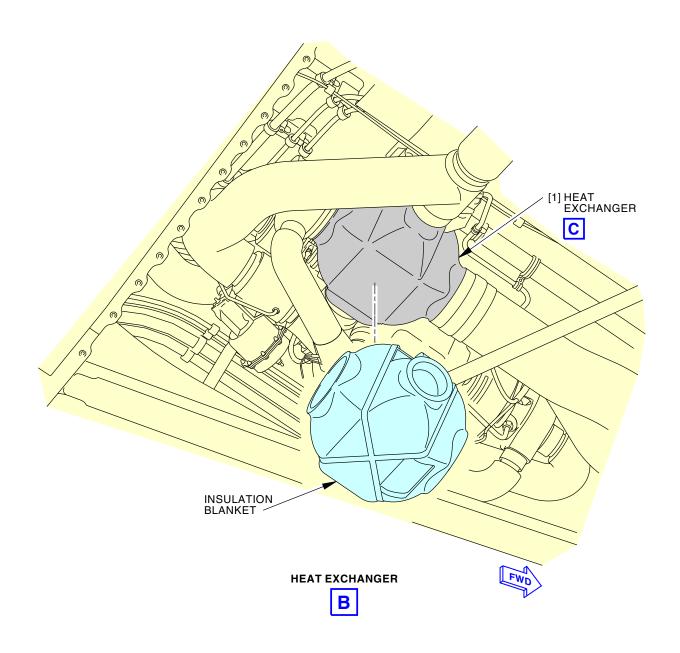
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47-32-03

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Heat Exchanger - Removal and Installation Figure 401/47-32-03-990-801 (Sheet 2 of 4)

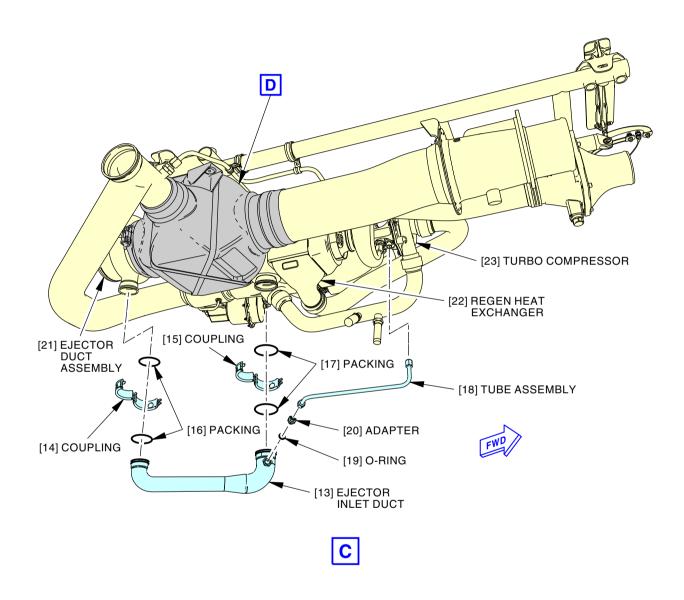
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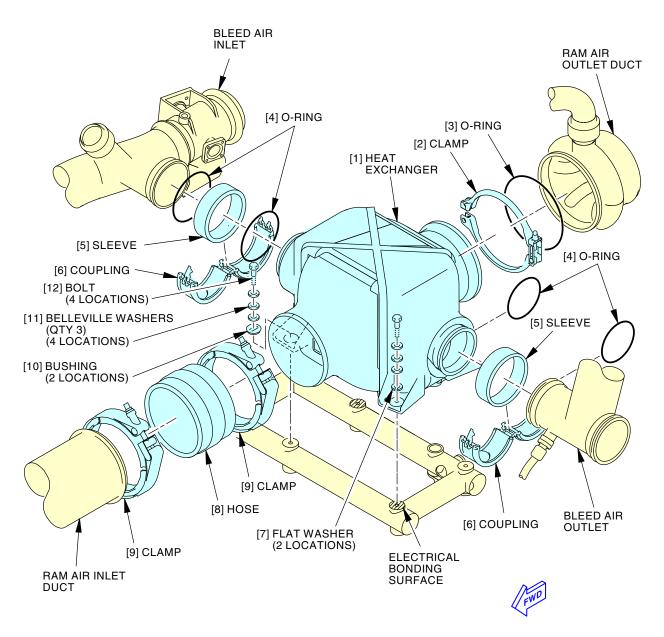
Heat Exchanger - Removal and Installation Figure 401/47-32-03-990-801 (Sheet 3 of 4)

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47-32-03

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# HEAT EXCHANGER (INSULATION BLANKET NOT SHOWN)



1669069 S0000305078\_V6

Heat Exchanger - Removal and Installation Figure 401/47-32-03-990-801 (Sheet 4 of 4)

ARO ALL

47-32-03

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## TASK 47-32-03-400-802

## 3. Heat Exchanger Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description		
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17		
STD-7423	Cover - Protective Tube		

## C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

## D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	Not Specified	
4	O-ring	Not Specified	

ARO ALL



## (Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
16	Packing	Not Specified	
17	Packing	Not Specified	
–			

#### E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### F. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel

## G. Install the Heat Exchanger

SUBTASK 47-32-03-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-32-03-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- · DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

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#### SUBTASK 47-32-03-020-004

- (3) Remove the used sealant from these components:
  - (a) The top of the inboard-forward and outboard-aft mounting brackets of the heat exchanger [1] (if re-used).
  - (b) The fasteners that attach the heat exchanger [1] to the inboard-forward and outboard-aft mounting brackets.

#### SUBTASK 47-32-03-420-001

(4) Go to the heat exchanger [1] location on the TCU.

#### SUBTASK 47-32-03-090-001

(5) Remove the protective covers, STD-7423, from the ram air inlet duct, ram air outlet duct, bleed air inlet duct, and bleed air outlet duct.

#### SUBTASK 47-32-03-110-001

(6) Make sure that the ram air inlet duct, ram air outlet duct, bleed air inlet duct, bleed air outlet duct, couplings [6], couplings [9] and clamp [2] are clean and free from grease and unwanted material.

## SUBTASK 47-32-03-110-002

(7) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-03-160-001

- (8) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surface of the inboard-forward mounting bracket of the heat exchanger [1].
  - (b) Contact surface of the outboard-aft mounting bracket of the heat exchanger [1].
  - (c) Contact surface of the TCU pallet frame.

#### SUBTASK 47-32-03-420-002

- (9) Do these steps to install the heat exchanger [1] to the TCU pallet frame:
  - (a) Install the two bushings [10] in the mounting brackets of the heat exchanger [1].
  - (b) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-rings [4] and o-ring [3].
  - (c) Install the four o-rings [4] on the heat exchanger [1], bleed air inlet duct, and the bleed air outlet duct.
  - (d) Install the o-ring [3] on the ram air outlet side of the heat exchanger [1].
  - (e) Slide the two sleeves [5] and the sleeve [8] on the bleed air inlet duct, bleed air outlet duct, and ram air inlet duct.
    - NOTE: The couplings [6] and sleeves [5] are parts of a top level coupling assembly.
  - (f) Align the heat exchanger [1] on the TCU pallet.
  - (g) Apply a thin layer of lubrication compound, C00852, to the four bolts [12].
  - (h) At the two locations where a bushing [10] is installed on the mounting bracket, do these steps:
    - 1) Install, but do not fully tighten, the three belleville washers [11] and bolt [12].

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NOTE: Install the belleville washers [11] with the convex side up. Do not fully tighten the bolts [12] until after you install the couplings [6], couplings [9], and clamp [2].

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- (i) At the two locations where a bushing [10] is not installed on the mounting bracket, do these steps:
  - 1) Install the flat washer [7].
  - 2) Install, but do not fully tighten, the three belleville washers [11] and bolt [12].

NOTE: Install the belleville washers [11] with the convex side up. Do not fully tighten the bolts [12] until after you install the couplings [6], couplings [9], and clamp [2].

#### SUBTASK 47-32-03-420-003

- (10) Do these steps to connect the heat exchanger [1]:
  - (a) Move the two sleeves [5] and sleeve [8] into their positions on the heat exchanger [1].
  - (b) Connect the clamp [2].
  - (c) Connect the two couplings [6].
  - (d) Connect the two couplings [9].

## SUBTASK 47-32-03-420-006

- (11) Do these steps to install the ejector inlet duct [13].
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new packings [16] and the new packings [17].
  - (b) Install a new packing [16] on the ejector inlet duct [13] and a new packing [16] on the ejector duct assembly [21].
  - (c) Install a new packing [17] on the regen heat exchanger [22] and a new packing [17] on the ejector inlet duct [13].
  - (d) Put the ejector inlet duct [13] in position on the ejector duct assembly [21] and the regen heat exchanger [22].
  - (e) Connect the ejector inlet duct [13] with the coupling [14] and the coupling [15].
  - (f) Install the tube assembly [18] if necessary.

### SUBTASK 47-32-03-420-004

- (12) Do these steps to tighten the bolts [12] (four locations):
  - (a) Tighten the bolt [12] until the three belleville washers [11] are in a flat condition.
  - (b) After the belleville washers [11] are flat, loosen the bolt [12] one quarter turn.

#### SUBTASK 47-32-03-760-001

- (13) Measure the electrical resistance between the electrically bonded mounting bracket on the heat exchanger [1] (inboard-forward location) and the TCU pallet structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure that the electrical resistance between the mounting bracket and the TCU pallet frame is 0.0075 ohm (7.5 milliohms) or less.

#### SUBTASK 47-32-03-760-002

- (14) Measure the electrical resistance between the electrically bonded mounting bracket on the heat exchanger [1] (outboard-aft location) and the TCU pallet structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure that the electrical resistance between the mounting bracket and the TCU pallet frame is 0.0075 ohm (7.5 milliohms) or less.



#### SUBTASK 47-32-03-420-005

(15) Apply P/S 890 Class B sealant, A50051, to fully cover the bolt [12], belleville washers [11], flat washer [7], and the exposed conversion coating at the electrically bonded mounting bracket (two locations).

#### SUBTASK 47-32-03-400-001

- (16) Install the insulation blanket on the heat exchanger [1]:
  - (a) Use the ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the heat exchanger [1]
  - (b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.

## H. Operational Test for the Heat Exchanger

## SUBTASK 47-32-03-860-005

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-03-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the heat exchanger [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair any leaks that you find.

## I. Put the Airplane Back to the Usual Condition

## SUBTASK 47-32-03-410-001

(1) Close these access panels:

<u>Number</u>	Name/Location
191NL	Forward Wing To Body Fairing Panel
191QL	Forward Wing To Body Fairing Panel
	——— END OF TASK ———



## FILTER - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) Filter Removal
  - (2) Filter Installation
- B. The location of the filter is inboard and aft of the air separation unit (ASU) between the thermal control unit (TCU) outlet duct and the ASU inlet duct.
- C. To get to the filter, open the ECS low pressure connection door, 196CR.

## TASK 47-32-04-000-801

## 2. Filter Removal

(Figure 401)

## A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## C. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

## D. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

## E. Prepare for the Removal

SUBTASK 47-32-04-860-004

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

# Left Power Management Panel, P110

	*****	anagomone	. a,
Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-04-010-002

(2) Open this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door

## F. Remove the Filter

SUBTASK 47-32-04-860-001



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

ARO ALL



## (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-04-010-001

(2) Go to the filter [1] location.

NOTE: The filter [1] is found aft and inboard of the air separation unit (ASU).

## SUBTASK 47-32-04-020-001

- (3) Do these steps to remove the filter [1] from the two duct segments:
  - (a) Disconnect the two couplings [3].
    - 1) Keep the coupling [3] for the installation.
    - 2) Move the sleeves [2] on each end of the filter [1] toward the duct segments.
    - 3) Remove and discard the o-rings [6] (four locations).

## SUBTASK 47-32-04-020-002

- (4) Do these steps to remove the bonding jumper [7]:
  - (a) Disconnect the bolt [9] and washer [8].
  - (b) Remove the bonding jumper [7] from the filter base.

#### SUBTASK 47-32-04-020-003

EFFECTIVITY

**ARO ALL** 

- (5) Do these steps to remove the filter [1]:
  - (a) Remove the bolts [4] and washers [5] from the filter base (four locations).
  - (b) Remove the filter [1].

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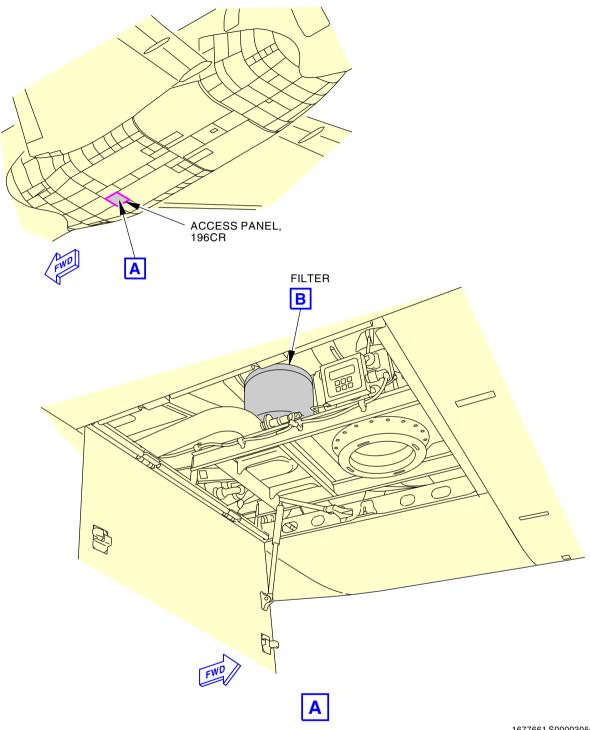


SUBTASK 47-32-04-420-001

(6)	Install protective covers, STD-7423, on the inlet and outlet duct.
	END OF TASK

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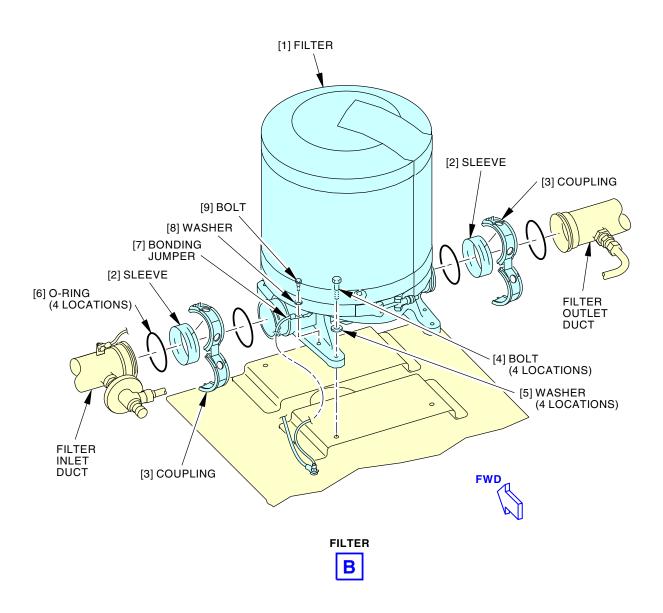
Filter - Removal and Installation Figure 401/47-32-04-990-801 (Sheet 1 of 2)

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# Filter - Removal and Installation Figure 401/47-32-04-990-801 (Sheet 2 of 2)

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#### TASK 47-32-04-400-801

### 3. Filter Installation

(Figure 401)

### A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

### B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### C. Consumable Materials

Reference	Description	Specification
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### D. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

### E. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

#### F. Install the Filter

SUBTASK 47-32-04-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

ARO ALL 47-32-04



### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-04-010-003

(2) Go to the filter [1] location.

#### SUBTASK 47-32-04-010-004

(3) Remove the protective covers, STD-7423, from the outlet and inlet duct.

#### SUBTASK 47-32-04-100-001

- (4) Make sure that these components are clean and free from grease, solvents, and unwanted materials:
  - (a) filter [1]
  - (b) filter outlet duct
  - (c) filter inlet duct
  - (d) couplings [3]
  - (e) sleeves [2]
  - (f) fasteners

### SUBTASK 47-32-04-110-001

(5) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-04-110-002

- (6) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) mating surfaces on the filter bracket
  - (b) bonding jumper [7]

#### SUBTASK 47-32-04-420-002

(7) Do these steps to install four new o-rings [6]:

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- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (a) Use Krytox 240AC perfluoropolyether grease, D50063, to lubricate the four o-rings [6].

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(b) Install the o-ring [6] on the o-ring cavities on the filter [1] and the ends of the outlet duct and the inlet duct.

#### SUBTASK 47-32-04-420-003

- (8) Do these steps to install the filter [1]:
  - (a) Apply a thin layer of compound, C00852, to the four bolts [4].
  - (b) Make sure the sleeves [2] are pre-installed on the duct segments.
  - (c) Hold the filter [1] in its position at the filter bracket.
  - (d) Install, but do not tighten, the four bolts [4] and four washers [5].
  - (e) Make sure that the filter [1] is aligned with the outlet duct and inlet duct.
  - (f) Move the sleeves [2] into their positions between the filter [1] and the duct segments.
  - (g) Connect the two couplings [3].
  - (h) Tighten the four bolts to 80  $\pm 2$  in-lb (9.0  $\pm 0.3$  N·m).

#### SUBTASK 47-32-04-420-004

- (9) Do these steps to install the bonding jumper [7]:
  - (a) Install the bonding jumper [7] on the filter base.
  - (b) Connect the bolt [9] and washer [8].

### G. Operational Test for the Filter

#### SUBTASK 47-32-04-860-006

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

### Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-32-04-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the filter [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair any leaks that you find.

### H. Put the Airplane Back to the Usual Condition

### SUBTASK 47-32-04-410-001

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(1) Close this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door
	END OF TASK



### RAM AIR CHECK VALVE - REMOVAL/INSTALLATION

### 1. General

- A. This procedure contains these tasks:
  - (1) Ram Air Check Valve Removal
  - (2) Ram Air Check Valve Installation
- B. The location of the ram air check valve is inboard of the fan, aft of the ram air door actuator (RADA), and forward of the primary heat exchanger.
- C. To get to the ram air check valve, open the Forward Wing to Body Fairing Panel, 191QL.

### TASK 47-32-05-000-801

### 2. Ram Air Check Valve Removal

(Figure 401)

### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### C. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### D. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

### E. Prepare for the Removal

SUBTASK 47-32-05-860-003

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

# Left Power Management Panel, P110

Lott i owor managomont i anoi, i i i o				
Row	<u>Col</u>	<u>Number</u>	<u>Name</u>	
L	9	C47601	NGS CONTROL	

SUBTASK 47-32-05-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

### F. Remove the Ram Air Check Valve

SUBTASK 47-32-05-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

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### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802

#### SUBTASK 47-32-05-010-002

(2) Go to the ram air check valve [1] location.

NOTE: The ram air check valve [1] is on the thermal control unit (TCU) located in the Left Forward Wing to Body Fairing Panel, 191QL, inboard of the fan.

#### SUBTASK 47-32-05-010-003

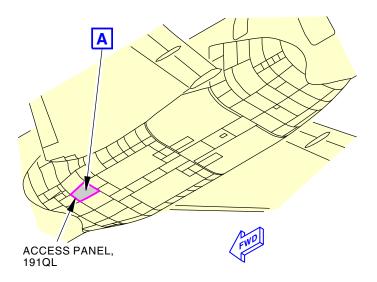
- (3) Do these steps to remove the ram air check valve [1]:
  - (a) Hold the ram air check valve [1] in its position.
  - (b) Remove the bolts [4] and washers [3] that attach the ram air check valve [1] to the ram air duct (14 locations).
  - (c) Disconnect the clamp [5].
  - (d) Move the sleeve [6] away from the ram air check valve [1] onto the ram air duct.
  - (e) Remove the ram air check valve [1] from the TCU.
  - (f) Examine the gasket [2] which remains on the ram air duct for damage or deterioration.
    - 1) Remove and discard the gasket [2] if it has damage or deterioration.

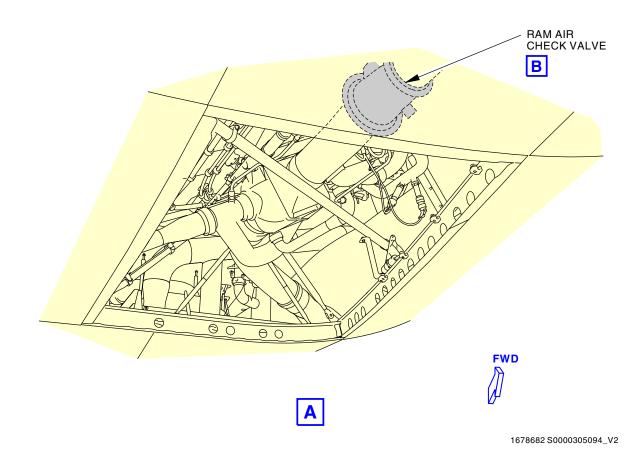
### SUBTASK 47-32-05-420-002

(4) Install protective covers, STD-7423, on the ram air duct.

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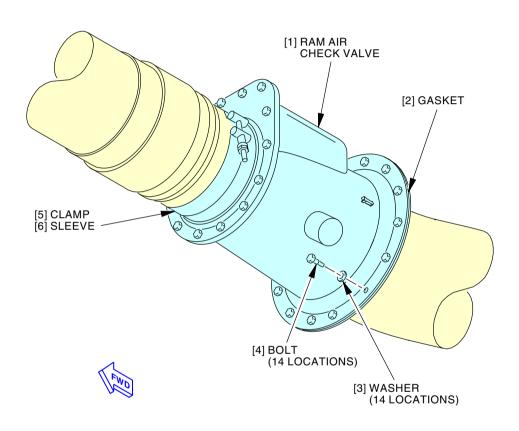
Ram Air Check Valve - Removal and Installation Figure 401/47-32-05-990-801 (Sheet 1 of 2)

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### **RAM AIR CHECK VALVE**



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Ram Air Check Valve - Removal and Installation Figure 401/47-32-05-990-801 (Sheet 2 of 2)

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### TASK 47-32-05-400-801

### 3. Ram Air Check Valve Installation

(Figure 401)

### A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-1064	Scraper - Phenolic, Hard Resin
STD-7423	Cover - Protective Tube

#### C. Consumable Materials

Reference	Description	Specification
A00924	Adhesive - Silicone, Flame Retardant, 1-Part - RTV 133	BAC5010 Type 98
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity	
1	Ram air check valve	Not Specified		

### E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

# F. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

### G. Install the Ram Air Check Valve

SUBTASK 47-32-05-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-05-010-004

(2) Go to the ram air check valve [1] location.

#### SUBTASK 47-32-05-010-005

(3) Remove the protective covers, STD-7423, from ram air duct.

#### SUBTASK 47-32-05-100-001

(4) Make sure the ram air check valve [1], clamp [5], and sleeve [6] are clean and free from grease and unwanted material.

#### SUBTASK 47-32-05-110-001

(5) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-05-420-003

- (6) If you removed the gasket [2], do the steps that follow to install a new gasket [2]:
  - (a) Use a hard resin phenolic scraper, STD-1064, or equivalent to remove the RTV 133 adhesive, A00924, from the ram air duct where you will install the gasket [2].
  - (b) Clean the seal surface with a clean cotton wiper, G00034, that is wet with solvent, B00083.
    - 1) Immediately rub the seal surface dry with a clean cotton wiper, G00034.
  - (c) Apply a layer of the RTV 133 adhesive, A00924, to the mating surfaces of the gasket [2] and the ram air duct.
  - (d) Put the gasket [2] on the ram air duct.

NOTE: Make sure you align all the holes in thegasket [2] with the holes in the ram air duct before the RTV 133 adhesive, A00924, has cured fully.

#### SUBTASK 47-32-05-420-001

- (7) Do these steps to install the ram air check valve [1]:
  - (a) Put the clamp [5] on the ram air duct.
  - (b) Make sure the sleeve [6] is on the ram air duct.
  - (c) Put the ram air check valve [1] in its position.

NOTE: Make sure you align the holes on the ram air check valve [1] with the holes on the gasket [2].

- (d) Install the bolts [4] and washers [3] that attach the ram air check valve [1] to the ram air duct (14 locations).
- (e) Move the sleeve [6] toward the ram air check valve [1] from the ram air duct.
- (f) Connect the clamp [5].

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### H. Operational Test for the Ram Air Check Valve

SUBTASK 47-32-05-860-005

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

<b>Left Power</b>	Management	Panel,	P110
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Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-05-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the ram air check valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair any leaks that you find.

# I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-05-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel
	——— END OF TASK ———
	LID OF TASK



### TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

### 1. General

- A. This procedure contains these tasks:
  - (1) Temperature Control Valve Removal
  - (2) Temperature Control Valve Installation
- B. The location of the temperature control valve is inboard of the ozone converter and outboard of the turbo compressor shutoff valve.
- C. To get to the temperature control valve, open the Forward Wing to Body Fairing Panel, 191QL.

### TASK 47-32-09-000-801

### 2. Temperature Control Valve Removal

(Figure 401)

### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class
		2 Grade C Composition
		MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches	MIL-Y-1140 Class C
	(0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	Form 5

### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

### F. Prepare for the Removal

SUBTASK 47-32-09-860-003

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-09-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

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### G. Remove the Temperature Control Valve

SUBTASK 47-32-09-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-09-010-002

(2) Go to the temperature control valve [1] location.

NOTE: The temperature control valve [1] is on the thermal control unit (TCU) found in the left forward wing to body fairing panel, 191QL, outboard of the primary heat exchanger.

#### SUBTASK 47-32-09-020-005

- (3) Do these steps to remove the insulation blanket from the temperature control valve [1]:
  - (a) Remove the ECC-A fiberglass tape, G51019.
  - (b) Remove the tape, G50789.
  - (c) Remove and keep the insulation blanket for the temperature control valve [1] installation.

#### SUBTASK 47-32-09-010-003

(4) Disconnect the electrical connector [7] from the temperature control valve [1].

### SUBTASK 47-32-09-020-001

- (5) Do these steps to remove the bonding jumper [10]:
  - (a) Remove the sealant from the temperature control valve [1] at the bonding tab location.

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- (b) Remove the bolt [12], washer [11], bonding jumper [10], washer [9], and nut [8].
  - 1) Keep the bolt [12], washer [11], bonding jumper [10], washer [9], and nut [8] for the installation.

### SUBTASK 47-32-09-020-003

- (6) Do these steps to disconnect the temperature control valve [1]:
  - (a) Hold the temperature control valve [1] in its position.
  - (b) Disconnect the sense line [2] from the temperature control valve [1].
  - (c) Disconnect the clamp [4].
    - 1) Remove and discard the o-ring [3].
  - (d) Disconnect the coupling [6].
    - 1) Move the sleeve [5] toward the bleed air inlet duct.
  - (e) Remove the temperature control valve [1].
  - (f) Remove and keep the clamp [4], sleeve [5], and coupling [6] for the installation.

#### SUBTASK 47-32-09-420-005

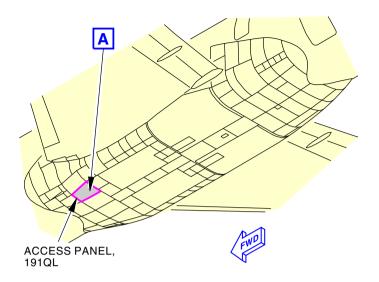
(7) Install protective covers, STD-7423, on the bleed air inlet duct and the bypass flow duct.

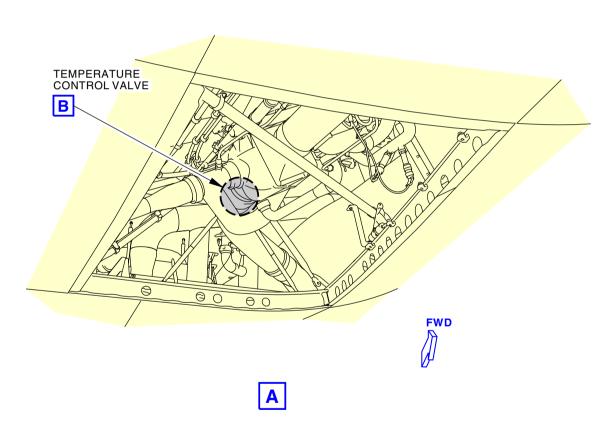
----- END OF TASK -----

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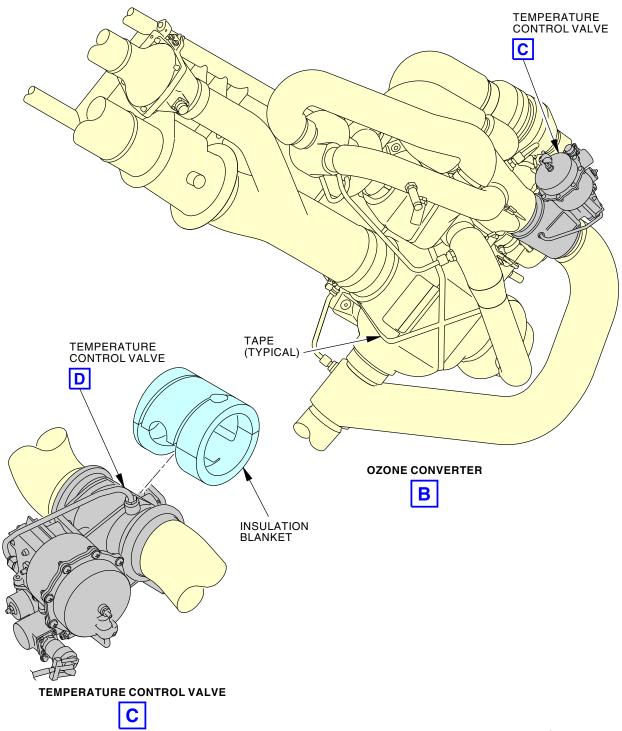
# Temperature Control Valve - Removal and Installation Figure 401/47-32-09-990-801 (Sheet 1 of 3)

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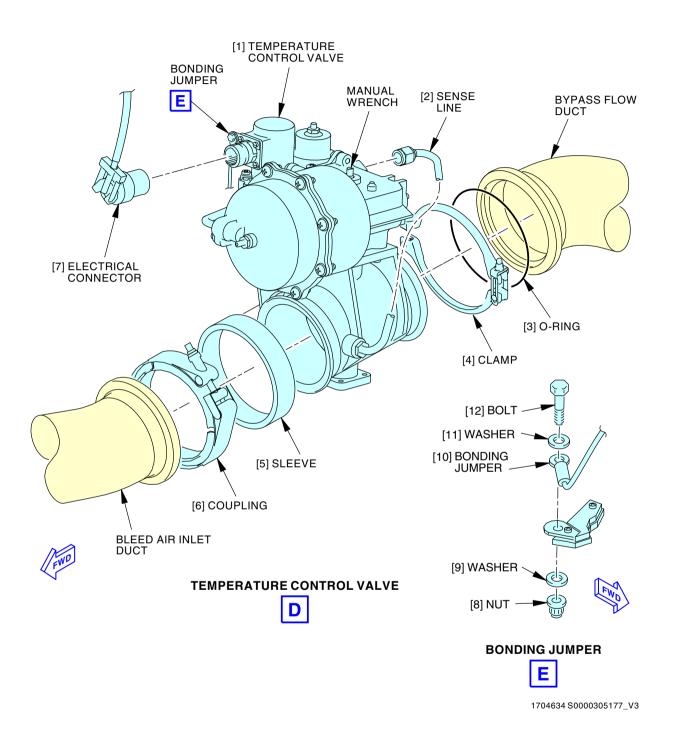
Temperature Control Valve - Removal and Installation Figure 401/47-32-09-990-801 (Sheet 2 of 3)

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Temperature Control Valve - Removal and Installation Figure 401/47-32-09-990-801 (Sheet 3 of 3)

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### TASK 47-32-09-400-801

# 3. Temperature Control Valve Installation

(Figure 401)

### A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

# E. Access Panels

Number	Name/Location	
191QL	Forward Wing To Body Fairing Panel	

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### F. Install the Temperature Control Valve

SUBTASK 47-32-09-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-09-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-32-09-010-004

(3) Go to the temperature control valve [1] location.

NOTE: The temperature control valve [1] is on the thermal control unit (TCU) found in the left forward wing to body fairing panel, 191QL, outboard of the primary heat exchanger.

### SUBTASK 47-32-09-010-005

(4) Remove the protective covers, STD-7423, from the bleed air inlet duct and the bypass flow duct.

#### SUBTASK 47-32-09-210-001

(5) Make sure the flow arrows on the temperature control valve [1] align with the correct flow orientation of the thermal control unit.

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#### SUBTASK 47-32-09-100-001

(6) Make sure the temperature control valve [1], clamp [4], coupling [6], and sleeve [5] are clean and free from grease.

#### SUBTASK 47-32-09-110-001

(7) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-09-160-001

- (8) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) Contact surfaces of the bonding jumper tab on the temperature control valve [1].
  - (b) Contact surfaces of the bonding jumper [10]

#### SUBTASK 47-32-09-860-006

(9) Use the manual wrench to close the valve body on the temperature control valve [1] (if necessary).

#### SUBTASK 47-32-09-420-001

- (10) Do these steps to install the temperature control valve [1]:
  - (a) Put the coupling [6] on the bleed air inlet duct.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (b) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-ring [3].
- (c) Put the o-ring [3] on the bypass flow duct.
- (d) Put the sleeve [5] on the bleed air inlet duct.
- (e) Put the temperature control valve [1] into its position.
- (f) Move the o-ring [3] and the sleeve [5] into their positions on the temperature control valve [1].
- (g) Connect the clamp [4].
- (h) Connect the coupling [6].

#### SUBTASK 47-32-09-420-003

(11) Connect the sense line [2] to the temperature control valve [1].

#### SUBTASK 47-32-09-420-006

- (12) Do these steps to install the bonding jumper to the temperature control valve [1]:
  - (a) Apply a thin layer of compound, C00852, to the bolt [12].
  - (b) Install the bolt [12], washer [11], bonding jumper [10], washer [9], and nut [8] to the bonding tab.

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(c) Tighten the bolt [12] to  $48 \pm 3$  in-lb  $(5 \pm 1 \text{ N} \cdot \text{m})$ .

NOTE: This torque value is in addition to the torque necessary to overcome the self-locking devices.

#### SUBTASK 47-32-09-760-001

- (13) Use the intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the electrical connector [7] shell and the airplane structure.
  - (a) Make sure the electrical resistance between the electrical connector [7] shell and the airplane structure is 0.010 ohm (10 milliohms) or less (SWPM 20-20-00).

#### SUBTASK 47-32-09-390-001

(14) Apply the P/S 890 Class B sealant, A50051, to fully cover the terminal on the bonding jumper [10], bolt [12], washer [11], washer [9], nut [8], and the exposed conversion coating on the bonding tab.

#### SUBTASK 47-32-09-420-004

(15) Connect the electrical connector [7] to the temperature control valve [1].

#### SUBTASK 47-32-09-420-007

- (16) Install the insulation blanket on the temperature control valve [1]:
  - (a) Use the ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the temperature control valve [1].
  - (b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.

### G. Operational Test for the Temperature Control Valve

#### SUBTASK 47-32-09-860-005

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

### Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-09-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the temperature control valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair all leaks that you find.

### H. Put the Airplane Back to the Usual Condition

### SUBTASK 47-32-09-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel
	——— FND OF TASK ———

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### **FAN - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure contains these tasks:
  - (1) Fan Removal
  - (2) Fan Installation
- B. The location of the fan is forward of the turbo compressor and outboard of the ram air check valve.
- C. To get to the fan, open the Forward Wing to Body Fairing Panel, 191QL.

#### TASK 47-32-11-000-801

#### 2. Fan Removal

(Figure 401)

### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### C. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### D. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## E. Prepare for the Removal

SUBTASK 47-32-11-860-003

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL

SUBTASK 47-32-11-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

### F. Remove the Fan

SUBTASK 47-32-11-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

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### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-11-010-002

(2) Go to the fan [1] location.

NOTE: The fan [1] is on the thermal control unit (TCU) found in the left forward wing to body fairing panel, 191QL, outboard of the ram air check valve.

#### SUBTASK 47-32-11-020-001

(3) Disconnect the electrical connector [12] from the fan [1].

#### SUBTASK 47-32-11-020-002

- (4) Do these steps to remove the grounding straps [4] (two locations):
  - (a) Remove the sealant from the fan [1] at the bonding tab location (two locations).
  - (b) Remove the bolt [2], washer [3], grounding strap [4], washer [5], and nut [6].
    - 1) Keep the bolt [2], washer [3], grounding strap [4], washer [5], and nut [6] for the installation.

#### SUBTASK 47-32-11-020-008

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- (5) Do these steps to remove the bonding jumper [9]:
  - (a) Remove the sealant from the fan [1] at the bonding tab location.
  - (b) Remove the bolt [7], washer [8], bonding jumper [9], washer [10], and nut [11].
    - 1) Keep the bolt [7], washer [8], bonding jumper [9], washer [10], and nut [11] for the installation.



#### SUBTASK 47-32-11-020-009

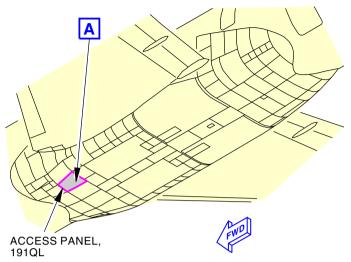
- (6) Do these steps to remove the fan [1]:
  - (a) Hold the fan [1] in its position.
  - (b) Remove the clamp [20] that attaches the fan [1] to the fan air inlet duct.
  - (c) Remove the fan air inlet duct from the fan [1].
  - (d) Remove the bolts [21] and washers [22] that attach the fan [1] to the flange.
  - (e) Remove the fan [1] from the fan air outlet duct.
  - (f) Remove and discard the packing [23] from the fan [1].

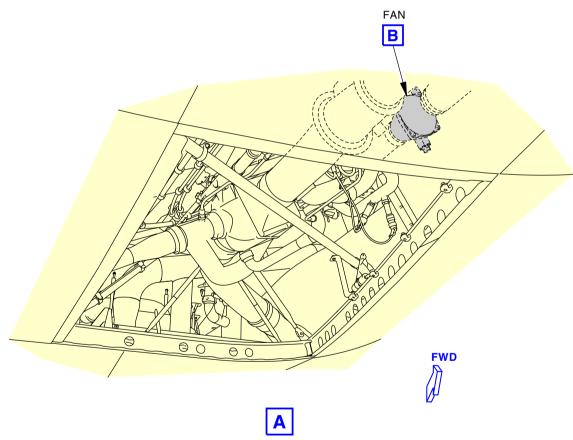
### SUBTASK 47-32-11-420-001

(7) Install protective covers, STD-7423, on the fan air inlet duct and the fan air outlet duct.

——— END OF TASK ———







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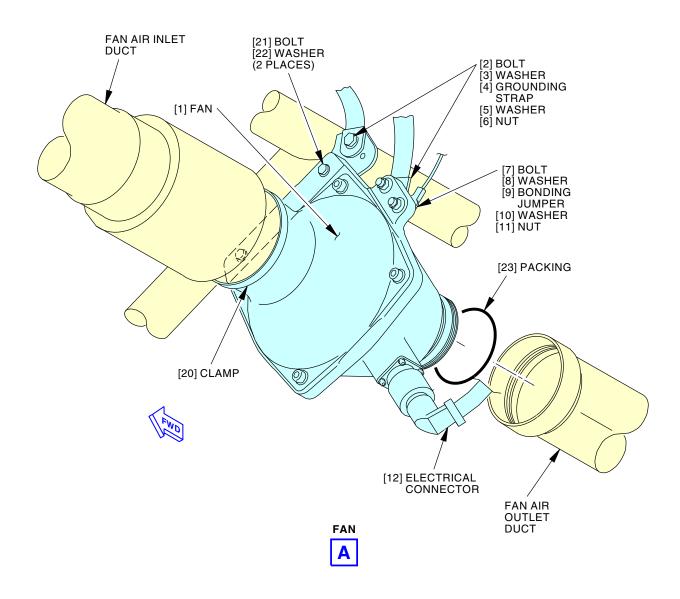
Fan - Removal and Installation Figure 401/47-32-11-990-801 (Sheet 1 of 2)

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# Fan - Removal and Installation Figure 401/47-32-11-990-801 (Sheet 2 of 2)

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### TASK 47-32-11-400-801

### 3. Fan Installation

(Figure 401)

### A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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).
OTD 7400	Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan	47-32-11-01-020	ARO ALL
23	Packing	47-32-11-01-015	ARO ALL

### E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### F. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

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#### G. Install the Fan

SUBTASK 47-32-11-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-32-11-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

SUBTASK 47-32-11-410-001

(3) Go to the fan [1] location on the TCU.

SUBTASK 47-32-11-020-007

(4) Remove the protective covers, STD-7423, from the fan air inlet duct and the fan air outlet duct.

SUBTASK 47-32-11-100-001

(5) Make sure the fan [1] and clamp [20] are clean and free from grease.

SUBTASK 47-32-11-110-001

(6) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

SUBTASK 47-32-11-160-001

(7) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):

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- (a) Contact surfaces of the bonding jumper [9] tab on the fan [1].
- (b) Contact surfaces of the bonding jumper [9]
- (c) Contact surfaces of the grounding strap [4] tabs on the fan [1] (two locations).
- (d) Contact surfaces of the grounding straps [4] (two locations).

#### SUBTASK 47-32-11-420-008

(8) Do these steps to install the fan [1]:

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063 to the new packing [23].
- (b) Install the new packing [23] on the fan.
- (c) Put the fan [1] in its position.
- (d) Install the fan outlet end into the fan air outlet duct.
- (e) Apply a thin layer of compound, C00852 on the threads of bolts [21].
- (f) Install the bolts [21] and washers [22] to attach the fan [1] to the flange.



FRICTIONAL TORQUE VALUES OR RUNDOWN RESISTANCE MUST BE ADDED TO SPECIFIED TORQUE.

- 1) Torque the bolts [21] to 112 in-lb (12.7 N·m)-125 in-lb (14.1 N·m).
- (g) Install the fan air inlet duct to the inlet of the fan [1].
- (h) Install the clamp [20].
  - 1) Torque the clamp [20] to 10 in-lb (1.1 N·m)-15 in-lb (1.7 N·m).

#### SUBTASK 47-32-11-420-006

- (9) Do these steps to install the grounding straps [4] to the fan [1] (two locations):
  - (a) Apply a thin layer of compound, C00852, to the bolt [2].
  - (b) Install the bolt [2], washer [3], grounding strap [4], washer [5], and nut [6] to the bonding tab.
  - (c) Tighten the bolt [2].

#### SUBTASK 47-32-11-420-007

- (10) Do these steps to install the bonding jumper [9] to the fan [1]:
  - (a) Apply a thin layer of compound, C00852, to the bolt [7].

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- (b) Install the bolt [7], washer [8], bonding jumper [9], washer [10], and nut [11] to the bonding tab.
- (c) Tighten the bolt [7].

#### SUBTASK 47-32-11-760-001

- Use the intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the fan [1] and the airplane structure.
  - Make sure the electrical resistance between the fan [1] and the airplane structure is 0.0002 ohm (0.2 milliohm) or less (SWPM 20-20-00).

#### SUBTASK 47-32-11-390-001

Apply the P/S 890 Class B sealant, A50051, to fully cover the terminal on the bolt [7], washer [8], bonding jumper [9], washer [10], nut [11], and the exposed conversion coating on the bonding tab.

#### SUBTASK 47-32-11-390-002

(13) Apply the P/S 890 Class B sealant, A50051, to fully cover the terminal on the bolt [2], washer [3], grounding strap [4], washer [5], nut [6], and the exposed conversion coating on the bonding tab (two locations).

#### SUBTASK 47-32-11-420-005

(14) Connect the electrical connector [12] to the fan [1].

### H. Operational Test for the Fan

#### SUBTASK 47-32-11-860-005

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tags and close these circuit breakers:

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
Н	10	C47301	NGS FAN
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-11-790-001

- Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the fan [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair all leaks that you find.

### I. Put the Airplane Back to the Usual Condition

### SUBTASK 47-32-11-410-002

(1) Close this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel
	——— END OF TASK ———



### **REGENERATIVE HEAT EXCHANGER - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
  - (1) Regenerative Heat Exchanger Removal
  - (2) Regenerative Heat Exchanger Installation
- C. The location of the regenerative heat exchanger is on the thermal control unit (TCU), between the turbocompressor and the primary heat exchanger.
- D. To get to the regenerative heat exchanger, open the Forward Wing to Body Fairing Panel, 191QL.

### TASK 47-32-14-000-801

# 2. Regenerative Heat Exchanger Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-32-03-000-802	Heat Exchanger Removal (P/B 401)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition
		MPEEK

### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

### F. Prepare for the Removal

SUBTASK 47-32-14-860-003

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

Left Power	Managemen	t Pane	I, P110
------------	-----------	--------	---------

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

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#### SUBTASK 47-32-14-010-001

(2) Open this access panel:

Number Name/Location

191QL Forward Wing To Body Fairing Panel

### G. Remove the Regenerative Heat Exchanger

SUBTASK 47-32-14-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-14-010-002

(2) Go to the regenerative heat exchanger [1] location.

NOTE: The location of the regenerative heat exchanger [1] is on the thermal control unit (TCU) between the turbo compressor and the primary heat exchanger.

#### SUBTASK 47-32-14-010-003

(3) Do this task: Heat Exchanger Removal, TASK 47-32-03-000-802.

#### SURTASK 47-32-14-020-009

- (4) Do these steps to remove the insulation blanket from the regenerative heat exchanger [1]:
  - (a) Remove the ties.
  - (b) Remove the tape, G50789.

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(c) Remove and keep the insulation blanket for the regenerative heat exchanger [1] installation.

#### SUBTASK 47-32-14-020-001

- (5) Do these steps to disconnect the regenerative heat exchanger [1]:
  - (a) Disconnect the coupling [5] from the compressor inlet duct [4].
    - 1) Move the sleeve [2] away from the regenerative heat exchanger [1].
    - 2) Discard the o-rings [3].
  - (b) Disconnect the coupling [7] from the regenerative heat exchanger exhaust duct [6].
    - 1) Move the sleeve [9] away from the regenerative heat exchanger [1].
    - 2) Discard the o-rings [8].
  - (c) Disconnect the coupling [10] from the bleed air inlet duct.
    - 1) Move the sleeve [12] away from the regenerative heat exchanger [1].
    - 2) Discard the o-rings [11].

#### SUBTASK 47-32-14-020-007

(6) Remove the bolt [15], flat washer [14], and believille washers [13] from the regenerative heat exchanger [1].

#### SUBTASK 47-32-14-020-008

(7) Remove the bolts [17] from the regenerative heat exchanger [1] (two locations).

NOTE: Make sure to support the regenerative heat exchanger [1], while removing the bolts [17].

#### SUBTASK 47-32-14-020-003

(8) Remove the regenerative heat exchanger [1].

### SUBTASK 47-32-14-020-010

(9) Discard o-ring [16].

#### SUBTASK 47-32-14-420-001

- (10) Install protective covers, STD-7423, on these components:
  - (a) regenerative heat exchanger exhaust duct [6]
  - (b) bleed air inlet duct
  - (c) compressor outlet duct
  - (d) compressor inlet duct [4].

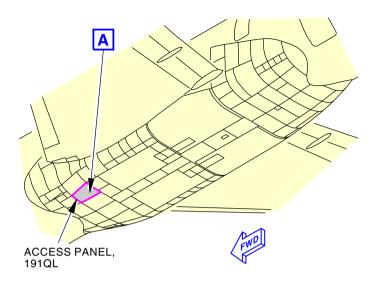
——— END OF TASK ———

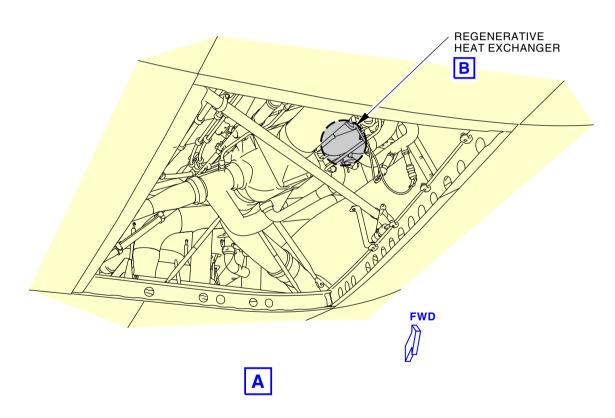
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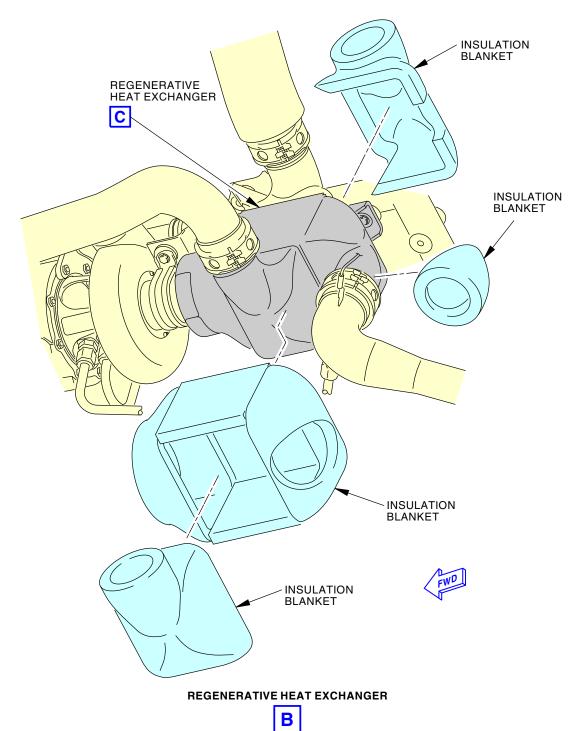
# Regenerative Heat Exchanger - Removal and Installation Figure 401/47-32-14-990-801 (Sheet 1 of 4)

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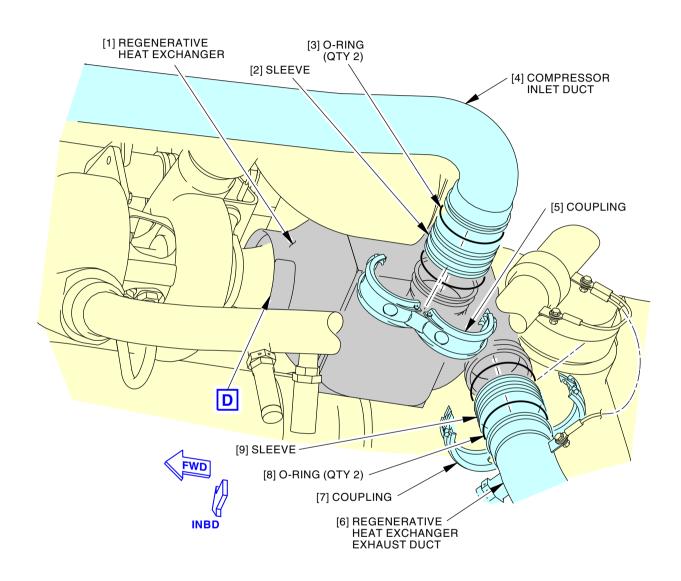
Regenerative Heat Exchanger - Removal and Installation Figure 401/47-32-14-990-801 (Sheet 2 of 4)

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REGENERATIVE HEAT EXCHANGER (INSULATION BLANKET NOT SHOWN)



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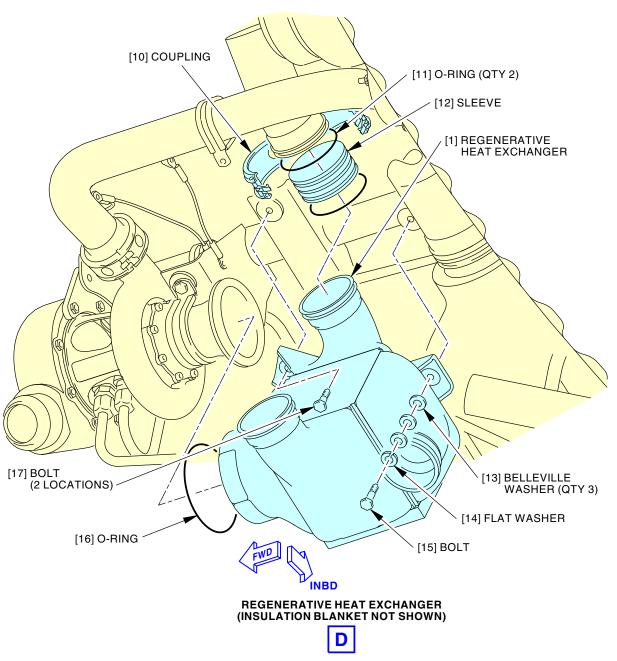
Regenerative Heat Exchanger - Removal and Installation Figure 401/47-32-14-990-801 (Sheet 3 of 4)

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Regenerative Heat Exchanger - Removal and Installation Figure 401/47-32-14-990-801 (Sheet 4 of 4)

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## TASK 47-32-14-400-801

## 3. Regenerative Heat Exchanger Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
47-32-03-400-802	Heat Exchanger Installation (P/B 401)

## B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

## D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Regenerative heat exchanger	47-32-14-01-080	ARO ALL
3	O-ring	47-32-00-01-325	ARO ALL
8	O-ring	47-32-00-01-395	ARO ALL
11	O-ring	47-32-02-01-205	ARO ALL
16	O-ring	47-32-14-01-017	ARO ALL

## E. Location Zones

Zone	Alta
191	Forward Wing-to-Body Fairings, Left

## F. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

ARO ALL

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## G. Install the Regenerative Heat Exchanger

SUBTASK 47-32-14-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-14-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

## SUBTASK 47-32-14-860-005

(3) Go to the regenerative heat exchanger [1] location on the TCU.

NOTE: The location of the regenerative heat exchanger [1] is on the TCU between the turbocompressor and the primary heat exchanger.

#### SUBTASK 47-32-14-020-005

(4) Remove the protective covers, STD-7423, from the bleed air inlet duct, regenerative heat exchanger exhaust duct [6], compressor inlet duct [4], and compressor outlet duct.

#### SUBTASK 47-32-14-210-001

(5) Make sure that the bleed air inlet duct, compressor inlet duct [4], compressor outlet duct, regenerative heat exchanger exhaust duct [6], and couplings are clean and free from grease and unwanted material.

ARO ALL



(a) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-14-420-002

- (6) Do these steps to install the regenerative heat exchanger [1] to the TCU pallet frame:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to these o-rings:
    - 1) o-rings [3] (qty 2)
    - 2) o-rings [8] (qty 2)
    - 3) o-rings [11] (qty 2)
    - 4) o-ring [16] (qty 1).
  - (b) Install the o-ring [16] on the turbo compressor.
  - (c) Install the o-ring [3], o-ring [8], and o-ring [11] on the regenerative heat exchanger [1].
  - (d) Install the o-ring [3] on the compressor inlet duct [4].
  - (e) Slide the sleeve [2] on the compressor inlet duct [4].
  - (f) Install the o-ring [8] on the regenerative heat exchanger exhaust duct [6].
  - (g) Slide the sleeve [9] on the regenerative heat exchanger exhaust duct [6].
  - (h) Install the o-ring [11] on the bleed air inlet duct.
  - (i) Slide the sleeve [12] on the bleed air inlet duct.
  - (j) Align the regenerative heat exchanger [1] on the TCU pallet.
  - (k) Apply a thin layer of lubrication compound, C00852, to these bolts:
    - 1) bolt [15]
    - 2) bolts [17].
  - (I) Install, but do not fully tighten, the three belleville washers [13], flat washer [14], and bolt [15] to the regenerative heat exchanger [1].
    - NOTE: Install thebelleville washers [13] with the convex side up. Do not fully tighten the bolt [15] until after you install the couplings.
  - (m) Install, but do not fully tighten, the bolts [17] to the regenerative heat exchanger [1].

#### SUBTASK 47-32-14-420-003

- (7) Do these steps to connect the regenerative heat exchanger [1]:
  - (a) Move the sleeve [2], sleeve [9], and sleeve [12] into their positions on the regenerative heat exchanger [1]:
  - (b) Connect the coupling [5], coupling [7], and coupling [10].

#### SUBTASK 47-32-14-420-005

(8) Tighten the bolts [17].

#### SUBTASK 47-32-14-420-004

- (9) Do these steps to tighten the bolt [15]:
  - (a) Tighten the bolt [15] until the three belleville washers [13] are in a flat condition.
  - (b) After the belleville washers [13] are flat, loosen the bolt [15] one quarter turn.

#### SUBTASK 47-32-14-400-001

- (10) Install the insulation blanket on the regenerative heat exchanger [1]:
  - (a) Use ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the regenerative heat exchanger [1].

ARO ALL



(b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.

SUBTASK 47-32-14-410-002

(11) Do this task: Heat Exchanger Installation, TASK 47-32-03-400-802.

## H. Operational Test for the Regenerative Heat Exchanger

SUBTASK 47-32-14-860-006

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

Left Power Management Panel, P110
-----------------------------------

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-14-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the regenerative heat exchanger [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair all leaks that you find.
- I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-14-410-001

· EFFECTIVITY -

**ARO ALL** 

(1) Close this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel
	END OF TASK



## TURBO COMPRESSOR - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) Turbo Compressor Removal
  - (2) Turbo Compressor Installation
- B. The location of the turbo compressor is on the thermal control unit (TCU), forward of the regenerative heat exchanger and outboard of the ram air duct.
- C. To get to the turbo compressor, open the Forward Wing to Body Fairing Panel, 191QL.

## TASK 47-32-15-000-801

## 2. Turbo Compressor Removal

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK

## D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## F. Prepare for the Removal

SUBTASK 47-32-15-860-003

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

## Left Power Management Panel, P110

<u>Row</u>	<u>Col</u>	<u>number</u>	<u>name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-15-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

ARO ALL



## G. Remove the Turbo Compressor

SUBTASK 47-32-15-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-15-010-002

(2) Go to the turbo compressor [1] location.

<u>NOTE</u>: The location of the turbo compressor [1] is on the thermal control unit (TCU) between the regenerative heat exchanger and the fan.

#### SUBTASK 47-32-15-020-007

- (3) Do these steps to remove the insulation blanket from the turbo compressor [1]:
  - (a) Remove the ties.
  - (b) Remove the tape, G50789.
  - (c) Remove and keep the insulation blanket for the turbo compressor [1] installation.

#### SUBTASK 47-32-15-020-001

- (4) Do these steps to disconnect the turbo compressor [1]:
  - (a) Disconnect the coupling [5] from the turbine inlet duct [6].
    - 1) Move the sleeve [4] away from the turbo compressor [1].
    - 2) Discard the o-rings [3].

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- (b) Disconnect the coupling [11] from the compressor outlet duct [8].
  - 1) Move the sleeve [10] away from the turbo compressor [1].
  - 2) Discard the o-rings [9].
- (c) Disconnect the coupling [14] from the compressor inlet duct [2].
  - 1) Move the sleeve [13] away from the turbo compressor [1].
  - 2) Discard the o-rings [12].

#### SUBTASK 47-32-15-020-002

(5) Disconnect the tube [25] and tube [24].

#### SUBTASK 47-32-15-020-008

(6) Remove the upper clamp [22].

#### SUBTASK 47-32-15-020-009

(7) Remove the screws [21] and washers [20].

#### SUBTASK 47-32-15-020-004

(8) Remove the bolts [17], washers [16], and nuts [15] from the turbo compressor [1] (four locations).

NOTE: Make sure to support the turbo compressor [1], while you remove the bolts [17].

#### SUBTASK 47-32-15-020-005

(9) Remove the turbo compressor [1].

#### SUBTASK 47-32-15-020-011

(10) Remove and discard the o-ring [23].

#### SUBTASK 47-32-15-020-010

(11) Remove the lower clamp [19].

#### SUBTASK 47-32-15-420-001

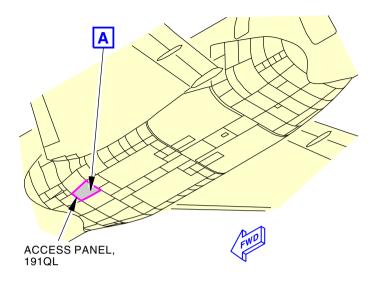
- (12) Install protective covers, STD-7423, on these components:
  - (a) compressor inlet duct [2]
  - (b) turbine inlet duct [6]
  - (c) compressor outlet duct [8]
  - (d) turbine outlet duct [18]

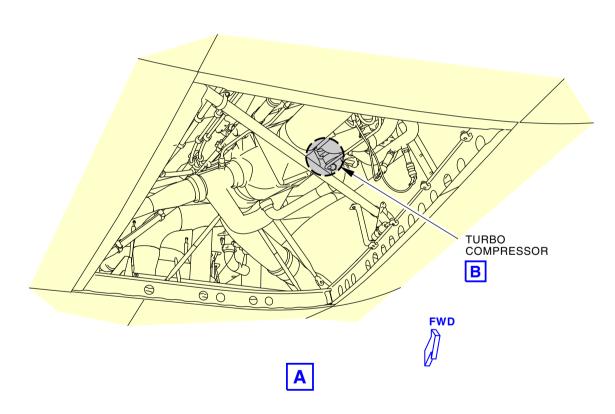
------ END OF TASK ------

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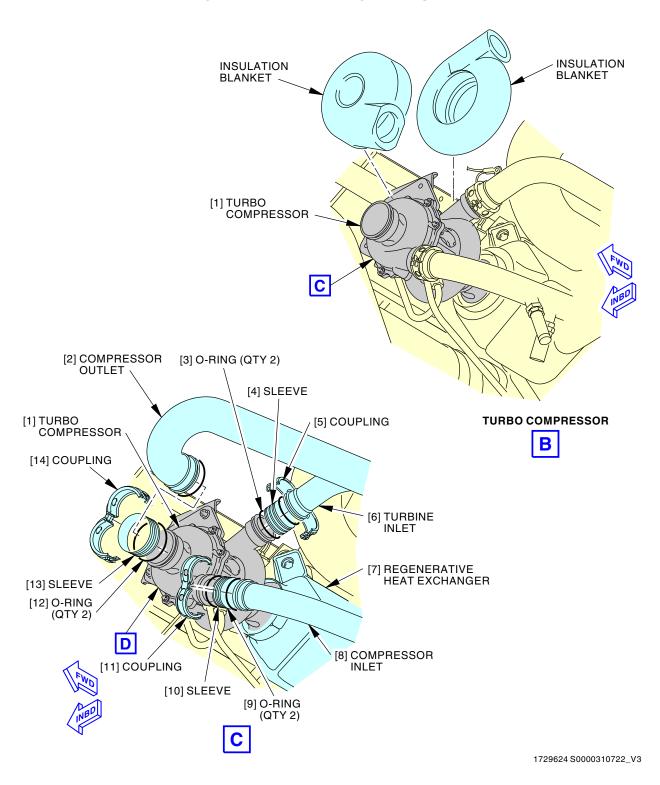
Turbo Compressor - Removal and Installation Figure 401/47-32-15-990-801 (Sheet 1 of 3)

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Turbo Compressor - Removal and Installation

Figure 401/47-32-15-990-801 (Sheet 2 of 3)

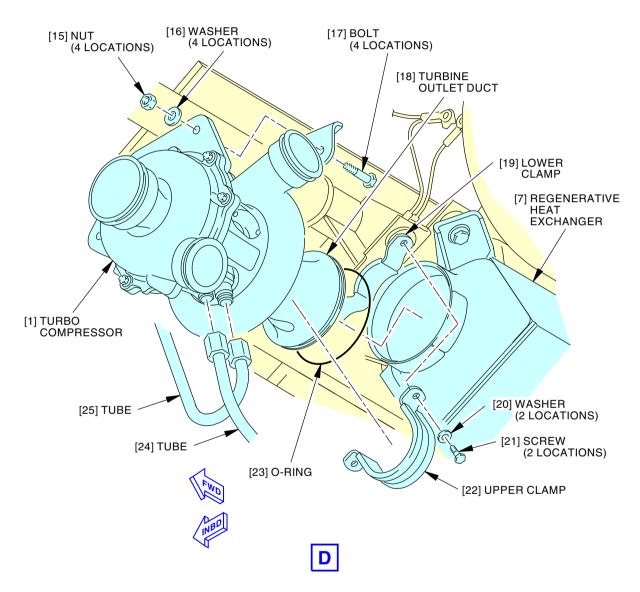
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Turbo Compressor - Removal and Installation Figure 401/47-32-15-990-801 (Sheet 3 of 3)

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## TASK 47-32-15-400-801

## 3. Turbo Compressor Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

## C. Consumable Materials

Reference	Description	Specification
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

## D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Turbo compressor	47-32-15-01-050	ARO ALL
23	O-ring	47-32-14-01-017	ARO ALL

## E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## F. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## G. Install the Turbo Compressor

SUBTASK 47-32-15-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

ARO ALL



#### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-15-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

## SUBTASK 47-32-15-860-005

(3) Go to the turbo compressor [1] location on the TCU.

<u>NOTE</u>: The location of the turbo compressor [1] is on the TCU between the regenerative heat exchanger and the fan.

#### SUBTASK 47-32-15-020-006

(4) Remove the protective covers, STD-7423, from the compressor inlet duct [2], turbine inlet duct [6], compressor outlet duct [8], and turbine outlet duct [18].

#### SUBTASK 47-32-15-210-001

- (5) Make sure that the compressor inlet duct [2], turbine inlet duct [6], compressor outlet duct [8], turbine outlet duct [18], and couplings are clean and free from grease and unwanted material.
  - (a) To clean the components, do this task: General Cleaning of Metal (Series 80), TASK 20-30-80-910-801.

#### SUBTASK 47-32-15-420-002

- (6) Do these steps to install the turbo compressor [1] to the TCU pallet frame:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to these o-rings:
    - 1) o-rings [3] (qty 2)
    - 2) o-rings [9] (qty 2)

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- 3) o-rings [12] (qty 2)
- 4) o-ring [23] (qty 1).
- (b) Install the o-ring [3], o-ring [9], o-ring [12], and new o-ring [23] on the turbo compressor [1].
- (c) Install the o-ring [3] on the turbine inlet duct [6].
- (d) Slide the sleeve [4] on the turbine inlet duct [6].
- (e) Install the o-ring [9] on the compressor outlet duct [8].
- (f) Slide the sleeve [10] on the compressor outlet duct [8].
- (g) Install the o-ring [12] on the compressor inlet duct [2].
- (h) Install o-ring [23] on the turbine outlet duct [18].
- (i) Slide the sleeve [13] on the compressor inlet duct [2].
- (j) Align the lower clamp [19] on the TCU pallet.
- (k) Align the turbo compressor [1] on the TCU pallet.
- (I) Apply a thin layer of lubrication compound, C00852, to the bolts [17] (qty 4).
- (m) Install the nuts [15], washers [16], and bolts [17] that attach the turbo compressor [1] to the TCU pallet (four locations).
- (n) Install the screws [21] and washers [20] to attach the upper clamp [22] and lower clamp [19] to the TCU pallet.

#### SUBTASK 47-32-15-420-003

- (7) Do these steps to connect the turbo compressor [1]:
  - (a) Move the sleeve [4], sleeve [10], and sleeve [13] into their positions on the turbo compressor [1]:
  - (b) Connect the coupling [5], coupling [11], and coupling [14].
  - (c) Connect the tube [24], and tube [25].

#### H. Operational Test for the Turbo Compressor

#### SUBTASK 47-32-15-860-006

- (1) Prepare the airplane for the operational test:
  - (a) Remove the safety tag and close this circuit breaker:

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-15-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the turbo compressor [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair all leaks that you find.

#### SUBTASK 47-32-15-420-004

- (3) Install the insulation blanket on the turbo compressor [1]:
  - (a) Use ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the turbo compressor [1].

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- (b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.
- I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-15-410-001

(1) Close this access panel:

NumberName/Location191QLForward Wing To Body Fairing Panel

----- END OF TASK ------

ARO ALL 47-32-15



#### TURBO COMPRESSOR CHECK VALVE - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) Turbo Compressor Check Valve Removal
  - (2) Turbo Compressor Check Valve Installation
- B. The location of the turbo compressor check valve is on the thermal control unit (TCU), forward of the turbo compressor shutoff valve and inboard of the ozone converter.
- C. To get to the turbo compressor check valve, open the Forward Wing to Body Fairing Panel, 191QL.

## TASK 47-32-16-000-801

## 2. Turbo Compressor Check Valve Removal

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

#### C. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## D. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## E. Prepare for the Removal

SUBTASK 47-32-16-860-003

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-32-16-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

## F. Remove the Turbo Compressor Check Valve

SUBTASK 47-32-16-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

ARO ALL



#### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-16-010-002

(2) Go to the turbo compressor check valve [1] location.

NOTE: The location of the turbo compressor check valve [1] is on the thermal control unit (TCU) forward of the turbo compressor shutoff valve and inboard of the ozone converter.

#### SUBTASK 47-32-16-020-001

- (3) Do these steps to remove the turbo compressor check valve [1]:
  - (a) Disconnect the clamp [3] on the bleed air duct.

NOTE: Keep the clamp [3] for the installation.

- (b) Separate the bleed air inlet duct [5] and outlet duct [2].
- (c) Remove the turbo compressor check valve [1].
  - 1) Discard the seal ring [4].

## SUBTASK 47-32-16-420-001

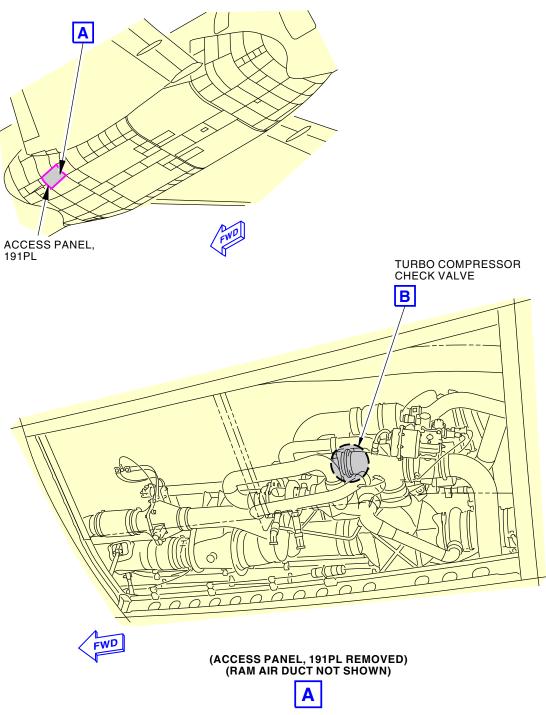
· EFFECTIVITY

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(4) Install protective covers, STD-7423, on the bleed air inlet duct [5] and outlet duct [2].

----- END OF TASK -----





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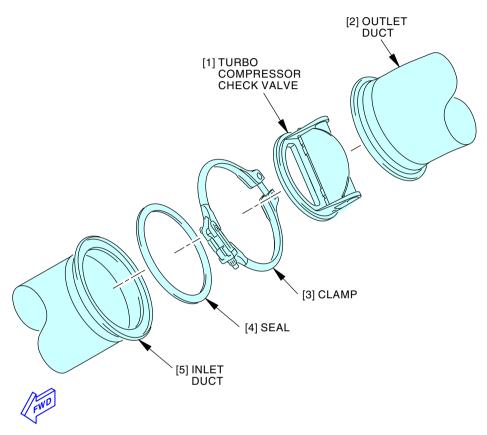
Turbo Compressor - Removal and Installation Figure 401/47-32-16-990-801 (Sheet 1 of 2)

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TURBO COMPRESSOR CHECK VALVE



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Turbo Compressor - Removal and Installation Figure 401/47-32-16-990-801 (Sheet 2 of 2)

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#### TASK 47-32-16-400-801

## 3. Turbo Compressor Check Valve Installation

(Figure 401)

#### A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

## D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## F. Prepare for the Installation

SUBTASK 47-32-16-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-32-16-860-005

(2) Go to the turbo compressor check valve [1] location on the TCU.

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#### SUBTASK 47-32-16-010-003

- (3) Remove the protective covers, STD-7423, from the bleed air inlet duct [5] and outlet duct [2]. SUBTASK 47-32-16-110-001
- (4) Make sure the bleed air inlet duct [5], outlet duct [2], and clamp [3] are clean and free from grease and unwanted material (TASK 20-30-80-910-801).

## G. Install the Turbo Compressor Check Valve

SUBTASK 47-32-16-420-003

- (1) Do these steps to install the turbo compressor check valve [1]:
  - (a) Install the seal ring [4].
  - (b) Install the turbo compressor check valve [1].
  - (c) Put the clamp [3] on the bleed air outlet duct [2].
  - (d) Align the bleed air inlet duct [5] and outlet duct [2].
  - (e) Connect the clamp [3].

## H. Operational Test for the Turbo Compressor Check Valve

SUBTASK 47-32-16-860-006

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-16-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the turbo compressor check valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

#### I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-16-420-002

(1) Close this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel
	END OF TASK

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· EFFECTIVITY ·



## TURBO COMPRESSOR SHUTOFF VALVE - REMOVAL/INSTALLATION

## 1. General

- A. This procedure has these tasks:
  - (1) Turbo Compressor Shutoff Valve Removal
  - (2) Turbo Compressor Shutoff Valve Installation
- B. The location of the turbo compressor shutoff valve is on the thermal control unit (TCU), between the primary heat exchanger the temperature control valve.
- C. To get to the turbo compressor shutoff valve, open the Forward Wing to Body Fairing Panel, 191QL.

## TASK 47-32-17-000-801

## 2. Turbo Compressor Shutoff Valve Removal

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class
		2 Grade C Composition
		MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches	MIL-Y-1140 Class C
	(0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	Form 5

## D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

## F. Prepare for the Removal

SUBTASK 47-32-17-860-003

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

## Left Power Management Panel, P110

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL
L	10	C47602	NGS 28V DC POWER

## SUBTASK 47-32-17-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

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## G. Remove the Turbo Compressor Shutoff Valve

SUBTASK 47-32-17-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-32-17-010-002

(2) Go to the turbo compressor shutoff valve [1] location.

NOTE: The location of the turbo compressor shutoff valve [1] is on the thermal control unit (TCU) inboard of the temperature control valve and aft of the primary heat exchanger.

#### SUBTASK 47-32-17-020-007

- (3) Do these steps to remove the insulation blanket from the turbo compressor shutoff valve [1]:
  - (a) Remove the ECC-A fiberglass tape, G51019.
  - (b) Remove the tape, G50789.
  - (c) Remove and keep the insulation blanket for the turbo compressor shutoff valve [1] installation.

#### SUBTASK 47-32-17-020-006

(4) Do these steps to remove the turbo compressor shutoff valve [1]:

NOTE: Keep the clamp [4] and coupling [14] for the installation.

(a) Disconnect the electrical connector [9] from the turbo compressor shutoff valve [1].

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- (b) Remove the bolt [7], washers [3], and nut [2] to disconnect the bonding jumper [8].
  - 1) Keep the bolt [7], washers [3], and nut [2] for the installation.
- (c) Disconnect the coupling [14] from between the bleed air inlet duct [13] and the turbo compressor shutoff valve [1].
  - 1) Keep the sleeve [11] for the installation.
  - 2) Discard the o-ring [10] and o-ring [12].
- (d) Hold the turbo compressor shutoff valve [1] in its position.
- (e) Disconnect the clamp [4] from between the turbo compressor shutoff valve [1] and the outlet duct [6].
  - 1) Discard the o-ring [5].
- (f) Remove the turbo compressor shutoff valve [1].

SUBTASK 47-32-17-420-001

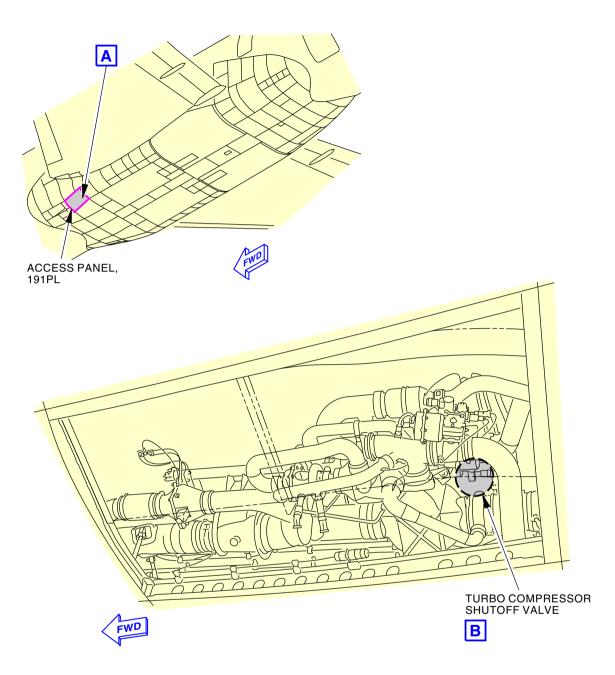
(5) Install protective covers, STD-7423, on the bleed air inlet duct [13] and the outlet duct [6].

——— END OF TASK ———

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(ACCESS PANEL, 191PL REMOVED) (RAM AIR DUCT NOT SHOWN)



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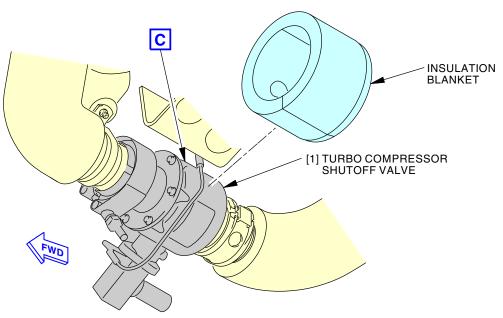
Turbo Compressor Shutoff Valve - Removal and Installation Figure 401/47-32-17-990-801 (Sheet 1 of 2)

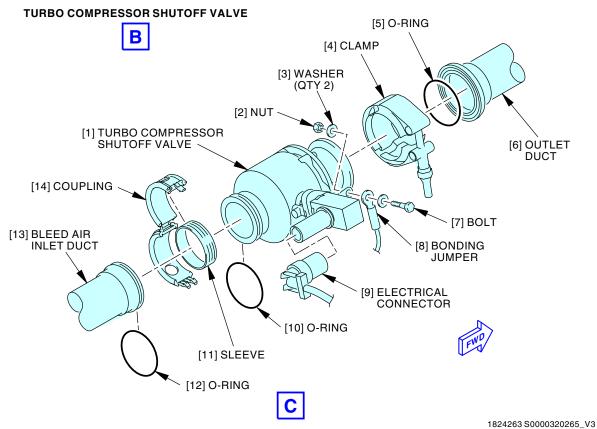
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Turbo Compressor Shutoff Valve - Removal and Installation Figure 401/47-32-17-990-801 (Sheet 2 of 2)

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## TASK 47-32-17-400-801

## 3. Turbo Compressor Shutoff Valve Installation

(Figure 401)

## A. References

Reference	Title
20-30-80-910-801	General Cleaning of Metal (Series 80) (P/B 201)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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).
OTD 7400	Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
STD-7423	Cover - Protective Tube

## C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - P/S 890 Class B Fuel Tank Sealant	SAE AMS-S-8802 Class B
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50789	Tape - Adhesive Insulation Blanket	BMS5-157 Type I Class 2 Grade C Composition MPEEK
G51019	Tape - ECC-A fiberglass tape, 0.005 Inches (0.127 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

## D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

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## F. Prepare for the Installation

SUBTASK 47-32-17-860-008



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-32-17-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (2) Obey the Krytox 240AC perfluoropolyether grease, D50063, precautions when you assemble and disassemble NGS components.

## SUBTASK 47-32-17-860-007

(3) Go to the turbo compressor shutoff valve [1] location on the TCU.

#### SUBTASK 47-32-17-010-004

(4) Remove the protective covers, STD-7423, from the bleed air inlet duct [13] and the outlet duct [6].

#### SUBTASK 47-32-17-160-001

(5) Remove the sealant from the bonding jumper [8], fasteners, and the bonding jumper tab.

#### SUBTASK 47-32-17-110-001

(6) Make sure that the bleed air inlet duct [13], outlet duct [6], bonding jumper [8], coupling [14], and clamp [4] are clean and free from grease and unwanted material (TASK 20-30-80-910-801).

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#### SUBTASK 47-32-17-760-001

- (7) Prepare the contact surfaces of these components for an electrical faying surface bond (SWPM 20-20-00):
  - (a) bonding jumper tab
  - (b) outlet duct [6]
  - (c) bleed air inlet duct [13]
  - (d) turbo compressor shutoff valve [1]

#### SUBTASK 47-32-17-420-007

- (8) Do these steps to install the o-ring [10] and o-ring [12] on the inlet side of the turbo compressor shutoff valve [1]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to o-ring [10] and o-ring [12].
  - (b) Put the o-ring [10] in the cavity on the turbo compressor shutoff valve [1].
  - (c) Put the o-ring [12] in the cavity on the bleed air inlet duct [13].

#### SUBTASK 47-32-17-420-008

- (9) Do these steps to install the new o-ring [5] on the outlet side of the turbo compressor shutoff valve [1]:
  - (a) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the o-ring [5].
  - (b) Put the o-ring [5] in the cavity on the outlet duct [6].

## G. Install the Turbo Compressor Shutoff Valve

#### SUBTASK 47-32-17-420-003

- (1) Do these steps to install the turbo compressor shutoff valve [1]:
  - (a) Align the turbo compressor shutoff valve [1] on the TCU pallet.
  - (b) Attach, but do not fully tighten the turbo compressor shutoff valve [1] to the outlet duct [6] with the clamp [4].
  - (c) Install the sleeve [11].
  - (d) Connect the coupling [14] between the turbo compressor shutoff valve [1] and the bleed air inlet duct [13].

#### SUBTASK 47-32-17-420-004

- (2) Do these steps to install the bonding jumper [8] to the turbo compressor shutoff valve [1]:
  - (a) Apply a thin layer of compound, C00852, to the bolt [7].
  - (b) Connect the bonding jumper [8] to the turbo compressor shutoff valve [1] with the bolt [7], washers [3], and nut [2].

#### SUBTASK 47-32-17-760-002

- (3) Measure the electrical bonding resistance between theturbo compressor shutoff valve [1] and the airplane structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the resistance is 0.008 ohm (8 milliohms) or less.
  - (b) Apply a cap seal of P/S 890 Class B sealant, A50051, to the terminal, fasteners, and bare conversion coated areas.

#### SUBTASK 47-32-17-420-005

(4) Connect the electrical connector [9] to the turbo compressor shutoff valve [1].

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#### SUBTASK 47-32-17-420-009

- (5) Install the insulation blanket on the turbo compressor shutoff valve [1]:
  - (a) Use ties (ECC-A fiberglass tape, G51019) to hold the insulation blanket to the turbo compressor shutoff valve [1].
  - (b) Use the tape, G50789, to seal the seams and corners of the insulation blanket.

## H. Operational Test for the Turbo Compressor Shutoff Valve

SUBTASK 47-32-17-860-005

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

Left Power	Managemen	t Panel. P110
Tell OME	Manadelliel	it i ali <del>c</del> i. I liv

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-32-17-790-002

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the turbo compressor shutoff valve [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

## I. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-17-420-006

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(1) Close this access panel:

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel
	——— END OF TASK ———



## **RAM AIR DOOR ACTUATOR - REMOVAL/INSTALLATION**

## 1. General

- A. This procedure has these tasks:
  - (1) Ram Air Door Actuator Removal
  - (2) Ram Air Door Actuator Installation
- B. The location of the ram air door actuator is forward of the thermal control unit (TCU), and aft of the ram air inlet door.
- C. To get to the ram air door actuator, open the Forward Wing to Body Fairing Panel, 191HL.

## TASK 47-32-18-000-801

## 2. Ram Air Door Actuator Removal

(Figure 401)

#### A. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)

#### B. Location Zones

Zone	Area
117	Main Equipment Center, Left
191	Forward Wing-to-Body Fairings, Left

#### C. Access Panels

Number	Name/Location	
191HL	Forward Wing To Body Fairing Panel	

#### D. Prepare for the Removal

SUBTASK 47-32-18-860-001

(1) Do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

SUBTASK 47-32-18-860-002

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

## Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR

SUBTASK 47-32-18-010-002

(3) Open this access panel:

<u>Number</u>	Name/Location
191HL	Forward Wing To Body Fairing Panel

#### E. Ram Air Door Actuator Removal

SUBTASK 47-32-18-020-001

(1) Disconnect the electrical connector [2] from the ram air door actuator [1].

SUBTASK 47-32-18-020-002

- (2) Disconnect the bonding jumper [6] (two locations) as follows:
  - (a) Remove the screw [9], washer [8], and nut [7] to disconnect the bonding jumper [6] from the ram air door actuator [1].

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#### SUBTASK 47-32-18-020-003

(3) Remove the bolt [10], countersunk washer [11], bushing [19], washer [12], and nut [13] to disconnect the actuator pushrod from the bellcrank [4].

#### SUBTASK 47-32-18-020-004

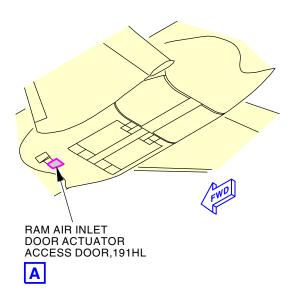
(4) Remove the bolt [16], countersunk washer [17], bushing [18], washer [15], and nut [14] to disconnect the ram air door actuator [1] from the support bracket [5].

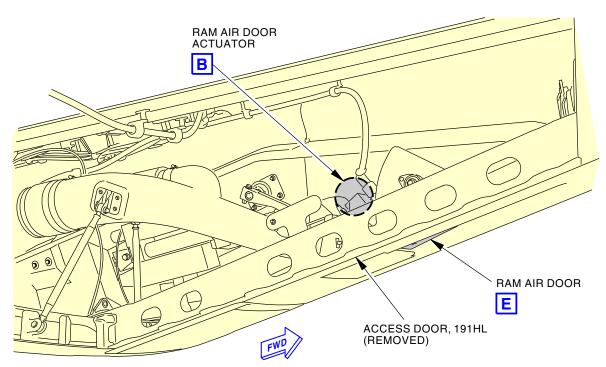
## SUBTASK 47-32-18-020-005

(5) Remove the ram air door actuator [1].

——— END OF TASK ———







## **RAM AIR INLET DOOR ACCESS**



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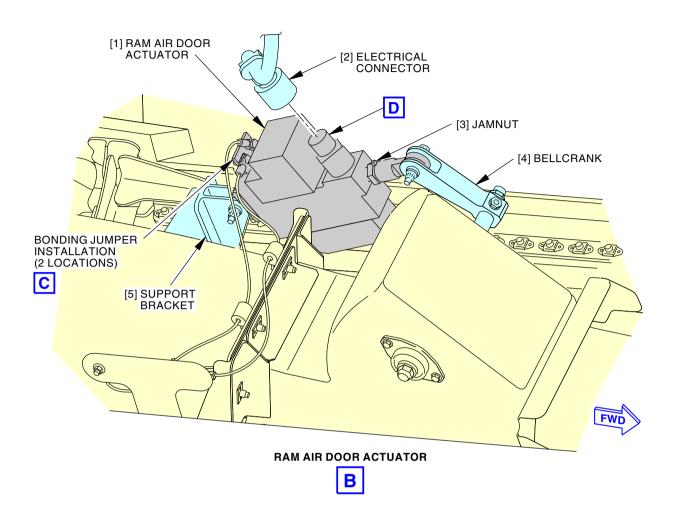
Ram Air Door Actuator - Removal and Installation Figure 401/47-32-18-990-801 (Sheet 1 of 3)

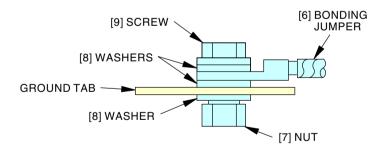
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# BONDING JUMPER INSTALLATION

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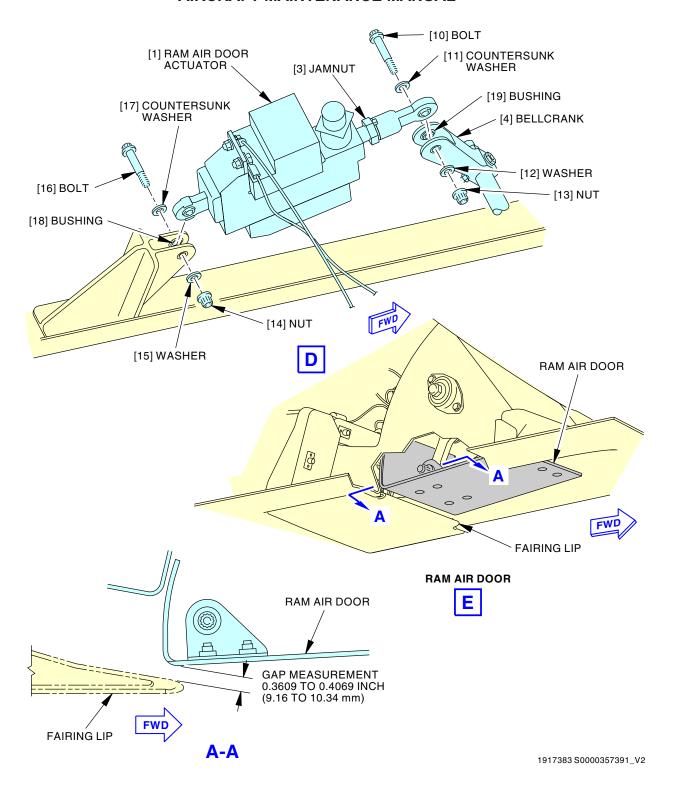
Ram Air Door Actuator - Removal and Installation Figure 401/47-32-18-990-801 (Sheet 2 of 3)

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Ram Air Door Actuator - Removal and Installation Figure 401/47-32-18-990-801 (Sheet 3 of 3)

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#### TASK 47-32-18-400-801

## 3. Ram Air Door Actuator Installation

(Figure 401)

## A. References

Reference	Title
20-10-22-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014
	Opt Part #: M1B Supplier: 3AD17

## C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Ram air door actuator	47-11-53-01-360	ARO ALL

## D. Location Zones

Zone	Area
117	Main Equipment Center, Left
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191HL	Forward Wing To Body Fairing Panel

#### F. Ram Air Door Actuator Installation

SUBTASK 47-32-18-860-003

(1) Put the ram air door actuator [1] in its position between the bellcrank [4] and the support bracket [5] (View D).

## SUBTASK 47-32-18-420-001

(2) Install the bolt [16], countersunk washer [17], bushing [18], washer [15], and nut [14], which connect the ram air door actuator [1] to the support bracket [5] (View D).

NOTE: Make sure the countersunk washer [17] is against the head of the bolt [16].

## SUBTASK 47-32-18-100-001

(3) To clean the bond surfaces of the ground tab, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-22-110-802.

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#### SUBTASK 47-32-18-100-002

(4) To clean the bond surfaces of the bonding jumpers [6] and washers [8], do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-22-110-802.

#### SUBTASK 47-32-18-420-002

- (5) Do these steps to install the bonding jumpers [6] (two locations)(View C):
  - (a) Put a washer [8] on the ground tab of the ram air door actuator [1].
  - (b) Put the bonding jumper [6] on the washer [8].
  - (c) Install the screw [9] and washer [8] on the bonding jumper terminal.
  - (d) Install the washer [8] and nut [7] on the screw [9].
    - 1) Tighten the nut [7].
  - (e) With an intrinsically safe approved bonding meter, COM-1550, make sure the resistance between the ground tab of the ram air door actuator [1] and the airplane structure is less than 0.004 ohm (4 milliohms).

#### SUBTASK 47-32-18-420-003

(6) Re-connect the electrical connector [2] to the ram air door actuator [1].

#### SUBTASK 47-32-18-820-001

- (7) Do these steps to measure the gap between the ram air inlet door and the fairing lip (View A-A):
  - (a) Loosely install the bolt [10] to connect the actuator rod end to the bellcrank [4].
  - (b) Measure the gap between the ram air inlet door and the fairing lip.
  - (c) Make sure the gap measures 0.3609 to 0.4069 inch (9.16 to 10.34 mm).
  - (d) Do the following steps if the gap is not 0.3609 to 0.4069 inch (9.16 to 10.34 mm):
    - 1) Remove the lockwire from the jamnut [3] on the actuator rod end.



USE TWO WRENCHES TO LOOSEN THE JAMNUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE ACTUATOR CAN OCCUR.

- 2) Use a wrench to hold the actuator rod end while you use a second wrench to loosen the jamnut [3].
- 3) Turn the actuator rod end a maximum of ±0.070 inch ( ±1.78 mm) until the distance measures 0.3609 to 0.4069 inch (9.16 to 10.34 mm).
  - Loosely install the bolt [10] to connect the actuator rod end to the bellcrank [4] during measurement.



USE TWO WRENCHES TO LOOSEN THE JAMNUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE ACTUATOR CAN OCCUR.

- 4) Use a wrench to hold the actuator rod end while you use a second wrench to tighten the jamnut [3] to 55 ±5 in-lb (6 ±1 N·m).
- 5) Install the lockwire.

## SUBTASK 47-32-18-420-005

(8) Install the bolt [10], countersunk washer [11], bushing [19], washer [12], and nut [13] to connect the actuator rod end to the bellcrank [4].

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### G. Operational Test for the Ram Air Door Actuator

SUBTASK 47-32-18-860-004

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
В	10	C47401	NGS RAM AIR ACTUATOR

SUBTASK 47-32-18-790-001



MAKE SURE THAT PERSONNEL ARE CLEAR OF THE RAM AIR INLET, OUTLET, LINKAGES, AND ACTUATORS. COMPONENTS CAN MOVE DURING THE PROCEDURE. INJURY TO PERSONNEL CAN OCCUR.

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) Make sure the applicable NGS RAM CIRCUIT FAIL or NGS RAM DOOR FAIL status messages do not show.

## H. Put the Airplane Back to the Usual Condition

SUBTASK 47-32-18-420-004

(1) Close this access panel:

<u>Number</u>	Name/Location	
191HL	Forward Wing To Body Fairing Panel	

SUBTASK 47-32-18-860-005

(2) Do this task: Pressurize the Pneumatic System, TASK 36-00-00-860-802.

——— END OF TASK ———

47-32-18



### **DIFFERENTIAL PRESSURE SENSOR - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure has these tasks:
  - (1) Differential Pressure Sensor Removal
  - (2) Differential Pressure Sensor Installation
- B. The differential pressure sensor is found forward and outboard of the air separation module (ASM). The differential pressure sensor is attached to the air separation unit (ASU) frame and connected to the NEADS outlet duct via a sense line.
- Access to the differential pressure sensor is through the Forward Wing to Body Fairing Panel, 192QR.

### TASK 47-42-02-000-801

# 2. Differential Pressure Sensor Removal

(Figure 401)

### A. General

(1) The differential pressure sensor is referred to as the pressure sensor in this procedure.

### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### C. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

#### D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

#### E. Access Panels

Number	Name/Location
192QR	Forward Wing To Body Fairing Panel

### F. Prepare for the Removal

SUBTASK 47-42-02-860-003

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

# Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-42-02-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
192QR	Forward Wing To Body Fairing Panel

ARO ALL 47-42-02



#### G. Remove the Pressure Sensor

SUBTASK 47-42-02-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-42-02-010-002

(2) Go to the differential pressure sensor [1] location on the ASU.

NOTE: The differential pressure sensor [1] is found on the forward section of the ASU attached to the NEADS outlet duct.

#### SUBTASK 47-42-02-020-001

(3) Disconnect the electrical connector [2].

#### SUBTASK 47-42-02-020-002

(4) Disconnect the nut [7] on the sense line [8].

NOTE: The nut [7] will stay with the sense line [8].

NOTE: Make sure you support the sense line [8] when you disconnect the nut [7].

#### SUBTASK 47-42-02-020-003

(5) Disconnect the nut [5] on the sense line [6].

NOTE: The nut [5] will stay with the sense line [6].

NOTE: Make sure you support the sense line [6] when you disconnect the nut [5].

#### SUBTASK 47-42-02-020-004

- (6) Disconnect the jamnut [4] that holds the differential pressure sensor [1] to the bracket [3].
  - (a) Keep the jamnut [4] for the installation.

#### SUBTASK 47-42-02-020-005

(7) Remove the differential pressure sensor [1].

### SUBTASK 47-42-02-420-001

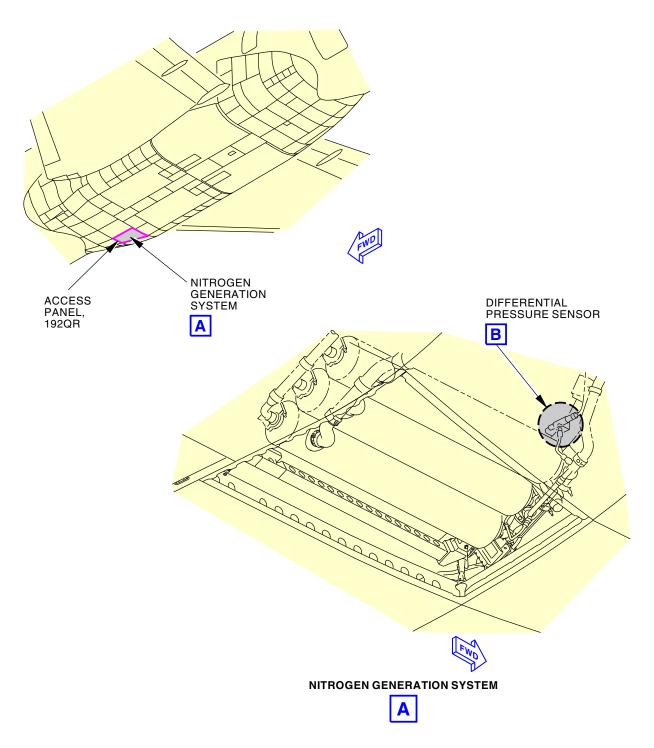
(8) Put protective covers, STD-7423, on sense line [6] and sense line [8].

47-42-02

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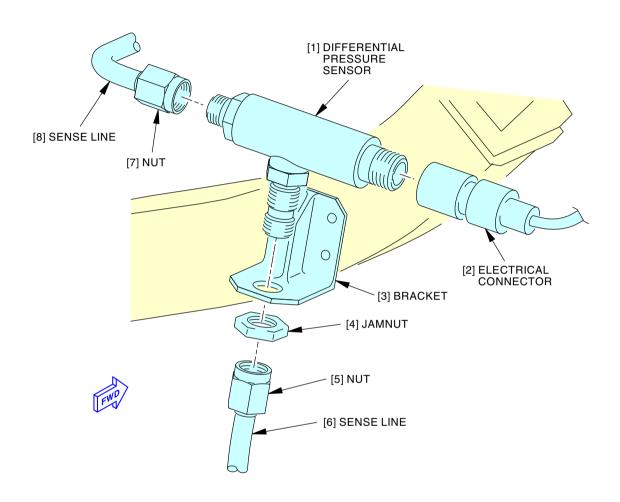
Differential Pressure Sensor - Removal and Installation Figure 401/47-42-02-990-801 (Sheet 1 of 2)

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### **DIFFERENTIAL PRESSURE SENSOR**



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Differential Pressure Sensor - Removal and Installation Figure 401/47-42-02-990-801 (Sheet 2 of 2)

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#### TASK 47-42-02-400-801

### 3. Differential Pressure Sensor Installation

(Figure 401)

#### A. General

(1) The differential pressure sensor is referred to as the pressure sensor in this procedure.

#### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### C. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### D. Consumable Materials

Reference	Description	Specification
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### E. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

### F. Access Panels

7100000 1 4	Access Full Color			
Number	ber Name/Location			
192QR	Forward Wing To Body Fairing Panel			

### G. Prepare to Install the Pressure Sensor

SUBTASK 47-42-02-940-002

- (1) Do these steps to prepare the components for the installation:
  - (a) Remove the protective covers, STD-7423, from the sense line [6] and sense line [8].
  - (b) Remove the protective shipping caps from the new differential pressure sensor [1].
  - (c) Use a clean, solvent free, cotton wiper, G00034, to clean the mating surfaces of the differential pressure sensor [1].

#### SUBTASK 47-42-02-860-006



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

ARO ALL



### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(2) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### H. Install the Pressure Sensor

SUBTASK 47-42-02-420-002

- (1) Do these steps to install the differential pressure sensor [1]:
  - (a) Apply a thin layer of compound, C00852, to the threads of the differential pressure sensor [1].
  - (b) Install the new differential pressure sensor [1] sensor in its position on the bracket [3].
    - 1) Install, but do not tighten, the jamnut [4].
    - 2) Install, but do not tighten, the nut [5] on the sense line [6].
    - 3) Install, but do not tighten, the nut [7] on the sense line [8].
    - 4) Tighten the jamnut [4] to  $135 \pm 15$  in-lb  $(15 \pm 2 \text{ N} \cdot \text{m})$ .
    - 5) Tighten the nut [5] on the sense line [6] to 230  $\pm$ 15 in-lb (26  $\pm$ 2 N·m).
    - 6) Tighten the nut [7] on the sense line [8] to 230 ±15 in-lb (26 ±2 N·m).

#### I. Operational Test for the Pressure Switch

SUBTASK 47-42-02-860-005

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>	
L	9	C47601	NGS CONTROL	

SUBTASK 47-42-02-710-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the differential pressure sensor [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

#### J. Put the Airplane Back to the Usual Condition

SUBTASK 47-42-02-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
192QR	Forward Wing To Body Fairing Panel
	END OF TASK

ARO ALL



#### **OXYGEN SENSOR - REMOVAL/INSTALLATION**

### 1. General

- A. This procedure has these tasks:
  - (1) Oxygen Sensor Removal
  - (2) Oxygen Sensor Installation
- B. The oxygen sensor is found forward and inboard of the air separation module (ASM). The oxygen sensor is attached to the air separation unit (ASU) frame via a mounting bracket.
- C. Access to the oxygen sensor is through the Forward Wing to Body Fairing Panel, 192QR.

### TASK 47-42-03-000-801

### 2. Oxygen Sensor Removal

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

#### B. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

### C. Access Panels

Number	Name/Location
192HR	Forward Wing To Body Fairing Panel

### D. Remove the Oxygen Sensor

SUBTASK 47-42-03-010-002

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

### Left Power Management Panel, P110

Row	<u>Col</u>	Number	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-42-03-010-001

(2) Open this access panel:

<u>Number</u>	Name/Location
192HR	Forward Wing To Body Fairing Panel

SUBTASK 47-42-03-860-001



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

ARO ALL



### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(3) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-42-03-860-002

(4) Go to the oxygen sensor [6] location.

NOTE: The oxygen sensor [6] is attached to the frame of the ASU, forward of the ASM.

#### SUBTASK 47-42-03-020-001

(5) Disconnect the electrical connector [7] from the oxygen sensor [6].

SUBTASK 47-42-03-020-002



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

(6) Loosen the coupling nut [3] that attaches the oxygen sensor inlet tube [5].

SUBTASK 47-42-03-020-003



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

(7) Disconnect the oxygen sensor inlet tube [5] from the sensor board assembly.

#### SUBTASK 47-42-03-020-004

(8) Remove the two screws [1] that attach the oxygen sensor [6] with the mounting frame.

#### SUBTASK 47-42-03-020-005

(9) Remove the two screws [2] that connects the two bonding jumpers [4].

### SUBTASK 47-42-03-020-006

(10) Remove the two bonding jumpers [4].

SUBTASK 47-42-03-020-007



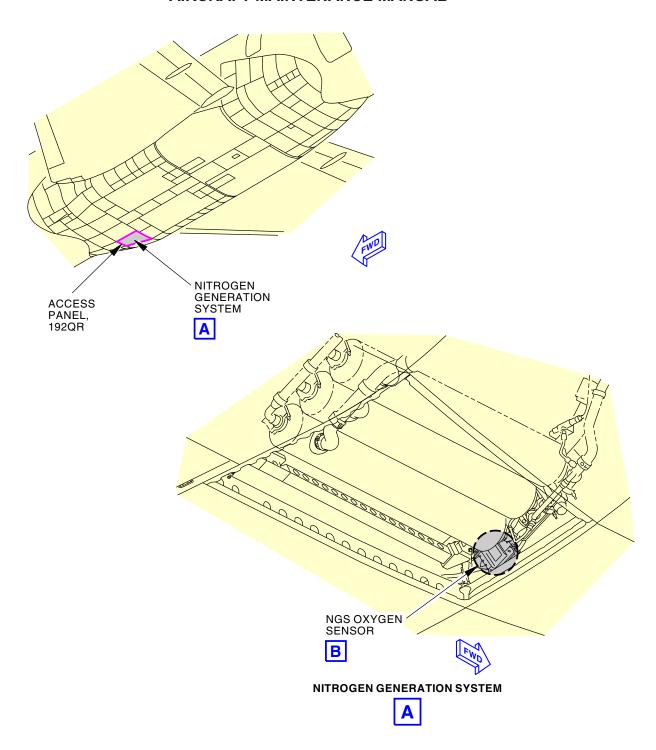
KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

(11) Remove the oxygen sensor [6] from the mounting frame.

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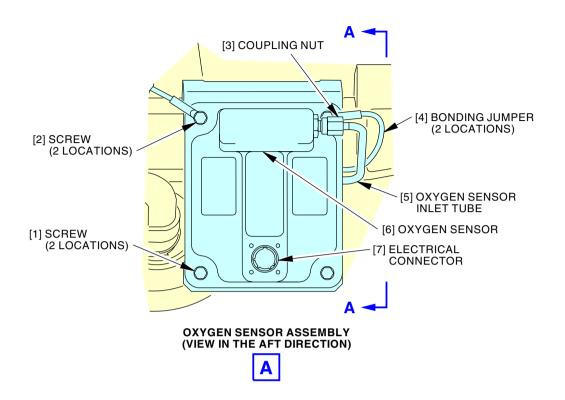
Oxygen Sensor - Removal and Installation Figure 401/47-42-03-990-801 (Sheet 1 of 2)

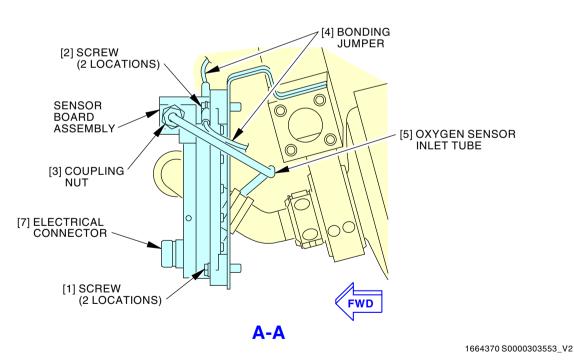
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Oxygen Sensor - Removal and Installation Figure 401/47-42-03-990-801 (Sheet 2 of 2)

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#### TASK 47-42-03-400-801

### 3. Oxygen Sensor Installation

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Bonding Meters - 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 #: T477W Supplier: 01014
	Opt Part #: M1B Supplier: 3AD17

#### C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### D. Location Zones

Zone	Area
192	Forward Wing-to-Body Fairings, Right

#### E. Access Panels

Number	Name/Location	
192HR	Forward Wing To Body Fairing Panel	

### F. Install the Oxygen Sensor

SUBTASK 47-42-03-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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47-42-03

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#### (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

SUBTASK 47-42-03-420-001



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

(2) Put the oxygen sensor [6] on the mounting frame and install the two screws [1].

SUBTASK 47-42-03-420-002

(3) Put the two bonding jumpers [4] on the oxygen sensor [6].

SUBTASK 47-42-03-420-003

(4) Install the two screws [2] to attach the bonding jumper [4].

SUBTASK 47-42-03-420-005



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

(5) Connect the oxygen sensor inlet tube [5] to the sensor board assembly and tighten the coupling nut [3].

SUBTASK 47-42-03-420-004

(6) Connect the electrical connector [7].

SUBTASK 47-42-03-760-001

- (7) Do a check of the electrical bond between the oxygen sensor [6] and the structure with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
  - (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

### G. Operational Test for the Oxygen Sensor

SUBTASK 47-42-03-860-003

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

#### Left Power Management Panel, P110

Row Col Number Name
L 9 C47601 NGS CONTROL

SUBTASK 47-42-03-710-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the oxygen sensor [6].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.

ARO ALL



- (c) Repair the leaks that you find.
- H. Put the Airplane Back to the Usual Condition

SUBTASK 47-42-03-410-001

(1) Close this access panel:

NumberName/Location192HRForward Wing To Body Fairing Panel

----- END OF TASK -----

ARO ALL



#### THERMAL SWITCH - REMOVAL/INSTALLATION

### 1. General

- A. This procedure has these tasks:
  - (1) Thermal Switch Removal
  - (2) Thermal Switch Installation
- B. The thermal switch is found aft and outboard on the air separation unit (ASU). The thermal switch is attached to the ASU inlet duct, downstream of the overtemperature shutoff valve (OTSOV).
- C. Access to the thermal switch is through the Underwing Fairing Panel, 196BR.



#### TASK 47-42-04-000-801

### 2. Thermal Switch Removal

(Figure 401)

#### A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 47-AWL-04.

NOTE: Replacement of the thermal switch is one option for this Airworthiness Limitation.

#### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### C. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### D. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

#### E. Location Zones

Zone	Area	
196	Underwing Wing-to-Body Fairings, Right	

#### F. Access Panels

Number	Name/Location
196BR	Underwing Fairing Panel

ARO ALL



### G. Prepare for the Removal

SUBTASK 47-42-04-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (1) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-42-04-860-004

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

# Left Power Management Panel, P110

	****	anagomone	. a,
Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-42-04-010-001

(3) Open this access panel:

Number Name/Location

196BR Underwing Fairing Panel

### H. Remove the Thermal Switch

SUBTASK 47-42-04-860-001



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

47-42-04

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#### SUBTASK 47-42-04-010-002

(2) Go to the thermal switch [2] location.

NOTE: The thermal switch [2] is attached to the ASU inlet duct, aft of the ASM.

### SUBTASK 47-42-04-020-001

(3) Disconnect the electrical connector [1].

#### SUBTASK 47-42-04-020-002

- (4) Do these steps to remove the thermal switch [2]:
  - (a) Remove the thermal switch [2] from the duct [4].

    NOTE: Use a backup wrench on the duct [4] when you disconnect the thermal switch [2].
  - (b) Discard the o-ring [3].

#### SUBTASK 47-42-04-420-001

(5) Install a protective cover, STD-7423, on the duct [4].

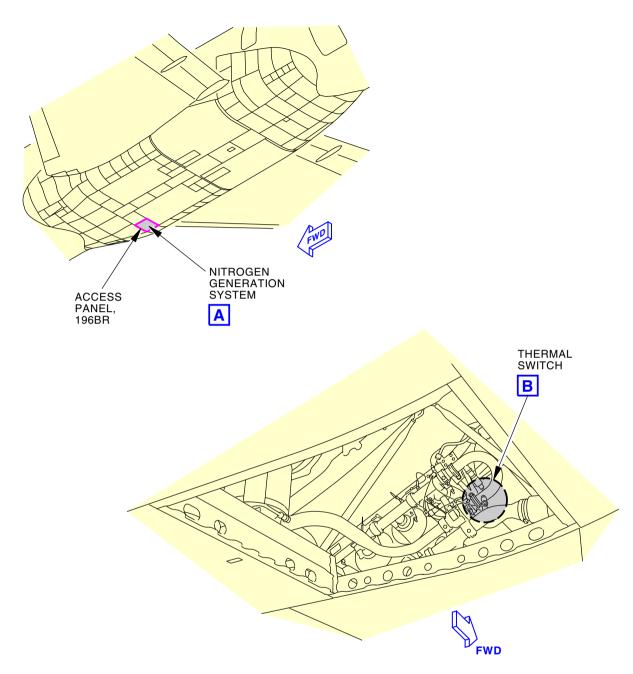
——— END OF TASK ———

47-42-04

- EFFECTIVITY -

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**NITROGEN GENERATION SYSTEM** 



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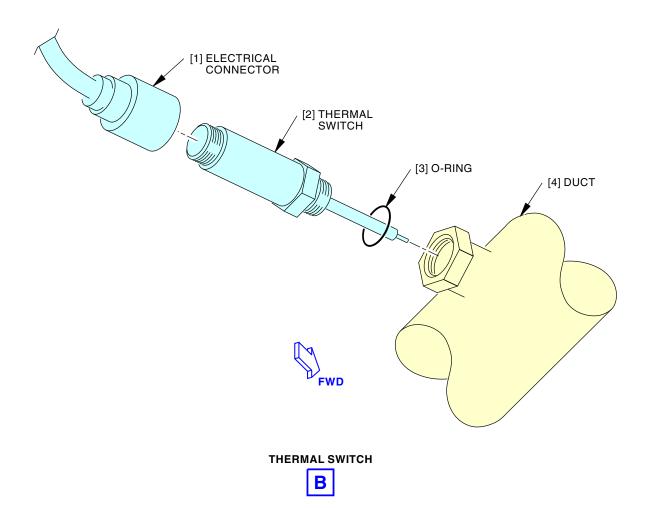
Thermal Switch - Removal and Installation Figure 401/47-42-04-990-801 (Sheet 1 of 2)

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47-42-04

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Thermal Switch - Removal and Installation Figure 401/47-42-04-990-801 (Sheet 2 of 2)

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→ 47-AWL-04: ALI

### TASK 47-42-04-400-801

### 3. Thermal Switch Installation

(Figure 401)

#### A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 47-AWL-04.

NOTE: Replacement of the thermal switch is one option for this Airworthiness Limitation.

#### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### C. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

### D. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Thermal switch	Not Specified	
3	O-ring	Not Specified	

#### F. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### G. Access Panels

Number	Name/Location
196BR	Underwing Fairing Panel

### H. Install the Thermal Switch

SUBTASK 47-42-04-860-012



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.

ARO ALL

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### (WARNING PRECEDES)



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-42-04-020-003

(2) Remove the protective cover, STD-7423, from the duct [4].

#### SUBTASK 47-42-04-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (3) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-42-04-640-001

(4) Apply a thin layer of grease, D50099, to the o-ring [3].

#### SUBTASK 47-42-04-420-002

(5) Install the o-ring [3] on the thermal switch [2].

### SUBTASK 47-42-04-420-003

(6) Carefully install the thermal switch [2] into the thermal switch port.

NOTE: Use a backup wrench on the nut attached to the duct [4] when you tighten the thermal switch [2].

#### SUBTASK 47-42-04-420-004

(7) Tighten the thermal switch [2] to 100  $\pm$ 10 in-lb (11  $\pm$ 1 N·m).

#### SUBTASK 47-42-04-420-005

(8) Connect the electrical connector [1].

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ARO ALL



### I. Operational Test for the Thermal Switch

SUBTASK 47-42-04-860-005

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

### Left Power Management Panel, P110

Row	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-42-04-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the thermal switch [2].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

### J. Put the Airplane Back to the Usual Condition

SUBTASK 47-42-04-420-006

(1) Close this access panel:

<u>Number</u>	Name/Location
196BR	Underwing Fairing Panel

----- END OF TASK -----



#### THERMAL SWITCH - ADJUSTMENT/TEST

### 1. General

This procedure contains scheduled maintenance task data.

47-AWL-04: ALI

#### TASK 47-42-04-720-801

### Thermal Switch Functional Test

NOTE: This procedure is a scheduled maintenance task.

#### A. General

- (1) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 47-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).
- Do this task to do the requirements of 47-AWL-04.
- (3) This task removes and bench tests the NGS thermal switch.
- The thermal switch (S47005), is on the air inlet duct that connects the air filter to the air separation unit (ASU).
- (5) You can get access to the thermal switch through the underwing fairing panel, 196BR.

#### References

Reference	Title	
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)	
47-42-04-000-801	Thermal Switch Removal (P/B 401)	
47-42-04-400-801	Thermal Switch Installation (P/B 401)	
Location Zones		

### C. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

#### D. Functional Test

SUBTASK 47-42-04-020-004

(1) Do this task: Thermal Switch Removal, TASK 47-42-04-000-801.

SUBTASK 47-42-04-720-001

(2) Test the thermal switch (S47005) per the manufacturer's instructions.

SUBTASK 47-42-04-420-007

(3) Do this task to install a new or serviceable thermal switch: Thermal Switch Installation, TASK 47-42-04-400-801.

END	<b>OF TASK</b>	
-----	----------------	--

47-42-04

**ARO ALL** 

**EFFECTIVITY** 

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### **TEMPERATURE SENSOR - REMOVAL/INSTALLATION**

# 1. General

- A. This procedure has these tasks:
  - (1) Temperature Sensor Removal
  - (2) Temperature Sensor Installation
- B. The temperature sensor is found aft and outboard on the air separation unit (ASU). The temperature sensor is attached to the ASU inlet duct, downstream of the thermal switch.
- C. Access to the temperature sensor is through the Underwing Fairing Panel, 196BR.

### TASK 47-42-05-000-801

### 2. Temperature Sensor Removal

(Figure 401)

### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

### D. Location Zones

Zone	Area	
196	Underwing Wing-to-Body Fairings, Right	

#### E. Access Panels

Number	Name/Location
196BR	Underwing Fairing Panel

ARO ALL 47-42-05



### F. Prepare for the Removal

SUBTASK 47-42-05-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (1) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

SUBTASK 47-42-05-860-003

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

# Left Power Management Panel, P110

	****	anagomone	. a,
Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-42-05-010-001

(3) Open this access panel:

Number Name/Location

196BR Underwing Fairing Panel

#### G. Remove the Temperature Sensor

SUBTASK 47-42-05-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-42-05-010-002

(2) Go to the temperature sensor [3] location.

NOTE: The temperature sensor [3] is attached to the ASU inlet duct, downstream of the thermal switch.

#### SUBTASK 47-42-05-020-001

(3) Disconnect the electrical connector [4].

#### SUBTASK 47-42-05-020-002

- (4) Do these steps to remove the temperature sensor [3]:
  - (a) Remove the temperature sensor [3] from the duct [1].

NOTE: Use a backup wrench on the duct [1] when you disconnect the temperature sensor [3].

(b) Discard the o-ring [2].

### SUBTASK 47-42-05-420-001

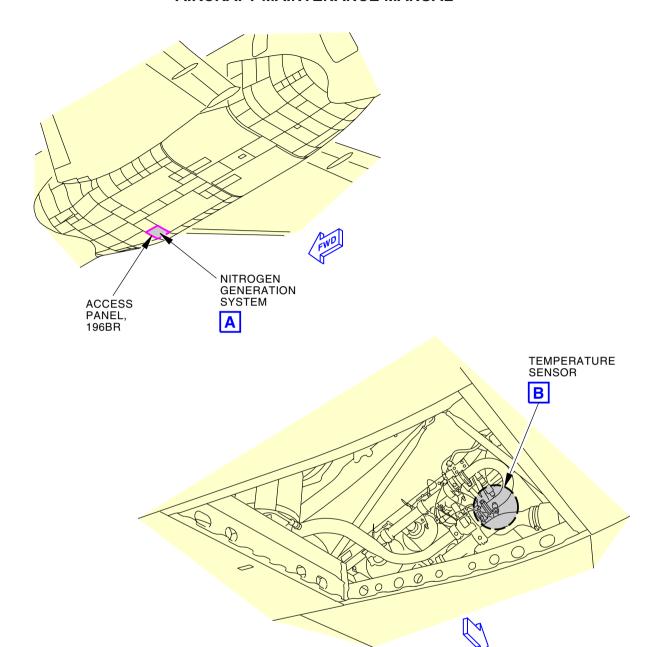
- EFFECTIVITY -

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(5) Install a protective cover, STD-7423, on the duct [1].

——— END OF TASK ———





### **NITROGEN GENERATION SYSTEM**



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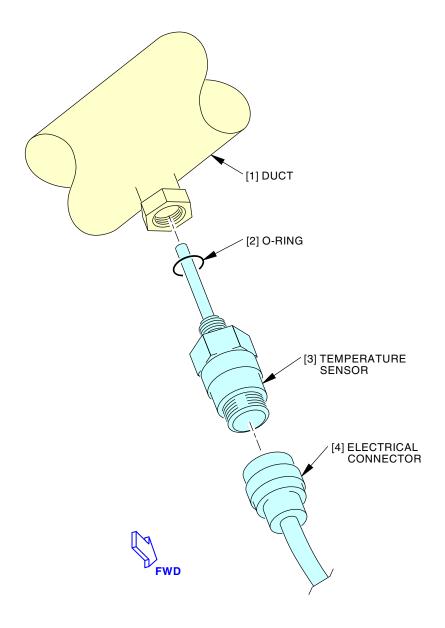
Temperature Sensor - Removal and Installation Figure 401/47-42-05-990-801 (Sheet 1 of 2)

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**TEMPERATURE SENSOR** 



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Temperature Sensor - Removal and Installation Figure 401/47-42-05-990-801 (Sheet 2 of 2)

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#### TASK 47-42-05-400-801

### 3. Temperature Sensor Installation

(Figure 401)

#### A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### D. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

### E. Access Panels

Number	Name/Location
196BR	Underwing Fairing Panel

### F. Install the Temperature Sensor

SUBTASK 47-42-05-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-42-05-020-003

(2) Remove the protective cover, STD-7423, from the duct [1].

#### SUBTASK 47-42-05-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (3) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-42-05-640-001

(4) Apply a thin layer of grease, D50099, to the o-ring [2].

#### SUBTASK 47-42-05-420-002

(5) Install the o-ring [2] on the temperature sensor [3].

#### SUBTASK 47-42-05-420-003

(6) Carefully install the temperature sensor [3] into the temperature sensor port.

NOTE: Use a backup wrench on the nut attached to the duct [1] when you tighten the temperature sensor [3].

#### SUBTASK 47-42-05-420-004

(7) Tighten the temperature sensor [3] to 80  $\pm$ 8 in-lb (9  $\pm$ 1 N·m).

#### SUBTASK 47-42-05-420-005

(8) Connect the electrical connector [4].

### G. Operational Test for the Temperature Sensor

#### SUBTASK 47-42-05-860-005

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

### Left Power Management Panel, P110

Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-42-05-790-001

EFFECTIVITY -

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the temperature sensor [3].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

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# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-42-05-420-006

(1) Close this access panel:

Number Name/Location

196BR Underwing Fairing Panel

----- END OF TASK -----

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### FILTER DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION

### 1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has these tasks:
  - (1) Filter Differential Pressure Switch Removal
  - (2) Filter Differential Pressure Switch Installation
- C. The filter differential pressure switch is found on the duct between the heat exchanger and the air filter
- D. Access to the filter differential pressure switch is through the ECS Low Pressure Connection Door, 196CR.

### TASK 47-43-01-000-801

### 2. Filter Differential Pressure Switch Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

#### A. General

(1) The filter differential pressure switch is referred to as the pressure switch in this procedure.

#### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### C. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### D. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

### E. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

### F. Access Panels

Number	Name/Location
196CR	ECS Low Pressure Connection Door

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### G. Prepare for the Removal

SUBTASK 47-43-01-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-43-01-860-003

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

### Left Power Management Panel, P110

Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

#### SUBTASK 47-43-01-010-001

(3) Open this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door

#### SUBTASK 47-43-01-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL. AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

Obey the nitrogen generation system (NGS) precautions (TASK 47-00-00-910-802).

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### H. Remove the Pressure Switch

#### SUBTASK 47-43-01-010-002

(1) Go to the pressure switch [1] location.

NOTE: The pressure switch [1] is attached to the air filter inlet duct [6] above the ECS Low Pressure Connection Door, 196CR.

#### SUBTASK 47-43-01-020-001

(2) Disconnect the electrical connector [2].

#### SUBTASK 47-43-01-020-002

(3) Disconnect the sense line [3].

NOTE: Use a second wrench to hold the pressure switch [1] when you disconnect the sense line [3].

#### SUBTASK 47-43-01-020-003

(4) Loosen the nut [4].

NOTE: Use a second wrench to hold the duct boss [7] when you loosen the nut [4].

NOTE: The sense line [3] is rigid. Do not bend the sense line [3] when you remove the pressure switch [1].

#### SUBTASK 47-43-01-020-004

(5) Remove the pressure switch [1].

NOTE: Keep the nut [4] for the installation.

(a) Discard the o-ring [5].

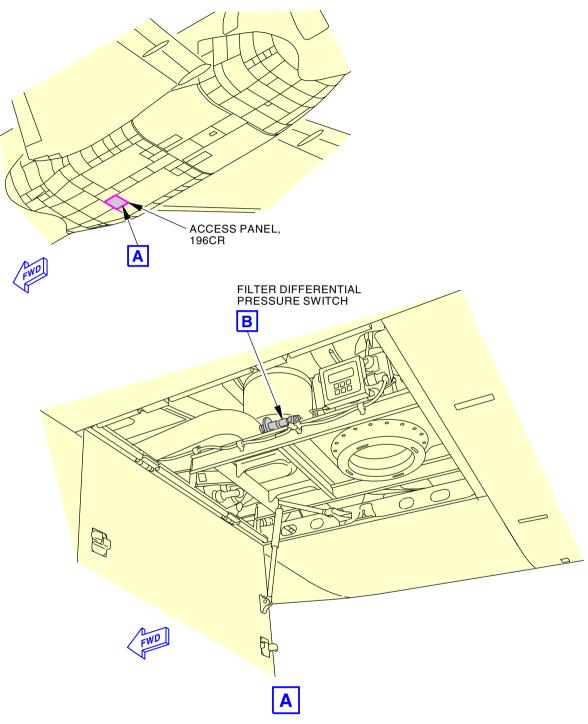
#### SUBTASK 47-43-01-420-001

(6) Put protective covers, STD-7423, on the sense line [3] and the duct [6] to keep out unwanted material.

----- END OF TASK -----

47-43-01





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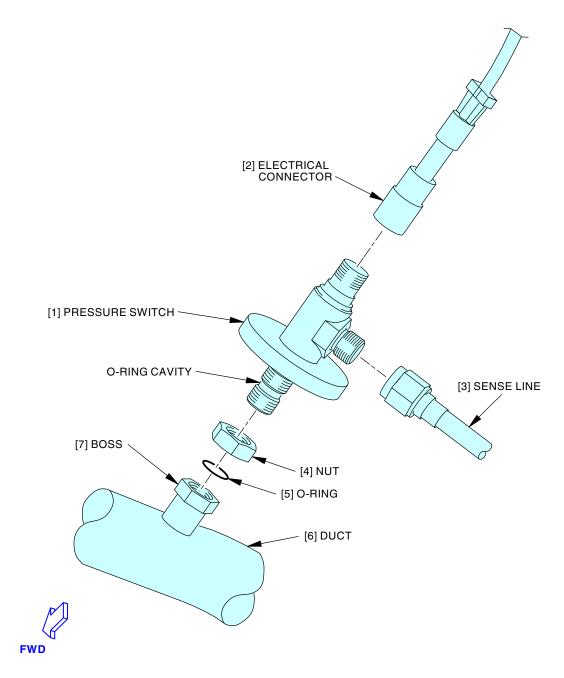
# Filter Differential Pressure Switch - Removal and Installation Figure 401/47-43-01-990-801 (Sheet 1 of 2)

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# FILTER DIFFERENTIAL PRESSURE SWITCH



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Filter Differential Pressure Switch - Removal and Installation Figure 401/47-43-01-990-801 (Sheet 2 of 2)

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#### TASK 47-43-01-400-801

## 3. Filter Differential Pressure Switch Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

#### A. General

(1) The filter differential pressure switch is referred to as the pressure switch in this procedure.

### B. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

# C. Tools/Equipment

Reference	Description
STD-3724	Wrench
STD-7423	Cover - Protective Tube

#### D. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

# E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	O-ring	Not Specified	

# F. Location Zones

Zone	Area
196	Underwing Wing-to-Body Fairings, Right

### G. Access Panels

Number	Name/Location	
196CR	ECS Low Pressure Connection Door	

### H. Install the Pressure Switch

SUBTASK 47-43-01-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

ARO ALL

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# (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-43-01-020-005

(2) Remove the protective covers, STD-7423, from the duct [6] and sense line [3].

#### SUBTASK 47-43-01-420-002

- (3) Install the nut [4] on the pressure switch [1].
  - (a) Continue to turn until the nut [4] is on the pressure switch [1] side of the o-ring cavity.

#### SUBTASK 47-43-01-640-001

(4) Apply a thin layer of grease, D50099, to the o-ring [5].

#### SUBTASK 47-43-01-420-003

(5) Install the new o-ring [5] in the cavity of the pressure switch [1].

#### SUBTASK 47-43-01-420-005

- (6) Install the pressure switch [1] into the boss [7] on the duct [6].
  - (a) Continue to turn the pressure switch [1] until the o-ring [5] is in its position in the top of the boss [7].

#### SUBTASK 47-43-01-420-006

(7) Tighten the nut [4] to 80 ±8 in-lb (9 ±1 N·m).

NOTE: Use a second wrench, STD-3724, on the boss [7] when you tighten the pressure switch [1].

NOTE: This torque value is in addition to the torque necessary to overcome the self-locking devices.

### SUBTASK 47-43-01-420-007

- (8) Align the pressure switch [1] with the sense line [3].
  - (a) Connect the sense line [3] to the pressure switch [1].

NOTE: Use a second wrench, STD-3724, on the pressure switch [1] when you tighten the sense line [3].

### SUBTASK 47-43-01-420-008

(9) Connect the electrical connector [2].

### I. Operational Test for the Pressure Switch

### SUBTASK 47-43-01-860-005

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

# Left Power Management Panel, P110 Row Col Number Name

L 9 C47601 NGS CONTROL

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#### SUBTASK 47-43-01-740-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the pressure switch [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.
- J. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-01-410-001

(1) Close this access panel:

<u>Number</u>	Name/Location
196CR	ECS Low Pressure Connection Door
	——— END OF TASK ———
	END OF TASK



# THERMAL SWITCH - REMOVAL/INSTALLATION

# 1. General

- A. This procedure has these tasks:
  - (1) Thermal Switch Removal
  - (2) Thermal Switch Installation
- B. The thermal switch is found on the outlet duct of the turbocompressor, forward of the temperature sensor.
- C. Access to the thermal switch is through the Forward Wing to Body Fairing Panel, 191QL.

# TASK 47-43-02-000-801

# 2. Thermal Switch Removal

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

# B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

# D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

#### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

47-43-02

EFFECTIVITY -



# F. Prepare for the Removal

SUBTASK 47-43-02-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

SUBTASK 47-43-02-860-003

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

# Left Power Management Panel, P110

	****	anagomone	. a,
Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-43-02-010-001

(3) Open this access panel:

<u>Number</u>	Name/Location
191QL	Forward Wing To Body Fairing Panel

#### G. Remove the Thermal Switch

SUBTASK 47-43-02-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-43-02-010-002

(2) Go to the thermal switch [2] location.

NOTE: The thermal switch [2] is attached to the turbo compressor outlet duct, forward of the temperature sensor.

#### SUBTASK 47-43-02-020-001

(3) Disconnect the electrical connector [1].

#### SUBTASK 47-43-02-020-002

- (4) Do these steps to remove the thermal switch [2]:
  - (a) Remove the thermal switch [2] from the turbo compressor outlet duct.

NOTE: Use a backup wrench on the turbo compressor outlet duct when you disconnect the thermal switch [2].

(b) Discard the o-ring [3].

### SUBTASK 47-43-02-420-001

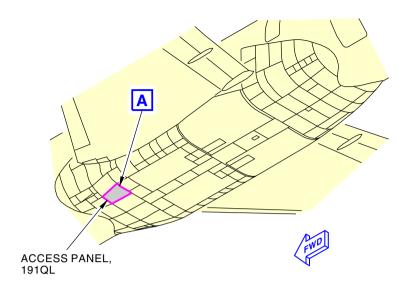
- EFFECTIVITY -

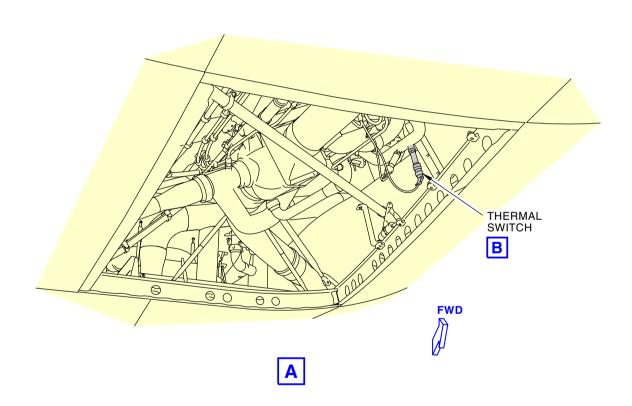
ARO ALL

(5) Install a protective cover, STD-7423, on the thermal switch port.

——— END OF TASK ———







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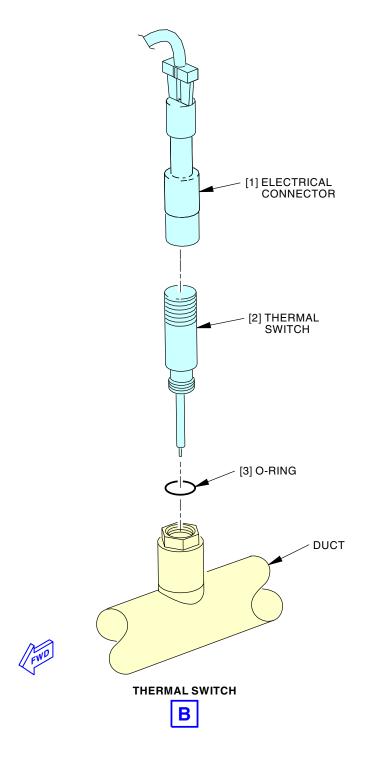
Thermal Switch - Removal and Installation Figure 401/47-43-02-990-801 (Sheet 1 of 2)

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Thermal Switch - Removal and Installation Figure 401/47-43-02-990-801 (Sheet 2 of 2)

EFFECTIVITY

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#### TASK 47-43-02-400-801

## 3. Thermal Switch Installation

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

## E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

# F. Install the Thermal Switch

SUBTASK 47-43-02-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

 Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-43-02-020-003

(2) Remove the protective cover, STD-7423, from the thermal switch port.

#### SUBTASK 47-43-02-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-43-02-640-001

(4) Apply a thin layer of grease, D50099, to the o-ring [3].

#### SUBTASK 47-43-02-420-002

(5) Install the o-ring [3] on the thermal switch [2].

#### SUBTASK 47-43-02-420-003

(6) Carefully install the thermal switch [2] into the thermal switch port.

NOTE: Use a backup wrench on the nut attached to the turbo compressor outlet duct when you tighten the thermal switch [2].

#### SUBTASK 47-43-02-420-004

(7) Tighten the thermal switch [2] to 100  $\pm$ 10 in-lb (11  $\pm$ 1 N·m).

#### SUBTASK 47-43-02-420-005

(8) Connect the electrical connector [1].

### G. Operational Test for the Thermal Switch

#### SUBTASK 47-43-02-860-005

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

### Left Power Management Panel, P110

Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-43-02-790-001

EFFECTIVITY -

**ARO ALL** 

- Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the thermal switch [2].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

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H. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-02-420-006

(1) Close this access panel:

Number191QLForward Wing To Body Fairing Panel

----- END OF TASK -----

ARO ALL



### **TEMPERATURE SENSOR - REMOVAL/INSTALLATION**

# 1. General

- A. This procedure has these tasks:
  - (1) Temperature Sensor Removal
  - (2) Temperature Sensor Installation
- B. The temperature sensor is found on the outlet duct of the turbocompressor, aft of the thermal switch.
- C. Access to the temperature sensor is through the Forward Wing to Body Fairing Panel, 191QL.

#### TASK 47-43-03-000-801

# 2. Temperature Sensor Removal

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

#### B Tools/Equipment

10013/Equipment		
Reference	Description	
STD-7423	Cover - Protective Tube	

#### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

#### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

### F. Prepare for the Removal

SUBTASK 47-43-03-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (1) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

ARO ALL



#### SUBTASK 47-43-03-860-003

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

# Left Power Management Panel, P110

Row Col Number Name

L 9 C47601 NGS CONTROL

#### SUBTASK 47-43-03-010-001

(3) Open this access panel:

Number Name/Location

191QL Forward Wing To Body Fairing Panel

### G. Remove the Temperature Sensor

SUBTASK 47-43-03-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

### SUBTASK 47-43-03-010-002

(2) Go to the temperature sensor [2] location.

NOTE: The temperature sensor [2] is attached to the turbo compressor outlet duct [4], aft of the thermal switch.

#### SUBTASK 47-43-03-020-001

(3) Disconnect the electrical connector [1].

### SUBTASK 47-43-03-020-002

- (4) Do these steps to remove the temperature sensor [2]:
  - (a) Remove the temperature sensor [2] from the turbo compressor outlet duct [4].

NOTE: Use a backup wrench on the turbo compressor outlet duct [4] when you disconnect the temperature sensor [2].

(b) Discard the o-ring [3].

# SUBTASK 47-43-03-420-001

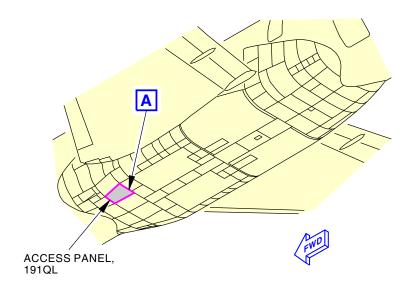
(5) Install a protective cover, STD-7423, on the temperature sensor port.

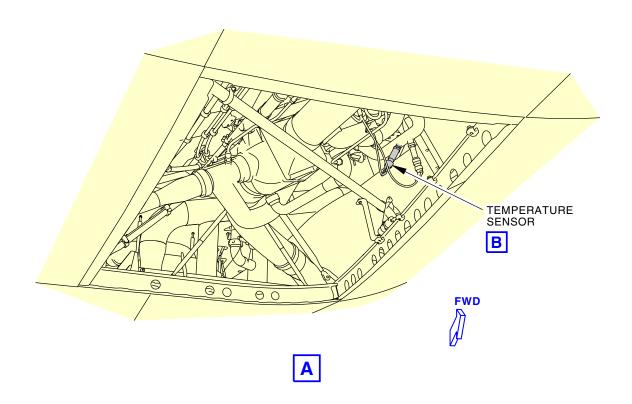
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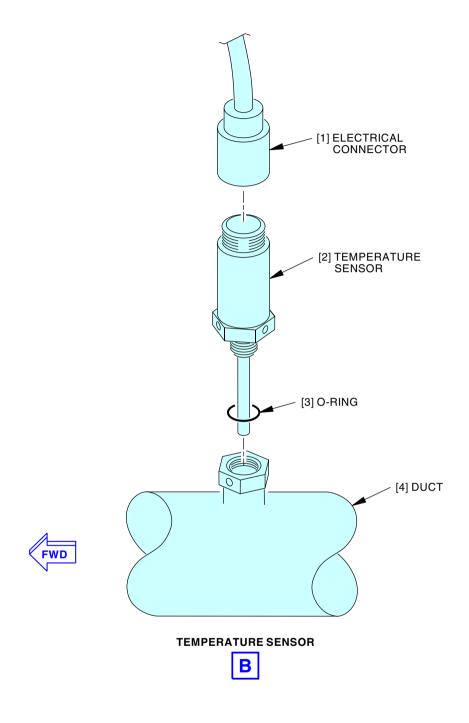
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# Temperature Sensor - Removal and Installation Figure 401/47-43-03-990-801 (Sheet 1 of 2)

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Temperature Sensor - Removal and Installation Figure 401/47-43-03-990-801 (Sheet 2 of 2)

ARO ALL

D633W101-ARO

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#### TASK 47-43-03-400-801

# 3. Temperature Sensor Installation

(Figure 401)

# A. References

Reference	Title
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

### B. Tools/Equipment

Reference	Description	
STD-7423	Cover - Protective Tube	

#### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

#### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### E. Access Panels

Number	Name/Location
191QL	Forward Wing To Body Fairing Panel

# F. Install the Temperature Sensor

SUBTASK 47-43-03-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

ARO ALL



#### SUBTASK 47-43-03-020-003

(2) Remove the protective cover, STD-7423, from the temperature sensor port.

#### SUBTASK 47-43-03-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (3) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-43-03-640-001

(4) Apply a thin layer of grease, D50099, to the o-ring [3].

#### SUBTASK 47-43-03-420-002

(5) Install the o-ring [3] on the temperature sensor [2].

#### SUBTASK 47-43-03-420-003

(6) Carefully install the temperature sensor [2] into the temperature sensor port.

NOTE: Use a backup wrench on the nut attached to the turbo compressor outlet duct when you tighten the temperature sensor [2].

#### SUBTASK 47-43-03-420-004

(7) Tighten the temperature sensor [2] to 80 ±8 in-lb (9 ±1 N·m).

### SUBTASK 47-43-03-420-005

(8) Connect the electrical connector [1].

#### G. Operational Test for the Temperature Sensor

#### SUBTASK 47-43-03-860-005

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

### Left Power Management Panel, P110

		•	
<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

### SUBTASK 47-43-03-790-001

EFFECTIVITY

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the temperature sensor [2].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.

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# H. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-03-420-006

(1) Close this access panel:

Number191QLForward Wing To Body Fairing Panel

----- END OF TASK -----

ARO ALL



# PRESSURE SENSOR - REMOVAL/INSTALLATION

# 1. General

- A. This procedure has these tasks:
  - (1) Pressure Sensor Removal
  - (2) Pressure Sensor Installation
- B. The pressure sensor is inboard and aft of the ozone converter. The pressure sensor is attached to the thermal control unit (TCU) frame and connected to the inlet duct of the TCU via a sense line.
- C. Access to the pressure sensor is through the Forward Wing to Body Fairing Panel, 191NL.

# TASK 47-43-04-000-801

# 2. Pressure Sensor Removal

(Figure 401)

#### A. References

Reference	Title
20-10-09-000-801	Flareless Tubing Assembly Removal (P/B 401)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)

### B. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and	MIL-PRF-27617 Type III
	Oxidizer Resistant	(Supersedes
		MIL-G-27617)

### D. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

# E. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel

ARO ALL 47-43-04



# F. Prepare for the Removal

SUBTASK 47-43-04-920-001

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT.
MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX
240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (1) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

SUBTASK 47-43-04-860-003

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

# Left Power Management Panel, P110

	*****	anagomont i	a.i.o., o
Row	Col	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

SUBTASK 47-43-04-010-001

(3) Open this access panel:

Number191NLForward Wing To Body Fairing Panel

#### G. Remove the Pressure Sensor

SUBTASK 47-43-04-860-004



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

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#### SUBTASK 47-43-04-010-002

(2) Go to the pressure sensor [1] location.

NOTE: The pressure sensor [1] is attached to the TCU inlet duct, aft and inboard of the ozone converter.

#### SUBTASK 47-43-04-020-001

(3) Disconnect the electrical connector [3].

#### SUBTASK 47-43-04-020-002

- (4) Do these steps to remove the pressure sensor [1]:
  - (a) Do this task to disconnect the pressure sense line: Flareless Tubing Assembly Removal, TASK 20-10-09-000-801.

NOTE: Use a backup wrench on the pressure sensor [1] when you disconnect the pressure sense line.

- (b) Hold the pressure sensor [1] in its position.
- (c) Remove the bolts [4] (2 locations), washers [5] (2 locations), and the clamp [2].
- (d) Remove the pressure sensor [1].
- (e) Keep the clamp [2], bolts [4], and washers [5] for the installation.

### SUBTASK 47-43-04-420-001

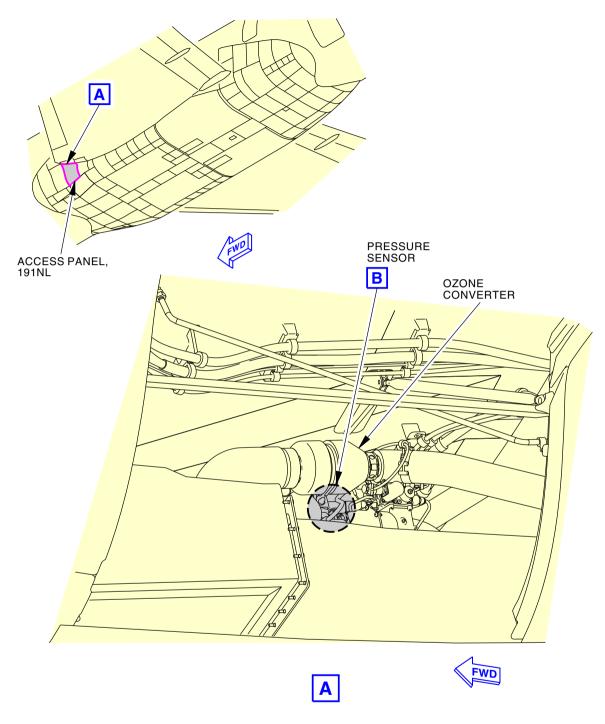
- EFFECTIVITY -

**ARO ALL** 

(5) Install a protective cover, STD-7423, on the pressure sense line.

------ END OF TASK ------





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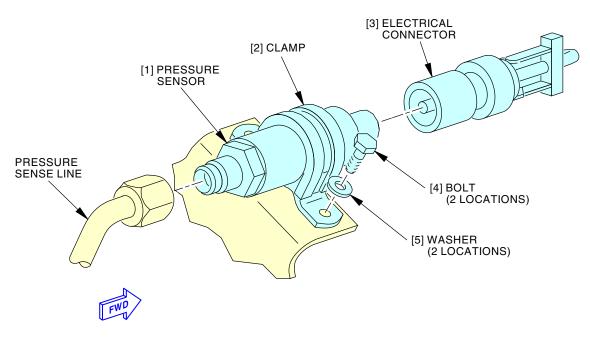
Pressure Sensor - Removal and Installation Figure 401/47-43-04-990-801 (Sheet 1 of 2)

ARO ALL

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PRESSURE SENSOR



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Pressure Sensor - Removal and Installation Figure 401/47-43-04-990-801 (Sheet 2 of 2)

ARO ALL

47-43-04

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#### TASK 47-43-04-400-801

## 3. Pressure Sensor Installation

(Figure 401)

### A. References

Reference	Title
20-10-09-400-801	Flareless Tubing Assembly Installation (P/B 401)
47-00-00-910-802	Nitrogen Generation System Precautions (P/B 201)
47-00-00-910-803	Ground Operation of the Nitrogen Generation System (P/B 201)

# **Tools/Equipment**

Reference	Description
STD-7423	Cover - Protective Tube

### C. Consumable Materials

Reference	Description	Specification
D50099	Grease - Aircraft and Instrument, Fuel and Oxidizer Resistant	MIL-PRF-27617 Type III (Supersedes MIL-G-27617)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

### D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity	
1	Pressure sensor	47-43-04-01-065	ARO ALL	

### E. Location Zones

Zone	Area
191	Forward Wing-to-Body Fairings, Left

### F. Access Panels

Number	Name/Location
191NL	Forward Wing To Body Fairing Panel

# G. Install the Pressure Sensor

SUBTASK 47-43-04-860-007



DO NOT TOUCH THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM WHEN THEY ARE HOT. WHEN THE COMPONENTS ARE HOT, THEY CAN CAUSE INJURIES TO PERSONNEL.



DO NOT DISCONNECT THE COMPONENTS OF THE NITROGEN GENERATION SYSTEM, OR DUCTS WHEN THE SYSTEM IS PRESSURIZED. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

47-43-04

- EFFECTIVITY -**ARO ALL** 



# (WARNING PRECEDES)



MAKE SURE THAT THE MAINTENANCE AREA IS FREE OF CONTAMINATION FROM SKYDROL, LUBRICANTS, SOLVENTS, FUEL, FUMES, EXHAUST, OR DUST. DO NOT LET SOLVENTS, LUBRICANTS, OTHER FLUIDS, OR THEIR FUMES GO INTO THE FLOW PATH TO OR FROM THE AIR SEPARATION MODULE. CONTAMINATION WILL CAUSE DAMAGE TO THE FIBERS IN THE AIR SEPARATION MODULE AND DECREASE THEIR LIFE.

(1) Obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-00-910-802.

#### SUBTASK 47-43-04-020-003

(2) Remove the protective cover, STD-7423, from the pressure sense line.

#### SUBTASK 47-43-04-920-002

KRYTOX 240AC IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN KRYTOX 240AC IS USED.



- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- · CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET KRYTOX 240AC IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- · DO NOT BREATHE THE GAS.
- DO NOT EAT KRYTOX 240AC.
- (3) Obey the grease, D50099, precautions when you assemble and disassemble NGS components.

#### SUBTASK 47-43-04-420-002

- (4) Do these steps to install the pressure sensor [1]:
  - (a) Put the clamp [2] and pressure sensor [1] into their position on the mounting bracket.
  - (b) Install the clamp [2] and pressure sensor [1] with the bolts [4] (2 locations) and washers [5] (2 locations).
  - (c) Do this task to connect the pressure sense line to the pressure sensor [1]: Flareless Tubing Assembly Installation, TASK 20-10-09-400-801.

NOTE: Use a backup wrench on the pressure sensor [1] when you connect the pressure sense line.

#### SUBTASK 47-43-04-420-003

(5) Connect the electrical connector [3].

# H. Operational Test for the Pressure Sensor

# SUBTASK 47-43-04-860-005

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

# Left Power Management Panel, P110

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
L	9	C47601	NGS CONTROL

ARO ALL



#### SUBTASK 47-43-04-790-001

- (2) Do this task: Ground Operation of the Nitrogen Generation System, TASK 47-00-00-910-803.
  - (a) With the NGS pressurized, use the leak detector, G50135, compound to do a check for leaks around the pressure sensor [1].
  - (b) Use a clean cotton wiper, G00034, to remove the leak detector, G50135, compound.
  - (c) Repair the leaks that you find.
- I. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-04-420-004

(1) Close this access panel:

<u>number</u>	Name/Location
191NL	Forward Wing To Body Fairing Panel
	——— END OF TASK ———
	END OF IASK