

CHAPTER

47

**INERT GAS
SYSTEM**



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<u>NGS FILTER - REMOVAL/INSTALLATION</u>	47-32-04		401	SIA ALL
NGS Filter Element - Removal TASK 47-32-04-000-802			401	SIA ALL
NGS Filter Element - Installation TASK 47-32-04-400-802			407	SIA ALL
NGS Filter Assembly - Removal TASK 47-32-04-000-801			409	SIA ALL
NGS Filter Assembly - Installation TASK 47-32-04-400-801			414	SIA ALL
<u>RAM AIR VALVE - REMOVAL/INSTALLATION</u>	47-32-05		401	SIA ALL
Ram Air Valve Removal TASK 47-32-05-000-801			401	SIA ALL
Ram Air Valve Installation TASK 47-32-05-400-801			406	SIA ALL
<u>ALTITUDE SENSOR - REMOVAL/INSTALLATION</u>	47-42-01		401	SIA ALL
Altitude Sensor Removal TASK 47-42-01-000-801			401	SIA ALL
Altitude Sensor Installation TASK 47-42-01-400-801			405	SIA ALL
<u>HIGH FLOW VALVE DIFFERENTIAL PRESSURE SENSOR - REMOVAL/INSTALLATION</u>	47-42-02		401	SIA ALL
High Flow Valve Differential Pressure Sensor Removal TASK 47-42-02-020-801			401	SIA ALL
High Flow Valve Differential Pressure Sensor Installation TASK 47-42-02-400-801			405	SIA ALL
<u>NGS OXYGEN SENSOR - REMOVAL/INSTALLATION</u>	47-42-03		401	SIA ALL
NGS Oxygen Sensor - Removal TASK 47-42-03-020-801			401	SIA ALL
NGS Oxygen Sensor - Installation TASK 47-42-03-420-801			406	SIA ALL

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CHAPTER 47
INERT GAS SYSTEM

<u>SUBJECT</u>	<u>CHAPTER SECTION SUBJECT</u>	<u>CONF</u>	<u>PAGE</u>	<u>EFFECT</u>
<u>FILTER DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION</u>	47-43-01		401	SIA ALL
Filter Differential Pressure Switch Removal TASK 47-43-01-000-801			401	SIA ALL
Filter Differential Pressure Switch Installation TASK 47-43-01-400-801			406	SIA ALL
<u>THERMAL SWITCH - REMOVAL/INSTALLATION</u>	47-43-02		401	SIA ALL
Thermal Switch Removal TASK 47-43-02-000-801			401	SIA ALL
Thermal Switch Installation TASK 47-43-02-400-801			405	SIA ALL
<u>THERMAL SWITCH - ADJUSTMENT/TEST</u>	47-43-02		501	SIA ALL
Thermal Switch Functional Test TASK 47-43-02-720-801			501	SIA ALL
<u>TEMPERATURE SENSOR - REMOVAL/INSTALLATION</u>	47-43-03		401	SIA ALL
Temperature Sensor Removal TASK 47-43-03-000-801			401	SIA ALL
Temperature Sensor Installation TASK 47-43-03-400-801			405	SIA ALL
<u>NGS PRESSURE SENSOR - REMOVAL/INSTALLATION</u>	47-43-04		401	SIA ALL
NGS Pressure Sensor Removal TASK 47-43-04-000-801			401	SIA ALL
NGS Pressure Sensor Installation TASK 47-43-04-400-801			405	SIA ALL

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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.
- B. In this procedure oxygen can be referred to as O2.

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 Aircraft Maintenance Manual (AMM) are identified by this note after each applicable CDCCL design feature:
 - 1) 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 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. CDCCLs 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, or applicable regulatory agency. 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:
 - 1) 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
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 that 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 MAINTENANCE THAT HAS AN EFFECT ON AN ALI. 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 that you follow the procedures for the items identified as ALIs.

————— END OF TASK —————

TASK 47-00-00-010-801

3. Nitrogen Generation System (NGS) Precautions

(Figure 201)

A. General

- (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) Main Wheel Well Precautions
 - (e) Nitrogen Generation System Maintenance Precautions

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- (f) 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 decreases 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 air conditioning compartment on the left side of the airplane. Access to the thermal control unit and air separation module (ASM) is through access door 192BL. The nitrogen-enriched air distribution system (NEADS) line is attached to the ASM and is routed to the center tank through the left wheel well. The NEADS line has 1/2 inch aluminum tubing, a dielectric hose, a flame arrestor, check valves, and an ejector nozzle.
 - (4) Operation of the nitrogen generation system causes the air inside the fuel tanks to decrease oxygen content. Do not breathe air in a fuel tank unless that tank is fully ventilated. Procedures for fuel tank purging and entry on airplanes equipped with a nitrogen generation system are given in FUEL, CHAPTER 28. Danger stencils and placards are installed adjacent to fuel tank access doors to warn you of the hazards that can occur if you breathe air with low oxygen content.
 - (5) NEA that is generated by the air separation module (ASM) 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.

B. References

Reference	Title
28	FUEL
28-11-00-910-801	Purging and Fuel Tank Entry Precautions (P/B 201)

C. Location Zones

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
192	Lower Wing-To-Body Fairing - Under Wing Box
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Physiological Effects of a Low Oxygen Content Environment

SUBTASK 47-00-00-910-003

- (1) NEA increases the nitrogen content and decreases the oxygen of the air. Breathing air without sufficient oxygen can have dangerous and immediate effects. If a person breathes air without sufficient oxygen, these health problems can occur:

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- (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.
- (b) An organic vapor filter respirator does not help a person breathe in a low oxygen environment.

SUBTASK 47-00-00-910-004

- (2) Make sure that you read and obey the warning placards in areas of nitrogen-enriched air. Read and obey the warnings in the maintenance instructions. Nitrogen generation equipment is dangerous because you cannot see or smell the gas. 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.

E. Fuel Tank Entry Precautions

SUBTASK 47-00-00-910-005

 WARNING	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 28-11-00-910-801.

F. Air Conditioning Compartment Precautions

SUBTASK 47-00-00-910-006

 WARNING	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.
---	--

 WARNING	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 air conditioning compartment and the left ram air duct bay:
 - (a) Make sure that the L PACK selector switch, on the P5-10 air conditioning panel, is in the OFF position.
 - (b) If the L PACK selector switch is in the AUTO position and the pack is on, do these steps:
 - 1) Make sure that a colleague is present to help you if necessary.
 - 2) Use extreme caution when entering the left air conditioning compartment or the wheel well.
 - 3) If there is an obvious NGS or NEADS leak, get out of the area and shut down the pneumatic air supply.

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G. Main Wheel Well Precautions

SUBTASK 47-00-00-910-007



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) Before you go into the wheel well do these steps:
 - (a) Make sure the L PACK selector switch, on the air conditioning panel, is in the OFF position.
 - (b) If the L PACK selector switch is in the AUTO position and the NGS is operating, do these steps:
 - 1) Make sure that colleague is present to help you if necessary.
 - 2) Do not go into the main wheel well area more than to waist level.
 - 3) If there is an obvious NGS leak, get out of the wheel well and shut off the pneumatic supply.
 - 4) There are no restrictions if the NGS system is locked out.

H. Nitrogen Generation System Maintenance Precautions

SUBTASK 47-00-00-910-008



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.

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

NOTE: The nitrogen generation equipment receives air from the wing bleed crossover duct. The heat exchanger decreases the air temperature from 300°F (149°C) - 400°F (204°C) to 160°F (71.1°C). A temperature of 160°F (71.1°C) will burn you if you touch the components.

NOTE: After the NGS stops, the cool down mode activates. The cool down mode prevents damage to the heat exchanger from the thermal shock of a fast cool down. The cool down mode drives the OTSOV and the ram air valve closed, and keeps the NGS shutoff valve open. After approximately 30 minutes, the NGS shutoff valve closes and the ram air valve opens.



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SUBTASK 47-00-00-910-009



WARNING

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 thermal control unit (TCU) components.

I. Air Separation Module Precautions

SUBTASK 47-00-00-910-010



CAUTION

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.



CAUTION

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 damage the ASM fibers.

NOTE: The ASM fibers are easily damaged.

SUBTASK 47-00-00-910-011



CAUTION

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 lubricants for the ASM and TCU.

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

————— **END OF TASK** —————

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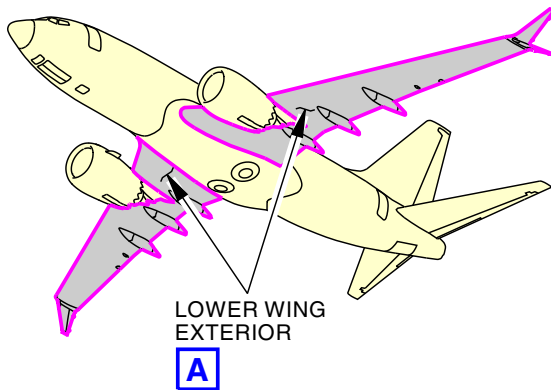
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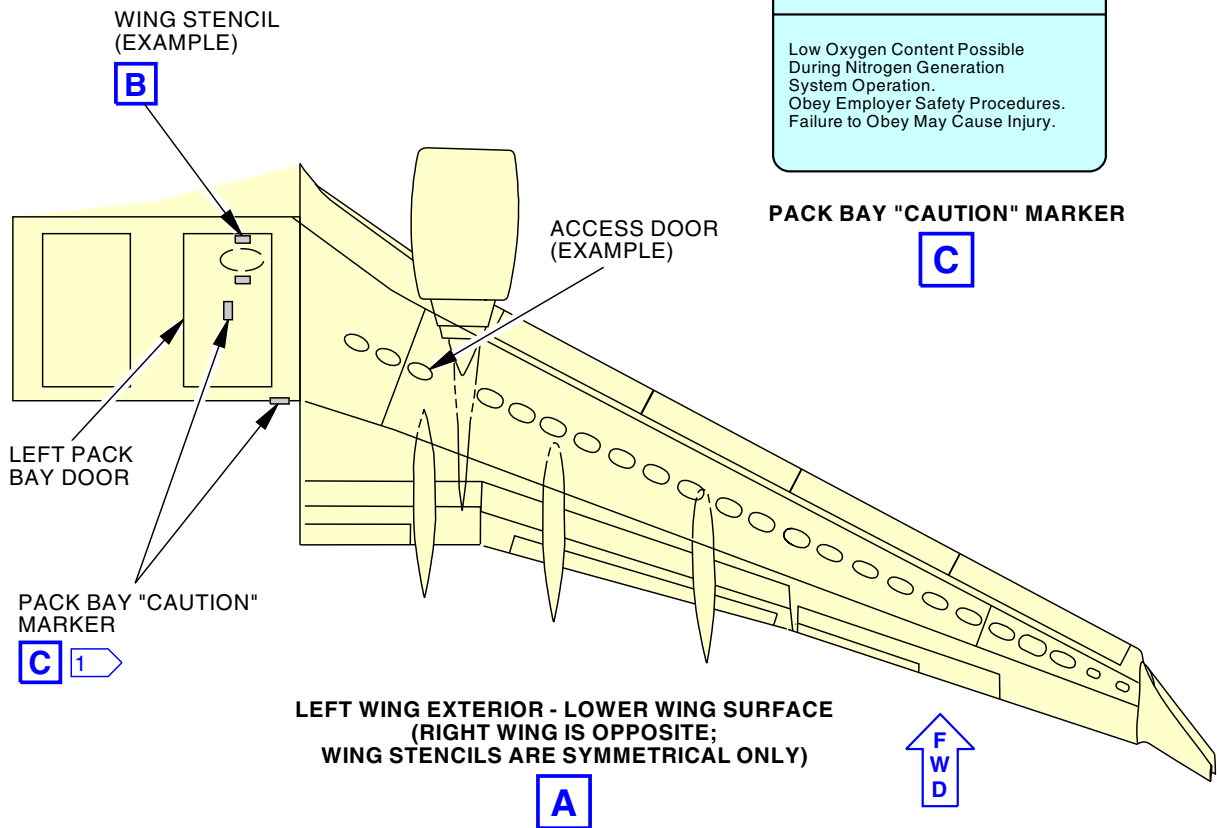


⚠ DANGER

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.

**WING STENCIL
(EXAMPLE)**

B



⚠ CAUTION

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

PACK BAY "CAUTION" MARKER

C

1 MARKERS LOCATE INSIDE THE LEFT PACK BAY DOOR
AND THE LEFT SIDE OF THE RAM COMPARTMENT ON
VAPOR BARRIER (AFT END, NEAREST WHEEL WELL)

2415303 S00061537524_V1

**Nitrogen Generation System Precautions
Figure 201/47-00-00-990-801 (Sheet 1 of 2)**

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CAUTION

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

A/C BAY PLACARD



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.

WING STENCIL



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.

TANK ENTRY PLACARD

2415304 S00061537525_V1

Nitrogen Generation System Precautions
Figure 201/47-00-00-990-801 (Sheet 2 of 2)

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TASK 47-00-00-800-801

4. Nitrogen Generation System Ground Operation

(Figure 202, Figure 203, Figure 204)

A. General

- (1) This task contains these procedures:
 - (a) Prepare for the Nitrogen Generation System Ground Operation
 - (b) Nitrogen Generation System - Electrical Test
 - (c) Pressurize the Environmental Control System (ECS) Air Supply System
 - (d) Nitrogen Generation System - System Test
 - (e) Nitrogen Generation System - Ground Operation
 - (f) Depressurize the ECS Air Supply System
 - (g) Put the Airplane Back to Its Usual Condition.
- (2) The Nitrogen Generation System (NGS) does not operate during refueling nor for a minimum of five minutes after refueling the center tank.

B. References

Reference	Title
21-00-00-800-803	Supply Conditioned Air with a Cooling Pack (P/B 201)
21-00-00-800-804	Remove Conditioned Air Supplied by a Cooling Pack (P/B 201)
32-09-00-860-802	Return the Airplane to the Ground Mode (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)
36-00-00-860-804	Supply Pressure to the Pneumatic System with One or Both Engines (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-31-02 P/B 201	BITE DISPLAY UNIT - MAINTENANCE PRACTICES
49-11-00-860-802	APU Usual Shutdown (P/B 201)

C. Location Zones

Zone	Area
124	Forward Cargo Compartment - Right
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door
621GB	Refuel Valve Door - Slat Station 125

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E. Prepare for the Nitrogen Generation System Ground Operation

SUBTASK 47-00-00-863-001

- (1) Make sure that the following Electric Motor-Driven Pump (EMDP) switches on the hydraulic pumps module (P5-8) are set to the OFF position:
 - (a) HYD PUMPS A ELEC 2.
 - (b) HYD PUMPS B ELEC 1.

SUBTASK 47-00-00-860-001

- (2) Make sure this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 47-00-00-860-002

- (3) Make sure that the airplane is in the ground mode.
 - (a) If the airplane is in the air mode, do this task: Return the Airplane to the Ground Mode, TASK 32-09-00-860-802.

SUBTASK 47-00-00-860-003

- (4) Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-00-00-010-001

- (5) Open these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

F. Nitrogen Generation System - Electrical Test

NOTE: This procedure does a test of the NGS power, Initiated Built In Test (IBIT), and Operability indicator.

SUBTASK 47-00-00-010-002

- (1) Go to the NGS BITE Display Unit (BDU) location.

SUBTASK 47-00-00-740-001

- (2) Use the BDU keys to set up the applicable Built-In-Test Equipment (BITE) initiated tests.

SUBTASK 47-00-00-740-002

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

NOTE: The BDU automatically goes into the standby mode after no activity for 5 minutes. To return to the main menu, push the ON/OFF button.

- (a) Make sure that the BDU is in the main menu mode.

NOTE: To return to the main menu, push the MENU button until Existing Faults? shows on the display.

SUBTASK 47-00-00-740-003

- (4) Select the Ground Tests? menu item.

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- (a) Push the up or down arrow button until Ground Test? shows.
- (b) Push the YES button on the BDU.

SUBTASK 47-00-00-740-004

- (5) Select the Electrical Test? menu item.
 - (a) Push the up or down arrow button until Electrical Test? shows.
 - (b) Push the YES button.

SUBTASK 47-00-00-740-005

- (6) The BITE test starts.

NOTE: TEST IN PROGRESS XXX% COMPLETE shows on the display while the test is in progress.

NOTE: The electrical test does an IBIT check of the operability indicator lights at 40 to 50 seconds after the test starts. You must make sure that the three colored lights come on in this sequence (Table 201):

Table 201/47-00-00-993-801

Light Color	System Indication	Time Light is On
Blue	Degraded Temporarily Serviceable	12 Seconds
Green	Operational	15 Seconds
Amber	Inoperative - Unserviceable	21 Seconds

SUBTASK 47-00-00-740-006

- (7) Make sure that the BDU shows ELECTRICAL TEST PASS at the end of the test.
 - (a) Make sure that the green OPERATIONAL light on the operability indicator is on.

SUBTASK 47-00-00-740-007

- (8) If the test fails, look at the BDU test results for the list of fault messages.

G. Pressurize the ECS Air Supply System

SUBTASK 47-00-00-740-008

- (1) Pressurize the pneumatic system (TASK 36-00-00-860-801).

NOTE: Use of engine(s) air to supply pneumatic pressure for this task is not recommended. All areas around operating engines are dangerous. If you must use the engine(s) to supply pneumatic power, make sure that you obey all applicable WARNINGS.

- (a) Make sure that these switches on the Air Conditioning Panel, P5-10, are in the positions shown (Table 202):

Table 202/47-00-00-993-802 P5-10 Panel - Switch Position

SWITCH	POSITION
BLEED APU	ON (if APU is running) OFF (if APU is not running)
Engine BLEED 1	ON (if engine is running) OFF (if engine is not running)
Engine BLEED 2	ON (if engine is running) OFF (if engine is not running)
Cabin Temp	AUTO

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Table 202/47-00-00-993-802 P5-10 Panel - Switch Position (Continued)

SWITCH	POSITION
ISOLATION VALVE	OPEN
L RECIRC FAN	AUTO
R RECIRC FAN	AUTO

SUBTASK 47-00-00-740-009

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

SUBTASK 47-00-00-860-020

- (3) On the P5-10 panel, do these steps:
- (a) Set the L PACK switch to the HIGH position.
 - (b) Set the R PACK switch of the OFF position.

SUBTASK 47-00-00-780-001

- (4) Do a check of the manifold duct pressure.
- (a) Look at the dual duct pressure gage on the Bleed Air Control Module, P5-10.
 - (b) Make sure that the L and R duct pressure is 20 psig (138 kPa) or more.

H. Nitrogen Generation System - System Test

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

NOTE: If the central fuel tank refuel valve has been opened for 13.8 minutes or more, the NGS system test will be inhibited until the next flight. If the center fuel tank refuel valve has been opened for less than 13.8 minutes, the NGS system test will be inhibited until the center fuel tank refuel valve has been closed for 300 seconds.

NOTE: The air conditioning packs must operate for approximately 120-150 seconds. This lets the packs become stable. The NGS system test will be inhibited until the packs are stable.

SUBTASK 47-00-00-860-017

- (1) Open and close these circuit breakers:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

NOTE: The circuit breakers should be open for 5 seconds at the same time to cycle the power to the NGS Controller.

SUBTASK 47-00-00-010-003

- (2) Go to the NGS BDU location.

SUBTASK 47-00-00-780-002

- (3) Use the BDU keys to set up the applicable BITE initiated tests.

NOTE: Refer to PAGEBLOCK 47-31-02/201 for information on the BDU menus.

SUBTASK 47-00-00-010-004

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

NOTE: The BDU automatically goes into the standby mode after no activity for 5 minutes. To return to the main menu, push the ON/OFF button.

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- (a) Make sure that the BDU is in the main menu mode.

NOTE: To return to the main menu, push the MENU button until EXISTING FAULTS shows.

SUBTASK 47-00-00-740-010

- (5) Select the Ground Tests? menu item.
 - (a) Push the up or down arrow button until Ground Test? shows.
 - (b) Push the YES button on the BDU.

SUBTASK 47-00-00-740-011

- (6) Select the System Test? menu item.
 - (a) Push the up or down arrow button until System Test? shows.
 - (b) Push the YES button.
 - 1) The system IBIT test begins.

NOTE: TEST IN PROGRESS XXX% COMPLETE shows on the display while the test is in progress.
 - 2) Wait until the system IBIT test is completed.

NOTE: The test takes two to three minutes to complete.

SUBTASK 47-00-00-740-012

- (7) Make sure that the BDU shows System Test Pass at the end of the test.
 - (a) If the test fails, look at the BDU test results for the list of fault messages.

I. Nitrogen Generation System - Ground Operation

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

NOTE: The NGS can be warmed faster by starting the NGS PERF HI FLOW test. This can only be done if the ambient temperature is less than 118°F (48°C).

SUBTASK 47-00-00-740-013

- (1) Make sure that the BDU initiated system test is completed first.

SUBTASK 47-00-00-740-014

- (2) Pressurize the pneumatic system (TASK 36-00-00-860-804, TASK 36-00-00-860-803).
 - (a) Let the NGS warm until the BDU display temperature reading shows 160 ±10°F (71.1 ±5.6°C).

NOTE: The system may take 30 minutes to warm in cold ambient temperatures. Before you start the functional test, make sure that the BDU temperature is 160 ±10°F (71.1 ±5.6°C).

SUBTASK 47-00-00-740-015

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

NOTE: The BDU automatically goes into the standby mode after no activity for 5 minutes. To return to the main menu, push the ON/OFF button.

 - (a) Make sure that the BDU is in the main menu mode.

NOTE: To return to the main menu, push the MENU button until existing faults shows on the display.

SUBTASK 47-00-00-740-016

- (4) Select the Ground Tests? menu item.
 - (a) Push the up or down arrow button until Ground Test? shows.

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- (b) Push the YES button on the BDU.

SUBTASK 47-00-00-740-017

- (5) Select the NGS PERF LO FLOW? menu item.
 - (a) Push the up or down arrow button until NGS PERF LOW FLOW? shows.
 - (b) Push the YES button to begin test.

SUBTASK 47-00-00-740-018

- (6) Make sure that the NGS shutoff valve opens.

NOTE: The NGS PERF LO FLOW test has started.

- (a) While the test is in progress, the subsequent messages show:
 - 1) GSE O2 SNS: XX.X% (or GSE 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 47-00-00-740-019

- (7) Look at the manual locking hex bolt [1] on the NGS shutoff valve.

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 NGS shutoff valve when the valve closes. The holes do not align when the valve does not fully close.

- (a) Make sure that the slot goes from the CLOSED position to the OPEN position.
NOTE: The manual lock arm turns 90 degrees in the counterclockwise direction when the NGS shutoff valve is fully open.
- (b) 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.
NOTE: The NGS shutoff valve is found in the FWD LH ECS bay.

SUBTASK 47-00-00-740-020

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

NOTE: The NGS shutoff valve stays in the incorrect open position when the NO button is not pushed after the MENU button is pushed.

SUBTASK 47-00-00-710-001

- (9) Make sure that the slot in the manual locking hex bolt [1] aligns with the word CLOSED on the NGS shutoff valve.

J. Depressurize the ECS Air Supply System

SUBTASK 47-00-00-864-001

- (1) Do the applicable task to remove pressure from the pneumatic system:
 - (a) Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.
 - (b) Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

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SUBTASK 47-00-00-864-002

- (2) Do a check of the manifold duct pressure:
- (a) Look at the dual duct pressure gage on the Bleed Air Control Module, P5-10.
 - (b) Make sure that the L and R duct pressure is 0 psig (0 kPa).

SUBTASK 47-00-00-864-003

- (3) If necessary, do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 47-00-00-410-001

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

————— **END OF TASK** —————

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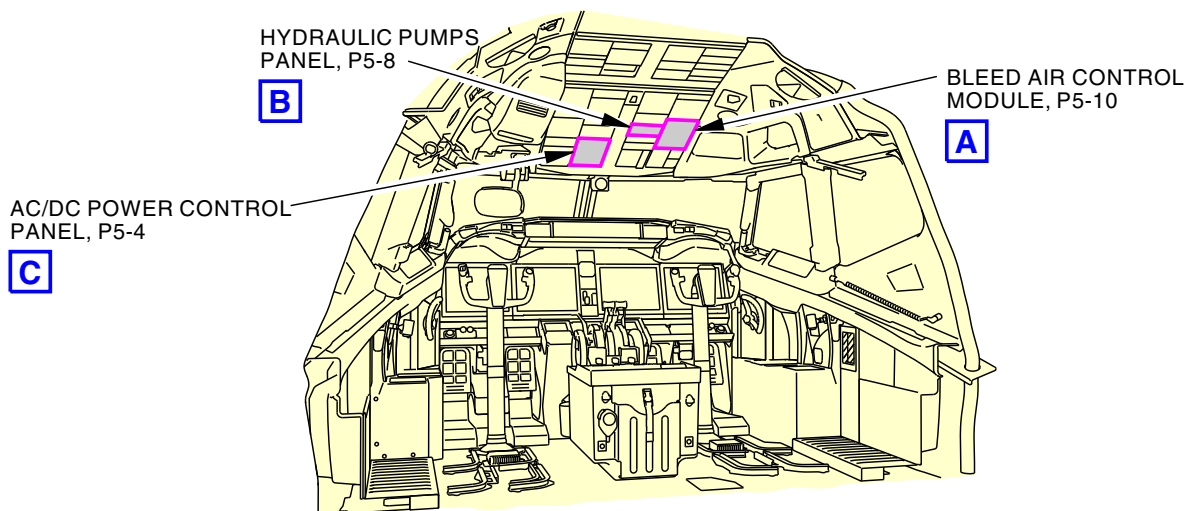
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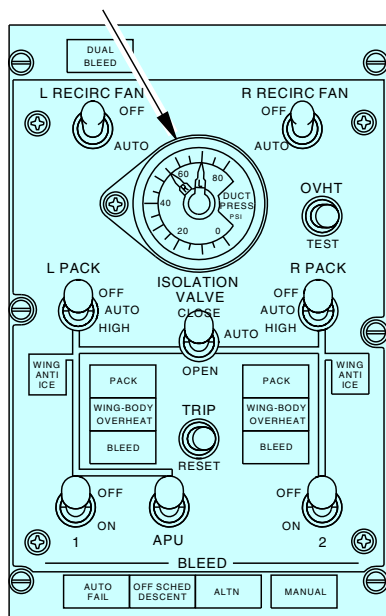
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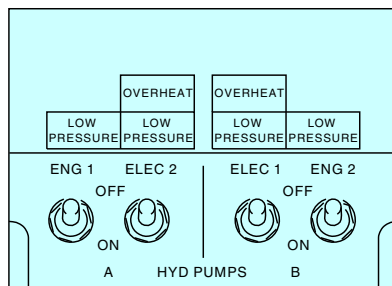
FLIGHT COMPARTMENT

DUAL DUCT PRESSURE GAGE



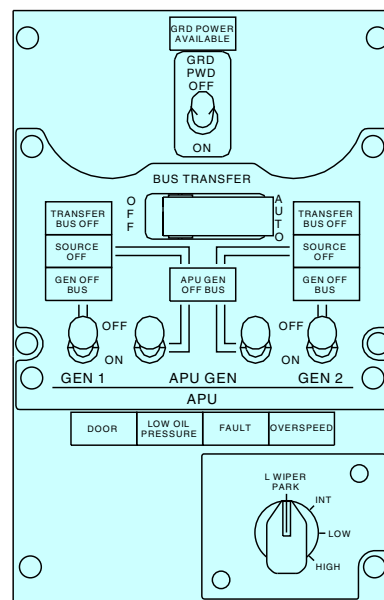
**BLEED AIR CONTROL
MODULE, P5-10**

A



**HYDRAULIC PUMPS
PANEL, P5-8**

B



**AC/DC POWER CONTROL
PANEL, P5-4**

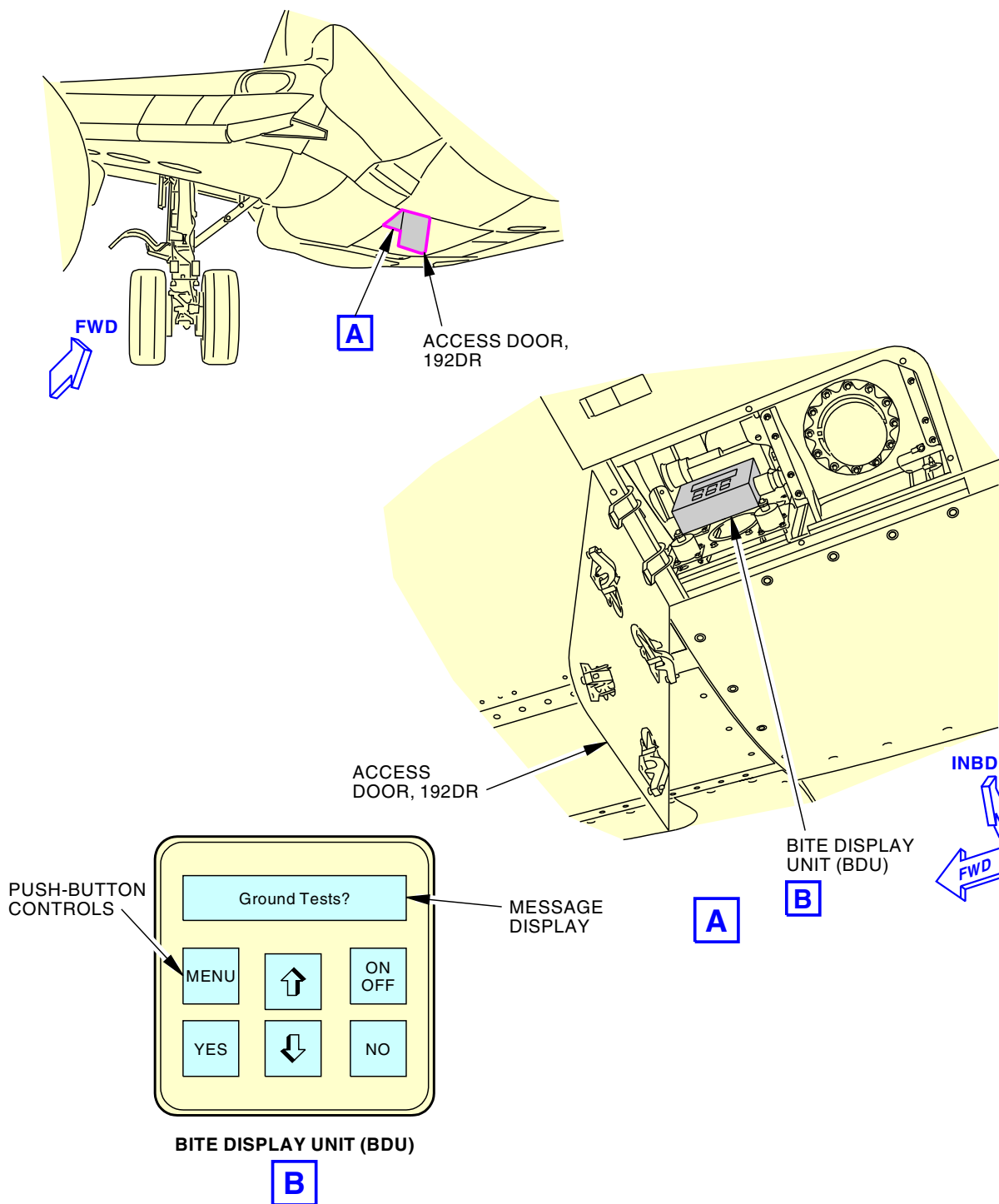
C

2415305 S00061537527_V1

NGS - Flight Deck Control Panels Figure 202/47-00-00-990-802

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2415306 S00061537528_V2

NGS - Bite Display Unit (BDU)
Figure 203/47-00-00-990-803

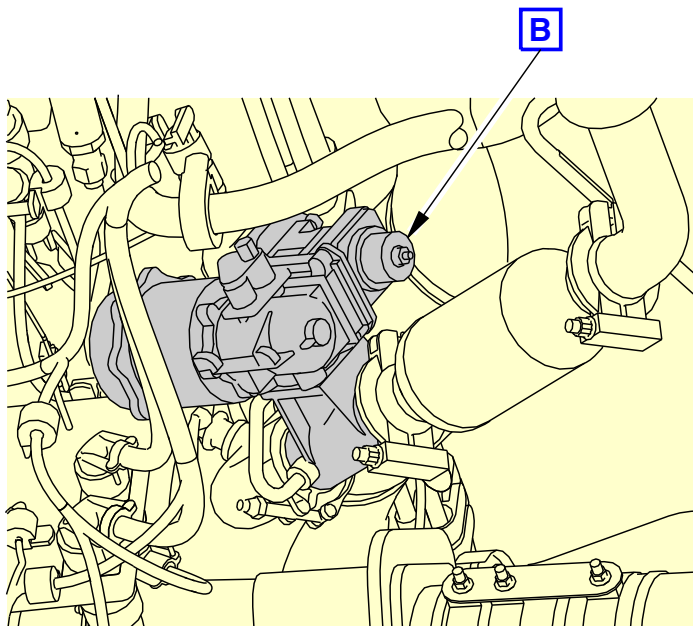
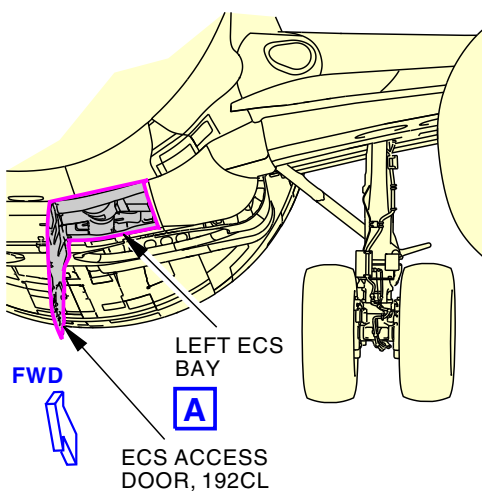
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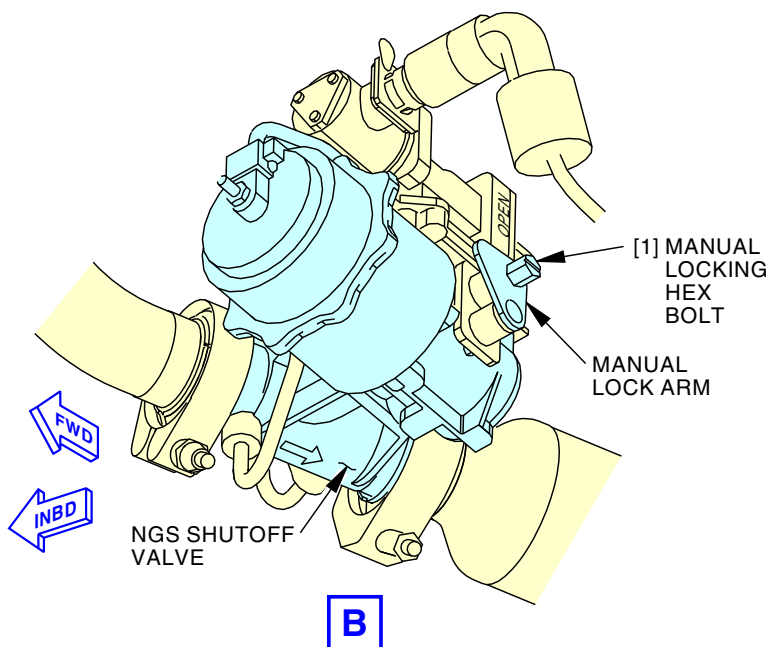
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LEFT ECS BAY

A



2415307 S00061537529_V2

NGS - NGS Shutoff Valve
Figure 204/47-00-00-990-804

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TASK 47-00-00-040-801

5. **Nitrogen Generation System - Deactivation**

(Figure 205)

A. **General**

- (1) This task deactivates the nitrogen generation system (NGS).

B. **Location Zones**

Zone	Area
------	------

192	Lower Wing-To-Body Fairing - Under Wing Box
-----	---

C. **Access Panels**

Number	Name/Location
--------	---------------

192DR	ECS High Pressure Access Door
-------	-------------------------------

D. **Procedure**

SUBTASK 47-00-00-020-001



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.



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) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

E. **Nitrogen Generation System - Tryout**

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

SUBTASK 47-00-00-020-002

- (1) Open this access door:

Number	Name/Location
--------	---------------

192DR	ECS High Pressure Access Door
-------	-------------------------------

SUBTASK 47-00-00-210-001

- (2) Go to the NGS Bite Display Unit (BDU) location.

SUBTASK 47-00-00-210-002

- (3) Push the ON/OFF button on the BDU to the ON position.

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

SUBTASK 47-00-00-410-002

(4) Close this access door:

<u>Number</u>	<u>Name/Location</u>
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

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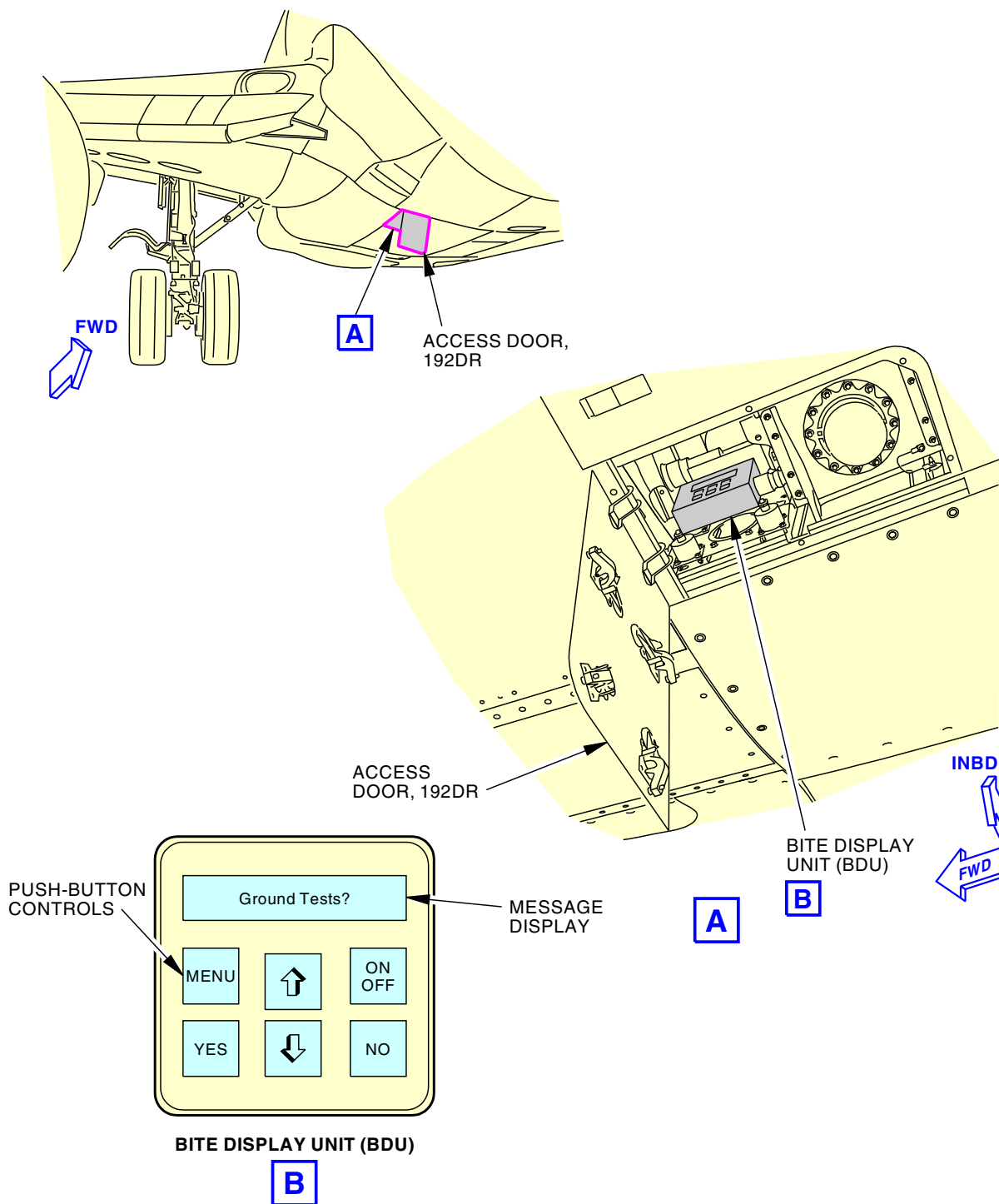
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NGS Bite Display Unit (BDU)
Figure 205/47-00-00-990-805

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TASK 47-00-00-440-801

6. **Nitrogen Generation System - Activation**

(Figure 205)

A. **General**

(1) This task activates the nitrogen generation system (NGS).

B. **Location Zones**

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

C. **Procedure**

SUBTASK 47-00-00-420-001



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.



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) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

————— **END OF TASK** —————

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NITROGEN GENERATION SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure has these tasks:
- (1) Functional Test of the Nitrogen Generation System
 - (2) Operational Test of the Cross Vent Check Valve
 - (3) Functional Test of the Oxygen Sensor.
- B. The Nitrogen Generation System (NGS) functional test checks the performance of the Air Separation Module (ASM). The ASM performance is measured by the purity of the Nitrogen Enriched Air (NEA) supplied to the center tank.
- C. To test the purity of the NEA, it is necessary to check the NGS operational temperature, pressure and the oxygen percentage in the NEA stream. The NGS temperature and pressure measurements are calculated by the NGS controller and shown on the BITE Display Unit (BDU). To test the oxygen percentage, an oxygen analyzer is connected to the Ground Support Equipment (GSE) test port on the Nitrogen-Enriched Air Distribution System (NEADS) line. The percent oxygen (displayed on the oxygen analyzer) and NGS inlet pressure (displayed on the BDU) are plotted on a GSE Go/No-Go criteria graph. The low flow and high flow NEA purity graphs for the ASM are supplied with this procedure.
- D. The purpose of the oxygen sensor functional test is to make sure that the sensor accurately detects the oxygen concentration of the air coming from the NGS.
- E. In this procedure oxygen can be referred to as O2.

TASK 47-00-00-720-801

2. Nitrogen Generation System - Functional Test

(Figure 501, Figure 502)

A. General

- (1) This task has these topics:
- (a) Prepare for the Functional Test
 - (b) Prepare the Oxygen Analyzer for the Test (If Used)
 - (c) NGS PERF LO FLOW Functional Test
 - (d) NGS PERF HI FLOW Functional Test
- (2) This task has an alternative tool to measure the oxygen concentration in the NEADS line. To measure the oxygen concentration, use the NGS BITE display unit (BDU) or the oxygen analyzer, COM-7456. The oxygen analyzer, COM-7456 can make sure that the NGS oxygen sensor operates correctly.

B. References

Reference	Title
21-00-00-800-804	Remove Conditioned Air Supplied by a Cooling Pack (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)
49-11-00-860-802	APU Usual Shutdown (P/B 201)

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C. Tools/Equipment

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

Reference	Description
COM-7456	Analyzer - Oxygen Part #: MODEL 111B Supplier: 1UM84
SPL-11507	Sense Line - Use with Oxygen Analyzer Model 111B Part #: H24004-124-5 Supplier: 11362

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

F. Prepare for the Functional Test

SUBTASK 47-00-00-040-001

- (1) Do ground operation procedure (Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801).
 - (a) Make sure that the ground operation passes before you continue.

SUBTASK 47-00-00-010-005

- (2) Open this access panel:

Number	Name/Location
192CL	ECS Access Door

SUBTASK 47-00-00-790-001

- (3) Do a fuel leak check in the NEADS line (TASK 47-21-00-700-801).

G. Prepare the Oxygen Analyzer for the Test (If Used)

NOTE: When you do the nitrogen-enriched air (NEA) purity check, there is the option to use the oxygen concentration shown on the BDU or the oxygen concentration shown by the oxygen analyzer, COM-7456.

SUBTASK 47-00-00-720-001

- (1) Read and obey the procedures supplied with the oxygen analyzer, COM-7456, and sense line, SPL-11507.

SUBTASK 47-00-00-720-002

- (2) Calibrate the oxygen analyzer, COM-7456, and make sure that the batteries are charged.

SUBTASK 47-00-00-720-003

- (3) Connect the oxygen analyzer, COM-7456, and the sense line, SPL-11507.

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- (a) Connect the sense line, SPL-11507, to the SAMPLE IN port.
 - 1) Make sure that the SAMPLE OUT exhaust port and vent are not blocked.
NOTE: An incorrect oxygen reading is sampled when the exhaust port or vent is blocked.
- (b) Set-up a platform adjacent to the ECS pack compartment.
 - 1) Make sure that the platform is not below the opening for the ECS pack compartment.
- (c) Attach the oxygen analyzer, COM-7456, to the platform.
 - 1) Make sure that the oxygen analyzer, COM-7456, is a minimum of 18 in. (0.5 m) above the ground.
- (d) Disconnect the cap on the GSE O₂ test port.
NOTE: The GSE O₂ test port is located in the aft section of 192CL, on beam 41 near the bottom.
- (e) Connect the sense line, SPL-11507, to the GSE O₂ test port.

SUBTASK 47-00-00-720-004

- (4) Energize the oxygen analyzer, COM-7456:
 - (a) Push the ON/OFF button on the control panel.
 - 1) Make sure that the green LED light comes on.
 - (b) Let the oxygen analyzer, COM-7456, warm up for two minutes.
NOTE: While the oxygen analyzer, COM-7456, warms up, the true oxygen percentage content initially over-shoots, then shows the correct percent oxygen value.
 - (c) Do not push the ON/OFF button during the test.
 - (d) Do not push the SPAN (Calibration) button during the test.

H. NGS PERF LO FLOW Functional Test

NOTE: This procedure does a check of the NEA purity for the ASM (low flow mode).

SUBTASK 47-00-00-740-021

- (1) Do the ground operation procedure (TASK 47-00-00-800-801).
 - (a) Make sure that you complete and pass the BDU System Test.
 - (b) Make sure that the BDU shows the NGS PERF LO FLOW during the NGS ground operation.
 - (c) Let the NGS warm until the BDU display temperature reading shows 160 ±10°F (71.1 ±5.6°C).
NOTE: For cold ambient temperatures, wait approximately 30 minutes for the system to warm up. Before you start the function test, make sure that the BDU temperature value is 160 ±10°F (71.1 ±5.6°C).

SUBTASK 47-00-00-740-022

- (2) When the BDU display temperature reading shows 160 ±10°F (71.1 ±5.6°C), push the MENU button on the BDU.

SUBTASK 47-00-00-740-023

- (3) Push the YES button to select the NGS PERF LO FLOW test.
NOTE: The NGS PERF LO FLOW test begins.

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- (a) Make sure that the NGS shutoff valve opens.

NOTE: The NGS shutoff valve is located in the FWD LH ECS bay between the bleed air inlet duct and the ozone converter.

- (b) While the test is in progress, the subsequent messages show:

- 1) GSE O2 SNS: XXXXX

NOTE: XXXXX is the O2 reading from the oxygen sensor and shows the subsequent: XX.X%, WARMING, OFF, or FAIL.

- 2) P: YY PSIA

NOTE: YY is the ASM outlet current pressure.

- 3) T: SZZZ F

NOTE: ZZZ is the current ASM inlet temperature.

S indicates a negative sign for negative values of temperature.

- 4) GSE TRANSITION

TO PERF BOOSTED

NOTE: This shows when the NGS high flow valve is opened.

SUBTASK 47-00-00-720-005

- (4) Do a check of the NGS temperature:

- (a) Record the NGS temperature from BDU using the following message:

- 1) T: SZZZ F

NOTE: ZZZ is the current ASM inlet temperature.

S indicates a negative sign for negative values of temperature.

- (b) Make sure that the BDU temperature is $160 \pm 10^{\circ}\text{F}$ ($71.1 \pm 5.6^{\circ}\text{C}$).

SUBTASK 47-00-00-720-006

- (5) Do a check of the NGS pressure:

- (a) Record the NGS pressure from the BDU using the following message:

- 1) P: YY PSIA

NOTE: YY is the ASM outlet current pressure.

- (b) On the flight deck P5 forward overhead panel, record the left duct pressure from the dual duct pressure gage.

NOTE: The dual duct pressure gage shows the pressure in PSIG.

- (c) Compare the pressure value on BDU with the pressure value on the dual duct pressure gage.

NOTE: Convert the pressure value from PSIA to PSIG by subtracting 14.7 psi from the reported BDU pressure (Figure 503).

- (d) Make sure that the BDU pressure is not lower than the dual duct pressure by 8 psig (55 kPa) by comparing gage values.

SUBTASK 47-00-00-720-007

- (6) Do a check of the NEA purity:

- (a) BDU OXYGEN SAMPLE PRIMARY METHOD;

- 1) Record the oxygen percentage from the BDU using the following message:

EFFECTIVITY
SIA ALL

D633AM101-SIA

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- a) GSE O2 SNS: XXXXX

NOTE: XXXXX is the O2 reading from the oxygen sensor and shows the subsequent: XX.X%, WARMING, OFF, or FAIL.

- (b) OXYGEN ANALYZER SAMPLE ALTERNATE METHOD;
- 1) Record the PERCENT OXYGEN from the oxygen analyzer, COM-7456.
 - 2) Record the left duct pressure from the dual duct pressure gage on the P5 forward overhead panel to measure NGS inlet pressure in psig.
 - 3) Use the GSE Go/No Go Criteria at Low Flow graph to plot the NGS inlet pressure and NEA purity (% O₂) data point (Figure 502).
 - 4) Make sure that the NGS pressure/NEA purity data point is in the go-zone area of the curve.

SUBTASK 47-00-00-740-026



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

SUBTASK 47-00-00-740-045

- (8) Push the ON/OFF button on the oxygen analyzer, COM-7456, to shut off the power.

I. NGS PERF HI FLOW Functional Test

NOTE: This procedure does a purity check of the NEA for the ASM (high flow mode).

SUBTASK 47-00-00-720-008

- (1) Do not start the NGS PERF HI FLOW test if the ambient temperature is more than 118°F (48°C).

NOTE: Ground operation of the NGS in high flow mode, with high ambient temperatures, can cause the system to get too hot.

SUBTASK 47-00-00-740-027

- (2) Do the ground operation procedure (TASK 47-00-00-800-801).
- (a) Make sure that you complete and pass the BDU System Test.
 - (b) Make sure that the BDU shows the NGS PERF LO FLOW during the NGS ground operation.
 - (c) Let the NGS warm until the BDU display temperature reading shows 160 ±10°F (71 ±6°C).

NOTE: For cold ambient temperatures, wait approximately 30 minutes for the system to warm up. Before you start the function test, make sure that the temperature value from the BDU display is 160 ±10°F (71 ±6°C).

SUBTASK 47-00-00-740-028

- (3) When the BDU display temperature reading shows 160 ±10°F (71 ±6°C), push the MENU button on the BDU.

NOTE: The BDU display shows NGS PERF LO FLOW.

- (a) Push the NO button to return to the ground test mode.

SUBTASK 47-00-00-740-029

- (4) Select the NGS PERF HI FLOW test.

EFFECTIVITY
SIA ALL

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SUBTASK 47-00-00-720-009

- (5) Push the YES button on the BDU.

NOTE: The NGS PERF HI FLOW test begins.

- (a) Make sure that the NGS shutoff valve opens.

NOTE: The NGS shutoff valve is located in the FWD LH ECS bay between the bleed air inlet duct and the ozone converter.

- (b) While the test is in progress, the subsequent message shows:

- 1) GSE O2 SNS: XXXXX

NOTE: XXXXX is the O2 reading from the oxygen sensor and shows the subsequent: XX.X%, WARMING, OFF, or FAIL.

- 2) P: YY PSIA

NOTE: YY is the ASM outlet current pressure.

- 3) T: SZZZ F

NOTE: ZZZ is the current ASM inlet temperature.

S indicates a negative sign for negative values of temperature.

SUBTASK 47-00-00-740-030

- (6) Do a check of the NGS temperature:

- (a) Record the NGS temperature from BDU using the following message:

- 1) T: SZZZ F

NOTE: ZZZ is the current ASM inlet temperature.

S indicates a negative sign for negative values of temperature.

- (b) Make sure that the BDU temperature is $160 \pm 10^{\circ}\text{F}$ ($71 \pm 6^{\circ}\text{C}$).

SUBTASK 47-00-00-740-031

- (7) Do a check of the NGS pressure:

- (a) Record the NGS pressure from the BDU using the following message:

- 1) P: YY PSIA

NOTE: YY is the ASM outlet current pressure.

- (b) On the flight deck P5 forward overhead panel, record the left manifold duct pressure from the dual duct pressure gage.

NOTE: The dual duct pressure gage shows the pressure in PSIG.

- (c) Compare the pressure value on BDU with the pressure on the dual duct pressure gage.

NOTE: Convert the pressure value from PSIA to PSIG by subtracting 14.7 psi from the reported BDU pressure (Figure 503).

- (d) Make sure that the BDU pressure is not lower than the dual duct pressure by 8 psi (55 kPa) by comparing gage values.

SUBTASK 47-00-00-740-032

- (8) Do a check of the NEA purity:

- (a) BDU OXYGEN SAMPLE PRIMARY METHOD;

- 1) Record the oxygen percentage from the BDU using the following message:

EFFECTIVITY
SIA ALL

D633AM101-SIA

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- a) GSE O2 SNS: XXXXX

NOTE: XXXXX is the O2 reading from the oxygen sensor and shows the subsequent: XX.X%, WARMING, OFF, or FAIL.

- 2) Make sure that the oxygen concentration (GSE O2 SNS) is less than 15 %.

- (b) OXYGEN ANALYZER SAMPLE ALTERNATE METHOD;

- 1) Record the percent oxygen from the oxygen analyzer, COM-7456.
- 2) Record the left duct pressure from the dual duct pressure gage on the P5 forward overhead panel to measure NGS inlet pressure in psig.
- 3) Use the GSE Go/No Go Criteria at High Flow graph to plot the NGS inlet pressure and NEA purity (% O₂) data point (Figure 502).
- 4) Make sure that the NGS pressure/NEA purity data point is in the go-zone area of the curve.

SUBTASK 47-00-00-740-033



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.

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

SUBTASK 47-00-00-720-010

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

SUBTASK 47-00-00-740-046

- (11) Push the ON/OFF button on the oxygen analyzer, COM-7456, to shut off the power.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-00-00-720-011

- (1) Remove pressure from the following systems:
- (a) Do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.
 - (b) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 47-00-00-080-001

- (2) Disconnect the sense line, SPL-11507, from the GSE O₂ test port.
- (a) Install the cap on the GSE O₂ test port.

SUBTASK 47-00-00-080-002

- (3) Remove the oxygen analyzer, COM-7456.

SUBTASK 47-00-00-741-001

- (4) Check the duct pressure on the dual duct pressure gage:
- (a) Make sure that the DUCT PRESS L and R indicators shows 0 psig (0 kPa).

SUBTASK 47-00-00-741-002

- (5) Shutdown the APU (TASK 49-11-00-860-802).

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SIA ALL

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SUBTASK 47-00-00-410-003

(6) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

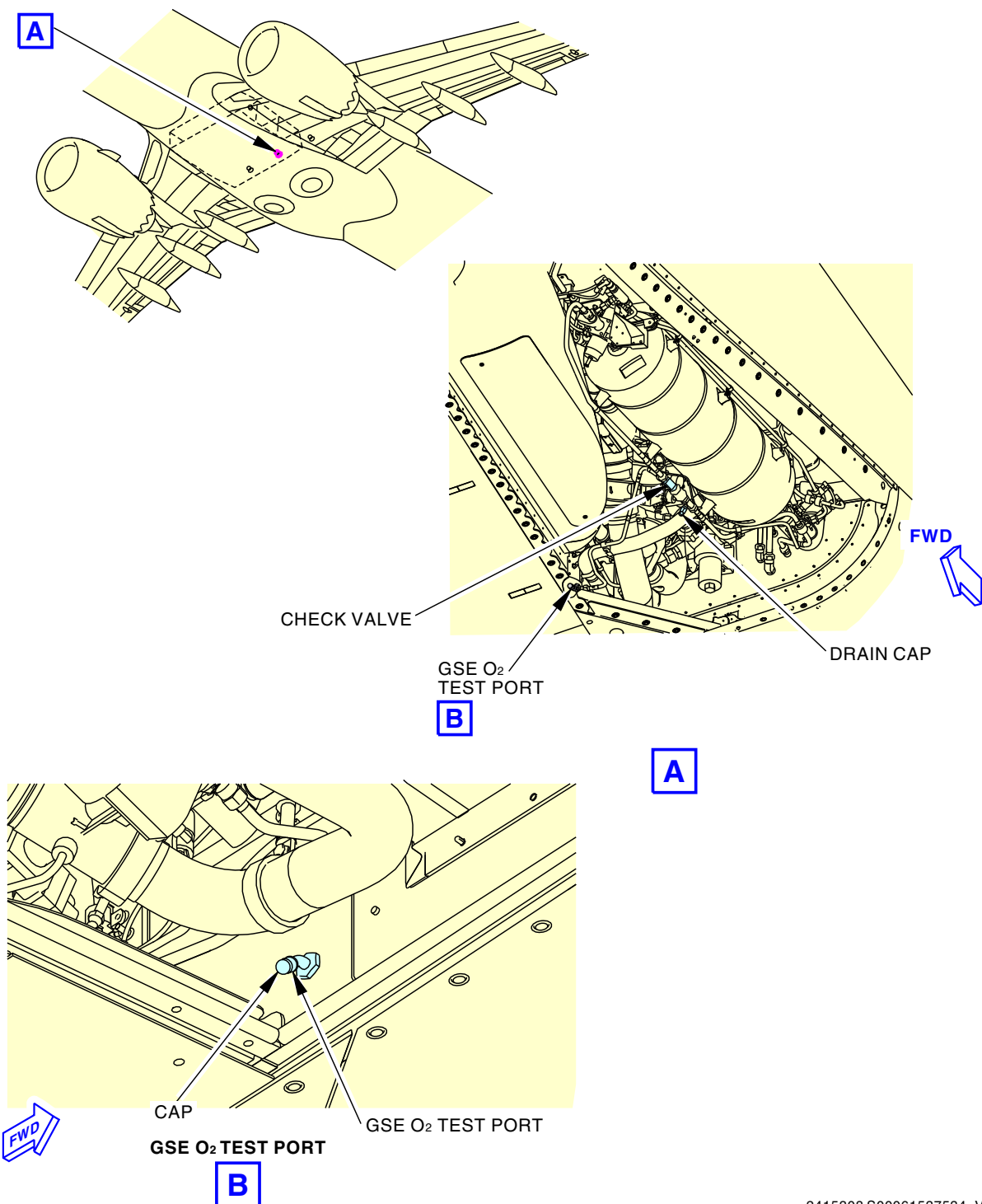
EFFECTIVITY
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2415308 S00061537534_V1

GSE O₂ Test Port Location
Figure 501/47-00-00-990-806

EFFECTIVITY
SIA ALL

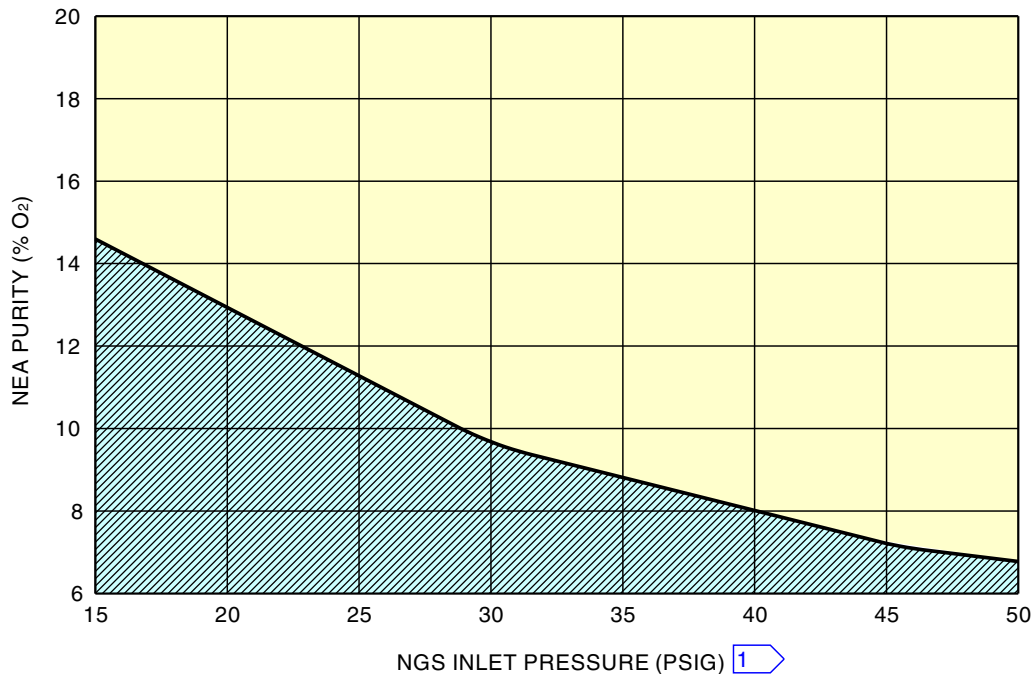
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GSE GO/NO-GO CRITERIA AT LOW FLOW

LEGEND:

- NEA PURITY SATISFACTORY (GO ZONE)
- NEA PURITY NOT SATISFACTORY (NO-GO ZONE)

NOTE:

VALUES REPORTED ON THE BDU ARE IN PSIA.

1 PSIG = PSIA - 14.7 PSI

2415309 S00061537535_V1

GSE Go/No-Go Criteria
Figure 502/47-00-00-990-807 (Sheet 1 of 2)

EFFECTIVITY
SIA ALL

D633AM101-SIA

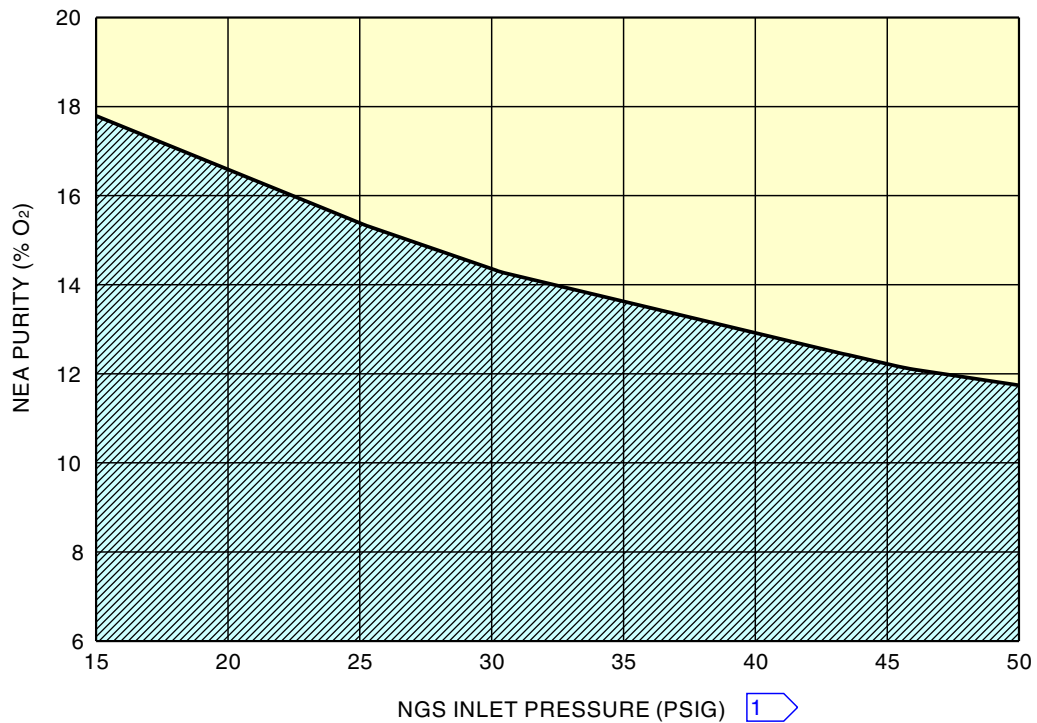
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GSE GO/NO-GO CRITERIA AT HIGH FLOW

LEGEND:

- NEA PURITY SATISFACTORY (GO ZONE)
- NEA PURITY NOT SATISFACTORY (NO-GO ZONE)

NOTE:

VALUES REPORTED ON THE BDU ARE IN PSIA.

2415310 S00061537536_V1

GSE Go/No-Go Criteria
Figure 502/47-00-00-990-807 (Sheet 2 of 2)

EFFECTIVITY
SIA ALL

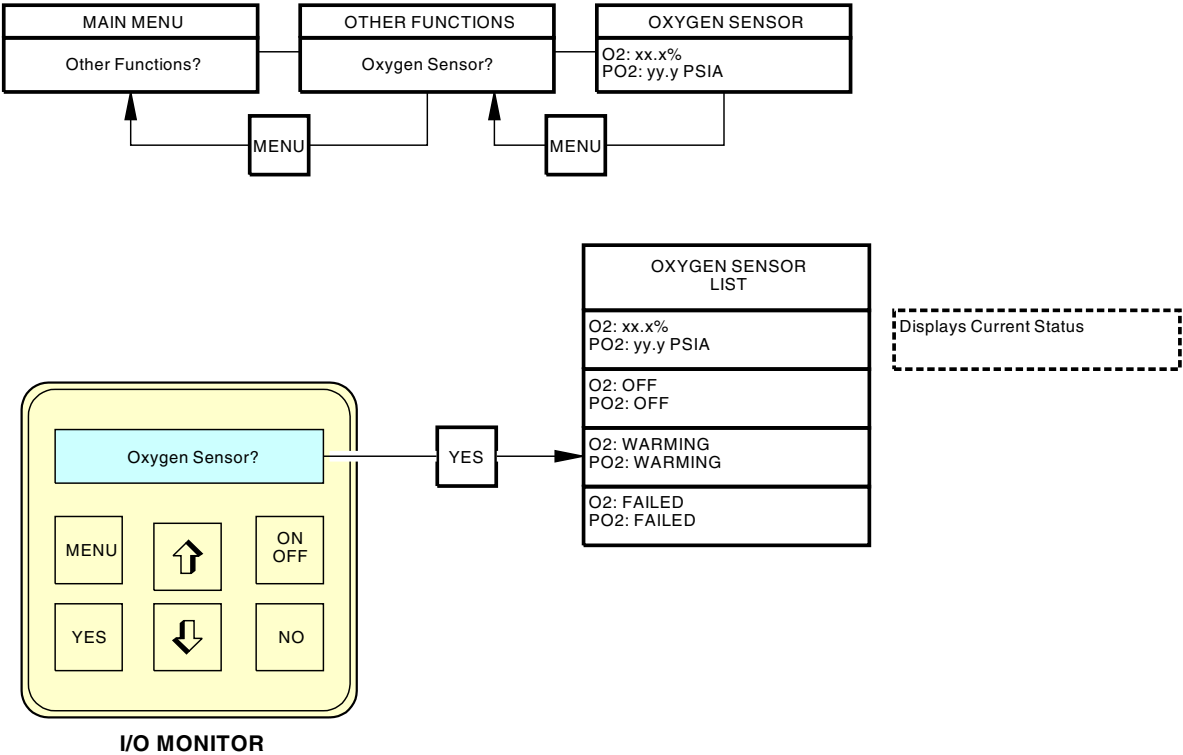
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NOTE:
THE FOLLOWING METHOD SHOULD BE USED TO CONVERT PSIG TO PSIA:
DETERMINE THE FIELD ATMOSPHERIC PRESSURE (IN INCHES OF MERCURY). DIVIDE THE
FIELD ATMOSPHERIC PRESSURE BY 2.036 AND ADD THE RESULT TO THE GAUGE PRESSURE
(PSIG) TO GIVE THE ABSOLUTE 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

Functional Menu
Figure 503/47-00-00-990-813

EFFECTIVITY
SIA ALL

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TASK 47-00-00-710-801

3. **Cross Vent Check Valve - Operational Test**

(Figure 504)

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) The cross vent check valve opens during over fuel conditions to relieve fuel tank pressure. The cross vent check valve is normally closed to prevent ambient air from entering the center tank during the descent phase of flight.

B. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)
28-11-11-400-802	Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) 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)
47-21-05-420-801	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
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
633AB	Surge Tank Access Door - Wing Station 655

F. Prepare for the Test



WARNING

CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE FUEL TANK. IF YOU DO NOT OBEY THE SAFETY PROCEDURES, YOU CAN CAUSE AN EXPLOSION. AN EXPLOSION WILL CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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SIA ALL

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(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.

SUBTASK 47-00-00-010-006



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) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

- (a) Open this access door:

(TASK 28-11-11-000-802)

<u>Number</u>	<u>Name/Location</u>
---------------	----------------------

633AB	Surge Tank Access Door - Wing Station 655
-------	---

G. Cross Vent Check Valve Operational Test

SUBTASK 47-00-00-710-002

- (1) Make a hook from a piece of 16 gauge wire, STD-1153, or equivalent.

SUBTASK 47-00-00-710-003

- (2) Insert the hook into the tang hole on the lower side of the flapper.

NOTE: Do not scratch or mar the surface of the flapper.

SUBTASK 47-00-00-710-004

 47-AWL-06: ALI

- (3) 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-06.

SUBTASK 47-00-00-710-005

 47-AWL-06: ALI

- (4) 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-06.

- (a) If the flapper does not open or seat correctly on the cross vent check valve.

1) Do this task: Cross Vent Check Valve Removal, TASK 47-21-05-000-801.

2) Do this task: Cross Vent Check Valve Installation, TASK 47-21-05-420-801.

- (b) If the cross vent check valve operation is satisfactory, remove the wire from the tang on the flapper.

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SIA ALL

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SUBTASK 47-00-00-210-004

- (5) Make sure that the surface of the cross vent check valve has not been scratched or marred.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 47-00-00-410-004

- (1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

- (a) Close this access panel:

(TASK 28-11-11-400-802)

<u>Number</u>	<u>Name/Location</u>
633AB	Surge Tank Access Door - Wing Station 655

————— **END OF TASK** —————

EFFECTIVITY
SIA ALL

D633AM101-SIA

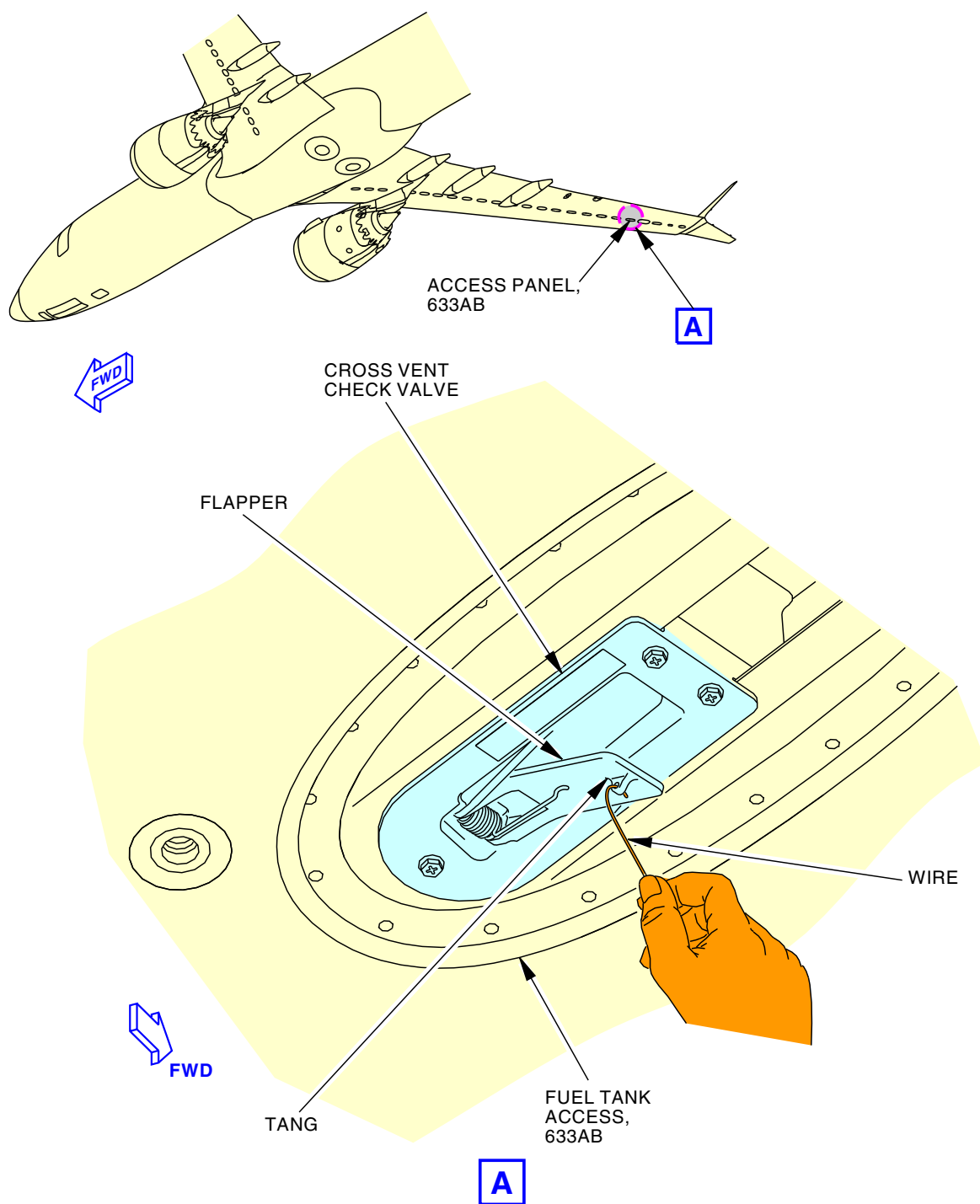
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2415311 S00061537538_V1

Cross Vent Check Valve - Test
Figure 504/47-00-00-990-808

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TASK 47-00-00-720-802

4. **Oxygen Sensor - Functional Test**

(Figure 505, Figure 506, Figure 507)

NOTE: This procedure is a scheduled maintenance task.

A. General

- (1) This task performs a functional test of the Nitrogen Generation System (NGS) oxygen sensor to make sure that the oxygen sensor accurately measures the oxygen concentration of the air coming from NGS.
- (2) To test the oxygen sensor, an oxygen sensor test equipment is connected to the NGS oxygen sensor. The percent oxygen from the certified cylinder is compared to the percent oxygen displayed on the BITE Display Unit (BDU). The test equipment provides certified air with $7.0 \pm 0.5\%$ oxygen content to the oxygen (O₂) sensor at 43.5 ± 3.0 psia (300 ± 21 kPa) pressure.
- (3) Exercise caution to avoid impacts to the oxygen sensor test equipment compressed gas cylinder integral pneumatic fitting or to the regulator assembly following its installation on the gas cylinder.
- (4) Store and transport the oxygen sensor test equipment in the stowed configuration inside the protective case with the regulator assembly separated from the gas cylinder and the gas cylinder shipping cap installed. Do not remove the compressed gas cylinder from the case during procedure.
- (5) If the test equipment relief valve is actuated at any time, immediately close test equipment gas cylinder shut-off valve and adjust the test equipment pressure regulator to 0 psig (0 kPa) outlet pressure. Open the test equipment vent valve to reduce the calibrated pressure gauge reading to 0 psig (0 kPa).
- (6) 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-09.

B. References

Reference	Title
24-22-00-860-801	Supply Electrical Power (P/B 201)
24-22-00-860-802	Remove Electrical Power (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-31-02-740-805	BDU Other Function Menu (P/B 201)
47-42-03 P/B 401	NGS OXYGEN SENSOR - REMOVAL/INSTALLATION

C. Tools/Equipment

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

Reference	Description
SPL-19703	Test Equipment - Oxygen Sensor, NGS Part #: C47002-30 Supplier: 81205

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D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

G. Prepare for the Functional Test

SUBTASK 47-00-00-210-005

- (1) Examine the label on the compressed gas cylinder included in test equipment, SPL-19703.

 47-AWL-09: ALI

- (a) Make sure that the label on the compressed gas cylinder shows $7.0 \pm 0.5\%$ oxygen concentration and the remainder nitrogen with a certified measurement accuracy within $\pm 0.05\%$ oxygen concentration.

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-09.

- (b) Make sure that the expiration date has not passed.

SUBTASK 47-00-00-480-002

- (2) Locate test equipment, SPL-19703, under the ECS High Pressure Access Door, 192DR.

SUBTASK 47-00-00-010-010



WARNING

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. THIS CAN CAUSE INJURY TO PERSONNEL.

- (3) Open these access panels:

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

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H. Oxygen Sensor Functional Test

SUBTASK 47-00-00-480-001



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.

- (1) Disconnect the tube assembly from the oxygen sensor at the 45-degree fitting interface.

SUBTASK 47-00-00-420-004

- (2) Connect the test equipment, SPL-19703, to the sensor (Figure 505).
 - (a) Remove the protective shipping cap from the compressed gas cylinder.
 - (b) Make sure that the gas cylinder shutoff valve and regulator shutoff valve are closed.

NOTE: Pressure regulator should be closed.
 - (c) Connect the regulator assembly to the compressed gas cylinder.

NOTE: A regulator to cylinder connection has a left hand thread.
 - (d) Loosen the swivel nut of the 45-degree fitting at the NGS oxygen sensor inlet and rotate the open 45-degree fitting 90 degrees clockwise to allow connection with the test equipment.
 - (e) Re-tighten the 45-degree fitting swivel nut to 140 ± 7 in-lb (16 ± 1 N·m).
 - (f) Install the test equipment plug on the interface of the disconnected tube assembly.
 - (g) Connect the test equipment adapter fitting at the end of the hose to the open 45-degree fitting interface.
 - (h) Open the gas cylinder shutoff valve.
 - (i) Open the regulator shutoff valve.

SUBTASK 47-00-00-610-001

- (3) Turn on the digital absolute pressure gauge.

47-AWL-09: ALI

SUBTASK 47-00-00-820-001



YOU MUST USE EAR PROTECTION AND EYE GOGGLES WHEN YOU USE COMPRESSED AIR. IF YOU DO NOT WEAR EAR PROTECTION AND EYE GOGGLES, AN INJURY TO YOUR EYES OR EARS CAN OCCUR.

- (4) Adjust the pressure regulator until the digital pressure gauge reads 43.5 ± 3.0 psia (300 ± 21 kPa).

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-09.

SUBTASK 47-00-00-420-002

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

SUBTASK 47-00-00-610-002

- (6) Operate the BDU control panel for the Oxygen Sensor mode (BDU Other Function Menu, TASK 47-31-02-740-805).

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- (a) Let the oxygen sensor warm up.

NOTE: The oxygen sensor can take up to 15 minutes to warm up. BDU will read GSE
O2 SNS: WARM while warming up.

SUBTASK 47-00-00-720-014

- (7) Compare the BDU indication to the known purity of the certified cylinder and to the pressure measurement downstream of the regulator on the oxygen sensor test equipment.

 47-AWL-09: ALI

- (a) Make sure that the difference in oxygen gas concentration between the certified gas mixture and the NGS-BDU oxygen sensor indication is 0.5% or less and the difference in pressure between the digital absolute pressure gauge and the NGS-BDU oxygen sensor indication is 0.9 psi (6.2 kPa) or less.

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-09.

 47-AWL-09: ALI

- 1) If the difference between the certified gas cylinder oxygen concentration and the NGS-BDU oxygen sensor indication is more than 0.5%, or the difference between the digital absolute pressure gauge measurement and the NGS-BDU oxygen sensor indication is more than 0.9 psi (6.2 kPa), replace the NGS oxygen sensor (PAGEBLOCK 47-42-03/401).

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-09.

SUBTASK 47-00-00-720-015

- (8) Stop operation of BDU control panel, press MENU on BDU.

SUBTASK 47-00-00-020-005

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

SUBTASK 47-00-00-610-003

- (10) Close the gas cylinder shutoff valve.

SUBTASK 47-00-00-020-004

- (11) Disconnect the test equipment, SPL-19703, from the oxygen sensor.

- (a) Remove vent plug from vent valve before venting.
- (b) Open the test equipment vent valve to vent the line pressure to 0 psig (0 kPa).
- (c) Close the test equipment vent valve.
- (d) Make sure that all pressure gauges indicate 0 psig (0 kPa).
- (e) Install vent plug back to outlet of vent valve.
- (f) Close the regulator shutoff valve.
- (g) Disconnect the test equipment hose end adapter from the 45-degree fitting.
- (h) Remove the test equipment plug from the tube assembly.
- (i) Adjust the test equipment pressure regulator to fully closed (CCW).

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- (j) Disconnect the regulator from the gas cylinder.

NOTE: A regulator to cylinder connection has a left hand thread.

SUBTASK 47-00-00-420-003

- (12) Connect the aircraft tube assembly to the oxygen sensor.
- (a) Loosen the 45-degree fitting swivel nut and rotate the 45-degree fitting 90 degrees counter clock-wise to return to the production orientation.
 - (b) Tighten the 45-degree fitting swivel nut to finger tight.
 - (c) Re-connect the tube assembly to the 45-degree fitting.
 - 1) Tighten the tube assembly fitting to 170 ± 8 in-lb (19 ± 1 N·m).
 - (d) Tighten the 45-degree fitting swivel nut that is connected to the oxygen sensor to 140 ± 7 in-lb (16 ± 1 N·m).
 - (e) Make sure that the oxygen sensor interface fitting is tighten to 140 ± 7 in-lb (16 ± 1 N·m).

SUBTASK 47-00-00-790-018

- (13) Operate the NGS in the low flow mode (ground operation of the NGS), do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Apply a small quantity of leak detector, G50135, to the oxygen sensor inlet.
 - (b) Examine the oxygen sensor interface fitting and 45 degree fitting for a leak.

NOTE: No leakage is permitted

 - 1) If leakage is detected, suspend NGS operation and re-tighten the fitting.
 - (c) Use a clean cotton wiper, G00034, to remove the leak detector.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-00-00-410-008

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

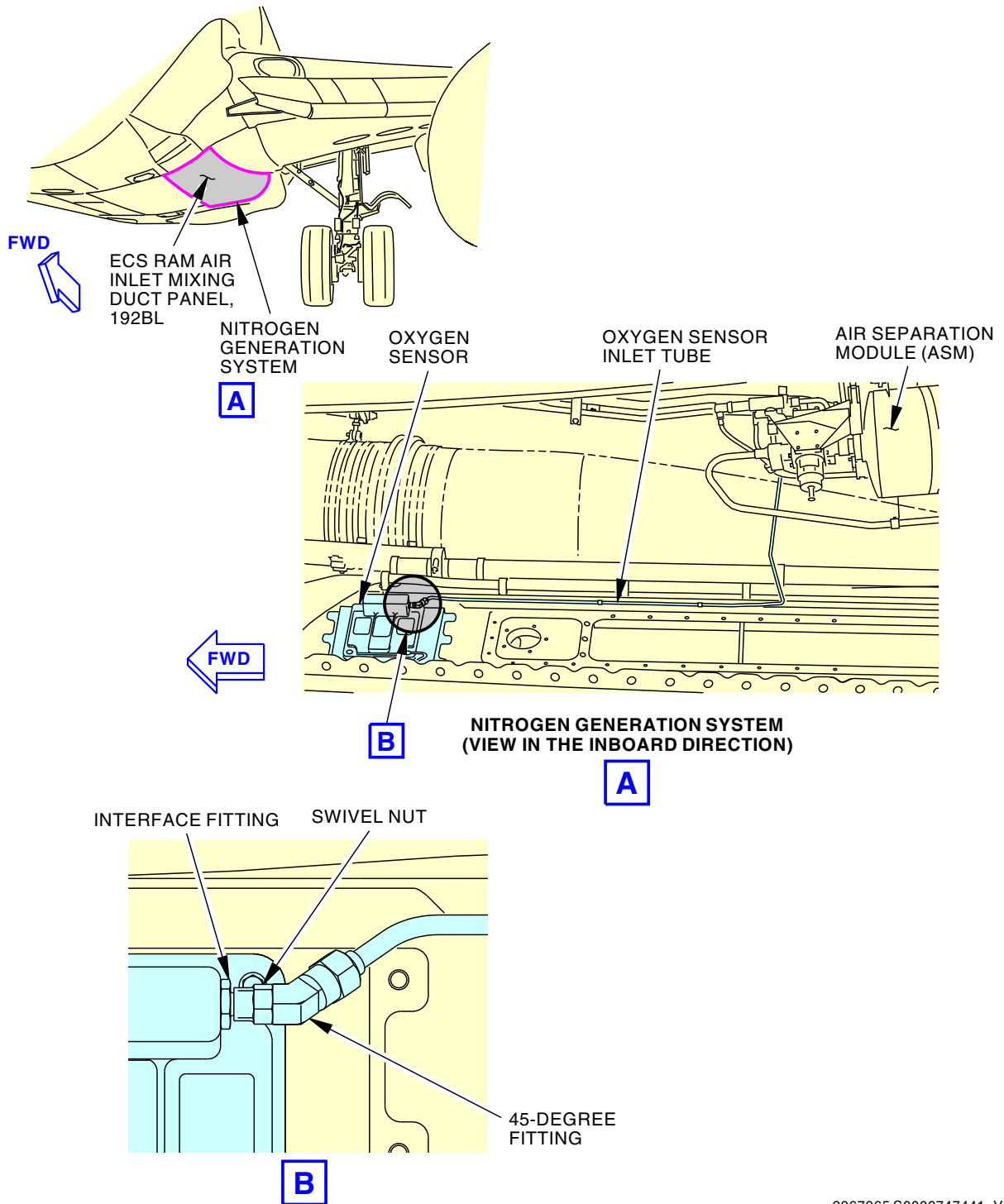
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NGS Oxygen Sensor Functional Test
Figure 505/47-00-00-990-814

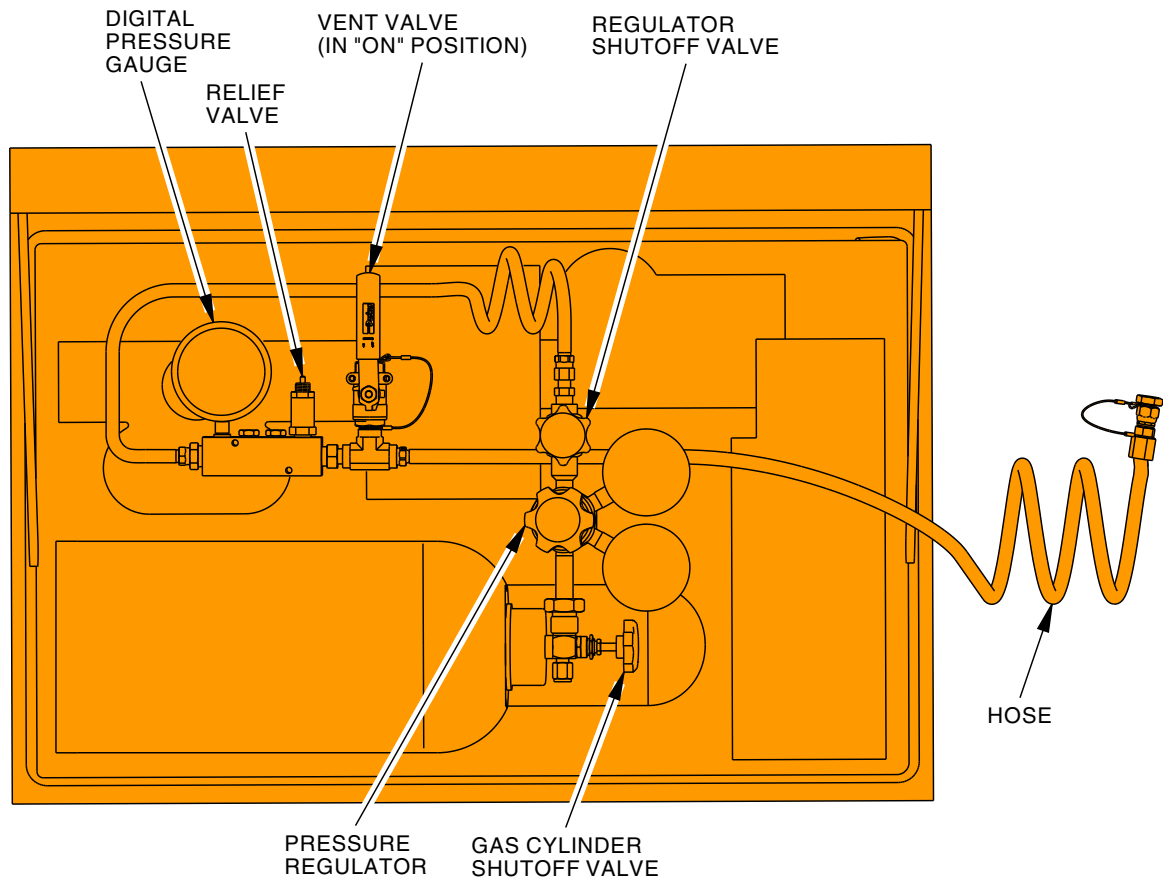
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NGS OXYGEN SENSOR TEST EQUIPMENT

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NGS OXYGEN SENSOR TEST EQUIPMENT
Figure 506/47-00-00-990-817

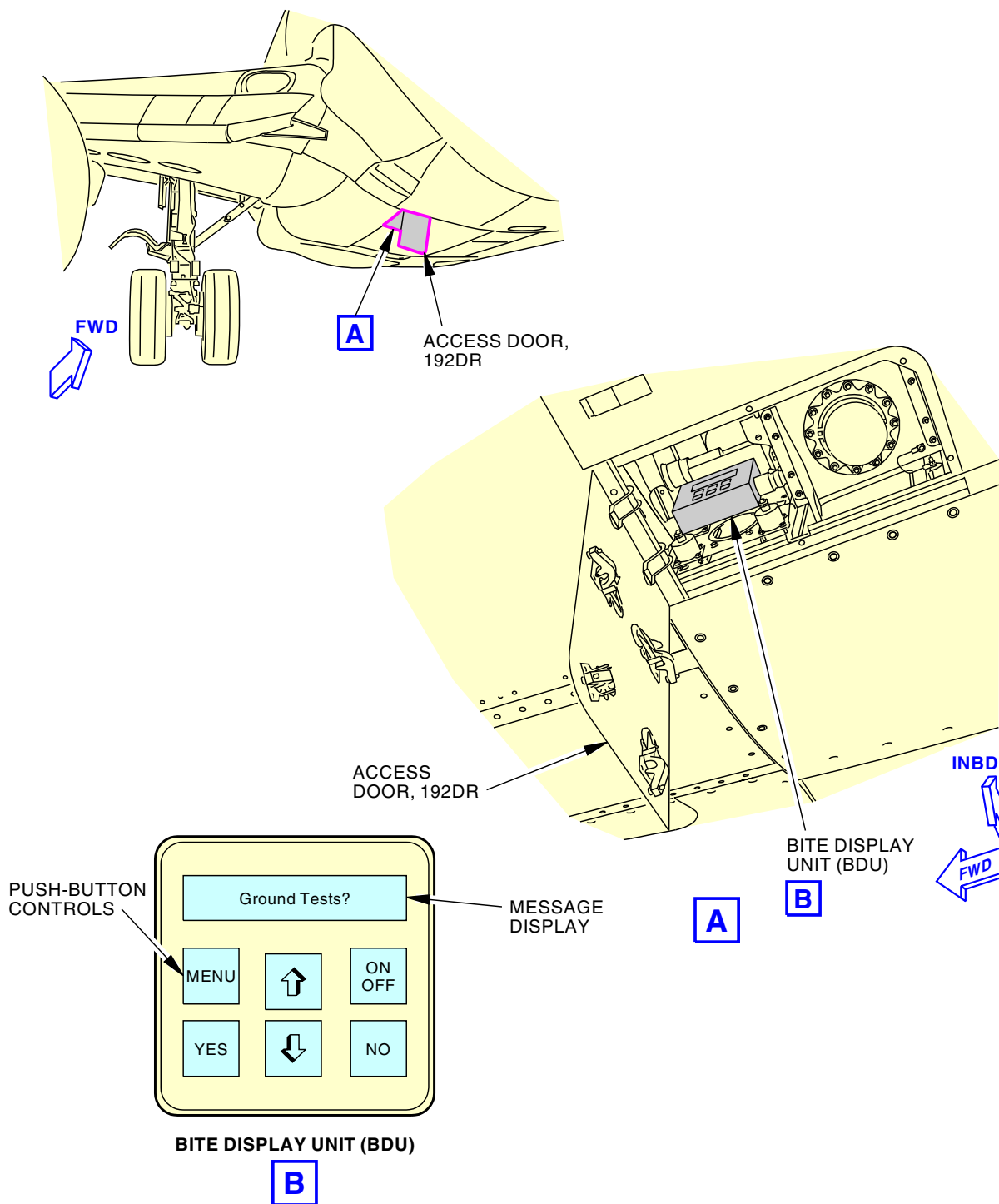
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NGS BDU
Figure 507/47-00-00-990-815

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NITROGEN GENERATION SYSTEM - INSPECTION/CHECK

1. General

A. This procedure has this task:

(1) Leak Check of the Nitrogen Generation System

- (a) This task make sure that the nitrogen generation system (NGS) is in the permitted leak limits. Do this procedure as a general leak check for the nitrogen generation system or as a post-installation leak check after you replace a NGS component or duct.
- (b) This procedure pressurizes the nitrogen generation system (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

B. In this procedure oxygen can be referred to as O2.

TASK 47-00-00-790-801

2. Leak Check of the Nitrogen Generation System

(Figure 601, Figure 602)

A. **General**

(1) This procedure is a scheduled maintenance task.

B. **References**

Reference	Title
21-00-00-800-803	Supply Conditioned Air with a Cooling Pack (P/B 201)
21-00-00-800-804	Remove Conditioned Air Supplied by a Cooling Pack (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)
47-32-01 P/B 401	NGS SHUTOFF VALVE - REMOVAL/INSTALLATION
49-11-00-860-802	APU Usual Shutdown (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)

C. **Consumable Materials**

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

D. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

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(Continued)

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

F. Prepare for the Leak Check

SUBTASK 47-00-00-790-002

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

SUBTASK 47-00-00-860-004

- (2) Pressurize the pneumatic system (TASK 36-00-00-860-801).

NOTE: Use of engine(s) air to supply pneumatic pressure for this task is not recommended. All areas around operating engines are dangerous. If you must use the engine(s) to supply pneumatic power, make sure that you obey all applicable WARNINGS.

- (a) Make sure that these switches on the air conditioning panel, P5-10, are in the positions shown:

SWITCH	POSITION
APU Bleed	ON (if APU is running) if not, OFF
ENG 1 Bleed	ON (if engine is running) if not, OFF
ENG 2 Bleed	ON (if engine is running) if not, OFF
Cabin Temp	AUTO
ISLN Valve	OPEN
L RECIRC FAN	AUTO
R RECIRC FAN	AUTO

SUBTASK 47-00-00-860-005

- (3) Supply conditioned air (TASK 21-00-00-800-803).

SUBTASK 47-00-00-860-018

- (4) On the P5-10 panel, do these steps:
- (a) Set the L PACK switch to the HIGH position.
 - (b) Set the R PACK switch to the OFF position.

SUBTASK 47-00-00-780-003

- (5) Do a check of the manifold duct pressure.
- (a) Look at the dual duct pressure gage on the air conditioning panel, P5-10.
 - (b) Make sure that the L and R duct pressure is 20 psig (138 kPa) or more.

SUBTASK 47-00-00-740-034

- (6) Push the MENU button on the BITE Display Unit (BDU).

SUBTASK 47-00-00-740-035

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

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SUBTASK 47-00-00-740-036

- (8) Push the YES button on the BDU.

SUBTASK 47-00-00-740-037

- (9) Push the up or down arrows on the BDU until one of these functions shows:

- (a) NGS PERF LOW FLOW?

NOTE: Use this function to do a leak check of the Nitrogen Generation System (NGS) components in the low flow mode, upstream of the Air Separation Module (ASM).

- (b) NGS PERF HI FLOW?

NOTE: Use this function to do a leak check between the ASM and the flame arrestor at the left wing rear spar. Do not use the NGS PERF HI FLOW? 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 47-00-00-730-001

- (10) Push the YES button to start the applicable test.

SUBTASK 47-00-00-730-002

- (11) The NGS shutoff valve will open and pressurize the NGS.

- (a) The display on the BDU will show these messages:

- 1) GSE O2 SNS: XX.X% (or GSE O2 SNS: WARM during warm-up 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

G. Leak Check of the Nitrogen Generation System

SUBTASK 47-00-00-790-003

- (1) Do a check for leaks at the joints of these components:

- (a) Thermal Control Unit (TCU)
- (b) ASM
- (c) Oxygen Enriched Air (OEA) duct

SUBTASK 47-00-00-790-004

- (2) If you find a leak, do these steps:

- (a) Position your hand 12 in. (304.8 mm) above the leak source.
- (b) If you can feel the airflow, then stop the operation of the NGS 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.

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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.



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.



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, then the NO button, on the BDU.
 - (b) Do the steps in this task to depressurize the Environmental Control System (ECS) air supply system: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (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.
 - (e) Examine the connections to do a check for leak(s).
 - (f) Repair the leaks that you find.
 - (g) Make sure that the parts align correctly.

SUBTASK 47-00-00-790-005

- (4) Pressurize the pneumatic system (TASK 36-00-00-860-801).
- (a) Do the leak check again to make sure that you repaired the problem.

SUBTASK 47-00-00-790-006

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

SUBTASK 47-00-00-790-007

- (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.

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- (c) No leaks are permitted.
- (d) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

SUBTASK 47-00-00-360-002



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.

- (7) If you find a leak, do these steps:
 - (a) Push the MENU button, then the NO button, on the BDU.
 - (b) Do the steps in this task to depressurize the ECS air supply system: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (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:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (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:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-00-00-790-008

- (8) Do the steps in this task to pressurize the pneumatic system: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
 - (a) Do the leak check again to make sure that you repaired the problem.

SUBTASK 47-00-00-210-003

- (9) Do an inspection of the Nitrogen-Enriched Air Distribution System (NEADS) lines between the ASM and the flame arrestor at the rear spar for damage.

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SUBTASK 47-00-00-790-009

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

SUBTASK 47-00-00-360-003



WARNING

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.



WARNING

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.



CAUTION

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.

- (11) If you find a leak, do these steps:
- (a) Push the MENU button, then the NO button, on the BDU.
 - (b) Do the steps in this task to depressurize the ECS air supply system: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (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.
 - 2) Replace the NGS shutoff valve if the valve fails to close (PAGEBLOCK 47-32-01/401).
 - (d) Examine the component to find the cause of the leak(s).
 - (e) Repair the problems that you find.
 - (f) Make sure that the components are aligned.
 - (g) Tighten the connections.

SUBTASK 47-00-00-790-010

- (12) Do the steps in this task to pressurize the pneumatic system: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Do the leak check again to make sure that you repaired the problem.

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SUBTASK 47-00-00-741-003



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.

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

SUBTASK 47-00-00-741-004

- (14) 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.

H. Depressurize the Pneumatic System

SUBTASK 47-00-00-741-005

- (1) To remove the conditioned air supply, do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

SUBTASK 47-00-00-741-006

- (2) Do the steps in this task to depressurize the ECS air supply system: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 47-00-00-741-007

- (3) Do a check of the pneumatic duct pressure:
- (a) Look at the dual duct pressure gage on the air conditioning panel, P5-10.
- (b) Make sure that the L and R duct pressures are 0 psig (0 kPa).

SUBTASK 47-00-00-741-008

- (4) To stop the Auxiliary Power Unit (APU), do this task: APU Usual Shutdown, TASK 49-11-00-860-802, if necessary.

SUBTASK 47-00-00-740-038

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

I. Put the Airplane Back to its Usual Condition

SUBTASK 47-00-00-741-009

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

————— END OF TASK —————

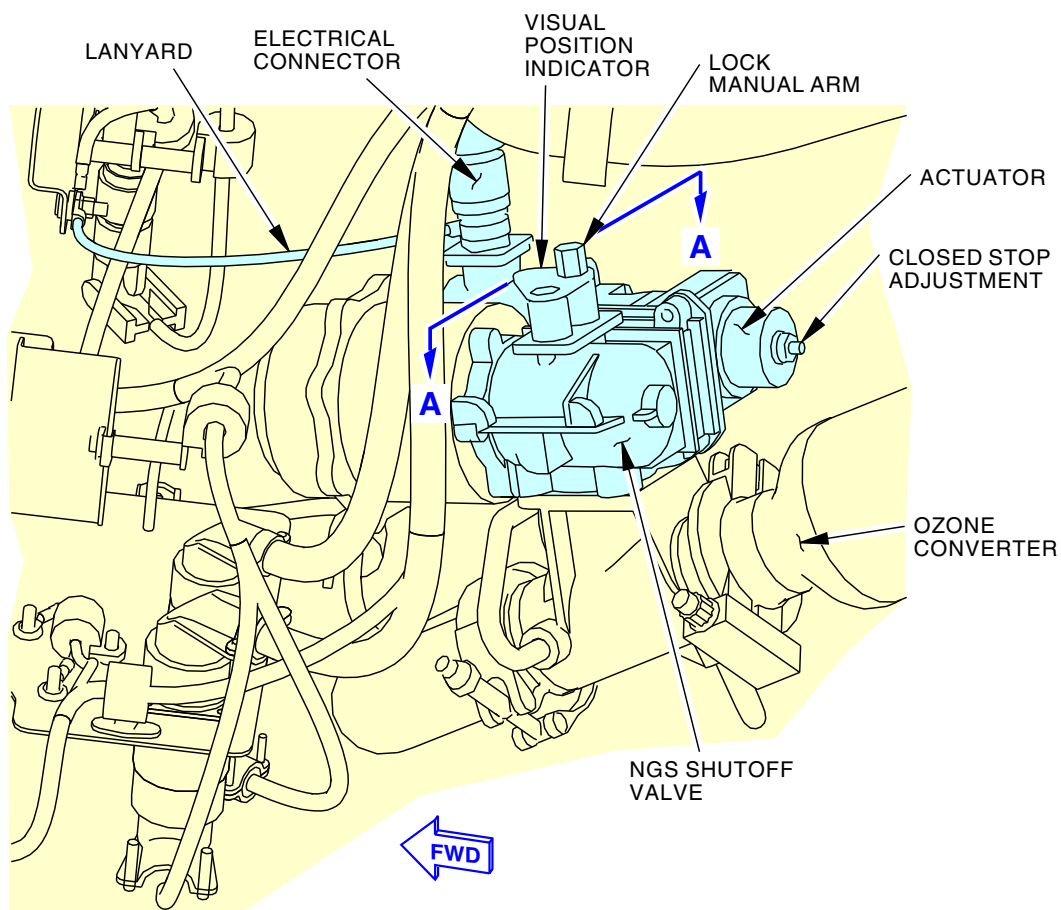
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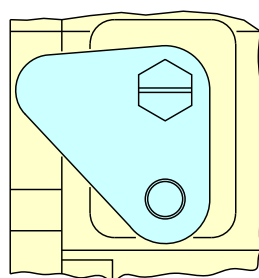
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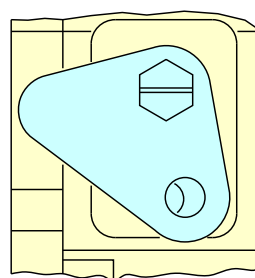
NGS SHUTOFF VALVE

B



(ALIGNED)

A-A



(MISALIGNED)

A-A

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NGS - Shutoff Valve
Figure 601/47-00-00-990-809

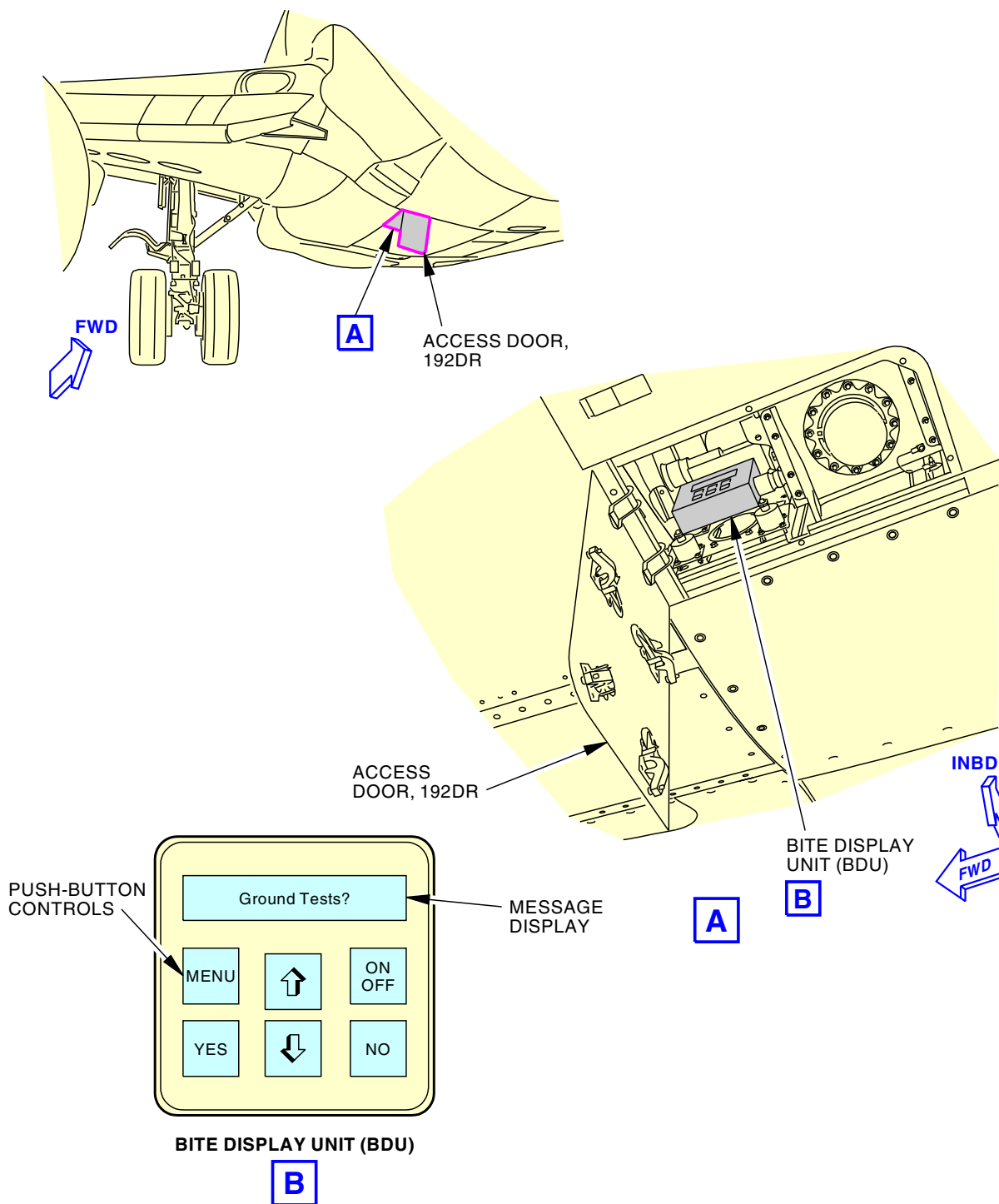
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NGS - BITE Display Unit (BDU)
Figure 602/47-00-00-990-810



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TASK 47-00-00-790-802

3. Leak Check of the Nitrogen-Enriched Air Distribution System (NEADS) Lines

(Figure 602 and Figure 603)

NOTE: This procedure is a scheduled maintenance task.

A. General

- (1) This task has one or more steps that are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to that 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-07.

- (2) This task inspects the Nitrogen-Enriched Air Distribution System (NEADS) lines between the Air Separation Module (ASM) and flame arrestor at the rear spar for damage and does a check for leaks in the NEADS lines between the ASM and flame arrestor at the rear spar.

B. References

Reference	Title
21-00-00-800-803	Supply Conditioned Air with a Cooling Pack (P/B 201)
21-00-00-800-804	Remove Conditioned Air Supplied by a Cooling Pack (P/B 201)
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check (P/B 601)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)
47-32-01-000-801	NGS Shutoff Valve Removal (P/B 401)
47-32-01-400-801	NGS Shutoff Valve Installation (P/B 401)
49-11-00-860-802	APU Usual Shutdown (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
212	Flight Compartment - Right

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E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

F. Prepare for the Leak Check

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.



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 47-00-00-010-801).

SUBTASK 47-00-00-790-011

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

SUBTASK 47-00-00-860-007

- (3) Pressurize the pneumatic system (TASK 36-00-00-860-801).
- (a) Make sure that these switches, on the P5-10 air conditioning panel, are in the positions shown:

SWITCH	POSITION
APU Bleed	ON (if APU is running) if not, OFF
ENG 1 Bleed	ON (if engine is running) if not, OFF
ENG 2 Bleed	ON (if engine is running) if not, OFF
Cabin Temp	AUTO
ISLN Valve	OPEN
L RECIRC FAN	AUTO
R RECIRC FAN	AUTO

SUBTASK 47-00-00-860-008

- (4) Supply conditioned air (TASK 21-00-00-800-803).

SUBTASK 47-00-00-860-019

- (5) On the P5-10 panel, do these steps:
- (a) Set the L PACK switch to the HIGH position.
- (b) Set the R PACK switch to the OFF position.

SUBTASK 47-00-00-780-004

- (6) Do a check of the manifold duct pressure.
- (a) Look at the dual duct pressure gage, on the P5 forward overhead panel.
- (b) Make sure that the L and R duct pressures are 15 psig (103 kPa) or more.

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SUBTASK 47-00-00-740-039

- (7) Push the MENU button on the BITE Display Unit (BDU) (Figure 602).

SUBTASK 47-00-00-740-040

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

SUBTASK 47-00-00-740-041

- (9) Push the YES button on the BDU.

SUBTASK 47-00-00-740-042

- (10) Push the up or down arrows on the BDU until this function shows:

- (a) NGS PERF HI FLOW?

NOTE: Use this function to do a leak check between the ASM and flame arrestor at the left wing rear spar. Do not use the NGS PERF HI FLOW? 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 47-00-00-740-043

- (11) Push the YES button to start the test.

SUBTASK 47-00-00-780-005

- (12) Make sure that the NGS shutoff valve goes from the CLOSED position to the OPEN position.

NOTE: The NGS shutoff valve opens and pressurizes the NGS.

- (a) Make sure that the display on the BDU shows these messages:

- 1) GSE O2 SNS: XX.X% (or GSE O2 SNS: WARM during warm-up 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

G. NEADS Lines Leak Check

SUBTASK 47-00-00-790-012

- (1) Do an inspection of the NEADS lines from the ASM to the flame arrestor at the fuel tank rear spar for damage and leaks (TASK 28-22-15-700-801).

47-AWL-07: ALI

- (a) Make sure there are no loose clamps for the NEADS couplings, drain line connections 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-07.

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 47-AWL-07: ALI

- (b) Make sure there are no disconnections for the NEADS couplings, drain line connections 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-07.

 47-AWL-07: ALI

- (c) Make sure there are no damaged tubes from the ASM to the fuel tank rear 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-07.

SUBTASK 47-00-00-790-013

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

SUBTASK 47-00-00-790-014



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) If a leak is found, do these steps:
- (a) Push the MENU button, then the NO button, on the BDU.
 - (b) To depressurize the Environmental Control System (ECS) air supply system, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (c) Examine the manual locking arm on the NGS shutoff valve.
 - 1) Make sure that the NGS shutoff valve goes from the OPEN position to the CLOSED position.
 - 2) Replace the NGS shutoff valve if the valve fails to close (TASK 47-32-01-000-801 and TASK 47-32-01-400-801).

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- (d) Examine the component to find the cause of the leak(s).
- (e) Repair the found problems.
- (f) Make sure that the components are aligned.
- (g) Tighten the connections.
- (h) To pressurize the pneumatic system, do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (i) Do the leak check again to make sure that the problem is repaired.

SUBTASK 47-00-00-740-044



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.

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

SUBTASK 47-00-00-790-016

- (5) 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.

H. Pneumatic System Depressurization

SUBTASK 47-00-00-860-009

- (1) To remove the conditioned air supply, do this task: Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804.

SUBTASK 47-00-00-860-010

- (2) To depressurize the ECS air supply system, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 47-00-00-780-006

- (3) Do a check of the pneumatic duct pressure:
 - (a) Look at the dual duct pressure gage, on the P5-10 air conditioning panel.
 - (b) Make sure that the L and R duct pressures are 0 psig (0 kPa).

SUBTASK 47-00-00-860-011

- (4) If it is necessary, to stop the Auxiliary Power Unit (APU), do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

SUBTASK 47-00-00-860-012

- (5) If it is necessary, to stop the engines, do this task: TASK 71-00-00-910-806-G00.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-00-00-410-005

- (1) Close these access panels, if applicable:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192DR	ECS High Pressure Access Door

————— END OF TASK —————

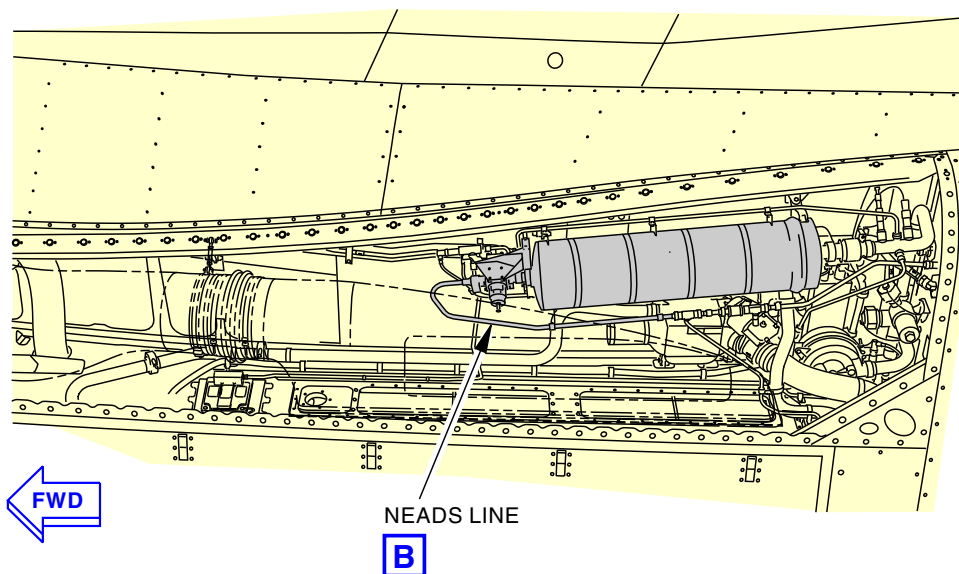
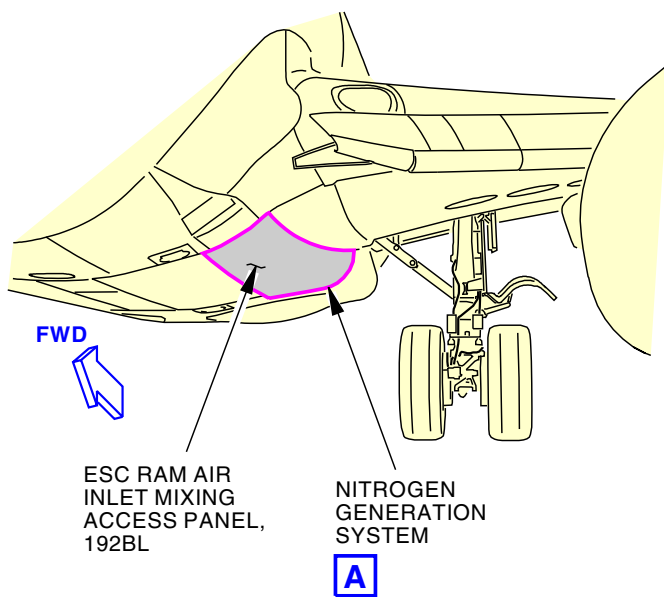
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NITROGEN GENERATION SYSTEM

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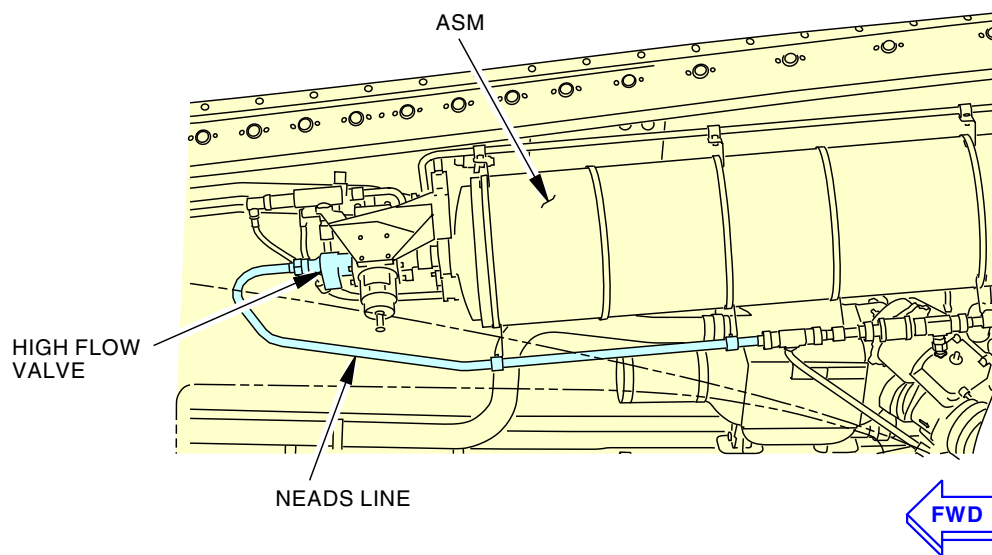
NEADS Lines Location
Figure 603/47-00-00-990-816 (Sheet 1 of 3)

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B

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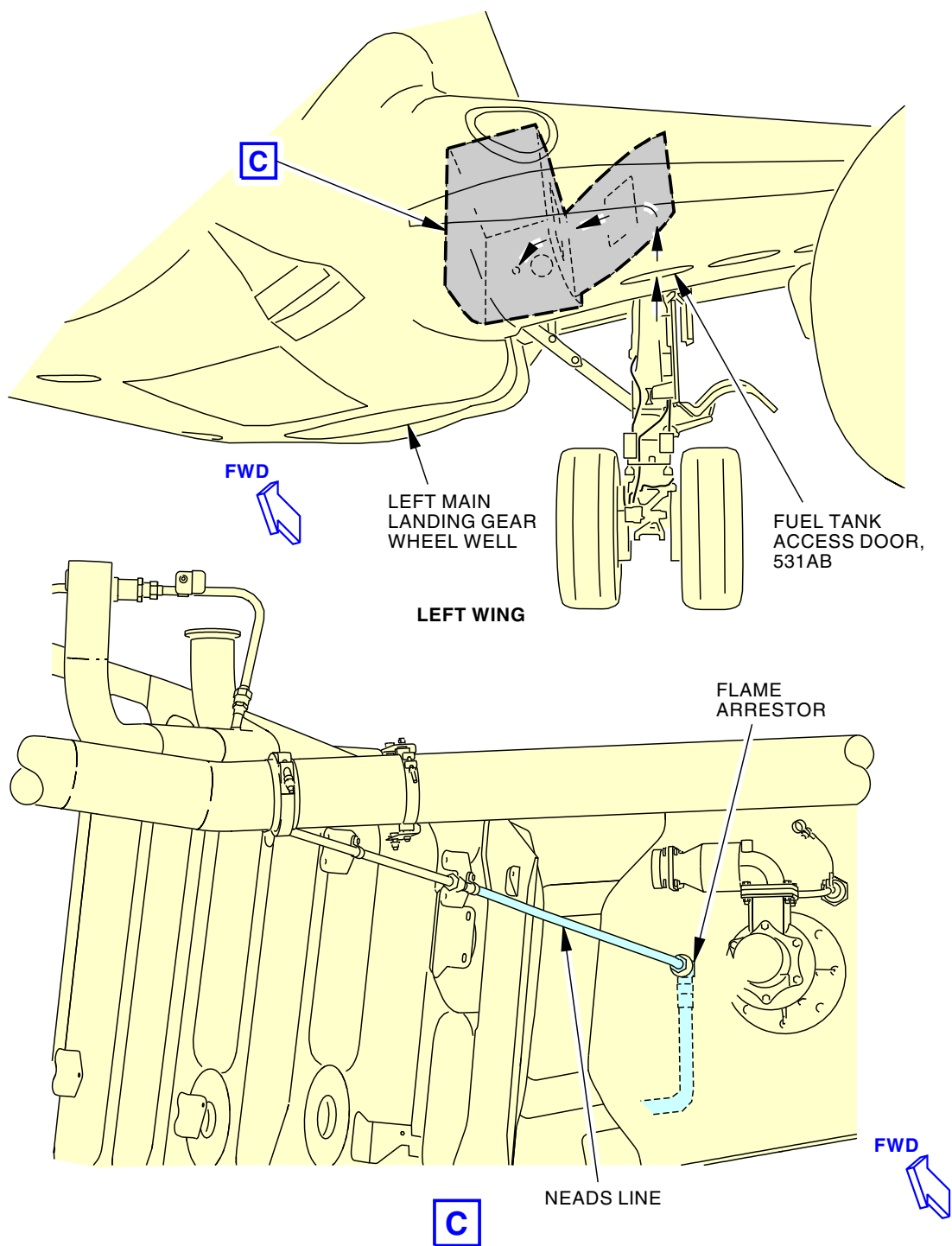
NEADS Lines Location
Figure 603/47-00-00-990-816 (Sheet 2 of 3)

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NEADS Lines Location
Figure 603/47-00-00-990-816 (Sheet 3 of 3)

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NITROGEN GENERATION SYSTEM - DDG MAINTENANCE PROCEDURES

1. **General**

- A. This procedure has the maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Guide (DDG). These tasks prepare the airplane for flight with systems/components that are inoperative.
- B. The procedure also has tasks to put the airplane back to its usual condition.
- C. These are the tasks for the components in the Nitrogen Generation System (NGS):
 - (1) DDG 47-11- 01 Nitrogen Generation System Inoperative - Preparation.
 - (2) DDG 47-11- 01 Nitrogen Generation System Inoperative - Restoration.

TASK 47-00-00-040-802

2. **DDG 47-11-01 Nitrogen Generation System (NGS) Inoperative - Preparation**

(Figure 901)

A. General

- (1) This task gives the maintenance steps which prepare airplane for flight with the Nitrogen Generation System (NGS) inoperative.

B. References

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

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192CL	ECS Access Door

E. Nitrogen Generation System Deactivation

SUBTASK 47-00-00-040-002

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-00-00-864-004

- (2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) Make sure that the dual duct pressure gage shows 0.50 psig (3.45 kPa) in the left and right pneumatic ducts.

SUBTASK 47-00-00-860-013

- (3) Put the L PACK and R PACK selector switches, on the P5-10 air conditioning panel, to the OFF position.
 - (a) Put DO-NOT-OPERATE tags on the L PACK and R PACK selector switches.

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SUBTASK 47-00-00-010-008



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. THIS CAN CAUSE INJURY TO PERSONNEL.



DO NOT TOUCH THE NITROGEN-GENERATION-SYSTEM COMPONENTS WHEN THEY ARE HOT. WHEN THE SYSTEM COMPONENTS ARE HOT, THEY CAN CAUSE INJURY TO PERSONS.

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

- (5) Go to the NGS Shutoff Valve.

NOTE: The NGS shutoff valve is on the forward bulkhead of the left air conditioning compartment.

SUBTASK 47-00-00-040-003

- (6) Do these steps to lock the NGS Shutoff Valve:

- (a) Make sure that the hole in the manual lock arm is aligned with the threaded boss on the NGS Shutoff Valve.

- 1) If the manual lock arm hole is not aligned, use a wrench to turn the manual locking hex bolt clockwise until the hole in the manual lock arm aligns with the threaded boss on the NGS Shutoff Valve.

- (b) Remove the lock pin from the NGS Shutoff Valve.

NOTE: The manual lock pin is attached to the NGS Shutoff Valve with a lanyard.

- (c) Install the lock pin through the hole in the manual lock arm.

- (d) Tighten the lock pin to 27 ± 2 in-lb (3 ± 0 N·m).

- (7) Make sure that the NGS inoperative condition is recorded.

F. Put the Airplane Back to the Usual Condition

SUBTASK 47-00-00-860-014

- (1) Remove the DO-NOT-OPERATE tags from the L PACK and R PACK selector switches.

- (a) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-00-00-410-006

- (2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

SUBTASK 47-00-00-040-004

- (3) Install an INOP placard adjacent to the switch of the Nitrogen Generation System (NGS) control panel in the flight compartment.

NOTE: Repairs must be made within ten flight days.

————— END OF TASK —————

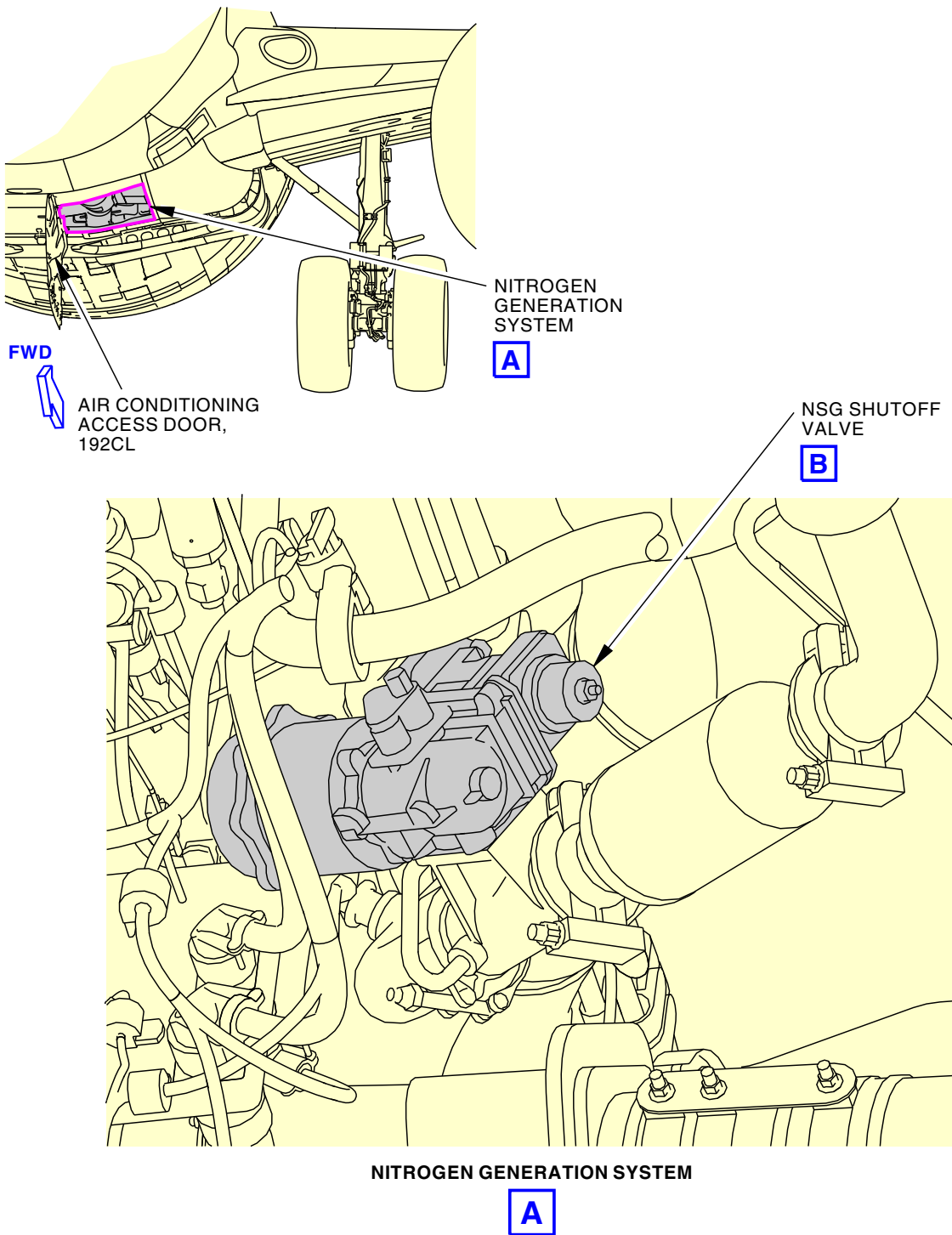
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Nitrogen Generation System (NGS) - Shutoff Valve
Figure 901/47-00-00-990-811 (Sheet 1 of 2)

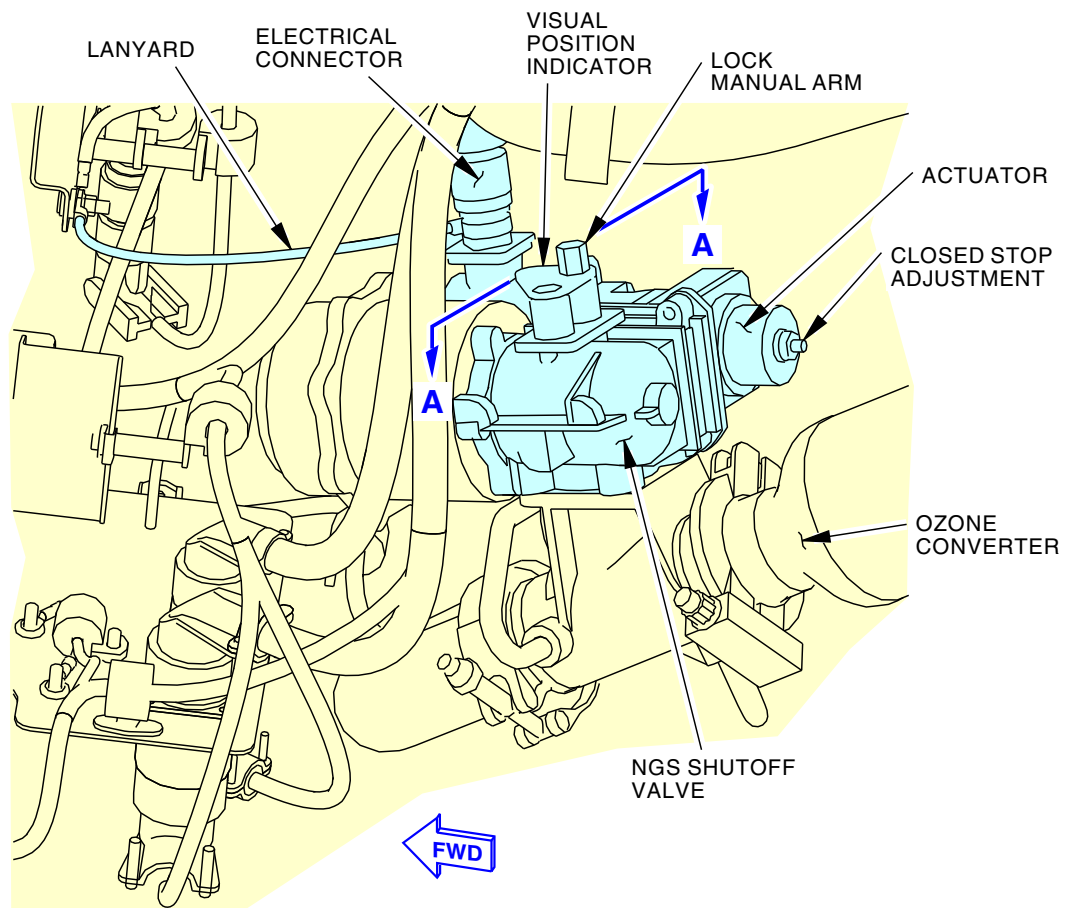
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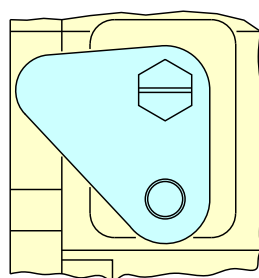
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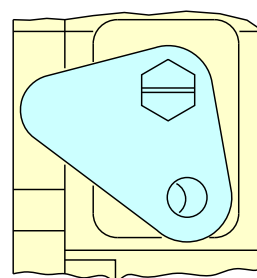
NGS SHUTOFF VALVE

B



(ALIGNED)

A-A



(MISALIGNED)

A-A

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Nitrogen Generation System (NGS) - Shutoff Valve
Figure 901/47-00-00-990-811 (Sheet 2 of 2)

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TASK 47-00-00-440-802

3. **DDG 47-11-01 Nitrogen Generation System (NGS) Inoperative - Restoration**

(Figure 901)

A. General

- (1) This task puts the airplane back to its usual condition after operation with the Nitrogen Generation System (NGS) inoperative.

B. References

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

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192CL	ECS Access Door

E. Nitrogen Generation System Activation

SUBTASK 47-00-00-864-005

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) Make sure that the dual duct pressure gage shows 0.50 psi (3.45 kPa) in the left and right pneumatic ducts.

SUBTASK 47-00-00-860-015

- (2) Put the L PACK and R PACK selector switches, found on the P5-10 air conditioning panel, to the OFF position.
- (a) Put DO-NOT-OPERATE tags on the L PACK and R PACK selector switches.

SUBTASK 47-00-00-010-009



WARNING

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. THIS CAN CAUSE INJURY TO PERSONNEL.



WARNING

DO NOT TOUCH THE NITROGEN-GENERATION-SYSTEM COMPONENTS WHEN THEY ARE HOT. WHEN THE SYSTEM COMPONENTS ARE HOT, THEY CAN CAUSE INJURY TO PERSONS.

- (3) Open this access panel:

Number	Name/Location
192CL	ECS Access Door

SUBTASK 47-00-00-440-001

- (4) Go to the NGS Shutoff Valve.

NOTE: The NGS Shutoff Valve is on the forward bulkhead of the left air conditioning compartment.

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SUBTASK 47-00-00-440-002

- (5) Do these steps to reactivate the NGS Shutoff Valve:
- (a) Remove the lock pin from the manual lock arm.
NOTE: The manual lock pin is attached with a lanyard.
NOTE: The NGS Shutoff Valve is spring loaded to the closed position when the system is not in operation.
 - (b) Install the lock pin in its storage space in the NGS Shutoff Valve.
 - (c) Tighten the lock pin to 27 ± 2 in-lb (3 ± 0 N·m).

SUBTASK 47-00-00-860-016

- (6) Remove the DO-NOT-OPERATE tags from the L PACK and R PACK selector switches.
- (a) Put the L PACK and R PACK selector switches to the AUTO position.
 - (b) Make sure the NGS operative condition is recorded.

F. Put the Airplane Back to the Usual Condition

SUBTASK 47-00-00-440-003

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-00-00-020-003

- (2) Remove the INOP placard adjacent to the switch of the Nitrogen Generation System (NGS) control panel in the flight compartment.

SUBTASK 47-00-00-410-007

- (3) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

————— END OF TASK —————

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AIR SEPARATION MODULE - REMOVAL/INSTALLATION

1. **General**

- A. The air separation module assembly are alternate tasks that removes the high flow valve [14], muscle air duct [9], and NEADS duct [27] as part of the air separation module assembly. This makes it easier to replace the air separation module [1].
- B. This procedure has these tasks:
- (1) Air Separation Module Removal
 - (2) Air Separation Module Installation
 - (3) Air Separation Module Assembly Removal
 - (4) Air Separation Module Assembly Installation

TASK 47-11-01-000-801

2. **Air Separation Module (ASM) - Removal**

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-11-04-000-801	Overtemperature Shutoff Valve Removal (P/B 401)

B. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

C. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

D. **Prepare for the Removal**

SUBTASK 47-11-01-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) On the P5-10 Bleed Air Control Module, make sure the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-11-01-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
- (a) Install DO-NOT-OPERATE tags, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-11-01-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-11-01-010-001



WARNING

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.

- (4) Open this access panel:

Number

Name/Location

192BL

ECS Ram Air Inlet Mixing Duct Panel - Forward

E. Air Separation Module Removal

SUBTASK 47-11-01-030-001



WARNING

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.



WARNING

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.



CAUTION

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 Nitrogen Generation System (NGS) precautions.

SUBTASK 47-11-01-020-001

- (2) Do these steps to remove the air separation module [1]:
- Remove the clamp [11] between the air separation module [1] and the overtemperature shutoff valve [10].
 - Discard the O-ring [12].
 - Remove the overtemperature shutoff valve [10] (TASK 47-11-04-000-801).

NOTE: The removal of the overtemperature shutoff valve is optional.
 - Disconnect the coupling [15] between the high flow valve [14], and the air separation module [1].
 - Remove the sleeve [13].
 - Discard the two O-rings [16].
 - Disconnect the coupling [18] from the OEA outlet port [17] and the OEA exhaust duct [21].
 - Remove the sleeve [19].
 - Discard the two O-rings [20].

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- (e) Remove the three bolts [3], washers [4], and nuts [2] from the brackets [5] on the muscle air duct [9].
- (f) Remove the three bolts [24], washers [23], and nuts [25] from the brackets [22] on the NEADS duct [27].
- (g) Hold the air separation module [1] in its position.
- (h) Remove the insulation tape that covers the strap [8].
- (i) Loosen the nut [28] on the strap [8].
 - 1) Separate the strap [8].
- (j) Loosen the nut [29] on the strap [26].
 - 1) Separate the strap [26]
- (k) Remove the air separation module [1].
- (3) Place the air separation module [1] on a clean surface.
- (4) Do these steps to remove the body insulation [64], aft insulation [62], and forward insulation [63] from the air separation module [1]:
 - (a) Cut the four ties on the surface of the body insulation [64].
 - (b) Slice the tape at the seam line to remove the forward insulation [63], body insulation [64] and aft insulation [62] from the air separation module [1].

NOTE: Be careful not to slice into the insulation, it will be reused for the installation.

- (c) Remove the insulation.
- (5) Loosen the setscrews [7] on the on the ASM hose clamps [6].
 - (a) Remove the brackets [5], brackets [22] and ASM hose clamp [6].

SUBTASK 47-11-01-490-001

- (6) Install protective covers on the three air separation module [1] ports, overtemperature shutoff valve [10], high flow valve [14] port, and OEA exhaust duct [21].

———— **END OF TASK** ————

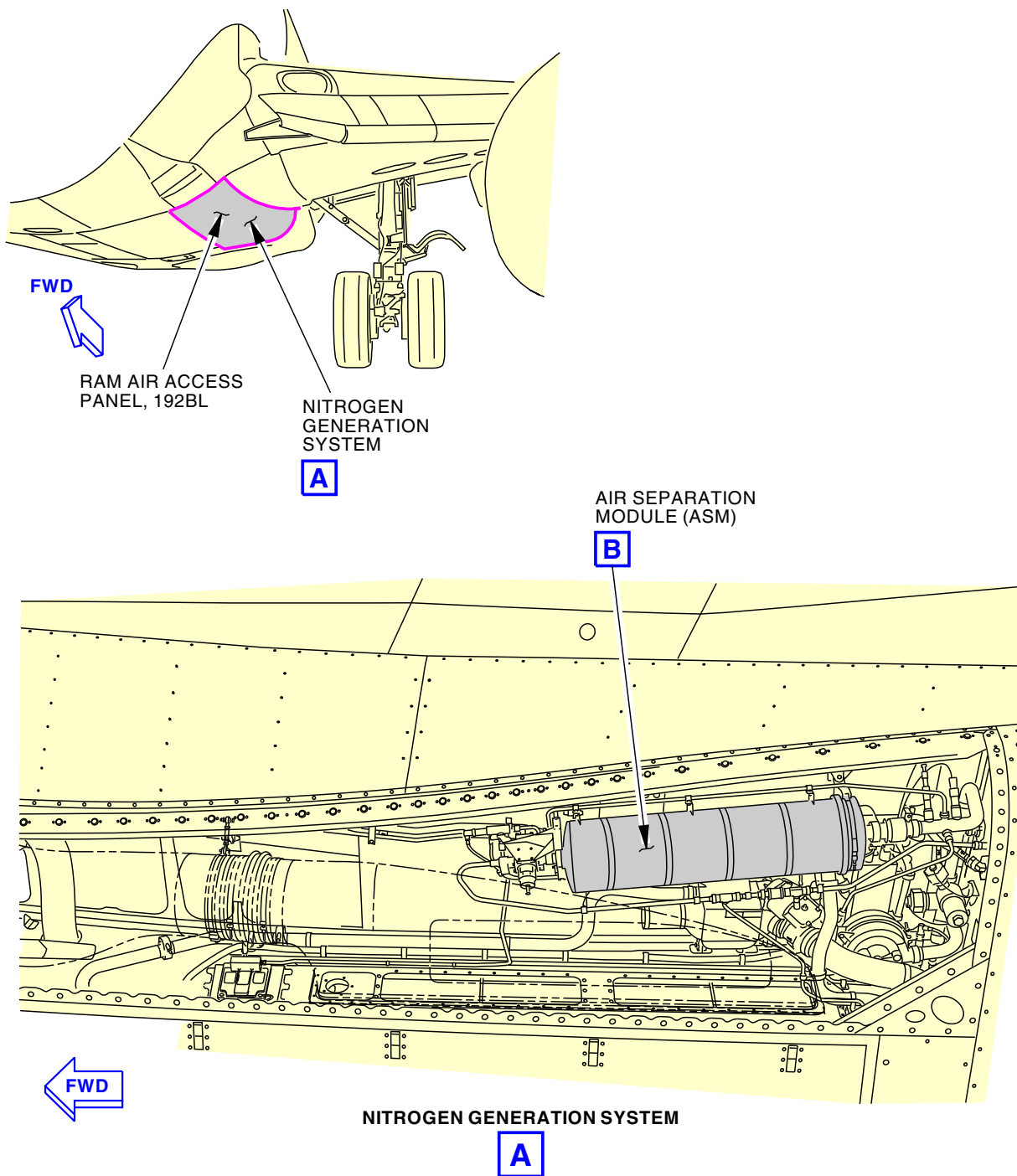
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2415314 S00061537551_V1

Air Separation Module Installation
Figure 401/47-11-01-990-801 (Sheet 1 of 6)

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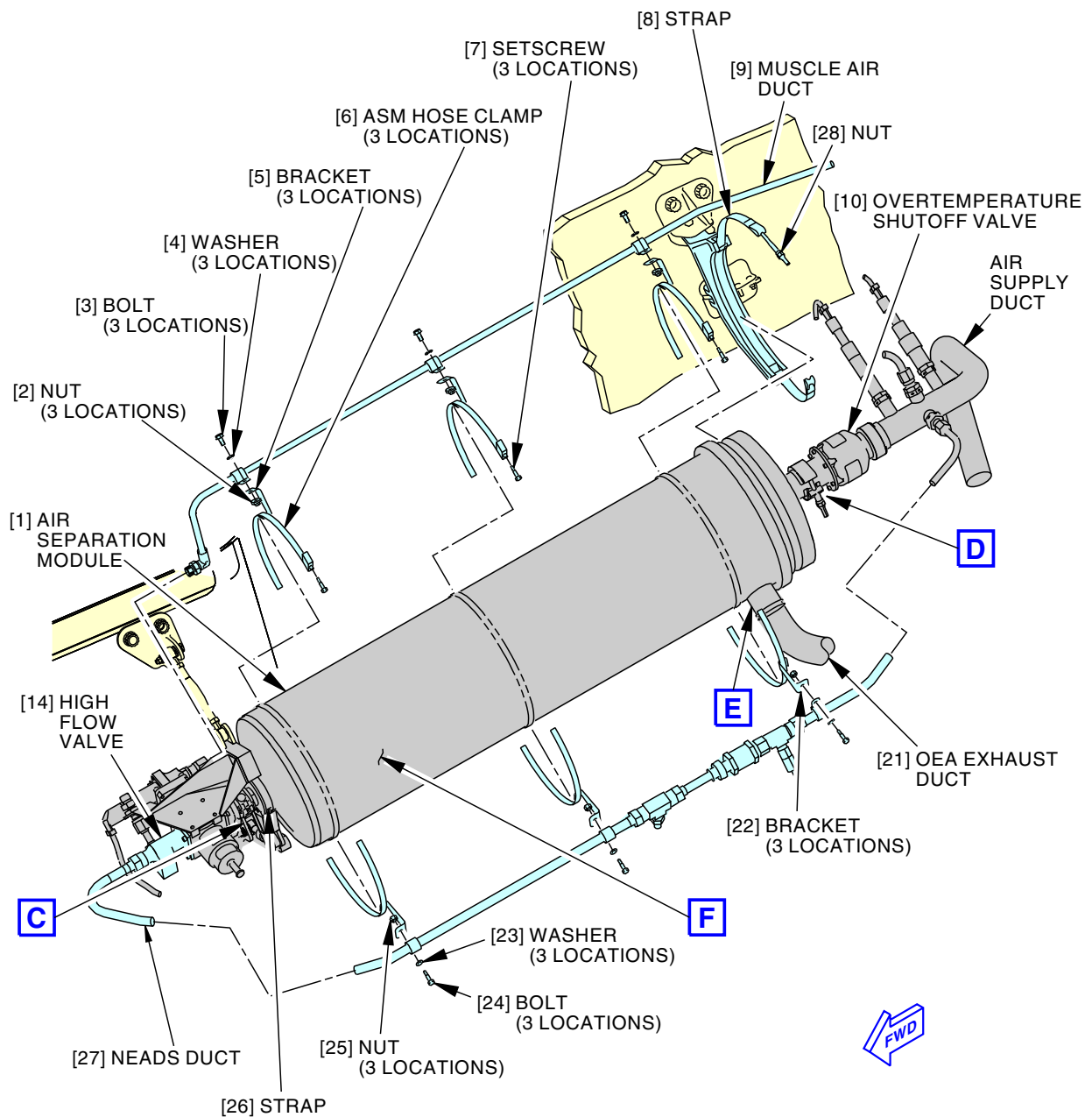
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AIR SEPARATION MODULE

NOTE:

THE AIR SEPARATION MODULE IS SHOWN WITHOUT THE INSULATION.

2415315 S00061537552_V1

Air Separation Module Installation
Figure 401/47-11-01-990-801 (Sheet 2 of 6)

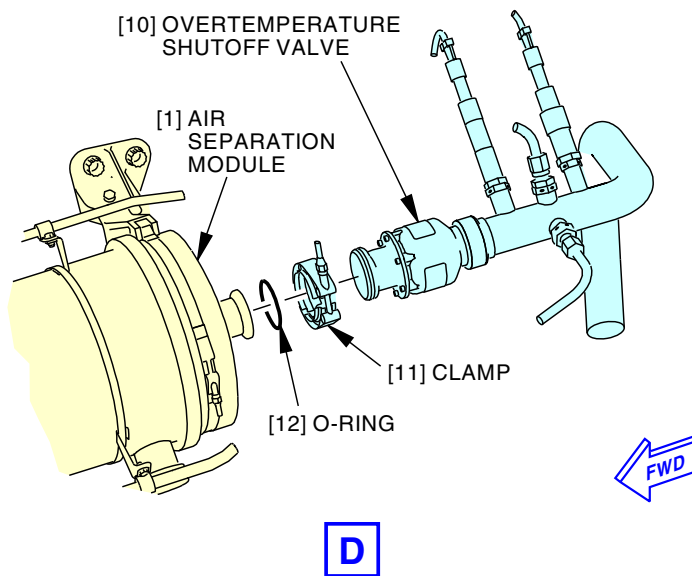
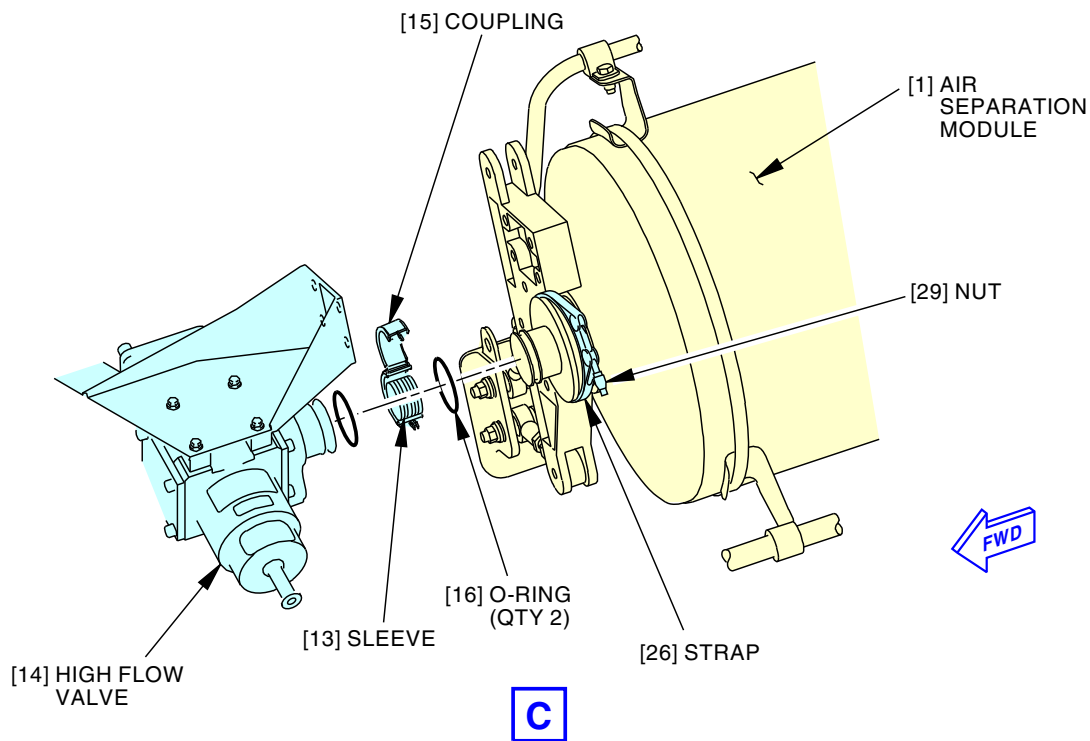
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2415316 S00061537553_V1

Air Separation Module Installation
Figure 401/47-11-01-990-801 (Sheet 3 of 6)

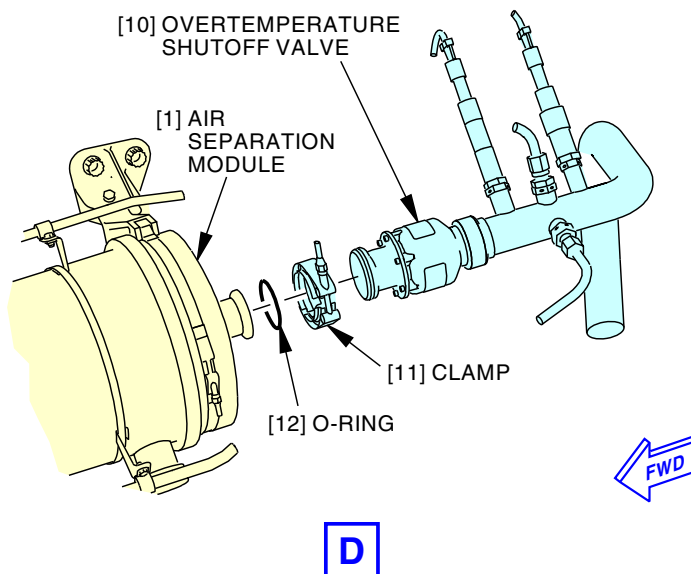
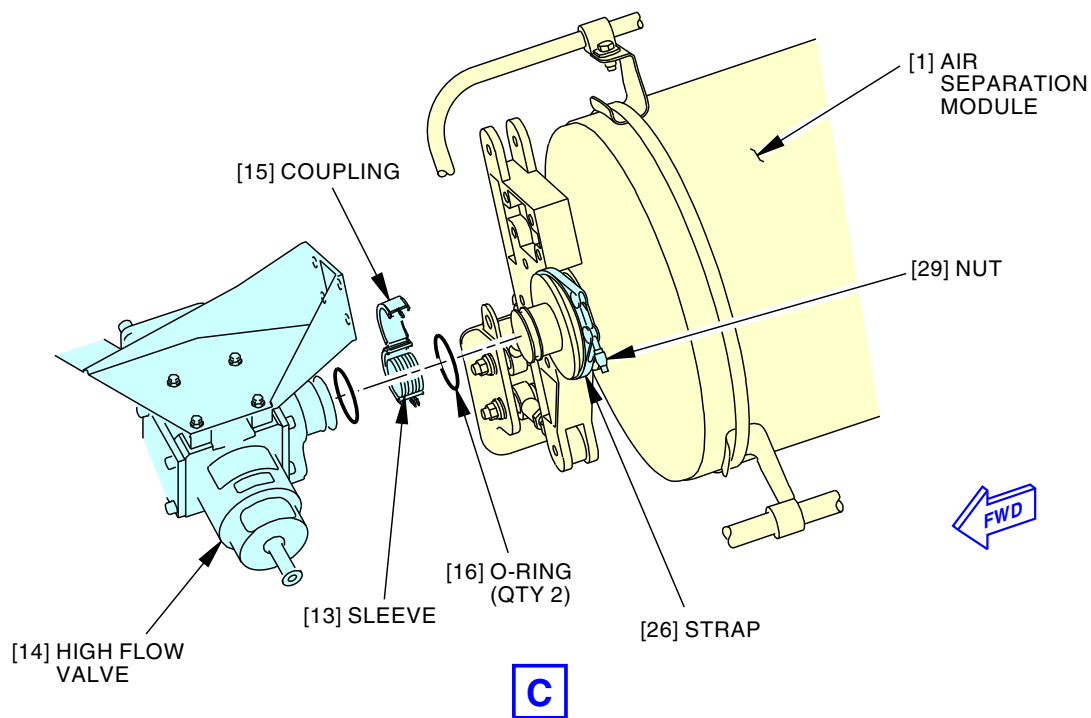
EFFECTIVITY
SIA 001-014 PRE SB 737-47-1016

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2572796 S0000618078_V1

Air Separation Module Installation
Figure 401/47-11-01-990-801 (Sheet 4 of 6)

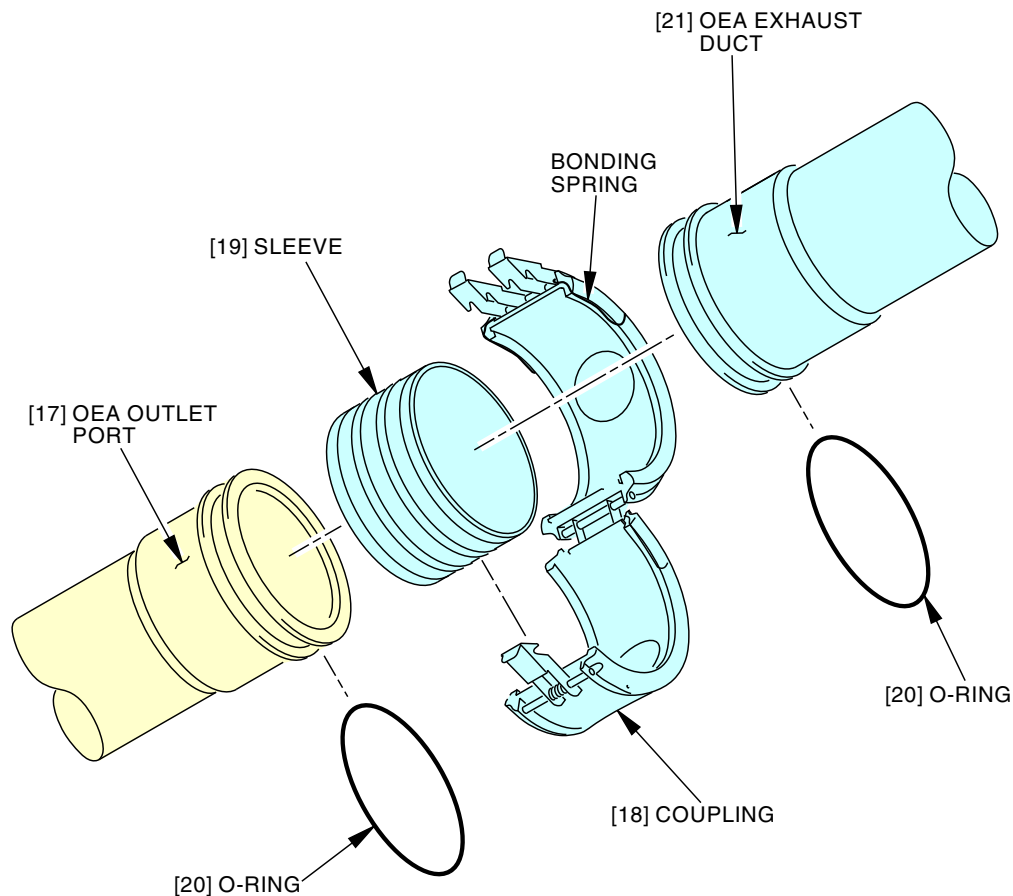
EFFECTIVITY
SIA 015-999; SIA 001-014 POST SB 737-47-1016

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2415317 S00061537554_V1

Air Separation Module Installation
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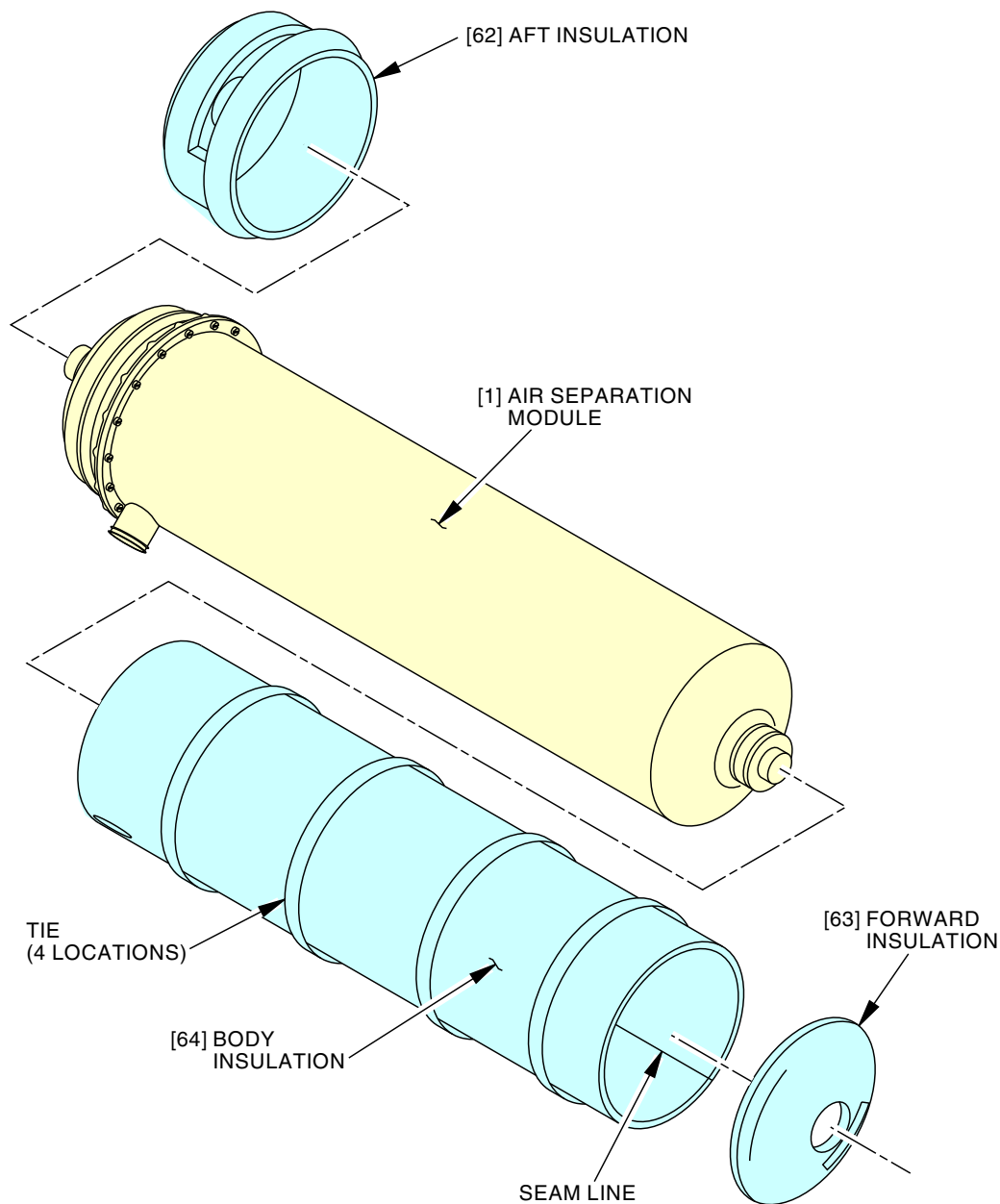
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Air Separation Module Installation
Figure 401/47-11-01-990-801 (Sheet 6 of 6)

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TASK 47-11-01-420-801

3. **Air Separation Module (ASM) Installation**

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-11-04-400-801	Overtemperature Shutoff Valve Installation (P/B 401)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)
47-21-04-000-801	Primary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-000-802	Secondary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-801	Primary Backflow Prevention Check Valve Installation (P/B 401)
47-21-04-400-802	Secondary Backflow Prevention Check Valve Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
C50285	Primer - Epoxy	MIL-PRF-23377 Type 1 Class C2
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50706	Tape - Jehier KB-23D, 3-Inch (76.2 mm) Wide	BMS5-172 TYPE I
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
G51020	Tape - ECC-A fiberglass tape, 0.007 Inches (0.1778 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5

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(Continued)

Reference	Description	Specification
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

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Air separation module	47-11-01-01-315	SIA 001-014
		47-11-01-01-335	SIA 001-014
		47-11-01-01-800	SIA 015-999
12	O-ring	47-11-01-01-395	SIA 001-014
		47-11-01-02-215	SIA 015-999
16	O-ring	47-11-01-02-080	SIA 015-999
		47-11-02-01-010	SIA 001-014
20	O-ring	47-21-01-01-055	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Prepare for the Installation

SUBTASK 47-11-01-710-002

- (1) Make sure that no fuel smell or liquid fuel is observed.
 - (a) If fuel smell or liquid fuel is observed, do these tasks:
 - Secondary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-802.
 - Secondary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-802.
 - Primary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-801.
 - Primary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-801.

SUBTASK 47-11-01-100-001

- (2) Do these steps to prepare the air separation module [1] for the installation:
 - (a) Remove the protective caps from the overtemperature shutoff valve [10], OEA exhaust duct [21], and high flow valve [14] port.
 - 1) Make sure that the valve, duct, and port are clean and free from grease, solvents, and unwanted material.
 - 2) Clean the valve, duct, and port with a clean cotton wiper, G00034, and isopropyl alcohol, B00130.

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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 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, or water to the new O-ring [20].
- (c) Install the O-ring [20] on the OEA exhaust duct [21].



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.

- (d) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new O-ring [16].
- (e) Install the O-ring [16] on the high flow valve [14] port.
- (f) Put the air separation module [1] on a clean surface.
- (g) Remove the protective caps on the air separation module [1] ports.



MAKE SURE THAT THERE ARE NO GREASE, SOLVENTS, AND UNWANTED MATERIALS IN THE AIR SEPARATION MODULE PORTS. IF YOU DO NOT OBEY, CONTAMINATION CAN CAUSE DAMAGE TO THE AIR SEPARATION MODULE.

- 1) Make sure that the air separation module [1] ports are free from grease, solvents, and unwanted material.
- 2) Clean the three ports with a clean cotton wiper, G00034, and isopropyl alcohol, B00130.

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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 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 YOU DO NOT APPLY TOO MUCH GREASE TO THE O-RING. IF YOU DO NOT OBEY, THE LEAK OF THE GREASE CAN CAUSE DAMAGE TO THE AIR SEPARATION MODULE.

- (h) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new O-ring [12].
- (i) Install the O-ring [12] on the inlet port of the air separation module [1].
- 1) Put a protective cap on the inlet port.



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.

- (j) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or water to the new O-ring [20].
- (k) Install the O-ring [20] on the OEA outlet port [17].
- 1) Put a protective cap on the OEA outlet port [17].

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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 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.

- (l) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new O-ring [16].
- (m) Install the O-ring [16] on the Nitrogen Enriched Air (NEA) outlet port of the air separation module [1].
 - 1) Put a protective cap on the NEA outlet port.

SUBTASK 47-11-01-400-001

- (3) Do these steps to install the ASM hose clamps [6] on the air separation module [1]:
 - (a) Apply epoxy primer, C50285, to the inside of the ASM hose clamps [6].
 - (b) Slide the ASM hose clamps [6] on the air separation module [1].
 - (c) Loosen the setscrews [7] on the ASM hose clamps [6], enough for the brackets [5] and brackets [22] to slide between the air separation module [1] and ASM hose clamps [6].
 - (d) Inspect the primer on the contact surfaces of the brackets [5] and brackets [22].
 - 1) Apply epoxy primer, C50285, as required, to the brackets [5] and brackets [22], on the surfaces that will be in contact between the air separation module [1] and ASM hose clamps [6].
 - (e) Install the brackets [5] and brackets [22] between the ASM hose clamps [6] and air separation module [1].
 - 1) Adjust the brackets [5] and brackets [22] on the ASM hose clamps [6] to their approximate position.
 - 2) Tighten the setscrews [7] enough to hold the brackets [5] and brackets [22] in their positions.
 - (f) Temporarily install the body insulation [64] on the air separation module [1] to correctly position the brackets [5] and brackets [22].
 - 1) Position the brackets [5] and brackets [22] such that there is a 0.15 ±0.10 in. (3.81 ±2.54 mm) clearance between the brackets and insulation cutouts.
 - 2) If it is necessary, re-adjust the brackets [5] and brackets [22].
 - (g) Remove the insulation.
 - (h) Torque the setscrews [7] to 16 ±2 in-lb (2 ±0 N·m).

SUBTASK 47-11-01-400-002

- (4) Do these steps to install the body insulation [64] and forward insulation [63] on the air separation module [1]:

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- (a) Install the body insulation [64] on the air separation module [1].

NOTE: Clearance between the brackets and insulation cutouts should be 0.15 ±0.10 in. (3.81 ±2.54 mm).

- (b) Use the orientation marks to align the forward insulation [63].

- (c) Install the forward insulation [63] on the air separation module [1].

NOTE: The Air Separation Module (ASM) nameplate should be visible.

- (d) Apply 3 in. (76 mm) wide tape to the seams of each insulation piece.

- (e) Make sure that no insulation foam is exposed.

- (f) Make sure that Jehier KB-23D tape, G50706, is centered between the insulation sections.

- 1) Jehier KB-23D tape, G50706, should extend at least 1 in. (2.5 cm) on either side of the seam.

NOTE: Small gaps, no larger than 0.25 in. (6.35 mm), are acceptable along the seam, as long as the gap does not extend through the entire seam and is covered by Jehier KB-23D tape, G50706. The ASM surface must not be visible through the gap.

- (g) Make sure that there are no gaps between the foam and outside diameter of the air separation module [1], except where bunching occurs.

- 1) If bunching occurs, make sure that the gap is 0.25 in. (6.35 mm) or less.

- (h) Install the ties (ECC-A fiberglass tape, G51019, ECC-A fiberglass tape, G51020, or ECC-B fiberglass tape, G51066) around the exterior surface of the insulation.

- 1) Use a square knot on each tie (ECC-A fiberglass tape, G51019) to prevent fraying.

NOTE: You must tuck the loose ends of the tie under the ties, between the tie and insulation. You must also make a knot on the end of the tie to prevent fraying. You must tuck the end of the insulation tie under itself (between the tie and foam) to prevent the ends from moving around during shipping, installation, or service.

- (i) Make sure that the ties (ECC-A fiberglass tape, G51019, ECC-A fiberglass tape, G51020, or ECC-B fiberglass tape, G51066) are tightly attached to the insulation.

NOTE: The ties (ECC-A fiberglass tape, G51019) can push down on the insulation sufficiently to keep its location, but not to the extent that visible gaps occur.

H. Air Separation Module Installation

SUBTASK 47-11-01-700-001

- (1) If the center fuel tank was used or filled during operation, do this task: Drain Cap - Fuel Leak Check, TASK 47-21-00-700-801.

SUBTASK 47-11-01-420-001

- (2) Do these steps to install the air separation module [1].
- (a) Remove the protective caps from the air separation module [1] ports.
- (b) Position the air separation module [1] into the strap [8] and strap [26].
- 1) Align all the ports and ducts.
- 2) Hold the air separation module [1] in this position.
- (c) Torque the nut [29] on the strap [26] to 31 ±1 in-lb (3.5 ±0.1 N·m).
- (d) Do these steps to secure the aft insulation [62]:

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DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- 1) Clean the aft insulation [62] with alcohol, B00130.
- 2) Apply the 3 in. (76 mm) wide Jehier KB-23D tape, G50706, to the seams on the aft insulation [62].
 - a) Make sure that no insulation foam is exposed.
 - b) Make sure that Jehier KB-23D tape, G50706, is centered between the insulation sections.

<1> Jehier KB-23D tape, G50706, must extend a minimum of 1 in. (2.5 cm) on each side of the seam.

NOTE: Small gaps, no larger than 0.25 in. (6.4 mm), are acceptable along the seam, as long as the gap does not extend through the entire seam and is covered by Jehier KB-23D tape, G50706. The ASM surface must not be visible through the gap.

- (e) Torque the nut [28] on the strap [8] to 31 ±1 in-lb (3.5 ±0.1 N·m).

SUBTASK 47-11-01-400-003

- (3) Do these steps to connect the ports and ducts:
 - (a) Put the sleeve [19] in its position between the OEA outlet port [17] and OEA exhaust duct [21].
 - (b) Install the coupling [18].
 - (c) Put the sleeve [13] in its position between the NEA outlet port and high flow valve [14] port.
 - (d) Install the coupling [15].
 - (e) If removed, install the overtemperature shutoff valve [10] (TASK 47-11-04-400-801).
 - (f) Inspect and apply epoxy primer, C50285, as required to the contact surfaces of the clamp [11].
 - (g) Install the clamp [11] between the inlet port and overtemperature shutoff valve [10].
 - 1) Torque the clamp [11] to 47.5 ±2.5 in-lb (5.4 ±0.3 N·m).

NOTE: This procedure requires a different torque value to the value that is printed on the clamp.

SUBTASK 47-11-01-400-004

- (4) Do these steps to attach the muscle air duct [9] and NEADS duct [27] to the air separation module [1]:
 - (a) Adjust the position of the P-clamps on the muscle air duct [9] and NEADS duct [27] until they are aligned with the brackets [5] and brackets [22] on the ASM hose clamps [6].
 - (b) Install the bolts [3], washers [4], and nuts [2], that attach the brackets [5] to the P-clamps on the muscle air duct [9].
 - (c) Install the bolts [24], washers [23], and nuts [25], that attach the brackets [22] to the P-clamps on the NEADS duct [27].

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SUBTASK 47-11-01-765-001

- (5) Measure the electrical bonding resistance between the strap [8] on the air separation module [1] and airplane structure (SWPM 20-20-00).
 - (a) Use an intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the electrical resistance is 0.010 ohm (10 milliohms) or less.

I. Air Separation Module Operational Test

SUBTASK 47-11-01-865-002

- (1) Do these steps to prepare for the operational test:
 - (a) Remove the safety tags and close these circuit breakers:
CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR
 - (b) Remove the DO NOT OPERATE tags from the L PACK and R PACK selector switches.
 - (c) Put the L PACK and the R PACK selector switches in the AUTO position.

SUBTASK 47-11-01-800-001

- (2) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

SUBTASK 47-11-01-790-001

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
 - (a) Repair the leaks that you find.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-11-01-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— END OF TASK —————

TASK 47-11-01-000-802

4. Air Separation Module Assembly - Removal

(Figure 402)

A. General

- (1) This is an alternate task to remove the air separation module (ASM). The high flow valve [14], NEADS duct [27], and OEA exhaust duct [21] are also removed as an assembly. This allows for easier removal of the ASM.

B. References

<u>Reference</u>	<u>Title</u>
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)

C. Tools/Equipment

<u>Reference</u>	<u>Description</u>
STD-858	Tag - DO NOT OPERATE

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D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Prepare for the Removal

SUBTASK 47-11-01-860-002

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-11-01-860-003

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install DO NOT OPERATE tag, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-11-01-860-004

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-11-01-010-003



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.

- (4) Open this access panel:

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-11-01-910-001



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)



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.

- (5) Obey the Nitrogen Generation System (NGS) precautions.

SUBTASK 47-11-01-650-001

- (6) Drain fuel from the swivel tee on the NEADS duct [27] (TASK 47-21-00-700-801).

G. Air Separation Module Assembly Removal

SUBTASK 47-11-01-020-002

- (1) Do these steps to disconnect these clamps:
- (a) Remove the screws [68], washers [67], and nuts [66] from the loop clamps [69] and wire bundle clamps [65] (Figure 402, View I).
 - 1) Keep the clamps on the wire bundle and muscle air duct [9].

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- (b) Remove the screw [74], washers [73], and nut [72] from the clamp [70] and clamp [71] (Figure 402 (Sheet 8), View J).
 - 1) Keep the clamps on the muscle air line and NEADS duct [27].

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- (c) Remove the screw [74], spacer [75], washers [73], and nut [72] from the clamp [70] and clamp [71] (Figure 402, View J).
 - 1) Keep the clamps on the muscle air line and NEADS duct [27].

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SUBTASK 47-11-01-020-003

- (2) Do these steps to disconnect the air separation module [1]:
- (a) Remove the clamp [11] between the air separation module [1] and the overtemperature shutoff valve [10].
 - 1) Discard the O-ring [12].
 - (b) Disconnect the coupling [18] from the OEA outlet port [17] and the OEA exhaust duct [21].
 - 1) Remove the sleeve [19].
 - 2) Discard the two O-rings [20].
 - (c) Disconnect the NEADS duct [27] from the rear spar.
 - (d) Disconnect the muscle air duct [9] from the air supply duct.
 - (e) Disconnect the tube [46] from the reducer tee.
 - (f) Remove the bonding jumper [41], bolts [40], washers [44], and nuts [43] from the clamps [42] that is attached to the NEADS duct [27].
 - (g) Remove the bonding jumpers [45], bolts [40], washers [44], and nuts [43] from the clamps [42] that is attached to the NEADS duct [27].
 - (h) Disconnect the electrical connectors [48].

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- (i) Disconnect the oxygen sensor tube [47] from the high flow valve [14].
- (j) Remove the bonding jumper [56], screw [58], washers [59], and nut [60] from the jumper tab [61].

SUBTASK 47-11-01-020-004

- (3) Do these steps to remove the air separation module [1] from the airplane:
 - (a) Hold the air separation module [1] in its position.
 - (b) Disconnect the three tie rods [50] from the ASM mount [49]:
 - 1) Remove the bolt [53], bushings [51], washer [52], washer [54], and nut [55].
 - (c) Loosen the nut [28] on the strap [8].
 - 1) Separate the strap [8].
 - (d) Remove the air separation module [1].

SUBTASK 47-11-01-480-001

- (4) Install the protective covers on the ports of the high flow valve [14], overtemperature shutoff valve [10], OEA exhaust duct [21], tube [46], reducer tee, and oxygen sensor tube [47].

SUBTASK 47-11-01-580-001

- (5) Place the air separation module [1] on a clean surface.

SUBTASK 47-11-01-020-005

- (6) Do these steps to remove the high flow valve [14] from the air separation module [1]:
 - (a) Disconnect the NEADS duct [27] from the high flow valve [14].
 - (b) Disconnect the muscle air duct [9] from the high flow valve [14].
 - (c) Disconnect the coupling [15] between the high flow valve [14], and the air separation module [1].
 - 1) Remove the sleeve [13].
 - 2) Discard the two O-rings [16].
 - (d) Loosen the nut [29] on the strap [26].
 - 1) Separate the strap [26].

SUBTASK 47-11-01-020-006

- (7) Remove the ASM hose clamps [6]:
 - (a) Cut the four ties on the surface of the insulation.
 - (b) Cut the tape at the seam line on the body insulation [64] and aft insulation [62].

NOTE: Be careful not to slice into the insulation, it will be reused.

Keep the forward insulation attached to the body insulation if possible.
 - (c) Loosen the setscrews [7] on the ASM hose clamps [6].
 - 1) Separate the ASM hose clamps [6].
 - (d) Remove the muscle air duct [9] with the attached brackets [5].
 - (e) Remove the NEADS duct [27] with the attached brackets [22].
 - (f) Remove the ASM hose clamp [6].

SUBTASK 47-11-01-020-007

- (8) Remove the aft insulation [62], body insulation [64], and forward insulation [63].

NOTE: Keep the forward insulation attached to the body insulation.

———— **END OF TASK** ————

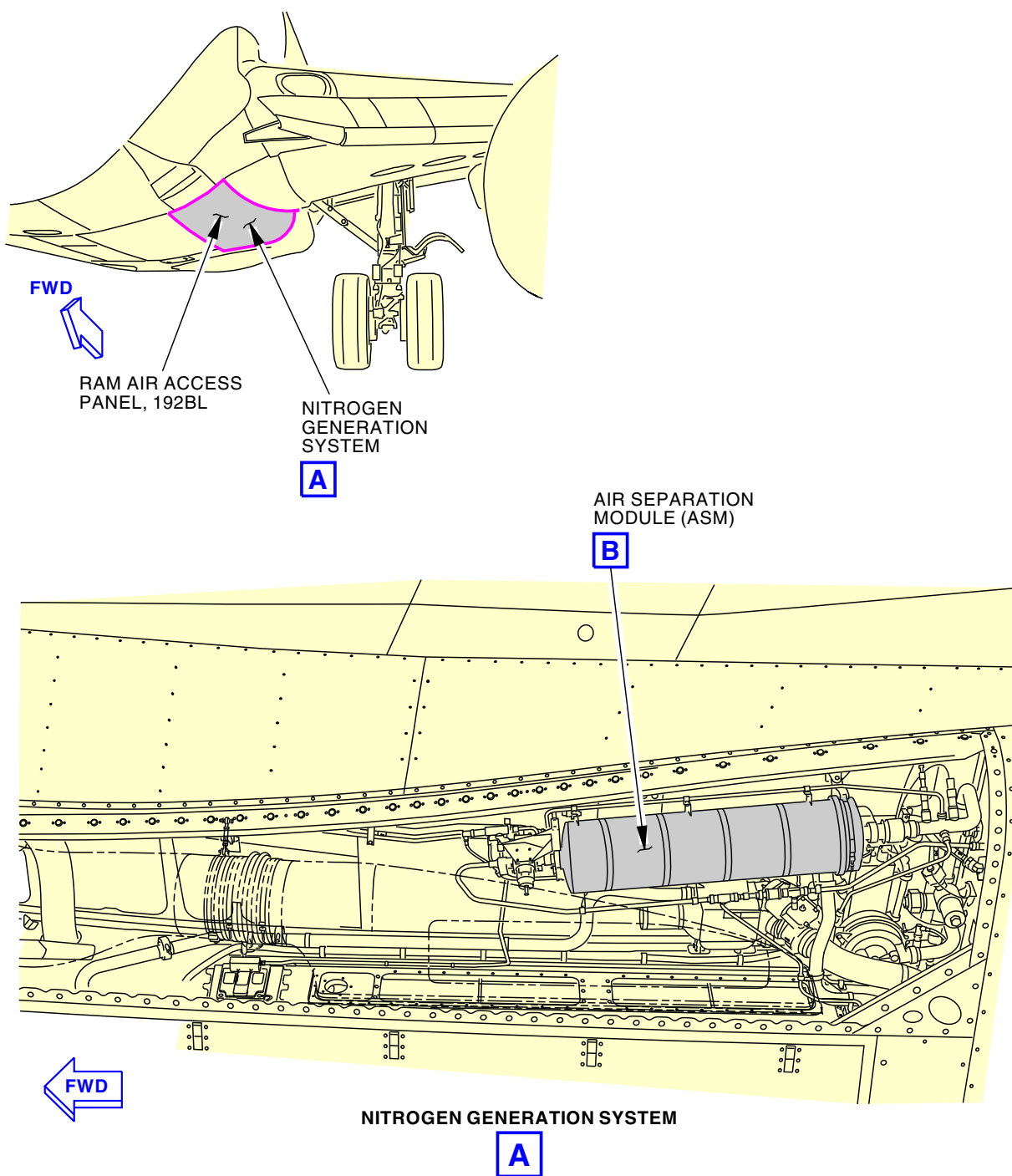
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2415314 S00061537551_V1

Air Separation Module Installation
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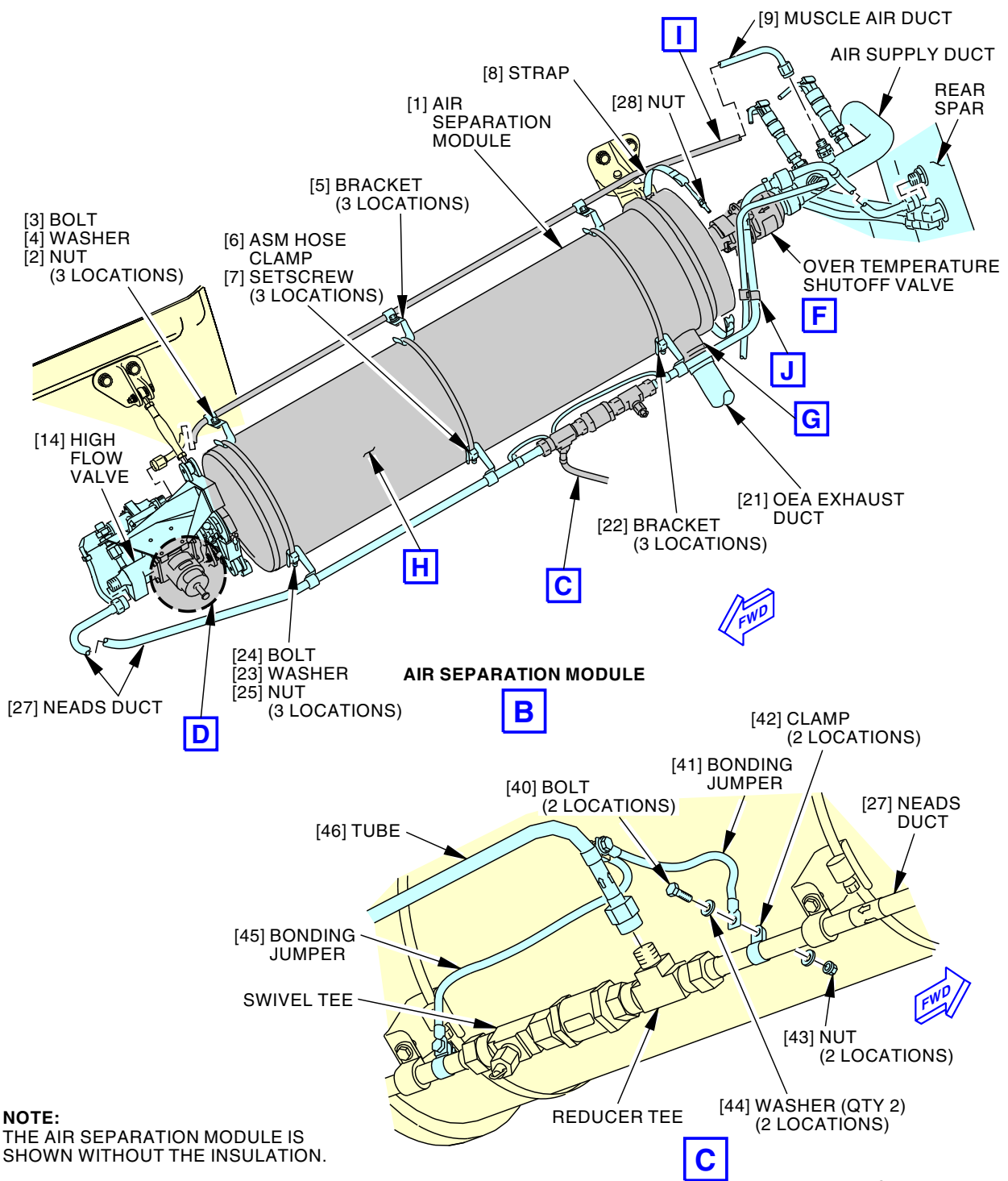
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**Air Separation Module Installation
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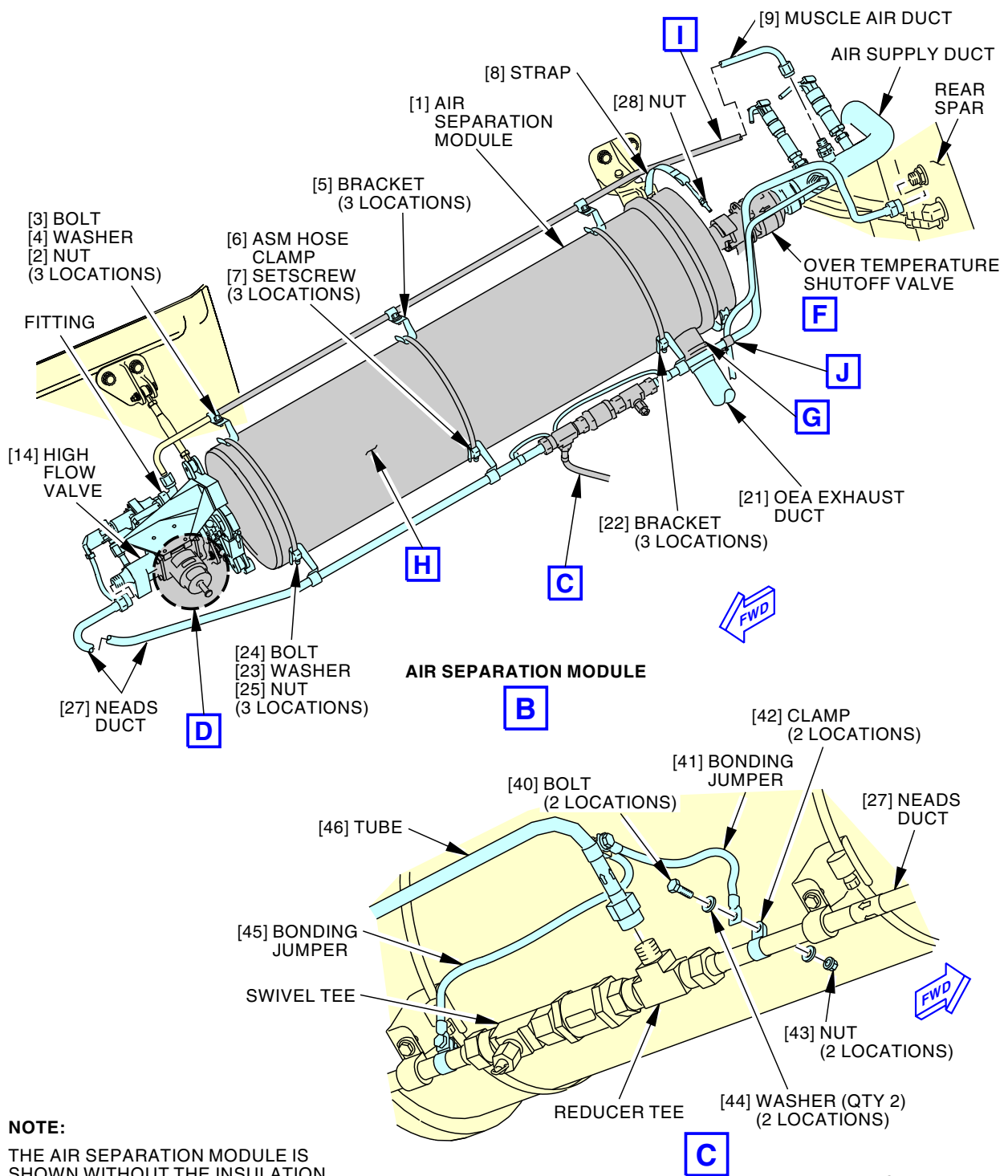
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2572717 S0000618077_V2

Air Separation Module Installation
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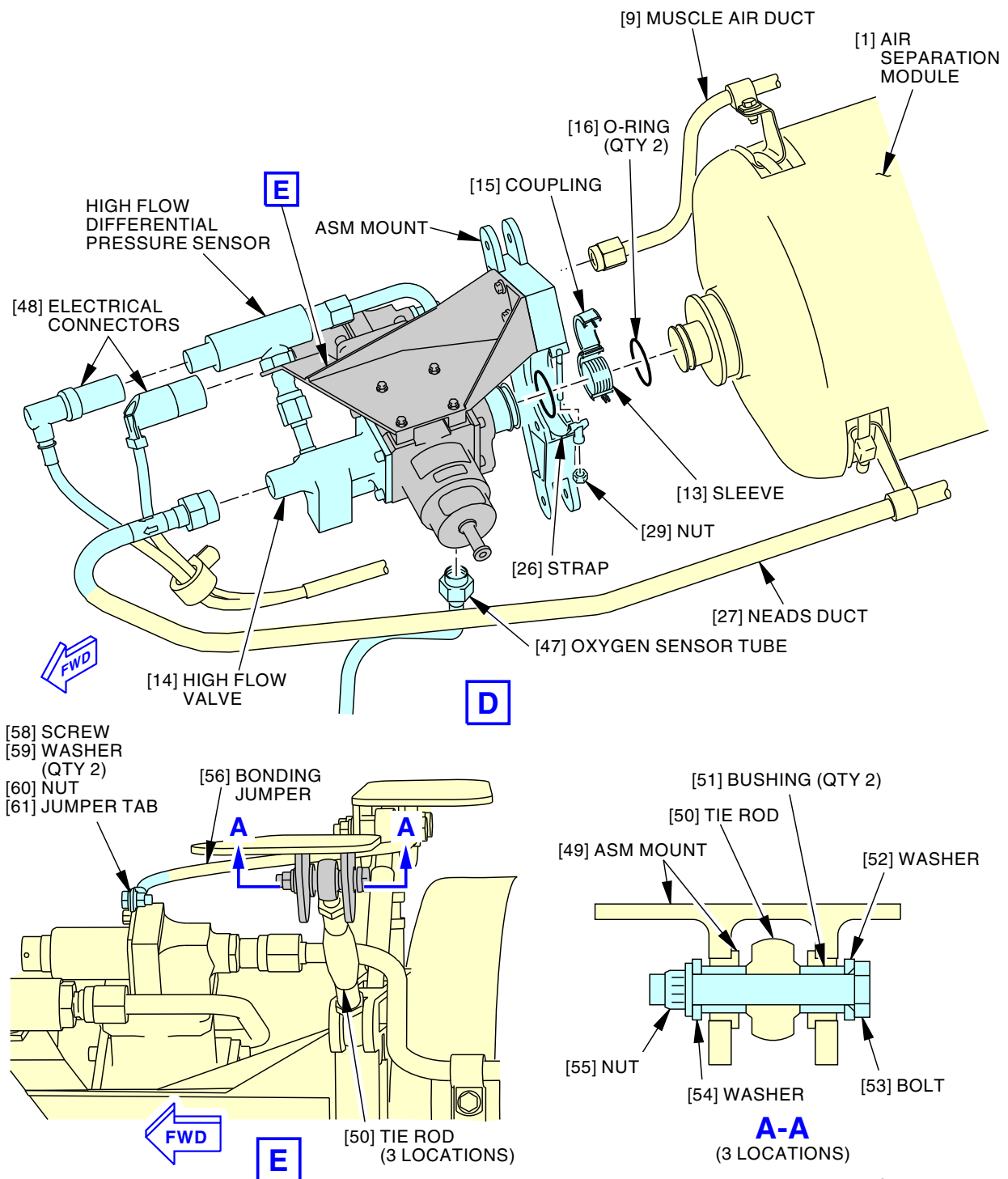
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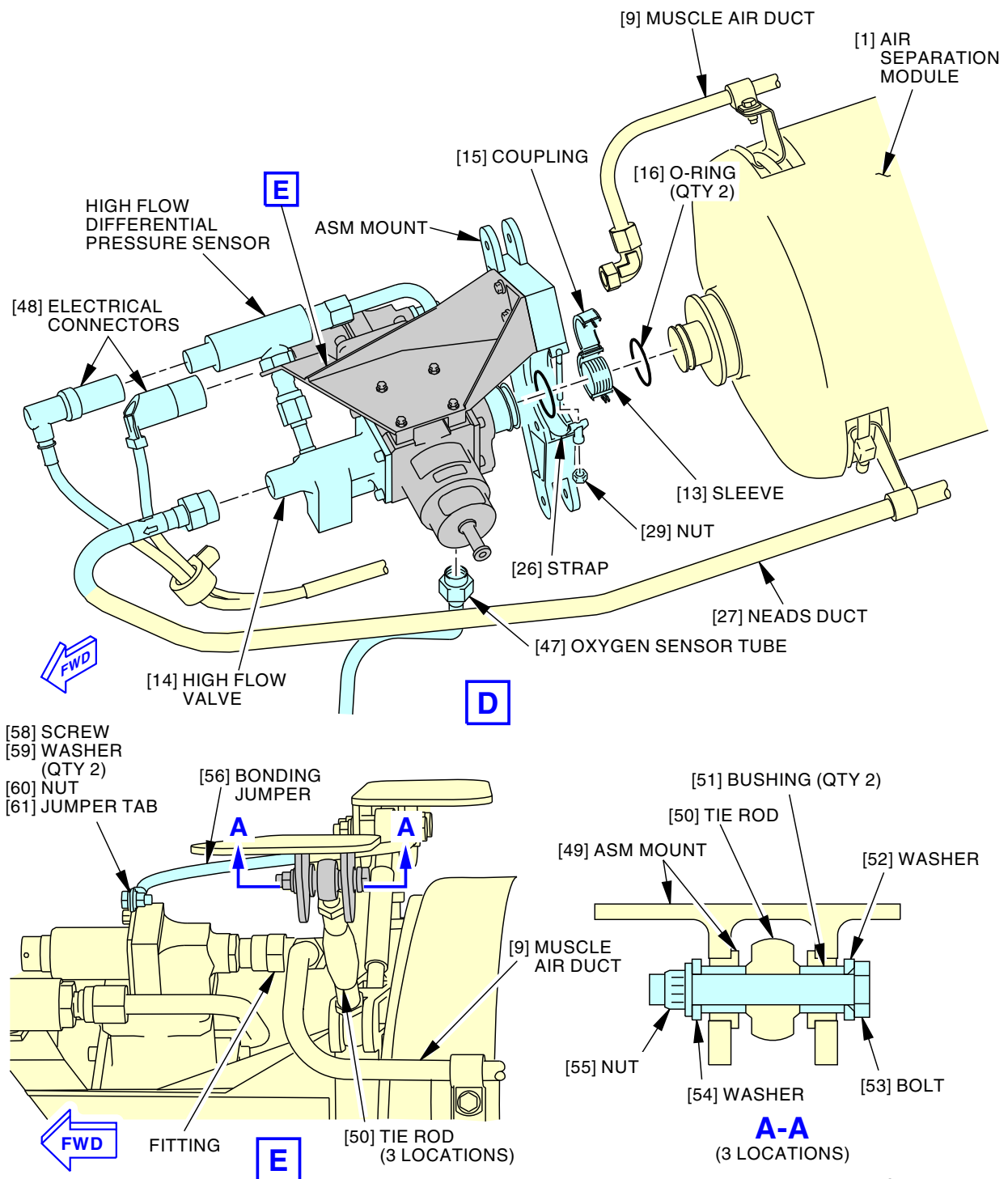
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2415320 S00061537559_V1

Air Separation Module Installation
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2572802 S0000618079_V1

Air Separation Module Installation
Figure 402/47-11-01-990-802 (Sheet 5 of 9)

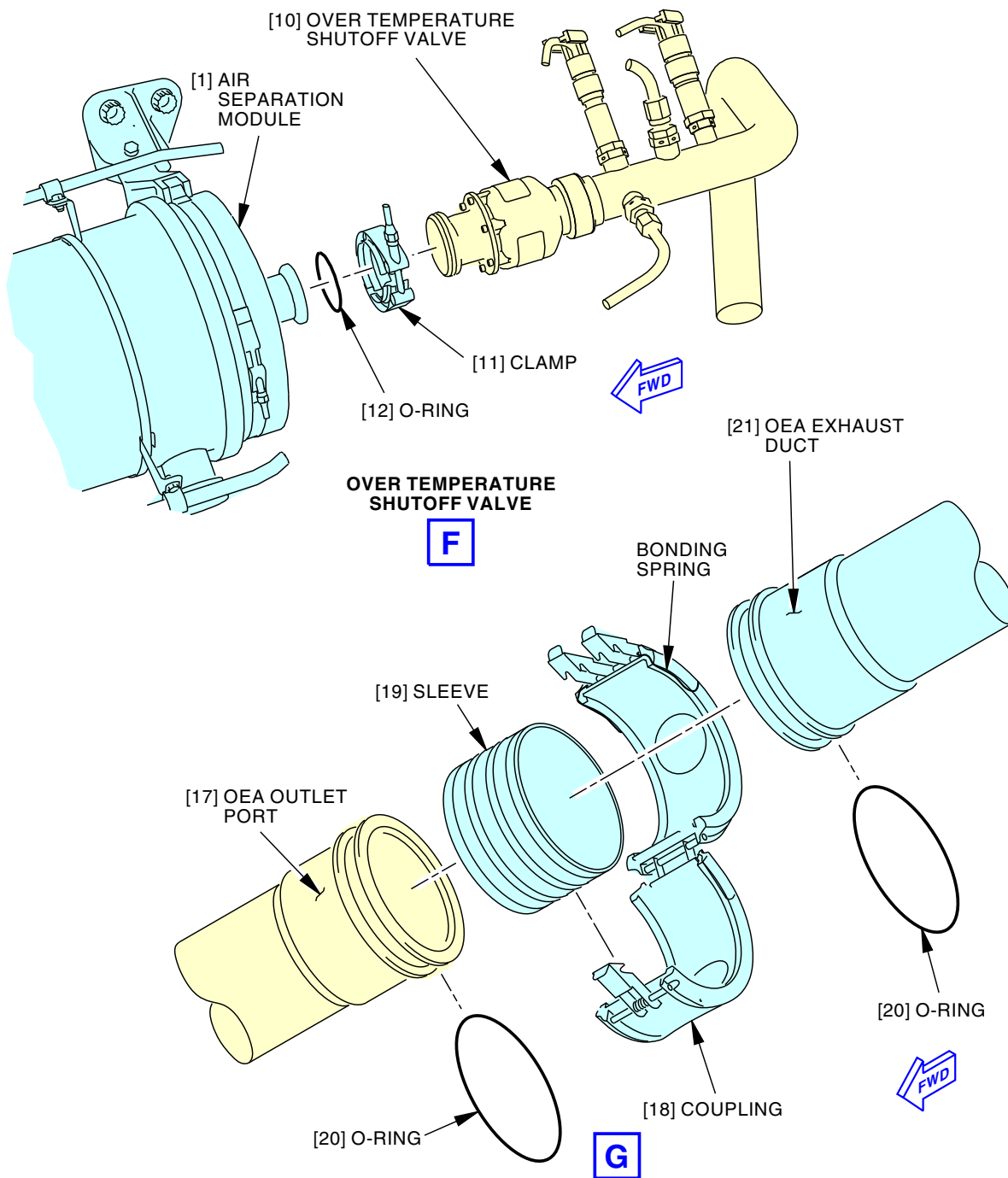
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2415321 S00061537560_V2

Air Separation Module Installation
Figure 402/47-11-01-990-802 (Sheet 6 of 9)

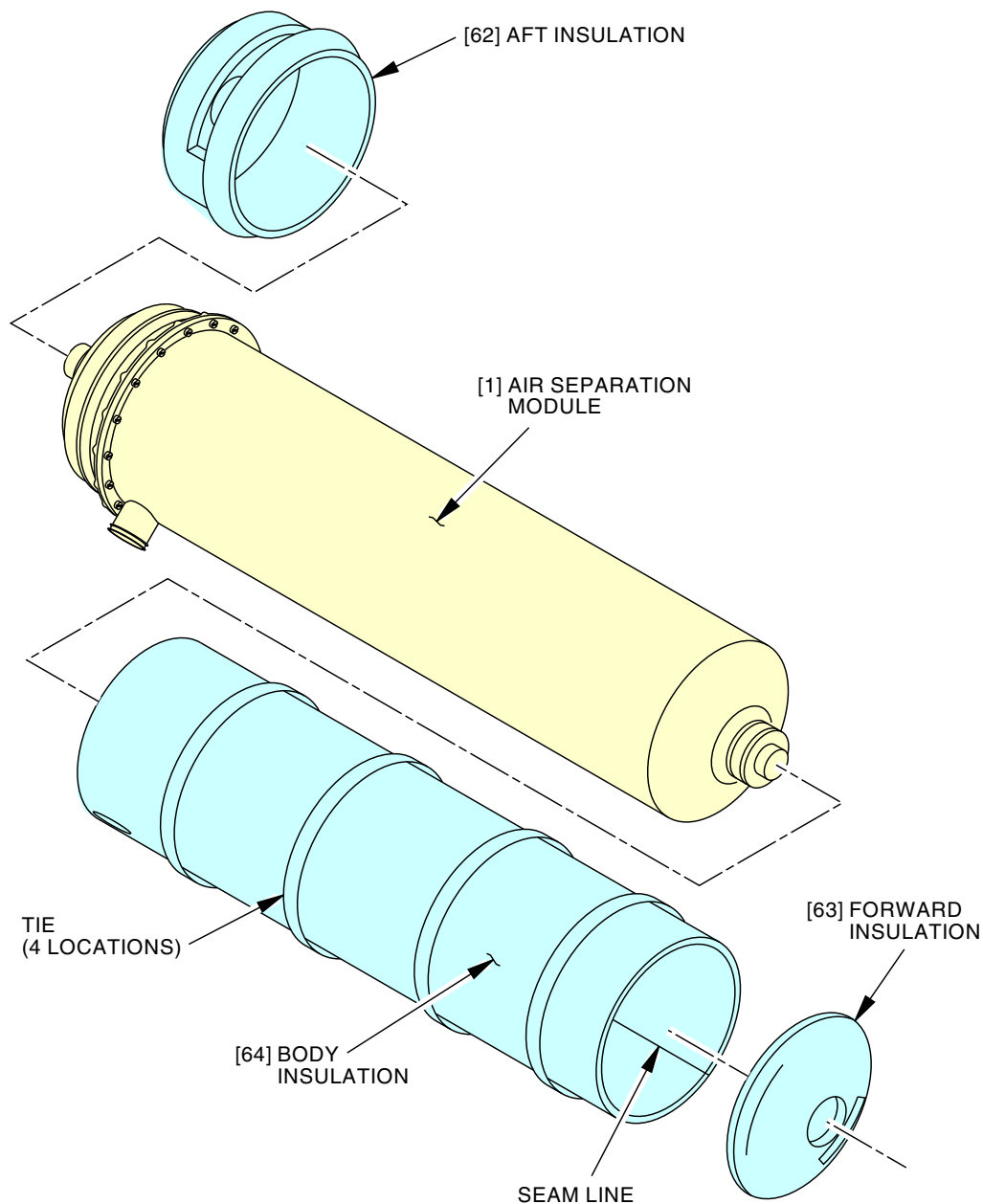
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2415322 S00061537561_V1

Air Separation Module Installation
Figure 402/47-11-01-990-802 (Sheet 7 of 9)

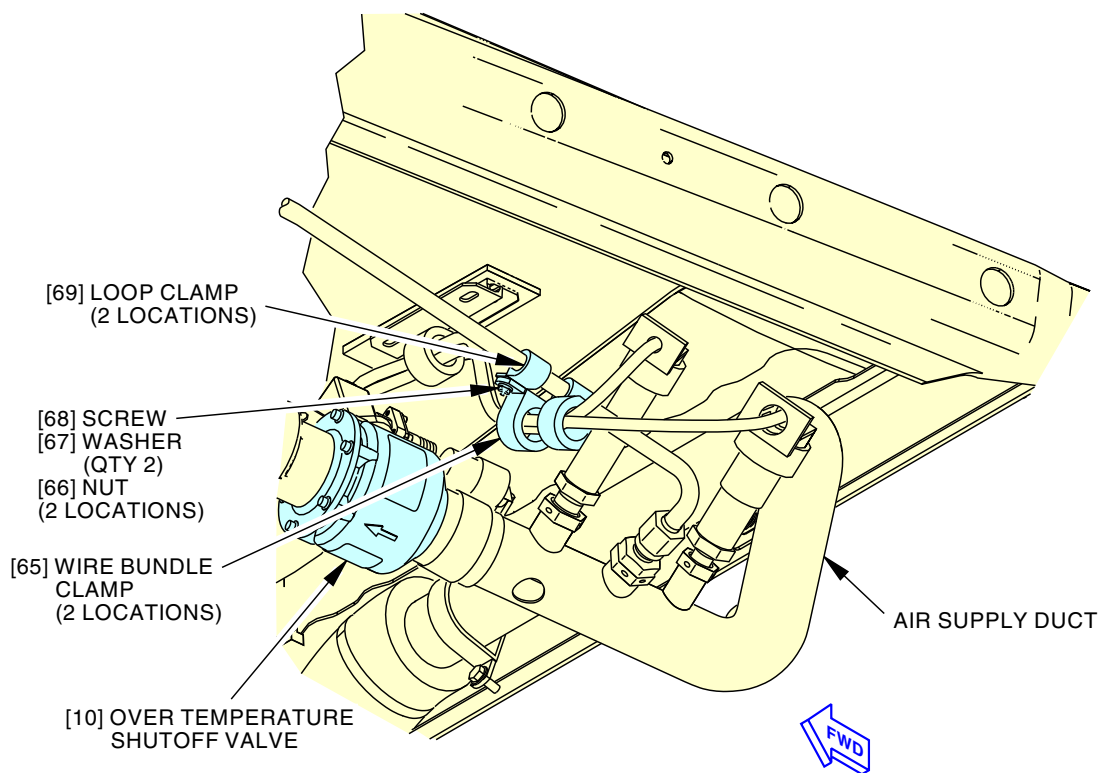
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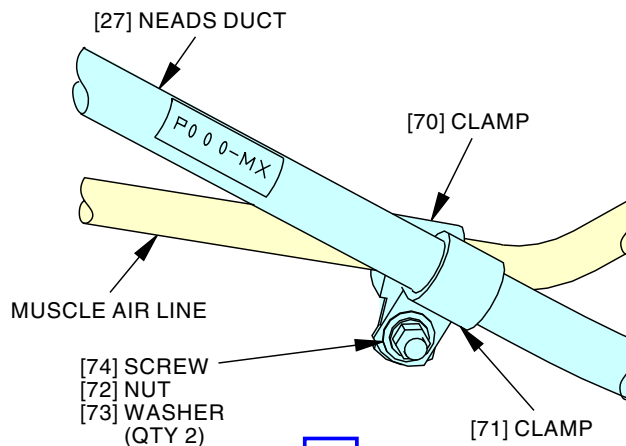
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2415323 S00061537562_V2

Air Separation Module Installation
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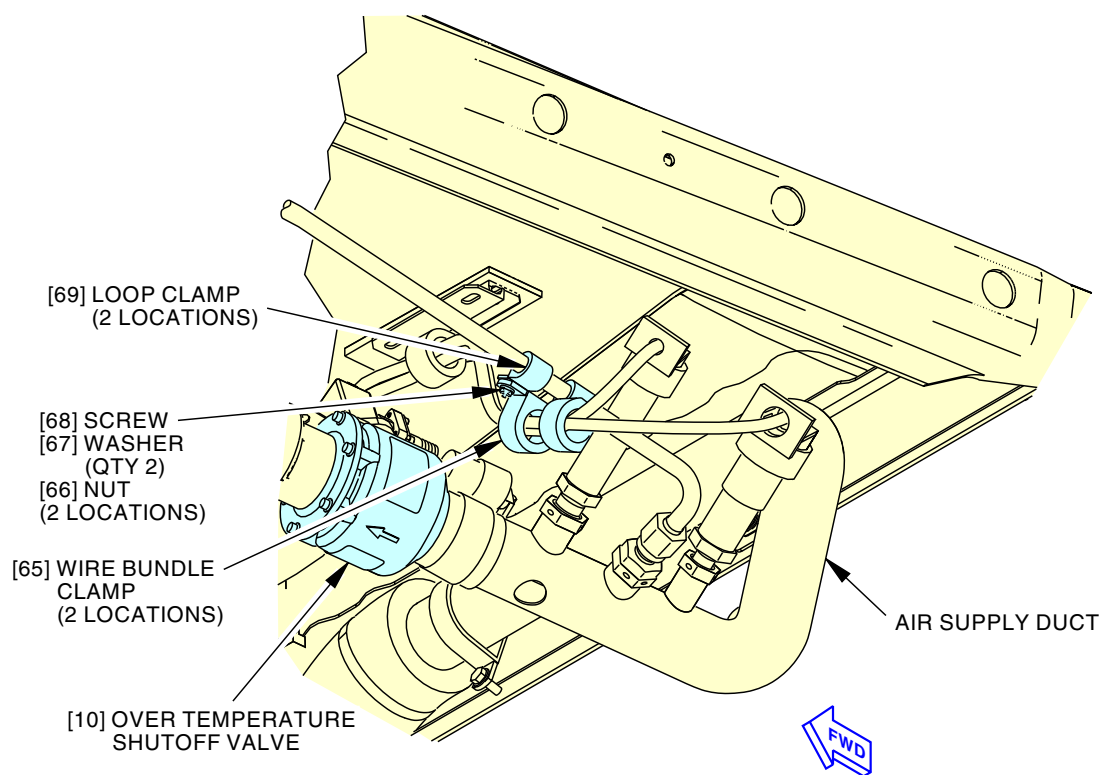
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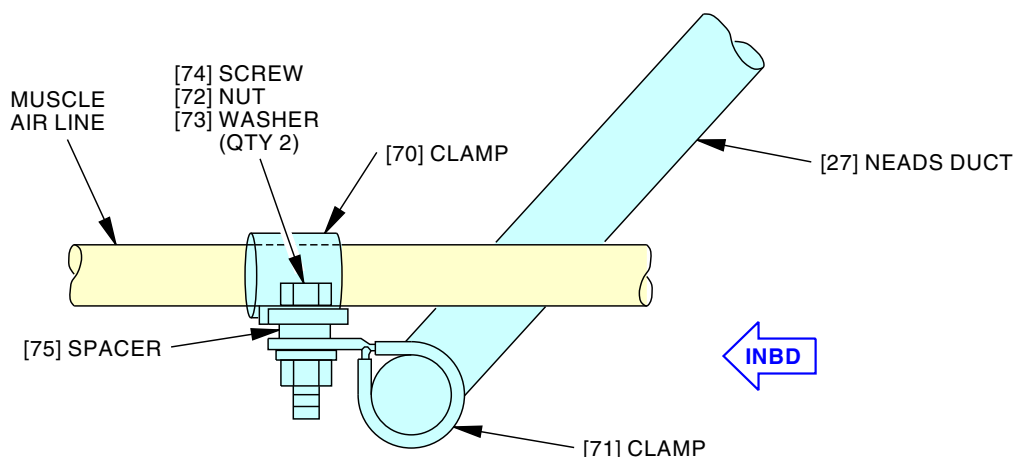
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2784108 S0000631021_V1

Air Separation Module Installation
Figure 402/47-11-01-990-802 (Sheet 9 of 9)

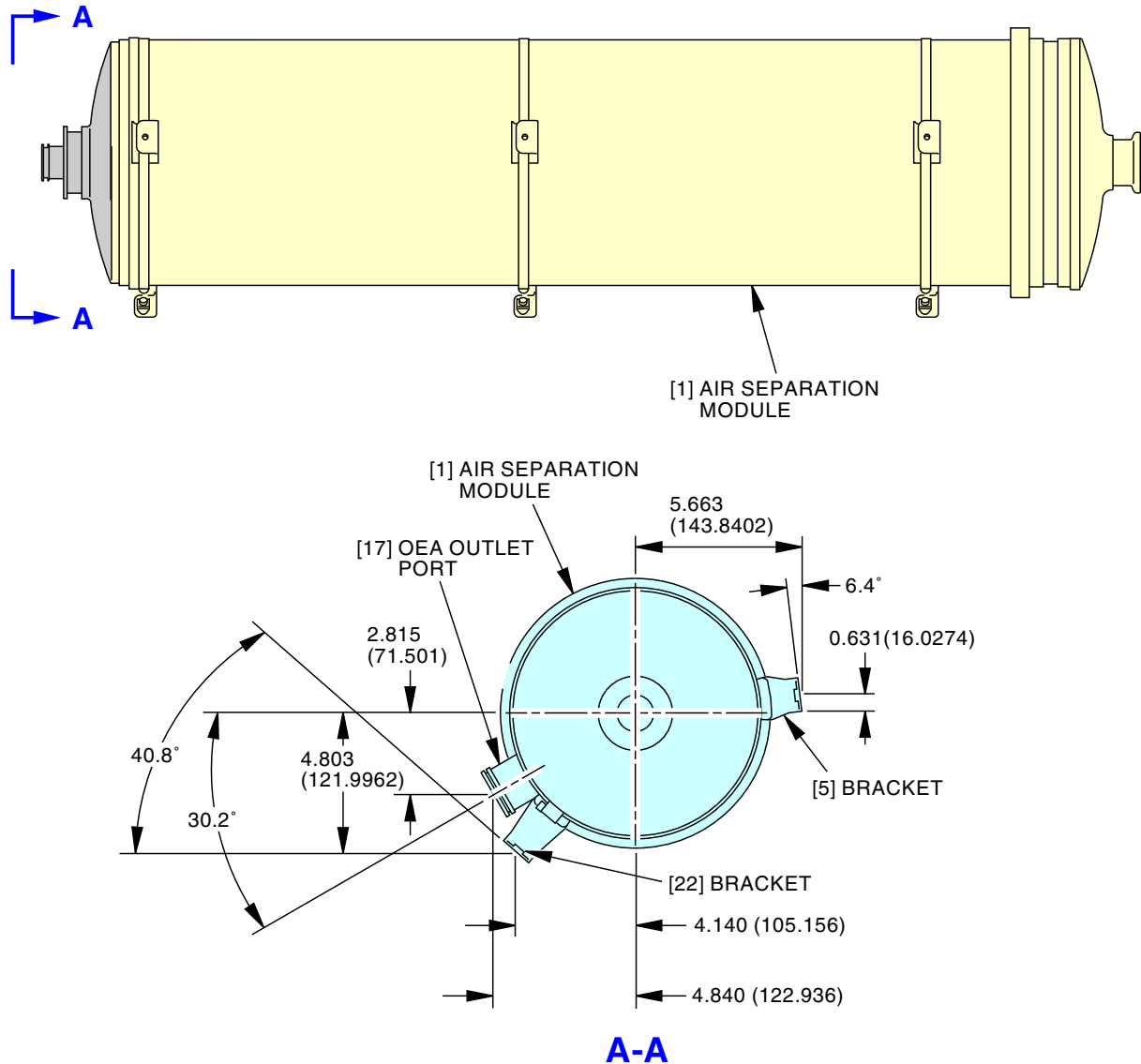
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NOTE:
INSULATION NOT SHOWN FOR CLARITY
DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)

2415324 S00061537563_V1

ASM Bracket Orientation
Figure 403/47-11-01-990-803

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TASK 47-11-01-400-801

5. Air Separation Module Assembly - Installation

(Figure 402)

A. General

- (1) This is an alternate task to install the air separation module (ASM). The high flow valve [14], muscle air duct [9], and NEADS duct [27] are installed on the ASM before installation on the airplane.

B. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
C00852	Compound - Antiseize, Molybdenum Disulfide-Petrolatum	MIL-PRF-83483
C50285	Primer - Epoxy	MIL-PRF-23377 Type 1 Class C2
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G50706	Tape - Jehier KB-23D, 3-Inch (76.2 mm) Wide	BMS5-172 TYPE I
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
G51020	Tape - ECC-A fiberglass tape, 0.007 Inches (0.1778 mm) Thick, 1/2 Inch (12.7 mm) Wide	MIL-Y-1140 Class C Form 5
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

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Air separation module	47-11-01-01-315	SIA 001-014
		47-11-01-01-335	SIA 001-014
		47-11-01-01-800	SIA 015-999
12	O-ring	47-11-01-01-395	SIA 001-014
		47-11-01-02-215	SIA 015-999
16	O-ring	47-11-01-02-080	SIA 015-999
		47-11-02-01-010	SIA 001-014
20	O-ring	47-21-01-01-055	SIA ALL

F. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

G. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

H. Prepare for the Installation

SUBTASK 47-11-01-160-001

- (1) Do these steps to clean the air separation module [1] and high flow valve [14]:
 - (a) Put the air separation module [1] on a clean surface.

NOTE: A bench or a clean work area are the best locations to work on the air separation module.
 - (b) Remove the protective caps on the ports of the air separation module [1].
 - (c) Clean the flanges and ports on the air separation module [1] with a clean cotton wiper, G00034, and alcohol, B00130.



MAKE SURE THAT THERE ARE NO GREASE, SOLVENTS, AND UNWANTED MATERIALS IN THE AIR SEPARATION MODULE PORTS. IF YOU DO NOT OBEY, CONTAMINATION CAN CAUSE DAMAGE TO THE AIR SEPARATION MODULE.

- 1) Make sure that the ports are free from grease, solvents and unwanted material.
- (d) Clean the flange and ports on the high flow valve [14] with a clean cotton wiper, G00034, and alcohol, B00130.

SUBTASK 47-11-01-420-002

- (2) Do these steps to install the muscle air duct [9] and NEADS duct [27] on the air separation module [1]:
 - (a) Apply a thin layer of compound, C00852, to the threads on the setscrews [7].
 - (b) Apply epoxy primer, C50285, to the inner side of the ASM hose clamps [6].
 - (c) Apply epoxy primer, C50285, to the contact surfaces on the brackets [5] and brackets [22].
 - (d) Slide the three ASM hose clamps [6] on the air separation module [1].

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- (e) Install the body insulation [64] on the air separation module [1].

NOTE: The forward insulation is attached to the body insulation.

- 1) Use the orientation marks to align the forward insulation [63].
- 2) Make sure that you can see the ASM nameplate through the cutout on the forward insulation [63].

- (f) Align each ASM hose clamp [6] with the cutouts on the body insulation [64].

- (g) Install the muscle air duct [9].

NOTE: A minimum clearance of 0.15 $\pm$ 0.10 in. (3.81 $\pm$ 2.54 mm) is recommended between the brackets and insulation cutouts.

- 1) Make sure that each bracket [5] is between the ASM hose clamp [6] and air separation module [1].
- 2) Make sure that the brackets [5] are aligned correctly (Figure 403).

- (h) Install the NEADS duct [27].

NOTE: A minimum clearance of 0.15 $\pm$ 0.10 in. (3.81 $\pm$ 2.54 mm) is recommended between the brackets and insulation cutouts.

- 1) Make sure that each bracket [22] is between the ASM hose clamp [6] and air separation module [1].
- 2) Make sure that the brackets [22] are aligned correctly (Figure 403).

- (i) Hand tighten each setscrew [7] on the three ASM hose clamps [6].

NOTE: Tighten enough to keep brackets in place.

SUBTASK 47-11-01-420-003

- (3) Do these steps to install the body insulation [64] and forward insulation [63] to the air separation module [1]:

- (a) Make sure that there is a clearance of 0.15 $\pm$ 0.10 in. (3.8 $\pm$ 2.5 mm) between each bracket and cutouts (on the body insulation [64]).



DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (b) Clean the body insulation [64] with alcohol, B00130.

- (c) Apply the 3 in. (76 mm) wide Jehler KB-23D tape, G50706, to the seams on the body insulation [64].

- 1) Make sure that no insulation foam is exposed.
- 2) Make sure that the Jehler KB-23D tape, G50706, is centered between the insulation sections.
 - a) The Jehler KB-23D tape, G50706, must extend a minimum of 1 in. (2.5 cm) on each side of the seam.

NOTE: Small gaps no larger than 0.25 in. (6.4 mm) are acceptable along the seam, as long as, the gap does not extend through the entire seam and is covered by tape. The ASM surface must not be visible through the gap.



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- (d) Make sure that there are no gaps between the foam and the outside diameter of the air separation module [1], except where bunching occurs.

NOTE: Where bunching occurs, gaps less than 0.25 in. (6.35 mm) wide is permitted.

- (e) Install the ties (ECC-A fiberglass tape, G51019, ECC-A fiberglass tape, G51020, or ECC-B fiberglass tape, G51066) around the exterior surface of the insulation.

NOTE: Use a square knot on each tie (ECC-A fiberglass tape, G51019) to prevent fraying. The loose ends of the tie must be tucked under the ties, between the tie and the insulation. A knot shall also be placed on the end of the tie to prevent fraying. The end of the insulation tie must be tucked under itself (between the tie and foam) to prevent the ends from moving around during shipping, installation or service.

- 1) Make sure that the ties (ECC-A fiberglass tape, G51019, ECC-A fiberglass tape, G51020, or ECC-B fiberglass tape, G51066) are tightly attached to the insulation.

NOTE: Ties (ECC-A fiberglass tape, G51019) may push down on insulation sufficiently to keep its location, but not to the extent that visible gaps occur.

SUBTASK 47-11-01-420-004

- (4) Do these steps to install the high flow valve [14] to the air separation module [1]:

- (a) Apply the epoxy primer, C50285, to the groove where it comes in contact with the strap [26].



WARNING

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 new O-rings [16].
- (c) Install an O-ring [16] on the flange of the high flow valve [14].
- (d) Install an O-ring [16] on the flange of the air separation module [1].
- (e) Put the sleeve [13] in its position between the high flow valve [14] and air separation module [1].
- (f) Make sure that the NEADS duct [27] and muscle air duct [9] align with the high flow valve [14] and ASM mount.
- (g) Install the coupling [15].
- (h) Attach the muscle air duct [9] to the high flow valve [14].
- (i) Attach the NEADS duct [27] to the high flow valve [14].

SUBTASK 47-11-01-420-005

- (5) Tighten each setscrew [7] on the three ASM hose clamps [6] to 16 ±2 in-lb (1.8 ±0.2 N·m).

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SUBTASK 47-11-01-410-002

- (6) Put protective caps on the air separation module [1] for transport.

NOTE: This is to prevent contamination while the air separation module is transported to the airplane.

I. Air Separation Module Assembly Installation

SUBTASK 47-11-01-420-006

- (1) Do these steps to install the air separation module [1] (Figure 402, View B):
- (a) Apply a thin layer of compound, C00852, to the threads on the t-bolt of the strap [8].
 - (b) Apply the epoxy primer, C50285, to the groove where it comes in contact with the straps [8].
 - (c) Put the aft insulation [62] on the air separation module [1].
 - (d) Remove the protective caps on each port.
 - (e) Align the three tie rods [50] to the ASM mounts [49] (Figure 402, View E).
 - (f) Install the bolt [53], washer [52], two bushings [51], washer [54], and nut [55] through the ASM mount [49] and tie rod [50] (three locations) (Figure 402, View A-A).
 - (g) Position the air separation module [1] into the strap [8] (Figure 402, View B).
 - 1) Align all ports and ducts.
 - 2) Hold the air separation module [1] in this position.
 - (h) Tighten the nut [28] to 31 ± 1 in-lb (3.5 ± 0.1 N·m).

SUBTASK 47-11-01-420-007

- (2) Do these steps to secure the aft insulation [62] to the body insulation [64] (Figure 402, View H):



WARNING

DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Clean the aft insulation [62] with alcohol, B00130.
 - (b) Apply the 3 in. (76 mm) wide Jehier KB-23D tape, G50706, to the seams on the aft insulation [62].
 - 1) Make sure that no insulation foam is exposed.
 - 2) Make sure that the Jehier KB-23D tape, G50706, is centered between the insulation sections.
 - a) The Jehier KB-23D tape, G50706, must extend a minimum of 1 in. (2.5 cm) on each side of the seam.
- NOTE: Small gaps no larger than 0.25 in. (6.4 mm) are acceptable along the seam, as long as, the gap does not extend through the entire seam and is covered by tape. The ASM surface must not be visible through the gap.
- (c) Make sure that there are no gaps between the foam and the outside diameter of the air separation module [1], except where bunching occurs.

NOTE: Where bunching occurs, gaps less than 0.25 in. (6.35 mm) wide is permitted.

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SUBTASK 47-11-01-420-008

(3) Do these steps to connect the coupling [18] (Figure 402, View G):



WARNING

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, or water to the new O-rings [20].
- Install an O-ring [20] on the flange of the OEA outlet port [17].
- Install an O-ring [20] on the flange of the OEA exhaust duct [21].
- Put the sleeve [19] in its position between the OEA outlet port [17] and the OEA exhaust duct [21].
- Install the coupling [18].

SUBTASK 47-11-01-420-009

(4) Do these steps to connect the clamp [11] (Figure 402, View F):

- Apply epoxy primer, C50285, to the contact surfaces on the clamp [11].



WARNING

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-ring [12].
- Install the new O-ring [12] and clamp [11] between the inlet port, on the air separation module [1], and the overtemperature shutoff valve [10].
- Tighten the clamp [11] to 47.5 $\pm$ 2.5 in-lb (5.4 $\pm$ 0.3 N·m).
NOTE: This procedure requires a different torque value to the value that is printed on the clamp [11].

SUBTASK 47-11-01-420-010

(5) Connect the aft part of the NEADS duct [27] to the rear spar (Figure 402, View B).

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SUBTASK 47-11-01-420-011

- (6) Connect the aft part of the muscle air duct [9] to the air supply duct (Figure 402, View B).

SUBTASK 47-11-01-420-012

- (7) Connect the oxygen sensor tube [47] to the high flow valve [14] (Figure 402, View D).

SUBTASK 47-11-01-420-013

- (8) Do these steps to connect the tube [46] and bonding jumpers (Figure 402, View C):
- Connect the tube [46] to the reducer tee on the NEADS duct [27].
 - Prepare these components for an electrical mating surface bond (SWPM 20-20-00):
 - Clean the contact surfaces on the NEADS duct [27].
NOTE: Where the two clamps are installed.
 - Contact surfaces on both clamps [42].
 - bonding jumper [41]
 - bonding jumper [45]
 - Install the bolt [40], washers [44], nut [43], and bonding jumper [41] to the clamp [42].
NOTE: Located aft of the reducer tee.
 - Install the bolt [40], washers [44], nut [43], and bonding jumper [45] to the clamp [42].
NOTE: Located forward of the swivel tee.

SUBTASK 47-11-01-420-014

- (9) Do these steps to install the bonding jumper [56]:
- Prepare the bonding jumper [56] and jumper tab [61] for an electrical mating surface bond (SWPM 20-20-00):
 - Attach the bonding jumper [56] to the jumper tab [61] with the screw [58], two washers [59], and nut [60].

SUBTASK 47-11-01-420-015

- (10) Do these steps to connect the aft ASM tubing clamps:
- Align the holes on the loop clamps [69] and wire bundle clamps [65] (Figure 402, View I).
NOTE: The loop clamps are found on the muscle air duct.

SIA 015-999; SIA 001-014 POST SB 737-47-1016

- Place the loop clamps [69] approximately 5 in. (12.7 cm) from the aft bend in the muscle air duct [9].

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- Install the screws [68], washers [67], and nuts [66] to the loop clamps [69] and wire bundle clamps [65].

SIA 001-014 PRE SB 737-47-1016

- Align the holes on the clamp [70] and clamp [71] (Figure 402, View J).

SIA 015-999; SIA 001-014 POST SB 737-47-1016

- Align the holes on the clamp [70], spacer [75], and clamp [71] (Figure 402, View J).

SIA 001-014 PRE SB 737-47-1016

- Install the screw [74], washers [73], and nut [72] to the clamp [70] and clamp [71].

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SIA 015-999; SIA 001-014 POST SB 737-47-1016

- (f) Install the screw [74], washers [73], and nut [72] to the clamp [70], spacer [75], and clamp [71].

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SUBTASK 47-11-01-760-001

- (11) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance between the jumper tab [61] and ASM mount [49] (SWPM 20-20-00).
 - (a) Make sure that the resistance is 0.008 ohm (8 milliohms) or less.

SUBTASK 47-11-01-760-002

- (12) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance between the NEADS duct [27] and tube [46] though the bonding jumper [41] (SWPM 20-20-00).
 - (a) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 47-11-01-760-003

- (13) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance between the NEADS duct [27] and tube [46] though the bonding jumper [45] (SWPM 20-20-00).
 - (a) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

J. Air Separation Module Assembly Operational Test

SUBTASK 47-11-01-860-005

- (1) Do these steps to prepare for the operational test:
 - (a) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO-NOT-OPERATE tags from the L PACK and R PACK selector switches.
- (c) Put the L PACK and R PACK selector switches in the AUTO position.

SUBTASK 47-11-01-790-002

- (2) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

SUBTASK 47-11-01-410-003

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
 - (a) Repair the leaks that you find.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 47-11-01-410-004

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

———— **END OF TASK** ————

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HIGH FLOW VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the high flow valve
- (2) An installation of the high flow valve.

TASK 47-11-02-000-801

2. High Flow Valve Removal

(Figure 401)

A. **General**

- (1) This task removes the High Flow Valve (HFV) and HFV differential pressure sensor as one unit.

B. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

C. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

E. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. **Prepare for the Removal**

SUBTASK 47-11-02-864-001



WARNING

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.



WARNING

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) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 bleed air control module, make sure that the DUCT PRESS L and R show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-11-02-860-001

- (2) On the P5-10 bleed air control module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install the DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

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SUBTASK 47-11-02-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-11-02-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. High Flow Valve Removal

SUBTASK 47-11-02-030-001



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.



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.

- (1) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-11-02-030-003

- (2) Disconnect the electrical connections.
- (a) Disconnect the electrical connector [13] from the high flow valve [11].
 - (b) Disconnect the electrical connector [13] from the HFV differential pressure sensor [20].

SUBTASK 47-11-02-030-004

- (3) Remove the cap screw [15], plain washers [16], and nut [17] to disconnect the jumper [14] from the jumper tab on the high flow valve [11].

SUBTASK 47-11-02-030-005

- (4) Disconnect the high flow valve [11] from the air separation module [6] and tubes:
- (a) Disconnect the coupling [3] from the NEA outlet port on the air separation module [6].
 - (b) Remove the sleeve [8].

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- (c) Remove and discard the O-rings [7].
- (d) Install identification tags on the ducts and fittings.
NOTE: This will clearly identify the correct connection locations.
- (e) Loosen the nut on the NEADS tube [12] at the NEA outlet port on the high flow valve [11].
 - 1) Make sure that you do not bend the NEADS tube [12].
NOTE: The NEADS tube must align with the high flow valve on installation.
- (f) Loosen the nut on the HFV muscle air duct [5].
 - 1) Make sure that you do not bend the HFV muscle air duct [5].
NOTE: The HFV muscle air duct must align with the high flow valve on installation.
- (g) Loosen the nut on the oxygen sensor tube [9].
 - 1) Make sure that you do not bend the oxygen sensor tube [9].
NOTE: The oxygen sensor tube must align with the high flow valve on installation.

SUBTASK 47-11-02-020-001

- (5) Remove the high flow valve [11] as follows:
 - (a) Hold the HFV differential pressure sensor [20], while you remove the nut [18], low pressure sensor tube [21], and O-ring [19].
 - 1) Discard the O-ring [19].
 - (b) Hold the high flow valve [11] while you remove the bolts [1] and washers [2].
 - (c) Remove the high flow valve [11].

SUBTASK 47-11-02-490-001

- (6) Install protective covers on these open ports:
 - (a) the NEA outlet port on the air separation module [6]
 - (b) the HFV muscle air duct [5]
 - (c) the NEADS tube [12]
 - (d) the oxygen sensor tube [9]
 - (e) the HFV differential pressure sensor [20]
 - (f) the low pressure sensor tube [21].

SUBTASK 47-11-02-490-002

- (7) Install protective covers on the high flow valve [11].

———— **END OF TASK** ————

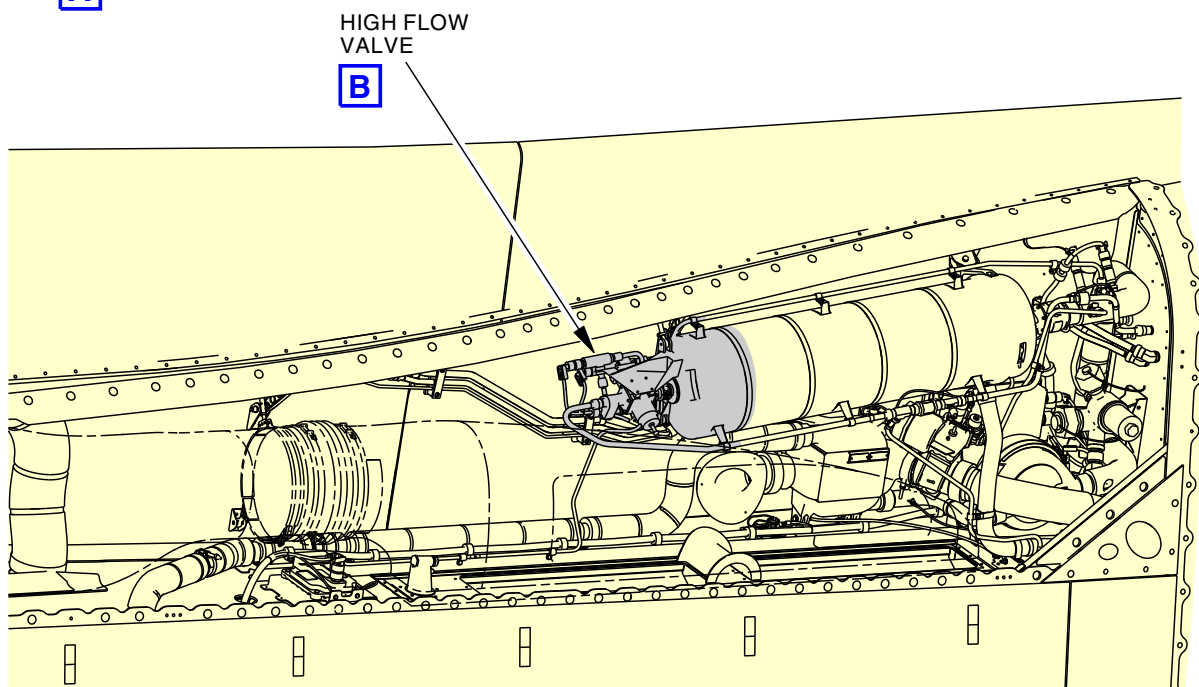
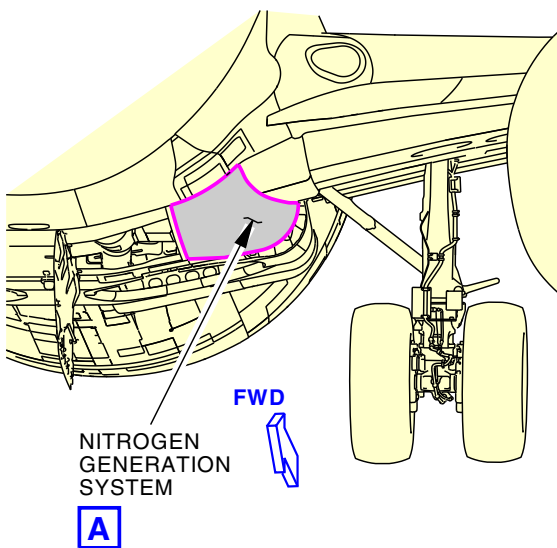
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NITROGEN GENERATION SYSTEM
(VIEW IN THE INBOARD DIRECTION)

A

2415325 S00061537568_V1

High Flow Valve Installation
Figure 401/47-11-02-990-801 (Sheet 1 of 3)

EFFECTIVITY
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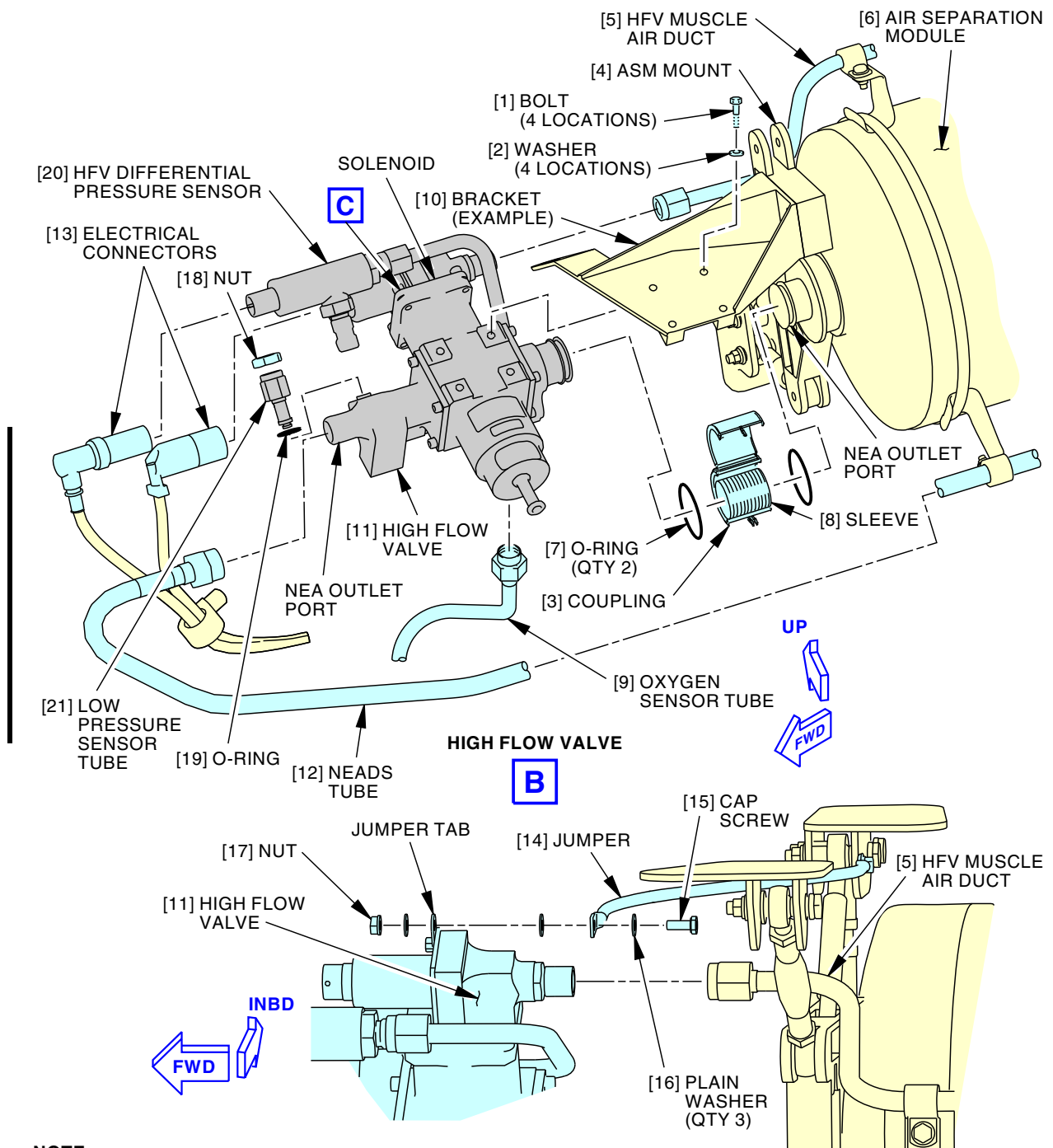
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NOTE:
INSULATION NOT SHOWN ON THE HIGH FLOW VALVE FOR CLARITY.

2415326 S00061537569_V4

**High Flow Valve Installation
Figure 401/47-11-02-990-801 (Sheet 2 of 3)**

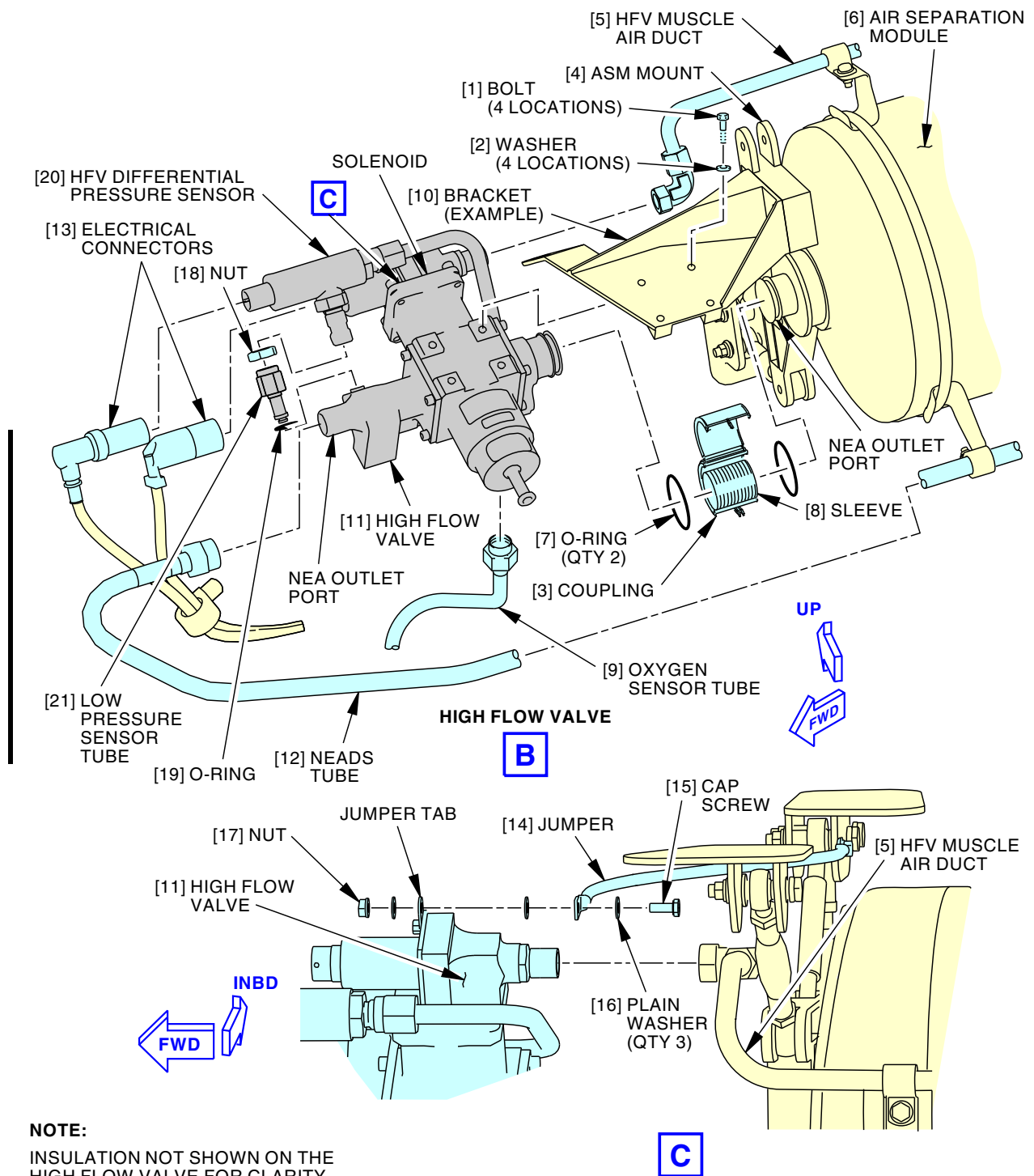
EFFECTIVITY
SIA 001-014 PRE SB 737-47-1016

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NOTE:
INSULATION NOT SHOWN ON THE
HIGH FLOW VALVE FOR CLARITY.

2572818 S0000618074_V4

High Flow Valve Installation
Figure 401/47-11-02-990-801 (Sheet 3 of 3)



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TASK 47-11-02-420-801

3. **High Flow Valve Installation**

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-3724	Wrench

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00346	Primer - Corrosion Inhibiting, Chemical & Solvent Resistant Epoxy, High Solids	MIL-PRF-23377
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
7	O-ring	47-11-01-02-080	SIA 015-999
		47-11-02-01-010	SIA 001-014
11	High flow valve	47-11-01-02-085	SIA 015-999
		47-11-02-01-015	SIA 001-014
19	O-ring	47-11-01-01-170	SIA 001-014
		47-11-01-02-100	SIA 015-999

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E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Prepare for the Installation

SUBTASK 47-11-02-090-001

- (1) Remove the protective covers from these ports:
 - (a) the HFV muscle air duct [5]
 - (b) the NEADS tube [12]
 - (c) the Nitrogen Enriched Air (NEA) outlet port on the air separation module [6]
 - (d) the oxygen sensor tube [9]
 - (e) the HFV differential pressure sensor [20]
 - (f) the low pressure sensor tube [21].

SUBTASK 47-11-02-160-002

- (2) Do these steps to prepare the high flow valve [11] and jumper [14] for installation:
 - (a) Clean the jumper [14] and steel jumper tab fay surfaces on the high flow valve [11] (SWPM 20-20-00):
 - 1) Use Cleaning Procedure 5 to clean the jumper tab fay surfaces, plain washers [16], and terminal on the jumper [14].
 - a) Use a new cotton wiper, G00034, or knit cotton wiper, G51293, soaked with solvent, B00062, or solvent, B00184.
 - b) Use cotton wiper, G00034, to dry the surfaces.
 - c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 47-11-02-430-001

- (3) Install the new O-rings [7].



WARNING

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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) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the O-rings [7].
- (b) Put the O-rings [7] in the cavities on the air separation module [6] and high flow valve [11].

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H. High Flow Valve Installation

SUBTASK 47-11-02-430-002

- (1) Install the high flow valve [11] to the bracket [10].
 - (a) Use the identification tags to correctly position the high flow valve [11].
 - (b) Align the high flow valve [11] with the bracket [10] and HFV differential pressure sensor [20].
 - (c) Install, but do not tighten, the bolts [1] to attach the high flow valve [11] to the bracket [10].
 - 1) Do not fully tighten the bolts [1] until you align the high flow valve [11] with the bracket [10], NEADS tube [12], air separation module [6], HFV muscle air duct [5], and oxygen sensor tube [9].



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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.

- (d) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the new O-ring [19].
- (e) Install, but do not tighten, the nut [18], low pressure sensor tube [21], and O-ring [19].

SUBTASK 47-11-02-430-003

- (2) Connect the high flow valve [11] to these components:
 - (a) Connect, but do not tighten, the nut on the HFV muscle air duct [5].
 - (b) Connect, but do not tighten, the nut on the NEADS tube [12].
 - (c) Connect, but do not tighten, the nut on the oxygen sensor tube [9].
 - (d) Make sure that the HFV muscle air duct [5], NEADS tube [12], and oxygen sensor tube [9] align with the high flow valve [11].
 - (e) Align the high flow valve [11] with the air separation module [6].
 - 1) Put the sleeve [8] in its position.
 - 2) Install the coupling [3].

SUBTASK 47-11-02-420-003

- (3) Tighten the nuts:
 - (a) Tighten the nut on the HFV muscle air duct [5] to 280 ±28 in-lb (31.6 ±3.2 N·m).
 - 1) Use two wrenches, STD-3724, to tighten the nuts.

NOTE: This will release torque pressure on the HFV muscle air duct.
 - (b) Tighten the nut on the NEADS tube [12] to 280 ±28 in-lb (31.6 ±3.2 N·m).

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- 1) Use two wrenches, STD-3724, to tighten the nuts.

NOTE: This will release torque pressure on the NEADS tube.

- (c) Tighten the nut on the oxygen sensor tube [9] to 170 ± 17 in-lb (19.2 ± 1.9 N·m).

- 1) Use two wrenches, STD-3724, to tighten the nuts.

NOTE: This will release torque pressure on the oxygen sensor tube.

- (d) Tighten the nut [18] to 135 ± 15 in-lb (15.3 ± 1.7 N·m).

- 1) Use two wrenches, STD-3724, to tighten the nut [18].

- (e) Tighten the nut on the low pressure sensor tube [21] to 160 ± 5 in-lb (18.1 ± 0.6 N·m).

- 1) Use two wrenches, STD-3724, to tighten the nut.

SUBTASK 47-11-02-420-004

- (4) Tighten the bolts [1]:

- (a) Remove the bolt [1] from the ASM mount [4].
- (b) Apply primer, C00346, on the bolt [1] and the washer [2].
- (c) Install the bolt [1] and washer [2].
- (d) Tighten the bolt [1] to 51.5 ± 2.5 in-lb (5.8 ± 0.3 N·m).
- (e) Do these steps again until all four bolts [1] are installed.

SUBTASK 47-11-02-420-001

- (5) Install the cap screw [15], plain washers [16], and nut [17] to attach the jumper [14] to the jumper tab on the high flow valve [11].

SUBTASK 47-11-02-420-005

- (6) Tighten the nut [17] to 36 ± 3 in-lb (4.1 ± 0.4 N·m).

SUBTASK 47-11-02-765-002

- (7) Measure the resistance between the jumper tab and ASM mount [4] (SWPM 20-20-00).
 - (a) Use an intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the resistance is 0.0010 ohm (1.0 milliohm) or less.

SUBTASK 47-11-02-420-006

- (8) Connect the electrical connector [13] to the High Flow Valve (HFV) differential pressure sensor.

SUBTASK 47-11-02-420-007

- (9) Connect the electrical connector [13] to the high flow valve [11].

I. High Flow Valve Installation Test

SUBTASK 47-11-02-760-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-11-02-865-002

- (2) On the P5-10 bleed air control module, remove the DO NOT OPERATE tags from the L PACK and R PACK switches.

SUBTASK 47-11-02-860-002

- (3) Put the L PACK and R PACK switches to the AUTO position.

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SUBTASK 47-11-02-360-001

- (4) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
(a) Repair the leaks that are founded.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-11-02-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

———— **END OF TASK** ————

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OVERTEMPERATURE SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the overtemperature shutoff valve
- (2) An installation of the overtemperature shutoff valve.

TASK 47-11-04-000-801

2. Overtemperature Shutoff Valve Removal

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-11-04-864-001



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

- (a) On the P5-10 bleed air control module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-11-04-860-001

(2) On the P5-10 bleed air control module, put the L PACK and R PACK switches to the OFF position.

- (a) Install the DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

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SUBTASK 47-11-04-860-002

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-11-04-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Overtemperature Shutoff Valve Removal

SUBTASK 47-11-04-020-001



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.



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.

- (1) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-11-04-020-002

- (2) Disconnect the electrical connector [4] from the overtemperature shutoff valve [1].

SUBTASK 47-11-04-020-003

- (3) Remove the cap screw [10], plain washers [11], and nut [3] to disconnect the jumper [2] from the jumper tab.

SUBTASK 47-11-04-000-001

- (4) Remove the overtemperature shutoff valve [1]:

- Disconnect the coupling [8] between the air supply duct [6] and overtemperature shutoff valve [1].
- Remove the sleeve [7], O-ring [5], and O-ring [9].
 - Discard the O-ring [5] and O-ring [9].

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- (c) Hold the overtemperature shutoff valve [1], disconnect the clamp coupling [12] between the overtemperature shutoff valve [1] and air separation module [14].
 - 1) Discard the O-ring [13].
- (d) Remove the overtemperature shutoff valve [1].

SUBTASK 47-11-04-480-001

- (5) Put a protective cover on the inlet port for the air separation module [14] and air supply duct [6].

————— **END OF TASK** —————

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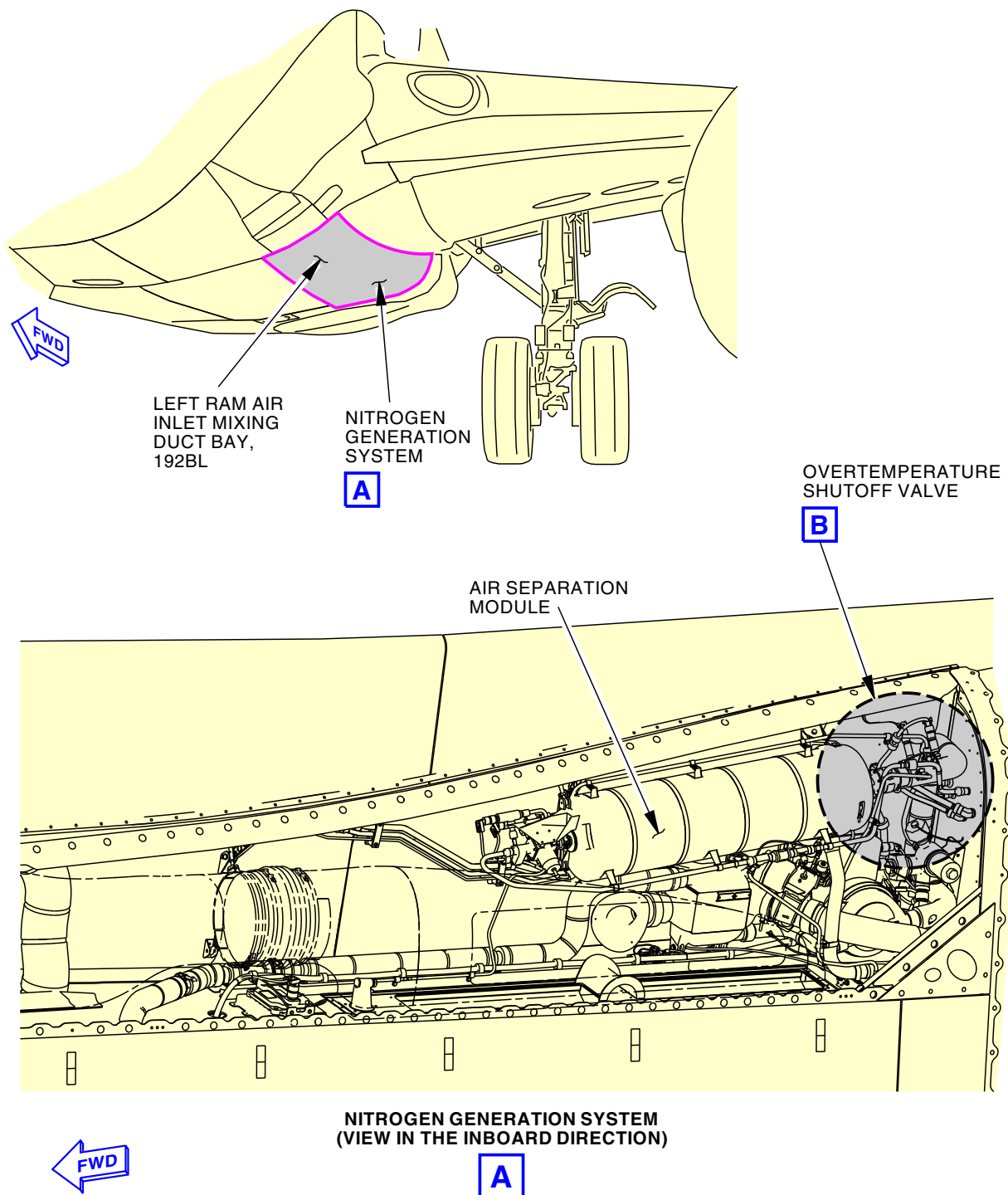
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2415327 S00061537574_V2

Overtemperature Shutoff Valve Installation
Figure 401/47-11-04-990-801 (Sheet 1 of 2)

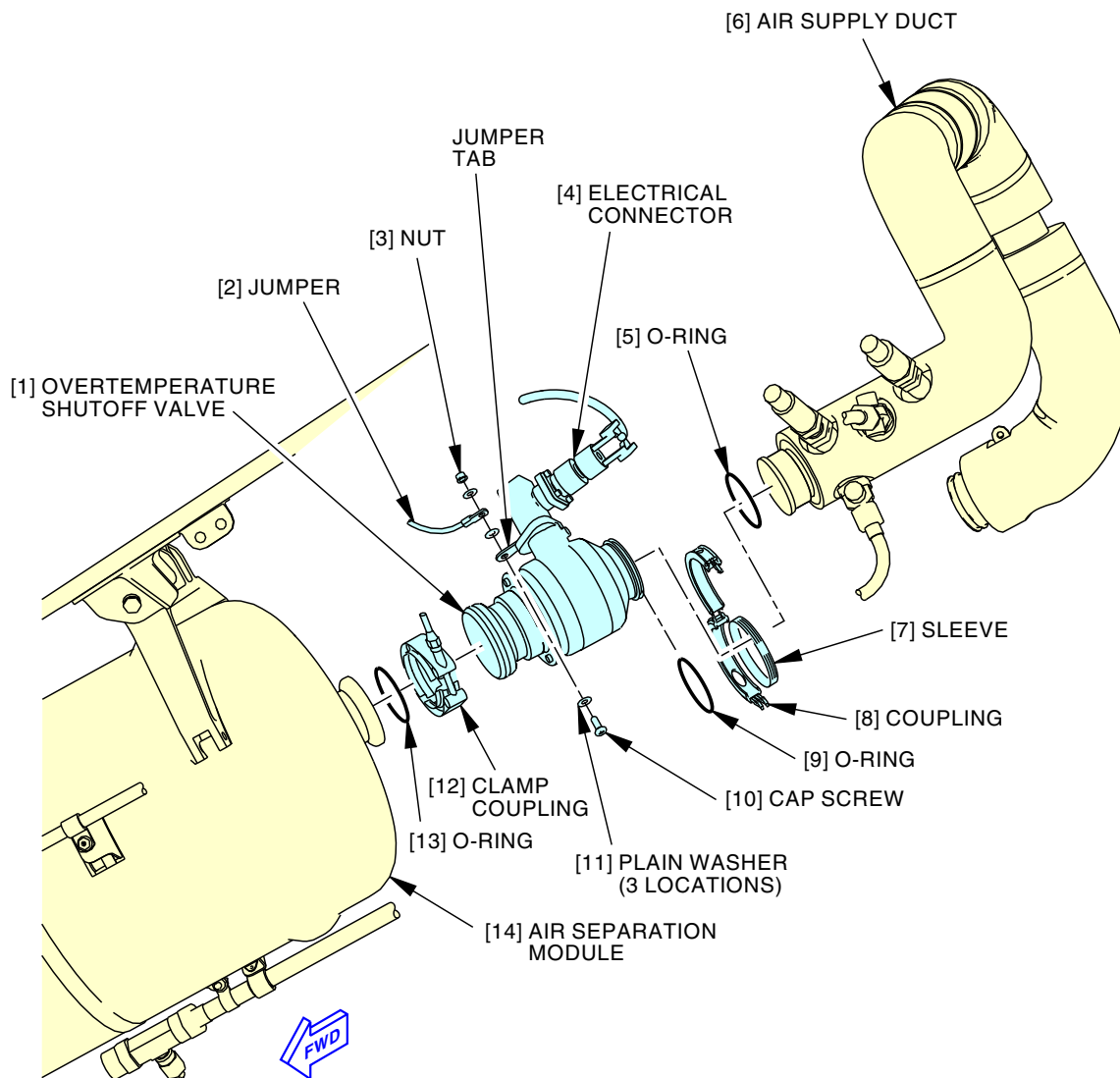
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OVERTEMPERATURE SHUTOFF VALVE

B

2415328 S00061537575_V1

Overtemperature Shutoff Valve Installation
Figure 401/47-11-04-990-801 (Sheet 2 of 2)

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TASK 47-11-04-400-801

3. Overtemperature Shutoff Valve Installation

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00346	Primer - Corrosion Inhibiting, Chemical & Solvent Resistant Epoxy, High Solids	MIL-PRF-23377
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Overtemperature shutoff valve	47-11-01-01-400	SIA 001-014
		47-11-01-02-380	SIA 015-999
5	O-ring	47-21-01-01-025	SIA ALL
9	O-ring	47-21-01-01-025	SIA ALL
13	O-ring	47-11-01-01-395	SIA 001-014
		47-11-01-02-215	SIA 015-999

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E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Prepare for the Installation

SUBTASK 47-11-04-080-001

- (1) Remove the protective covers from the air separation module [14] and air supply duct [6].

SUBTASK 47-11-04-100-001

- (2) Do these steps to prepare the overtemperature shutoff valve [1] and jumper [2] for installation:
- (a) Clean the jumper tab fay surface on the overtemperature shutoff valve [1] and terminal on the jumper [2] (SWPM 20-20-10):
- 1) Use Cleaning Procedure 5 to clean the jumper tab fay surface, plain washers [11], and terminal on the jumper [2].



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a new cotton wiper, G00034, or knit cotton wiper, G51293, soaked with solvent, B00062, or solvent, B00184.
- b) Use a new cotton wiper to dry the surfaces.
- c) Continue to clean and dry the surface until the cotton wiper stays clean.

SUBTASK 47-11-04-390-001

- (3) Apply primer, C00346, on the contact surfaces of the clamp coupling [12].

SUBTASK 47-11-04-420-002

- (4) Install the new O-ring [5] and O-ring [9]:

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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 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, or water to the O-ring [5] and O-ring [9].
- Put the O-ring [5] in the cavity of the air supply duct [6].
- Put the O-ring [9] in the cavity of the overtemperature shutoff valve [1].

SUBTASK 47-11-04-420-003

- Install the new O-ring [13]:



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 YOU DO NOT APPLY TOO MUCH GREASE TO THE O-RING. IF YOU DO NOT OBEY, THE LEAK OF THE GREASE CAN CAUSE DAMAGE TO THE AIR SEPARATION MODULE.

- Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, to the O-ring [13].
- Put the O-ring [13] in the cavity of the air separation module [14].

H. Overtemperature Shutoff Valve Installation

SUBTASK 47-11-04-420-001

- Install the overtemperature shutoff valve [1]:
 - Align the overtemperature shutoff valve [1] in the correct position.
 - Attach, but do not fully tighten, the overtemperature shutoff valve [1] to the air separation module [14] with the clamp coupling [12].
 - Align the overtemperature shutoff valve [1] with the air supply duct [6].
 - Put the sleeve [7] in its position.
 - Install the coupling [8].

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- (f) Torque the clamp coupling [12] to 47.5 ± 2.5 in-lb (5.4 ± 0.3 N·m).

NOTE: This procedure requires a different torque value to the value that is printed on the clamp coupling [12].

SUBTASK 47-11-04-420-004

- (2) Install the cap screw [10], jumper [2], plain washers [11], and nut [3] to the jumper tab on the overtemperature shutoff valve [1].

SUBTASK 47-11-04-420-005

- (3) Torque the nut [3] to 32 ± 3 in-lb (3.6 ± 0.4 N·m).

SUBTASK 47-11-04-420-006

- (4) Connect the electrical connector [4] to the overtemperature shutoff valve [1].

SUBTASK 47-11-04-760-001

- (5) Measure the electrical bonding resistance between the overtemperature shutoff valve [1] and airplane structure (SWPM 20-20-00).
- (a) Use an intrinsically safe approved bonding meter, COM-1550.
- (b) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

I. Overtemperature Shutoff Valve Installation Test

SUBTASK 47-11-04-860-003

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-11-04-860-004

- (2) On the P5-10 bleed air control module, remove the DO NOT OPERATE tags, STD-858, from the L PACK and R PACK selector switches.

SUBTASK 47-11-04-860-005

- (3) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-11-04-360-001

- (4) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-11-04-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— **END OF TASK** —————

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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: Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check, TASK 28-22-15-700-801.
- B. If the NEADS tubing must be replaced, refer to this procedure: FLARELESS TUBING ASSEMBLY - REMOVAL/INSTALLATION, PAGEBLOCK 20-10-51/401.

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NITROGEN-ENRICHED AIR DISTRIBUTION - INSPECTION/CHECK

1. **General**

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
 - (1) Drain Cap - Fuel Leak Check
 - (2) NEADS - Air Pressure Leak Check
 - (3) NEADS - Negative Pressure Leak Check
 - (4) NEADS - Secondary Backflow Prevention Check Valve Air Pressure Leak Check.
- C. The fibers in the Air Separation Module (ASM) is 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 cap attached to the NEADS drain line or at the GSE O2 test port.
- D. The drain cap is installed below and inboard of the ASM. The drain line is at the lowest area of the NEADS line where water, fuel, and sediment collects. Fuel may also be trapped in the GSC O2 line. You must periodically inspect the NEADS line to make sure that the NEADS line does not contain fuel.
- E. The NEADS - Negative Pressure Leak Check can be used to make sure that the primary backflow prevention check valve operates correctly.
- F. The NEADS - Secondary Backflow Prevention Check Valve Air Pressure Leak Check is used to make sure that the secondary backflow prevention check valve operates correctly.

TASK 47-21-00-700-801

2. **Drain Cap - Fuel Leak Check**

(Figure 601)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
12-33-01-600-801	Cold Weather Maintenance Procedure (P/B 301)
47-21-04-000-802	Secondary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-801	Primary Backflow Prevention Check Valve Installation (P/B 401)
47-21-04-400-802	Secondary Backflow Prevention Check Valve Installation (P/B 401)

B. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart, Oil/Fuel Resistant

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
SIA 015-999; SIA 001-014 POST SB 737-47-1019	
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

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SIA 015-999; SIA 001-014 POST SB 737-47-1019 (Continued)

(Continued)

Zone	Area
------	------

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D. Access Panels

Number	Name/Location
--------	---------------

192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
-------	---

193AL	Wheel Well Panel - Forward Outboard
-------	-------------------------------------

E. Prepare for the Drain Cap Fuel Leak Check

SUBTASK 47-21-00-010-001

(1) Open this access panel:

Number	Name/Location
--------	---------------

192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
-------	---

Open this access panel:

SIA 015-999; SIA 001-014 POST SB 737-47-1019

Number	Name/Location
--------	---------------

193AL	Wheel Well Panel - Forward Outboard
-------	-------------------------------------

SIA ALL

SUBTASK 47-21-00-660-001

(2) If the ambient temperature is less than 32°F (0°C), do this task: Cold Weather Maintenance Procedure, TASK 12-33-01-600-801.

F. Drain the Fluid from the NEADS Line

SUBTASK 47-21-00-941-001

(1) Go to the drain cap [1] for the Nitrogen-Enriched Air Distribution System (NEADS).

NOTE: The drain cap [1] is found below the Air Separation Module (ASM).

SUBTASK 47-21-00-941-002

(2) Put a 1 quart oil/fuel resistant container, STD-195, below the drain cap [1].

SUBTASK 47-21-00-010-002

(3) Remove the drain cap [1] connected to the tee.

SUBTASK 47-21-00-616-001

(4) Collect the fluid from the NEADS line.

SIA 015-999; SIA 001-014 POST SB 737-47-1019

SUBTASK 47-21-00-940-003

(5) Go to the drain cap [2] for the NEADS.

NOTE: The drain cap [2] is found on the Main Landing Gear (MLG) wheel well forward bulkhead.

SUBTASK 47-21-00-940-004

(6) Put a 1 quart oil/fuel resistant container, STD-195, below the drain cap [2].

SUBTASK 47-21-00-010-005

(7) Remove the drain cap [2] connected to the elbow.

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SIA 015-999; SIA 001-014 POST SB 737-47-1019 (Continued)

SUBTASK 47-21-00-610-002

- (8) Collect the fluid from the NEADS line.

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SUBTASK 47-21-00-940-001

- (9) Go to the Ground Support Equipment (GSE) O2 test port:

NOTE: The GSE O2 test port is located in the aft section of 192CL, on beam 41.

SUBTASK 47-21-00-940-002

- (10) Put a 1 quart oil/fuel resistant container, STD-195, below the GSE O2 test port.

SUBTASK 47-21-00-010-004

- (11) Remove the cap connected to the GSE O2 test port.

SUBTASK 47-21-00-610-001

- (12) Collect the fluid from the GSE O2 line.

SUBTASK 47-21-00-790-001

- (13) If there is no fluid in the two containers, and you cannot smell fuel at the drain port or the GSE O2 test port, the NEADS line is satisfactory.

SUBTASK 47-21-00-790-002

- (14) If there is fluid in the NEADS line or the GSE O2 test line, or you can smell fuel at the drain port or at the GSE O2 test port, do these steps:

- (a) Replace the secondary backflow prevention check valve with a new secondary backflow prevention check valve, do these tasks:
- Secondary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-802
 - Secondary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-802.
- (b) Make sure that a new primary backflow prevention check valve is installed (TASK 47-21-04-400-801).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-00-430-001

- (1) Attach the drain cap [1] to the tee.

SIA 015-999; SIA 001-014 POST SB 737-47-1019

SUBTASK 47-21-00-420-006

- (2) Attach the drain cap [2] to the elbow.

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SUBTASK 47-21-00-420-005

- (3) Attach the cap to the GSE O2 test port.

SUBTASK 47-21-00-410-001

- (4) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

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Close this access panel:

SIA 015-999; SIA 001-014 POST SB 737-47-1019

<u>Number</u>	<u>Name/Location</u>
193AL	Wheel Well Panel - Forward Outboard

SIA ALL

————— END OF TASK —————

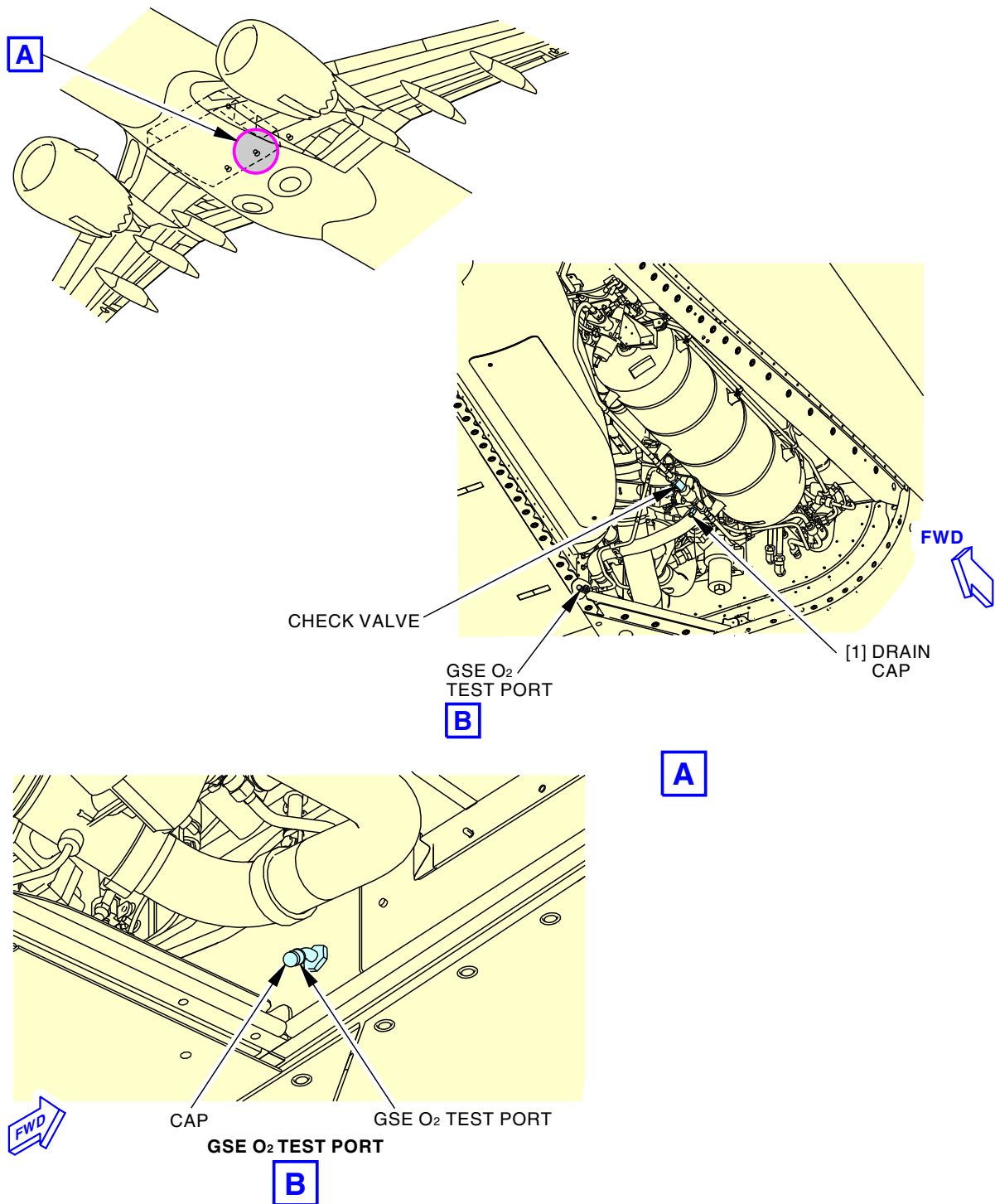
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GSE O₂ Test Port Location
Figure 601/47-21-00-990-802 (Sheet 1 of 2)

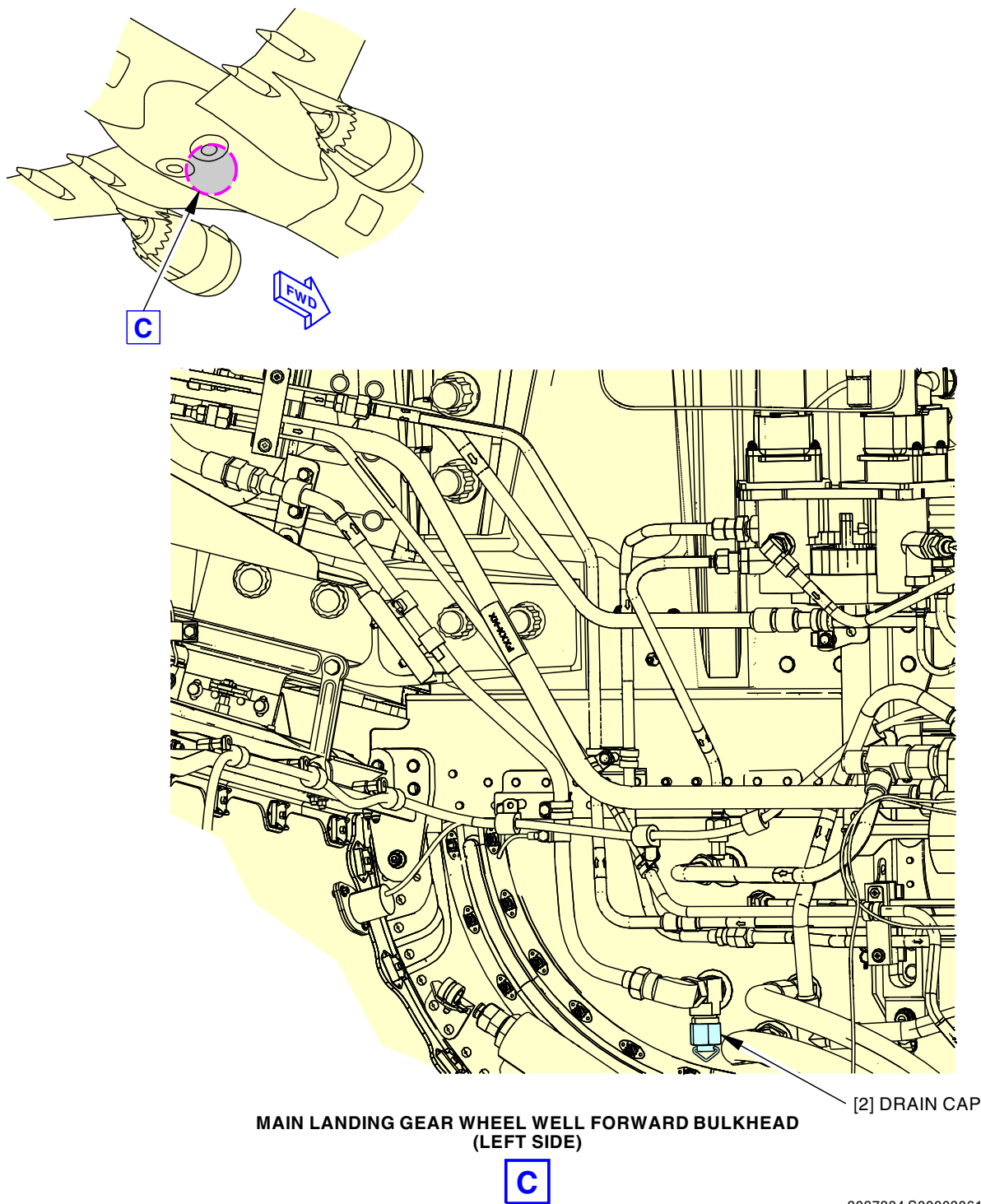
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MAIN LANDING GEAR WHEEL WELL FORWARD BULKHEAD
(LEFT SIDE)

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GSE O2 Test Port Location
Figure 601/47-21-00-990-802 (Sheet 2 of 2)

EFFECTIVITY
SIA 015-999; SIA 001-014 POST SB 737-47-1019

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TASK 47-21-00-700-802

3. **NEADS - Air Pressure Leak Check**

(Figure 602)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-26-00 P/B 201	DEFUELING - MAINTENANCE PRACTICES
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-21-04-000-801	Primary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-801	Primary Backflow Prevention Check Valve Installation (P/B 401)
47-21-11-400-801	Drain Cap Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-7455	Test Equipment - Leak and Pressure Part #: G47001-19 Supplier: 81205
STD-1280	Source - Air, Regulated, Dry Filtered, 0-30 PSIG

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00150	Tape - Nitto P-421 NAT (Formerly Permacel) PTFE Film Tape	
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50310	Tape - Nitto P-412 (Formerly Permacel) Ribbon Dope Thread Sealant Tape	A-A-58092

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
531AB	Center Tank Access Door - Wing Station 168

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G. Prepare for the Air Pressure Leak Check

SUBTASK 47-21-00-780-001

- (1) Remove pressure from the pneumatic system (Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806).

SUBTASK 47-21-00-865-001

- (2) Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-21-00-650-001



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.

- (3) Defuel or transfer fuel from the center tank (DEFUELING - MAINTENANCE PRACTICES, PAGEBLOCK 28-26-00/201).

SUBTASK 47-21-00-171-001



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.

- (4) Prepare for fuel tank entry (Purging and Fuel Tank Entry, TASK 28-11-00-910-802).

SUBTASK 47-21-00-010-003

- (5) Remove the center tank access door (Center Tank Access Door Removal, TASK 28-11-31-000-801).

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

SUBTASK 47-21-00-020-001



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.

- (6) Open these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door

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H. Test Equipment Installation - Center Tank

SUBTASK 47-21-00-020-002

- (1) Remove the primary backflow prevention check valve (Primary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-801).
 - (a) Do not loosen the Nitrogen-Enriched Air Distribution System (NEADS) tube when the primary backflow check valve is removed.

SUBTASK 47-21-00-480-001

- (2) Install the cap assembly (pressure test equipment, SPL-7455) on the NEADS tube.

I. Test Equipment Installation - Drain Port

SUBTASK 47-21-00-923-001



WARNING

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 the nitrogen generation system precautions when you install the pressure test equipment, SPL-7455.

SUBTASK 47-21-00-680-001

- (2) Drain fuel from the drain port (Drain Cap - Fuel Leak Check, TASK 47-21-00-700-801).

SUBTASK 47-21-00-480-002

- (3) Connect the pressure test equipment, SPL-7455, to the drain port.
 - (a) Apply Nitto P-412 tape, G50310, or Nitto P-421 tape, G00150, to the threads on the drain port.
 - (b) Connect the hose assembly to the drain port.

J. Air Pressure Leak Check

SUBTASK 47-21-00-480-003

- (1) Connect the pressure test equipment, SPL-7455, to a 0-30 psig dry filtered regulated air source, STD-1280.

SUBTASK 47-21-00-780-002

- (2) Use the 0-30 psig dry filtered regulated air source, STD-1280, to apply 22 psig (152 kPa) to the NEADS line.

SUBTASK 47-21-00-780-003

- (3) Use the 0-30 psig dry filtered regulated air source, STD-1280, to apply 20 psig (138 kPa) to the NEADS line, then use the leak detector, G50135, compound to do a check for leaks at these components:
 - (a) Secondary back flow prevention check valve.
 - (b) NEADS tube segments.
 - (c) NEADS couplings.
 - (d) High flow valve.

SUBTASK 47-21-00-030-001

- (4) Remove the leak detector, G50135, compound with a cotton wiper, G00034.

SUBTASK 47-21-00-360-001

- (5) Open the bleed valve slowly and let the pressure in the lines bleed to zero, then repair the problems that are found.

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SUBTASK 47-21-00-780-004

- (6) After you repaired the problems you found, use the 0-30 psig dry filtered regulated air source, STD-1280, to apply 20 psig (138 kPa) to the NEADS line.
 - (a) Use the leak detector, G50135, compound to do a check for leaks at the components you repaired.

SUBTASK 47-21-00-780-005

- (7) After you are done with the leak check, slowly remove the air pressure from the pressure test equipment, SPL-7455.

K. Test Equipment Removal - Drain Port

SUBTASK 47-21-00-080-001

- (1) Disconnect the air source from the pressure test equipment, SPL-7455.

SUBTASK 47-21-00-020-003

- (2) Disconnect the hose assembly from the drain port.

SUBTASK 47-21-00-420-001

- (3) Install the drain cap on the drain port (Drain Cap Installation, TASK 47-21-11-400-801).

L. Test Equipment Removal - Center Tank

SUBTASK 47-21-00-080-002

- (1) Disconnect the cap assembly (pressure test equipment, SPL-7455) from the NEADS tube.

SUBTASK 47-21-00-410-002

- (2) Install the primary backflow prevention check valve (Primary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-801).

M. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-00-410-003

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door

SUBTASK 47-21-00-410-004

- (2) Close the center tank access door (TASK 28-11-31-400-801).

- (a) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

———— END OF TASK ————

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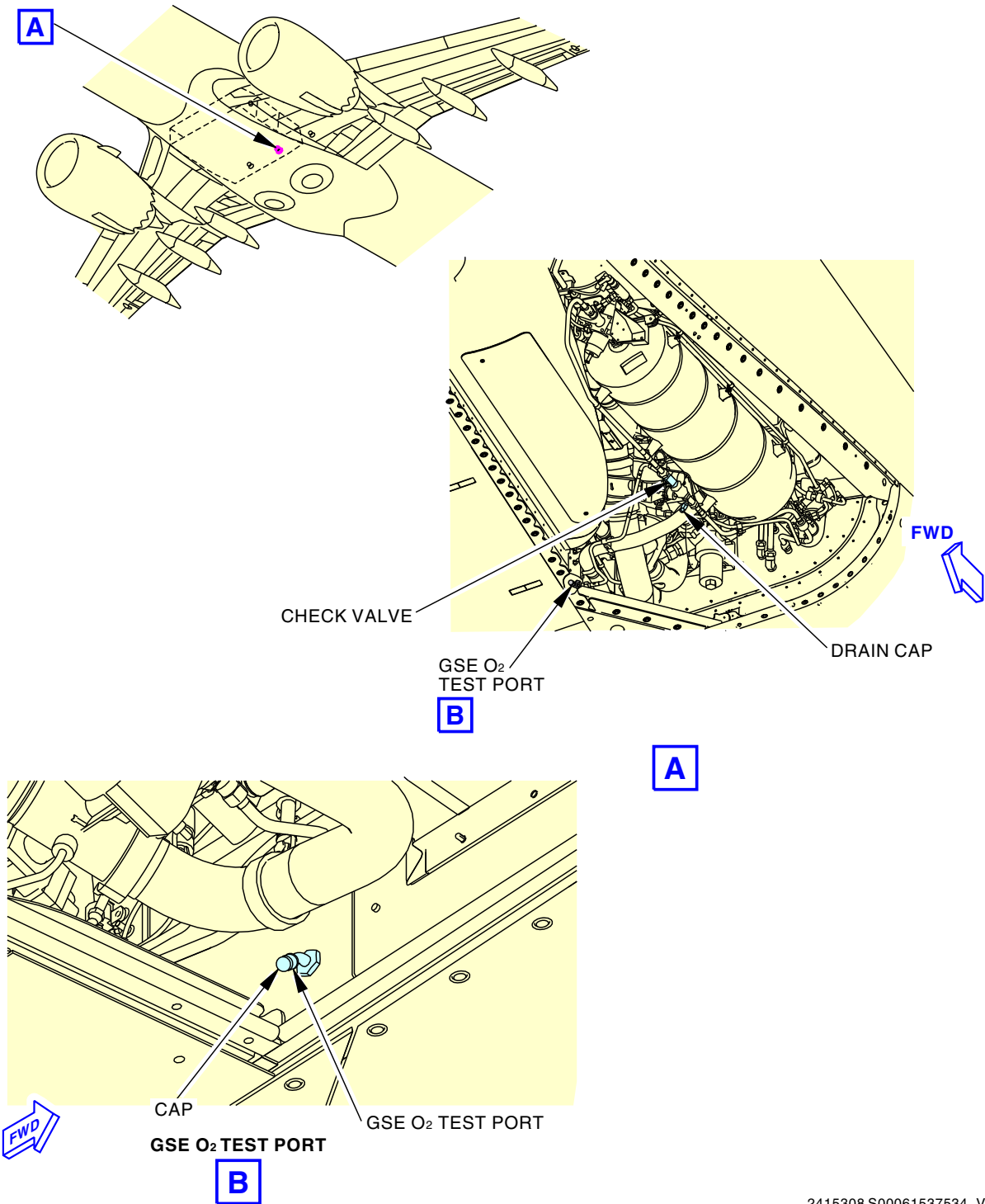
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GSE O2 Test Port Location
Figure 602/47-21-00-990-801

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TASK 47-21-00-700-803

4. **NEADS - Negative Pressure Leak Check**

A. General

- (1) This task makes sure that the primary backflow prevention check valve operates correctly.

B. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-21-04-000-801	Primary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-801	Primary Backflow Prevention Check Valve Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-14094	Test Equipment, NEADS Negative Pressure Leak Check Part #: C47001-72 Supplier: 81205

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Prepare for the Leak Check

SUBTASK 47-21-00-020-004

- (1) In the left main wheel well, on the rear spar of the center tank, at the flame arrestor, disconnect the dielectric hose.

NOTE:

Use caution to prevent damage to the threads on the flame arrestor and hose.

- (a) Put a protective cover on the dielectric hose.

SUBTASK 47-21-00-480-004



CAUTION

DO NOT CONNECT THE HOSE ASSEMBLY TO THE CONTROL BOX UNTIL THE PRESSURE HAS STABILIZED. DAMAGE TO THE TUBES CAN OCCUR.

- (2) Connect one end of the hose assembly included with the test equipment, SPL-14094, to the flame arrestor fitting.

- (a) Tighten the hose fitting to 252 in-lb (28 N·m) - 308 in-lb (35 N·m).

F. NEADS Negative Pressure Leak Check

SUBTASK 47-21-00-790-003



WARNING

USE APPROVED SAFETY EQUIPMENT FOR EARS FOR ALL PERSONNEL WHEN THEY ARE NEAR NOISE THAT IS MORE THAN 84 DBA. THIS WILL PREVENT INJURIES TO THEIR EARS.

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(WARNING PRECEDES)



CAUTION

DO NOT CONNECT THE HOSE ASSEMBLY TO THE CONTROL BOX UNTIL THE PRESSURE HAS STABILIZED. DAMAGE TO THE TUBES CAN OCCUR.

- (1) On the control box of the test equipment, SPL-14094, do these steps:
 - (a) Set the EXHAUST valve to the CLOSED position.
 - (b) Set the VACUUM valve to the ON position.
 - (c) Set the AIR SUPPLY REGULATOR control to decrease to the lowest position.
 - (d) Set the VACUUM REGULATOR control to increase to the highest position.

SUBTASK 47-21-00-790-004

- (2) On the control box of the test equipment, SPL-14094, do these steps:



CAUTION

KEEP THE PRESSURE IN THE LIMITS. NEGATIVE PRESSURE CAN CAUSE DAMAGE TO THE TUBES.

- (a) Adjust the AIR SUPPLY REGULATOR control to increase to get -4.0 psig (-27.6 kPa).
- (b) Adjust the VACUUM REGULATOR control to decrease to get -4.5 psig (-31.0 kPa) to -5.0 psig (-34.5 kPa).

SUBTASK 47-21-00-480-005

- (3) Connect the other end of the hose assembly included with the test equipment, SPL-14094, to the vacuum hose fitting on the control box of the test equipment, SPL-14094.
 - (a) Set the VACUUM valve to the OFF position.
 - (b) Adjust the AIR SUPPLY REGULATOR control to decrease to the lowest position.
 - (c) Remove the external air pressure.

SUBTASK 47-21-00-790-005

- (4) Do the vacuum leakage test.
 - (a) Hold the vacuum pressure between 1 minute 50 seconds and 2 minutes 10 seconds.
 - (b) Make sure that the vacuum pressure reading on the gauge is between -4.5 psig (-31.0 kPa) to -5.0 psig (-34.5 kPa).
 - 1) Shut off the vacuum source.
 - 2) Record the initial vacuum value from the gauge.
 - (c) Wait between 24 minutes and 26 minutes.
 - 1) Record the final vacuum value from the gauge.
 - (d) Make sure that the air vacuum difference between initial and final values is between -0.20 psig (-1.38 kPa) to 0.20 psig (1.38 kPa).
 - (e) If the air vacuum difference between initial and final values is not in the limits, do this step:
 - 1) Replace the primary backflow prevention check valve with a new primary backflow prevention check valve, do these tasks:
 - Primary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-801,
 - Primary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-801.

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- (f) Repeat the vacuum leakage test to make sure that the leak is repaired.

SUBTASK 47-21-00-980-002

- (5) On the control box of the test equipment, SPL-14094, set the EXHAUST valve to the OPEN position.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-00-020-005

- (1) In the left main wheel well, on the rear spar, disconnect one end of the hose assembly included with the test equipment, SPL-14094, from the flame arrestor fitting.

SUBTASK 47-21-00-020-006

- (2) Disconnect the other end of the hose assembly included with the test equipment, SPL-14094, from the vacuum hose fitting on the control box of the test equipment, SPL-14094.

SUBTASK 47-21-00-420-002

- (3) Connect the dielectric hose to the flame arrestor.
(a) Make sure that you do not damage the threads on the flame arrestor or dielectric hose.

SUBTASK 47-21-00-790-007

- (4) Leak check the Nitrogen-Enriched Air Distribution System (NEADS) lines (Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801).
(a) With the Nitrogen Generation System (NGS) pressurized, do a leak check around the dielectric hose connection to the flame arrestor.
(b) Repair the leaks that you find.

————— END OF TASK —————

TASK 47-21-00-700-804

5. NEADS - Secondary Backflow Prevention Check Valve Air Pressure Leak Check

A. General

- (1) This task makes sure that the secondary backflow prevention check valve operates correctly.

B. References

Reference	Title
47-21-04-000-802	Secondary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-802	Secondary Backflow Prevention Check Valve Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-7455	Test Equipment - Leak and Pressure Part #: G47001-19 Supplier: 81205
STD-1280	Source - Air, Regulated, Dry Filtered, 0-30 PSIG

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

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(Continued)

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

E. Prepare for the Air Pressure Leak Check

SUBTASK 47-21-00-020-008



BE CAREFUL WHEN YOU CONNECT OR DISCONNECT THE DIELECTRIC HOSE. DAMAGE TO THE THREADS ON THE COUPLING NUT OR THE DIELECTRIC HOSE CAN OCCUR IF YOU ARE NOT CAREFUL.

- (1) In the left main wheel well, on the rear spar of the center tank, at the dielectric hose, disconnect the dielectric hose from the NEADS tube.



MAKE SURE TO PUT THE PROTECTIVE COVER ON THE DIELECTRIC HOSE. IF YOU DO NOT OBEY, THE DAMAGE ON THE THREADS OF THE COUPLING NUT AND THE HOSE CAN OCCUR.

- (a) Put a protective cover on the dielectric hose.

SUBTASK 47-21-00-480-007

- (2) Connect the pressure test equipment, SPL-7455, to the NEADS tubing.

F. Air Pressure Leak Check

SUBTASK 47-21-00-480-008

- (1) Connect the pressure test equipment, SPL-7455, to a 0-30 psig dry filtered regulated air source, STD-1280.

SUBTASK 47-21-00-790-006

- (2) Do the air pressure leak check.
 - (a) Use the 0-30 psig dry filtered regulated air source, STD-1280, to apply 20 psig (138 kPa) to the NEADS line.
 - (b) Make sure that the pressure reading on the gauge is between 19 psig (131 kPa) to 21 psig (145 kPa).
 - (c) Shut off the air supply.
 - 1) Record the initial air pressure value from the gauge.
 - (d) Wait between 9 minutes and 11 minutes.
 - 1) Record the final air pressure value from the gauge.
 - (e) Make sure that the air pressure difference between initial and final values is 0 $\pm$ 4 psig (0.00 $\pm$ 27.58 kPa).
 - (f) If the air pressure difference between initial and final values is not in the limits, do this step:
 - 1) Replace the secondary backflow prevention check valve with a new secondary backflow prevention check valve, do these tasks:
 - Secondary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-802,
 - Secondary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-802.
 - (g) Repeat the air pressure leak check to make sure that the leak is repaired.

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SUBTASK 47-21-00-080-003

- (3) Slowly remove the air pressure from the pressure test equipment, SPL-7455.
 - (a) Disconnect the pressure test equipment, SPL-7455, from the 0-30 psig dry filtered regulated air source, STD-1280.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-00-080-004

- (1) Disconnect the pressure test equipment, SPL-7455, from the NEADS tubing.

SUBTASK 47-21-00-420-003

- (2) Remove the protective cover from the dielectric hose.

SUBTASK 47-21-00-420-004



BE CAREFUL WHEN YOU CONNECT OR DISCONNECT THE DIELECTRIC HOSE. DAMAGE TO THE THREADS ON THE COUPLING NUT OR THE DIELECTRIC HOSE CAN OCCUR IF YOU ARE NOT CAREFUL.

- (3) Connect the dielectric hose to the NEADS tubing.

———— **END OF TASK** ————

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FLOAT VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure contains these tasks:

- (1) Float Valve Removal
- (2) Float Valve Installation.

TASK 47-21-02-000-801

2. Float Valve Removal

(Figure 401)

A. General

- (1) The float valve assembly is on the forward vent channel in the center tank, outboard of rib #1 and forward of the right vent climb port.

B. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (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.

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Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: \$0855 Part #: 10811 Supplier: \$0855 Part #: 10812 Supplier: \$0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: \$1351 Part #: AS2 Supplier: \$1351 Part #: AS3 Supplier: \$1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
SPL-768	Sealant Removal Tool, Non-Metallic Part #: ST982L-9 Supplier: 81205 Part #: ST982LF-9 Supplier: 81205 Part #: ST982LH-A-1 Supplier: 81205

D. Location Zones

Zone	Area
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Access Panels

Number	Name/Location
631AB	Center Tank Access Door - Wing Station 168

F. Prepare for the Removal

SUBTASK 47-21-02-650-001

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

SUBTASK 47-21-02-010-001

 WARNING	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 for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
- (a) Open this access panel:
(TASK 28-11-31-000-801)

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<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

G. Float Valve Removal

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 assembly [3] and the adapter [2].

NOTE: Do not remove the sealant from around the cover plate. Do not remove the cover plate or the adapter [2].

NOTE: The sealant removal/application tools are shown in this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803

SUBTASK 47-21-02-020-001

- (2) Remove the float valve assembly [3], as follows:
- (a) Hold the float valve assembly [3] in its position.
 - (b) Remove the four screws [4] and flat washers [5].
 - (c) Remove the float valve assembly [3] from the adapter [2].

SUBTASK 47-21-02-020-002

- (3) Discard the O-ring [1].

SUBTASK 47-21-02-480-001

- (4) Install a protective cover in the vent tube.

———— **END OF TASK** ————

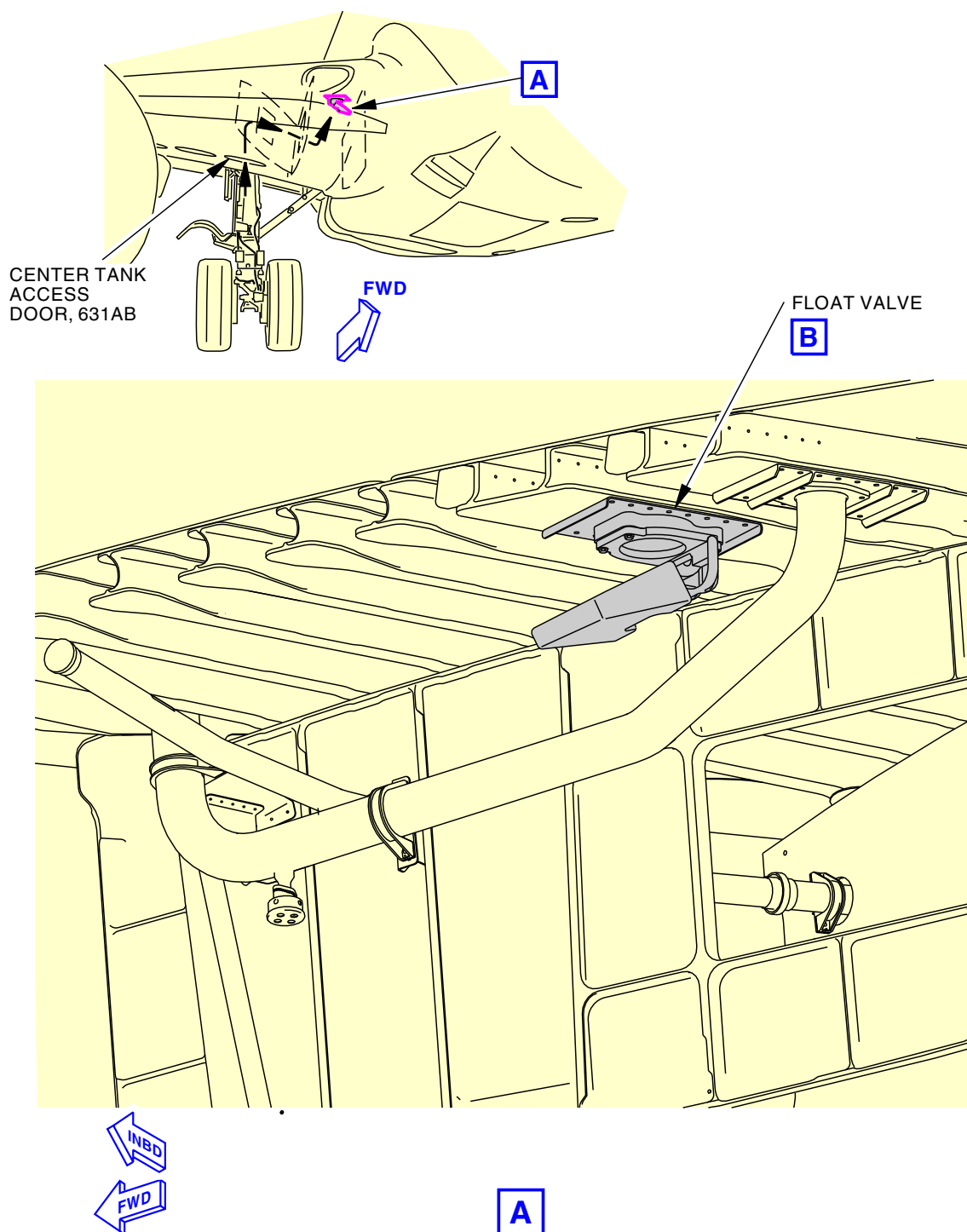
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Float Valve Installation
Figure 401/47-21-02-990-801 (Sheet 1 of 2)

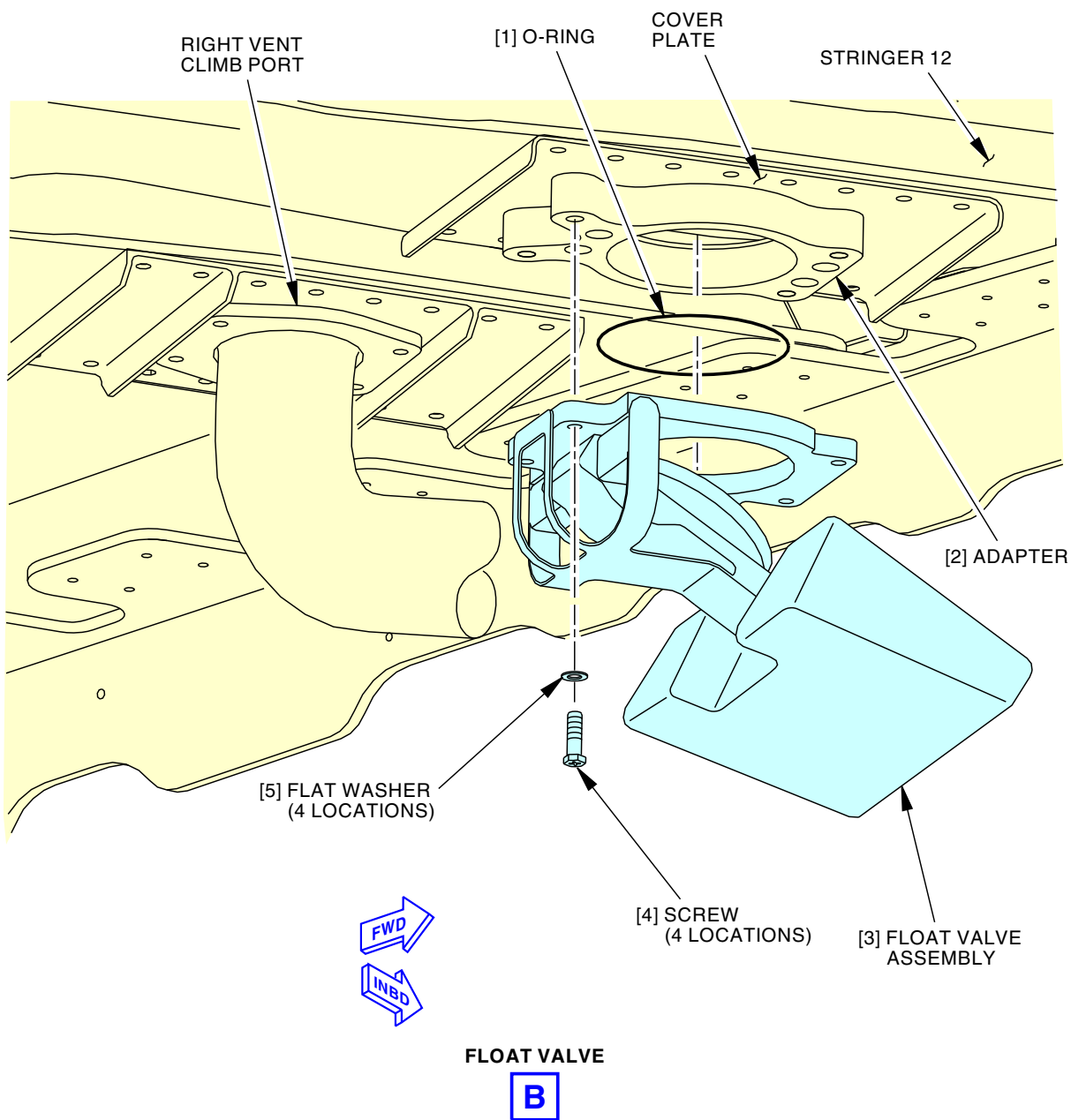
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Float Valve Installation
Figure 401/47-21-02-990-801 (Sheet 2 of 2)

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TASK 47-21-02-420-801

3. **Float Valve Installation**

(Figure 401)

A. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00862	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	O-ring	47-21-02-01-030	SIA ALL
3	Float valve assembly	47-21-02-01-025	SIA ALL

E. Location Zones

Zone	Area
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

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F. Access Panels

Number	Name/Location
--------	---------------

631AB	Center Tank Access Door - Wing Station 168
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G. Prepare for the Installation

SUBTASK 47-21-02-010-005

- (1) Remove the protective cap from the vent tube.

SUBTASK 47-21-02-100-002

- (2) Do these steps to prepare the float valve assembly [3] and the adapter [2] for installation.
 - (a) Clean the fay surfaces of the aluminum float valve assembly [3] and aluminum adapter [2] (SWPM 20-20-00):
 - 1) Use Cleaning Procedure 1 to manually clean the fay surface on the adapter [2].
 - a) Use an abrasive pad to clean the fay surface on the adapter [2].
 - b) Move the pad in a circular movement while you press with your thumb.
 - 2) Use Cleaning Procedure 5 to clean the fay surface on the float valve assembly [3].



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.
 - b) Use a new cotton wiper to dry the surfaces.
 - c) Continue to clean and dry the surface until the cotton wiper shows clean.
- 3) Final clean the fay surface of the adapter [2].



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.
- b) Rub dry with a clean dry cotton wiper.
- c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 47-21-02-620-001

- (3) Apply chemical conversion coating to the abraded surfaces on the base of the adapter [2].
 - (a) Manually apply Bonderite M-CR 600 Aero coating, C00862 to the contact surfaces with a clean cotton wiper, G00034.

NOTE: Keep the surfaces wet, until a perceptible color develops. Color change takes about 2-3 minutes.

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- (b) Air dry at room temperature.

NOTE: The maximum drying air temperature is 130°F (54°C).

H. Float Valve Installation

SUBTASK 47-21-02-640-001

- (1) Install the new O-ring [1], as follows:
 - (a) Apply a thin coat of grease, D00504 to the new O-ring [1].
 - (b) Put the new O-ring [1] in the groove on the float valve assembly [3].
 - (c) Remove unwanted grease with a cotton wiper, G00034.

SUBTASK 47-21-02-420-001

- (2) Install the float valve.
 - (a) Put the float valve assembly [3] in its position on the adapter [2].
 - (b) Install the four screws [4] and the flat washers [5].

SUBTASK 47-21-02-700-001

- (3) Measure the electrical bonding resistance between the float valve assembly [3] and the adapter [2] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure that the electrical bonding resistance is 0.00050 ohm (0.50 milliohms) or less.

I. Float Valve Installation Test

SUBTASK 47-21-02-212-001

- (1) Push the float valve assembly [3] to the closed position.
 - (a) Make sure that the float valve moves freely.
 - (b) Make sure that the float valve assembly [3] moves to the fully open position.

SUBTASK 47-21-02-710-001

- (2) Make sure that the float valve on the float valve assembly [3] does not touch the adjacent structure.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-02-410-001

- (1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.
 - (a) Close this access panel:

(TASK 28-11-31-400-801)

<u>Number</u>	<u>Name/Location</u>
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631AB	Center Tank Access Door - Wing Station 168
-------	--

————— **END OF TASK** —————

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BACKFLOW CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has 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. Access Notes:

- (1) The primary backflow prevention check valve is inside the center tank. You will need to go into the center tank to remove and install the check valve.

TASK 47-21-04-000-801

2. Primary Backflow Prevention Check Valve Removal

(Figure 401)

A. **General**

- (1) The primary backflow prevention check valve is referred to as the check valve [1] in this task.

B. **References**

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

C. **Location Zones**

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

D. **Access Panels**

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

E. **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



WARNING

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 28-11-00-910-802.

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SUBTASK 47-21-04-010-001



WARNING

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.



WARNING

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) Open this access panel:
(Center Tank Access Door Removal, TASK 28-11-31-000-801)

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

SUBTASK 47-21-04-010-002

- (4) Go into the center tank (TASK 28-11-00-910-802).

SUBTASK 47-21-04-010-003

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

NOTE: The check valve is installed in the center tank, left side, forward of the vent stringer.

F. Prepare the NEADS Tube

SUBTASK 47-21-04-030-001

- (1) Disconnect the P-clamp [5] from the NEADS tube [6].
(a) Remove the P-clamp [5], screw [31], washers [30], and nut [29].

SUBTASK 47-21-04-030-002

- (2) Loosen the clamps [19].

SUBTASK 47-21-04-030-003

- (3) Loosen the nut [32] to disconnect the NEADS tube [6].

SUBTASK 47-21-04-030-004

- (4) Disconnect the bonding jumper [24].
(a) Remove the clamp [28], screw [25], washers [26], and nut [27].

SUBTASK 47-21-04-560-001

- (5) Swing the NEADS tube [6].
NOTE: The NEADS tube is not flexible. Swing slowly to prevent damage.
(a) Hold the check valve [1].

G. Check Valve Removal

SUBTASK 47-21-04-030-005

- (1) Disconnect the bonding jumper [2] from the ejector tube [3].
(a) Remove the screw [20], washers [21] and nut [23] to remove the clamp [22] from the ejector tube [3].

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SUBTASK 47-21-04-030-006

- (2) Loosen the union [7] to disconnect the NEADS tube [6] from the check valve [1].

NOTE: Use a second wrench on the check valve to prevent the NEADS tube from turning.

SUBTASK 47-21-04-030-007

- (3) Loosen the nut [8] to disconnect the ejector tube [3] from the check valve [1].

NOTE: Use a second wrench on the check valve to prevent the ejector tube from turning.

SUBTASK 47-21-04-020-001

- (4) Remove the check valve [1].

- (a) Turn the NEADS tube [6] slowly to remove the check valve [1].

NOTE: The NEADS tube is not flexible.

SUBTASK 47-21-04-420-001

- (5) Install the protective caps on the ejector tube [3], ends of the NEADS tube [6], and flareless fitting [4].

———— **END OF TASK** ————

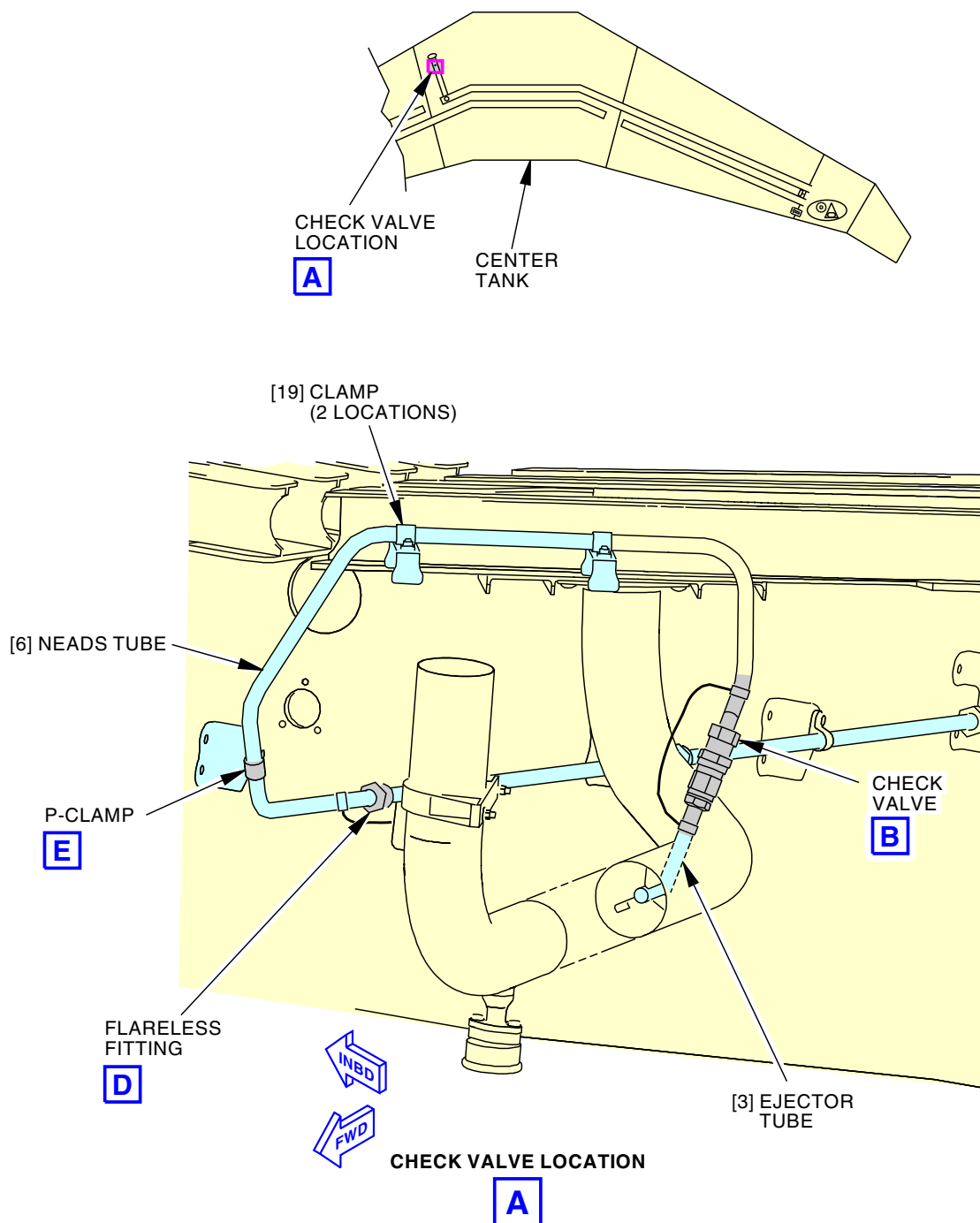
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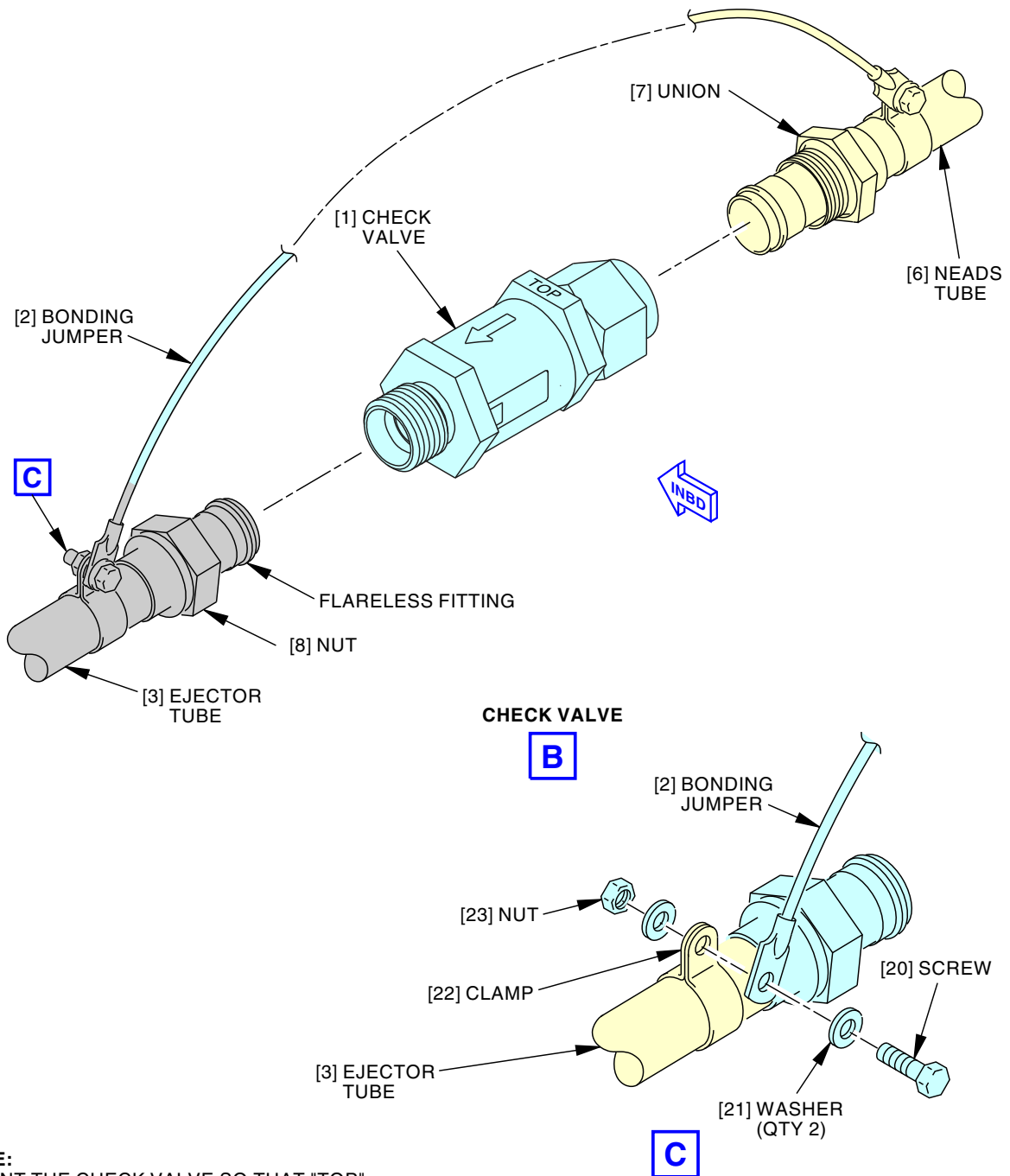
Primary Backflow Prevention Check Valve Installation
Figure 401/47-21-04-990-801 (Sheet 1 of 3)

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Primary Backflow Prevention Check Valve Installation
Figure 401/47-21-04-990-801 (Sheet 2 of 3)

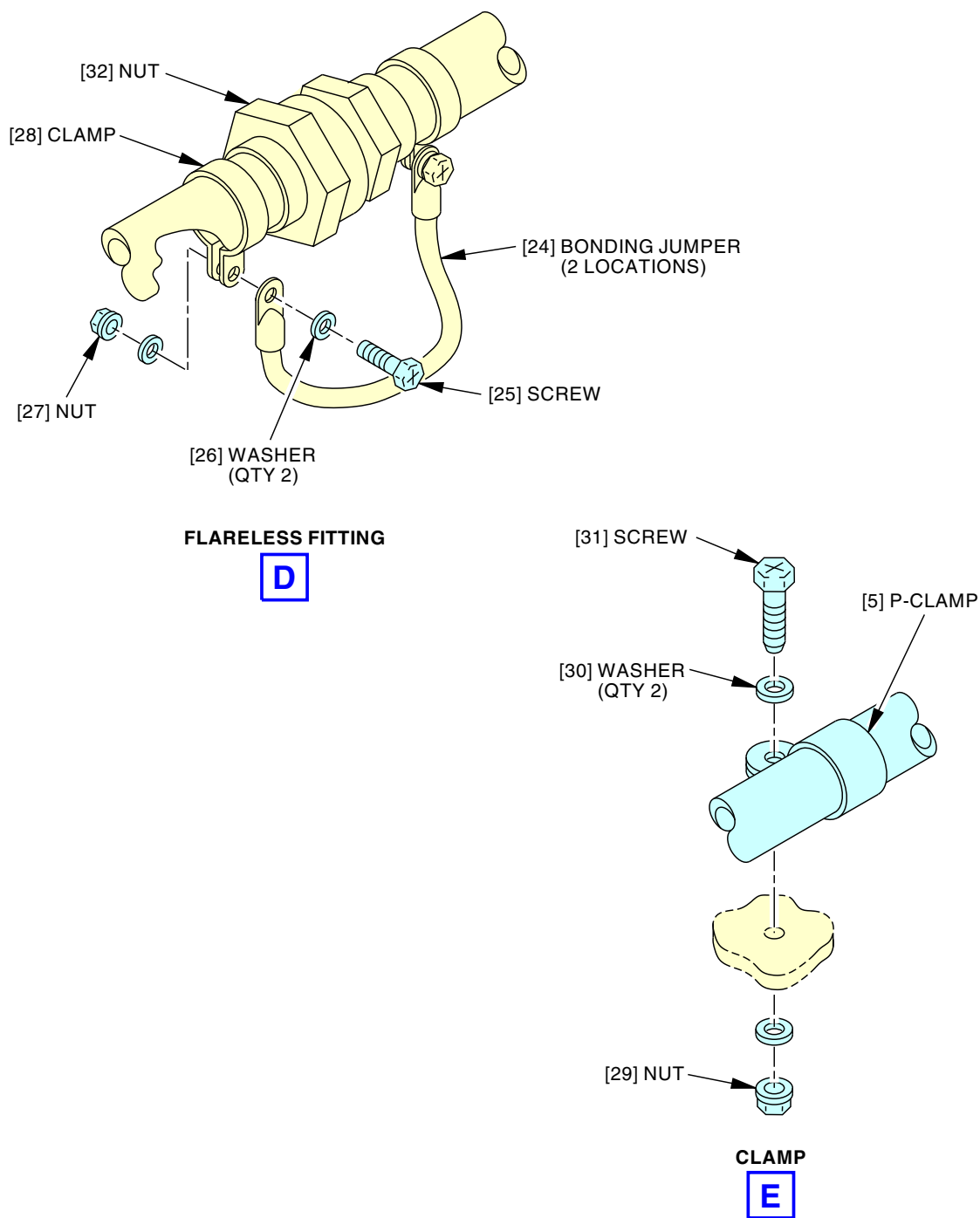
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Primary Backflow Prevention Check Valve Installation
Figure 401/47-21-04-990-801 (Sheet 3 of 3)

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TASK 47-21-04-400-801

3. **Primary Backflow Prevention Check Valve Installation**

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
47-21-00-700-803	NEADS - Negative Pressure Leak Check (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Check valve	47-21-04-01-045	SIA ALL

D. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Access Panels

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

F. Prepare for the Installation

SUBTASK 47-21-04-010-004

- (1) Go into the center tank (TASK 28-11-00-910-802).

SUBTASK 47-21-04-010-005

- (2) Remove the protective covers from the NEADS tube [6], ejector tube [3], and flareless fitting [4].

SUBTASK 47-21-04-110-001

- (3) Prepare these components for an electrical surface bond (SWPM 20-20-00):
- (a) Mating surface of the NEADS tube [6].
 - (b) Mating surfaces of the ejector tube [3].
 - (c) Mating surfaces of the bonding jumper [2] and bonding jumper [24].
 - (d) Mating surfaces of the clamp [28].

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G. Check Valve Installation

SUBTASK 47-21-04-420-002

- (1) Align the flareless fitting [4] to the nut [32].
 - (a) Install, but do not fully tighten, the nut [32] on the flareless fitting [4].

SUBTASK 47-21-04-400-001

- (2) Hold the check valve [1] in position.
 - (a) Make sure that the FLOW ARROW is seen and that the arrow direction points down.
 - (b) Make sure that the stamped word HINGE (or TOP) point to the forward direction of the aircraft.
 - (c) Install, but do not fully tighten, the NEADS tube [6] on the check valve [1].
 - (d) Align the check valve [1] to the ejector tube [3].
 - (e) Install, but do not fully tighten, the ejector tube [3] on the check valve [1].

SUBTASK 47-21-04-430-001

- (3) Tighten the clamps [19] that hold the NEADS tube [6] to the structure.

SUBTASK 47-21-04-430-002

- (4) Attach the P-clamp [5] and NEADS tube [6] to the structure with the screw [31], washers [30], and nut [29].

SUBTASK 47-21-04-430-003

- (5) Tighten the nut [32] to 280 ± 28 in-lb (31.6 ± 3.2 N·m).
 - (a) Use a second wrench on the nut [32] to stop the NEADS tube [6] from turning.

SUBTASK 47-21-04-430-004

- (6) Attach the bonding jumper [24] to the NEADS tube [6] with a clamp [28], screw [25], washers [26], and nut [27].

SUBTASK 47-21-04-430-005

- (7) Tighten the nut [8] to 280 ± 28 in-lb (31.6 ± 3.2 N·m).
 - (a) Use a second wrench on the check valve [1] adjacent to the nut [8] to hold it.

SUBTASK 47-21-04-430-006

- (8) Tighten the union [7] to 280 ± 28 in-lb (31.6 ± 3.2 N·m).
 - (a) Use a second wrench on the check valve [1] to hold it.

SUBTASK 47-21-04-430-007

- (9) Attach the bonding jumper [2] and clamp [22] to the ejector tube [3] with the screw [20], washers [21], clamp [22], and nut [23].

SUBTASK 47-21-04-700-001

- (10) Measure the electrical bonding resistance between check valve [1] and nearest primary structure (SWPM 20-20-00).
 - (a) Use an intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the electrical bonding resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 47-21-04-410-003

- (11) Do this task: NEADS - Negative Pressure Leak Check, TASK 47-21-00-700-803.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-04-410-001

- (1) Close this access panel:

(Center Tank Access Door - Installation, TASK 28-11-31-400-801)

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

————— END OF TASK —————

TASK 47-21-04-000-802

4. Secondary Backflow Prevention Check Valve Removal

(Figure 402)

A. References

<u>Reference</u>	<u>Title</u>
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)

B. Tools/Equipment

<u>Reference</u>	<u>Description</u>
STD-858	Tag - DO NOT OPERATE

C. Location Zones

<u>Zone</u>	<u>Area</u>
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Access Panels

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. Prepare for the Removal

SUBTASK 47-21-04-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indications show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-21-04-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
- (a) Install DO NOT OPERATE tag, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-21-04-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-21-04-010-006



WARNING

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.

- (4) Open this access panel:

Number

Name/Location

192BL

ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-21-04-616-001

- (5) Drain fuel from the drain cap (TASK 47-21-00-700-801).

F. Check Valve Removal

SUBTASK 47-21-04-010-007



WARNING

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.



WARNING

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.



CAUTION

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) Go to the check valve [16] location.

NOTE: The check valve [16] is on the Air Separation Module (ASM [18]) between the drain cap and the GSE oxygen port tube [14].

SUBTASK 47-21-04-020-002

- (2) Do these steps to remove the check valve [16]:

- Disconnect the nut [9] from the high flow valve outlet port.
- Loosen the two screws [11] that attach the NEADS tube [10] to the ASM [18].
- Disconnect the bonding jumper [12] from the NEADS tube [10].
- Disconnect the nut [13] from the GSE oxygen port tube [14].
- Disconnect the nut [15] from the check valve [16].

NOTE: Attach a second wrench to hold the check valve [16].

- Move the NEADS tube [10] forward.
- Disconnect the nut [17] from the check valve [16].

NOTE: Attach a second wrench to hold the check valve [16].

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- (h) Remove the check valve [16].
- (i) Install the protective covers on the open ends of the NEADS tube [10].

———— **END OF TASK** ————

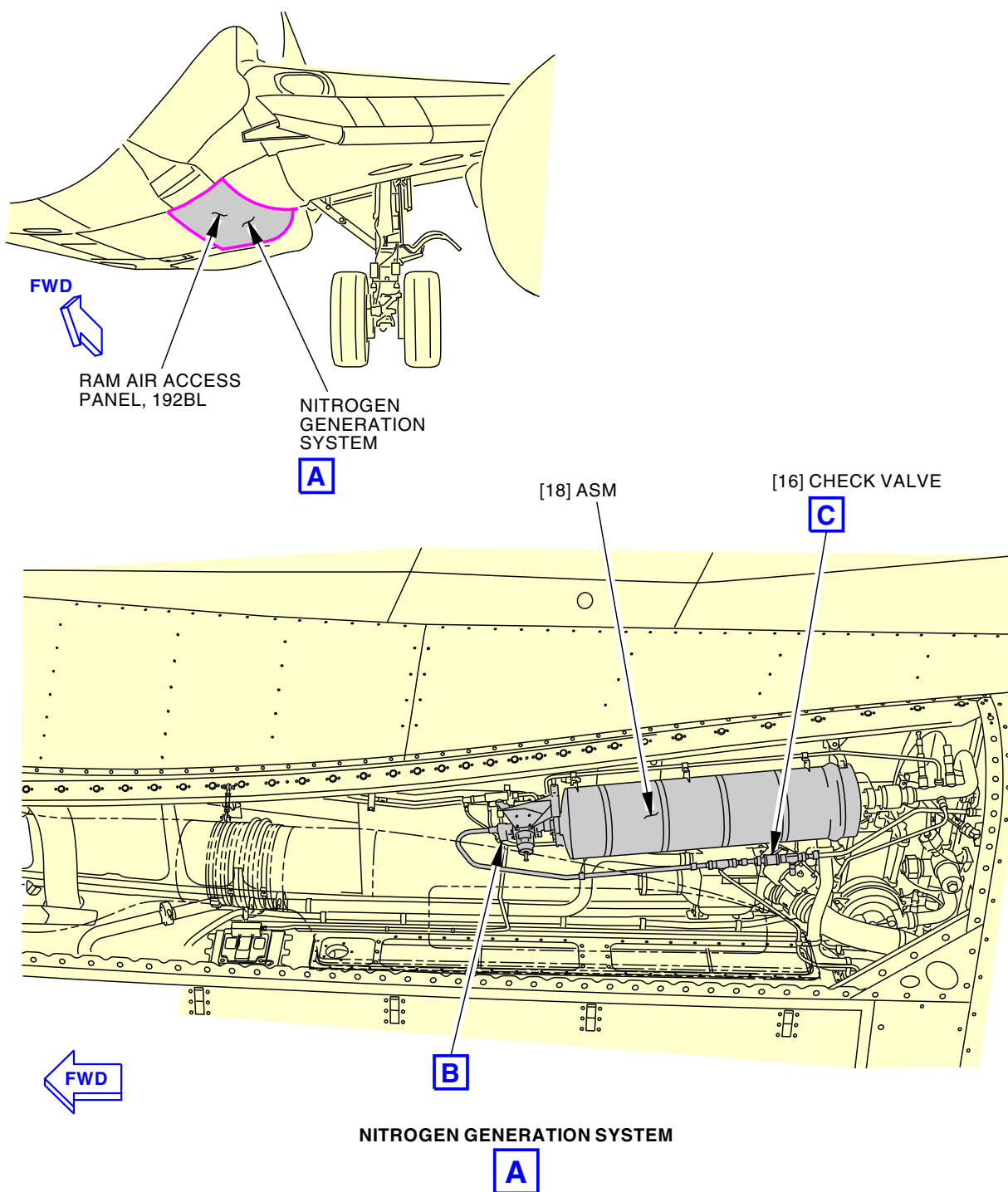
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2415334 S00061537598_V1

Secondary Backflow Prevention Check Valve Installation
Figure 402/47-21-04-990-802 (Sheet 1 of 2)

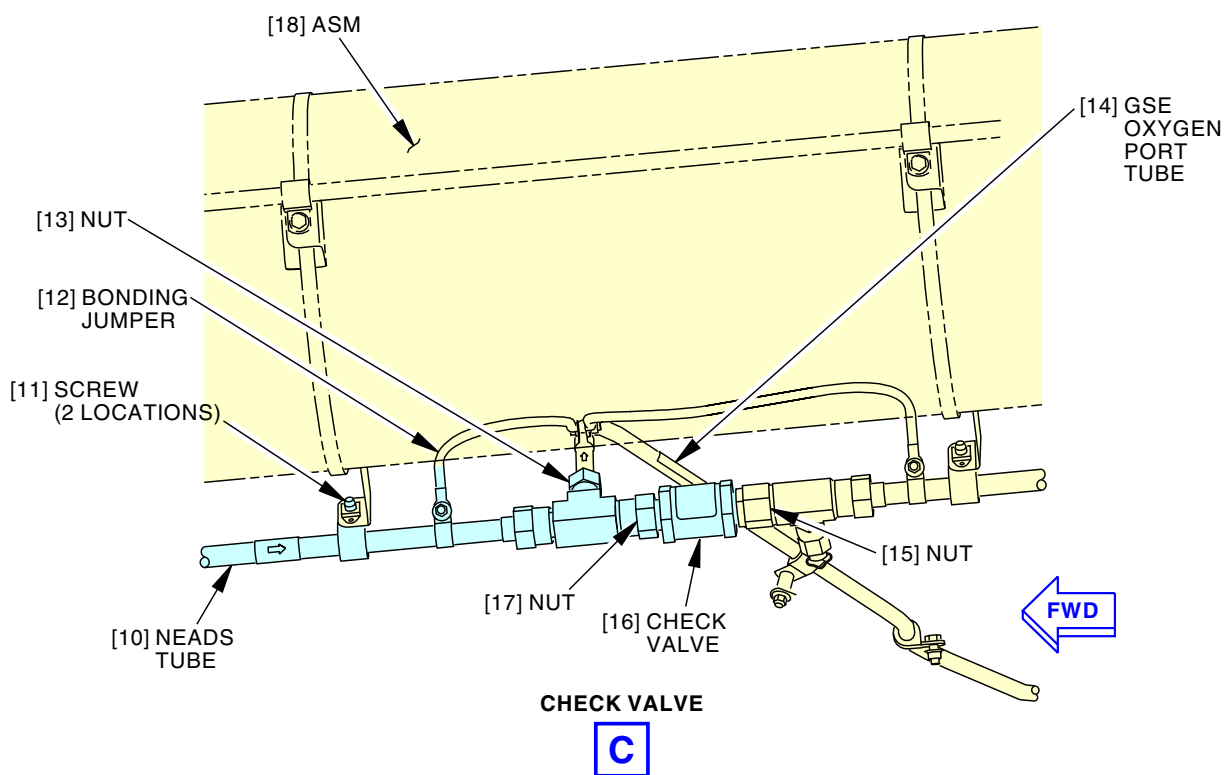
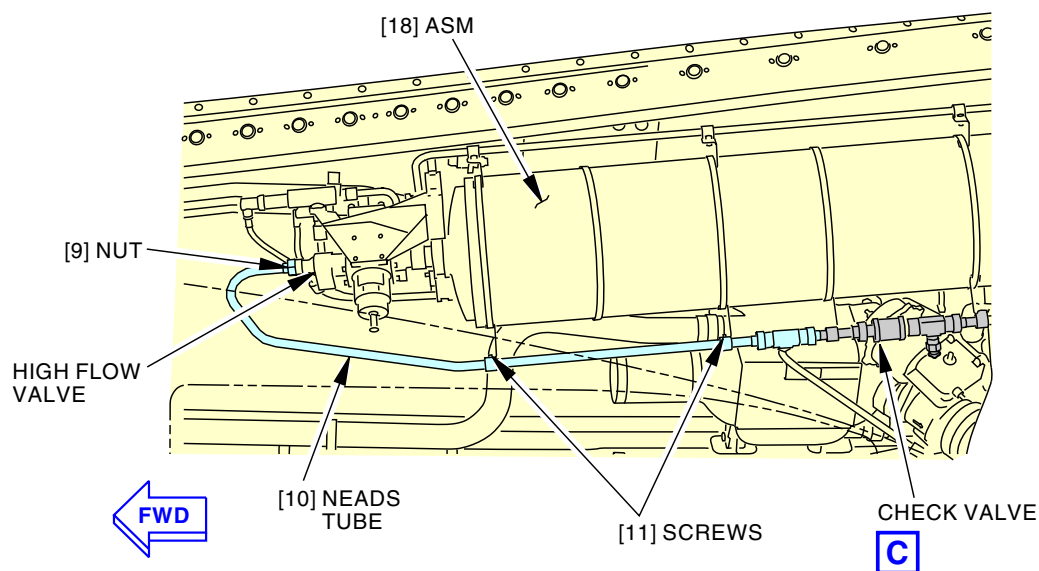
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2415335 S00061537599_V1

Secondary Backflow Prevention Check Valve Installation
Figure 402/47-21-04-990-802 (Sheet 2 of 2)

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TASK 47-21-04-400-802

5. Secondary Backflow Prevention Check Valve Installation

(Figure 402)

A. References

Reference	Title
47-00-00-790-802	Leak Check of the Nitrogen-Enriched Air Distribution System (NEADS) Lines (P/B 601)
47-21-00-700-804	NEADS - Secondary Backflow Prevention Check Valve Air Pressure Leak Check (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
16	Check valve	47-21-04-02-070	SIA ALL

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Check Valve Installation

SUBTASK 47-21-04-090-001

- (1) Remove the protective covers from the NEADS tube [10] ends.

SUBTASK 47-21-04-110-002

- (2) Prepare these components for an electrical surface bond (SWPM 20-20-00):
- (a) Mating surfaces of the NEADS tube [10] ends where the bonding jumper [12] is attached.
 - (b) Mating surface of the bonding jumper [12], if it is removed.

SUBTASK 47-21-04-420-003

- (3) Do these steps to install check valve [16]:
- (a) Align the check valve [16] to make sure that the FLOW ARROW points aft.

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- (b) Make sure that the word HINGE (or TOP) (stamped into the check valve [16]) is on the top surface of the check valve [16].
- (c) Put the check valve [16] in its position.
- (d) Align the check valve [16] and NEADS tube [10].
- (e) Install the nut [15] on the check valve [16].
- (f) Install the nut [17] on the check valve [16].
 - 1) Tighten the nut [15] and nut [17] to 252 in-lb (28.5 N·m) - 308 in-lb (34.8 N·m).
 - a) Put a second wrench on the check valve [16] to hold it.

SUBTASK 47-21-04-430-008

- (4) Do these steps to complete the installation:
 - (a) Attach the NEADS tube [10] to the high flow valve outlet port.
 - (b) Tighten the nut [9] to 252 in-lb (28.5 N·m) - 308 in-lb (34.8 N·m).
 - (c) Attach the GSE oxygen port tube [14] to the Oxygen (O₂) Ground Support Equipment (GSE) fitting.
 - (d) Tighten the nut [13] to 153 in-lb (17.3 N·m) - 187 in-lb (21.1 N·m).
 - (e) Install the screws [11] that attach the NEADS tube [10] to the ASM [18].

SUBTASK 47-21-04-430-009

- (5) Install the bonding jumper [12].

SUBTASK 47-21-04-200-002

- (6) Measure the electrical bonding resistance between the check valve [16], NEADS tube [10], and nearest primary structure (SWPM 20-20-00).
 - (a) Use an intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the electrical bonding resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 47-21-04-700-002

- (7) Leak check the Nitrogen-Enriched Air Distribution System (NEADS) lines (TASK 47-00-00-790-802).

SUBTASK 47-21-04-700-003

- (8) With the Nitrogen Generation System (NGS) pressurized, do a leak check around the secondary backflow prevention check valve (TASK 47-21-00-700-804).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-04-410-002

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-21-04-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-21-04-860-002

- (3) Make sure that the L PACK and R PACK selector switches, on the P5-10 air conditioning panel, are in the OFF position.
 - (a) Remove the DO NOT OPERATE tag on the L PACK and R PACK selector switches.

———— **END OF TASK** ————

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CROSS VENT CHECK VALVE - REMOVAL/INSTALLATION

TASK 47-21-05-000-801

1. Cross Vent Check Valve Removal

(Figure 401)

A. General

- (1) The cross vent check valve [1] is inside the right surge tank.

B. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)

C. Location Zones

Zone	Area
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Access Panels

Number	Name/Location
633AB	Surge Tank Access Door - Wing Station 655

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 28-11-11-000-802.

Number	Name/Location
633AB	Surge Tank Access Door - Wing Station 655

F. Cross Vent Check Valve Removal

SUBTASK 47-21-05-910-001

- (1) Do these steps to remove the cross vent check valve [1]:
- (a) Hold the cross vent check valve [1] in its position.
 - (b) Remove the two screws [5] and washers [3] that attach the cross vent check valve [1] to the fuel dam [2].
 - (c) Loosen the bolt [7] and washer [8] on the clamping device.

NOTE: Loosen the bolt enough to relieve the spring tension on the clamping device.

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- (d) Remove the cross vent check valve [1] and gasket [6].
- (e) Discard the gasket [6].

———— **END OF TASK** ————

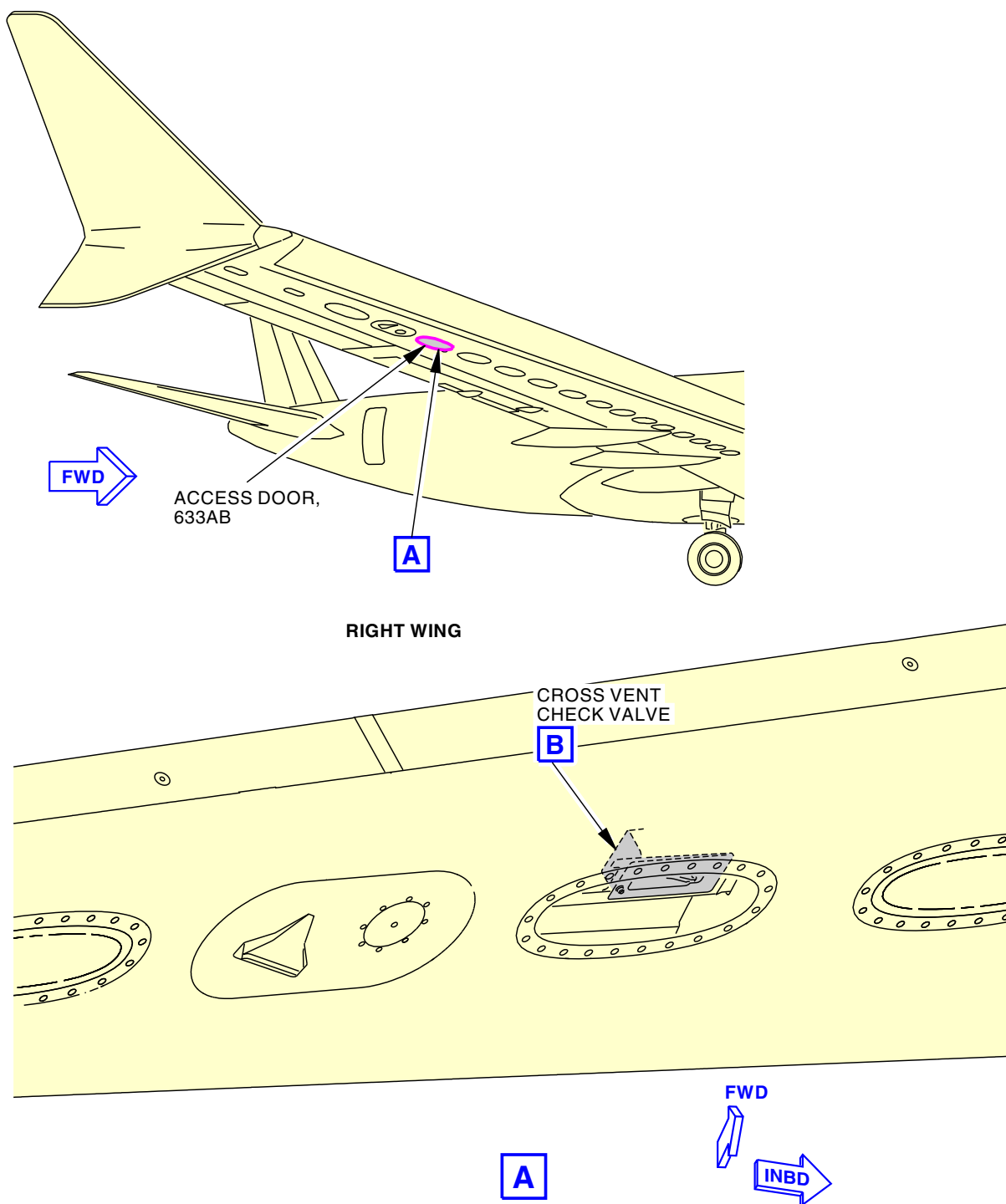
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Cross Vent Check Valve Installation
Figure 401/47-21-05-990-801 (Sheet 1 of 2)

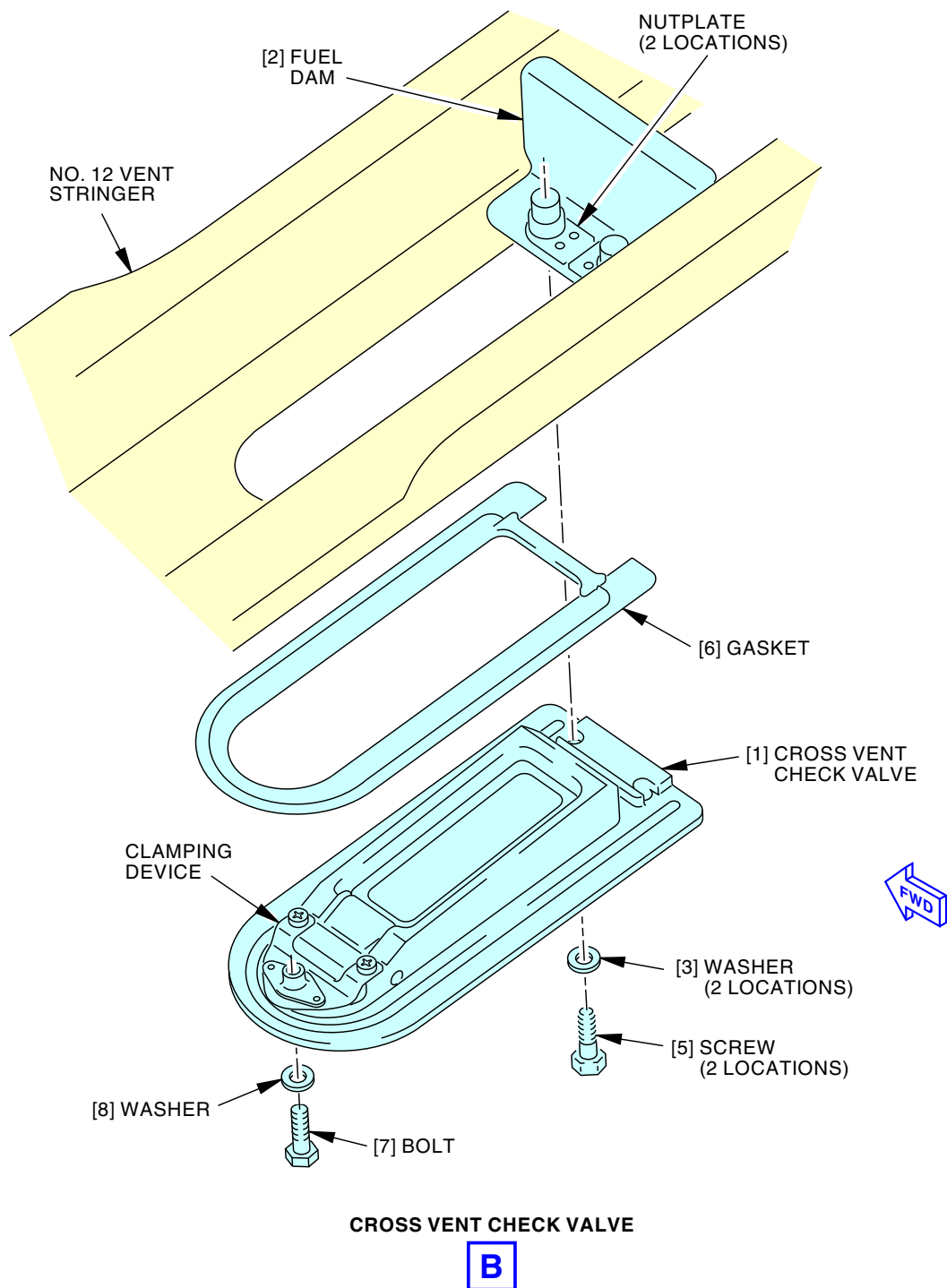
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2415337 S00061537605_V1

Cross Vent Check Valve Installation
Figure 401/47-21-05-990-801 (Sheet 2 of 2)

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TASK 47-21-05-420-801

2. Cross Vent Check Valve Installation

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-802	Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Cross vent check valve	47-21-05-01-020	SIA ALL
6	Gasket	47-21-05-01-025	SIA ALL

E. Location Zones

Zone	Area
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Access Panels

Number	Name/Location
633AB	Surge Tank Access Door - Wing Station 655

G. Prepare for the Installation

SUBTASK 47-21-05-010-002



WARNING

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.

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(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) Go into the right surge tank (TASK 28-11-00-910-802).

SUBTASK 47-21-05-765-001

- (2) Prepare the faying surfaces of these components for a mating surface bond (SWPM 20-20-00):
 - (a) cross vent check valve [1]
 - (b) vent channel
 - (c) new gasket [6]
 - (d) fuel dam [2].

H. Cross Vent Check Valve Installation

SUBTASK 47-21-05-420-001

- (1) Do these steps to install the cross vent check valve [1]:
 - (a) Put the new gasket [6] on the top side of the valve face.
 - 1) Make sure that the raised block, on the gasket [6], points to the stringers.
 - (b) Install the cross vent check valve [1] in the vent channel.

NOTE: The valve flange and gasket must be below the No. 12 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 screws [5] and washers [3] into the fuel dam [2] nutplates.
 - (e) Make sure that the bolt [7] and washer [8] 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. 12 vent stringer.
 - (g) Make sure that you align the cross vent check valve [1] with the vent channel and the fuel dam [2].

SUBTASK 47-21-05-420-002

- (2) Fully tighten the two screws [5] and the clamp bolt [7] to 55 ±4 in-lb (6.2 ±0.5 N·m).

SUBTASK 47-21-05-280-001

- (3) Use intrinsically safe approved bonding meter, COM-1550, to measure the resistance between the cross vent check valve [1] and the nearest primary structure (SWPM 20-20-00).
 - (a) Make sure that the total resistance is 0.010 ohm (10 milliohm) or less.

SUBTASK 47-21-05-914-001

- (4) Apply sealant, A00767, to these locations:
 - (a) Apply a cap seal on the bolt [7] and two screws [5].

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- (b) Apply a fillet seal around the periphery of the cross vent check valve [1].

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-05-410-001

- (1) Do this task: Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

- (a) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
633AB	Surge Tank Access Door - Wing Station 655

———— **END OF TASK** ————

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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 rear spar of the left side of the center tank. It acts like a bulkhead fitting and requires one person in the center tank and one person in the wheel well to replace it.

TASK 47-21-07-000-801

2. Flame Arrestor Removal

(Figure 401)

A. **General**

- (1) Two persons are necessary to do this task.

B. **References**

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)

C. **Tools/Equipment**

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

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Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: \$0855 Part #: 10811 Supplier: \$0855 Part #: 10812 Supplier: \$0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: \$1351 Part #: AS2 Supplier: \$1351 Part #: AS3 Supplier: \$1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
SPL-768	Sealant Removal Tool, Non-Metallic Part #: ST982L-9 Supplier: 81205 Part #: ST982LF-9 Supplier: 81205 Part #: ST982LH-A-1 Supplier: 81205
STD-133	Brush - Stiff Bristle, Non-metallic
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

F. Access Panels

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

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G. Prepare for the Removal

SUBTASK 47-21-07-860-001



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 47-00-00-010-801).

SUBTASK 47-21-07-860-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-21-07-860-003

- (3) On the P5-10 Bleed Air Control module, put the L PACK and R PACK switches to the OFF position.

- (a) Install DO NOT OPERATE tag, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-21-07-010-001

- (4) Do this task: Center Tank Access Door Removal, TASK 28-11-31-000-801.

SUBTASK 47-21-07-010-002



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.

- (5) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

SUBTASK 47-21-07-030-001

- (6) Go into the left wheel well.

SUBTASK 47-21-07-650-001



MAKE SURE THAT YOU DO NOT PUSH OR PULL THE FQIS COMPONENTS IN THE FUEL TANK. DAMAGE TO FQIS COMPONENTS CAN EASILY OCCUR.

- (7) Drain fuel from the NEADS line (TASK 47-21-00-700-801).

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H. Flame Arrestor Removal

SUBTASK 47-21-07-030-002

- (1) Disconnect the dielectric hose [6] from the flame arrestor [1].
 - (a) Put a protective cover on the dielectric hose [6].

SUBTASK 47-21-07-941-001

- (2) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 47-21-07-490-001

- (3) Disconnect the NEADS tube [5] from the flame arrestor [1].
 - (a) Put a protective cover on the NEADS tube [5].

SUBTASK 47-21-07-100-001

- (4) Do these steps to remove the flame arrestor [1]:
 - (a) Use the sealant removal tool, SPL-768, (sealant removal tool, COM-2481, or equivalent) to remove the sealant from the nut [3] in the center tank.
 - (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 wheel well.

NOTE: The sealant removal/application tools are shown in this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.
 - (c) Disconnect the nut [3] and the washer [2] in the center tank.

NOTE: Use a second wrench on the flame arrestor [1] in the wheel well to stop it from turning
 - (d) Remove the flame arrestor [1].
 - (e) Discard the O-ring [7].

SUBTASK 47-21-07-100-002



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 solvent, B00184 or solvent, B00148.
 - (c) Rub the area with a clean, dry cotton wiper, G00034.

————— **END OF TASK** —————

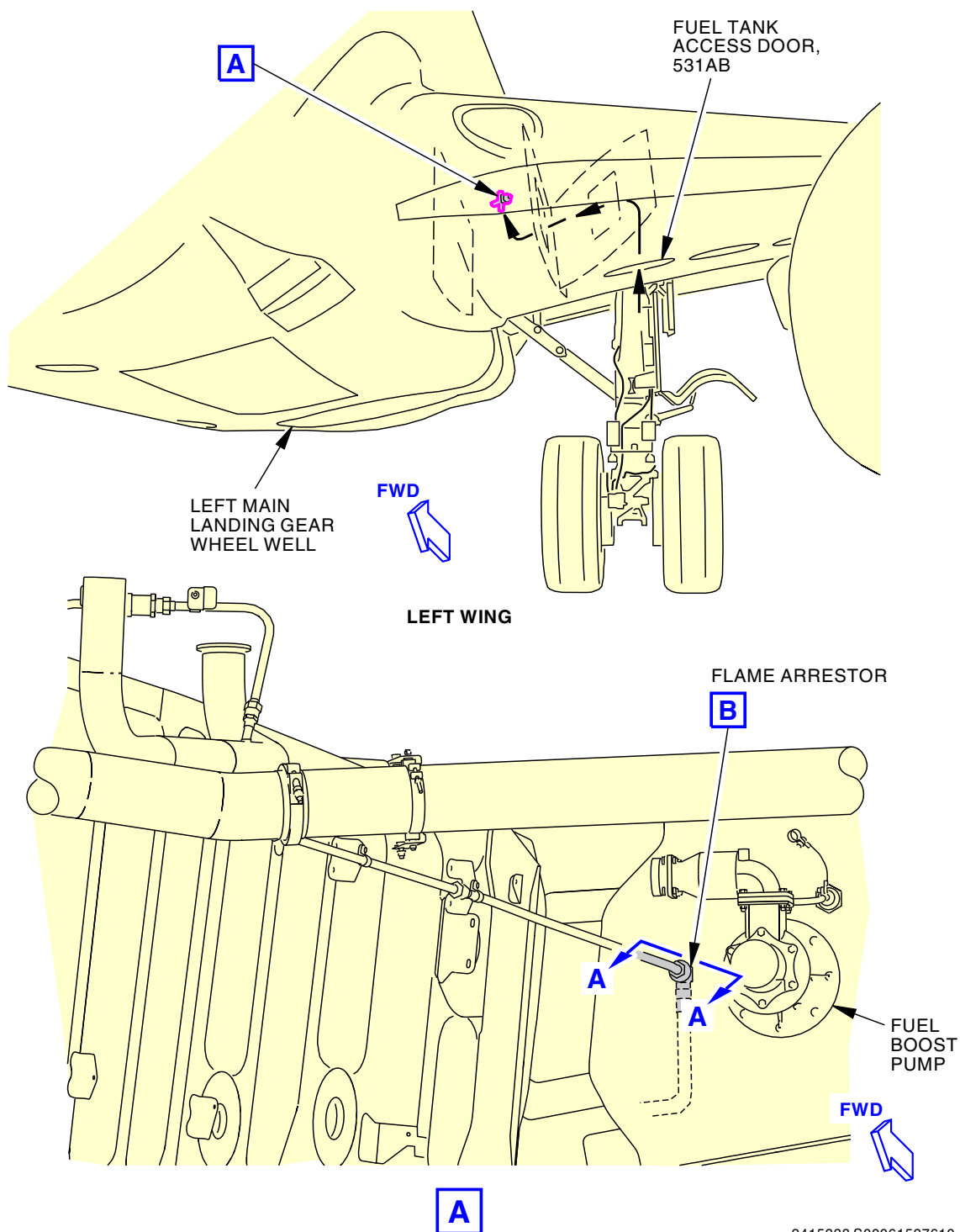
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Flame Arrestor Installation
Figure 401/47-21-07-990-801 (Sheet 1 of 2)

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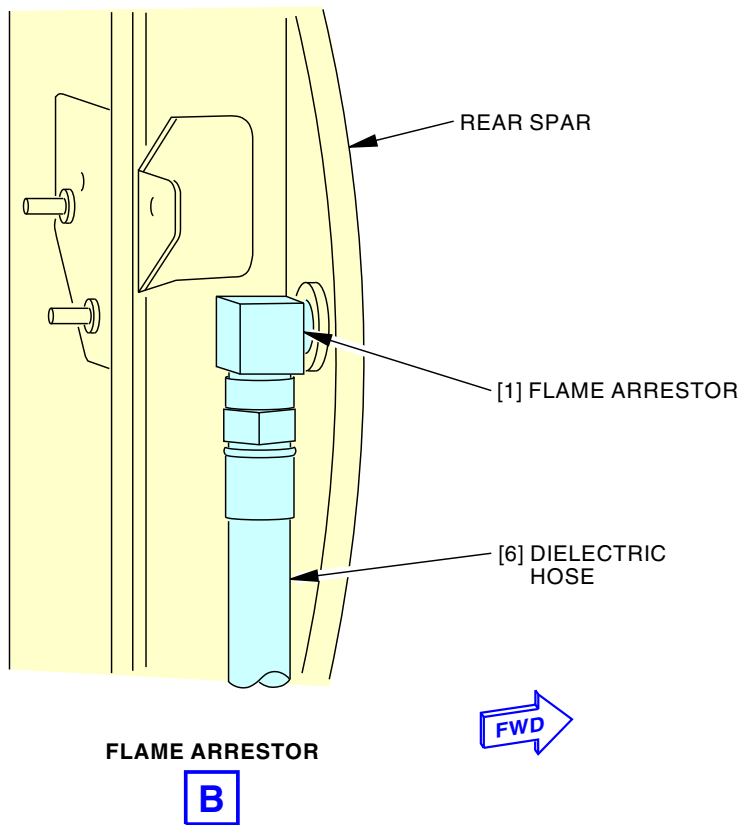
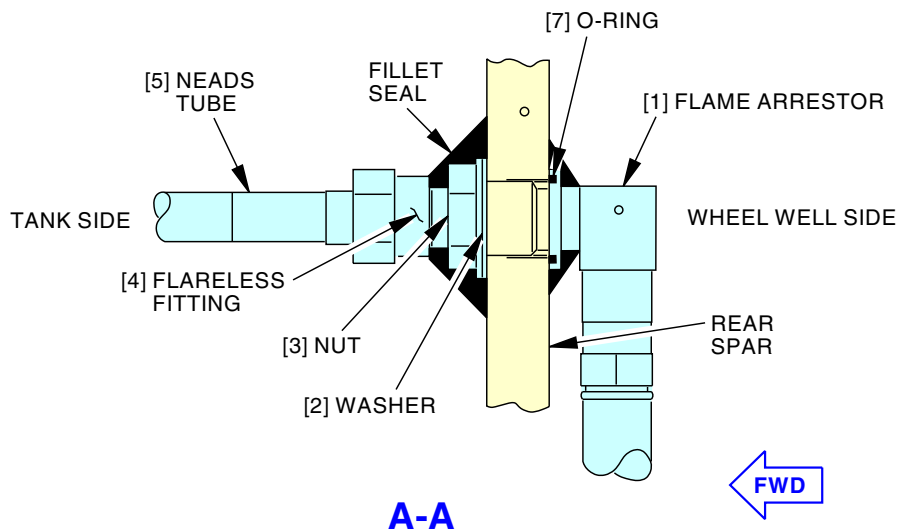
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Flame Arrestor Installation
Figure 401/47-21-07-990-801 (Sheet 2 of 2)

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TASK 47-21-07-400-801

3. Flame Arrestor Installation

(Figure 401)

A. General

- (1) This task has one or more steps that 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.

B. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
D00128	Grease - Silicone	A-A-59173
D50090	Hydraulic Fluid - Petroleum Base NATO H-515 PETROLEUM BASE AIRCRAFT HYDRAULIC FLUID	MIL-PRF-5606H (NATO H-515)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Flame arrestor	47-21-07-01-015	SIA ALL
7	O-ring	47-21-07-01-020	SIA ALL

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F. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
551	Left Wing - Rear Spar To Landing Gear Support Beam

G. Access Panels

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

H. Prepare for the Installation

SUBTASK 47-21-07-010-003

- (1) Go to the flame arrestor [1] location.

NOTE: One person must be in the center tank location (TASK 28-11-00-910-802). One person must be in the left wheel well.

SUBTASK 47-21-07-090-001

- (2) Remove the protective cover from the NEADS tube [5] in the center tank.

SUBTASK 47-21-07-090-002

- (3) Remove the protective cover from the dielectric hose [6] in the wheel well.

SUBTASK 47-21-07-210-001

47-AWL-01: CDCCL

- (4) Make sure that 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 47-21-07-100-003

- (5) Make sure that the NEADS tube [5], flame arrestor [1], nut [3], and washer [2] are clean, free from grease and unwanted material.

SUBTASK 47-21-07-765-001

- (6) Prepare these components for an electrical mating surface bond (SWPM 20-20-00):

- (a) flame arrestor [1]
- (b) rear spar of the center tank where the flame arrestor [1] will attach
- (c) washer [2]
- (d) nut [3]

SUBTASK 47-21-07-760-001

47-AWL-01: CDCCL

- (7) Apply a fay surface bond between the flame arrestor [1] (bulkhead fitting) and the structure outside 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.

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I. Flame Arrestor Installation

SUBTASK 47-21-07-430-001

- (1) Do these steps to install the new O-ring [7] in the flame arrestor [1]:
 - (a) Put a thin layer of grease, D00128, or hydraulic fluid, D50090, on an O-ring [7].
 - (b) Put the new O-ring [7] in the space on the flame arrestor [1].

SUBTASK 47-21-07-420-001

- (2) Do these steps to install the flame arrestor [1]:
 - (a) Put the flame arrestor [1] in its position on the rear spar in the left wheel well.
 - (b) Put the washer [2] and the nut [3] on the flame arrestor [1] in the center tank.
 - (c) Make sure that the flame arrestor [1] correctly aligns.
 - (d) Tighten the nut [3] to 280 ± 28 in-lb (32 ± 4 N·m).
 - 1) Use a second wrench to make sure that the flame arrestor [1] does not turn.

SUBTASK 47-21-07-430-002

- (3) Do these steps to connect the flame arrestor [1] to the NEA distribution system:
 - (a) Connect the NEADS tube [5] in the center tank to the flame arrestor [1].
 - (b) Tighten the nut on the flareless fitting [4].

SUBTASK 47-21-07-430-003

47-AWL-01: CDCCL

- (4) From outside of the center tank, connect the dielectric hose [6] to the flame arrestor [1].

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) Tighten the nut on the dielectric hose [6].
 - 1) Use a second wrench to hold the dielectric hose [6] to make sure that it does not twist.

SUBTASK 47-21-07-765-002

47-AWL-01: CDCCL

- (5) Measure the electrical bonding resistance between the flame arrestor [1] (bulkhead fitting) and the rear spar structure outside 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.

- (a) Use an intrinsically safe approved bonding meter, COM-1550, to make the measurement.

47-AWL-01: CDCCL

- (b) Make sure that 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.

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SUBTASK 47-21-07-420-002

47-AWL-01: CDCCL

- (6) Apply a fillet seal between the flame arrestor [1] (bulkhead fitting) flange and the structure outside the tank (aft side of the rear spar) (Figure 401).

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 47-21-07-430-004

47-AWL-01: CDCCL

- (7) Apply a fillet seal around the perimeter of the fitting (nut [3] (jam nut) and washer [2]) to the tank wall inside the tank (forward side of the rear spar) (Figure 401).

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 47-21-07-760-002

- (8) Measure the electrical bonding resistance between the first tube that mates with the flame arrestor [1] (bulkhead fitting) and the structure inside the tank (SWPM 20-20-00).

- (a) Use an intrinsically safe approved bonding meter, COM-1550, to make the measurement.
(b) Make sure that the electrical bonding resistance is 0.100 ohm (100 milliohms) or less.

J. Flame Arrestor Operational Test

SUBTASK 47-21-07-865-001

- (1) Do these steps to prepare for the operational test:

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tag from the L PACK and the R PACK selector switches.
(c) Make sure that the L PACK and R PACK selector switches are in the OFF position.

SUBTASK 47-21-07-790-001

- (2) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

- (a) Repair the leaks that you find.

K. Put the Airplane Back to its Usual Condition

SUBTASK 47-21-07-410-001

- (1) Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801.

- (a) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

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————— END OF TASK —————

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LIGHTNING SHIELDS - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) Upper Lightning Shield Removal
 - (2) Upper Lightning Shield Installation
 - (3) Lower Lightning Shield Removal
 - (4) Lower Lightning Shield Installation.
- B. The two lightning shields are installed on the rear spar in the left wheel well. They provide lightning protection for the Nitrogen Enriched Air Distribution System (NEADS) line.

TASK 47-21-08-000-801

2. Upper Lightning Shield Removal

(Figure 401)

A. **References**

Reference	Title
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
SRM 51-40-02-0G-0	Fastener Installation and Removal

B. **Location Zones**

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

C. **Prepare for the Removal**

SUBTASK 47-21-08-860-001



WARNING

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.



WARNING

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 47-00-00-010-801).

D. **Upper Lightning Shield Removal**

SUBTASK 47-21-08-800-001

- (1) Go into the left wheel well.

SUBTASK 47-21-08-030-002

- (2) Do these steps to remove the upper lightning shield [1].
 - (a) Remove the two rivets [2] or two bolts [21] and collars [20] that attach the upper lightning shield [1] to the vertical stiffener (SRM PROCEDURE 51-40-02-0G-0).
 - 1) Discard the rivets [2] or collars [20].

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- (b) Remove the cap screw [3] that attaches the upper lightning shield [1] to the wire bundle.

———— **END OF TASK** ————

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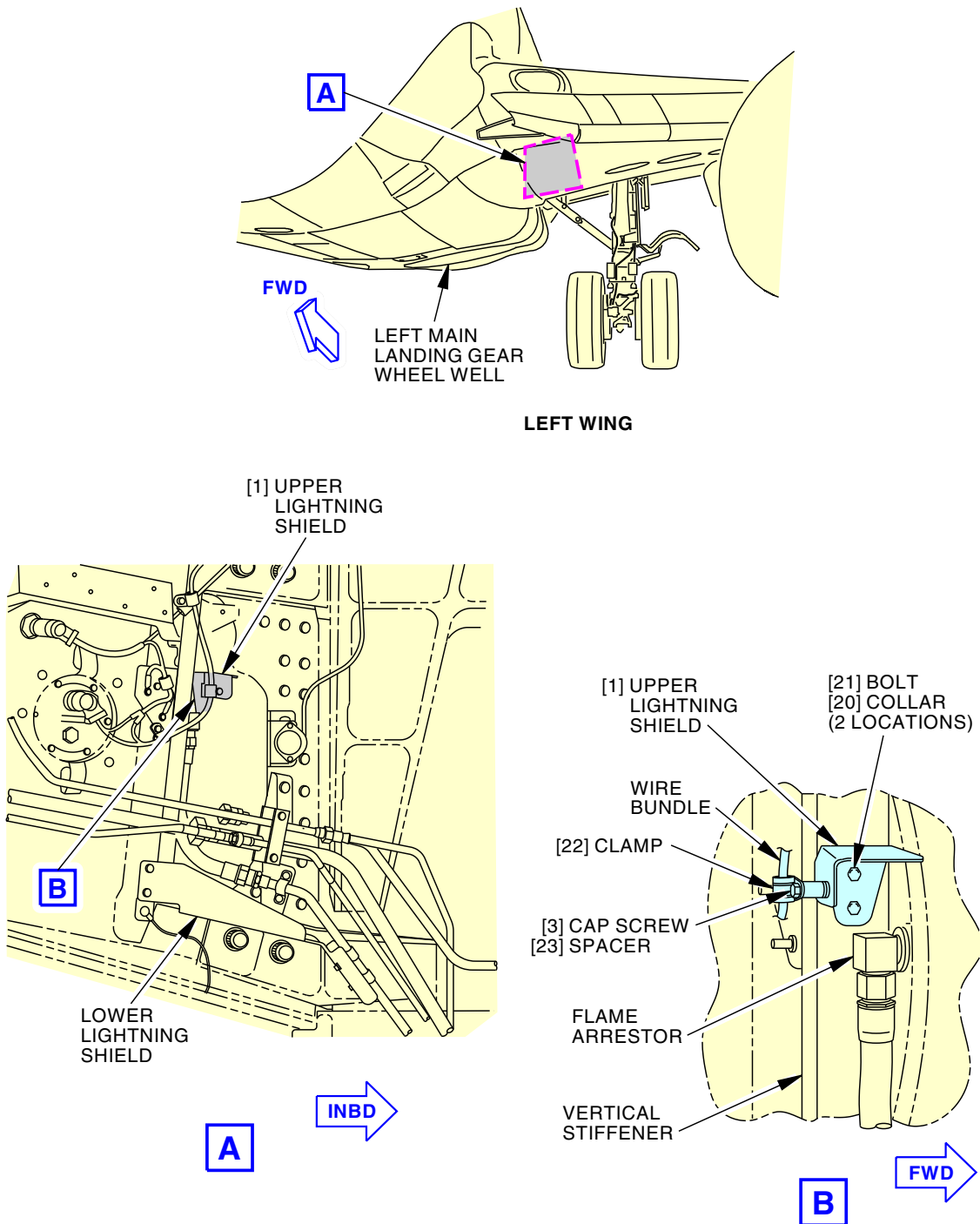
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Upper Lightning Shield Installation
Figure 401/47-21-08-990-801

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TASK 47-21-08-400-801

3. Upper Lightning Shield 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-05.

B. References

Reference	Title
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
SRM 51-40-02-0G-0	Fastener Installation and Removal
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Upper lightning shield	57-20-51-60-055	SIA ALL

F. Location Zones

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
551	Left Wing - Rear Spar To Landing Gear Support Beam

G. Prepare for Installation

SUBTASK 47-21-08-010-001

- (1) Go into the left wheel well.

H. Upper Lightning Shield Installation

SUBTASK 47-21-08-110-001



WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (1) Use a cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00062 or solvent, B00184, to clean these areas before you install NGS shutoff valve [24].

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-21-08-110-002

 47-AWL-05: CDCCL

- (2) Apply a fay sealed fay surface bond between the mating surfaces of the upper lightning shield [1] and the vertical stiffener (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-05.

SUBTASK 47-21-08-430-001

- (3) Do these steps to install the upper lightning shield [1].
- (a) Apply sealant, A00247, or sealant, A02315, on the shanks of the two bolts [21].
 - (b) Wet install the two bolts [21] and new collars [20] that attach the upper lightning shield [1] to the vertical support (SRM PROCEDURE 51-40-02-0G-0).
NOTE: Do not install rivets.
 - (c) Install the cap screw [3], clamp [22], and spacer [23] that attaches the upper lightning shield [1] to the wire bundle.

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SUBTASK 47-21-08-765-001

47-AWL-05: CDCCL

- (4) Measure the electrical bonding resistance between the upper lightning shield [1] and the rear spar web (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-05.

- (a) Use an intrinsically safe approved bonding meter, COM-1550, to make the measurement.

47-AWL-05: CDCCL

- (b) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 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-05.

SUBTASK 47-21-08-860-002

- (5) Apply a fillet seal with sealant, A00247, or sealant, A02315, on the collars [20] and bolt heads of the bolt [21] and the upper lightning shield [1].

————— END OF TASK —————

TASK 47-21-08-000-802

4. Lower Lightning Shield Removal

(Figure 402)

A. References

Reference	Title
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

C. Prepare for the Removal

SUBTASK 47-21-08-860-003



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 47-00-00-010-801).

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D. Lower Lightning Shield Removal

SUBTASK 47-21-08-030-003

- (1) Go into the left wheel well.

SUBTASK 47-21-08-030-004

- (2) Do these steps to remove the lower lightning shield [5].
- (a) Remove two cap screws [6], four washers [7], and two nuts [8] that attach the lower lightning shield [5] to the attach bracket.
 - (b) Remove the screw [9], two washers [7], and nut [8] that attach the lower lightning shield [5] to the hydraulic bracket.
 - (c) Remove two cap screws [12], four washers [7], two spacers [10], and two nuts [8] from the two clamps [11] that attach the lower lightning shield [5] to the NEADS tube [13].

————— **END OF TASK** —————

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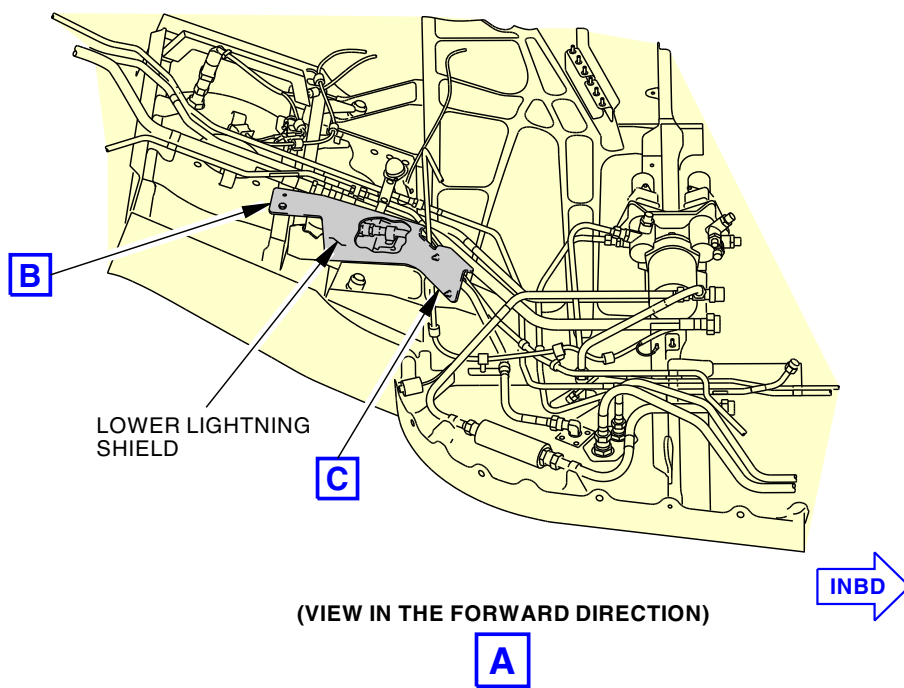
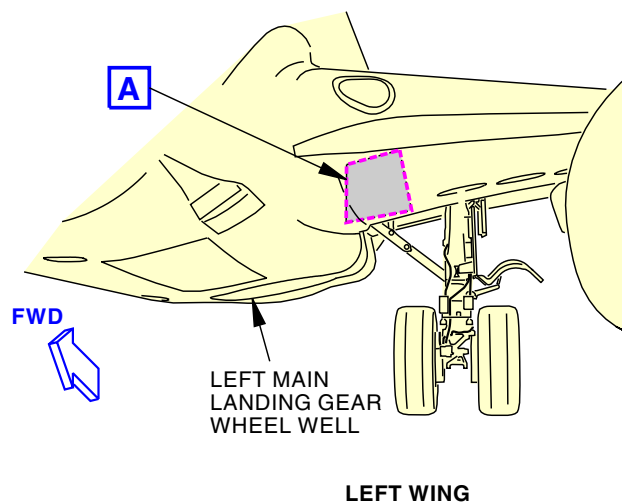
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Lower Lightning Shield Installation
Figure 402/47-21-08-990-802 (Sheet 1 of 2)

EFFECTIVITY
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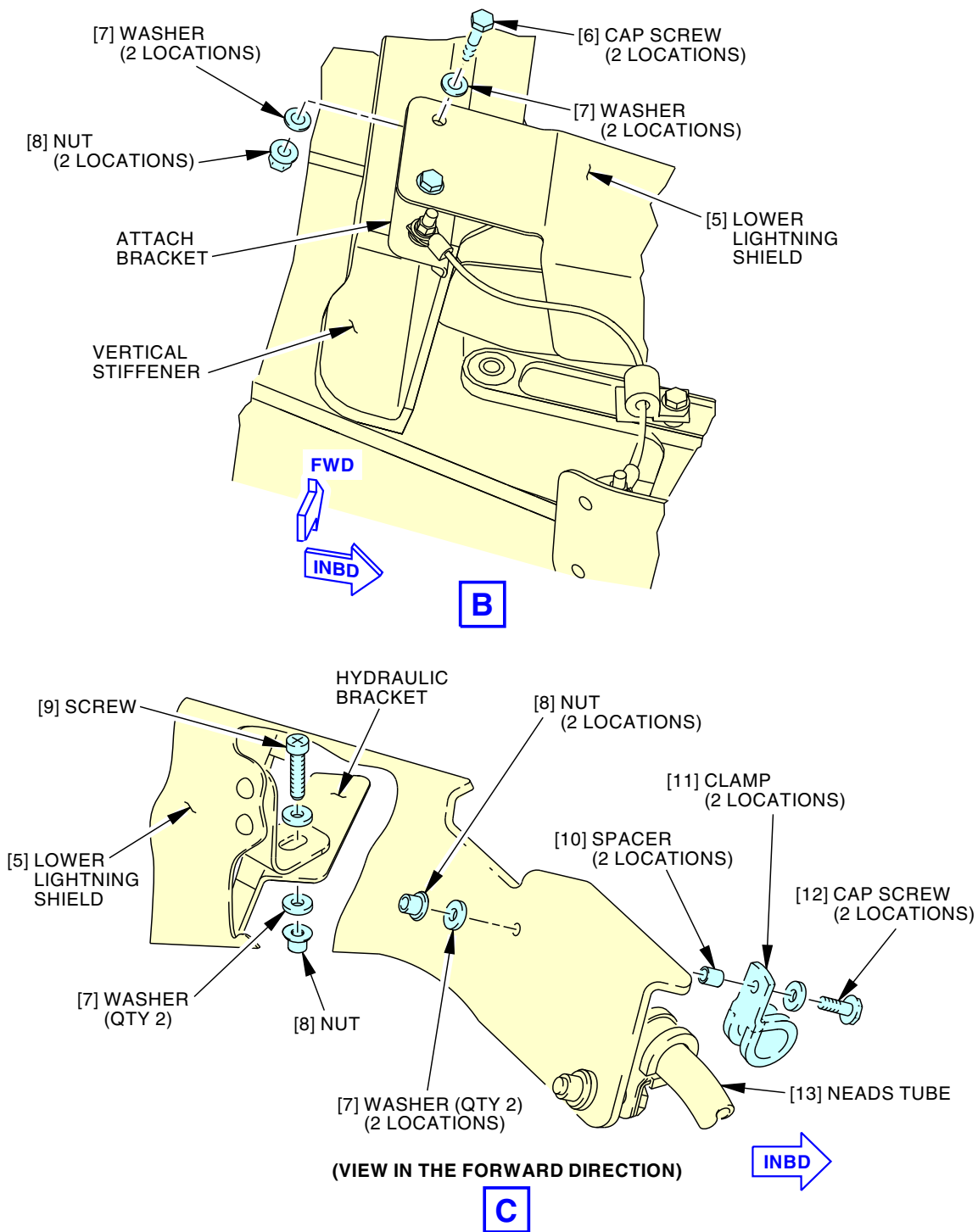
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2415342 S00061537620_V1

Lower Lightning Shield Installation
Figure 402/47-21-08-990-802 (Sheet 2 of 2)

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TASK 47-21-08-400-802

5. Lower Lightning Shield Installation

(Figure 402)

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-05.

B. References

Reference	Title
47-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Lower lightning shield	47-21-08-01-095	SIA ALL

F. Location Zones

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
551	Left Wing - Rear Spar To Landing Gear Support Beam

G. Prepare for the Installation

SUBTASK 47-21-08-010-002

- (1) Go into the left wheel well.
 - (a) Go to the lower lightning shield [5] location.

NOTE: The lower lightning shield [5] is on the rear spar.

H. Lower Lightning Shield Installation

SUBTASK 47-21-08-100-001

- (1) Remove the used sealant from the electrical bracket.

SUBTASK 47-21-08-110-003



WARNING

DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (2) Use a cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00062 or solvent, B00184, to clean these areas before you install NGS shutoff valve [24].

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-21-08-110-004

 47-AWL-05: CDCCL

- (3) Apply a fay sealed fay surface bond to these components (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-05.

 47-AWL-05: CDCCL

- (a) Mating surfaces of the lower lightning shield [5] and the attach bracket.

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-05.

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 47-AWL-05: CDCCL

- (b) Mating surfaces of the attach bracket (if the attach bracket was removed) and the vertical stiffener.

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-05.

SUBTASK 47-21-08-430-002

- (4) Do these steps to install the lower lightning shield [5].
- (a) Install four washers [7], two cap screws [6], and two nuts [8] that attach the lower lightning shield [5] to the attach bracket.
 - (b) Install the two washers [7], screw [9], and nut [8] that attach the lower lightning shield [5] to the hydraulic bracket.
 - (c) Install two spacers [10], four washers [7], two cap screws [12], and nuts [8] to the clamps [11] that attach the lower lightning shield [5] to the NEADS tube [13].

SUBTASK 47-21-08-765-002

 47-AWL-05: CDCCL

- (5) Measure the electrical bonding resistance between the lower lightning shield [5] and the rear spar web (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-05.

- (a) Use an intrinsically safe approved bonding meter, COM-1550, to make the measurement.

 47-AWL-05: CDCCL

- (b) Make sure that the electrical bonding resistance is 0.0015 ohm (1.5 milliohms) 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-05.

SUBTASK 47-21-08-390-001

- (6) Apply a layer of sealant, A00247, or sealant, A02315, around the cap screws [6] and washers [7] and the edges of the lower lightning shield [5] on the attach bracket.

————— **END OF TASK** —————

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DRAIN CAP - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) Drain Cap Removal
- (2) Drain Cap Installation.

B. The drain cap is installed below the air separation module (ASM) on the NEADS tubing.

TASK 47-21-11-000-801

2. Drain Cap Removal

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left SIA 015-999; SIA 001-014 POST SB 737-47-1019
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left SIA ALL

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
193AL	Wheel Well Panel - Forward Outboard

E. **Prepare for Removal**

SUBTASK 47-21-11-922-001



WARNING

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.



WARNING

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)



CAUTION

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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-21-11-864-001

- (2) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-21-11-860-001

- (3) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-21-11-865-001

- (4) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-21-11-010-001



WARNING

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.

- (5) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

Open this access panel:

SIA 015-999; SIA 001-014 POST SB 737-47-1019

<u>Number</u>	<u>Name/Location</u>
193AL	Wheel Well Panel - Forward Outboard

SIA ALL

F. Drain Cap Removal

SUBTASK 47-21-11-020-001

- (1) Remove the drain cap [1] from the tee.

NOTE: The drain cap is found below the Air Separation Module (ASM).

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SIA 015-999; SIA 001-014 POST SB 737-47-1019

SUBTASK 47-21-11-020-002

(2) Remove the drain cap [2] from the elbow.

NOTE: The drain cap is found on the Main Landing Gear (MLG) wheel well forward bulkhead.

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———— **END OF TASK** ————

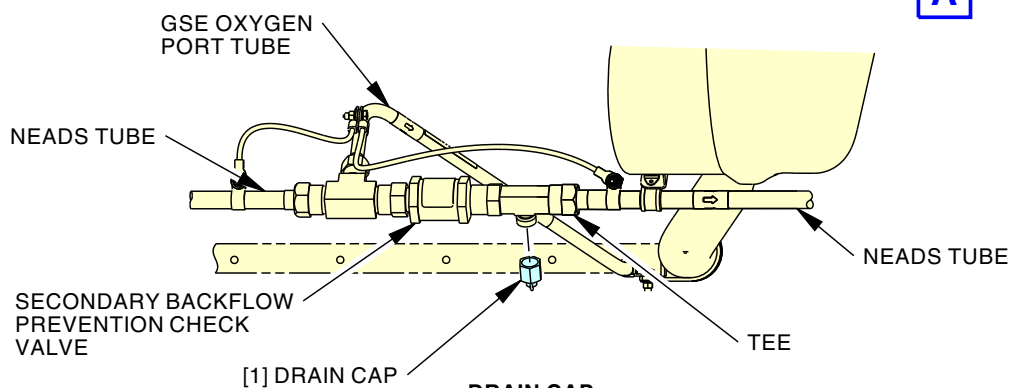
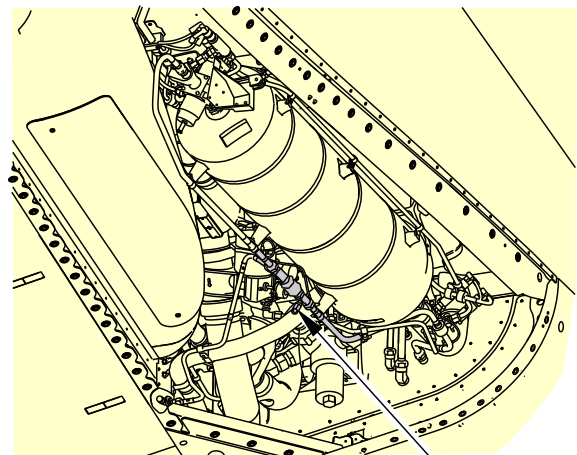
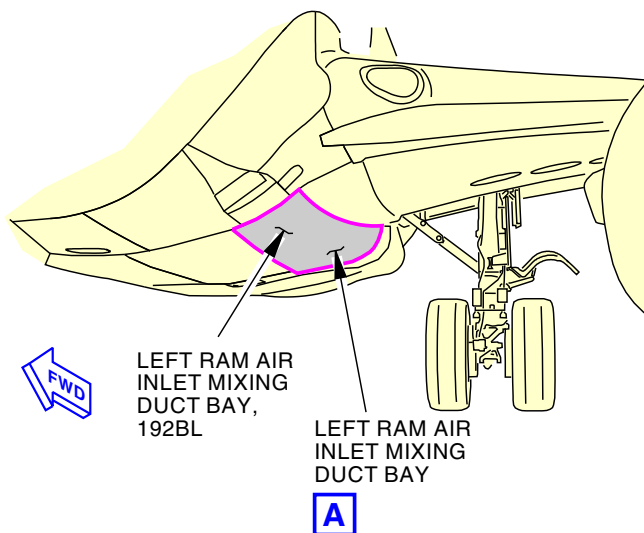
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NOTE:
PART OF THE AIR SEPARATION MODULE
IS NOT SHOWN.

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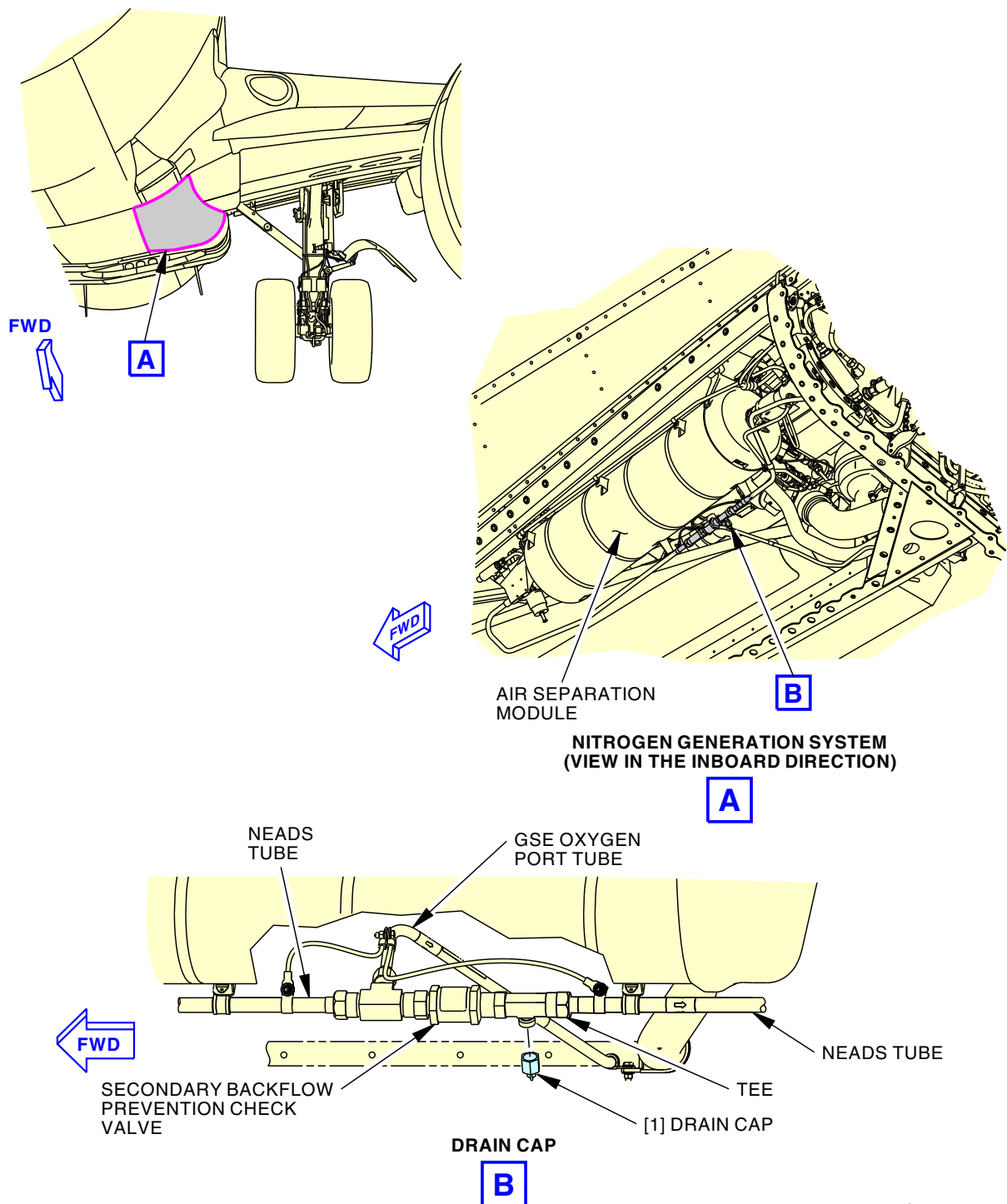
Drain Cap Installation
Figure 401/47-21-11-990-801 (Sheet 1 of 3)

EFFECTIVITY
SIA 001-014 PRE SB 737-47-1019

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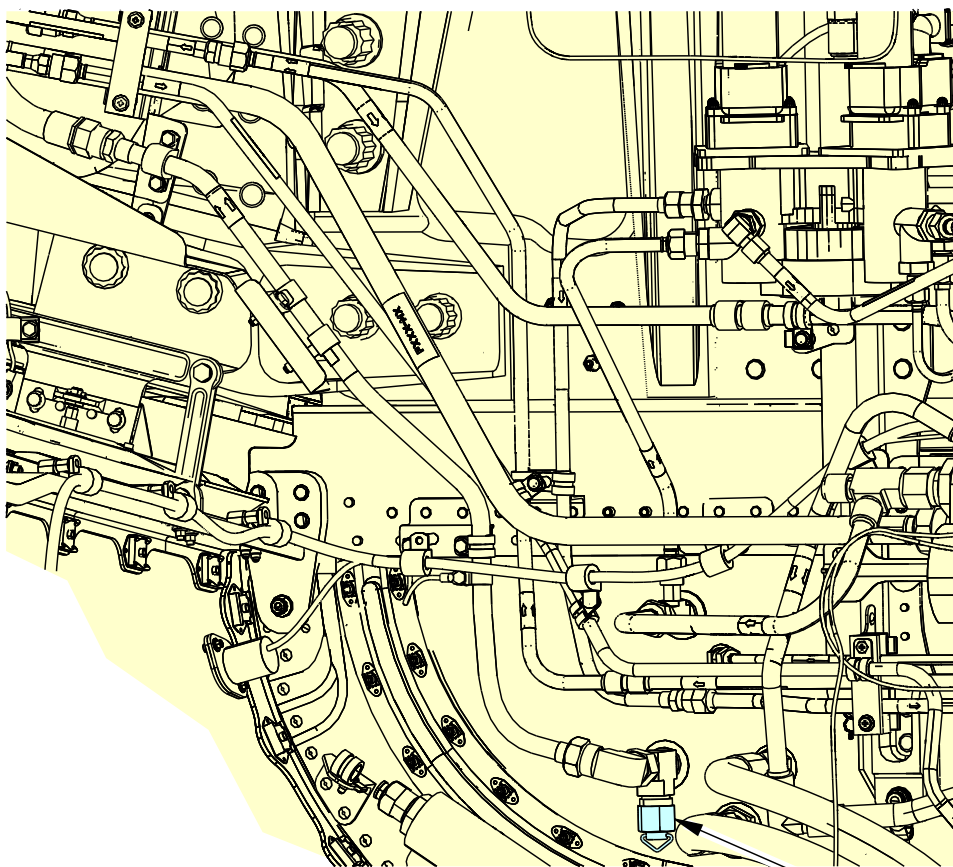
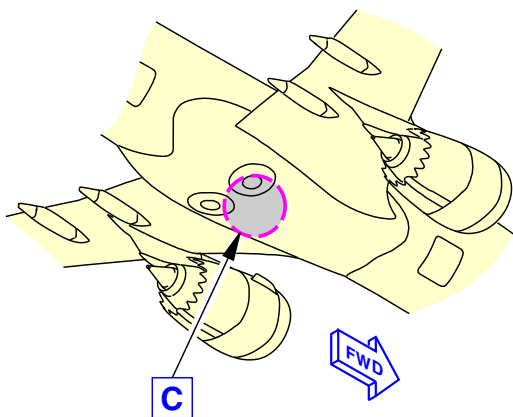
Drain Cap Installation
Figure 401/47-21-11-990-801 (Sheet 2 of 3)

EFFECTIVITY
SIA 015-999; SIA 001-014 POST SB 737-47-1019

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[2] DRAIN CAP

MAIN LANDING GEAR WHEEL WELL FORWARD BULKHEAD
(LEFT SIDE)

C

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Drain Cap Installation
Figure 401/47-21-11-990-801 (Sheet 3 of 3)

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SIA 015-999; SIA 001-014 POST SB 737-47-1019

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TASK 47-21-11-400-801

3. Drain Cap Installation

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Drain cap	47-21-04-02-040	SIA ALL

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left SIA 015-999; SIA 001-014 POST SB 737-47-1019
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left SIA ALL

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
193AL	Wheel Well Panel - Forward Outboard

F. Drain Cap Installation

SUBTASK 47-21-11-410-003

(1) Go to the drain cap [1] location in the left Environmental Control System (ECS) bay.

SUBTASK 47-21-11-000-001

(2) Remove the protective cover from the drain cap [1].

SUBTASK 47-21-11-420-001

(3) Connect the drain cap [1] to the tee.

(a) Tighten the drain cap [1] to the tee.

SIA 015-999; SIA 001-014 POST SB 737-47-1019

SUBTASK 47-21-11-410-004

(4) Go to the drain cap [2] location on the Main Landing Gear (MLG) wheel well forward bulkhead.

SUBTASK 47-21-11-000-002

(5) Remove the protective cover from the drain cap [2].

SUBTASK 47-21-11-420-002

(6) Connect the drain cap [2] to the elbow.

(a) Tighten the drain cap [2] to the elbow.

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G. Drain Cap Installation Test

SUBTASK 47-21-11-860-003

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-21-11-211-002

- (2) On the P5-10 Bleed Air Control Module, remove the DO NOT OPERATE tags, STD-858, from the L PACK and R PACK switches.
- (a) Put the L PACK and R PACK switches to the AUTO position.

SUBTASK 47-21-11-211-003

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 47-21-11-410-005

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

Close this access panel:

SIA 015-999; SIA 001-014 POST SB 737-47-1019

<u>Number</u>	<u>Name/Location</u>
193AL	Wheel Well Panel - Forward Outboard

————— **END OF TASK** —————

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NITROGEN GENERATION CONTROL SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has this task for the nitrogen generation control system:

- (1) Nitrogen Generation System - Air Pressure Test

TASK 47-31-00-780-801

2. Nitrogen Generation Control System - Air Pressure Test

A. **General**

- (1) This task does a pressure tests of the NEADS tubing in the fuel tank.

B. **References**

Reference	Title
20-40-11-910-801	Static Grounding (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
47-21-00	NITROGEN-ENRICHED AIR DISTRIBUTION
47-21-07-000-801	Flame Arrestor Removal (P/B 401)

C. **Location Zones**

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

D. **Access Panels**

Number	Name/Location
192CL	ECS Access Door

E. **Prepare for the Air Pressure Test**

SUBTASK 47-31-00-480-001



MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT.

- (1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 47-31-00-480-002

- (2) Static ground the airplane (TASK 20-40-11-910-801).

SUBTASK 47-31-00-650-001

- (3) Defuel the fuel tanks (TASK 28-26-00-650-801).

SUBTASK 47-31-00-650-002

- (4) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

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SUBTASK 47-31-00-780-001

- (5) Use an air pressure source that can supply pressure at 7.0 psig (48.3 kPa) and 30 ft³ (850 l) per minute with an in-line shutoff valve.

SUBTASK 47-31-00-780-002

- (6) Use a pressure gauge that shows changes in air pressure of 0.25 psig (1.72 kPa).

SUBTASK 47-31-00-780-003

- (7) Use a flow meter that can show air flow from 0.0 ft³ (0.0 l) to 30 ft³ (850 l) per minute.

SUBTASK 47-31-00-020-001

- (8) Disconnect the dielectric hose or flame arrestor (TASK 47-21-07-000-801).

SUBTASK 47-31-00-480-003

- (9) Connect an air inlet adapter to the flame arrestor (or bulkhead fitting).

SUBTASK 47-31-00-480-004

- (10) Connect a hose to the air inlet adapter and pressure gauge.

NOTE: The minimum inside hose diameter is 0.5 in. (1.3 cm) and maximum hose length is 18 in. (46 cm).

SUBTASK 47-31-00-480-005



TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE NGS TUBES. YOU MUST USE AN APPLICABLE PRESSURE LIMIT DEVICE TO PREVENT TOO MUCH PRESSURE INSIDE THE NGS TUBES. THE MAXIMUM PRESSURE PUT INTO THE NGS TUBES DURING THE PRESSURE TEST IS +5.2 PSIG OR +144.2 INCHES OF WATER. ADJUST THE AIR PRESSURE IF NECESSARY BEFORE CONNECT THE TEST EQUIPMENT TO THE AIRPLANE.

- (11) Connect the pressure gauge to the air pressure supply.

NOTE: Air pressure flows into the tubing with the open.

- (a) Open the shutoff valve.

F. Nitrogen Generation Control System - Air Pressure Test

SUBTASK 47-31-00-780-004

- (1) Turn on the air pressure source and apply a positive air pressure of 1.5 ±0.5 psig (10.3 ±3.5 kPa) through the Nitrogen Enriched Air Distribution System (NEADS) tubing.

NOTE: Wait 60 seconds for the air flow to stabilize.

SUBTASK 47-31-00-780-005

- (2) If the air flow meter shows more than 10 ft³ (283 l) per minute:

- (a) Make sure that the air pressure is less than 5 psig (34 kPa).

NOTE: Keep the air pressure less than 5 psig (34 kPa) in the NEADS tubing.

- (b) If the flow meter reading is less than 10 ft³ (283 l) per minute with an air pressure of 5 psig (34 kPa), then the NEADS tubing in the fuel tank has a blockage or bent tubing.

- 1) Repair the blockage or bent tubing (SUBJECT 47-21-00).

- 2) Do the Nitrogen Generation Control System - Air Pressure Test procedure.

- (c) Turn off the air pressure supply source.

SUBTASK 47-31-00-780-006

- (3) If the air flow meter shows less than 10 ft³ (283 l) per minute:

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- (a) Increase the air pressure in increments of 1.0 psig (6.9 kPa) to 1.5 psig (10.3 kPa).

NOTE: Wait 30 to 60 seconds for the air flow to stabilize after each increment. Increase the air pressure until the flow meter shows a minimum of 10 ft³ (283 l) per minute. The maximum air pressure is 5 psig (34 kPa).

- (b) If the flow meter reading is less than 10 ft³ (283 l) per minute with an air pressure of 5 psig (34 kPa), then the NEADS tubing in the fuel tank can have a blockage or bent tubing.
- 1) Repair the blockage or bent tubing (SUBJECT 47-21-00).
 - 2) Do the Nitrogen Generation Control System - Air Pressure Test procedure.
- (c) Turn off the air pressure supply source.

SUBTASK 47-31-00-780-007

- (4) Release the air pressure from the NEADS tubing and air flow meter.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-00-080-001

- (1) Disconnect the air source, shutoff valve, flow meter and pressure gauge from the inlet adapter.

SUBTASK 47-31-00-080-002

- (2) On the rear spar, remove the inlet adapter from the flame arrestor fitting or bulkhead fitting.

SUBTASK 47-31-00-420-001

- (3) Install the flame arrestor fitting or bulkhead fitting.

SUBTASK 47-31-00-650-003

- (4) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

———— **END OF TASK** ————

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NITROGEN GENERATION SYSTEM CONTROLLER - REMOVAL/INSTALLATION

1. **General**

A. This procedure has these tasks:

- (1) Nitrogen Generation System Controller Removal
- (2) Nitrogen Generation System Controller Installation

TASK 47-31-01-000-801

2. **Nitrogen Generation System Controller Removal**

(Figure 401)

A. **General**

- (1) This task gives the steps to remove the nitrogen generation system (NGS) controller from the bracket.

B. **References**

Reference	Title
50-11-02-000-801	Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401)

C. **Location Zones**

Zone	Area
122	Forward Cargo Compartment - Right
125	Air Conditioning Distribution Bay - Left
126	Air Conditioning Distribution Bay - Right
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
821	Forward Cargo Door

E. **Prepare for the Removal**

SUBTASK 47-31-01-865-001

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-01-010-001

- (2) Open this access panel:

Number	Name/Location
821	Forward Cargo Door

SUBTASK 47-31-01-860-001

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

SUBTASK 47-31-01-010-002

- (4) Remove the aft center bulkhead liner in the forward cargo compartment (TASK 50-11-02-000-801).

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F. Remove the Controller

SUBTASK 47-31-01-020-001

(1) Do these steps to remove the controller [1]:

(a) Disconnect the two electrical connectors [3] from the controller [1].

1) Move the two electrical connectors [3] out of the way.

NOTE: The two electrical connectors [3] 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.

(b) Remove the four screws [10] and washers [11] to remove the drip shield [2].

(c) Remove the drip shield [2].

(d) Remove the four screws [6] and washers [7] from the controller [1] vibration isolator [8].

(e) Pull the controller [1] away from the brackets [5] to remove it.

NOTE: The bonding jumpers [9] will stay with the controller [1]. Make sure that you do not damage them when you remove the controller [1].

———— **END OF TASK** ————

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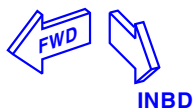
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— MIX
MANIFOLD



**MIX BAY COMPARTMENT
(CENTER VERTICAL ACCESS LINING REMOVED)**



2415343 S00061537630_V1

NGS Controller
Figure 401/47-31-01-990-801 (Sheet 1 of 2)

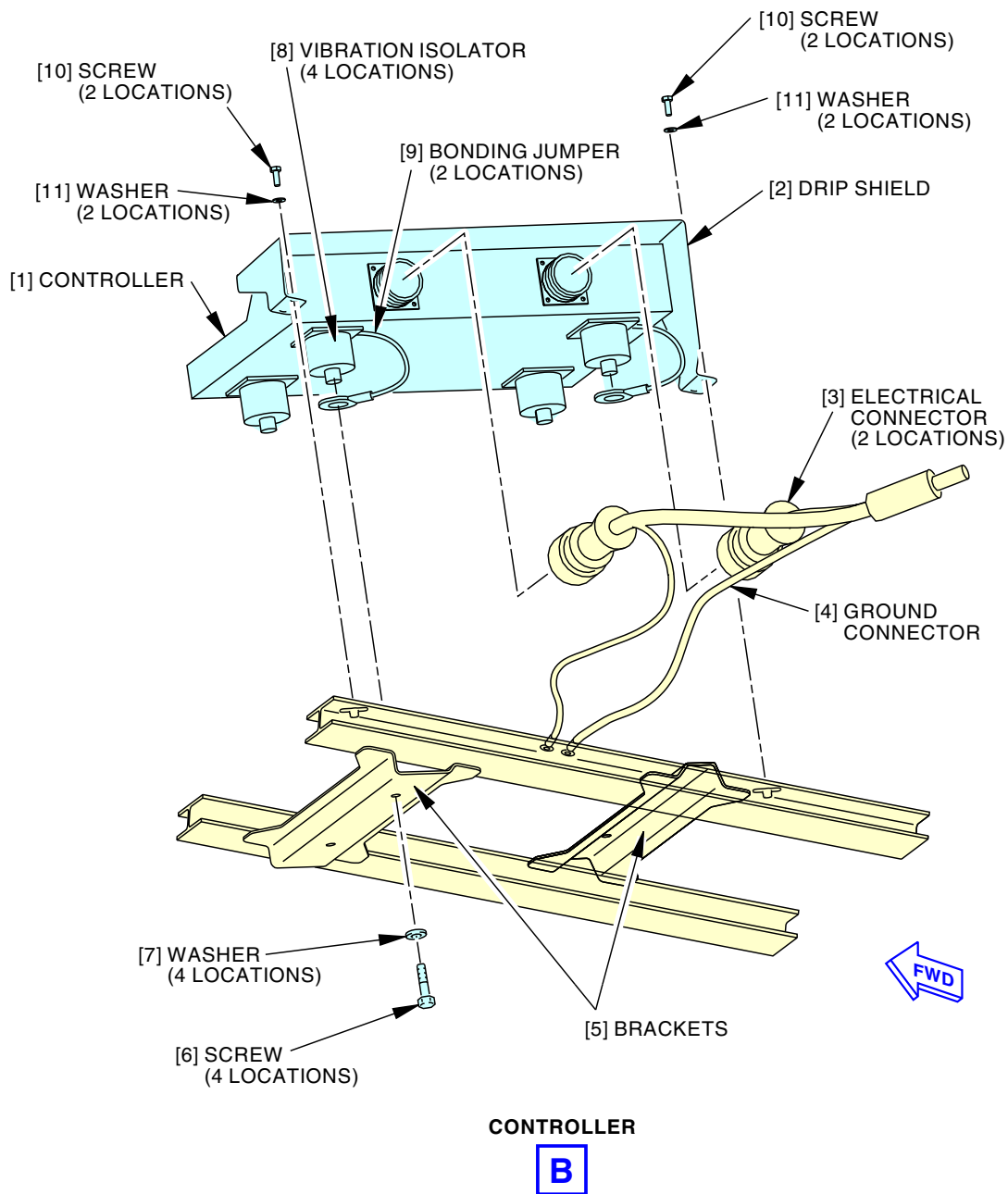
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2415344 S00061537631_V1

NGS Controller
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 Controller Installation**

(Figure 401)

A. General

- (1) This task gives the steps to install the nitrogen generation system (NGS) controller to the bracket.

B. References

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
50-11-02-400-801	Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401)
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A50006	Compound - Sealing, Thread-Locking, Anaerobic, Single-Component (100-200 In-Lbs)	MIL-S-46163 Type II Grade M

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Controller	47-31-01-01-030	SIA ALL

F. Location Zones

Zone	Area
121	Forward Cargo Compartment - Left
122	Forward Cargo Compartment - Right
125	Air Conditioning Distribution Bay - Left
126	Air Conditioning Distribution Bay - Right
212	Flight Compartment - Right

G. Access Panels

Number	Name/Location
821	Forward Cargo Door

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H. Prepare for the Installation

SUBTASK 47-31-01-100-001

- (1) Remove the sealant from the four screws [6] and the threaded vibration isolators [8] on the brackets [5].

SUBTASK 47-31-01-110-001

- (2) Prepare these components for an electrical faying surface bond (SWPM 20-20-10):
 - (a) Contact surface on the brackets [5].
 - (b) Contact surface of the bonding jumpers [9].

I. Install the Controller

SUBTASK 47-31-01-390-001

- (1) Apply compound, A50006, to the four screws [6] and the threaded cavity on the four vibration isolators [8].

SUBTASK 47-31-01-420-001

- (2) Put and hold the controller [1] in its position.

SUBTASK 47-31-01-430-001

- (3) Install the four screws [6], bonding jumpers [9], and washers [7] to attach the controller [1] to the brackets [5].

SUBTASK 47-31-01-430-002

- (4) Tighten the four screws [6] to 13 ± 1 in-lb (1.47 ± 0.11 N·m).

NOTE: Use a second (1/2 inch open-ended) wrench to hold the vibration isolator [8] stem.

SUBTASK 47-31-01-410-001

- (5) Install the four screws [10] and washers [11] to install the drip shield [2].

SUBTASK 47-31-01-760-001

- (6) Use the intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance across the bonding jumpers [9] between the controller [1] and the brackets [5] (SWPM 20-20-10).
 - (a) Make sure that the electrical resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 47-31-01-430-003

- (7) If the ground connectors [4] were disconnected from the airplane structure during removal, attach the ground connectors [4] to the airplane structure.

SUBTASK 47-31-01-420-002

- (8) Connect the electrical connectors [3] to the controller [1].

J. Operational Test for the Controller

SUBTASK 47-31-01-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-01-710-001

- (2) Do this task to test the controller [1]: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

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K. Put the Airplane Back to the Usual Condition

SUBTASK 47-31-01-410-002

- (1) Do this task: Forward Cargo Compartment Aft Bulkhead Liner Installation,
TASK 50-11-02-400-801.

SUBTASK 47-31-01-410-003

- (2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
821	Forward Cargo Door

————— END OF TASK —————

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BITE DISPLAY UNIT - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

- (1) BDU Power Off Mode
- (2) BDU Standby Mode
- (3) BDU Main Menu
- (4) BDU Existing Fault Menu
- (5) BDU Fault History Menu
- (6) BDU Ground Test Menu
- (7) Other Function Menu.

TASK 47-31-02-740-807

2. BDU Power Off Mode

(Figure 201)

A. **General**

- (1) This task gives instructions to power off the BITE Display Unit (BDU) and help navigate through the BDU menu structure (Figure 205).

B. **Power Off Mode**

SUBTASK 47-31-02-740-001

- (1) Push the ON/OFF push-button on the BDU to start and stop the BITE display or immediately stop the BDU ground tests.
 - (a) The TurnOff Display? shows on the display.
 - 1) When you push the YES push-button, the DISPLAY OFF shows on the display for 2 seconds.
 - a) The BDU goes to Standby Mode.
 - 2) When you push the NO push-button.
 - a) The BDU returns to the previous BDU mode, or
 - b) The BDU continues with the initiated test.

———— **END OF TASK** ————

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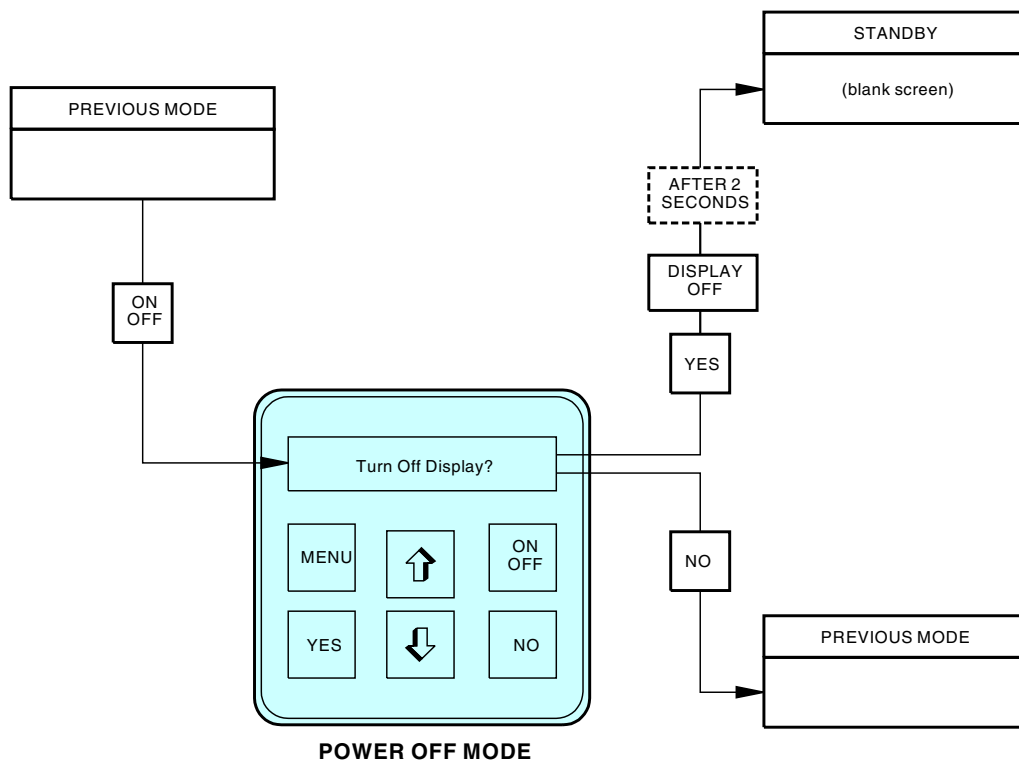
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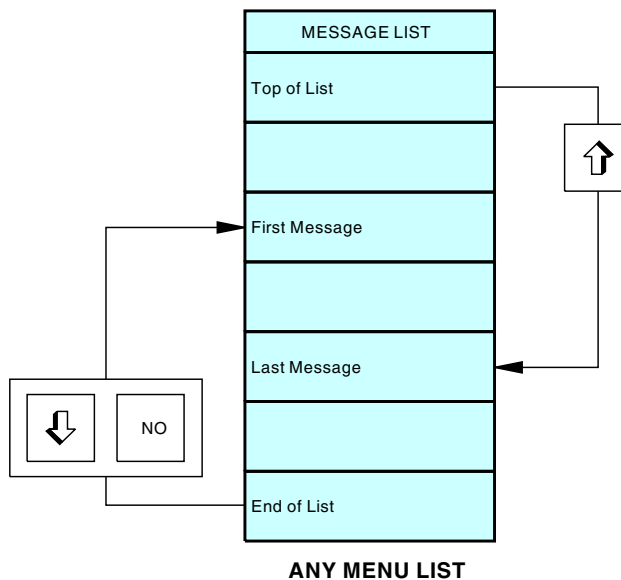
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When the ON/OFF pushbutton is pressed in any mode, the display goes to Power OFF Mode (except for Display Test)



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BDU Power Off Mode
Figure 201/47-31-02-990-812

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TASK 47-31-02-740-808

3. BDU Standby Mode

A. General

- (1) To help navigate through the BDU menu structure (Figure 205).
- (2) The BITE display unit (BDU) goes into standby mode when one of these conditions occur:
 - (a) BDU is initialized to BDU standby mode on cold starts.
 - (b) No inputs are entered for 5 minutes and no IBIT test is in progress.
 - (c) The ON/OFF push-button is pressed from the BDU Power Off Mode.

B. BDU Standby Mode

SUBTASK 47-31-02-740-002

- (1) Push the ON/OFF push-button.
 - (a) The Existing Faults? shows on the display when the BDU is not inhibited.
 - (b) When the BDU is inhibited, one of these messages shows:
 - 1) In Air
NOTE: Airplane is in the air mode.
 - 2) Switch Inactive
NOTE: A push-button is pushed that is not on.
 - 3) Inhibited: CMCS Active
NOTE: The CMCS Active mode is active.

———— **END OF TASK** ————

EFFECTIVITY
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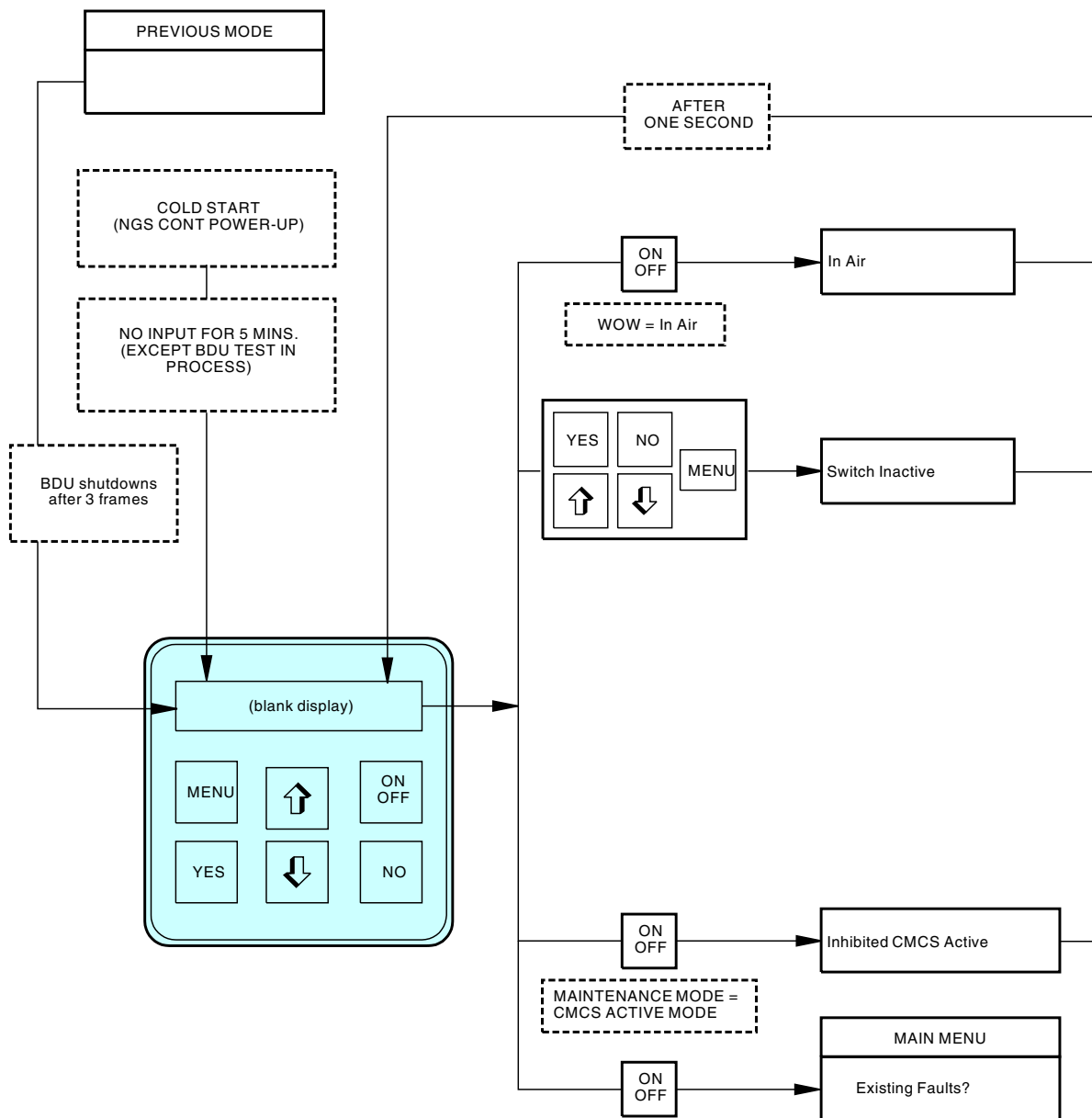
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1500580 S0000273106_V3

BDU Standby Mode
Figure 202/47-31-02-990-813

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TASK 47-31-02-740-801

4. BDU Main Menu

(Figure 203, Figure 204, 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 BDU menu structure (Figure 203).

B. References

Reference	Title
32-09-00-860-802	Return the Airplane to the Ground Mode (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. Access Panels

Number	Name/Location
192CR	ECS Access Door
621GB	Refuel Valve Door - Slat Station 125

E. Prepare to Use the BITE Display Unit

SUBTASK 47-31-02-010-001



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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-31-02-860-001

- (2) Make sure that the airplane is in the ground mode (TASK 32-09-00-860-802).

SUBTASK 47-31-02-865-001

- (3) Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-02-010-002

- (4) Make sure this access panel is closed:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

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SUBTASK 47-31-02-010-003

- (5) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door

F. BDU Main Menu Mode

SUBTASK 47-31-02-740-007

- (1) Push the ON/OFF push-button to activate the BITE Display Unit (BDU).
(a) The Existing Faults? shows on the display.

SUBTASK 47-31-02-740-008

- (2) The main menu mode has these display options:
(a) Existing Faults? (TASK 47-31-02-740-802)
(b) Fault History? (TASK 47-31-02-740-803)
(c) Ground Tests? (TASK 47-31-02-740-804)
(d) Other Functions? (TASK 47-31-02-740-805).

SUBTASK 47-31-02-740-009

- (3) Push these push-buttons to move through the main menu list:
(a) "↑", Up Arrow - to move up the menu list on the main menu.
(b) "↓", Down Arrow - to move down the menu list on the main menu.
(c) NO - to move down the menu list on the main menu.
(d) YES - to select the current menu option on the main menu.

SUBTASK 47-31-02-740-011

- (4) When the necessary maintenance tasks are completed, go to the subsequent procedure.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-740-012

- (1) Make sure that all the BDU initiated tests are done.

SUBTASK 47-31-02-740-013

- (2) Push the ON/OFF push-button.

SUBTASK 47-31-02-410-001

- (3) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door

————— END OF TASK —————

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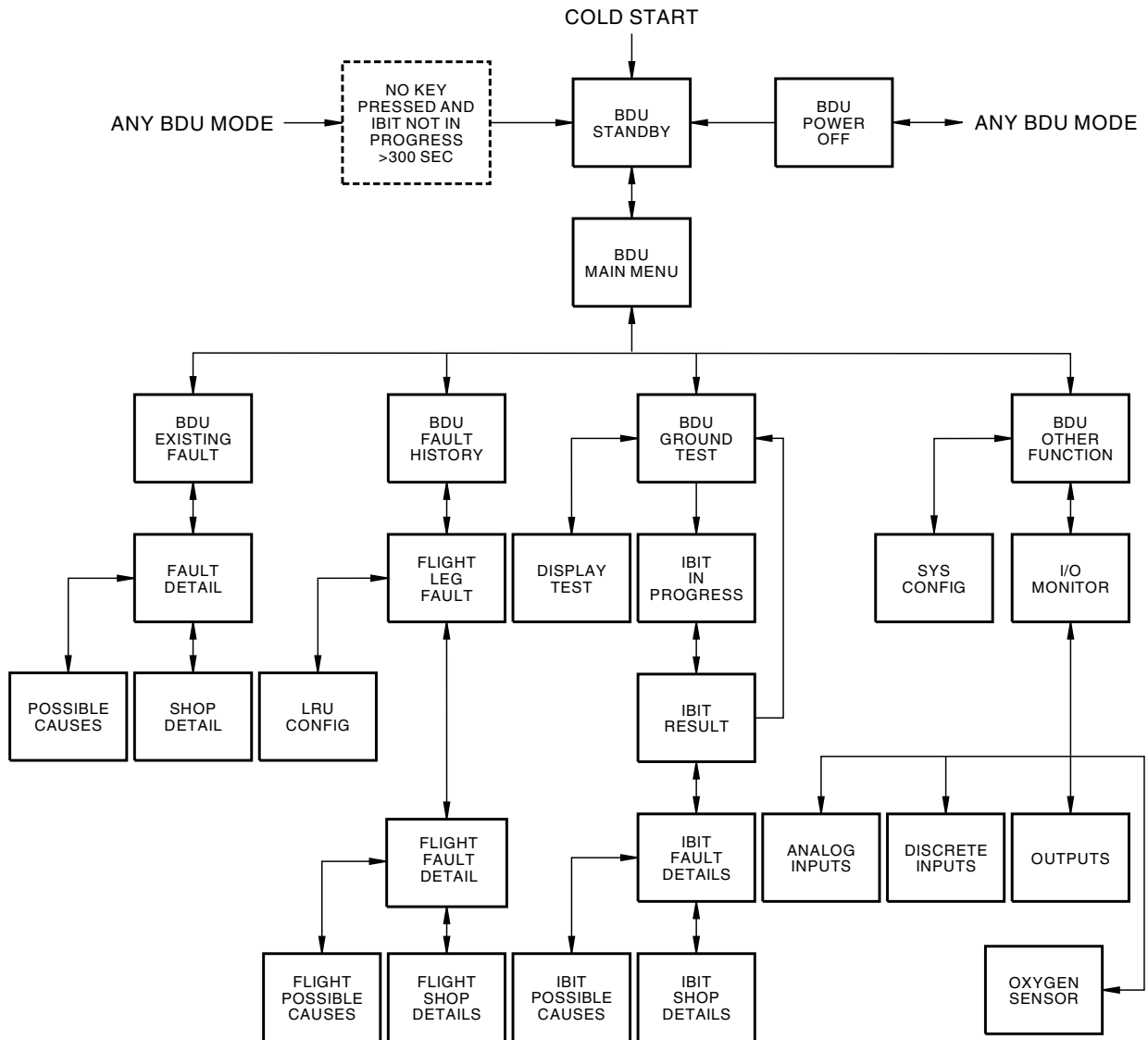
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2415345 S00061537636_V1

BDU Structure Map
Figure 203/47-31-02-990-801

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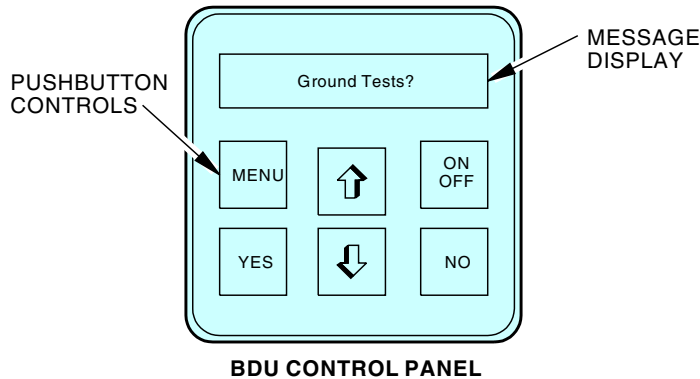
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LEGEND:

- ON
OFF

 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.

- MENU

 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.

- YES

 PRESS THE YES PUSHBUTTON TO REPLY TO THE MESSAGE DISPLAY QUESTION (?). THE YES PUSHBUTTON IS ALSO USED TO START THE BDU GROUND TEST.

- NO

 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.

- YES

 →
 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 Push-Button Control
Figure 204/47-31-02-990-802

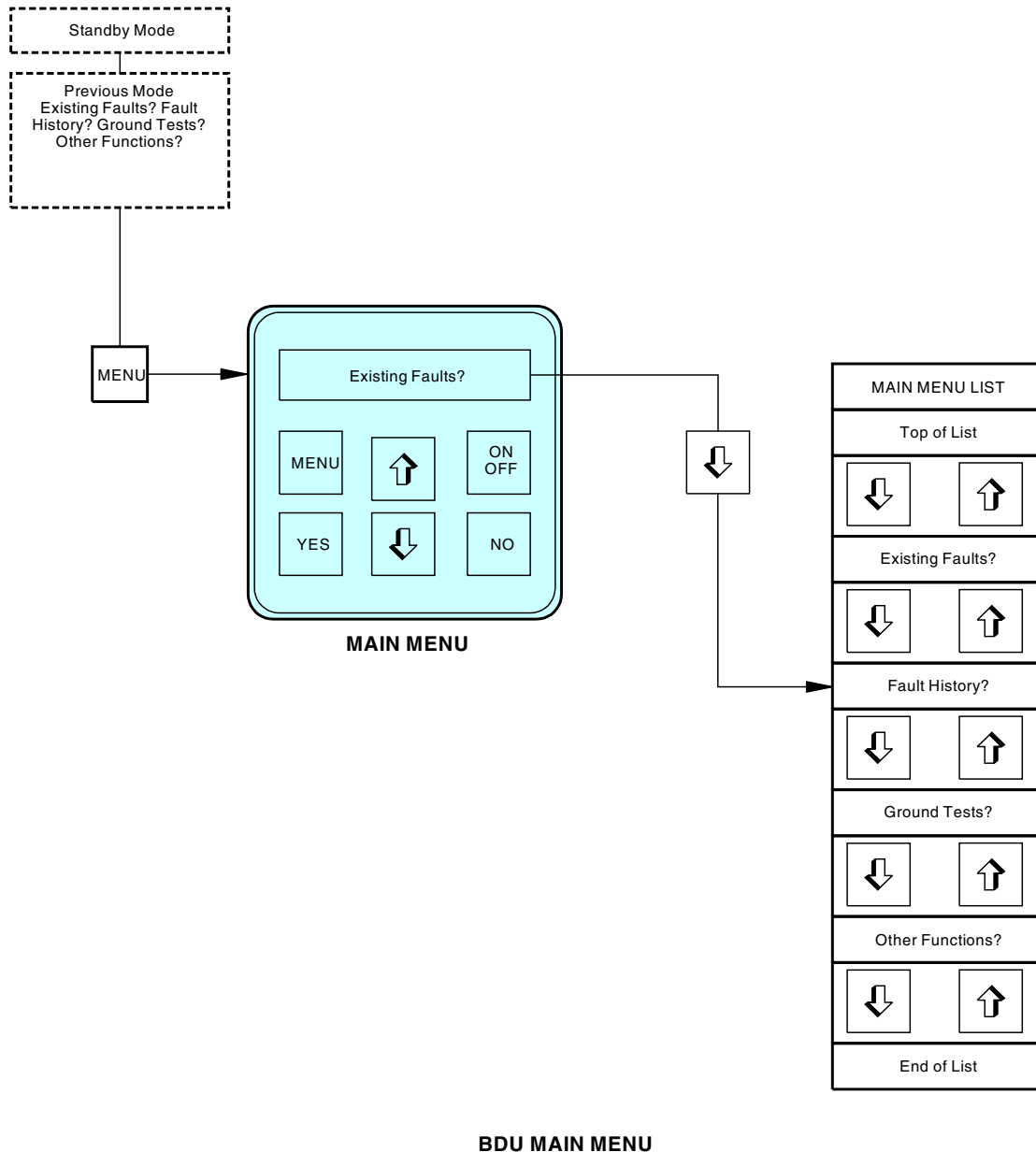
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BDU Main Menu
Figure 205/47-31-02-990-805

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TASK 47-31-02-740-802

5. **BDU Existing Fault Menu**

(Figure 206)

A. General

- (1) This task gives the instructions to operate the BDU control panel for the Existing Faults? menu. To help navigate through the Existing Faults? menu (Figure 206).
- (2) The Existing Faults? report the active NGS faults for the applicable flight phase. Recorded faults have a possibly of not showing the real time fault conditions. You can find if a fault is active when you select ACTIVE from the menu.
- (3) Existing faults are listed in reverse chronological order (the most recent fault listed first).
- (4) This task has the subsequent procedures:
 - (a) Prepare for the Existing Fault Mode
 - (b) Existing Fault Mode
 - (c) Fault Details Mode
 - (d) Possible Cause
 - (e) Shop Details

B. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Access Panels

Number	Name/Location
192CR	ECS Access Door

D. Prepare for the Existing Fault Mode

SUBTASK 47-31-02-740-014

- (1) Select the Existing Faults? menu mode (BDU Main Menu, TASK 47-31-02-740-801).
 - (a) The Existing Faults? shows on the display.

E. Existing Fault Mode

SUBTASK 47-31-02-740-015

- (1) Push the YES push-button.
 - (a) The No Faults Found shows on the display when no faults have been recorded.
 - (b) The XXX Faults Found shows on the display when faults have been recorded.

NOTE: XXX indicates the number of existing faults found.

- 1) Use the “↑” up arrow or “↓” down arrow to show a different fault.

F. Fault Details Mode

SUBTASK 47-31-02-740-017

- (1) To show more details about the applicable fault:
 - (a) Select the applicable fault from the existing fault mode.
 - (b) Push the (↓) down arrow to get More Details?.
 - (c) The More Details? shows on the display.
 - (d) Push the YES push-button.
 - (e) The INDICATOR LAMP: <lamp indication> shows on the display.

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- (f) Fault detail menu list:
- 1) INDICATOR LAMP: <lamp indication>
NOTE: Shows the lamp indication messages.
 - 2) POSSIBLE CAUSES?
NOTE: A list of possible causes, in most probable to least probable sequence.
 - 3) LATCHED: YES, NO
NOTE: Data on the latched status of the existing fault.
 - 4) <unlatch method>
 - 5) UNLATCH: N/A
NOTE: The necessary action to be done to unlatch the existing fault.
Refer to the existing fault menu figure for a list of steps necessary to unlatch the applicable fault.
 - 6) ACTIVE: YES, NO
NOTE: Data on the active status of the existing fault
 - 7) SHOP DETAILS?
NOTE: Data on the configuration of various systems when the existing fault was set.

G. Possible Causes Mode

SUBTASK 47-31-02-740-018

- (1) To show details about the possible causes:
- (a) Push the (↓) down arrow to get POSSIBLE CAUSES?.
 - (b) Push the YES push-button.
 - (c) The most probable cause of the existing fault shows on the display.
 - (d) Push the (↓) down arrow to show the next probable cause.
 - (e) The second probable cause shows on the display.
- NOTE: The list continues to show possible causes, ranked by probability, until the End of List shows.

H. Shop Details Mode

SUBTASK 47-31-02-740-019

- (1) Push the down/up arrow on the fault details mode to get SHOP DETAILS?.
- (a) The SHOP DETAILS? shows on the display.
 - (b) Push the YES push-button.
 - (c) The SHOPCODE: XXXX shows on the display.
NOTE: XXXX is the fault ID.
 - (d) Use the up or down arrows to view the menu items for the shop details list.
NOTE: For the complete list of the shop details items (Figure 206).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-740-020

- (1) Make sure that all BDU initiated tests are completed.
- (a) Push the ON/OFF push-button.

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SUBTASK 47-31-02-410-002

(2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door

————— END OF TASK —————

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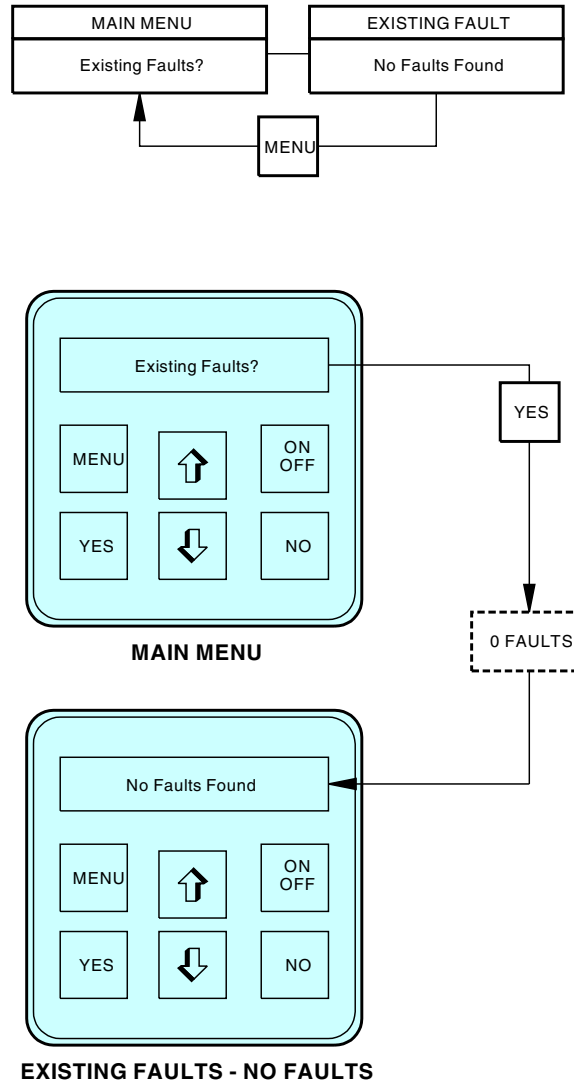
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1501058 S0000273469_V2

Existing Fault Menu
Figure 206/47-31-02-990-806 (Sheet 1 of 6)

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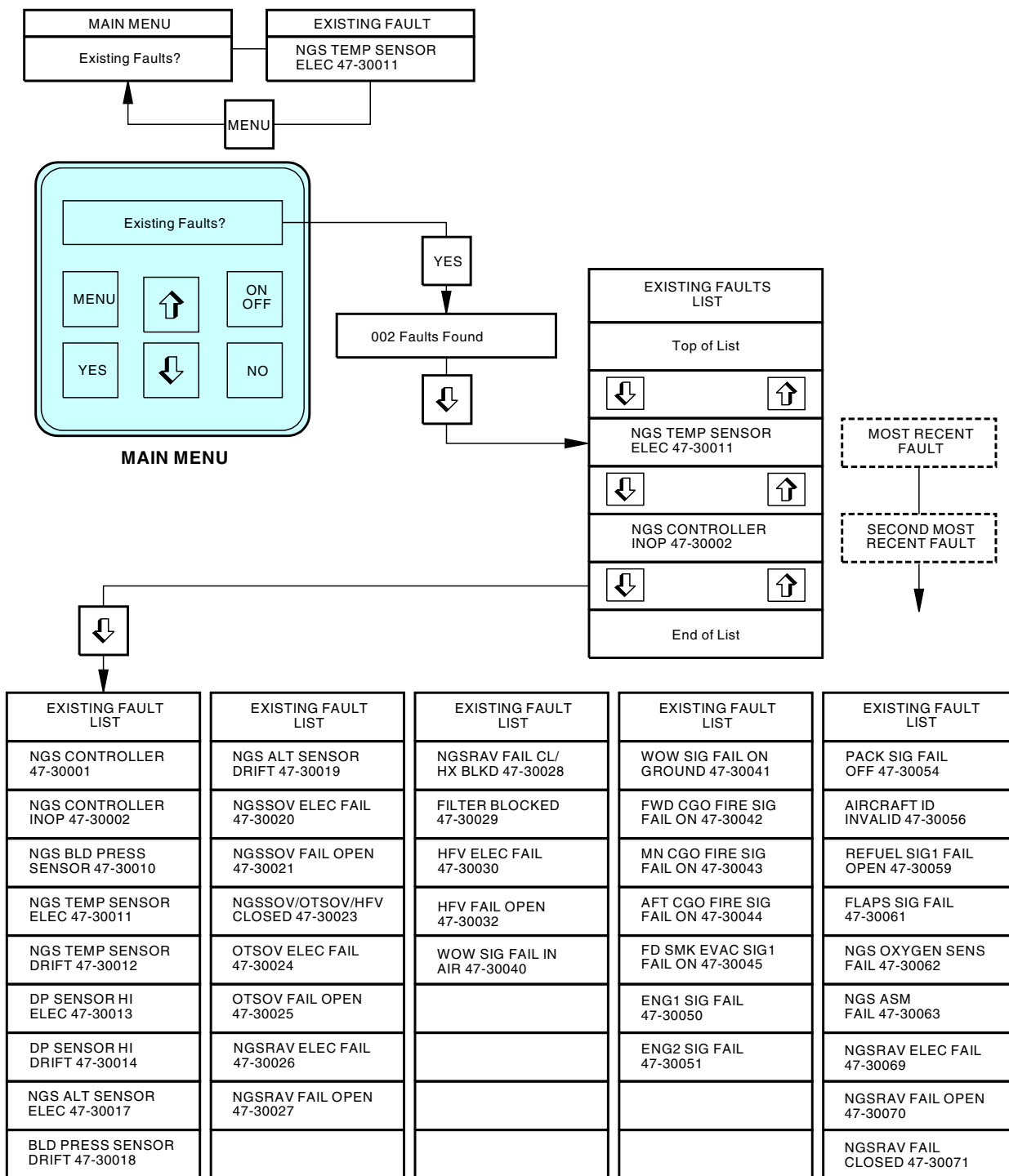
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2415351 S00061537643_V1

Existing Fault Menu
Figure 206/47-31-02-990-806 (Sheet 2 of 6)

EFFECTIVITY
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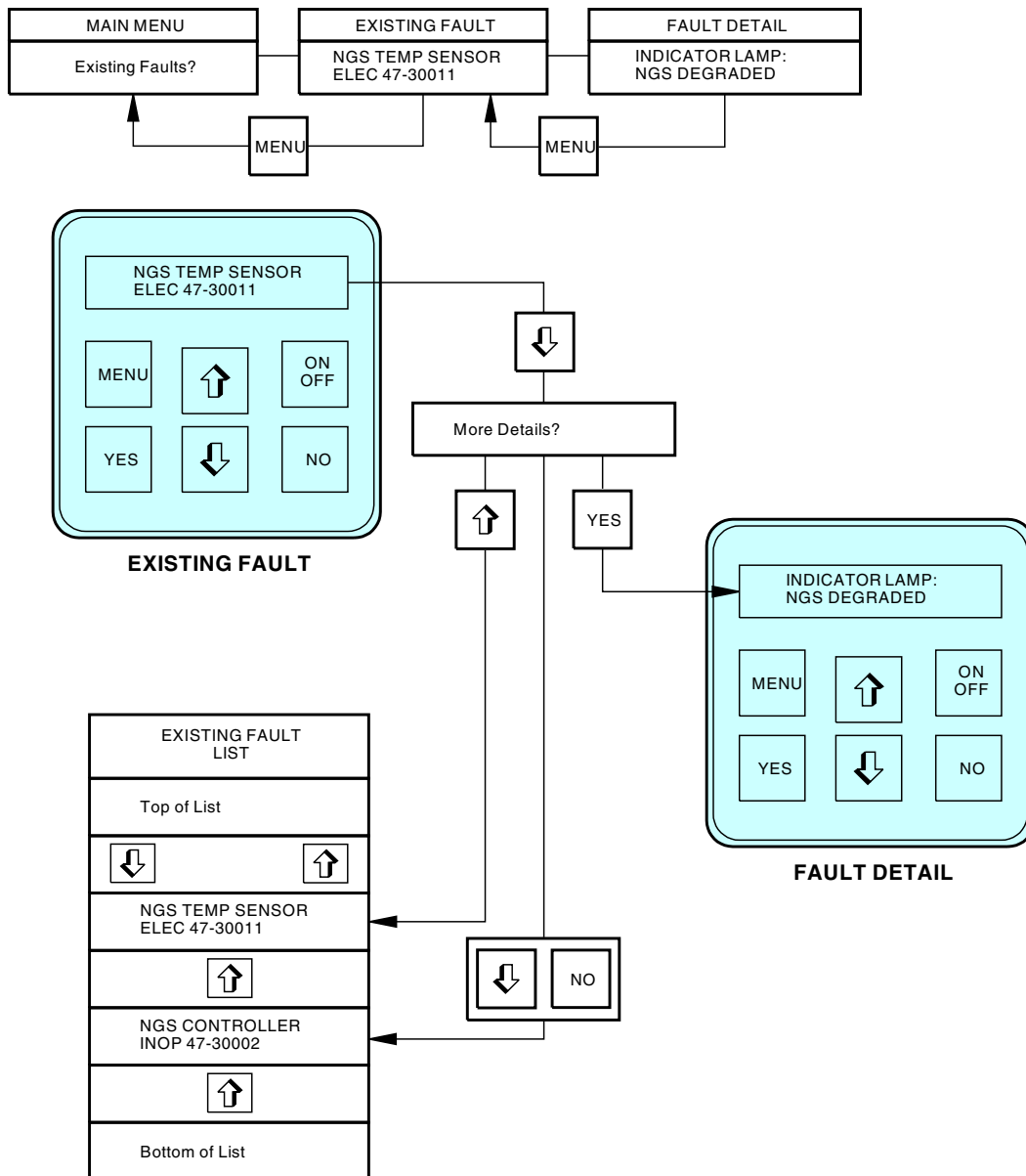
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J84519 S0000180541_V3

Existing Fault Menu
Figure 206/47-31-02-990-806 (Sheet 3 of 6)

— EFFECTIVITY
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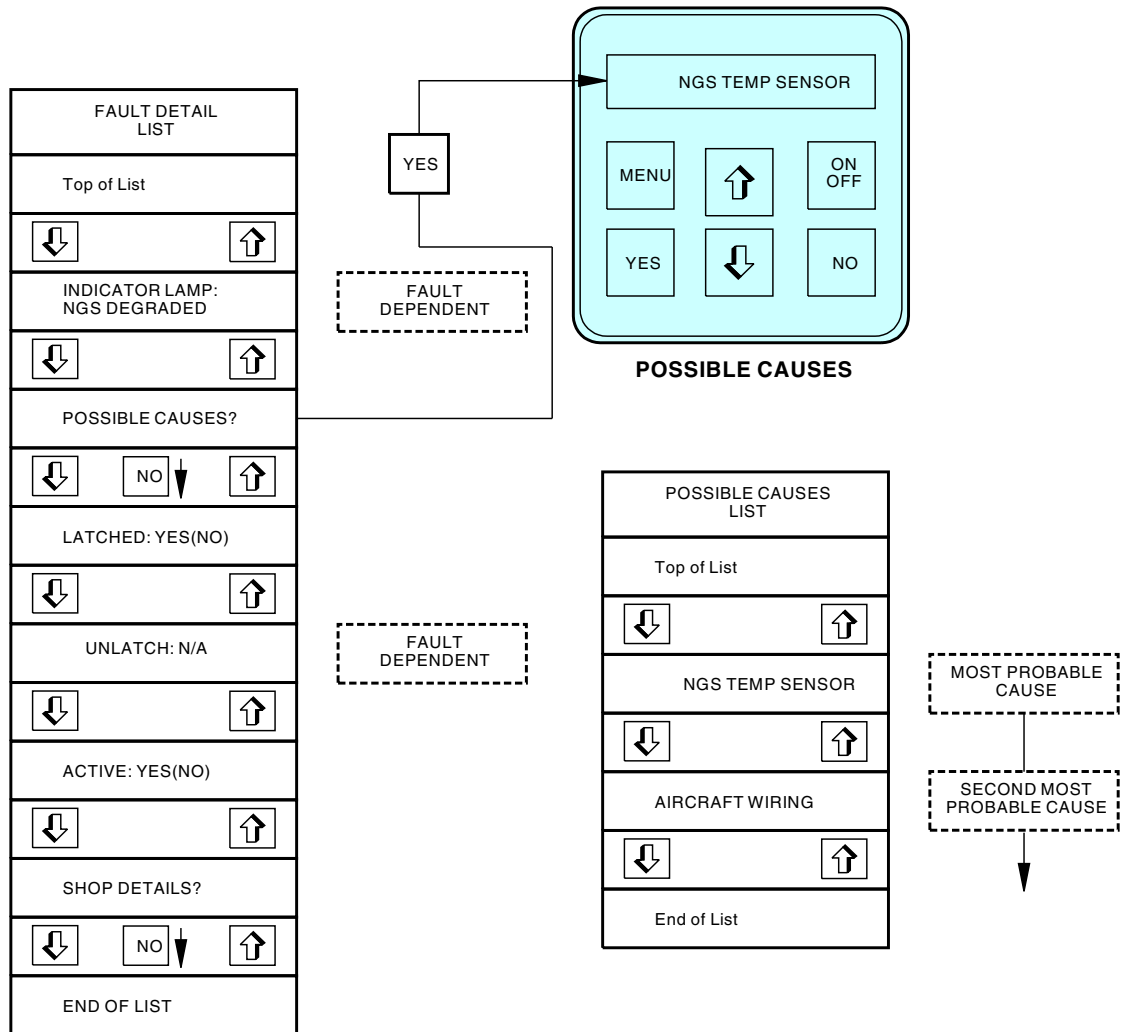
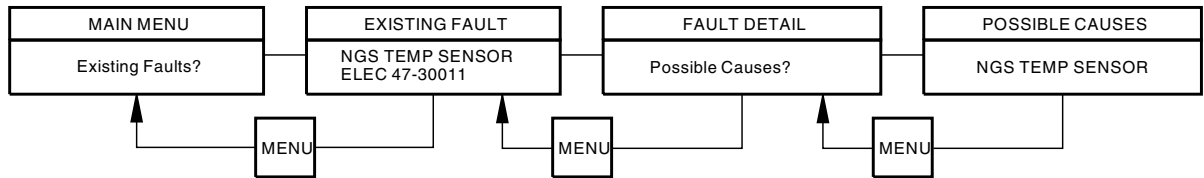
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1500650 S0000273148_V3

Existing Fault Menu
Figure 206/47-31-02-990-806 (Sheet 4 of 6)

EFFECTIVITY
SIA ALL

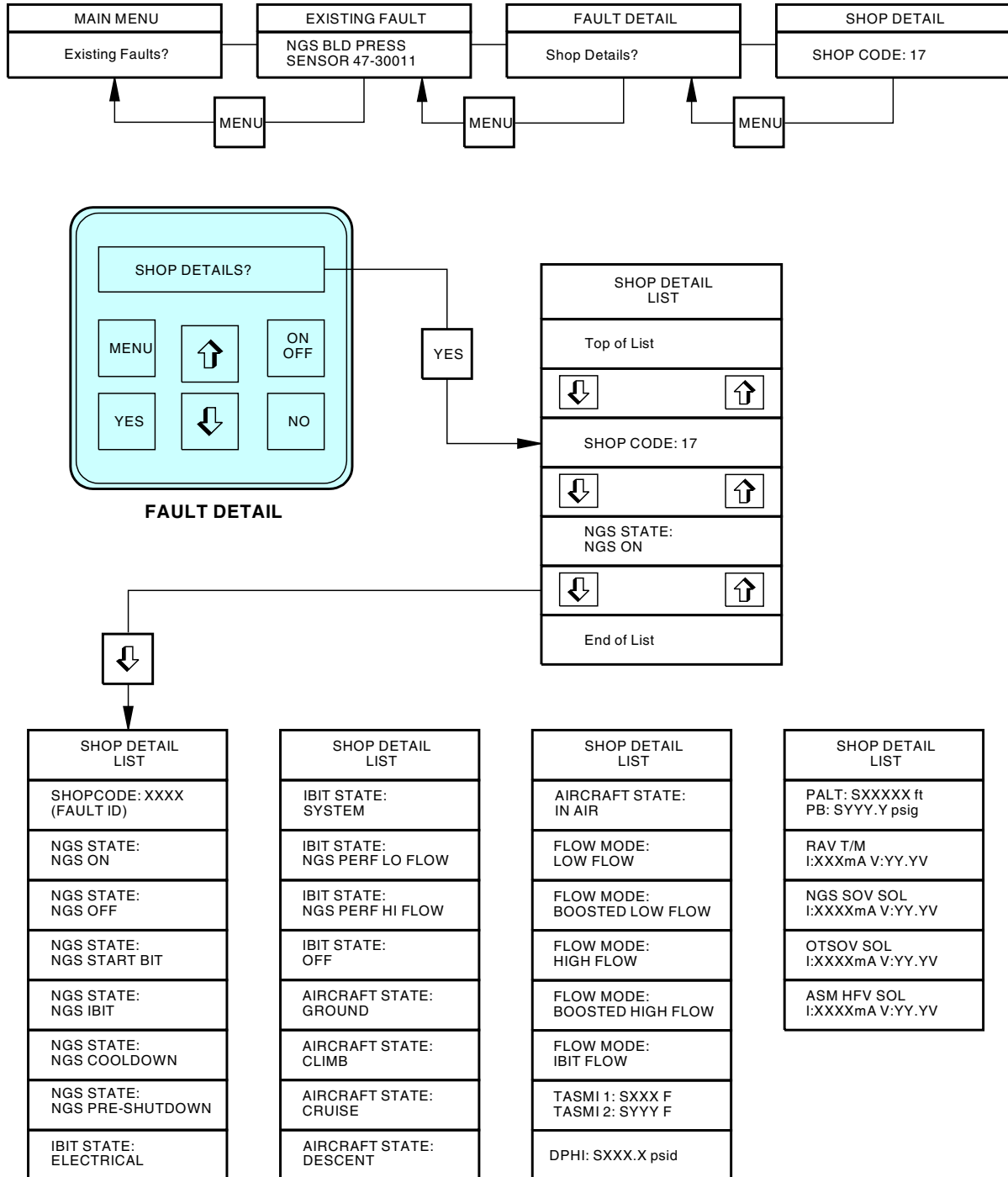
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BOEING
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1500540 S0000273149_V3

Existing Fault Menu
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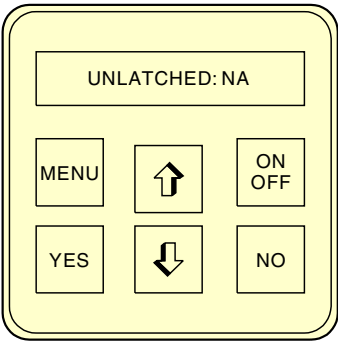
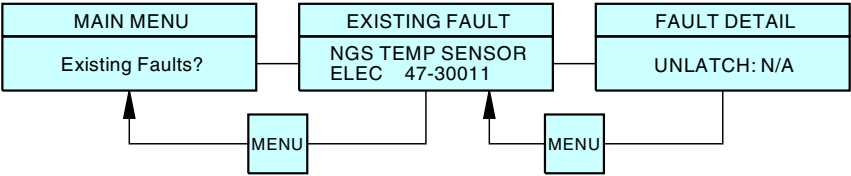
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FAULT DETAIL

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 206/47-31-02-990-806 (Sheet 6 of 6)

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TASK 47-31-02-740-803

6. **BDU Fault History Menu**

(Figure 207)

A. General

- (1) This task gives the instructions to operate the BDU control panel for the BDU Fault History Menu.
- (2) To help navigate through the NGS BDU fault history structure (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
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Access Panels

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

D. Prepare for the Fault History Mode

SUBTASK 47-31-02-740-027

- (1) Select the Fault History? menu item (BDU Main Menu, TASK 47-31-02-740-801).

E. Fault History Mode

SUBTASK 47-31-02-740-028

- (1) Push the YES push-button to get the Fault History?.

NOTE: The NGS system recorded faults when Flight Leg 0? shows on the display.

- (a) If the Invalid Fault History shows on the display, then the BDU timed-out or no valid faults where found.
- (b) If the No Fault History shows on the display, then no recorded faults where found.
- (c) If Flight Leg 0 shows on the display, then the system has a recorded fault(s).

- 1) Push the up or down arrow to get the FLIGHT LEG -###?.

NOTE: ### is the flight leg number selected.

NOTE: The display shows the fault history from flight leg 0 to flight leg -1000.

- a) The FLIGHT LEG -###? shows on the display.

NOTE: FLIGHT LEG 0 is the newest flight leg.

- b) Push the YES push-button.

F. Flight Leg Fault Mode

SUBTASK 47-31-02-740-029

- (1) Push the up or down arrow from the fault history mode to select the FLIGHT LEG -###?.
- (a) The FLIGHT LEG -###? shows on the display.

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- (b) Push the YES push-button.
- (c) The fault code shows on the display for the flight leg selected.
- (d) The list of fault codes are found in the existing fault list (Figure 206)
- (e) The LRU Config? shows on the display after the last flight leg fault.

G. LRU Configuration Mode

SUBTASK 47-31-02-740-030

- (1) Push the down arrow on the Flight Leg Fault Mode to get LRU Config?.
 - (a) Push the YES push-button.
 - (b) The HARDWARE PART NO shows on the display.
 - (c) LRU configuration mode menu:
 - 1) HARDWARE PART
NO: XXXXXXXX-XX
NOTE: XXXXXXXX-XX is the current part number installed.
 - 2) BOOT LOADER PART
NO: XXXXXXXX-XX
 - 3) SOFTWARE PART
NO: XXXXXXXX-XX
 - 4) CONFIG DATA PART
NO: XXXXXXXX-XX
 - 5) AIRCRAFT ID:

H. Flight Fault Details Mode

SUBTASK 47-31-02-740-032

- (1) Push the down or up arrow on the Flight Leg Fault Mode to select a FLIGHT LEG -###?.
 - (a) The FLIGHT LEG -###? shows on the display.
 - (b) Push the YES push-button.
 - (c) Push the down arrow to get More Details?.
 - (d) Push the YES push-button.
 - (e) The INDICATOR LAMP: <lamp indication> shows on the display.
NOTE: The <lamp indication> displays the current status of the NGS system.
 - (f) The list of Flight Fault Details are shown in Figure 207.

I. Flight Possible Causes Mode

SUBTASK 47-31-02-740-033

- (1) Push the down or up arrow on the Flight Fault Details Mode to get POSSIBLE CAUSES?.
 - (a) Push the YES push-button.
 - (b) The first <possible cause #1> shows on the display.
 - (c) Push the down arrow to show the next possible cause.
 - (d) The next <possible cause #N> shows on the display.
NOTE: The list continues to show possible causes, ranked by probability, until the end of list shows.
 - (e) The list of Flight Possible Causes are shown in Figure 207.

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J. Flight Shop Details Mode

SUBTASK 47-31-02-740-034

- (1) Push the down or up arrow on the Flight Fault Details Mode to get SHOP DETAILS?.
 - (a) The SHOP DETAILS? shows on the display.
 - (b) Push the YES push-button.
 - (c) The SHOPCODE: XXXX shows on the display.

NOTE: XXXX is the fault code number.
 - (d) The list of Flight Possible Causes are shown in Figure 207.

SUBTASK 47-31-02-740-123

- (2) Reference table/figure for Normal Operation Values.

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Table 201/47-31-02-993-804 Normal Operation Values - General Guidance Only for operating both A/C packs and dual bleed system

	On-Ground, Before Flight	Takeoff after StartBIT	Takeoff above 15,000 ft	Cruise	Descent	Ground Operation after Landing, 10 minutes
Leg	-xx	-xx	-xx	-xx	-xx	-xx
Fault	Shop Code, See IFIM for Cross Reference to Maintenance Message					
AC_ID	737 MAX					
CSCI1_PN	Part Number of the NGS Controller Operational Software					
CSCI2_PN	Part Number of the NGS Controller BootloaderSoftware					
CSCI3_PN	Part Number of the NGS Controller Operational Parameter file					
LRU_PN	1153154-04					
Time	Time since Controller Reset					
A/C (Aircraft State)	GROUND	CLIMB	CLIMB	CRUISE	DESCENT	GROUND
NGS	NGS_Off	NGS_On	NGS_On	NGS_On	NGS_On	NGS_On
IBIT	Off	Off	Off	Off	Off	Off
Preshtdn	FALSE	FALSE	FALSE	FALSE	FALSE	
ASM State		ASM_LOW	ASM_HIGH	ASM_LOW	ASM_HIGH	ASM_LOW
Alt ft		Below 15,000 ft	Above 15,000 ft	Cruise Altitude		Ground Alt.
TASMI 1		100 — 175 deg F	155 — 175 deg F	155 — 180 deg F	155 — 180 deg F	155 — 180 deg F
TASMI 2		100 — 175 deg F	155 — 175 deg F	155 — 180 deg F	155 — 180 deg F	155 — 180 deg F
Pbleed		42 psig nominal if on 5th stage	42 psig nominal if on 5th stage	42 psig nominal if on 5th stage	32 psig nominal if on 9th stage regulation	32 psig nominal if on 9th stage regulation
DPHI (High Flow Delta Pressure Sensor, PSID) includes gauge tolerance		Less than 5 psid	Greater than 5 psid	Less than 5 psid	Greater than 5 psid	Less than 5 psid

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**737-7/8/8200/9/10
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Table 201/47-31-02-993-804 Normal Operation Values - General Guidance Only for operating both A/C packs and dual bleed system (Continued)

Ram Air Valve	TM1 (mA) Ram Air Valve (0 mA full open, 120 mA full closed)		Temperature Regulation Mode	Temperature Regulation Mode	Temperature Regulation Mode	Temperature Regulation Mode	Temperature Regulation Mode
	TM1 (V)						
NGS Shutoff Valve	SOV (mA). Valve Normally Closed. (0mA closed, greater than 0 mA commanded open)		Commanded Open	Commanded Open	Commanded Open	Commanded Open	Commanded Open
	SOV (V)						
Over Temp Shutoff Valve	OTSOV (mA). Valve Normally Closed. (0mA) closed, greater than 0 mA commanded open)		Commanded Open	Commanded Open	Commanded Open	Commanded Open	Commanded Open
	OTSOV (V)						
High Flow Valve	HFV (mA). Valve Normally closed. (0mA closed, greater than 0 mA commanded open)		Closed	Commanded Open	Closed	Commanded Open	Closed
	HFV (V)						

NOTE: O2 Sensor operates during a portion of cruise or descent. Readings are not recorded in NVM data.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-740-035

- (1) Make sure all BDU initiated tests are complete.
 - (a) Push the ON/OFF push-button.

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SUBTASK 47-31-02-410-003

(2) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

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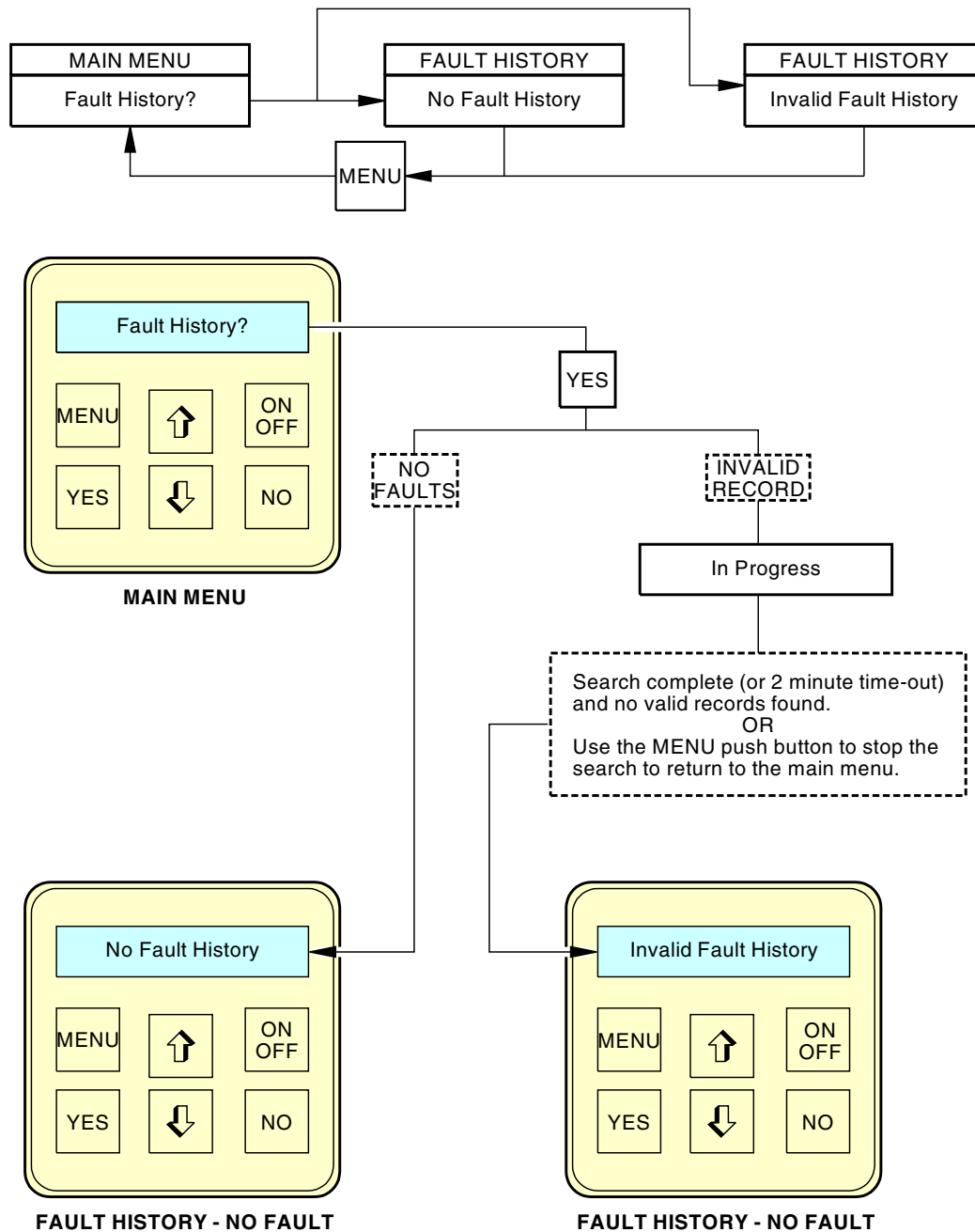
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2415356 S00061537649_V1

Fault History Menu
Figure 207/47-31-02-990-807 (Sheet 1 of 8)

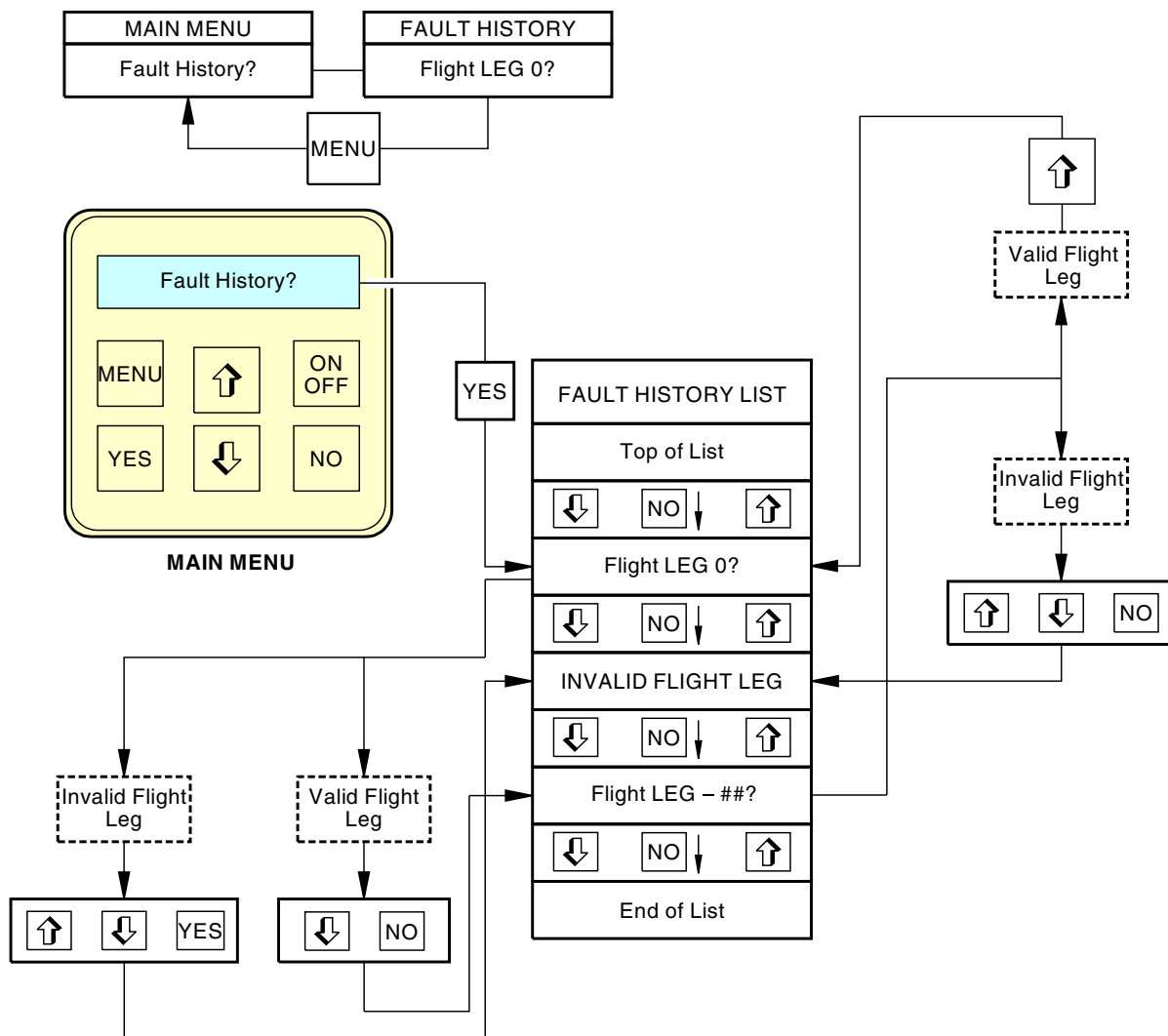
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SIA ALL

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2415357 S00061537650_V1

Fault History Menu
Figure 207/47-31-02-990-807 (Sheet 2 of 8)

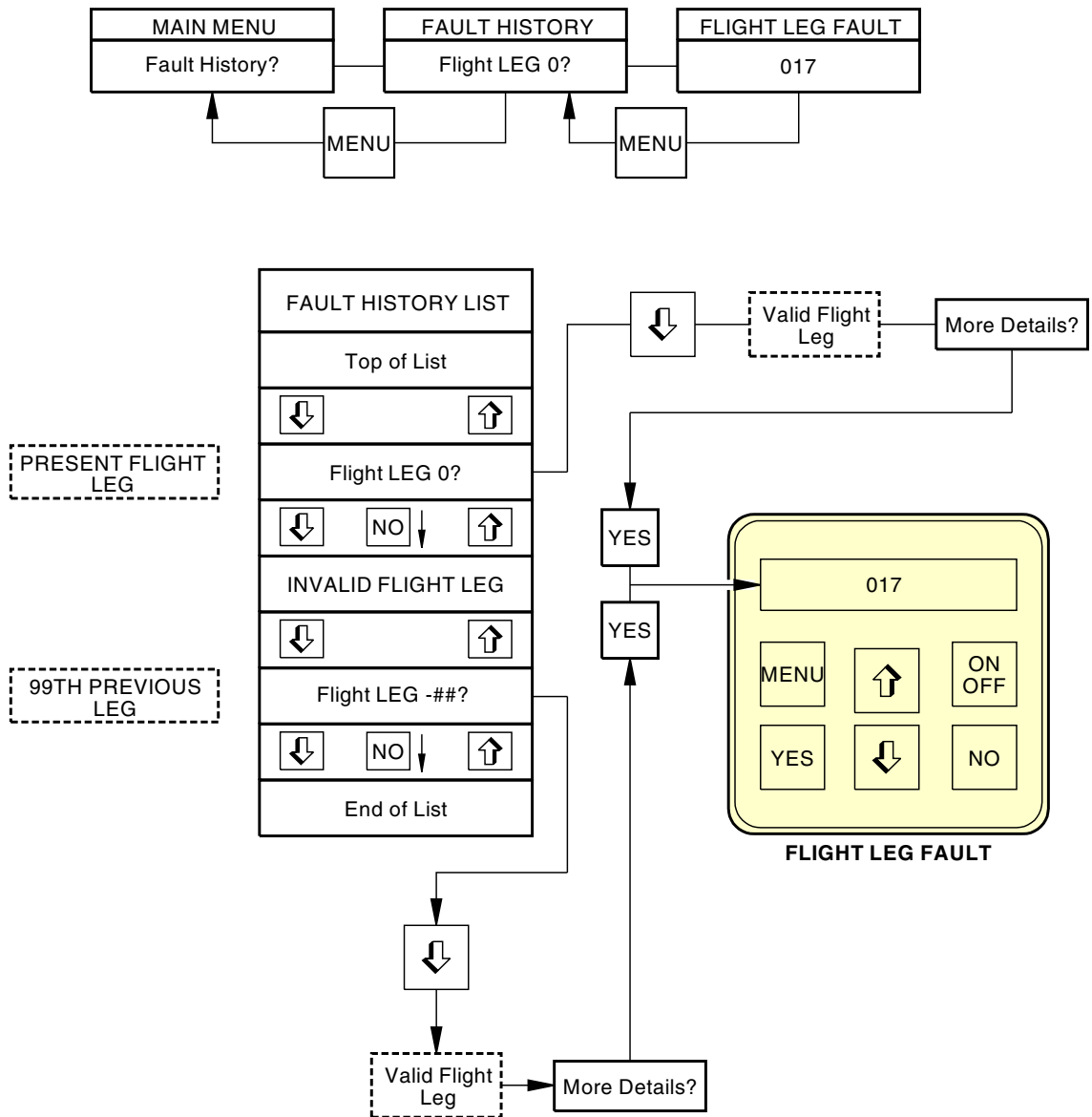
EFFECTIVITY
SIA ALL

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2415358 S00061537651_V1

Fault History Menu
Figure 207/47-31-02-990-807 (Sheet 3 of 8)

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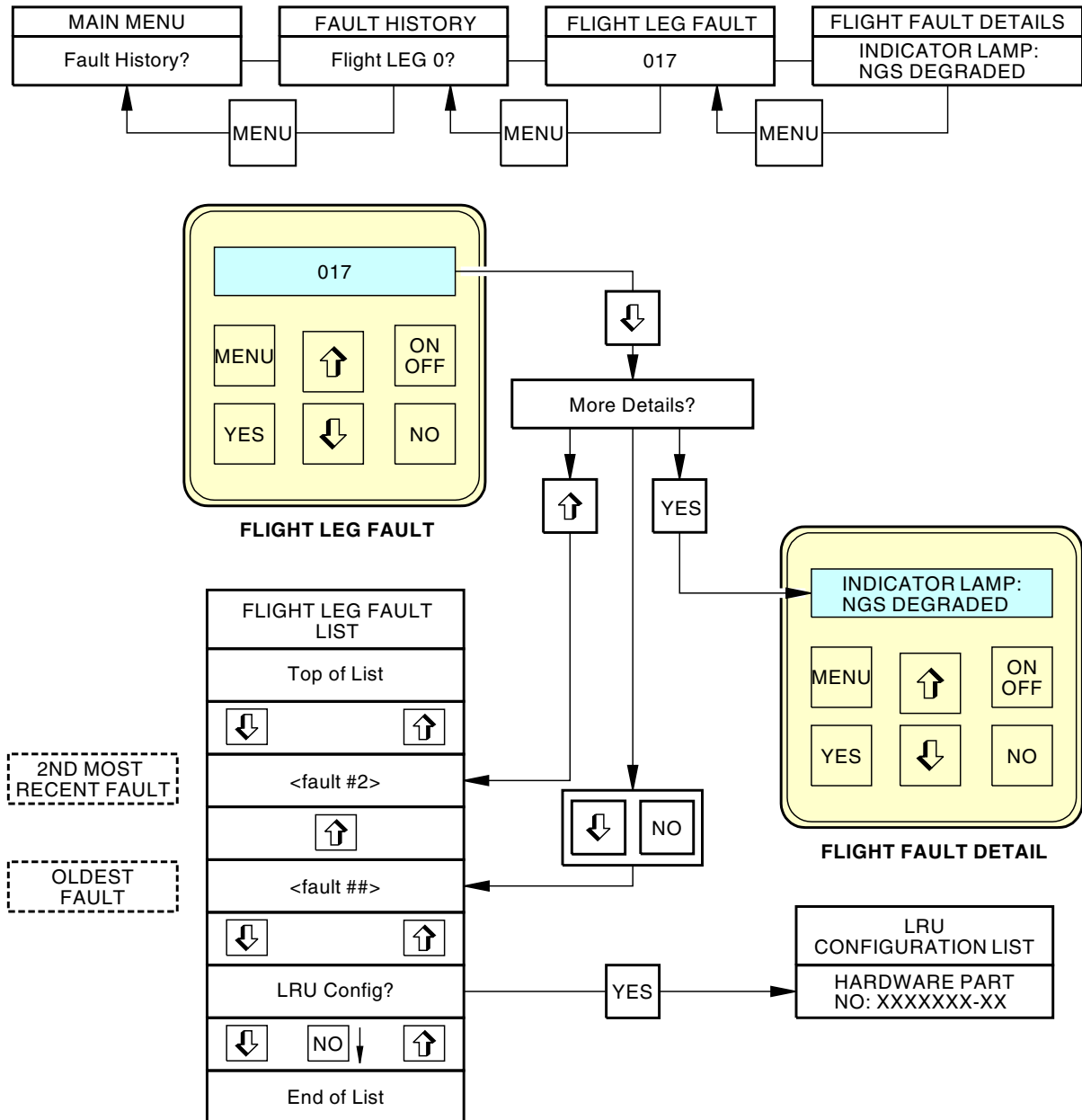
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2415359 S00061537652_V1

Fault History Menu
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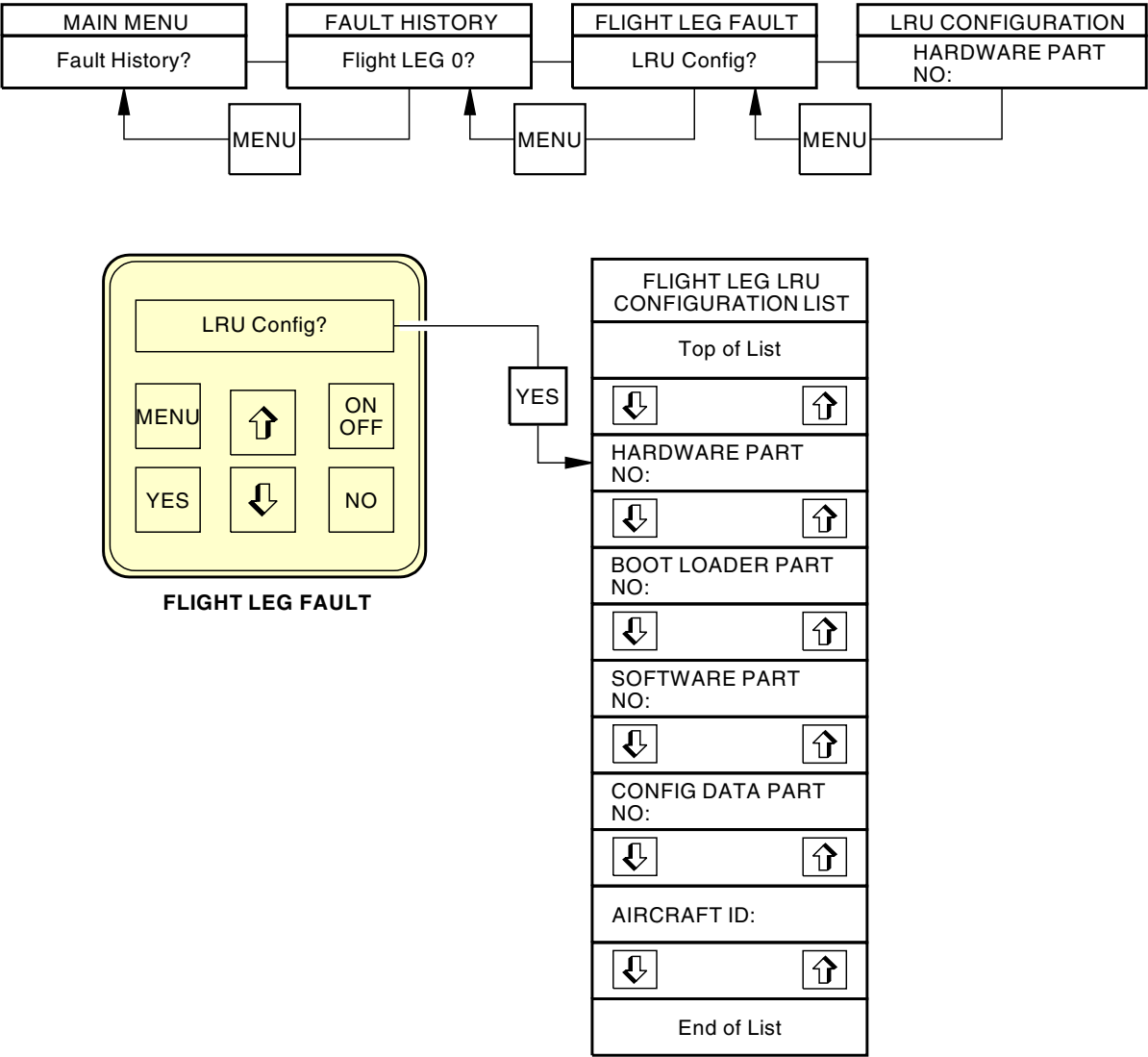
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2415360 S00061537653_V1

Fault History Menu
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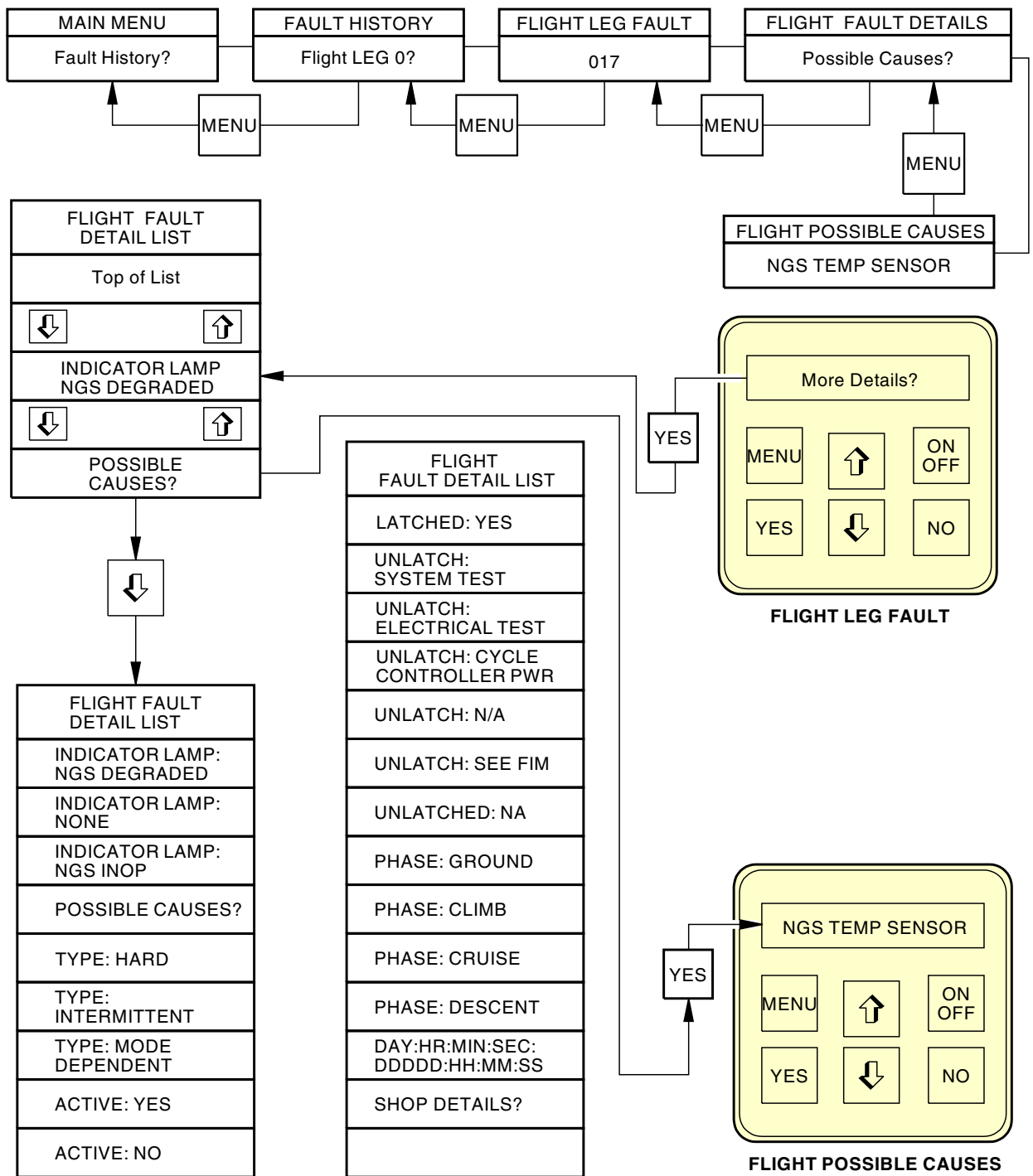
EFFECTIVITY
SIA ALL

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2415361 S00061537654_V1

Fault History Menu
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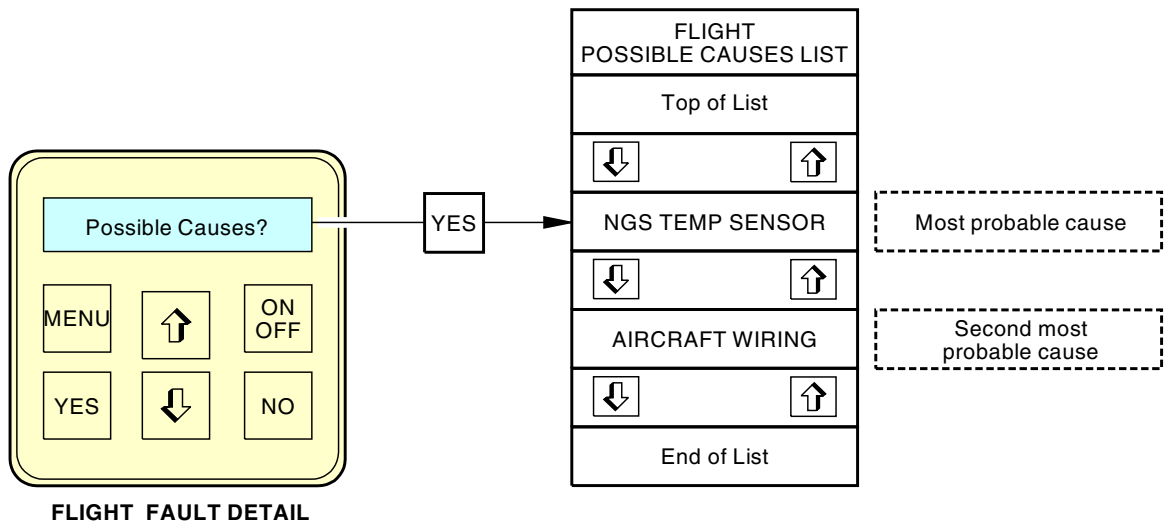
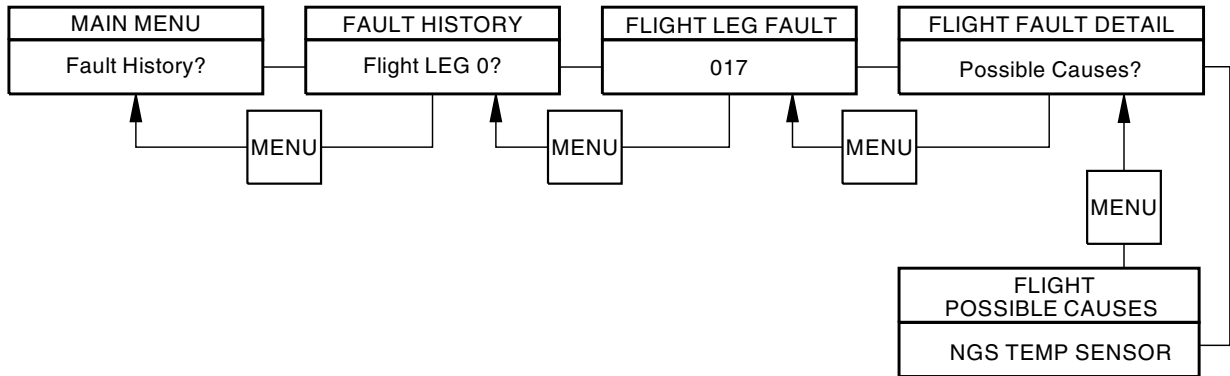
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2415362 S00061537655_V1

Fault History Menu
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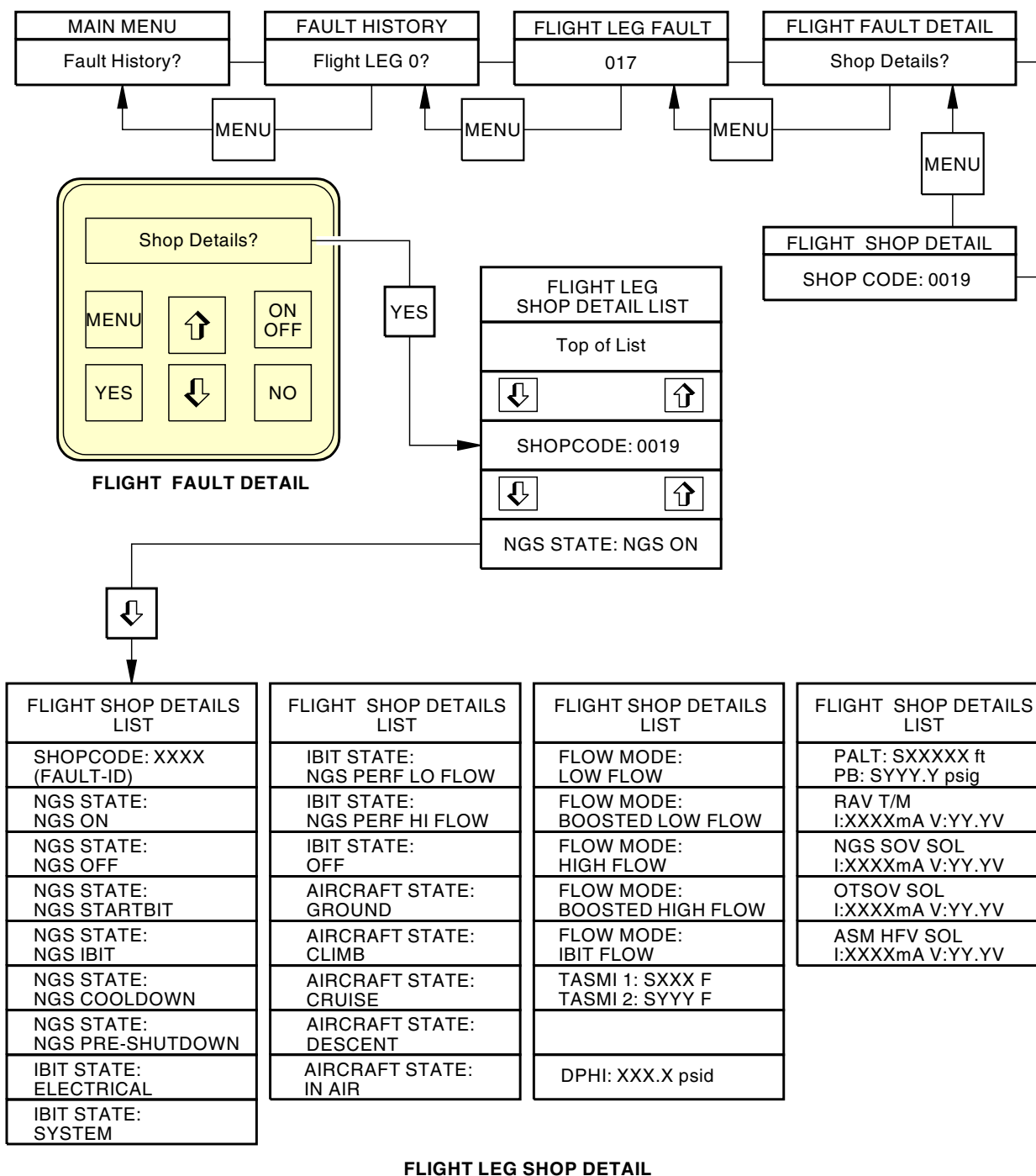
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FLIGHT LEG SHOP DETAIL

2415363 S00061537656_V1

Fault History Menu
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TASK 47-31-02-740-804

7. 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 Menu.
- (2) To help you scroll through the BDU ground test structure (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) System IBIT
 - (b) Electrical IBIT
 - (c) NGS performance IBIT
- (4) BDU System IBIT (System Test?)
 - (a) The BDU system test is 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 and operate the left air conditioning pack. 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, ram air 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, stop the test (test aborted), if the airplane configuration is incorrect. This includes: NGS inlet pressure less than 15 psig (103 kPa), the airplane in air mode, the packs are off, the center tank refuel valves are open, 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 existing fault messages. The NGS controller will also inhibit the test if a controller valve driver, or valve solenoid/torque motor is inoperative.
 - (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.
- (5) BDU Electrical IBIT (Electrical Test?)
 - (a) The BDU electrical test is 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 when started, 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.

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- (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.
- (6) NGS Performance IBIT
 - (a) There are two manually initiated BDU tests done by the NGS controller to test the NGS performance:
 - 1) NGS PERF LO FLOW?
 - 2) NGS PERF HI FLOW?
 - (b) The two tests are done when the NGS system is pressurized. The NGS PERF LO FLOW test, does a check of the NGS in the low flow mode. The NGS PERF HI FLOW test, does a check of the NGS in high flow mode. To do the NGS performance tests, it is necessary to pressurize the NGS with bleed air pressure and operate the left air conditioning pack. The left air conditioning pack is also operated to increase the bleed air pressure during the test. It is necessary to warm up the ASM to the operating temperature of $160 \pm 10^{\circ}\text{F}$ ($71 \pm 6^{\circ}\text{C}$). To 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 ASM.
 - (c) When the BDU starts the NGS PERF LO FLOW test, the NGS controller commands the NGS shutoff valve and overtemperature shutoff valve to ON. The high-flow valve is commanded closed. The NGS ram air valve controls the ASM inlet temperature in the standard temperature range limits. The test continues until the MENU or ON/OFF push-button is pushed.
 - (d) When the BDU starts the NGS PERF HI FLOW test, the NGS controller commands the NGS shutoff valve and overtemperature shutoff valve to ON. The high-flow valve is commanded open. The NGS ram air valve controls the ASM inlet temperature in the standard temperature range limits. The test continues until the MENU or ON/OFF push-button is pushed.
 - (e) The NGS controller will not start the test or stop the test when the airplane configuration is incorrect. This includes NGS inlet pressure less than 15 psig (103 kPa), the airplane is in air mode, the packs are off, a center tank refuel valve is open, 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) NGS ram air valve
 - 5) ASM High-flow valve
 - 6) NGS bleed air pressure sensor
 - 7) NGS temperature sensor
 - 8) 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 stops the test if there is a change in the airplane configuration as noted in the previous steps. Other events that causes the test to stop include an overtemperature condition or an NGS fault is recorded by the NGS controller.
- (h) The test can also be stopped manually if the MENU or ON/OFF push-button is 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.
- (i) If the performance test does not start, or the test is stopped by the NGS controller, one of these BDU display messages shows:
 - 1) INHIBITED: SYS PRESS LOW/INVL
 - 2) INHIBITED: PACK OFF
 - 3) INHIBITED: REFUEL VLV OPEN
 - 4) INHIBITED: A/C ID INVALID
 - 5) INHIBITED: SEE EXISTING FAULTS
 - 6) INHIBITED: WOW = IN AIR
 - 7) INHIBITED: ASG.

B. References

Reference	Title
47-00-00-720-801	Nitrogen Generation System - Functional Test (P/B 501)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. Access Panels

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

E. Prepare for the Ground Test Mode

SUBTASK 47-31-02-740-049

- (1) Select the Ground Tests? mode (TASK 47-31-02-740-801).

F. Ground Test Mode

SUBTASK 47-31-02-740-050

- (1) Make sure that GROUND TESTS? shows on the display.
 - (a) Push the YES push-button.
 - (b) The Electrical Test? shows on the display.
 - (c) Push the down arrow to see the applicable ground test menu items.
 - (d) Ground test menu list:
 - 1) Electrical Test?
 - 2) System Test?
 - 3) NGS PERF LO FLOW?
 - 4) NGS PERF HI FLOW?

EFFECTIVITY
SIA ALL

D633AM101-SIA

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5) Display Test?

SUBTASK 47-31-02-740-051

- (2) Push the up/down arrow from the ground test mode to get Display Test?.

NOTE: The BDU does a 10 second test display routine. All push-buttons are disabled, but the MENU push-button stays active.

- (a) The Display Test? shows on the display.
- (b) Push the YES push-button.

NOTE: To stop the test, push the MENU push-button.

SUBTASK 47-31-02-740-052

- (3) Procedures are supplied to do the BDU ground tests. Do these tasks:

- (a) Electrical Test: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801
- (b) System Test: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801
- (c) NGS PERF LO FLOW Test: Nitrogen Generation System - Functional Test, TASK 47-00-00-720-801
- (d) NGS PERF HI FLOW Test: Nitrogen Generation System - Functional Test, TASK 47-00-00-720-801.

G. IBIT in Progress

SUBTASK 47-31-02-740-053

- (1) Push the up/down arrow to select the applicable ground test mode.

- (a) Push the YES push-button to start the applicable ground test.

NOTE: To stop the test, push the MENU push-button.

- (b) For the electrical test, the display shows:

- TEST IN PROGRESS
- XXX% COMPLETE

- (c) For the system test, the display shows:

- TEST IN PROGRESS
- XXX% COMPLETE

- (d) For the NGS PERF LO FLOW test, the display shows:

- GSE O2 SNS: ZZZZZ
- P: XX PSIA T:SYYYF

- (e) For the NGS PERF HI FLOW Test:

- GSE O2 SNS: ZZZZZ
- P: XX PSIA T:SYYYF

SUBTASK 47-31-02-740-054

- (2) If the applicable ground test is inhibited, one of these inhibited items will show:

NOTE: The NGS controller will not start the ground test (inhibited) when the aircraft configuration is incorrect.

- (a) INHIBITED: SYS PRESS LOW/INVLD
- (b) INHIBITED: PACK OFF
- (c) INHIBITED: REFUEL VLV OPEN
- (d) INHIBITED: A/C ID INVALID

EFFECTIVITY
SIA ALL

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- (e) INHIBITED: SEE EXISTING FAULTS

NOTE: The NGS controller has detected a fault that must be repaired before the ground test starts.

- (f) INHIBITED: WOW = IN AIR
(g) INHIBITED: ASG

SUBTASK 47-31-02-740-055

- (3) When the applicable ground test is completed:

- (a) If the ground test is satisfactory, Electrical Test Pass or System Test Pass shows on the display.
(b) If the ground test is not satisfactory, the fault messages shows on the display.

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.

H. IBIT Results Mode

SUBTASK 47-31-02-740-056

- (1) Make sure that a fault message shows on the display.

- (a) Push the down arrow.
(b) The More Details? shows on the display.
(c) Push the down arrow.

NOTE: The second most recent fault message shows (if applicable).

- (d) Push the down arrow to show the fault messages until the last fault message.

I. IBIT Fault Details Mode

SUBTASK 47-31-02-740-057

- (1) Push the up or down arrow to get to the applicable fault message to troubleshoot.

- (a) The More Details? shows on the display.
(b) Push the YES push-button.
(c) The INDICATOR LAMP: <lamp indication> shows on the display.
(d) Push the up or down arrows to select the menu item for the BDU IBIT test fault details mode.
(e) BDU IBIT test fault details list:
 - INDICATOR LAMP: <lamp indication>
 - POSSIBLE CAUSES?
 - SHOP DETAILS?

J. IBIT Possible Causes Mode

SUBTASK 47-31-02-740-058

- (1) Push the up or down arrow from the BDU IBIT fault details mode to get POSSIBLE CAUSES?.

- (a) The POSSIBLE CAUSES? shows on the display.
(b) Push the YES push-button.
(c) The most probable cause of the fault shows on the display.
(d) Push the down arrow.



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- (e) The second most probable cause of the fault shows on the display.

NOTE: The list continues to show possible causes, ranked by probability, until the End of List shows on the display.

- (2) Make sure that the applicable fault message for the BDU test result shows.

K. IBIT Shop Details Mode

SUBTASK 47-31-02-740-059

- (1) Push the up or down arrow from the BDU IBIT fault details mode to get SHOP DETAILS?.
- (a) The SHOP DETAILS? shows on the display.
- (b) Push the YES push-button.
- (c) The SHOPCODE: XXXX shows on the display.
- (d) Push the up or down arrows to select the menu items for the BDU IBIT shop details mode.
- (e) The BDU IBIT shop details menu list are found in Figure 208.

L. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-740-060

- (1) Make sure that all BDU initiated tests are completed.
- (a) Push the ON/OFF push-button.

SUBTASK 47-31-02-410-004

- (2) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

EFFECTIVITY
SIA ALL

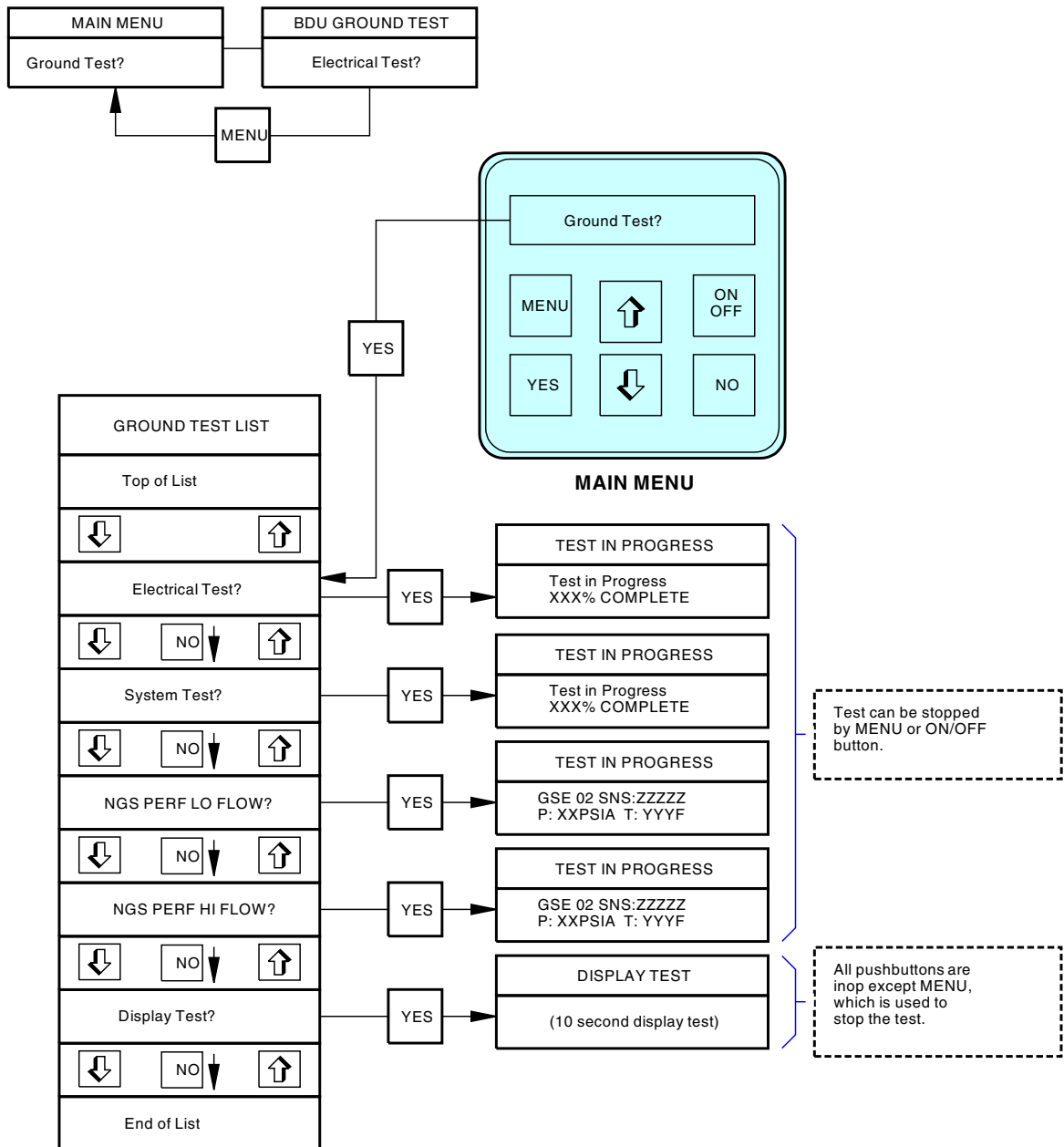
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1501308 S0000273555_V3

BDU Ground Test Menu
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EFFECTIVITY
SIA ALL

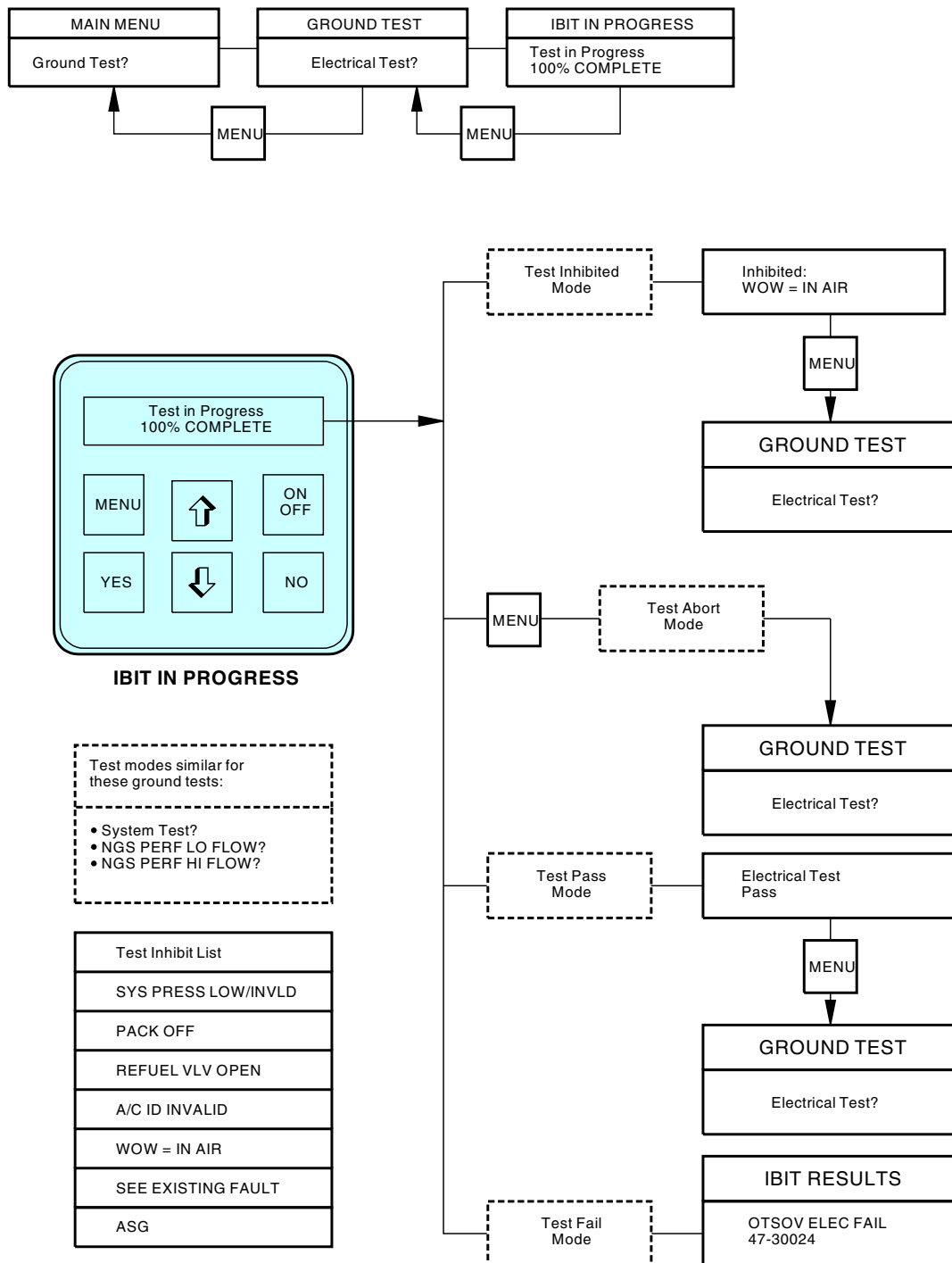
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1501313 S0000273556_V3

BDU Ground Test Menu
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EFFECTIVITY
SIA ALL

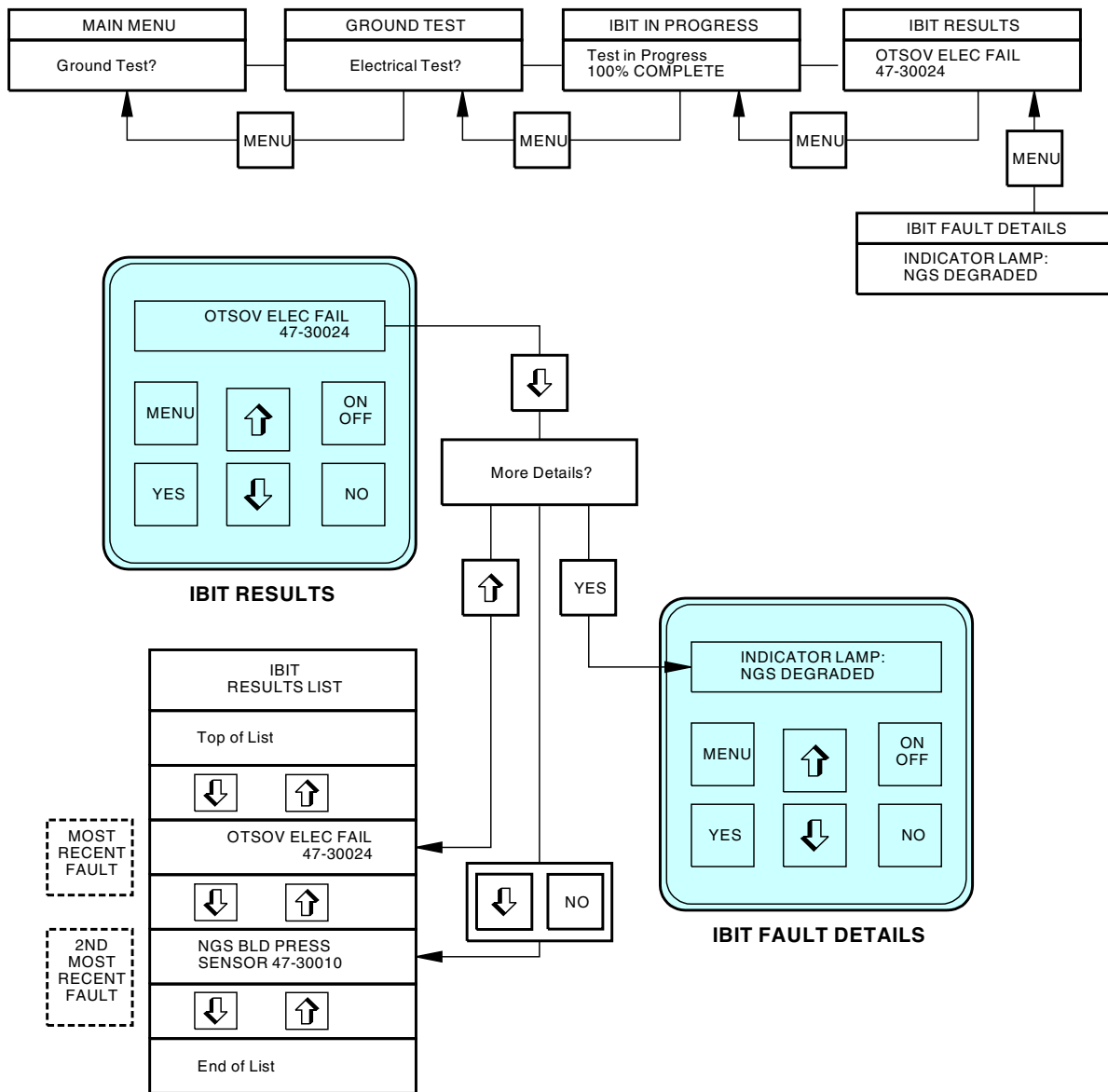
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J84483 S0000180602_V4

BDU Ground Test Menu
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EFFECTIVITY
SIA ALL

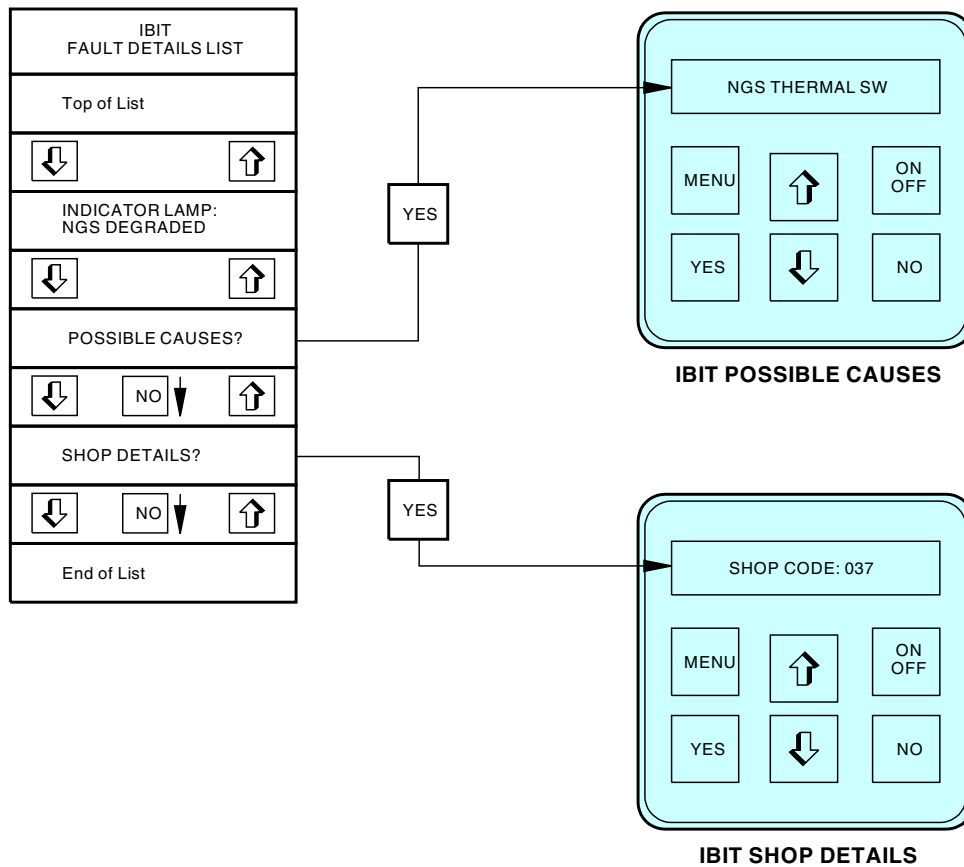
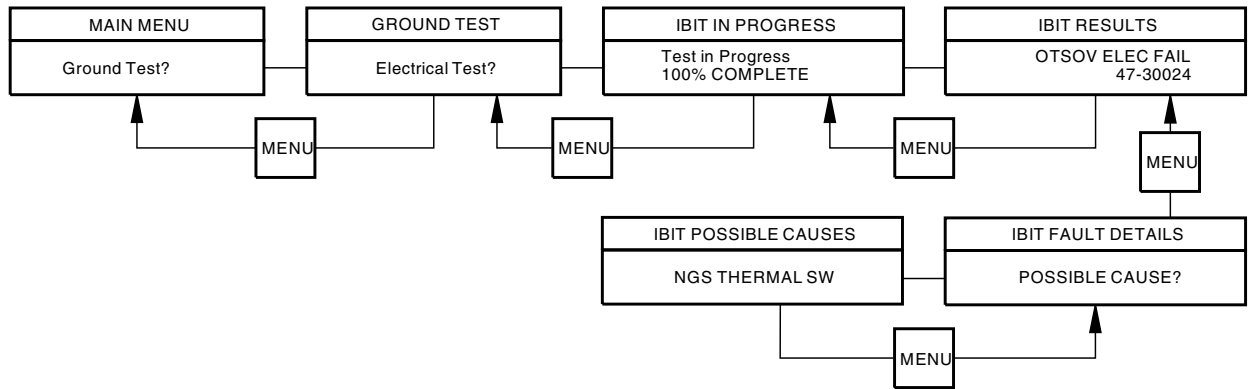
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1501316 S0000273557_V3

BDU Ground Test Menu
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EFFECTIVITY
SIA ALL

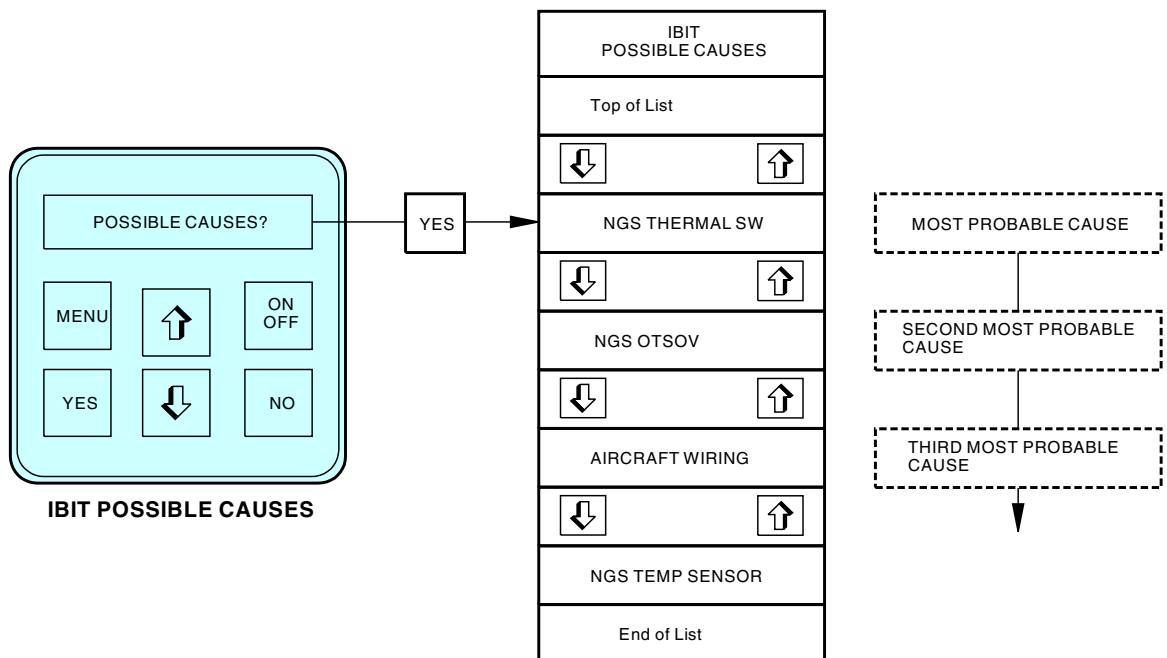
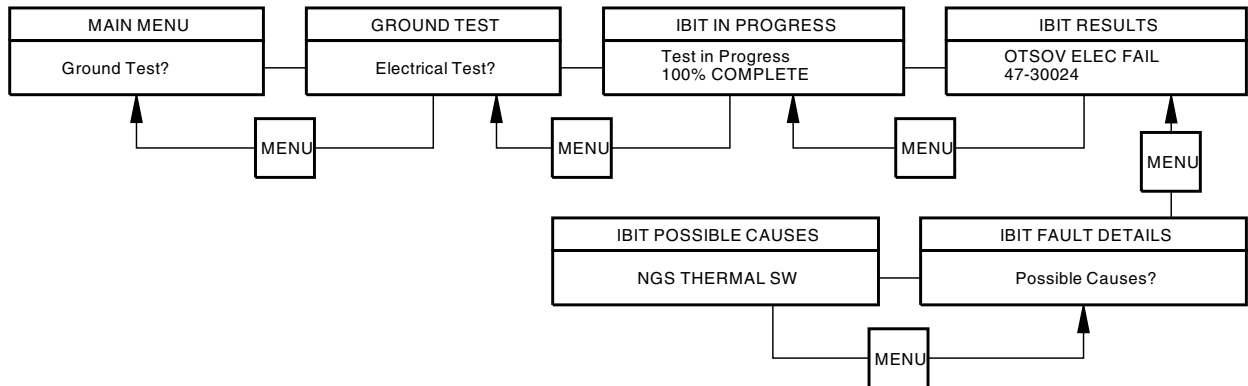
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1501317 S0000273558_V3

BDU Ground Test Menu
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EFFECTIVITY
SIA ALL

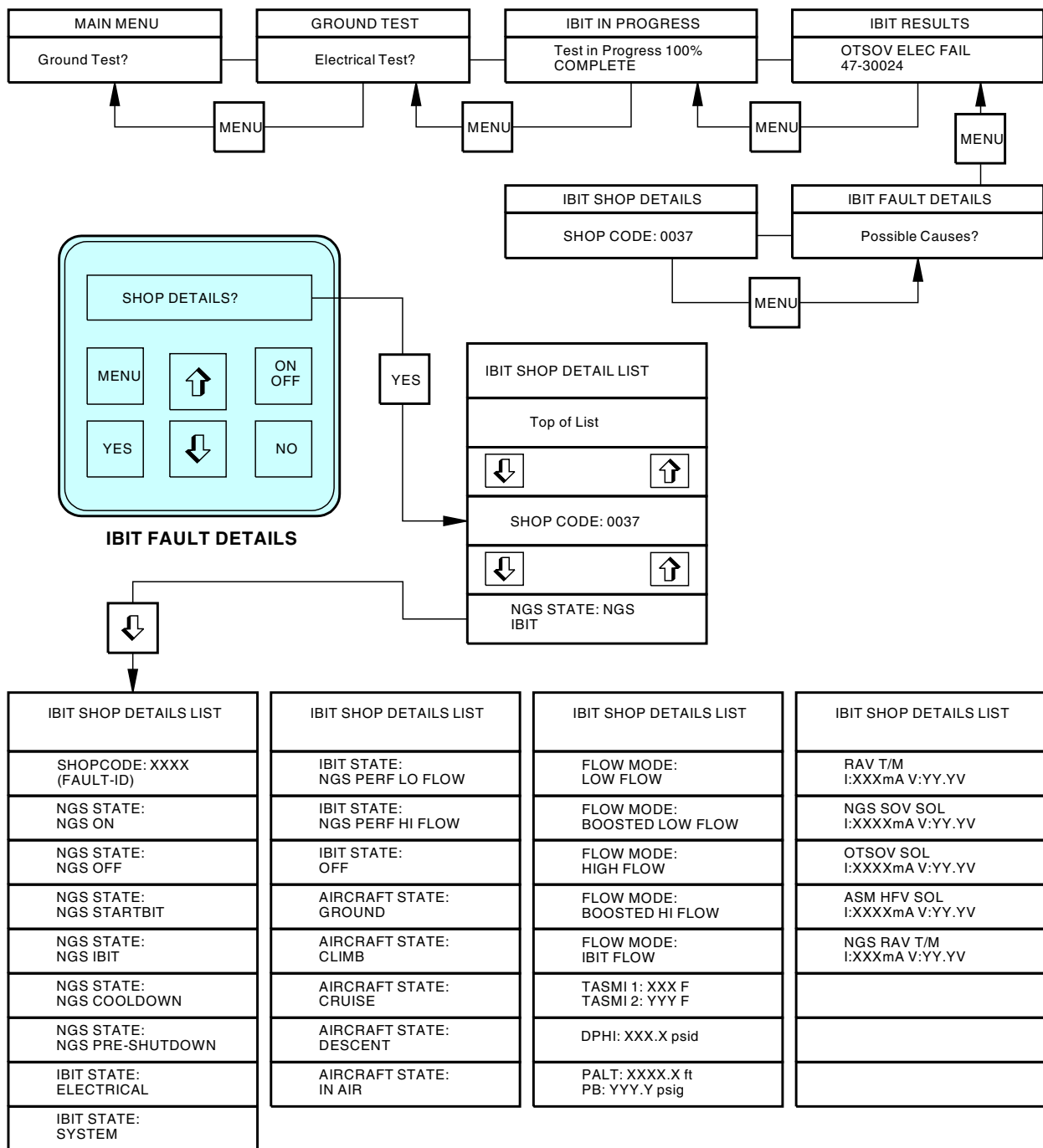
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IBIT SHOP DETAILS

1857813 S0000333031_V3

BDU Ground Test Menu
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— EFFECTIVITY
SIA ALL

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TASK 47-31-02-740-805

8. BDU 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 OTHER FUNCTION menu structure (Figure 209).
- (3) The OTHER FUNCTION menu lets you do a check of the NGS system configuration. Also, input signals can be monitored and the condition of the NGS controller valve drivers.

B. Access Panels

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

C. Prepare for the Other Function Mode

SUBTASK 47-31-02-740-070

- (1) Select the OTHER FUNCTION? menu item (BDU Main Menu, TASK 47-31-02-740-801).

D. Other Function Mode

SUBTASK 47-31-02-740-071

- (1) Make sure that OTHER FUNCTIONS? shows on the display.
 - (a) Push the YES push-button.
 - (b) The System Config? shows on the display.
 - (c) Push the down arrow to see the applicable other function menu items.
 - (d) Other function menu list:
 - 1) System Config?
 - 2) I/O Monitor?.

E. System Configuration Mode

SUBTASK 47-31-02-740-073

- (1) Push the up/down arrow from the other function mode to get System Config?.
 - (a) The System Config? shows on the display.
 - (b) Push the YES push-button.
 - (c) The HARDWARE PART NO: shows on the display.
 - (d) Push the down arrow to see the System Configuration menu items.
 - (e) System configuration menu list:
 - 1) HARDWARE PART
NO: XXXXXXXX-XX
 - 2) BOOT LOADER PART
NO: XXXXXXXX-XX
 - 3) SOFTWARE PART
NO: XXXXXXXX-XX
 - 4) CONFIG DATA PART

EFFECTIVITY
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NO: XXXXXXXX-XX

- 5) AIRCRAFT ID:
737

F. I/O Monitor Mode

SUBTASK 47-31-02-740-074

- (1) Push the up/down arrow from the other function mode to get I/O Monitor?.
 - (a) The I/O Monitor? shows on the display.
 - (b) Push the YES push-button.
 - (c) The Analog Inputs? shows on the display.
 - (d) I/O monitor menu list:
 - 1) Analog Inputs?
 - 2) Discrete Inputs?
 - 3) Outputs?
 - 4) Oxygen Sensor?

G. Analog Inputs Mode

SUBTASK 47-31-02-740-075

- (1) Push the up/down arrow from the I/O monitor mode to get Analog Inputs?.
 - (a) The Analog Inputs? shows on the display.
 - (b) Push the YES push-button.
 - (c) The TASMI 1: XXX F shows on the display.
 - (d) Push the up/down arrow to view the menu items for the analog input list.
 - (e) Analog input menu list displays:
 - 1) TASMI 1: SXXX F
TASMI 2: SXXX F
 - 2) DPHI: SXXX.X psid
 - 3) PALT: SXXXXX ft
PB: SYYY.Y psig

H. Discrete Inputs Mode

SUBTASK 47-31-02-740-076

- (1) Push the down/up arrow on the I/O monitor mode to get Discrete Inputs?.
 - (a) The Discrete Inputs? shows on the display.
 - (b) Push the YES push-button.
 - (c) The FLIGHT DECK SMOKE1: EVAC or NOT EVAC shows on the display.
 - (d) Discrete inputs menu list.

NOTE: For the complete list of discrete menu items (Figure 209).

I. Outputs Mode

SUBTASK 47-31-02-740-077

- (1) Push the up/down arrow from the I/O monitor mode to get Outputs?.
 - (a) Outputs? shows on the display.

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SIA ALL

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- (b) Push the YES push-button.
- (c) Output mode menu displays:
 - 1) RAV Torque Motor
CMD: XXX mA
 - 2) NGS SOV SOL CMD:
OPEN, CLOSED
 - 3) OTSOV SOL CMD:
OPEN, CLOSED
 - 4) ASM HFV SOL CMD:
OPEN, CLOSED

J. Oxygen Sensor Mode

SUBTASK 47-31-02-740-078

- (1) Push the down/up arrow or NO on the I/O Monitor list to get Oxygen Sensor?.
 - (a) The Oxygen Sensor? shows on the display.
 - (b) Push the YES push-button.
 - (c) Oxygen Sensor mode menu displays:
 - 1) O2: XX.X%, OFF, WARMING, FAILED
PO2: YY.Y PSIA, OFF, WARMING, FAILED

K. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-740-079

- (1) Make sure that all BDU initiated tests are completed.
 - (a) Push the ON/OFF push-button.

SUBTASK 47-31-02-410-005

- (2) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

EFFECTIVITY
SIA ALL

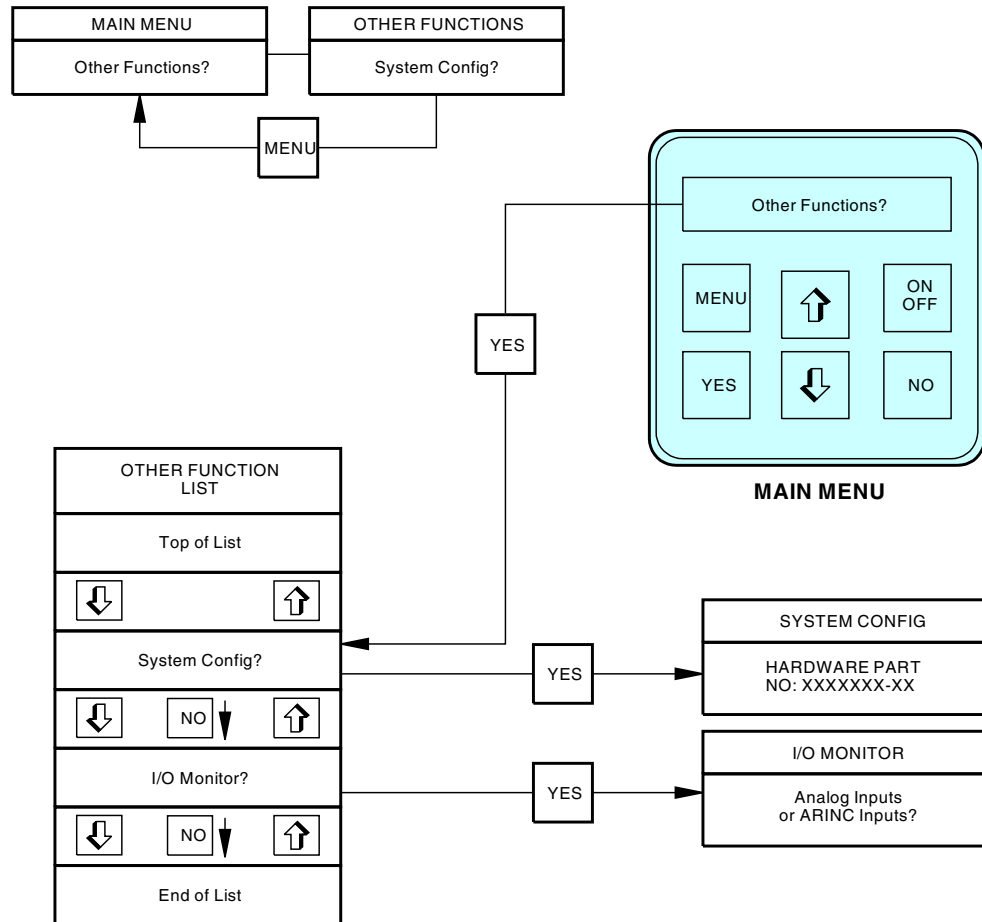
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J86293 S0000180642_V5

Other Functions Menu
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EFFECTIVITY
SIA ALL

D633AM101-SIA

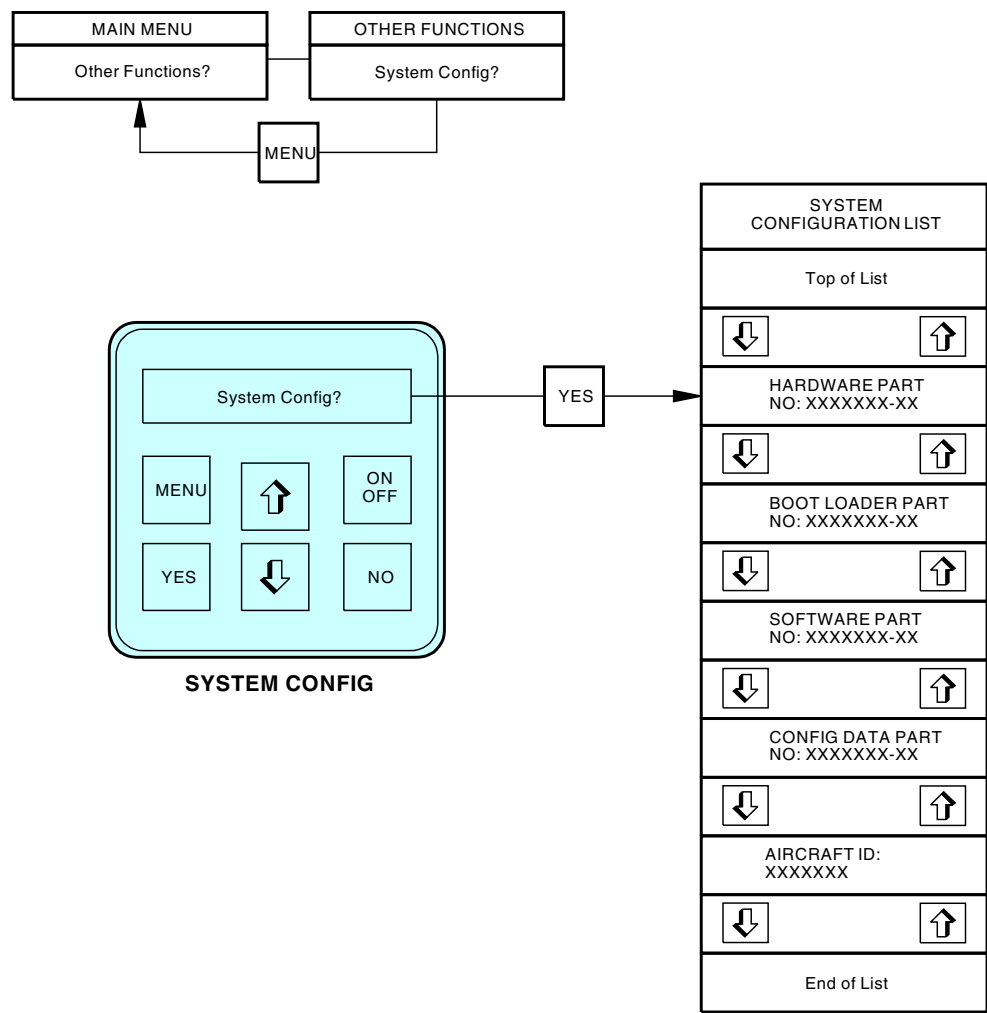
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Other Functions Menu
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EFFECTIVITY
SIA ALL

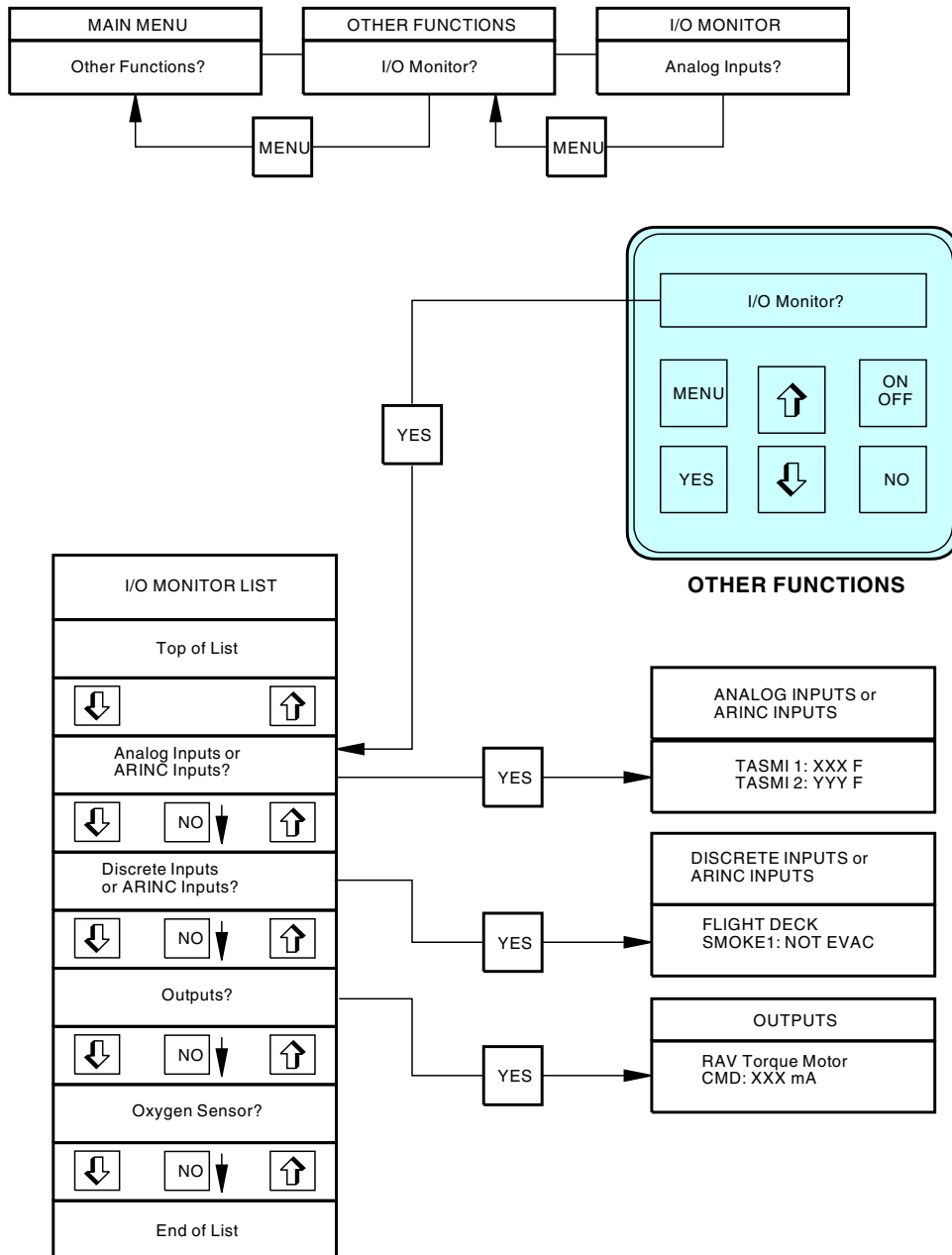
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J86054 S0000180643_V5

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1503679 S0000273985_V4

Other Functions Menu
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EFFECTIVITY
SIA ALL

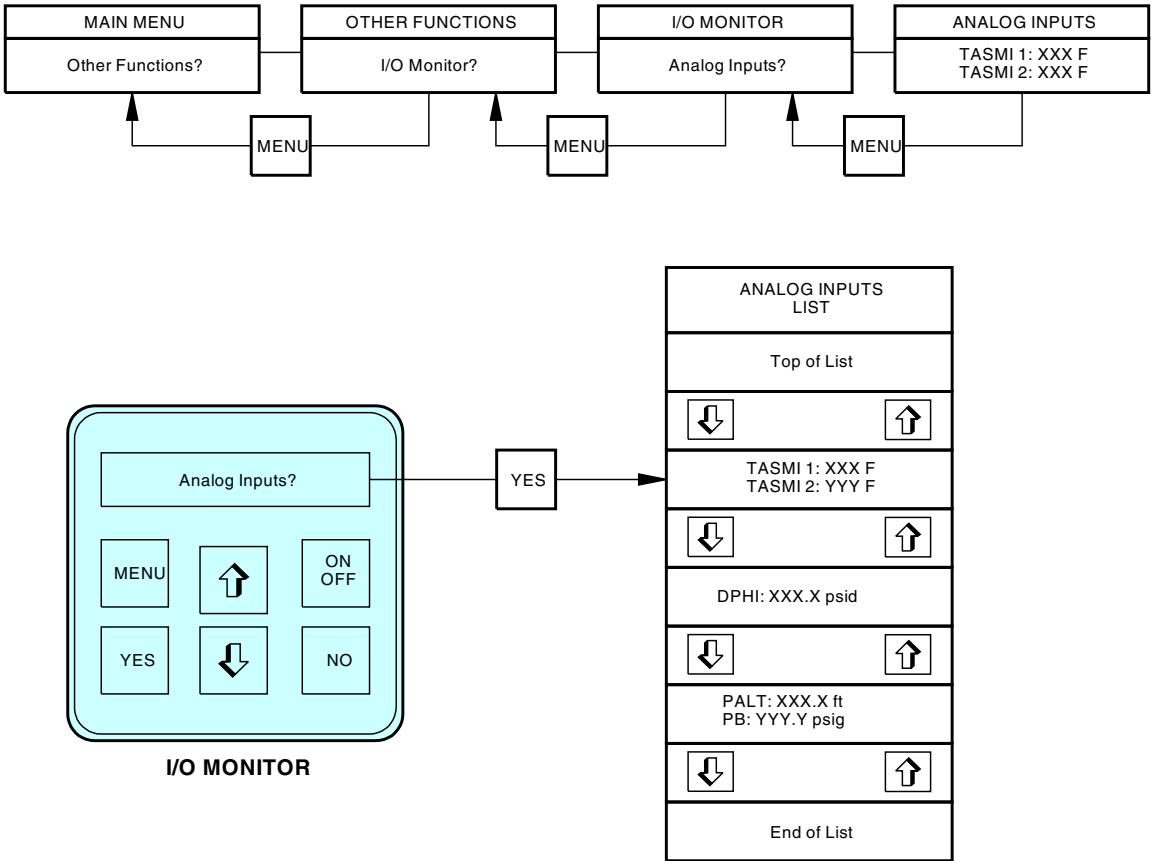
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1503721 S0000273987_V3

Other Functions Menu
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EFFECTIVITY
SIA ALL

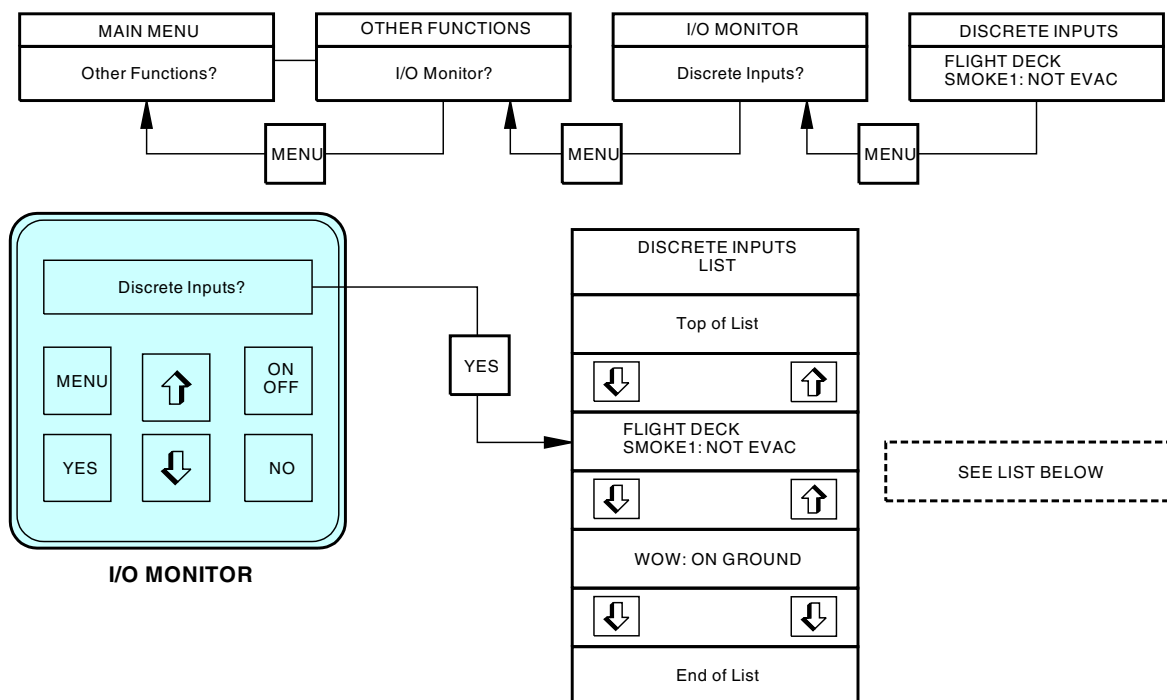
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DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST	DISCRETE INPUTS LIST
FLIGHT DECK SMOKE1: NOT EVAC	TEST MODE 1: OPEN	ID PIN 1: OPEN	ENGINE 1 SIG: ON	FILTER DP SW: High Pressure
FLIGHT DECK SMOKE1: EVAC	TEST MODE 1: GROUND	ID PIN 1: GROUND	ENGINE 1 SIG: OFF	FILTER DP SW: Normal
WOW: ON GROUND	TEST MODE 2: OPEN	ID PIN 2: OPEN	ENGINE 2 SIG: ON	LAMP DISCRETE: LAMP TEST
WOW: IN AIR	TEST MODE 2: GROUND	ID PIN 2: GROUND	ENGINE 2 SIG: OFF	LAMP DISCRETE: NO TEST
MAIN CARGO FIRE: ARMED	TEST MODE 3: OPEN	ID PIN 3: OPEN	PACK SIG: OFF	
MAIN CARGO FIRE: NOT ARMED	TEST MODE 3: GROUND	ID PIN 3: GROUND	PACK SIG: ON	
AFT CARGO FIRE: ARMED	TEST MODE 4: OPEN	ID PIN 4: OPEN	REFUEL VLV SIG1: Valve Open	
AFT CARGO FIRE: NOT ARMED	TEST MODE 3: GROUND	ID PIN 4: GROUND	REFUEL VLV SIG1: Valve Closed	
FWD CARGO FIRE: ARMED		ID PIN 5: OPEN		
FWD CARGO FIRE: NOT ARMED		ID PIN 5: GROUND		

DISCRETE INPUTS

1503864 S0000273988_V3

Other Functions Menu
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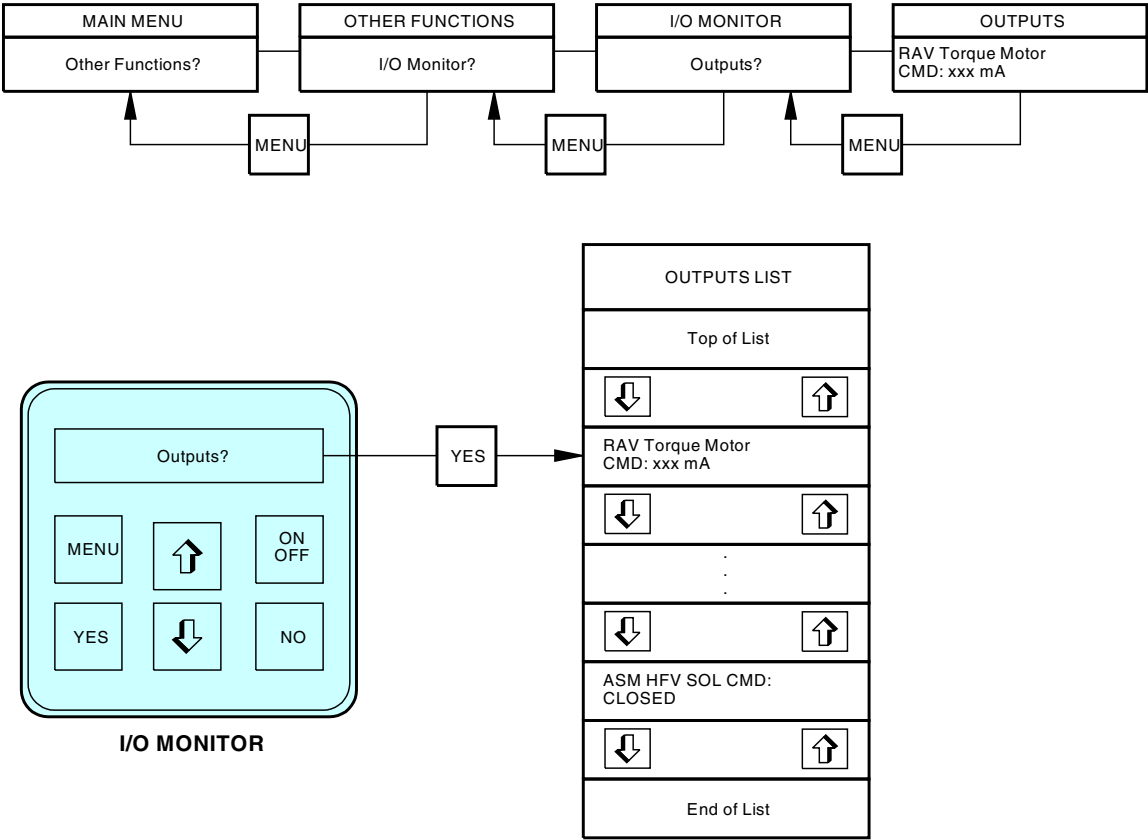
EFFECTIVITY
SIA ALL

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OUTPUTS LIST	OUTPUTS LIST
RAV Torque Motor CMD: XXX mA	ASM HFV SOL CMD: OPEN
NGS SOV SOL CMD: OPEN	ASM HFV SOL CMD: CLOSED
NGS SOV SOL CMD: CLOSED	
OTSOV SOL CMD: OPEN	
OTSOV SOL CMD: CLOSED	

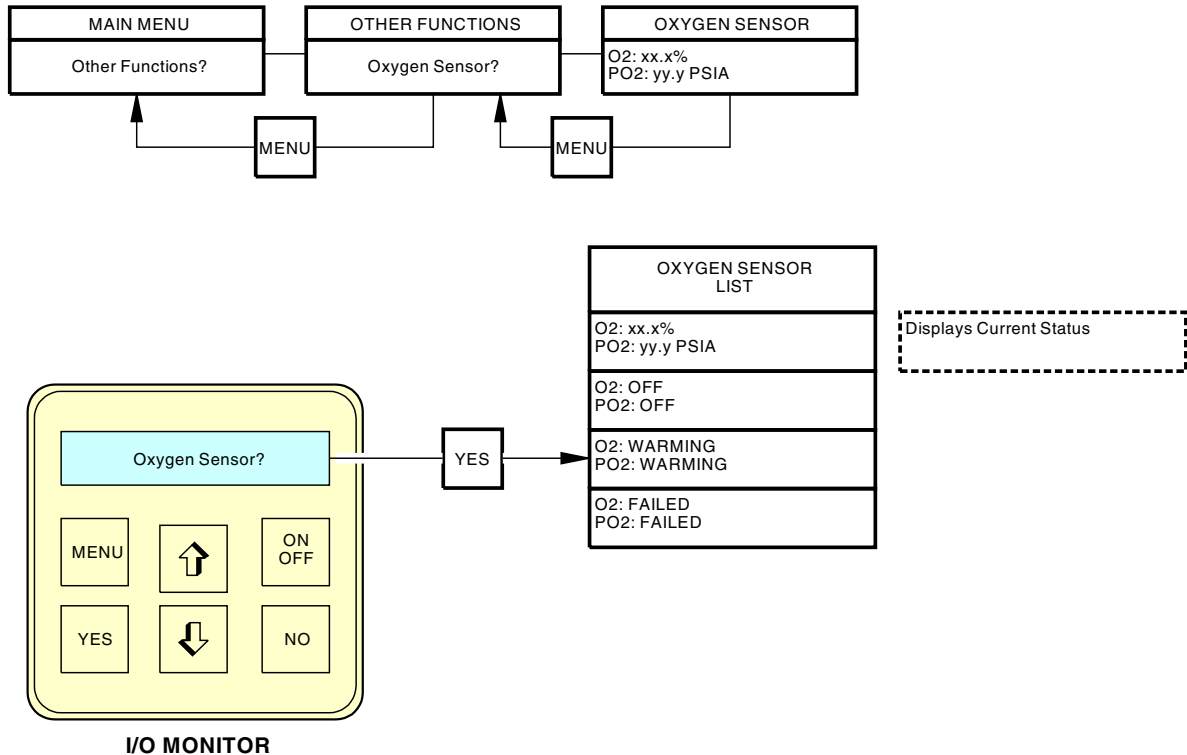
1503938 S0000273989_V3

Other Functions Menu
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SIA ALL

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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
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EFFECTIVITY SIA ALL	
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BITE DISPLAY UNIT - REMOVAL/INSTALLATION

1. **General**

A. This procedure has these tasks:

- (1) A removal of the BITE Display Unit
- (2) An installation of the BITE Display Unit.

TASK 47-31-02-000-801

2. **BITE Display Unit Removal**

(Figure 401)

A. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

B. **Location Zones**

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
212	Flight Compartment - Right

C. **Access Panels**

Number	Name/Location
192CR	ECS Access Door

D. **Prepare for Removal**

SUBTASK 47-31-02-865-002

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-02-860-002

- (2) Put the L PACK and R PACK selector switches, on the air conditioning panel, P5-10, to the OFF position.
 - (a) Attach DO NOT OPERATE tags, STD-858, on the L PACK and R PACK selector switches.

SUBTASK 47-31-02-010-011

- (3) Open this access panel:

Number	Name/Location
192CR	ECS Access Door

SUBTASK 47-31-02-010-008

- (4) Go to the BITE Display Unit [1] location.

E. **BITE Display Unit Removal**

SUBTASK 47-31-02-020-001

- (1) Disconnect the electrical connector [4] from the BITE Display Unit [1].

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SUBTASK 47-31-02-030-001

- (2) Remove the screw [8] and washers [9] to disconnect the bonding jumper [5] and bonding jumper [7] on the bottom right side.

NOTE: Keep the hardware for the installation.

SUBTASK 47-31-02-020-002

- (3) Hold the BITE Display Unit [1] in its position.

SUBTASK 47-31-02-030-002

- (4) Remove the screws [2] and washers [3].

SUBTASK 47-31-02-020-003

- (5) Remove the BITE Display Unit [1] from the vibration isolators [6].

———— **END OF TASK** ————

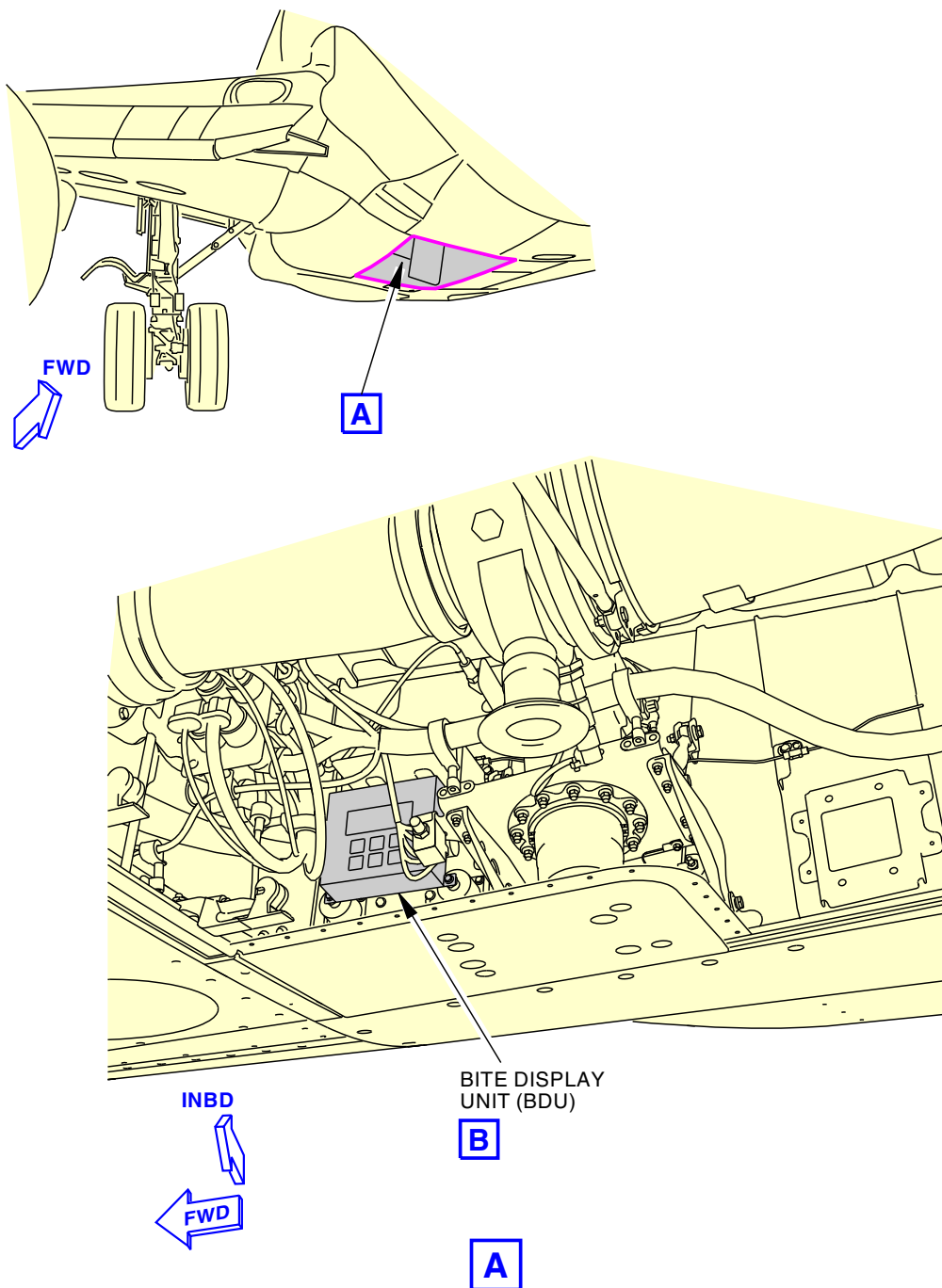
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BITE Display Unit (BDU)
Figure 401/47-31-02-990-810 (Sheet 1 of 2)

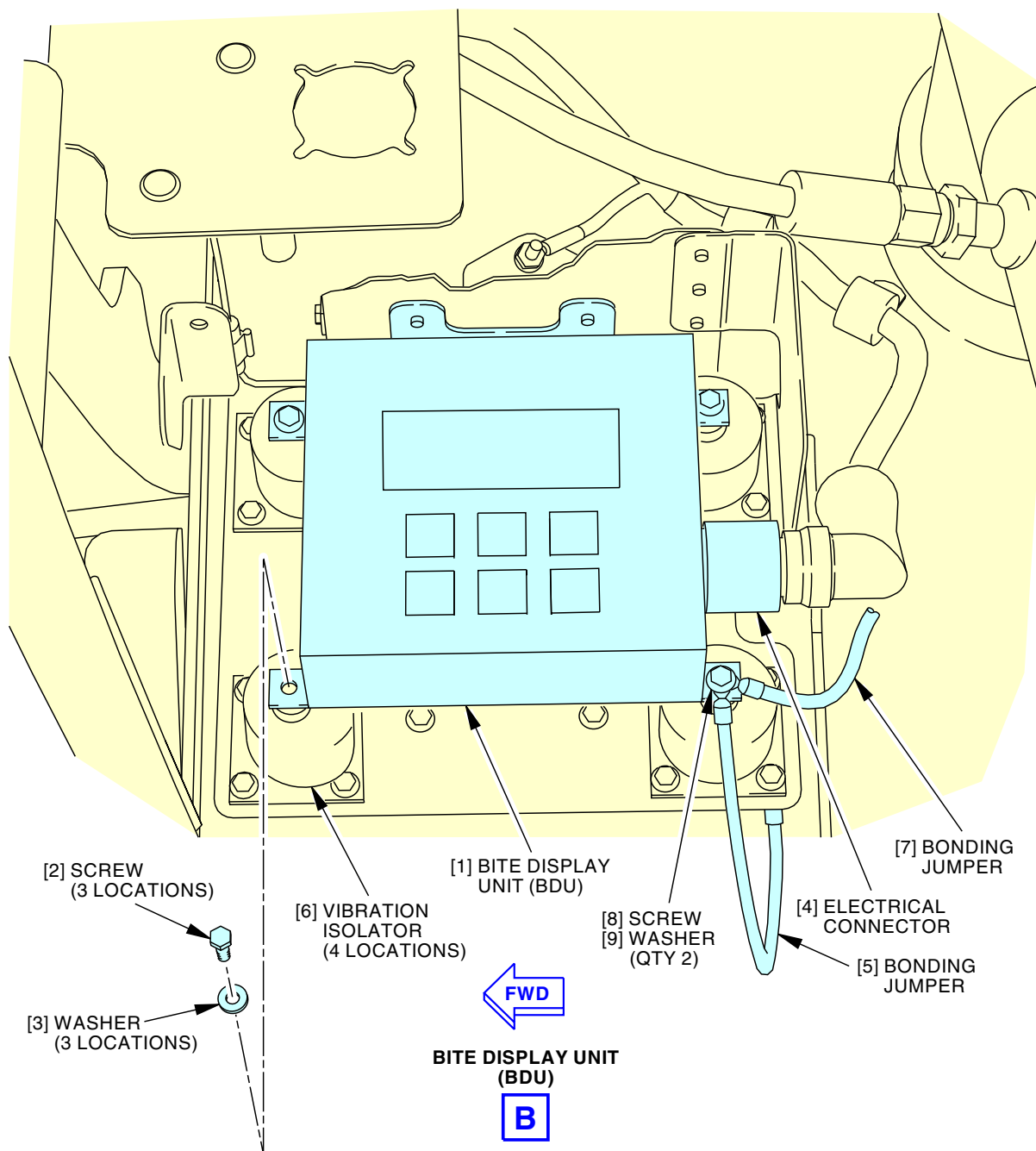
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BITE Display Unit (BDU)
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TASK 47-31-02-400-801

3. **BITE Display Unit Installation**

(Figure 401)

A. References

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

B. Tools/Equipment

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

Reference	Description
COM-614	Bonding Meters - Non-Intrinsically Safe (For use in outside Class I, Divisions I & II non-hazardous locations. For hazardous locations, use COM-1550). Part #: 247000 Supplier: 00426 Part #: 620LK Supplier: 1CRL2 Part #: BLR-0003-XX Supplier: KC432 Part #: BT51 Supplier: 00426 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659 Opt Part #: 247001 Supplier: 00426

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	BITE Display Unit	47-31-02-01A-150	SIA ALL

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192CR	ECS Access Door

F. BITE Display Unit Installation

SUBTASK 47-31-02-010-009

- (1) Go to the BITE Display Unit [1] location in the air conditioning equipment bay.

SUBTASK 47-31-02-100-001

- (2) Make sure that the mating surfaces of the BITE Display Unit [1] and the vibration isolator [6] are clean, free from grease and unwanted material.

SUBTASK 47-31-02-110-001

- (3) Prepare these components for an electrical mating surface bond (SWPM 20-20-10, Paragraph 4):
- (a) Contact surface of the BITE Display Unit [1].
 - (b) Contact surface of the bonding jumper [5].

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- (c) Contact surface of the bonding jumper [7].

SUBTASK 47-31-02-420-001

- (4) Install the BITE Display Unit [1].

- (a) Align the BITE Display Unit [1] on the vibration isolators [6].
- (b) Install the screws [2] and washers [3], but do not tighten the fasteners.
- (c) Put the terminals of the bonding jumper [7] and bonding jumper [5] on the mounting lug of the BITE Display Unit [1].
- (d) Install the screw [8] and washers [9] loosely to keep the bonding jumper [5] and bonding jumper [7] in their positions.
- (e) Tighten the screws to 12 in-lb (1.36 N·m) - 14 in-lb (1.58 N·m).

SUBTASK 47-31-02-760-001

- (5) Do a check of the electrical bonding resistance with non-intrinsically safe bonding meter, COM-614 (SWPM 20-20-10, Paragraph 4).

- (a) Measure resistance between the BITE Display Unit [1] and airplane structure at the vibration isolator [6].
 - 1) Make sure that the electrical resistance is less than 0.005 ohm (5 milliohm).
- (b) Measure resistance between the bonding jumper [5] and mounting lug of the BITE Display Unit [1].
 - 1) Make sure that the electrical resistance is less than 0.005 ohm (5 milliohm).
- (c) Measure resistance between the bonding jumper [7] and mounting lug of the BITE Display Unit [1].
 - 1) Make sure that the electrical resistance is less than 0.005 ohm (5 milliohm).

SUBTASK 47-31-02-430-001

- (6) Connect the electrical connector [4].

G. BITE Display Unit Operational Test

SUBTASK 47-31-02-865-003

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-02-020-005

- (2) Remove the DO NOT OPERATE tags, from the L PACK and R PACK selector switches.

SUBTASK 47-31-02-740-097

- (3) Do this task to do a test of the BITE Display Unit [1]: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-410-007

- (1) Make sure that this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
192CR	ECS Access Door

————— END OF TASK —————

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BITE DISPLAY UNIT - ADJUSTMENT/TEST

1. General

- A. This task has this procedure.
(1) BITE Display Unit - BITE Test.

TASK 47-31-02-740-809

2. BITE Display Unit - BITE Test

A. **General**

- (1) The performance of the Air Separation Module (ASM) is measured by the purity of the Nitrogen Enriched Air (NEA) supplied to the center tank. To do a test of the NEA purity, it is necessary to do a check of the bleed temperature, bleed pressure, and the oxygen concentration of the conditioned air. The Nitrogen Generation System (NGS) controller calculates the bleed air temperature and pressure and shown on the BITE Display Unit (BDU).

B. **References**

Reference	Title
21-00-00-800-803	Supply Conditioned Air with a Cooling Pack (P/B 201)
21-00-00-800-804	Remove Conditioned Air Supplied by a Cooling Pack (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-31-02-740-801	BDU Main Menu (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)
49-11-00-860-802	APU Usual Shutdown (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. **Location Zones**

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

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E. Prepare for the Test

SUBTASK 47-31-02-010-005



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) Open these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

SUBTASK 47-31-02-440-001

- (2) Start the Auxiliary Power Unit (APU) (TASK 49-11-00-860-801).

SUBTASK 47-31-02-740-098

- (3) On the P5-10 Air Conditioning Panel, set the switches to the position shown in Table 501.

Table 501/47-31-02-993-802 P5-10 Air Conditioning Panel - Switch Positions

Switch	Position
BLEED APU	OFF (if APU is not running)
L PACK	OFF
R PACK	OFF
Engine BLEED 1	OFF (if engine is not running)
Engine BLEED 2	OFF (if engine is not running)
Cabin Temp	AUTO
ISOLATION VALVE	OPEN
L RECIRC FAN	OFF
R RECIRC FAN	OFF

SUBTASK 47-31-02-860-003

- (4) Pressurize the Environmental Control System (ECS) Air Supply System.

- (a) Pressurize the pneumatic system (TASK 36-00-00-860-801).

NOTE: The supply of pneumatic pressure from the engines is not recommended. All areas around an operating engine are dangerous. When an engine supplies pneumatic power, make sure that all applicable WARNINGS are obeyed.

- 1) On the P5-10 Air Conditioning Panel, set the switches to the position shown in Table 502.

Table 502/47-31-02-993-803 P5-10 Air Conditioning Panel - Switch Positions

Switch	Position
BLEED APU	ON (if APU is running) OFF (if APU is not running)

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Table 502/47-31-02-993-803 P5-10 Air Conditioning Panel - Switch Positions (Continued)

Switch	Position
Engine BLEED 1	OFF (if engine is not running) ON (if engine is running)
Engine BLEED 2	OFF (if engine is not running) ON (if engine is running)
Cabin Temp	AUTO
ISOLATION VALVE	OPEN
L RECIRC FAN	AUTO
R RECIRC FAN	AUTO

- (b) Supply conditioned air (TASK 21-00-00-800-803).
- (c) On the P5-10 panel, do these steps:
 - 1) Set the L PACK switch to the HIGH position.
 - 2) Set the R PACK switch to the OFF position.
- (d) On the P5-10 Bleed Air Control Panel, make sure that the DUCT PRESS L and R indicators are 15 psig (103 kPa) or more.

NOTE: The dual duct pressure gage shows the pressure in PSIG.

F. NGS Valve Operation - BITE Test

SUBTASK 47-31-02-740-099

- (1) Select the Ground Test? mode on the BDU (TASK 47-31-02-740-801).

SUBTASK 47-31-02-740-100

- (2) Select the System Test? menu item.
 - (a) Push the up or down arrow until System Test? shows.
 - (b) Push the Yes push-button.
 - (c) The BITE test starts.

NOTE: TEST IN PROGRESS XXX% COMPLETE shows on the display while the test is in progress.

SUBTASK 47-31-02-740-101

- (3) Wait until the test is complete.

NOTE: The test takes 2 to 3 minutes.

SUBTASK 47-31-02-740-102

- (4) The BDU shows SYSTEM TEST PASS when the test is satisfactory.
 - (a) If the test fails, look at the BDU test results for the list of fault messages.

SUBTASK 47-31-02-740-103

- (5) Make sure that the NGS shutoff valve position indicator is in the CLOSED position.

SUBTASK 47-31-02-740-104

- (6) Make sure that the NGS ram air valve position indicator is in the OPEN position.

G. NGS BITE Electrical Test

SUBTASK 47-31-02-740-105

- (1) Select the Ground Test? mode on the BDU (TASK 47-31-02-740-801).

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SUBTASK 47-31-02-740-106

- (2) Select the NGS PERF LO FLOW? menu item.
 - (a) Push the up or down arrow until NGS PERF LO FLOW? shows.
 - (b) Push the YES push-button.

NOTE: This starts the NGS PERF LO FLOW test.

SUBTASK 47-31-02-740-107

- (3) The display on the BDU shows this message:

GSE O2 SNS: XX.X%

P:YY PSIA T:SZZZF

NOTE: XX.X is the O2% reading from the oxygen sensor. Or, WARM for the warm-up mode.

YY is the current pressure

ZZZ is the current temperature.

S is the negative sign (-) for negative temperature values.

SUBTASK 47-31-02-740-108

- (4) Make sure that the NGS shutoff valve position indicator is in the OPEN position.

SUBTASK 47-31-02-740-109

- (5) Do a check for concentrated leakage for these components in the Left Hand Side (LHS) Air Conditioning Bay:

NOTE: High pressure line - a concentrated leak is defined as a leak where air flow can be felt or heard 12 in. (30.5 cm) away from the source.

- (a) NGS duct joints
- (b) Connections between the LHS air conditioning pneumatic duct to the NGS penetration on the 41 beam
- (c) bleed pressure sensor
- (d) NGS shutoff valve
- (e) ozone converter
- (f) NGS Ground Support Equipment (GSE) oxygen (O2) port.

SUBTASK 47-31-02-790-001

- (6) Do a check for concentrated leakage for these components in the LHS Ram and NGS compartment:

NOTE: Several location in the ducts, tubes, and components have acceptable leakage. These include drain holes in the insulation duct, tube assemblies, and the primary and secondary drain ports on the NGS filter.

- (a) NGS duct joints
- (b) Connections between the NGS penetration on the 41 beam to the inlet on the air separation module
- (c) Heat exchanger
- (d) NGS filter
- (e) Overtemperature shutoff valve

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SUBTASK 47-31-02-790-002

- (7) Do a check for concentrated leakage downstream of the ASM:

NOTE: Low pressure line - a concentrated leak is defined as a leak where air flow can be felt 2 in. (5.1 cm) away from the source.

- (a) High flow valve
- (b) Tube that leads to the NGS oxygen sensor
- (c) Nitrogen-Enriched Air Distribution System (NEADS) tubing to the vapor barrier penetration.

SUBTASK 47-31-02-790-003

- (8) Make sure that there are no leakage along the oxygen port line.

SUBTASK 47-31-02-790-004

- (9) Make sure that there are no leakage along the Oxygen Enriched Air (OEA) duct and connection from the ASM to the exhaust port.

SUBTASK 47-31-02-790-005

- (10) Do a check for concentrated leakage along the ram air duct and connections as follows:
- (a) Make sure that no leakage between ram duct interface to the heat exchanger inlet.
 - (b) Make sure that no leakage between heat exchanger and ram valve joints to the fairing exhaust port.

SUBTASK 47-31-02-790-006

- (11) Make sure that there are leakage at these locations:
- NOTE: Leakage is possible from the vent in the ram air valve reference pressure regulator when the NGS is pressurized and energized.
- (a) Primary drain port under the NGS filter.
 - (b) Secondary drain port under the NGS filter.
 - (c) weep hole in the NGS filter outlet duct.
 - (d) ram air valve tubing.

SUBTASK 47-31-02-790-007

- (12) Do a check for concentrated leakage on the NEADS line in the wheel well.
- (a) Make sure that there are no leakage from the vapor barrier penetration to the rear spar penetration for the center tank.

SUBTASK 47-31-02-740-094

- (13) To stop the test, push the MENU push-button, then the NO push-button.
- NOTE: The NGS shutoff valve stays in the incorrect open position when the NO push-button is not pushed after the MENU button is pushed.

SUBTASK 47-31-02-740-110

- (14) Make sure that the NGS shutoff valve position indicator is in the CLOSED position.

SUBTASK 47-31-02-710-001

- (15) Make sure that the NGS ram air valve position indicator is in the OPEN position.

H. BDU Pressure Temperature and Oxygen Concentration Reading

SUBTASK 47-31-02-740-111

- (1) Select the Ground Test? mode on the BDU (TASK 47-31-02-740-801).

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SUBTASK 47-31-02-740-112

- (2) Select the NGS PERF LO FLOW? menu item.
 - (a) Push the up or down arrow until NGS PERF LO FLOW? shows.
 - (b) Push the YES push-button.

NOTE: This starts the NGS PERF LO FLOW test.

SUBTASK 47-31-02-740-113

- (3) The display on the BDU shows this message:

GSE O2 SNS: XX.X%

P:YY PSIA T:ZZZF

NOTE: XX.X is the O2% reading from the oxygen sensor. Or, WARM for the warm-up mode.

YY is the current pressure

ZZZ is the current temperature.

S is the negative sign (-) for negative temperature values.

SUBTASK 47-31-02-710-002

- (4) Make sure that the NGS shutoff valve position indicator is in the OPEN position.

SUBTASK 47-31-02-790-008

- (5) Make sure that the BDU pressure is in ± 8 psi (± 55 kPa) as follows:

- (a) On the BDU, record the pressure.

NOTE: The pressure is in PSIA.

- (b) On the P5-10 Bleed Air Control Panel, record the DUCT PRESS L and R indicators.

NOTE: The dual duct pressure gage shows the pressure in PSIG.

- (c) Subtract 14.7 psi from the BDU pressure.

- (d) Make sure that the dual duct pressure gage is in ± 8 psig of the subtracted BDU pressure.

SUBTASK 47-31-02-740-114

- (6) To stop the test, push the MENU push-button, then the NO push-button.

NOTE: The NGS shutoff valve stays in the incorrect open position when the NO push-button is not pushed after the MENU button is pushed.

SUBTASK 47-31-02-810-001

- (7) If the test fails, refer to the IFIM and do the applicable procedure(s) for the applicable maintenance message.

I. Overtemperature Shutoff Valve Overheat Protection Test

SUBTASK 47-31-02-740-115

- (1) Select the Ground Test? mode on the BDU (TASK 47-31-02-740-801).

SUBTASK 47-31-02-740-116

- (2) Select the NGS PERF LO FLOW? menu item.
 - (a) Push the up or down arrow until NGS PERF LO FLOW? shows.
 - (b) Push the YES push-button.

NOTE: This starts the NGS PERF LO FLOW test.

SUBTASK 47-31-02-740-117

- (3) The display on the BDU shows this message:

GSE O2 SNS: XX.X%

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P:YY PSIA T:ZZZF

NOTE: XX.X is the O2% reading from the oxygen sensor. Or, WARM for the warm-up mode.

YY is the current pressure

ZZZ is the current temperature.

S is the negative sign (-) for negative temperature values.

SUBTASK 47-31-02-710-003

- (4) On the operability indicator, make sure that the green OPERATIONAL SERVICEABLE light is on.

SUBTASK 47-31-02-020-004

- (5) Disconnect the electrical connector from the thermal switch.

SUBTASK 47-31-02-710-004

- (6) On the operability indicator, make sure that the blue DEGRADED TEMPORARILY SERVICEABLE light is on.

SUBTASK 47-31-02-420-002

- (7) connect the electrical connector to the thermal switch.

SUBTASK 47-31-02-740-118

- (8) On the BDU, push the ON/OFF push-button.
 - (a) Make sure that the blue DEGRADED TEMPORARILY SERVICEABLE light is on.

SUBTASK 47-31-02-740-119

- (9) Select the Ground Test? mode on the BDU (TASK 47-31-02-740-801).

SUBTASK 47-31-02-740-120

- (10) Select the Electrical Test? menu item.
 - (a) Push the up or down arrow until Electrical Test? shows.
 - (b) Push the Yes push-button.
 - (c) The BITE test starts.

NOTE: TEST IN PROGRESS XXX% COMPLETE shows on the display while the test is in progress.

SUBTASK 47-31-02-740-121

- (11) Make sure that the BDU shows ELECTRICAL TEST PASS at the end of the test.
 - (a) Make sure that the green OPERATIONAL SERVICEABLE light is on.
 - (b) If the test fails, look at the BDU test results for the list of fault messages.

SUBTASK 47-31-02-740-122

- (12) Push the MENU push-button.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-02-780-001

- (1) Do the applicable task to depressurize the pneumatic system:
 - (a) Remove Conditioned Air Supplied by a Cooling Pack, TASK 21-00-00-800-804
 - (b) Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

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SUBTASK 47-31-02-710-005

- (2) On the P5-10 Bleed Air Control Panel, make sure that the DUCT PRESS L and R indicators are 0 psig (0 kPa).

NOTE: The dual duct pressure gage shows the pressure in PSIG.

SUBTASK 47-31-02-860-004

- (3) If necessary, do this task:APU Usual Shutdown, TASK 49-11-00-860-802.

SUBTASK 47-31-02-410-006

- (4) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

———— **END OF TASK** ————

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OPERABILITY INDICATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) Operability Indicator Removal
 - (2) Operability Indicator Installation.

TASK 47-31-03-000-801

2. Operability Indicator Removal

(Figure 401)

A. **Location Zones**

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

B. **Prepare for the Removal**

SUBTASK 47-31-03-860-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

C. **Operability Indicator Removal**

SUBTASK 47-31-03-020-001

- (1) Disconnect the electrical connector [10] from the operability indicator [9].

SUBTASK 47-31-03-020-002

- (2) Remove the nut [1] and washer [2] to disconnect the bonding jumper [3] from the bulkhead.

SUBTASK 47-31-03-020-003

- (3) Remove the bolt [4], washer [5], flat washer [6], nut [7], and loop clamp [8] that holds the pneumatic tube and operability indicator [9] to the bulkhead.

SUBTASK 47-31-03-020-004

- (4) Remove the operability indicator [9].
- (a) Hold the operability indicator [9] in its position.
 - (b) Remove the two screws [11] and washers [12] that attach the operability indicator [9] to the P28 APU Remote Control Panel.
 - (c) Remove the operability indicator [9].

———— **END OF TASK** ————

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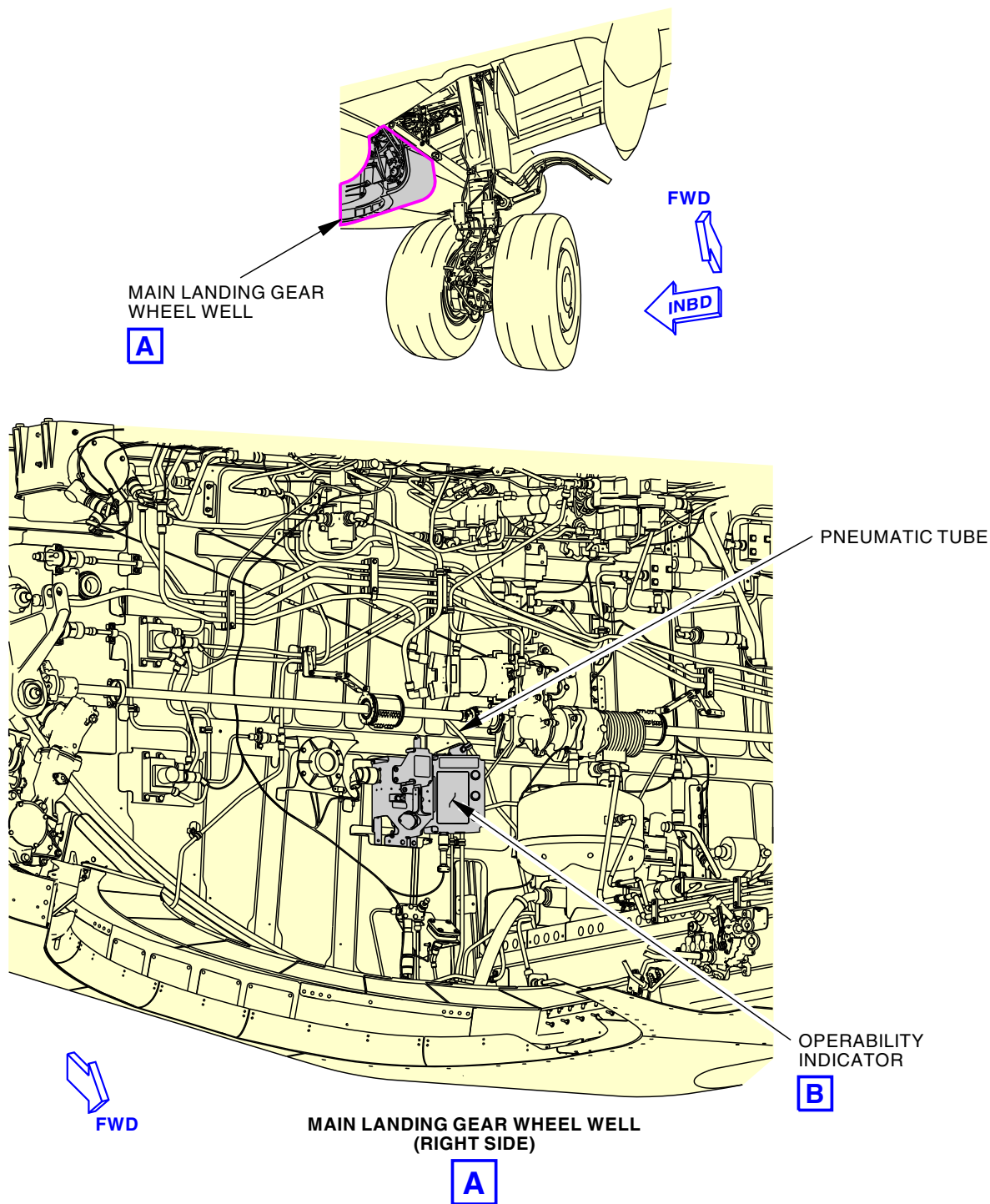
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Operability Indicator Installation
Figure 401/47-31-03-990-801 (Sheet 1 of 2)

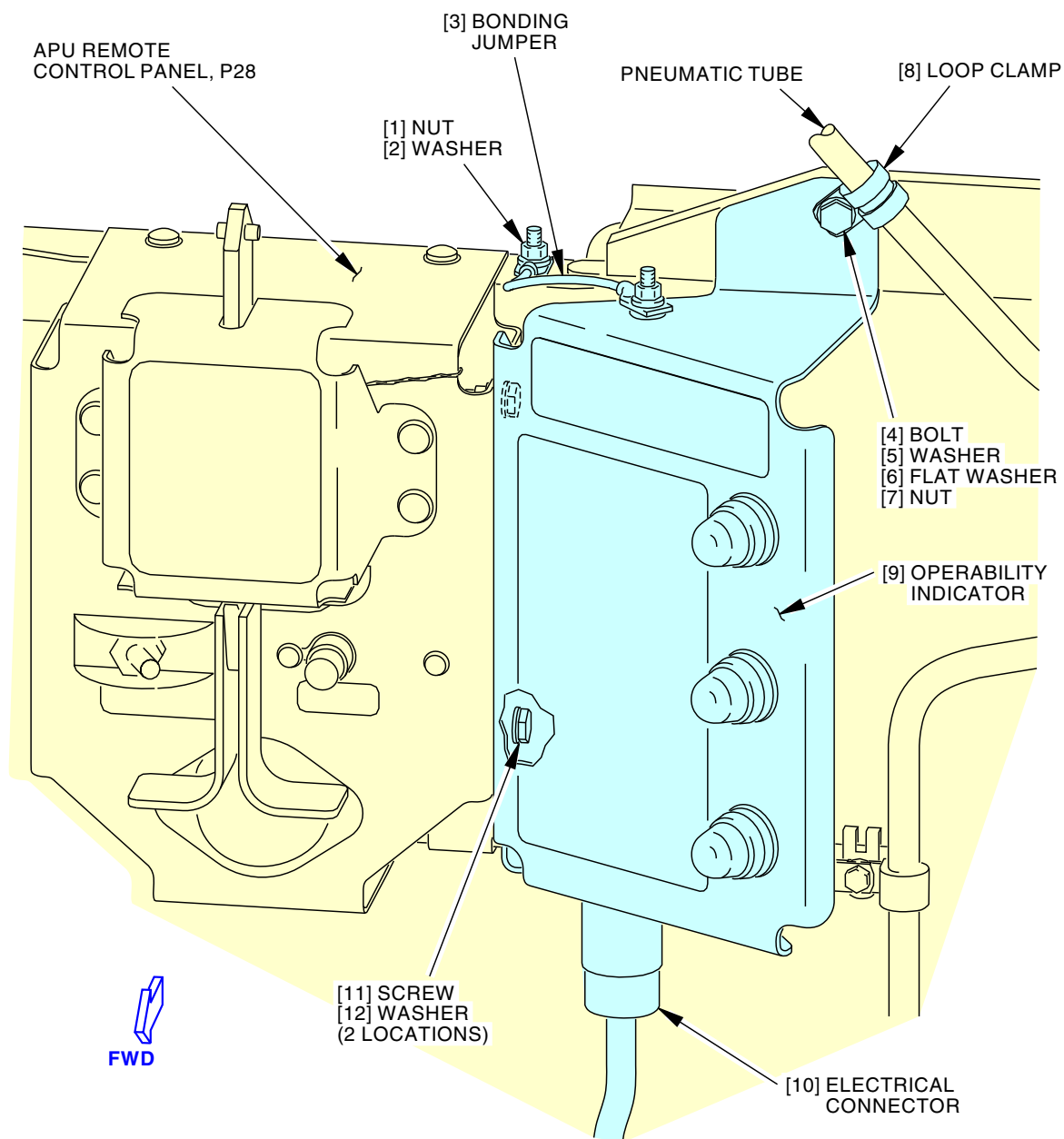
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OPERABILITY INDICATOR



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Operability Indicator Installation
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TASK 47-31-03-400-801

3. Operability Indicator Installation

(Figure 401)

A. References

Reference	Title
20-60-07-910-802	Inspection, Cleaning and Sealing of Electrical Connectors (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50359	Sealant - Low Density, Non-Chromate Type	BMS5-142 Type II Class B
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
9	Operability indicator	47-31-03-01-040	SIA ALL

E. Location Zones

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

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F. Operability Indicator Installation

SUBTASK 47-31-03-420-001

- (1) Install the operability indicator [9].
 - (a) Align the operability indicator [9] in its position.
 - (b) Install the two screws [11] and washers [12] that attach the operability indicator [9] to the P28 APU Remote Control Panel.
 - (c) Make sure that the loop clamp [8] is on the pneumatic tube.
 - (d) Install the bolt [4], washer [5], flat washer [6], loop clamp [8], and nut [7] to attach the pneumatic tube and operability indicator [9] to the bulkhead.

SUBTASK 47-31-03-100-001

- (2) Do these steps to prepare the bonding jumper [3] and the ground stud for installation:
 - (a) Clean the fay surfaces of the bonding jumper [3] and ground stud (SWPM 20-20-10, Paragraph 4):
 - 1) Use Cleaning Procedure 5 to clean the ground stud.



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00062 or solvent, B00184.
 - b) Use a new cotton wiper to dry the surfaces.
 - c) Continue to clean and dry the surface until the cotton wiper shows clean.
 - 2) Use Cleaning Procedure 5 to clean the terminal contact surface on the bonding jumper.



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.
 - b) Use a new cotton wiper to clean the surface.
 - c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 47-31-03-420-003

- (3) Install the bonding jumper [3], washer [2], and nut [1] to attach the bonding jumper [3] to the bulkhead.

SUBTASK 47-31-03-860-002

- (4) Tighten the nut [1] to 36 ±3 in-lb (4.1 ±0.4 N·m).

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SUBTASK 47-31-03-700-001

- (5) Measure the electrical bonding resistance between the operability indicator [9] and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).
- (a) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

SUBTASK 47-31-03-390-001

- (6) Apply a fillet seal to the ground stud, terminal on the bonding jumper [3], and nut [1] (SWPM 20-20-10, Paragraph 4).
- (a) Apply sealant, A50231 or sealant, A50359 to the surfaces.

SUBTASK 47-31-03-100-002

- (7) Before you connect the electrical connector [10], examine the connector for corrosion (TASK 20-60-07-910-802).

SUBTASK 47-31-03-420-002

- (8) Connect the electrical connector [10] to the operability indicator [9].

G. Operability Indicator Installation Test

SUBTASK 47-31-03-840-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-31-03-881-001

- (2) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

————— END OF TASK —————

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OPERABILITY INDICATOR - ADJUSTMENT/TEST

1. General

A. This procedure has this task:

- (1) A visual check of the operability indicator light.

TASK 47-31-03-210-801

2. Operability Indicator Light Visual Check

(Figure 501 and Figure 502)

NOTE: This procedure is a scheduled maintenance task.

A. **General**

- (1) This task gives the instruction to do a visual check of the operability indicator light.
(2) The operability indicator is on the aft bulkhead of the right Main Landing Gear (MLG) wheel well. It is adjacent to the P28 Auxiliary Power Unit (APU) remote control panel.

B. **References**

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-31-02-740-802	BDU Existing Fault Menu (P/B 201)

C. **Location Zones**

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

D. **Access Panels**

Number	Name/Location
192DR	ECS High Pressure Access Door

E. **Operability Indicator Light Visual Check**

SUBTASK 47-31-03-210-001

- (1) Do a visual check of the Nitrogen Generation System (NGS) operability indicator light (Figure 501).

NOTE: The operability indicator has three lights that show the condition of the NGS.

- (a) The green OPERATIONAL light shows that the system operates correctly, and no maintenance is necessary.

NOTE: If the green OPERATIONAL light is on, then the visual check is complete.

- (b) The blue DEGRADED light shows that the system is serviceable, but at a decreased capacity.

- (c) The amber INOP light shows that the system is not serviceable.

SUBTASK 47-31-03-860-003

- (2) For the system faults, refer to the BITE Display Unit (BDU) located in the right air-conditioning pack bay (Figure 502).

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192DR	ECS High Pressure Access Door

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SUBTASK 47-31-03-740-001

- (3) If none of the lights are illuminated, the operability indicator is not serviceable.
- (a) Use the BDU to find an existing fault (TASK 47-31-02-740-802).
 - (b) Use the BDU to do an electrical test to make sure that all the lights work properly (TASK 47-00-00-800-801).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 47-31-03-860-004

- (1) If the access panel was opened, do this step:
- (a) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192DR	ECS High Pressure Access Door

———— **END OF TASK** ————

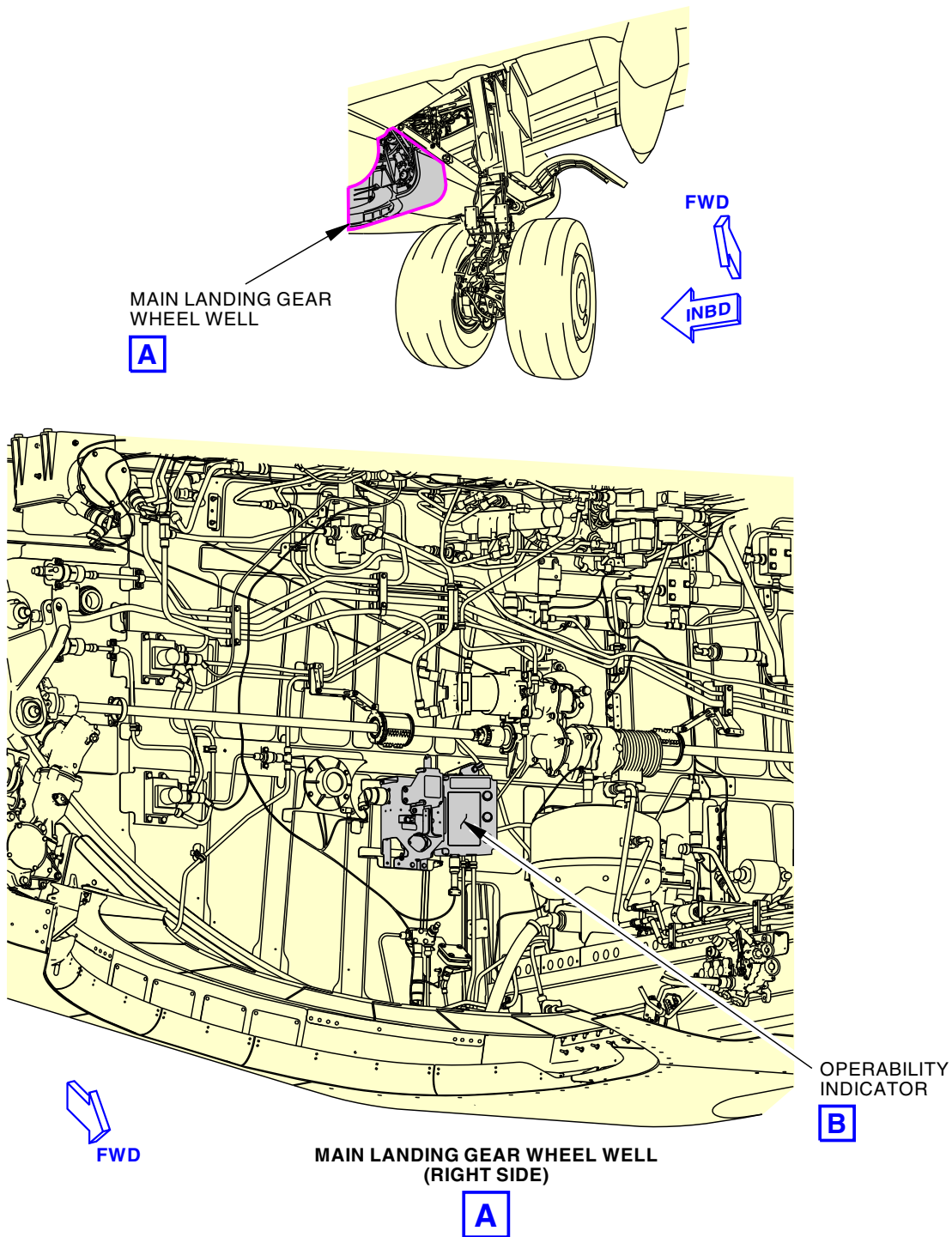
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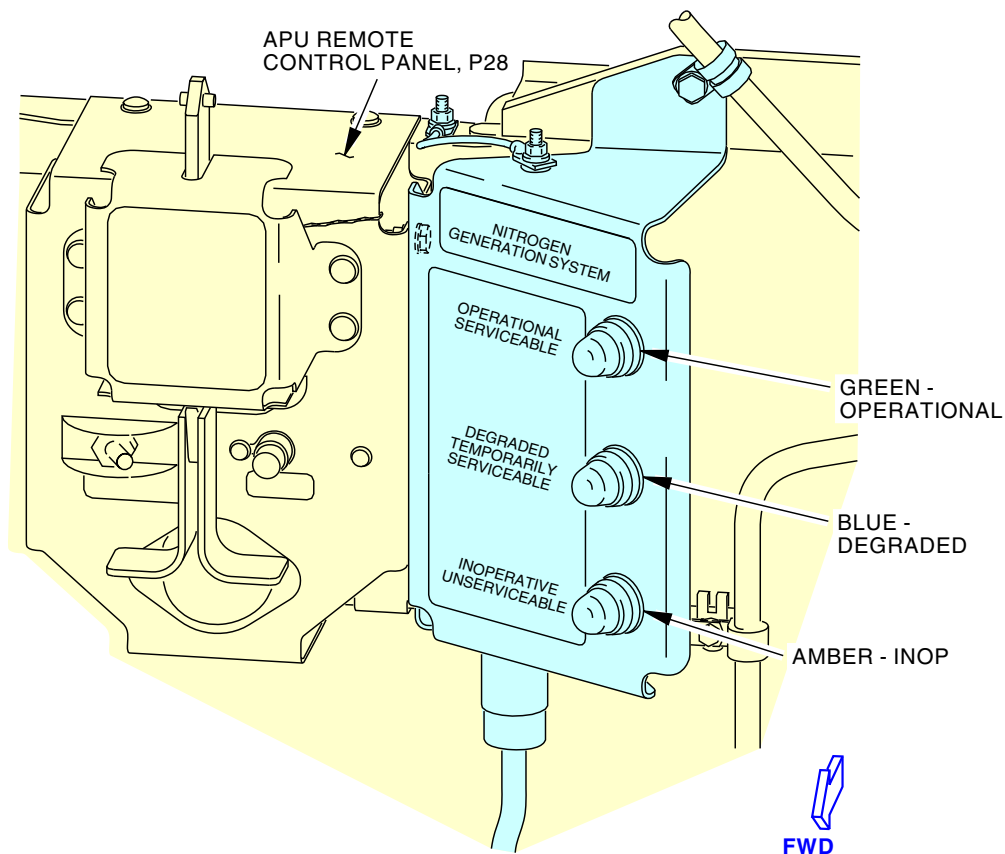
Operability Indicator Light Visual Check
Figure 501/47-31-03-990-802 (Sheet 1 of 2)

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OPERABILITY INDICATOR



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Operability Indicator Light Visual Check
Figure 501/47-31-03-990-802 (Sheet 2 of 2)

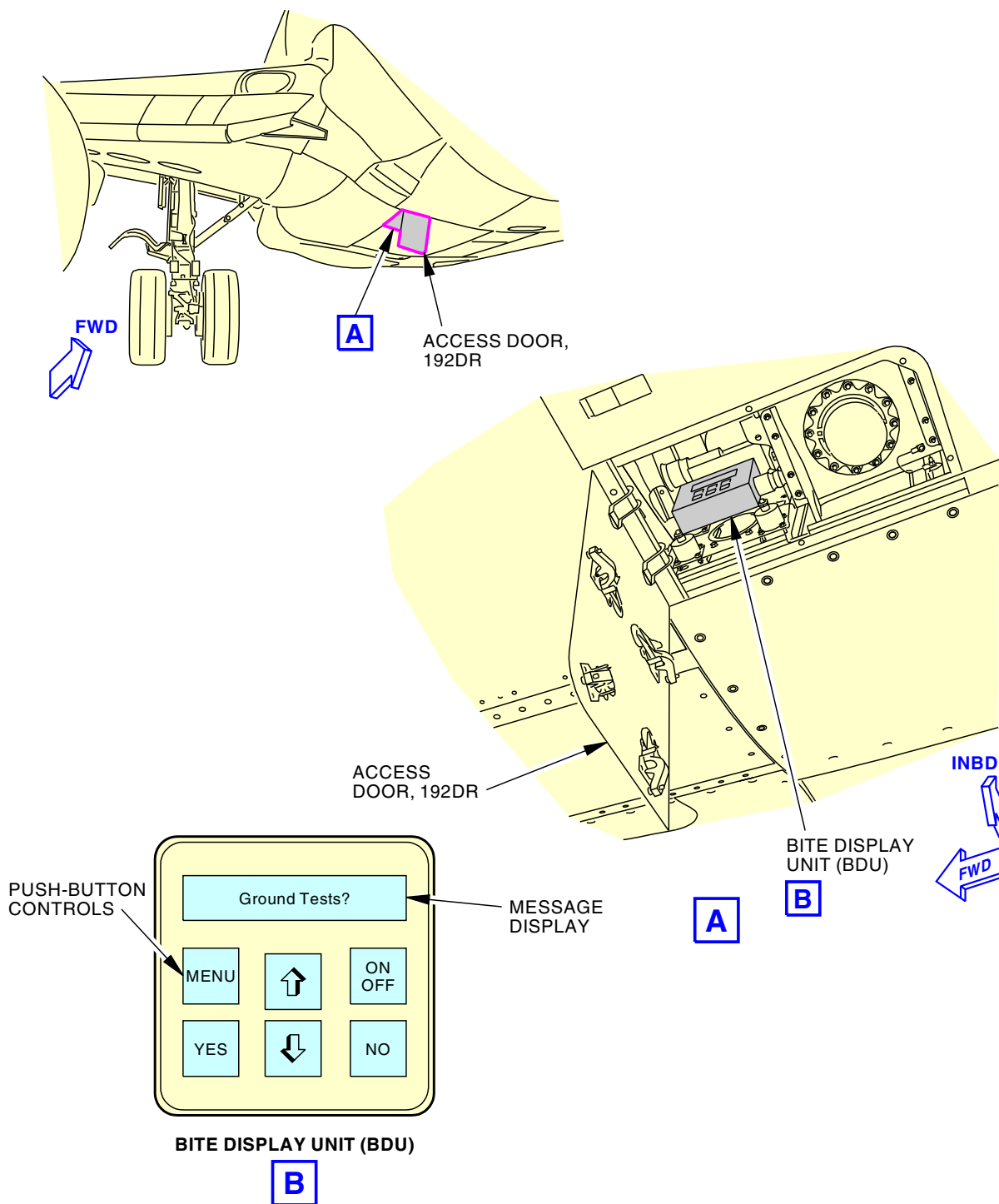
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NGS - BITE Display Unit (BDU)
Figure 502/47-31-03-990-803

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NGS SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the NGS shutoff valve
- (2) An installation of the NGS shutoff valve.

TASK 47-32-01-000-801

2. NGS Shutoff Valve Removal

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192CL	ECS Access Door

E. **Prepare for the Removal**

SUBTASK 47-32-01-010-001

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

- (a) On the P5-10 bleed control module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-32-01-860-001

(2) On the P5-10 bleed control module, put the L PACK and R PACK switches to the OFF position.

- (a) Install the DO NOT OPERATE tag, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-32-01-865-001

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-32-01-010-002

(4) Open this access panel:

Number	Name/Location
192CL	ECS Access Door

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F. NGS Shutoff Valve Removal

SUBTASK 47-32-01-869-001



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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-32-01-030-001

- (2) Disconnect the electrical connector [7].

SUBTASK 47-32-01-030-002

- (3) Do these steps to disconnect the bonding jumper [12].
- (a) Remove the screw [9], washers [10], and nut [11].
 - (b) Disconnect the bonding jumper [12].

SUBTASK 47-32-01-020-001

- (4) Do these steps to disconnect the NGS shutoff valve [1] from the bleed air inlet duct [2].
- (a) Disconnect the coupling [4].

SUBTASK 47-32-01-020-002

- (5) Do these steps to disconnect the NGS shutoff valve [1] from the ozone converter [6]:
- (a) Hold the NGS shutoff valve [1] in its position.
 - (b) Disconnect the coupling [5] and seal [3].
 - (c) Remove the NGS shutoff valve [1].

SUBTASK 47-32-01-490-001

- (6) Install protective covers on the open bleed air inlet duct [2] and ozone converter [6].

————— END OF TASK —————

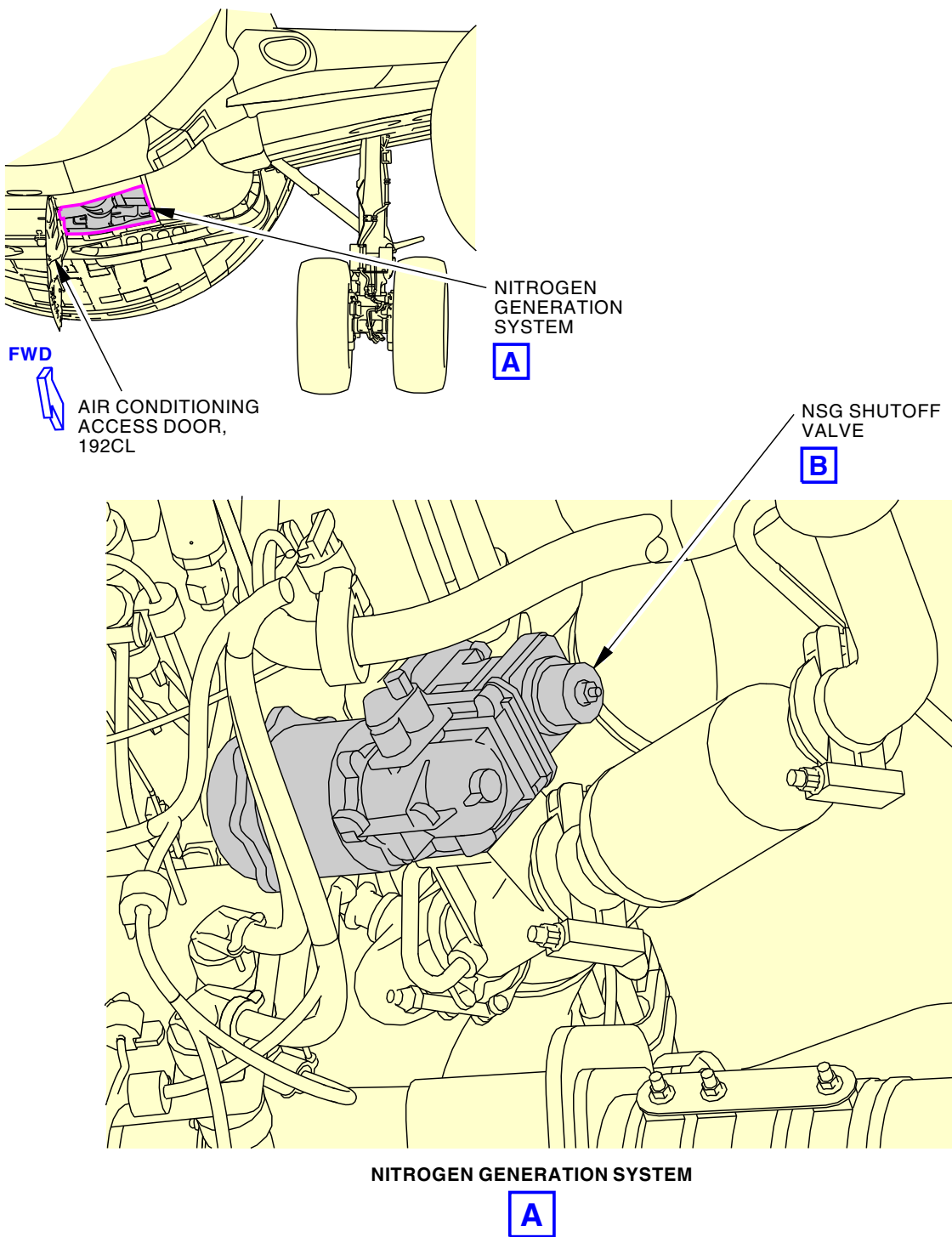
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NGS Shutoff Valve Installation
Figure 401/47-32-01-990-801 (Sheet 1 of 2)

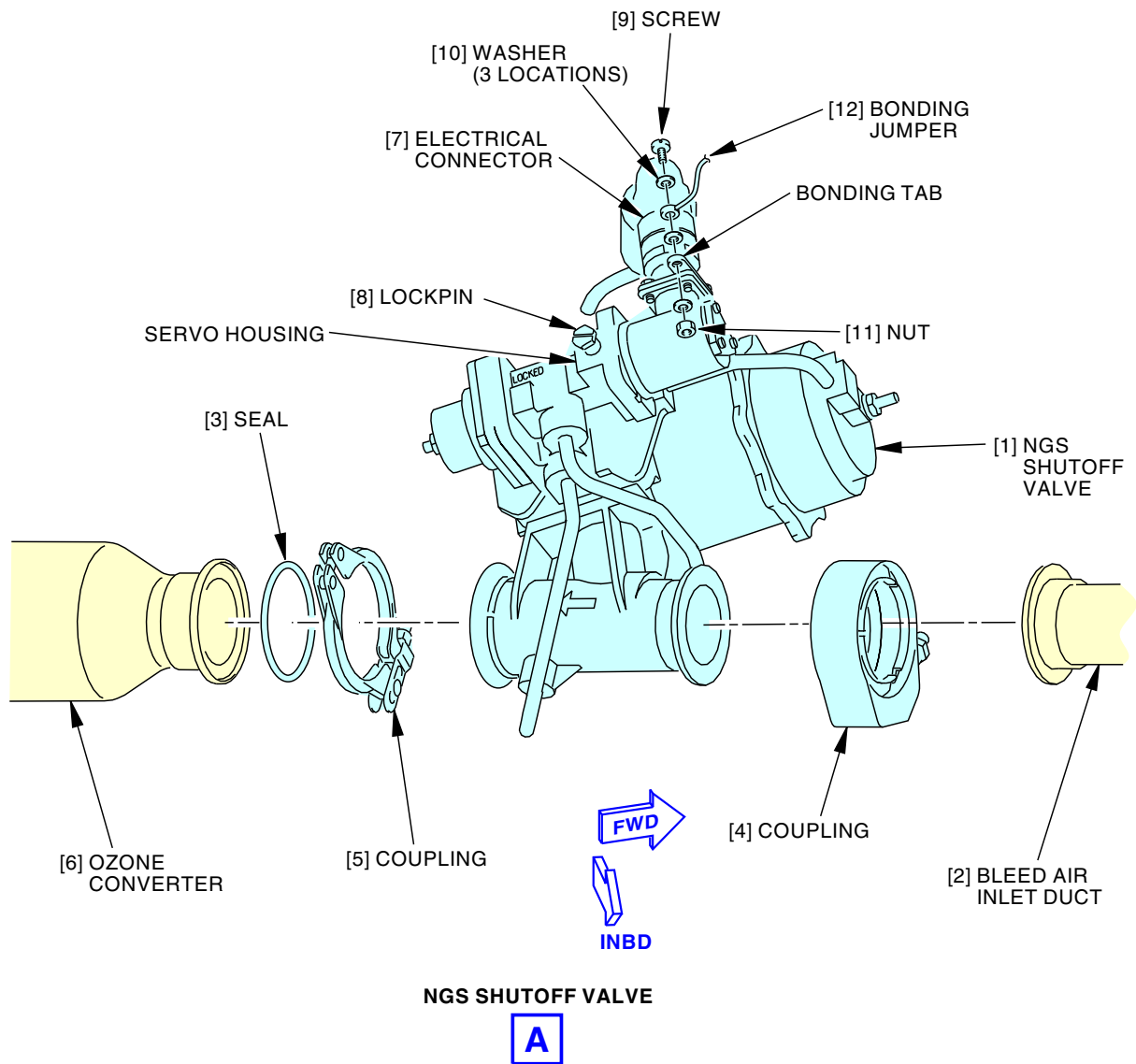
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NGS Shutoff Valve Installation
Figure 401/47-32-01-990-801 (Sheet 2 of 2)

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TASK 47-32-01-400-801

3. NGS Shutoff Valve Installation

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
D00062	Lubricant - Pneumatic System	SAE AMS-G-4343 (NATO G-392)
D00504	Grease - Petrolatum	VV-P-236
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	NGS shutoff valve	47-32-01-01-025	SIA ALL
3	Seal	47-32-02-01-020	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

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Zone	Area
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192CL	ECS Access Door

G. Prepare for the Installation

SUBTASK 47-32-01-430-001

- (1) Do these steps to prepare the NGS shutoff valve [1] for the installation:
 - (a) Make sure that the lockpin [8] is stowed in the servo housing and fully tightened.
 - (b) Make sure that the visual position indicator points to the CLOSED position.

SUBTASK 47-32-01-090-001

- (2) Remove the protective covers from the ozone converter [6] and bleed air inlet duct [2].

SUBTASK 47-32-01-100-001

- (3) Make sure that the NGS shutoff valve [1], ozone converter [6], seal [3], coupling [4], and coupling [5] are clean and free from grease and unwanted materials.

SUBTASK 47-32-01-110-001



DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (4) Use cotton wiper, G00034, or knit cotton wiper, G51293, made moist with solvent, B00062, or solvent, B00184, to clean these areas before the NGS shutoff valve [1] installation.

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-32-01-110-002

- (5) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
 - (a) The mating surfaces of the NGS shutoff valve [1].
 - (b) The mating surfaces of the coupling [4].
 - (c) The mating surfaces of the coupling [5].
 - (d) The mating surfaces of the ozone converter [6].
 - (e) The mating surfaces of the bleed air inlet duct [2].

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SUBTASK 47-32-01-390-001



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.

- (6) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or grease, D00504, or lubricant, D00062, to the seal [3].

SUBTASK 47-32-01-430-002

- (7) Install the seal [3] in its groove of the NGS shutoff valve [1] and ozone converter [6].

H. NGS Shutoff Valve Installation

SUBTASK 47-32-01-420-001

- (1) Do these steps to install the NGS shutoff valve [1]:
- (a) Align the NGS shutoff valve [1] with the bleed air inlet duct [2].
 - (b) Move the coupling [4] for the bleed air inlet duct [2] to its position on the NGS shutoff valve [1].
 - 1) Close, but do not fully tighten, the coupling [4].
 - (c) Make sure that the NGS shutoff valve [1] aligns with the ozone converter [6].
 - (d) Put the coupling [5] in its position on the ozone converter [6] and NGS shutoff valve [1].
 - (e) Torque the coupling [4] to 52.5 ±2.5 in-lb (5.9 ±0.3 N·m).
 - (f) Torque the coupling [5] to 62.5 ±7.5 in-lb (7.1 ±0.8 N·m).
 - (g) Connect the electrical connector [7].

SUBTASK 47-32-01-430-003

- (2) Connect the bonding jumper [12] to the NGS shutoff valve [1] with the screw [9], washers [10], and nut [11].

SUBTASK 47-32-01-200-001

- (3) Measure the electrical bonding resistance between the structure and NGS shutoff valve [1] (SWPM 20-20-00).
- (a) Use an intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

I. NGS Shutoff Valve Operational Test

SUBTASK 47-32-01-865-002

- (1) Prepare the airplane for the operational test:

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tag, STD-858, from the L PACK and R PACK selector switches.

- 1) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-32-01-881-001

- (2) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

SUBTASK 47-32-01-720-001

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.

- (a) With the Nitrogen Generation System (NGS) pressurized, do a check for leaks around the NGS shutoff valve [1].
- (b) Repair any leaks that you find.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-32-01-410-001

- (1) Close this access door:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

————— **END OF TASK** —————

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OZONE CONVERTER - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) A removal of the ozone converter
 - (2) An installation of the ozone converter.

TASK 47-32-02-000-801

2. Ozone Converter Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192CL	ECS Access Door

E. Prepare for the Removal

SUBTASK 47-32-02-860-003

- (1) Make sure that the pneumatic power is off (TASK 36-00-00-860-806).
 - (a) On the P5-10 bleed air control module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-32-02-860-004

- (2) On the P5-10 bleed air control module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install the DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-32-02-860-005

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

EFFECTIVITY
SIA ALL

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SUBTASK 47-32-02-010-004

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

F. Ozone Converter Removal

SUBTASK 47-32-02-020-003



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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-32-02-020-004

- (2) Do these steps to disconnect the ozone converter [1]:
- Disconnect the first coupling [4] between the ozone converter [1] and NGS shutoff valve [2].
 - Hold the ozone converter [1] in its position.
 - Disconnect the second coupling [4] between the ozone converter [1] and air duct [5], inboard of the 41 beam.
 - Remove the ozone converter [1].
 - Keep the seals [3].

SUBTASK 47-32-02-910-001

- (3) Put protective covers on the air duct [5] and NGS shutoff valve [2] to keep out unwanted material.

————— END OF TASK —————

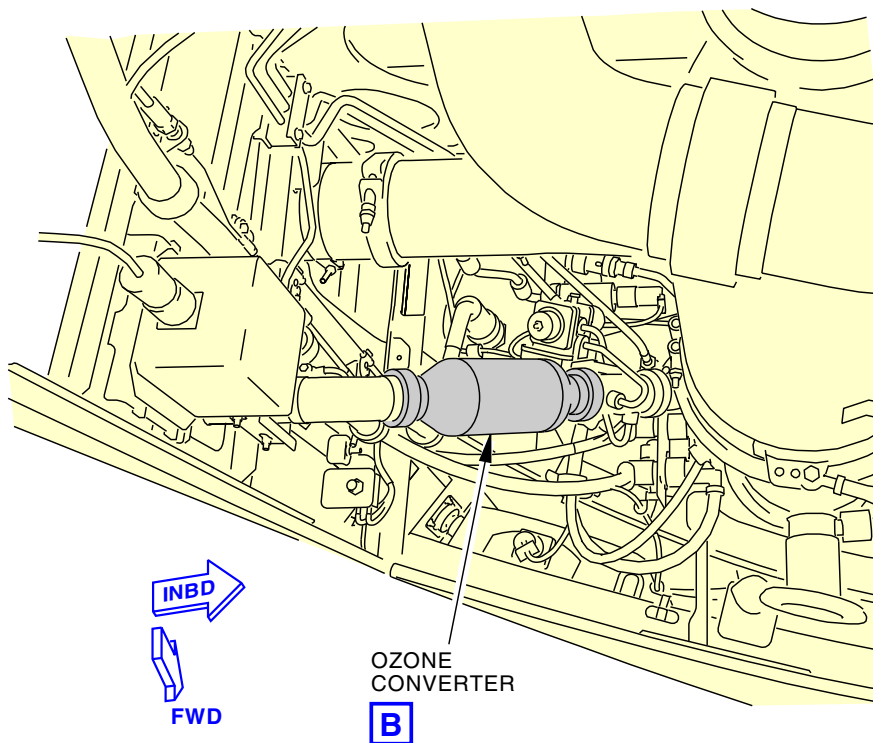
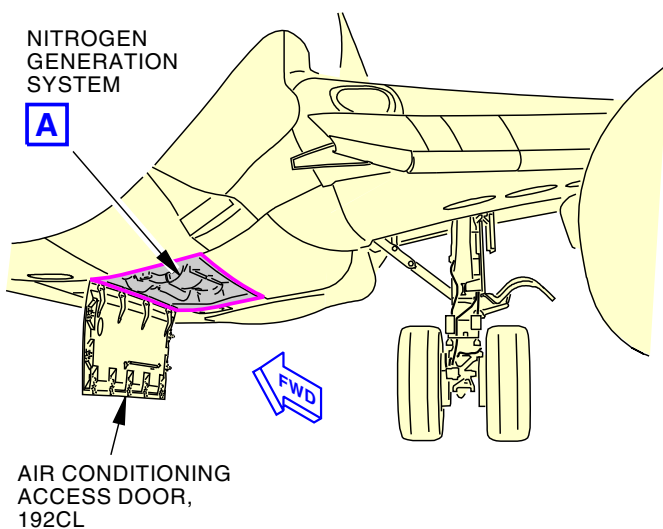
EFFECTIVITY
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2415382 S00061537692_V1

Ozone Converter Installation
Figure 401/47-32-02-990-802 (Sheet 1 of 2)

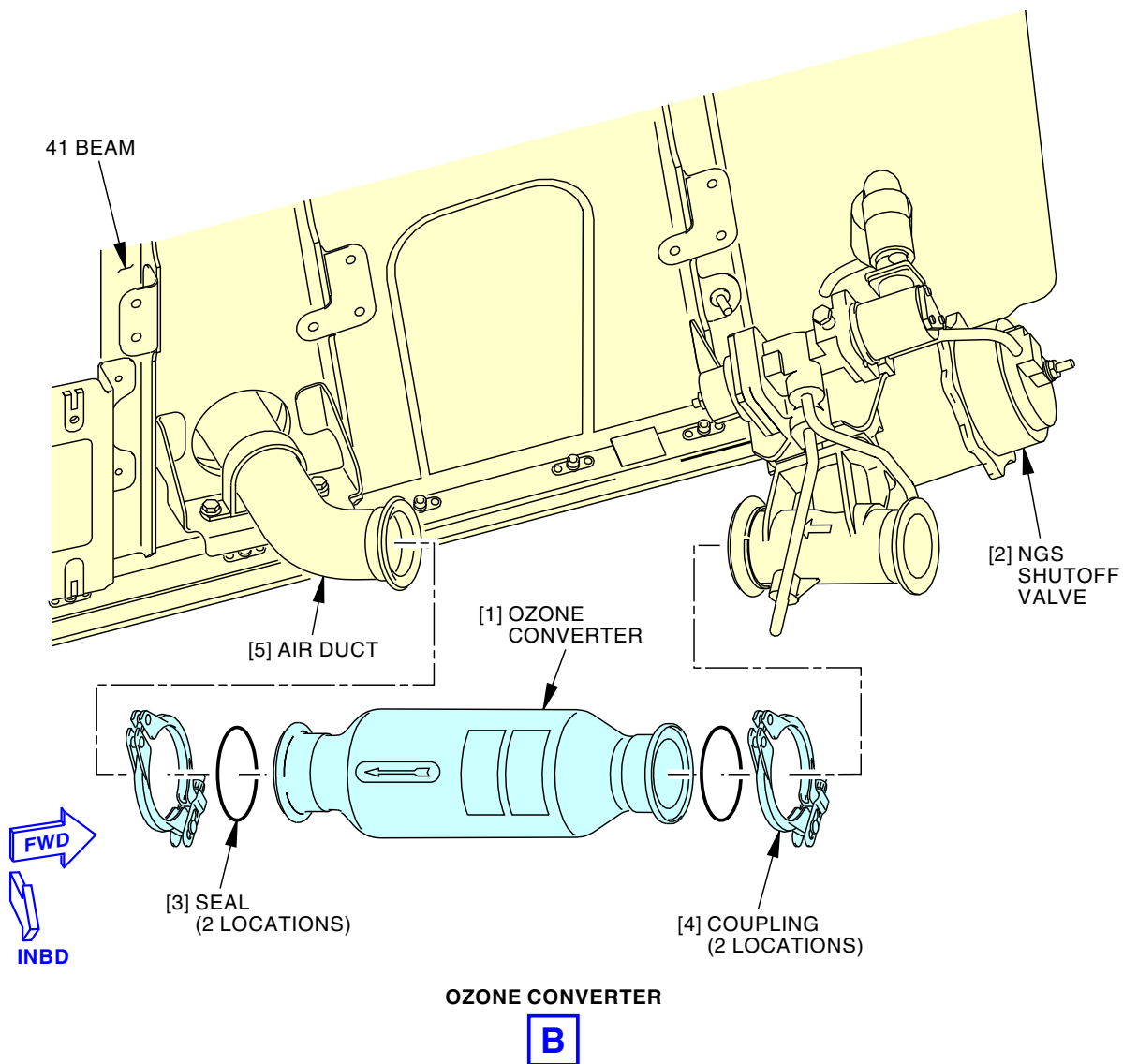
EFFECTIVITY
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2415383 S00061537693_V2

Ozone Converter Installation
Figure 401/47-32-02-990-802 (Sheet 2 of 2)

EFFECTIVITY
SIA ALL

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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
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
D00062	Lubricant - Pneumatic System	SAE AMS-G-4343 (NATO G-392)
D00504	Grease - Petrolatum	VV-P-236
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Ozone converter	47-32-02-01-050	SIA ALL
3	Seal	47-32-02-01-020	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

EFFECTIVITY
SIA ALL

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F. Access Panels

Number	Name/Location
192CL	ECS Access Door

G. Ozone Converter Installation

SUBTASK 47-32-02-030-001

- (1) Remove the protective covers from the NGS shutoff valve [2] and air duct [5].

SUBTASK 47-32-02-100-001

- (2) Make sure that the ozone converter [1], air duct [5], NGS shutoff valve [2], seals [3], and couplings [4] are clean, free from grease and unwanted material.

SUBTASK 47-32-02-110-001



DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (3) Use cotton wiper, G00034, or knit cotton wiper, G51293, made moist with solvent, B00062, or solvent, B00184, to clean these areas before the ozone converter [1] installation.

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-32-02-110-002

- (4) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
 - (a) The mating surfaces of the ozone converter [1].
 - (b) The mating surface of the NGS shutoff valve [2].
 - (c) The mating surface of the couplings [4].

SUBTASK 47-32-02-390-001



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.

- (5) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or grease, D00504, or lubricant, D00062, to the seals [3].

SUBTASK 47-32-02-430-001

- (6) Install the seals [3] in their grooves on the ozone converter [1] on both sides.

SUBTASK 47-32-02-420-001

- (7) Do these steps to install the ozone converter [1]:
 - (a) Put one coupling [4] on each end of the ozone converter [1].

EFFECTIVITY
SIA ALL

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- (b) Put the ozone converter [1] in its position.
 - 1) Make sure that the arrow on the ozone converter [1] is directed from the NGS shutoff valve [2] to the air duct [5].
- (c) Connect, but do not tighten, the coupling [4] to the ozone converter [1] and NGS shutoff valve [2].
- (d) Connect, but do not tighten, the coupling [4] on the ozone converter [1] and air duct [5].
- (e) Make sure that the ozone converter [1] aligns with the NGS shutoff valve [2] and air duct [5].
- (f) Tighten the two couplings [4] to 62.5 ± 7.5 in-lb (7.1 ± 0.8 N·m).

SUBTASK 47-32-02-765-001

- (8) Measure the resistance between the 41 beam and ozone converter [1] (SWPM 20-20-00).
 - (a) Use the intrinsically safe approved bonding meter, COM-1550.
 - (b) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

H. Ozone Converter Operational Test

SUBTASK 47-32-02-710-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-32-02-860-002

- (2) Remove the DO NOT OPERATE tags, from the L PACK and R PACK selector switches, on the P5-10 air conditioning panel.
 - (a) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-32-02-790-001

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
 - (a) Repair the leaks that you find.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-32-02-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

————— END OF TASK —————

EFFECTIVITY
SIA ALL

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HEAT EXCHANGER - REMOVAL/INSTALLATION

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has these tasks:
 - (1) Heat Exchanger Removal
 - (2) Heat Exchanger Installation.
- C. There is insulation installed on the heat exchanger, but it is not shown on Figure 401 in this procedure.

TASK 47-32-03-000-801

2. Heat Exchanger Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. **References**

Reference	Title
21-51-24-000-801	Ram Air Ducts Removal (P/B 401)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-32-03-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indications show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-32-03-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R switches to the OFF position.
 - (a) Install DO NOT OPERATE tag, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-32-03-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL

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(Continued)

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	15	C01680	NGS ALT PWR

SUBTASK 47-32-03-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-32-03-010-002



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.



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.

- (5) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-32-03-020-006

- (6) If it is necessary, do these steps to remove the tube [2] that is under the heat exchanger [11] (View B, Figure 401):
- (a) Do these steps to remove clamp [1]:
 - 1) Remove the nut [6], washers [8] and bolt [3] from the clamp [1].
 - 2) Remove the clamp [1] from the tube [2].
 - (b) Disconnect the bonding jumpers [4] from tube [2]:
 - 1) Remove the nut [6], washers [5] and bolt [3].
 - (c) Loosen the nut on the tube [2] from the tee [7].
 - (d) Loosen the nut on the other end of the tube [2] from the airplane structure.
 - (e) Remove the tube [2].

SUBTASK 47-32-03-030-001

- (7) Loosen the hose clamp [14] that connects the heat exchanger [11] to the flex hose [15] (View C, Figure 401).

EFFECTIVITY
SIA ALL

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SUBTASK 47-32-03-010-003

- (8) To get access to the heat exchanger [11], do this task: Ram Air Ducts Removal, TASK 21-51-24-000-801.

NOTE: When you remove the ram air duct, the flex hose will stay attached to the ram air inlet duct. You must pull the flex hose off the ram air inlet duct.

NOTE: If it is necessary, when you remove the ram air inlet duct, disconnect the nut on the Nitrogen Enriched Air (NEA) duct at the outlet port on the high flow valve. Remove the clamps on the NEA duct and then remove the NEA duct.

F. Heat Exchanger Removal

SUBTASK 47-32-03-030-002

- (1) Remove the coupling [10] between the bleed air inlet duct and the heat exchanger [11].
- (a) Discard the two O-rings [9].

SUBTASK 47-32-03-030-003

- (2) Remove the coupling [10] between the bleed air outlet duct and the heat exchanger [11].
- (a) Discard the two O-rings [9].

SUBTASK 47-32-03-030-004

- (3) Remove the coupling [13] and the seal [12] between the ram air valve and the heat exchanger [11].
- (a) Keep the seal [12].

SUBTASK 47-32-03-030-005

- (4) Remove the flex hose [15] between the ram air inlet duct and the heat exchanger [11].

SUBTASK 47-32-03-030-006

- (5) Do this step to disconnect the attached brackets (View D and View F, Figure 401):
- (a) Remove the bolt [16], washer [17], bushings [18], washer [19], and nut [20].

SUBTASK 47-32-03-030-007

- (6) Do this step to disconnect the extension rod [23] (View E, Figure 401):
- (a) Remove the bolt [21], washer [17], bushing [22], washer [24], and nut [20].

SUBTASK 47-32-03-020-004

- (7) Do these steps to remove the heat exchanger [11] from the attached bracket (View G, Figure 401):
- (a) Hold the heat exchanger [11] in its position.
- (b) Remove the bolt [21], washer [17], bonding jumper [26], washer [24], shim [25] (if installed), bushing [22], washer [19], and nut [20].

SUBTASK 47-32-03-913-001

- (8) Install protective covers on the duct openings to keep out unwanted material.

————— **END OF TASK** —————

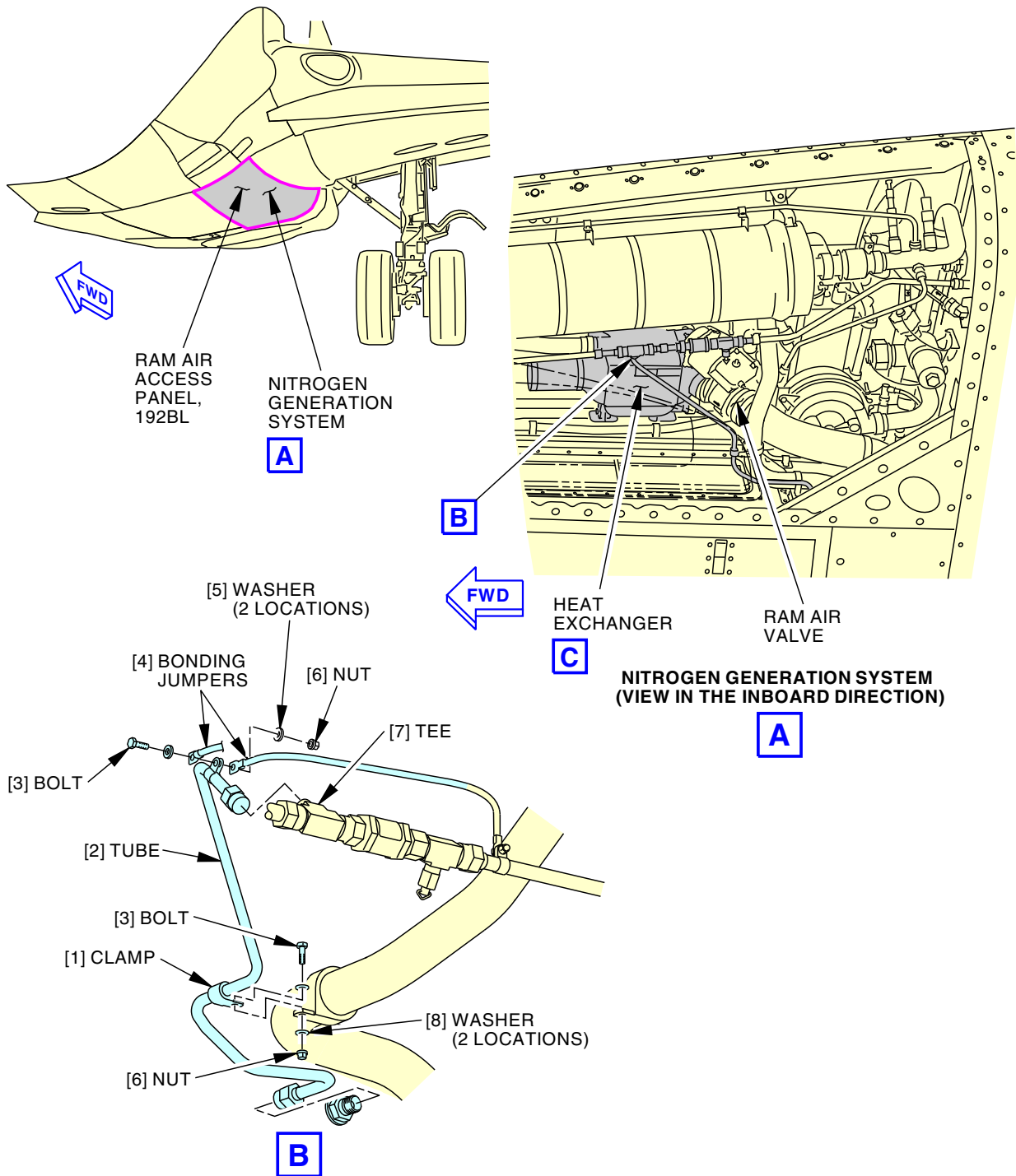
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Heat Exchanger Installation
Figure 401/47-32-03-990-801 (Sheet 1 of 3)

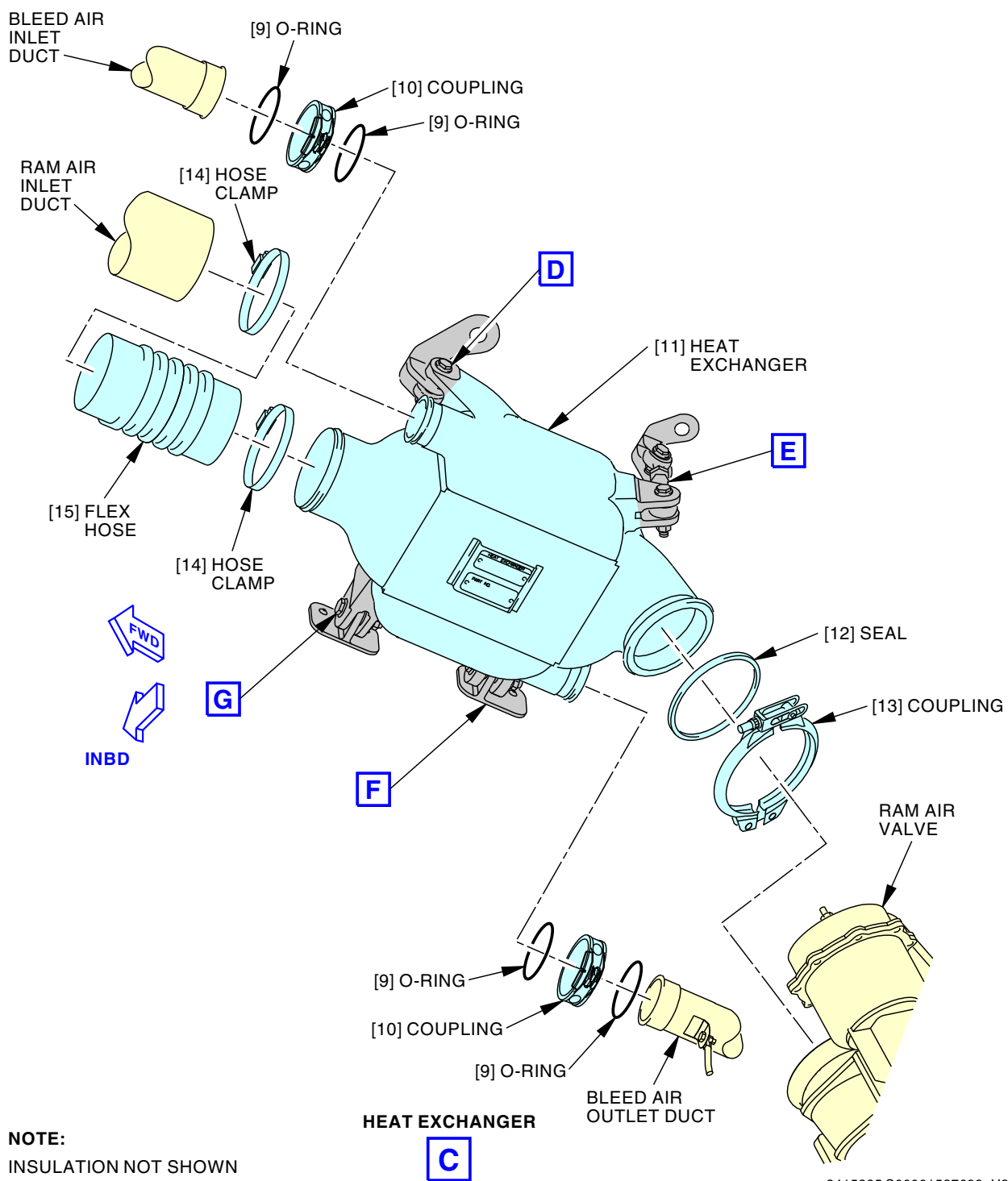
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Heat Exchanger Installation
Figure 401/47-32-03-990-801 (Sheet 2 of 3)

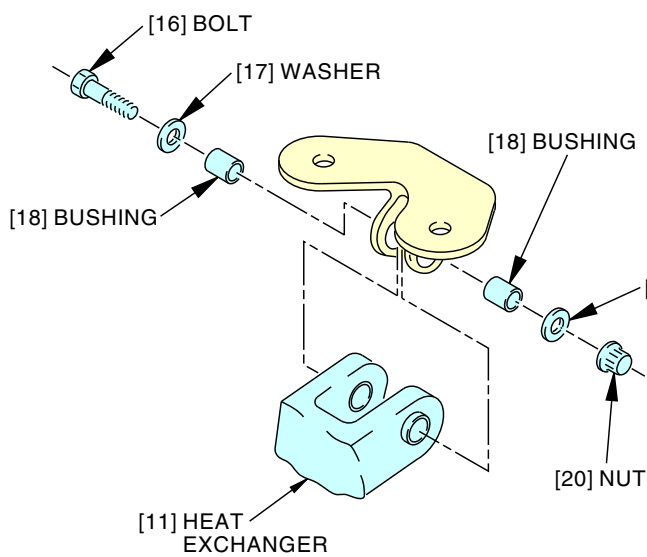
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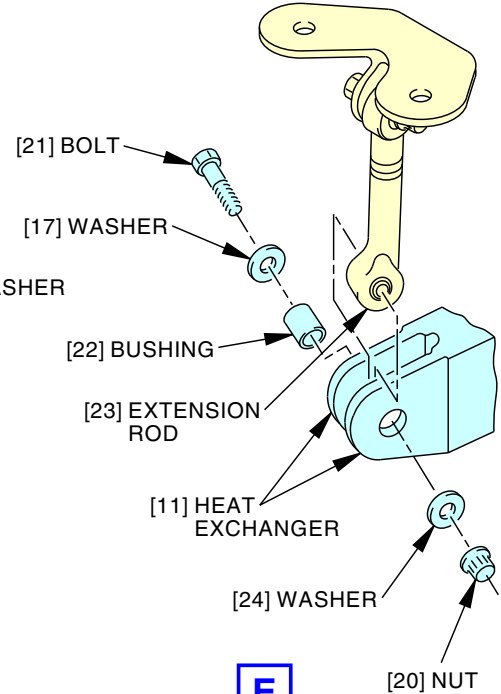
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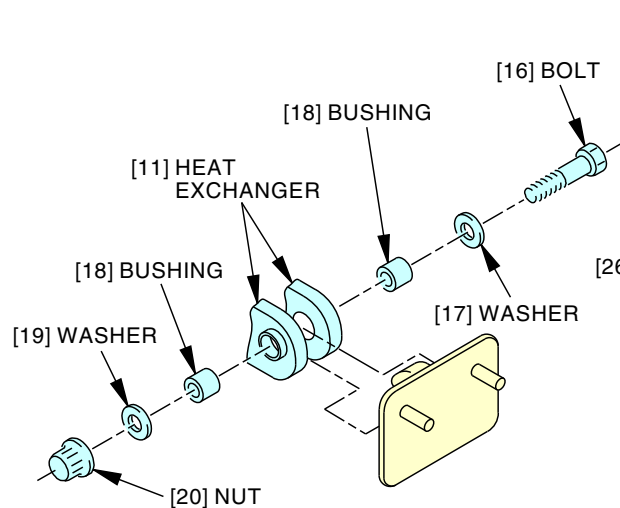
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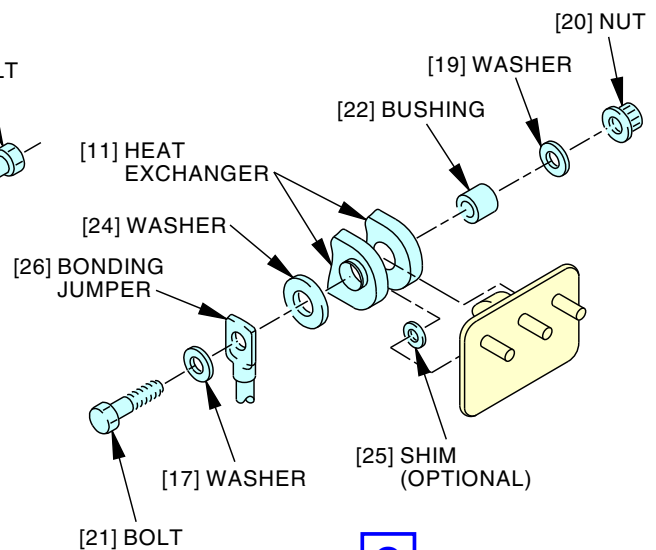
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E



F



G

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Heat Exchanger Installation
Figure 401/47-32-03-990-801 (Sheet 3 of 3)

EFFECTIVITY
SIA ALL

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TASK 47-32-03-400-801

3. Heat Exchanger Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
21-51-24-400-801	Ram Air Ducts Installation (P/B 401)
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
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)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
9	O-ring	47-21-01-01-025	SIA ALL
11	Heat exchanger	47-32-03-01-090	SIA ALL
12	Seal	47-32-03-01-110	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

EFFECTIVITY
SIA ALL

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(Continued)

Zone	Area
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212	Flight Compartment - Right
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F. Access Panels

Number	Name/Location
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192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
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G. Prepare for the Installation

SUBTASK 47-32-03-020-005

- (1) Remove the protective covers from the ducts.

SUBTASK 47-32-03-100-001

- (2) Make sure that the ducts, couplings, clamps, and fasteners are clean, free from grease and unwanted material.

SUBTASK 47-32-03-110-001



DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (3) Use a cotton wiper, G00034, or knit cotton wiper, G51293, made moist with solvent, B00062, or solvent, B00184, to clean these areas before you install heat exchanger [11].

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-32-03-100-002

- (4) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
 - (a) Mating surfaces of the attach brackets.
 - (b) Mating surfaces of the heat exchanger [11] attach brackets.
 - (c) Mating surfaces of the ram air valve and the heat exchanger [11].

H. Heat Exchanger Installation

SUBTASK 47-32-03-430-001

- (1) Make sure that insulation blankets and tape for the insulation blankets have been installed on the heat exchanger before the heat exchanger is installed on the airplane.
- (2) Do these steps to attach the heat exchanger [11] to the bracket (View D, Figure 401).
 - (a) Make sure that the bushings [18] are installed in the attached bracket.
 - (b) Apply a thin layer of compound, C00852, to the bolt [16].
 - (c) Put the heat exchanger [11] in its position.
 - (d) Install, but do not fully tighten, the bolt [16], washer [17], bushings [18], washer [19], and nut [20].

SUBTASK 47-32-03-430-002

- (3) Do these steps to attach the heat exchanger [11] to the extension rod [23] (View E, Figure 401).
 - (a) Make sure that the bushing [22] is installed.
 - (b) Apply a thin layer of compound, C00852, to the bolt [21].

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- (c) Put the heat exchanger [11] in its position.
- (d) Install, but do not fully tighten, the bolt [21], washer [17], bushing [22], washer [24], and nut [20].

SUBTASK 47-32-03-430-003

- (4) Do these steps to attach the heat exchanger [11] to the bracket (View F, Figure 401).
 - (a) Make sure that the bushings [18] are installed in the attached bracket.
 - (b) Put the heat exchanger [11] in its position.
 - (c) Install, but do not fully tighten, the bolt [16], washer [17], bushings [18], washer [19], and nut [20].

SUBTASK 47-32-03-430-004

- (5) Do these steps to attach the heat exchanger [11] to the bracket (View G, Figure 401).
 - (a) Make sure that the bushing [22] is installed in the attached bracket.
 - (b) Install, but do not fully tighten, the bolt [21], washer [17], bonding jumper [26], washer [24], new shim [25] (if necessary), bushing [22], washer [19], and nut [20].

NOTE: Use a shim to fill the space between the bosses when necessary.

SUBTASK 47-32-03-430-005

- (6) Do these steps to connect to the bleed air inlet duct (View C, Figure 401):



WARNING

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, or water to the two new O-rings [9].
- (b) Install the O-rings [9] on the bleed air inlet duct and the heat exchanger inlet.
- (c) Install the coupling [10] to the bleed air inlet.

SUBTASK 47-32-03-430-006

- (7) Do these steps to connect to the bleed air outlet duct:

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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.

- Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or water to the two O-rings [9].
- Install the O-rings [9] on the bleed air outlet duct and the heat exchanger outlet.
- Install the coupling [10] to the bleed air outlet.

SUBTASK 47-32-03-430-007

- Do these steps to connect to the ram air valve:
 - Examine the seal [12] to make sure that it is clean and not damaged before reuse, replace if necessary.



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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.

- Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or water to the seal [12].
- Install the seal [12] to the ram air valve.
- Install the coupling [13] to the bleed air outlet.

SIA ALL; AIRPLANES WITH COUPLING P/N 234-072-9009

- Torque the coupling [13] to 60 $\pm$ 5 in-lb (7 $\pm$ 1 N·m).

SIA ALL; AIRPLANES WITH COUPLING P/N AS1895/4-300

- Torque the coupling [13] to 92.5 $\pm$ 7.5 in-lb (10 $\pm$ 1 N·m).

SIA ALL

SUBTASK 47-32-03-420-001

- Torque the bolts [16] and bolts [21] to 65 $\pm$ 15 in-lb (7.3 $\pm$ 1.7 N·m).

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SUBTASK 47-32-03-280-001

- (10) Use an intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the bonding jumper [26] (View G, Figure 401) and the airplane structure (SWPM 20-20-00).
 - (a) Make sure that the electrical resistance is 0.010 ohm (10 milliohms) or less.

I. Left Ram Air Duct Installation

SUBTASK 47-32-03-210-001

- (1) Prepare to install the left ram air duct:
 - (a) Examine the flex hose [15] and the hose clamp [14] that remained on the ram air duct.
 - 1) Replace the flex hose [15] and hose clamp [14] if it is necessary.
 - (b) Install, but do not tighten, the remaining hose clamp [14] on the flex hose.

SUBTASK 47-32-03-410-001

- (2) Do this task to install the left ram air duct: Ram Air Ducts Installation, TASK 21-51-24-400-801.

SUBTASK 47-32-03-430-008

- (3) Do these steps to complete the installation:
 - (a) Put the flex hose [15] on the heat exchanger [11] at the ram air inlet port.
 - (b) Align the hose clamp [14] in its position on the heat exchanger [11].
 - (c) Torque the hose clamp [14] to 15.5 ± 2.5 in-lb (1.8 ± 0.3 N·m).

J. Tube Under the Heat Exchanger Installation

SUBTASK 47-32-03-420-005

- (1) If it was removed, install the tube [2] under the heat exchanger [11] (View B, Figure 401):
 - (a) Torque the nuts [6] on the tube [2] to 170 ± 5 in-lb (19 ± 1 N·m).
 - (b) Install the clamp [1] on the tube [2].
 - 1) Install the washers [8], nut [6], and bolt [3]
 - (c) Attach the bonding jumpers [4] to the tube [2].
 - 1) Install the washers [5], nut [6], and bolt [3].
 - (d) Use an intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the tube [2] and airplane structure (SWPM 20-20-00).
 - 1) Make sure that the electrical resistance is 0.010 ohm (10 milliohms) or less.

K. Heat Exchanger Operational Test

SUBTASK 47-32-03-710-001

- (1) Prepare the airplane for the operational test:
 - (a) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tag, from the L PACK and R PACK switches, on the P5 panel.
- (c) Put the L PACK and R PACK selector switches to the AUTO position.

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SUBTASK 47-32-03-790-001

- (2) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
- (a) With the Nitrogen Generation System (NGS) pressurized, do a check for leaks around the heat exchanger [11].
 - (b) Repair the leaks that you find.

L. Put the Airplane Back to Its Usual Condition

SUBTASK 47-32-03-410-002

- (1) Close this access door:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— **END OF TASK** —————

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NGS FILTER - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the NGS filter element
- (2) An installation of the NGS filter element
- (3) A removal of the NGS filter assembly
- (4) An installation of the NGS filter assembly.

TASK 47-32-04-000-802

2. NGS Filter Element - Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. **References**

Reference	Title
33-44-02-960-804	Lower Anti-Collision Light - Power Supply Replacement (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-32-04-860-002

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that DUCT PRESS L and R indicators shows 0.50 psig (3.45 kPa) in the L and R pneumatic ducts.

SUBTASK 47-32-04-860-003

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install DO NOT OPERATE tag, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-32-04-860-004

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-32-04-020-002

(4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-32-04-910-002



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.



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.

(5) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SIA 001-014

SUBTASK 47-32-04-000-001

(6) Remove the lower anti-collision light power supply (TASK 33-44-02-960-804).

SIA ALL

F. NGS Filter Element Removal

SUBTASK 47-32-04-020-003

- (1) Remove the filter bowl [11].
 - (a) Remove the lockwire from the insulation jacket [20].
 - (b) Unscrew the nut from the T-Bolt trunnion on the vee band clamp [12].
 - (c) Remove the filter bowl [11] with the insulation jacket [20].
 - (d) Remove the vee band clamp [12].
 - (e) Remove the outer flange O-ring [15].
 - 1) Discard the O-ring [15].

SUBTASK 47-32-04-020-004

- (2) Remove the filter element [17] from the filter head [16].
 - (a) Remove the bolt [19].
 - 1) Remove the O-ring [18] from the bolt [19].
 - 2) Discard the O-ring [18].

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- (b) Remove the filter element [17] away from the filter head [16].

NOTE: You might need extra pulling force for the filter element.

NOTE: Special precaution is necessary to make sure that residual contamination in the filter head does not go into the outlet side of the NGS filter assembly and then downstream into the ASM.

- 1) Discard the filter element [17].

- (c) Remove the O-ring [13] and O-ring [14].

- 1) Discard the O-ring [13] and O-ring [14].

———— **END OF TASK** ————

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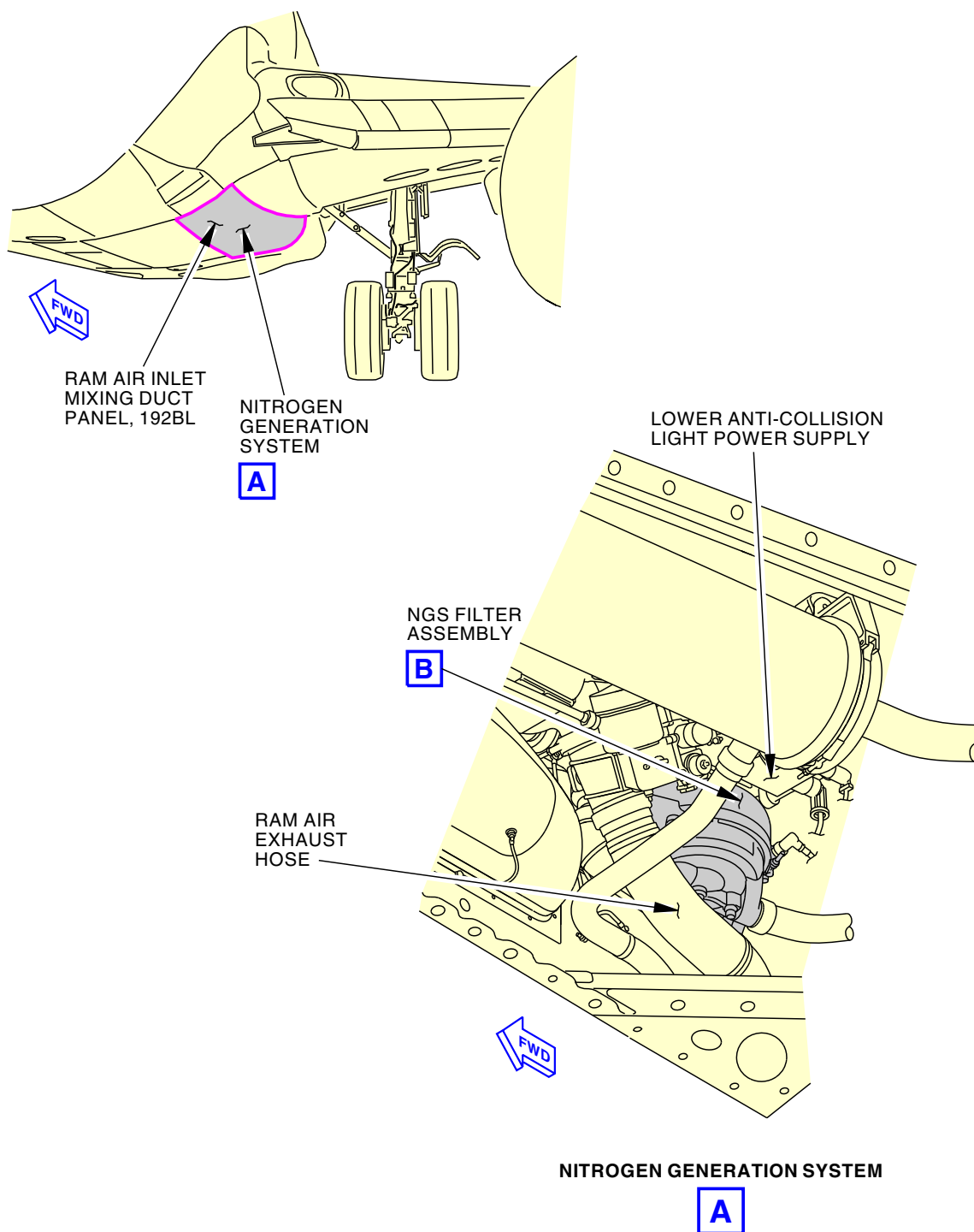
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2415389 S00061537709_V1

NGS Filter Element Installation
Figure 401/47-32-04-990-802 (Sheet 1 of 3)

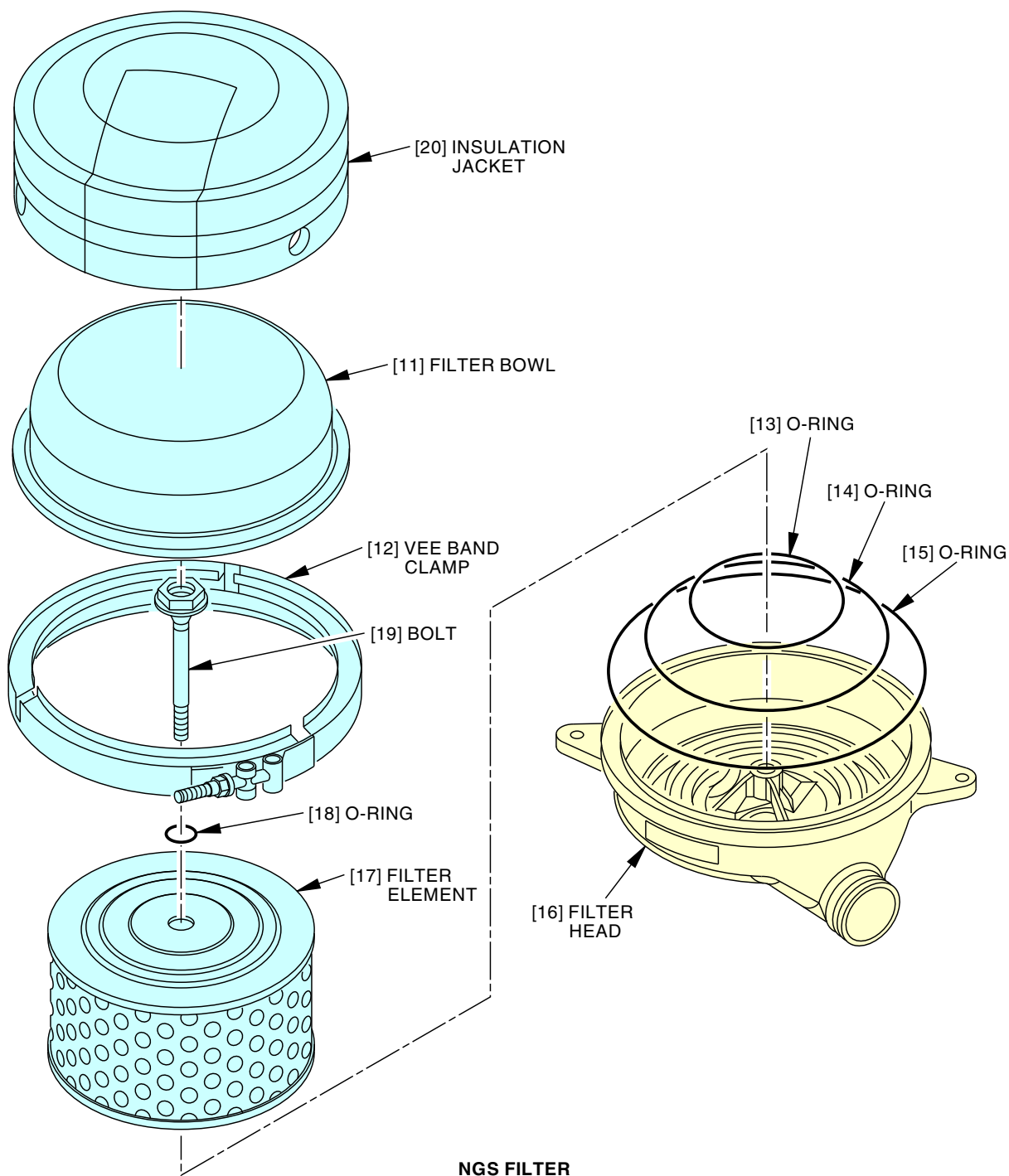
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2415390 S00061537710_V2

NGS Filter Element Installation
Figure 401/47-32-04-990-802 (Sheet 2 of 3)

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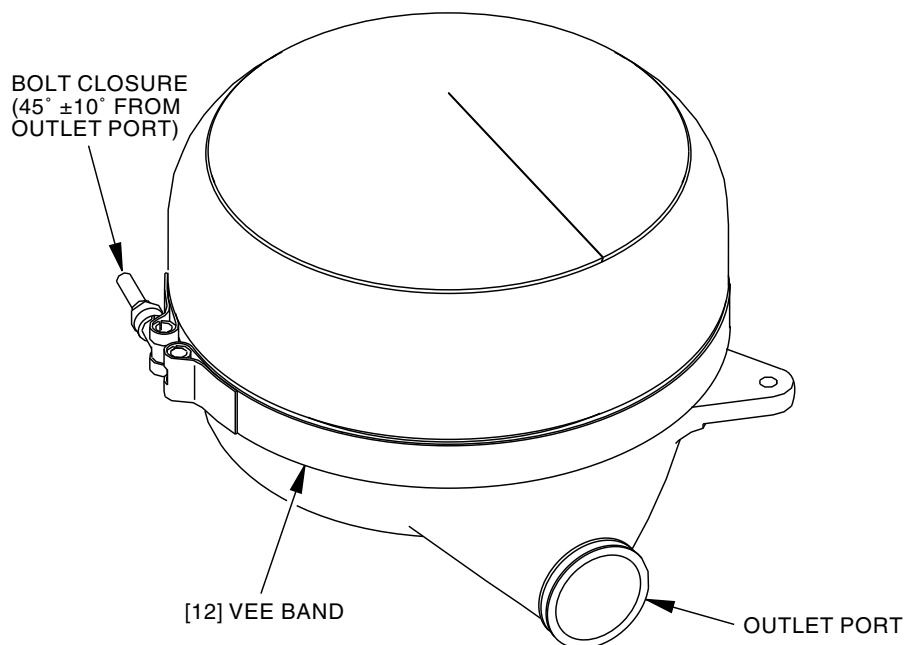
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3012169 S0000785777_V1

NGS Filter Element Installation
Figure 401/47-32-04-990-802 (Sheet 3 of 3)

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TASK 47-32-04-400-802

3. **NGS Filter Element - Installation**

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. **References**

Reference	Title
33-44-02-960-804	Lower Anti-Collision Light - Power Supply Replacement (P/B 201)
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Consumable Materials**

Reference	Description	Specification
D50063	Grease - Perfluoropolyether, fuel and oxygen resistant - Krytox 240AC	MIL-PRF- 27617 Type III
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. **Expendables/Parts**

AMM Item	Description	AIPC Reference	AIPC Effectivity
13	O-ring	47-32-04-01-065	SIA ALL
14	O-ring	47-32-04-01-070	SIA ALL
15	O-ring	47-32-04-01-075	SIA ALL
17	Filter element	47-32-04-01-050	SIA ALL
18	O-ring	47-32-04-01-060	SIA ALL

E. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

F. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. **Prepare for the Installation**

SUBTASK 47-32-04-110-003

- (1) Clean these components:
 - (a) The flange of the filter bowl [11]
 - (b) The flange of the filter head [16].

H. **NGS Filter Element Installation**

SUBTASK 47-32-04-420-002

- (1) Install the filter element [17] onto the filter head [16].
 - (a) Install the new O-ring [13] and new O-ring [14].

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- (b) Install the new filter element [17].



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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.

- (c) Apply a small quantity of Krytox 240AC perfluoropolyether grease, D50063, to the O-ring [18].
- (d) Install the new O-ring [18] on the bolt [19].
- (e) Install the bolt [19] through the filter element [17] into the filter head [16].
- (f) Torque the bolt [19] to 89 in-lb (10 N·m).

SUBTASK 47-32-04-420-003

- (2) Install the filter bowl [11] on the filter head [16].



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- 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 small quantity of Krytox 240AC perfluoropolyether grease, D50063, to the O-ring [15].
- (b) Install the new O-ring [15] in its groove on the filter head [16].
- (c) Install the filter bowl [11] on the filter head [16].
- 1) Make sure that both parts are concentric.
- (d) Install the vee band clamp [12] to the filter bowl [11] and filter head [16].

SUBTASK 47-32-04-420-004

- (3) Install the insulation jacket [20] onto the filter bowl [11].
- (a) Put the insulation jacket [20] on the filter bowl [11].
- (b) Position the bolt closure on the vee band clamp [12] between 35.00°arc (0.61 rad) and 55.00°arc (0.96 rad) from the outlet port.
- (c) Align the wire locking eyelets on the insulation jacket [20] with the gaps in the vee band clamp [12].



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- (d) Use the MS20995C32 lockwire, G01048, or MS20995N32 lockwire, G50177 (optional), to secure the insulation jacket [20] to the vee band clamp [12].

SUBTASK 47-32-04-420-005

- (4) Torque the nut on the vee band clamp [12] to 75 ±4 in-lb (8.5 ±0.5 N·m).

SIA 001-014

SUBTASK 47-32-04-420-006

- (5) Install the lower anti-collision light power supply (TASK 33-44-02-960-804).

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I. NGS Filter Assembly Operational Test

SUBTASK 47-32-04-860-005

- (1) Prepare the airplane for the operational test.
- (a) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tag, STD-858, from the L PACK and the R PACK selector switches.
- (c) Put the L PACK and the R PACK selector switches to the AUTO position.

SUBTASK 47-32-04-790-002

- (2) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
- (a) With the Nitrogen Generation System (NGS) pressurized, do a leak check of the NGS filter assembly [1].
- (b) Repair the leaks that you find.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-32-04-410-003

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— END OF TASK —————

TASK 47-32-04-000-801

4. NGS Filter Assembly - Removal

(Figure 402)

A. References

<u>Reference</u>	<u>Title</u>
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
47-32-05-000-801	Ram Air Valve Removal (P/B 401)

B. Tools/Equipment

<u>Reference</u>	<u>Description</u>
STD-858	Tag - DO NOT OPERATE

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C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. Prepare for the Removal

SUBTASK 47-32-04-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators shows 0.50 psig (3.45 kPa) in the L and R pneumatic ducts.

SUBTASK 47-32-04-860-001

- (2) On the P5-10 Bleed Control Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install the DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-32-04-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-32-04-010-001

- (4) Open this access panel:

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. NGS Filter Assembly Removal

SUBTASK 47-32-04-910-001



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)



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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-32-04-010-003

- (2) To remove the ram air exhaust hose, disconnect the flexible exhaust hose (TASK 47-32-05-000-801).
 - (a) Remove the ram air exhaust duct to help remove the NGS filter assembly [1].

SUBTASK 47-32-04-020-001

- (3) Do these steps to remove the NGS filter assembly [1].
 - (a) Remove the coupling [5] between the NGS filter assembly [1] and outlet duct [3].
 - 1) Discard the two O-rings [4].
 - (b) Remove the coupling [8] between the NGS filter assembly [1] and inlet duct [9].
 - 1) Discard the two O-rings [4].
 - (c) Hold the NGS filter assembly [1] in its position.
 - (d) Remove the three bolts [6], three washers [7] and three washers [10].
 - (e) Remove the NGS filter assembly [1].
 - (f) Put protective covers on the ends of the outlet duct [3] and inlet duct [9].

————— END OF TASK —————

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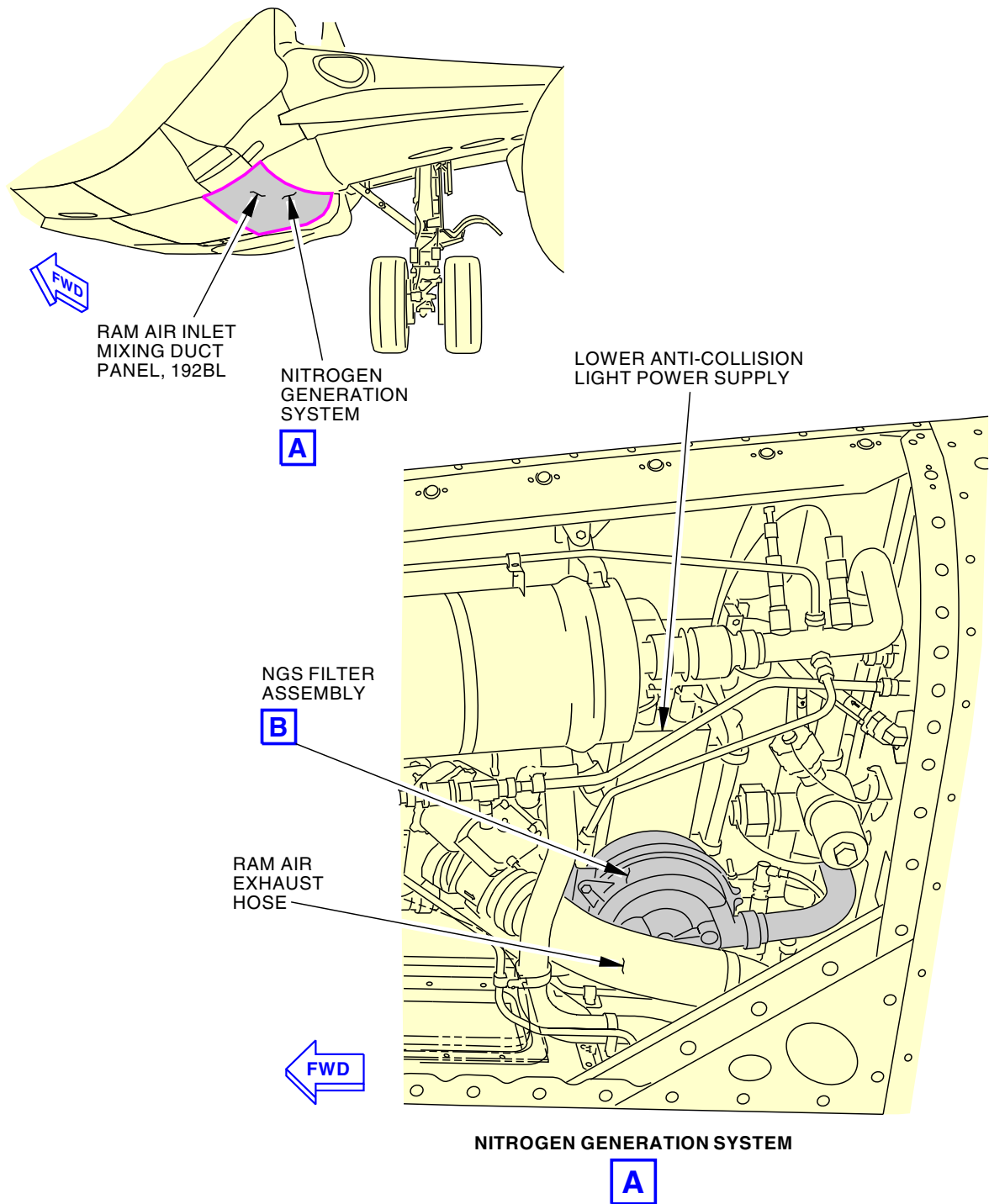
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NGS Filter Assembly Installation
Figure 402/47-32-04-990-801 (Sheet 1 of 2)

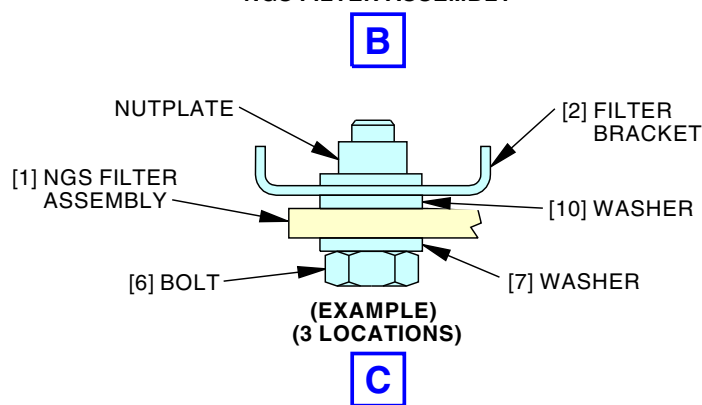
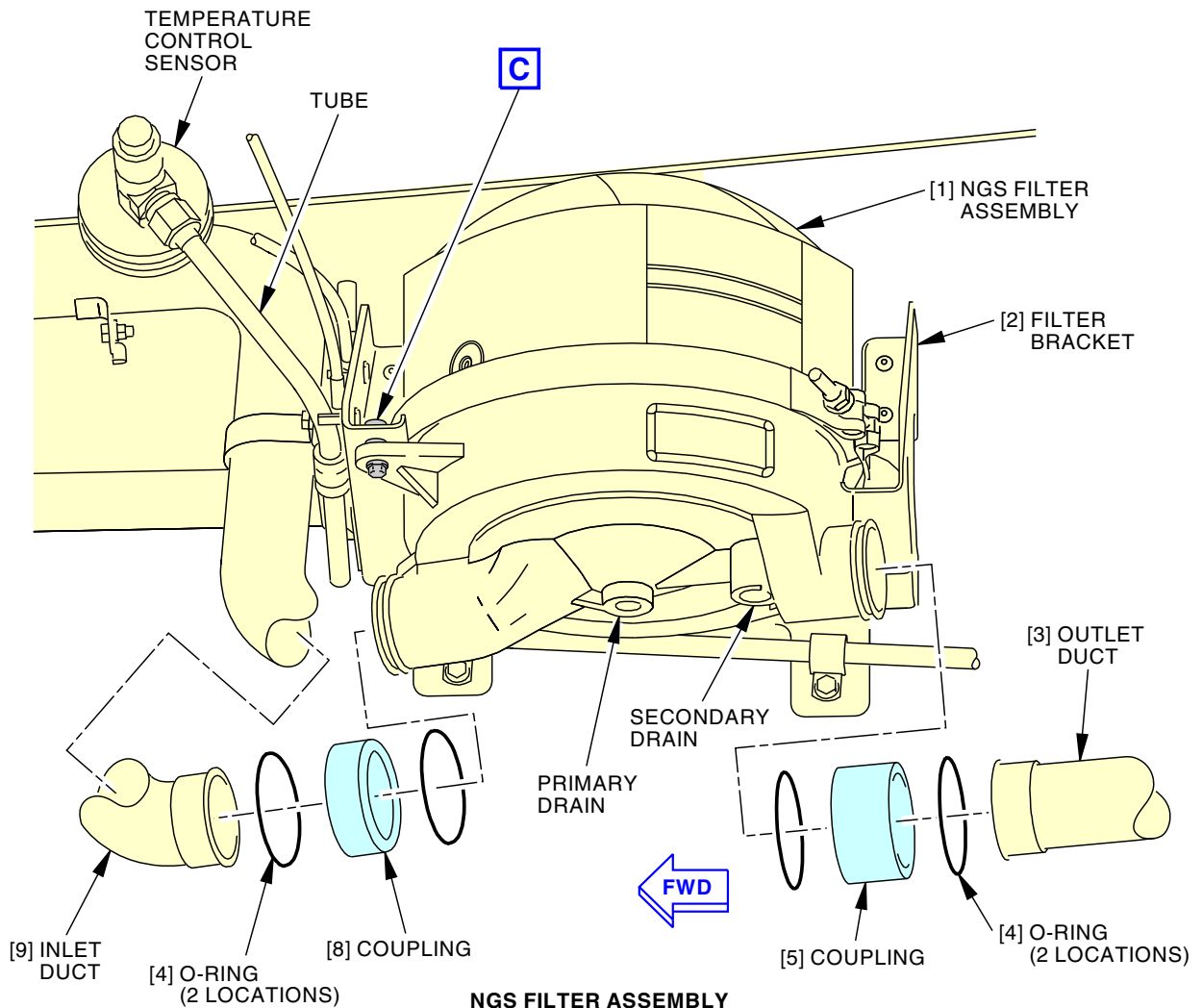
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NGS Filter Assembly Installation
Figure 402/47-32-04-990-801 (Sheet 2 of 2)

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TASK 47-32-04-400-801

5. NGS Filter Assembly - Installation

(Figure 402)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
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)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	NGS filter assembly	47-32-04-01-010	SIA ALL
4	O-ring	47-21-01-01-025	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

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(Continued)

Zone	Area
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. NGS Filter Assembly Installation

SUBTASK 47-32-04-010-005

- (1) Remove the protective covers from the outlet duct [3] and inlet duct [9].

SUBTASK 47-32-04-100-001

- (2) Make sure that these components are clean, free from grease, solvents, and unwanted material:
- (a) NGS filter assembly [1]
 - (b) outlet duct [3]
 - (c) inlet duct [9]
 - (d) coupling [8] and coupling [5]
 - (e) bolt [6]
 - (f) washer [7] and washer [10].

SUBTASK 47-32-04-110-001



DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (3) Use cotton wiper, G00034, or knit cotton wiper, G51293, made moist with solvent, B00062, or solvent, B00184, to clean these areas before you install NGS filter assembly [1].
- (a) If it is necessary, use more than one cotton wiper, G00034, to clean the area.

SUBTASK 47-32-04-110-002

- (4) Prepare these components for an electrical faying surface bond (SWPM 20-20-00, SWPM 20-20-10):

NOTE: The Nitrogen Generation System (NGS) filter assembly is electrically bonded to the filter bracket at the three attach points.

- (a) Mating surfaces on the NGS filter assembly [1].
- (b) Mating surfaces on the filter bracket [2].

SUBTASK 47-32-04-430-001

- (5) Do these steps to install the four new O-rings [4] on the inlet duct [9] and outlet duct [3]:

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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 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.

- Use water or Krytox 240AC perfluoropolyether grease, D50063, to lubricate the four O-rings [4].
- Install the O-rings [4] in its groove on the NGS filter assembly [1], ends of the outlet duct [3], and inlet duct [9].

SUBTASK 47-32-04-420-001

- Do these steps to install the NGS filter assembly [1]:
 - Apply a thin layer of compound, C00852, to the three bolts [6].
 - Apply a thin layer of corrosion inhibiting material, G50136, to each washer [10].
 - Remove all excess corrosion inhibiting material, G50136.
 - Hold the NGS filter assembly [1] in its position at the filter bracket [2].
 - Install, but do not tighten, the three bolts [6], washers [7], and washers [10].
 - Make sure that each washer [10] is installed between the NGS filter assembly [1] and filter bracket [2].

NOTE: The NGS filter assembly and filter bracket are made from dissimilar materials. The washer [10] is installed between them to prevent electrical arcing and corrosion.
 - Make sure that the NGS filter assembly [1] is aligned with the outlet duct [3] and inlet duct [9].
 - Move the coupling [5] and coupling [8] into their positions.
 - Latch the coupling [5] between the outlet duct [3] and NGS filter assembly [1].
 - Latch the coupling [8] between the inlet duct [9] and NGS filter assembly [1].
 - Tighten the three bolts [6] to 80 ± 2 in-lb (9 ± 0 N·m).

SUBTASK 47-32-04-760-001

- Measure the electrical resistance between the outlet duct [3] on the NGS filter assembly [1] and the filter bracket (SWPM 20-20-00).
 - Use an intrinsically safe approved bonding meter, COM-1550.
 - Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 47-32-04-410-001

- Install the flexible ram air exhaust hose.
 - Tighten the hose clamps.

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H. NGS Filter Assembly Operational Test

SUBTASK 47-32-04-865-002

- (1) Prepare the airplane for the operational test:
 - (a) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tags, from the L PACK and R PACK selector switches.
 - (c) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-32-04-790-001

- (2) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
 - (a) With the NGS pressurized, do a leak check of the NGS filter assembly [1].
 - (b) Repair the leaks that you find.

I. Put the Airplane Back to its Usual Condition

SUBTASK 47-32-04-410-002

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— **END OF TASK** —————

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RAM AIR VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the ram air valve
- (2) An installation of the ram air valve.

TASK 47-32-05-000-801

2. Ram Air Valve Removal

(Figure 401)

A. References

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
47-11-01-000-801	Air Separation Module (ASM) - Removal (P/B 401)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. Prepare for the Removal

SUBTASK 47-32-05-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less in the L and R pneumatic ducts or less.

SUBTASK 47-32-05-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches, to the OFF position.
 - (a) Put DO NOT OPERATE tag, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-32-05-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-32-05-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Ram Air Valve Removal

SUBTASK 47-32-05-910-001



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 nitrogen generation system (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-32-05-410-001

- (2) Do these steps to disconnect the OEA duct in this task: Air Separation Module (ASM) - Removal, TASK 47-11-01-000-801.

NOTE: To improve access to the ram air valve, you can remove the OEA duct.

SUBTASK 47-32-05-030-001

- (3) Disconnect the electrical connector [3] from the ram air valve [1].

SUBTASK 47-32-05-020-001

- (4) Do these steps to remove the bonding jumper [2]:
- (a) Remove the sealant from the ram air valve [1] at the bonding tab location.
 - (b) Remove the bolt [11], washers [12], bonding jumper [2] and nut [14].

SUBTASK 47-32-05-020-002

- (5) Do these steps to disconnect the ram air valve [1]:
- (a) Disconnect the muscle air line [4] from the ram air valve [1].
 - (b) Disconnect the coupling [8] on the flexible hose [7] side.
 - 1) Discard the two O-rings [9].
 - (c) Loosen the hose clamp [6].
 - (d) Disconnect the flexible hose [7] from the exhaust duct [5].
 - (e) Hold the ram air valve [1] in its position.
 - (f) Disconnect the coupling [13] from the heat exchanger.
 - (g) Remove the ram air valve [1].

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(h) Remove the seal [15].

SUBTASK 47-32-05-490-001

(6) Install protective covers on the heat exchanger and the exhaust duct [5].

———— **END OF TASK** ————

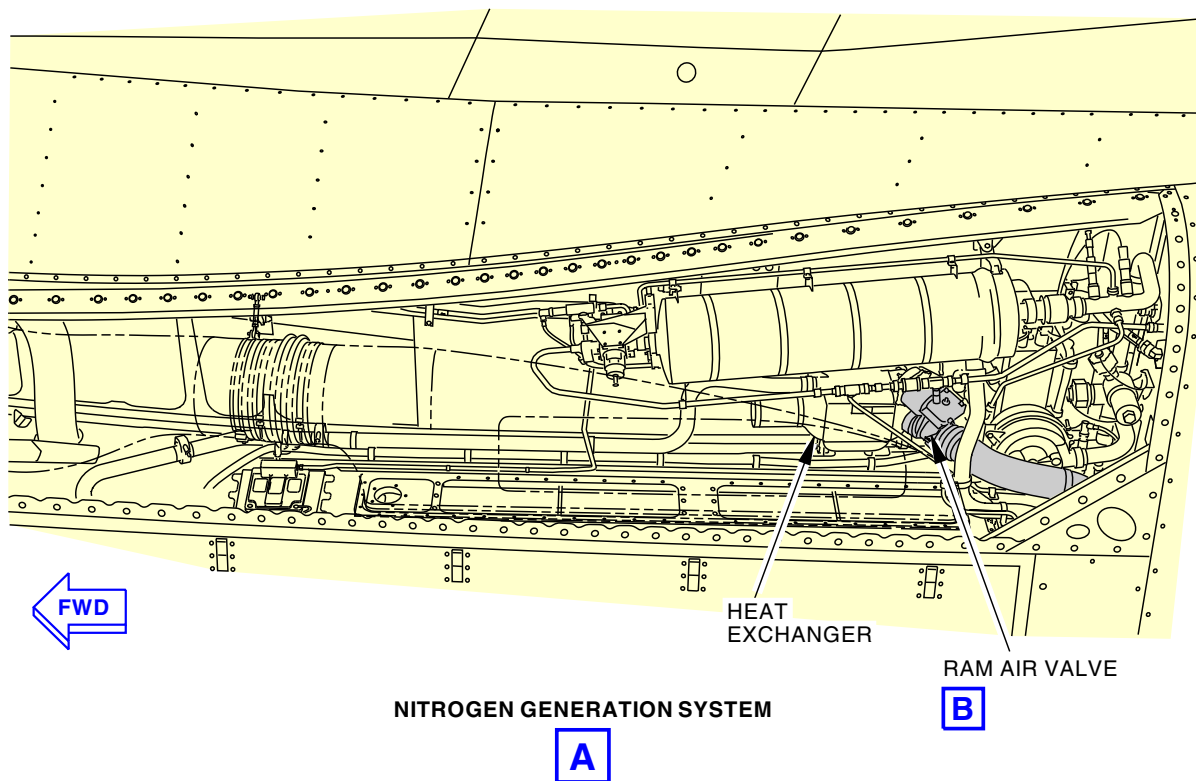
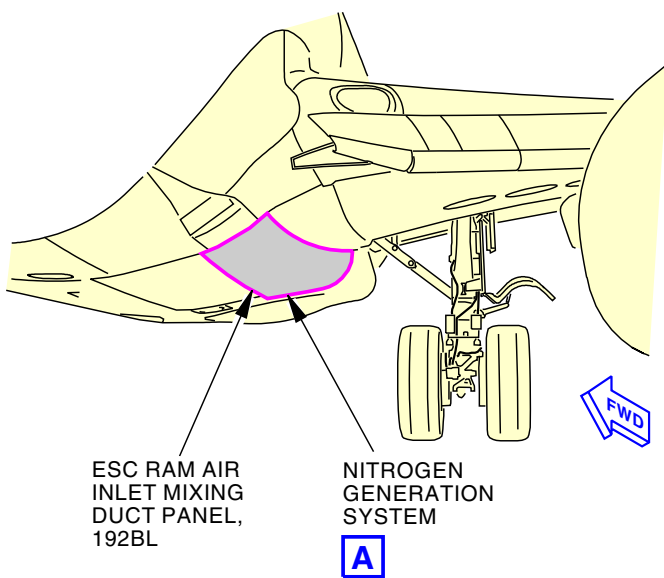
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Ram Air Valve Installation
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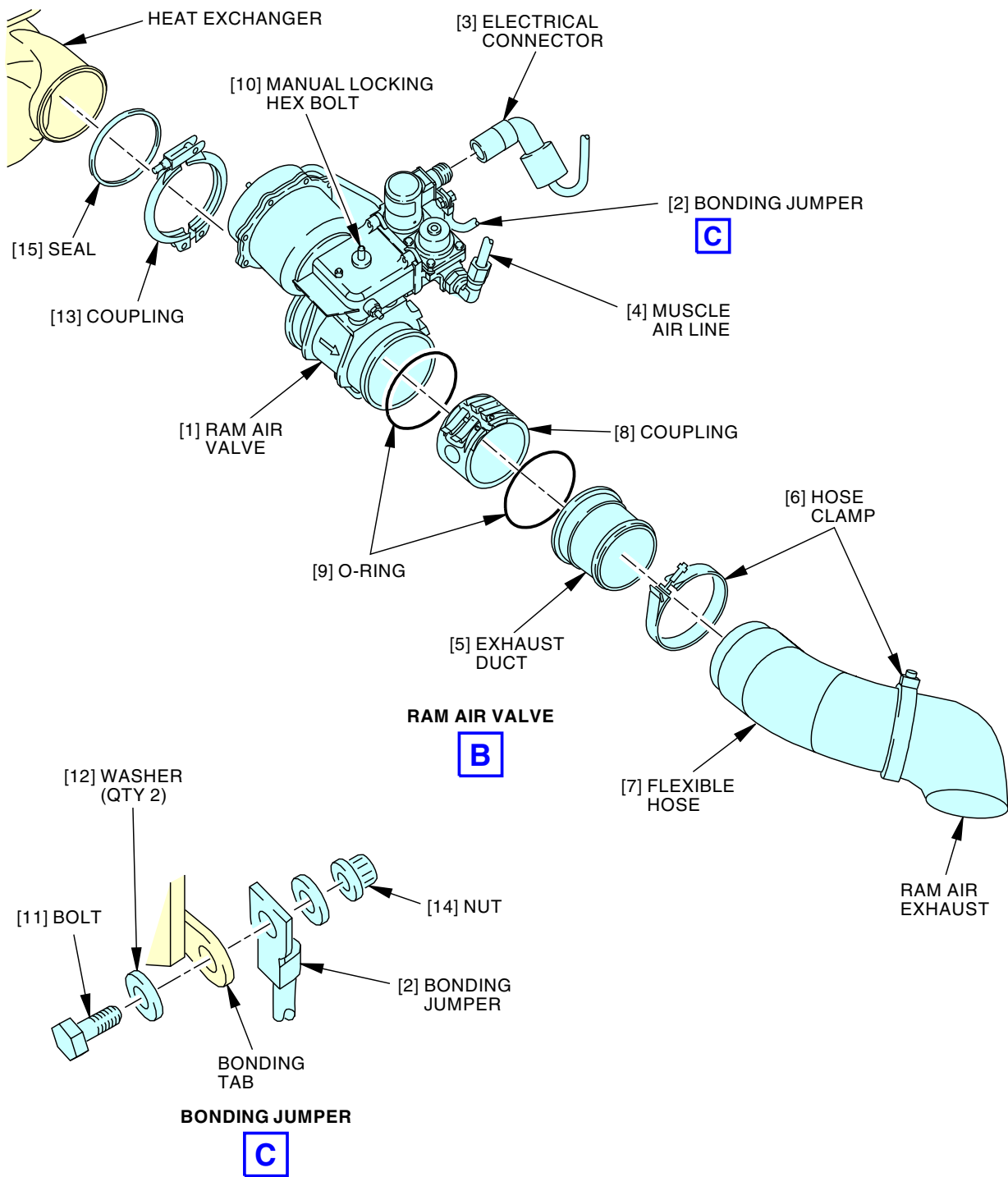
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Ram Air Valve Installation
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TASK 47-32-05-400-801

3. Ram Air Valve Installation

(Figure 401)

A. References

Reference	Title
47-00-00-790-801	Leak Check of the Nitrogen Generation System (P/B 601)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-11-01-420-801	Air Separation Module (ASM) Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
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)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Ram air valve	47-32-05-01-035	SIA ALL
9	O-ring	47-21-01-01-045	SIA ALL
15	Seal	47-32-03-01-110	SIA ALL

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E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

G. Ram Air Valve Installation

SUBTASK 47-32-05-100-001

- (1) Remove the sealant from the bonding jumper [2], bolt [11], washers [12], nut [14], and the bonding tab.

SUBTASK 47-32-05-110-001

- (2) Make sure that the ram air valve [1], heat exchanger, couplings [8], coupling [13], hose clamps [6], and the flexible hose [7] are clean, free from grease and unwanted material.

SUBTASK 47-32-05-110-002



DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

- (3) Use a cotton wiper, G00034, or a knit cotton wiper, G51293, made moist with solvent, B00062, or solvent, B00184, to clean these areas before you install the ram air valve [1].

NOTE: It is possible that more than one cotton wiper, G00034, is necessary to clean the area sufficiently.

SUBTASK 47-32-05-110-003

- (4) Prepare these components for an electrical faying surface bond (SWPM 20-20-00):
 - (a) The contact surfaces of the bonding tab on the ram air valve [1].
 - (b) The contact surfaces of the bonding jumper [2].

SUBTASK 47-32-05-430-001

- (5) Do these steps to install the O-rings [9]:

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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 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, or water to the two O-rings [9].
- Install one O-ring [9] in its groove on the ram air valve [1].
- Install one O-ring [9] in its groove on the exhaust duct [5].

SUBTASK 47-32-05-420-001

- Do these steps to install the ram air valve [1]:
 - Put the ram air valve [1] in its position.
 - Install the seal [15] in its groove between the heat exchanger and the ram air valve [1].
 - Install the coupling [8] on the ram air valve [1] and the heat exchanger.
 - Install the flexible hose [7] on the ram air exhaust duct in the lower fairing.
 - Install the flexible hose [7] to the exhaust duct [5].
 - Tighten the hose clamp [6] on the ram air exhaust duct in the lower fairing.
 - Connect the muscle air line [4] to the ram air valve [1].

SUBTASK 47-32-05-430-002

- Do these steps to connect the bonding jumper [2] to the ram air valve [1]:
 - Apply a thin layer of compound, C00852, to the bolt [11].
 - Install the bolt [11], washers [12], bonding jumper [2], and the nut [14] to the bonding tab.
 - Torque the bolt [11] to 48 $\pm$ 3 in-lb (5 $\pm$ 1 N·m).

SUBTASK 47-32-05-765-001

- Use the intrinsically safe approved bonding meter, COM-1550, to measure the electrical resistance between the electrical connector [3] shell and the airplane structure (SWPM 20-20-00).
 - Make sure that the electrical resistance between the electrical connector [3] shell and the airplane structure is 0.010 ohm (10 milliohms) or less (SWPM 20-20-00).

SUBTASK 47-32-05-390-001

- Apply the sealant, A50296, to fully cover the terminal on the bonding jumper [2], bolt [11], washers [12], nut [14], and the exposed conversion coating on the bonding tab.

SUBTASK 47-32-05-410-002

- Do these steps to install the Oxygen Enriched Air (OEA) duct: Air Separation Module (ASM) Installation, TASK 47-11-01-420-801.

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H. Ram Air Valve Operational Test

SUBTASK 47-32-05-860-002

- (1) Prepare the airplane for the operational test:
 - (a) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

- (b) Remove the DO NOT OPERATE tag, STD-858, from the L PACK and the R PACK selector switches on the P5 panel.
 - (c) Put the L PACK and the R PACK selector switches in the AUTO position.

SUBTASK 47-32-05-710-001

- (2) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

SUBTASK 47-32-05-790-001

- (3) Do this task: Leak Check of the Nitrogen Generation System, TASK 47-00-00-790-801.
 - (a) Repair the leaks that you find.

I. Put the Airplane Back to its Usual Condition

SUBTASK 47-32-05-410-003

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CL	ECS Access Door
192CR	ECS Access Door

———— END OF TASK ————

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ALTITUDE SENSOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) Altitude Sensor Removal
 - (2) Altitude Sensor Installation.

TASK 47-42-01-000-801

2. Altitude Sensor Removal

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-42-01-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-42-01-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
- (a) Install DO NOT OPERATE tags, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-42-01-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-42-01-010-001

- (4) Open this access panel:

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

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F. Altitude Sensor Removal

SUBTASK 47-42-01-869-001



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.

- (1) Obey the nitrogen generation system (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-42-01-030-001

- (2) Disconnect the electrical connector [10] from the altitude sensor [6].

NOTE: The altitude sensor [6] is attached to the filter mounting bracket with two loop clamps [9].

SUBTASK 47-42-01-020-002

- (3) Remove the two loop clamps [9].

- (a) Remove the two screws [7] and washers [8] that attach the loop clamps [9] to the filter mounting bracket.

SUBTASK 47-42-01-020-001

- (4) Disconnect the jumper [4] from the altitude sensor [6].

- (a) Remove the self-locking nut [1], two plain washers [2], and screw [5] that attach the jumper [4] to the bonding clamp [3].
- (b) Remove the bonding clamp [3] from the altitude sensor [6].

————— **END OF TASK** —————

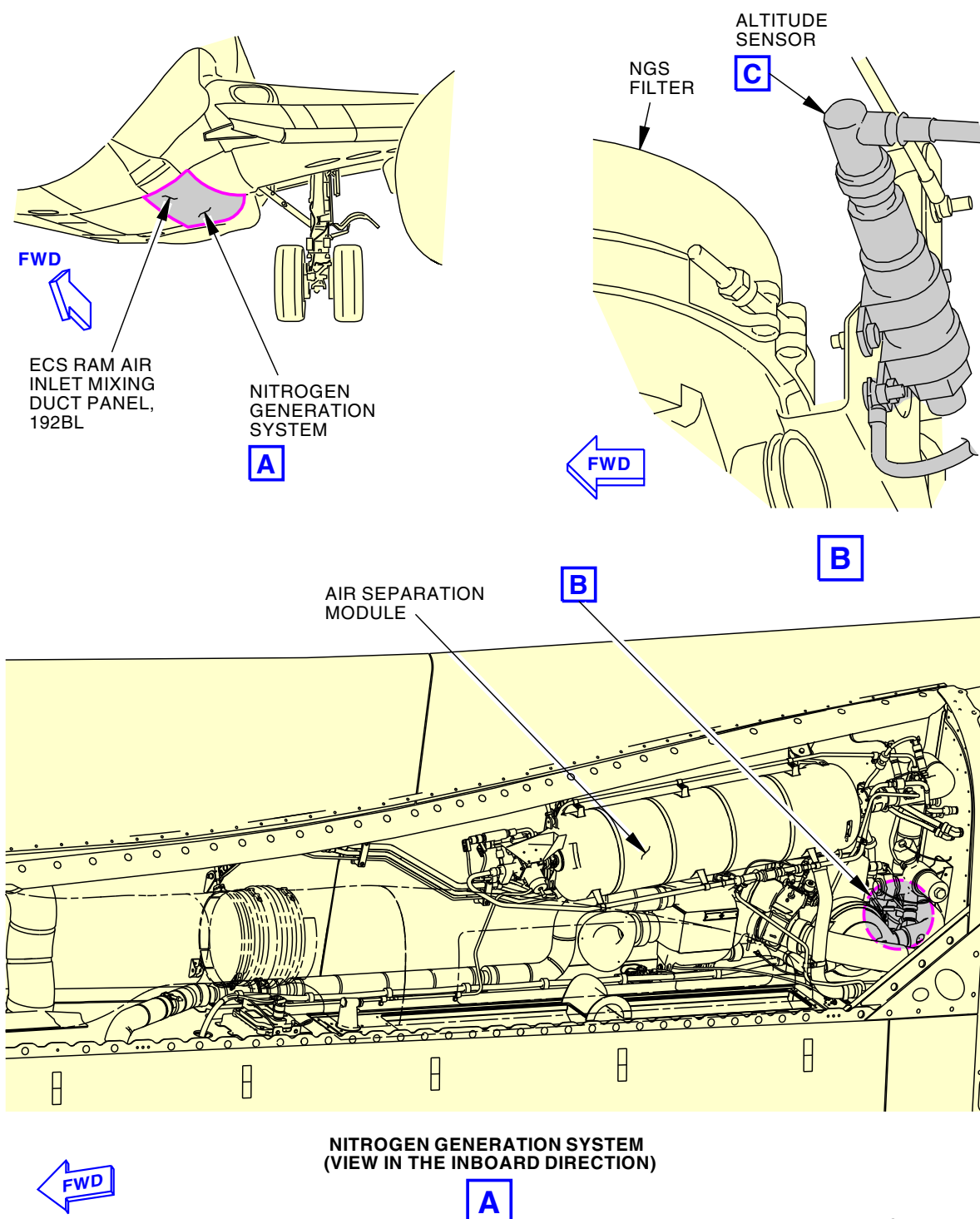
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Altitude Sensor Installation
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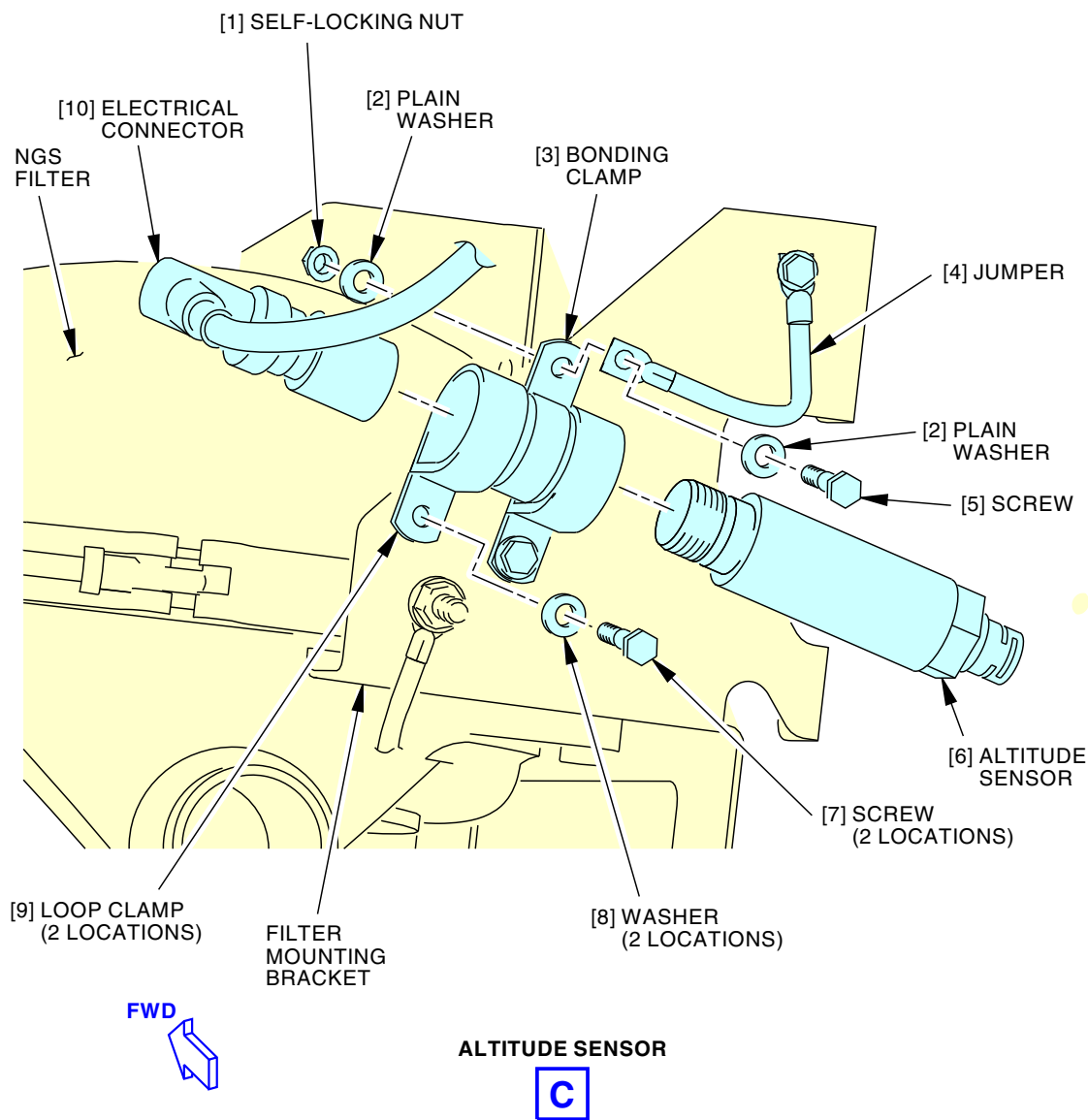
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Altitude Sensor Installation
Figure 401/47-42-01-990-801 (Sheet 2 of 2)

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TASK 47-42-01-400-801

3. **Altitude Sensor Installation**

(Figure 401)

A. References

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

B. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Altitude sensor	47-42-01-01-045	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Altitude Sensor Installation

SUBTASK 47-42-01-100-001

- (1) Do these steps to prepare the bonding clamp [3], jumper [4], and altitude sensor [6] for installation:

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- (a) Clean the fay surfaces of the CRES bonding clamp [3], CRES altitude sensor [6], and jumper [4] (SWPM 20-20-00):

- 1) Use Cleaning Procedure 5 to clean the CRES contact surfaces of the bonding clamp [3] and altitude sensor [6].



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00062 or solvent, B00184.
- b) Use a new cotton wiper, G00034 to dry the surfaces.
- c) Continue to clean and dry the surfaces until the cotton wiper shows clean.
- 2) Use Cleaning Procedure 5 to clean the terminal contact surfaces on the jumper [4].



WARNING

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

- a) Use a cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00062 or solvent, B00184.
- b) Use a new cotton wiper, G00034 to dry the surfaces.
- c) Continue to clean and dry the surfaces until the cotton wiper shows clean.

SUBTASK 47-42-01-420-002

- (2) Install the bonding clamp [3] to the altitude sensor [6].
- (a) Install the screw [5], two plain washers [2], and self-locking nut [1] to attach the jumper [4] to the altitude sensor [6].
- (b) Tighten the screw [5] to 36 $\pm$ 3 in-lb (4.1 $\pm$ 0.4 N·m).

SUBTASK 47-42-01-420-001

- (3) Install the altitude sensor [6] to the filter mounting bracket.
- NOTE:** The altitude sensor [6] is oriented with the keyway clocked at the 9 o'clock position.
- (a) Put the two loop clamps [9] on each end of the altitude sensor [6].
- (b) Align the loop clamps [9] with the mounting holes on the filter mounting bracket.
- (c) Install the two screws [7] and washers [8] to attach the two loop clamps [9] to the filter mounting bracket.
- (d) Tighten the screws [7] to 25 in-lb (2.8 N·m).

SUBTASK 47-42-01-765-001

- (4) Measure the electrical bonding resistance between the altitude sensor [6] and the terminal on the jumper [4] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).
- (a) Make sure that the electrical bonding resistance is 0.0017 ohm (1.7 milliohms) or less.

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SUBTASK 47-42-01-430-001

- (5) Connect the electrical connector [10].

H. Altitude Sensor Installation Test

SUBTASK 47-42-01-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-42-01-860-002

- (2) On the P5-10 Bleed Air Control Module, remove the DO NOT OPERATE tags, STD-858 from the L PACK and R PACK switches.
 - (a) Put the L PACK and R PACK switches to the AUTO position.

SUBTASK 47-42-01-710-001

- (3) Do the electrical test (TASK 47-00-00-800-801).
 - (a) Make sure that the electrical test does not fail the test.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-42-01-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— END OF TASK —————

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HIGH FLOW VALVE DIFFERENTIAL PRESSURE SENSOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the high flow valve differential pressure sensor
- (2) An installation of the high flow valve differential pressure sensor.

TASK 47-42-02-020-801

2. High Flow Valve Differential Pressure Sensor Removal

(Figure 401)

A. General

- (1) The high flow valve differential pressure sensor is referred to as the pressure sensor in this task.

B. References

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-11-02-000-801	High Flow Valve Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Prepare for the Removal

SUBTASK 47-42-02-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 bleed air control module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-42-02-860-001

- (2) On the P5-10 bleed air control module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install the DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

SUBTASK 47-42-02-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-42-02-010-001



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.

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-42-02-020-001

- (5) Remove the high flow valve [8] (TASK 47-11-02-000-801).

G. High Flow Valve Differential Pressure Sensor Removal

SUBTASK 47-42-02-941-001

- (1) Put the high flow valve [8] on a clean surface.

SUBTASK 47-42-02-030-001

- (2) Loosen the sense line nut to disconnect the sense line [2] from the pressure sensor [1].

(a) Make sure that you support the sense line [2] when you disconnect the nut.

NOTE: The nut will stay with the sense line.

SUBTASK 47-42-02-030-002

- (3) Disconnect the nut [5] on the tube assembly [4].

(a) Use a second wrench on the pressure sensor [1] when you disconnect the nut [5].

NOTE: The nut will stay with the tube assembly.

SUBTASK 47-42-02-020-002

- (4) Remove the jamnut [6] that holds the pressure sensor [1] to the bracket.

(a) Keep the jamnut [6] for the installation.

SUBTASK 47-42-02-020-003

- (5) Remove the pressure sensor [1].

SUBTASK 47-42-02-030-003

- (6) Disconnect the tube assembly [4] from the high flow valve [8].

(a) Keep the tube assembly [4] for the installation.

(b) Discard the O-ring [3].

SUBTASK 47-42-02-490-001

- (7) Install protective covers on the high flow valve [8].

————— **END OF TASK** —————

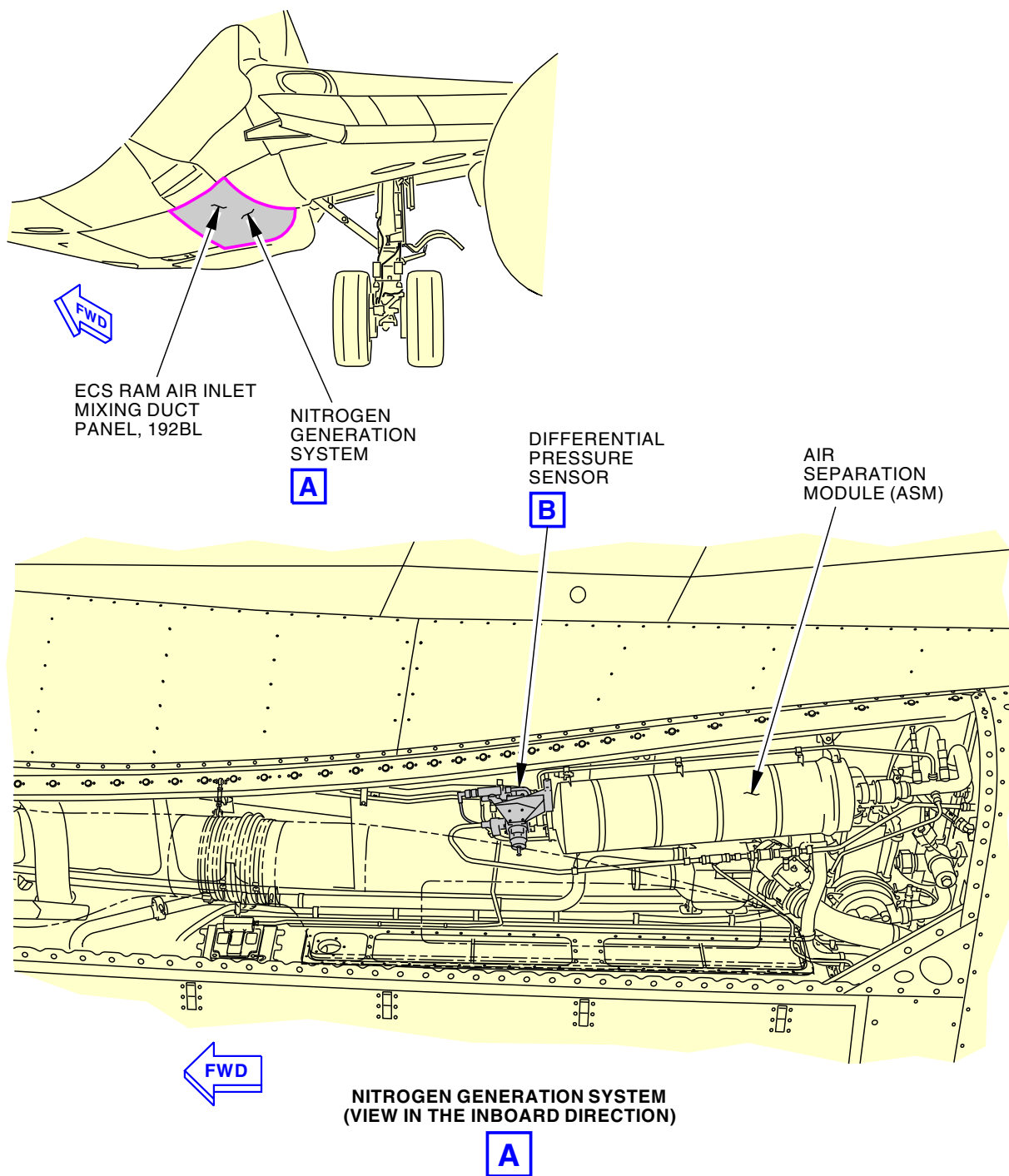
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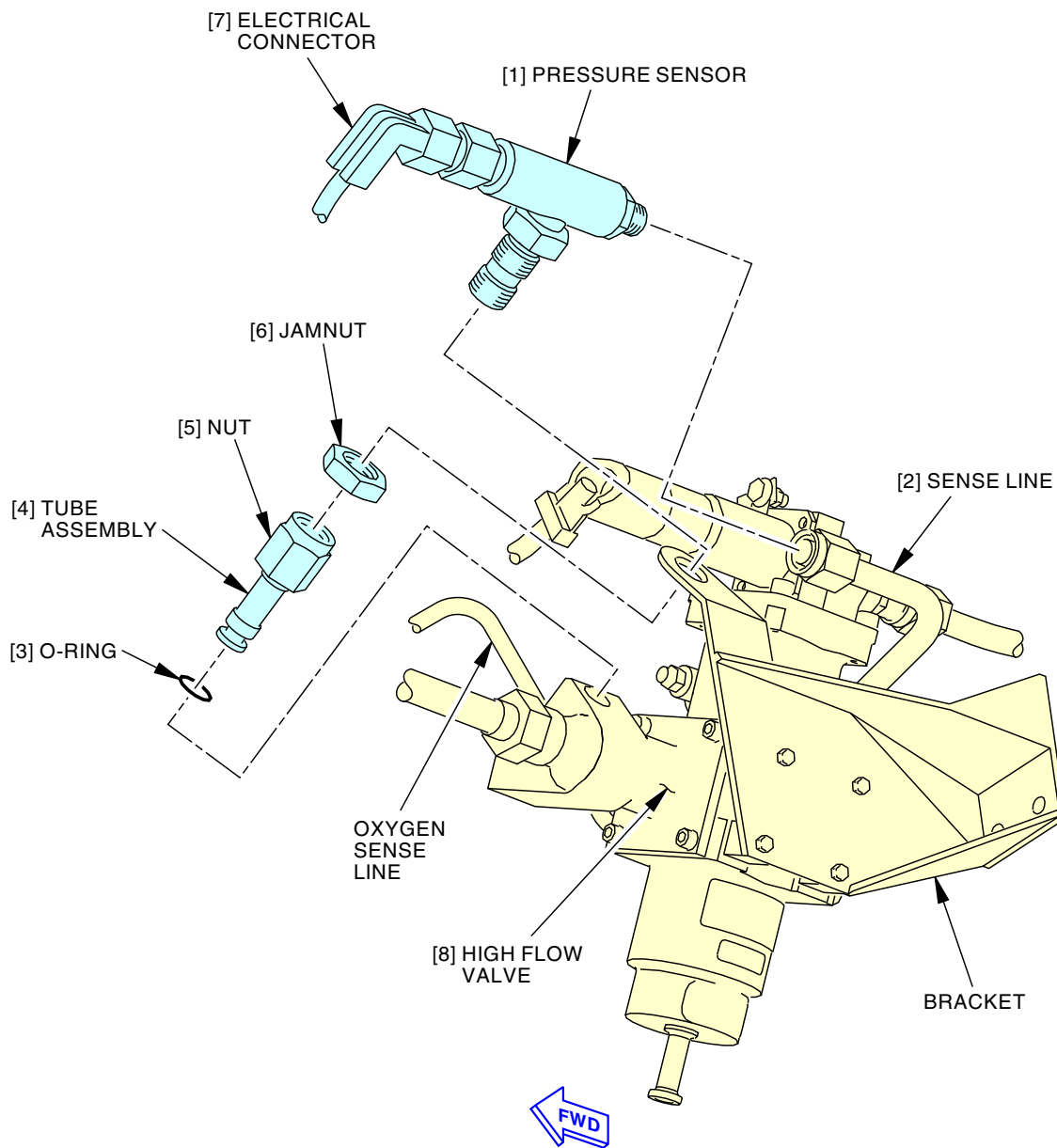
High Flow Valve Differential Pressure Sensor
Figure 401/47-42-02-990-801 (Sheet 1 of 2)

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**DIFFERENTIAL PRESSURE SENSOR
(EXAMPLE)**

B

NOTE:
INSULATION NOT SHOWN FOR CLARITY

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**High Flow Valve Differential Pressure Sensor
Figure 401/47-42-02-990-801 (Sheet 2 of 2)**

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TASK 47-42-02-400-801

3. High Flow Valve Differential Pressure Sensor Installation

(Figure 401)

A. General

- (1) The High Flow Valve (HFV) differential pressure sensor is referred to as the pressure sensor in this task.

B. References

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-11-02-420-801	High Flow Valve Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-4373	Vise

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
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)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure sensor	47-11-01-01-180	SIA 001-014
		47-11-01-02-110	SIA 015-999
3	O-ring	47-11-01-01-170	SIA 001-014
		47-11-01-02-100	SIA 015-999

F. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

G. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

H. Prepare for the Installation

SUBTASK 47-42-02-100-001

- (1) Do these steps to prepare the components for the installation:

- (a) Put the high flow valve [8] on a clean surface.

NOTE: If it is necessary, use a vise, STD-4373, to fasten the high flow valve to the surface.

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- (b) Remove the protective covers from the high flow valve [8].
- (c) Make sure that the threaded flanges, nuts, tubes, and high flow valve [8] are clean and free from grease, solvents, and unwanted material.



WARNING

ISOPROPYL ALCOHOL IS TOXIC AND FLAMMABLE. USE PERSONAL PROTECTION EQUIPMENT. USE IN A WELL-VENTILATED AREA.

- (d) Clean the components with a clean cotton wiper, G00034, and alcohol, B00130.
- (e) Remove the protective shipping caps from the new pressure sensor [1].
- (f) Use a clean, solvent free, cotton wiper, G00034, to clean the mating surfaces of the pressure sensor [1].

I. High Flow Valve Differential Pressure Sensor Installation

SUBTASK 47-42-02-430-001

- (1) Do these steps to install the pressure sensor [1]:



WARNING

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 O-ring [3].
- (b) Install the O-ring [3] on the tube assembly [4].
- (c) Insert the tube assembly [4] and O-ring [3] into the high flow valve [8].
- (d) Apply a thin layer of compound, C00852, to the threads of the pressure sensor [1].
- (e) Install the pressure sensor [1] in its position on the bracket:
 - 1) Put the jamnut [6] on the pressure sensor [1].
 - a) Connect the tube assembly [4] to the pressure sensor [1] when you install the pressure sensor [1] on the high flow valve [8].
 - 2) Install, but do not tighten, the nut [5].
 - 3) Install, but do not tighten, the nut on the sense line [2].
 - 4) Tighten the jamnut [6] to 135 ±15 in-lb (15 ±2 N·m).
 - 5) Tighten the nut on the sense line [2] to 230 ±15 in-lb (26 ±2 N·m).
 - 6) Tighten the nut [5] on the tube assembly [4] to 230 ±15 in-lb (26 ±2 N·m).

SUBTASK 47-42-02-420-001

- (2) Install the high flow valve [8] (TASK 47-11-02-420-801).

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J. Pressure Sensor Operational Test

SUBTASK 47-42-02-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-42-02-942-001

- (2) On the P5-10 bleed air control module, remove the DO NOT OPERATE tags from the L PACK and the R PACK selector switches.
- (a) Put the L PACK and the R PACK selector switches to the AUTO position.

SUBTASK 47-42-02-710-001

- (3) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Make sure that the electrical test is good.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 47-42-02-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— **END OF TASK** —————

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NGS OXYGEN SENSOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) NGS Oxygen Sensor Removal
 - (2) NGS Oxygen Sensor Installation.

 47-AWL-09: ALI

TASK 47-42-03-020-801

2. NGS Oxygen Sensor - Removal

(Figure 401)

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-09.

B. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

C. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

E. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

F. **Prepare for the Removal**

SUBTASK 47-42-03-860-002

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-42-03-860-003

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

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SUBTASK 47-42-03-860-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-42-03-010-001



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.

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-42-03-923-001



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.

- (5) Obey the Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

G. NGS Oxygen Sensor Removal

SUBTASK 47-42-03-030-001

- (1) Disconnect the electrical connector [6] from the oxygen sensor [7].

SUBTASK 47-42-03-030-002



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

- (2) Loosen the coupling nut attached to the sense line.

SUBTASK 47-42-03-030-003



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

- (3) Disconnect the sense line from the oxygen sensor [7].

SUBTASK 47-42-03-030-005

- (4) Remove the screw [1], washer [2], and bonding jumper [3] from the oxygen sensor [7].

SUBTASK 47-42-03-030-004

- (5) Remove the three screws [5] and washers [4] that attach the oxygen sensor [7] to the mounting frame.

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SUBTASK 47-42-03-030-007



CAUTION

KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

- (6) Remove the oxygen sensor [7] from the mounting frame.

———— **END OF TASK** ————

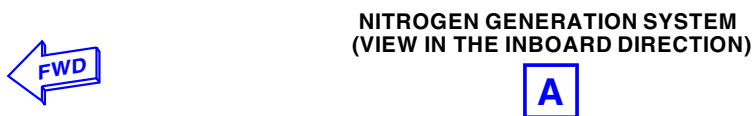
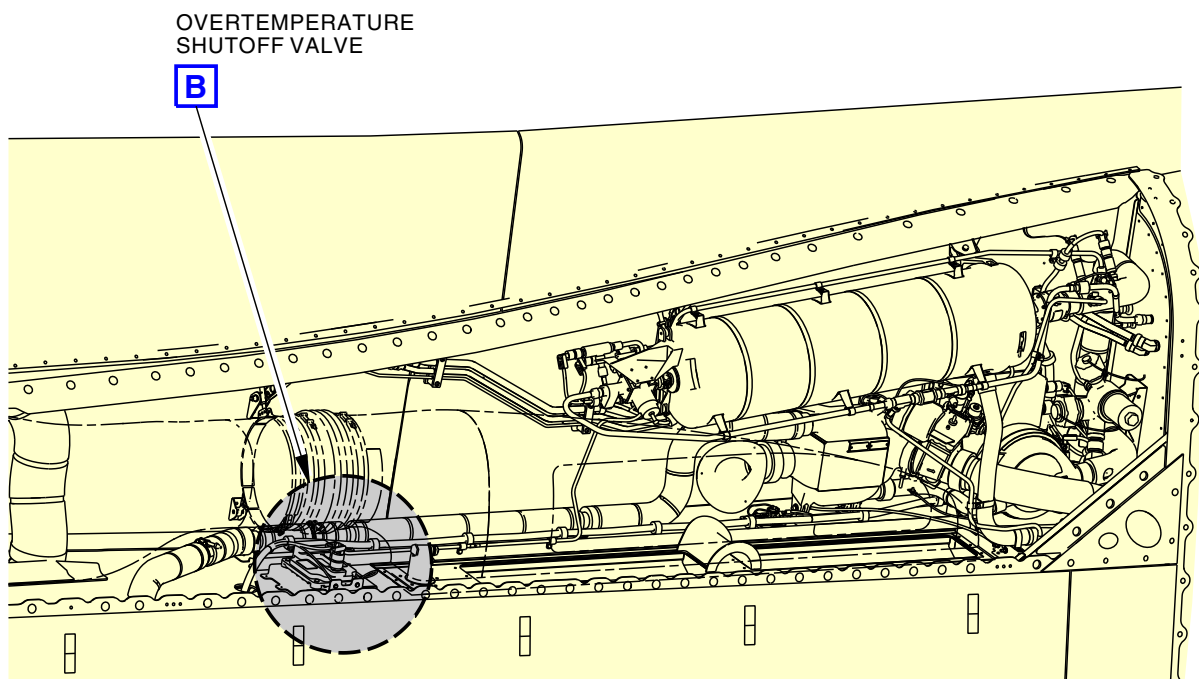
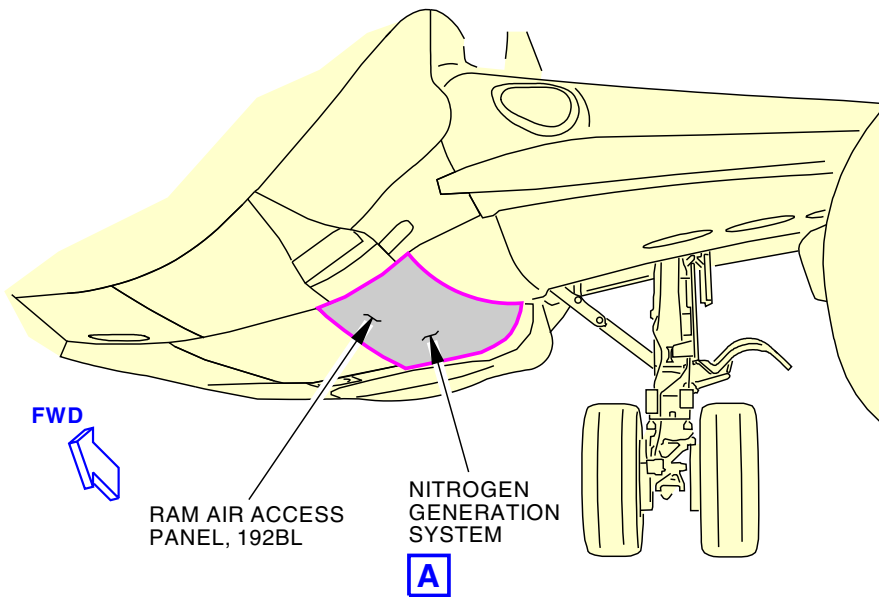
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NGS Oxygen Sensor Installation
Figure 401/47-42-03-990-801 (Sheet 1 of 2)

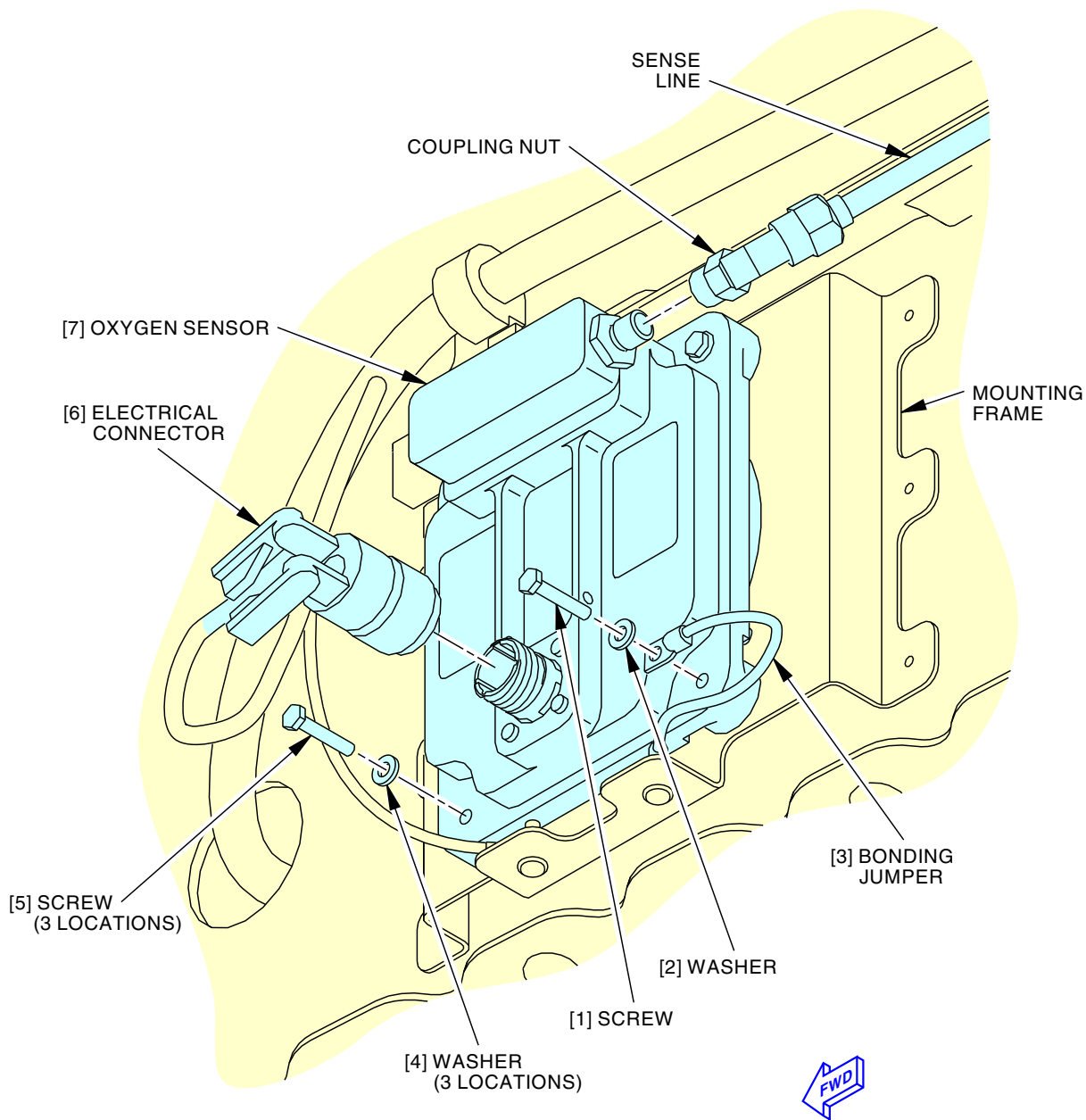
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**OXYGEN SENSOR ASSEMBLY
(VIEW IN THE INBOARD DIRECTION)**

B

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**NGS Oxygen Sensor Installation
Figure 401/47-42-03-990-801 (Sheet 2 of 2)**

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 47-AWL-09: ALI

TASK 47-42-03-420-801

3. NGS Oxygen Sensor - Installation

(Figure 401)

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-09.

B. References

Reference	Title
05-51-98-210-801	Nitrogen Generation System (NGS) Fuel Leak Conditional Inspection (P/B 201)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-21-00-700-801	Drain Cap - Fuel Leak Check (P/B 601)
47-21-04-000-801	Primary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-000-802	Secondary Backflow Prevention Check Valve Removal (P/B 401)
47-21-04-400-801	Primary Backflow Prevention Check Valve Installation (P/B 401)
47-21-04-400-802	Secondary Backflow Prevention Check Valve Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7

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(Continued)

Reference	Description	Specification
G00018	Nitrogen - Gaseous, Pressurizing, 99.5 Percent Pure	A-A-59503 Type I Grade B, MIL-PRF-27401 Type I Grade A
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
7	Oxygen sensor	47-42-03-01-035	SIA ALL

F. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

G. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

H. NGS Oxygen Sensor Installation

SUBTASK 47-42-03-400-001

- (1) Examine the oxygen sensor inlet tube where it connects to the oxygen sensor [7] for fuel smell or liquid fuel. If fuel smell or liquid fuel is observed, do the steps that follow:
 - (a) Remove and install a new primary and secondary backflow prevention check valves, do these tasks:
 - Secondary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-802
 - Secondary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-802
 - Primary Backflow Prevention Check Valve Removal, TASK 47-21-04-000-801
 - Primary Backflow Prevention Check Valve Installation, TASK 47-21-04-400-801.
 - (b) Check for fuel leakage at the Nitrogen Generation System (NGS) Air Separation Module (ASM) Oxygen Enriched Air (OEA) Exhaust Port.
 - 1) If fuel leakage is found, do this task: NGS Fuel Leak Conditional Inspection, Nitrogen Generation System (NGS) Fuel Leak Conditional Inspection, TASK 05-51-98-210-801.
 - (c) Clean and dry the tubing between the O2 Sensor and the High Flow Valve (HFV) refer to Standard Overhaul Practices Manual (SOPM) 20-30-03, Immersion Cleaning.

SUBTASK 47-42-03-700-004

- (2) If the center fuel tank was used or filled during operation, do this task: Drain Cap - Fuel Leak Check, TASK 47-21-00-700-801.

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SUBTASK 47-42-03-430-001



CAUTION

KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

- (3) Align the holes on the oxygen sensor [7] to the mounting frame.

SUBTASK 47-42-03-420-001

- (4) Install the three screws [5] and washers [4].

SUBTASK 47-42-03-100-001

- (5) Do these steps to prepare the oxygen sensor [7] and bonding jumper [3] for installation:
- (a) Clean the bonding jumper [3] and the fay surfaces of the oxygen sensor [7] (SWPM 20-20-00).
 - 1) Use Cleaning Procedure 5 to clean the remaining oxygen sensor [7] fay surface, and terminal on the bonding jumper [3].
 - a) Use a new cotton wiper, G00034, or knit cotton wiper, G51293, soaked with solvent, B00062, or solvent, B00184.
 - b) Use a new cotton wiper, G00034 to dry the surfaces.
 - c) Continue to clean and dry the surface until the cotton wiper, G00034 shows clean.

SUBTASK 47-42-03-430-003

- (6) Install the screw [1] and washer [2] to attach the bonding jumper [3].

SUBTASK 47-42-03-420-002

- (7) Tighten the screw [1] to 35 $\pm$ 3 in-lb (4.0 $\pm$ 0.4 N·m).

SUBTASK 47-42-03-110-001



WARNING

DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (8) Clean the inlet fitting of the oxygen sensor [7] and the inlet tube (internally and externally as practical) with a clean cotton wiper, G00034, wet with alcohol, B00130.

SUBTASK 47-42-03-160-001



WARNING

BEFORE YOU USE COMPRESSED AIR, PUT ON GOGGLES FOR EYE PROTECTION. DO NOT POINT THE NOZZLE AT OTHER PERSONNEL. IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURIES TO PERSONNEL CAN OCCUR.

- (9) Blow nitrogen, G00018, to dry the inlet fitting of the oxygen sensor [7] and the sense line.
- (a) Make sure that the oxygen sensor [7] and the sense line are free from alcohol and contamination.

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SUBTASK 47-42-03-430-002



KEEP THE OXYGEN SENSOR AND THE INLET TUBE CLEAN AND FREE OF CONTAMINATION. CONTAMINATION CAN CAUSE DAMAGE TO THE OXYGEN SENSOR.

- (10) Connect the sense line to the oxygen sensor [7] and then tighten the coupling nut.

SUBTASK 47-42-03-765-001

- (11) Measure the electrical bonding resistance between the oxygen sensor [7] and mounting frame with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).
- (a) Make sure that the electrical bonding resistance is 0.010 ohm (10.00 milliohms) or less.

SUBTASK 47-42-03-030-008

- (12) Connect the electrical connector [6].

I. NGS Oxygen Sensor Installation Test

SUBTASK 47-42-03-700-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-42-03-860-004

- (2) On the P5-10 Bleed Air Control Module, remove the DO NOT OPERATE tag, STD-858, from the L PACK and R PACK switches.

SUBTASK 47-42-03-700-002

- (3) Do a test of the oxygen sensor [7] (Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801).

SUBTASK 47-42-03-700-003

- (4) Make sure that the oxygen sensor [7] operates correctly.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 47-42-03-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— END OF TASK —————

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FILTER DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION

1. **General**

A. This procedure has these tasks:

- (1) Filter Differential Pressure Switch Removal
- (2) Filter Differential Pressure Switch Installation.

TASK 47-43-01-000-801

2. **Filter Differential Pressure Switch Removal**

(Figure 401)

A. **General**

- (1) This task gives the steps to remove the filter differential pressure switch from the air filter inlet duct.

B. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)
47-32-05-000-801	Ram Air Valve Removal (P/B 401)

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-43-01-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) Make sure that the dual duct pressure gage shows 0.50 psig (3.45 kPa) or less in the L and R pneumatic ducts.

SUBTASK 47-43-01-860-001

- (2) Put the L PACK and R PACK selector switches, found on the P5-10 air conditioning panel, to the OFF position.
 - (a) Put DO-NOT-OPERATE tags on the L PACK and R PACK selector switches.

SUBTASK 47-43-01-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-43-01-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

SUBTASK 47-43-01-922-001



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.

- (5) Obey the nitrogen generation system (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-43-01-020-001

- (6) Do the steps in this task to remove the ram air valve exhaust duct [10] and clamps [9]: Ram Air Valve Removal, TASK 47-32-05-000-801.

NOTE: These steps are to make it easier to get access to the pressure switch [1].

F. 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].

SUBTASK 47-43-01-020-002

- (2) Disconnect the electrical connector [2].

SUBTASK 47-43-01-020-003

- (3) Remove the applicable lockwire.

SUBTASK 47-43-01-030-001

- (4) Disconnect the sense line [3].

NOTE: Use a second wrench to hold the pressure switch [1] when you disconnect the sense line [3].

SUBTASK 47-43-01-030-002

- (5) Loosen the nut [4].

NOTE: Use a second wrench to hold the boss of duct [6] 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].

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SUBTASK 47-43-01-020-004

- (6) Remove the pressure switch [1].
 - (a) Discard the o-ring [5].
 - (b) Keep the nut [4] washer [8].

SUBTASK 47-43-01-800-001

- (7) Put protective caps on the sense line [3] to keep unwanted materials out.

———— **END OF TASK** ————

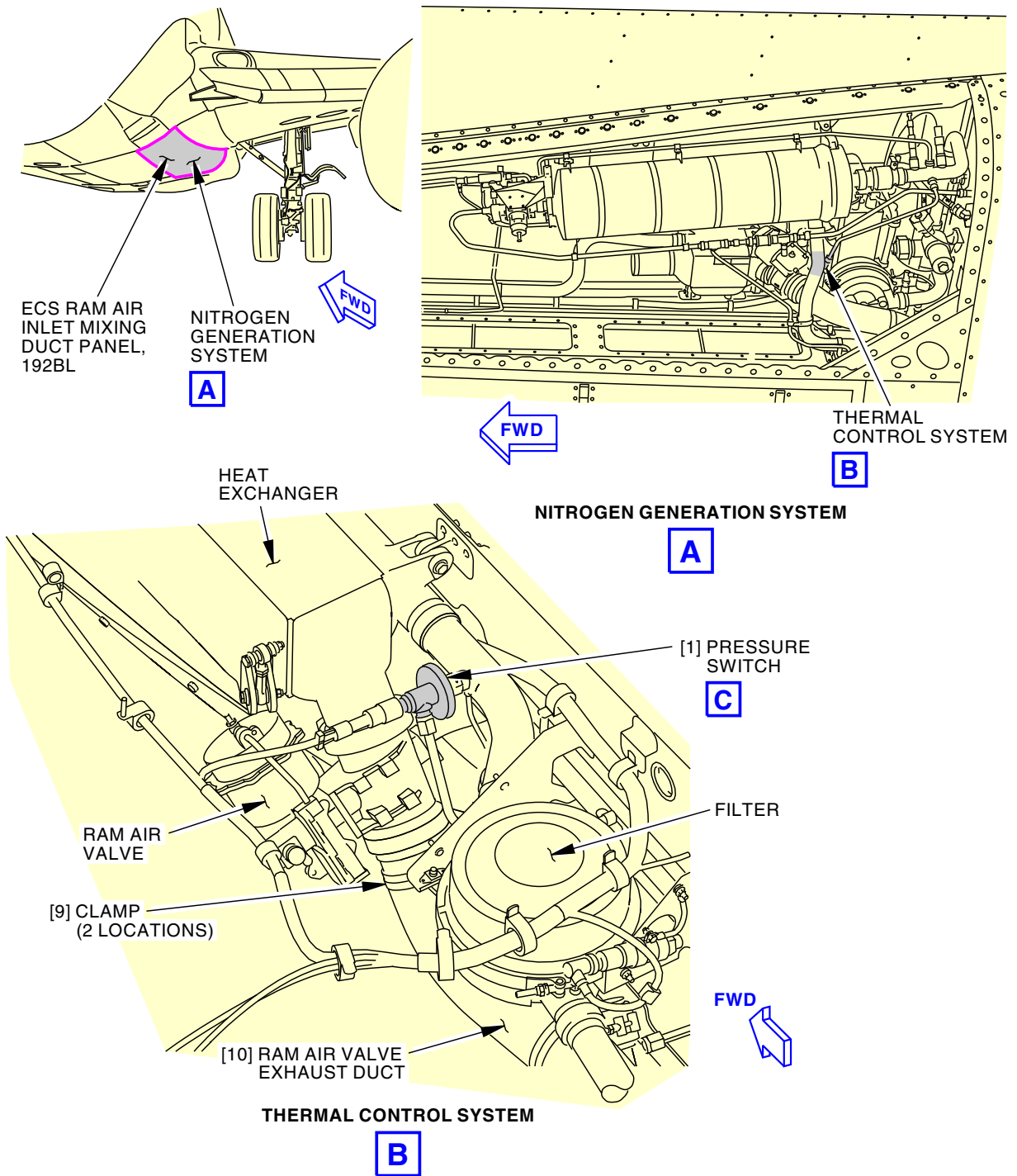
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Filter Differential Pressure Switch
Figure 401/47-43-01-990-801 (Sheet 1 of 2)

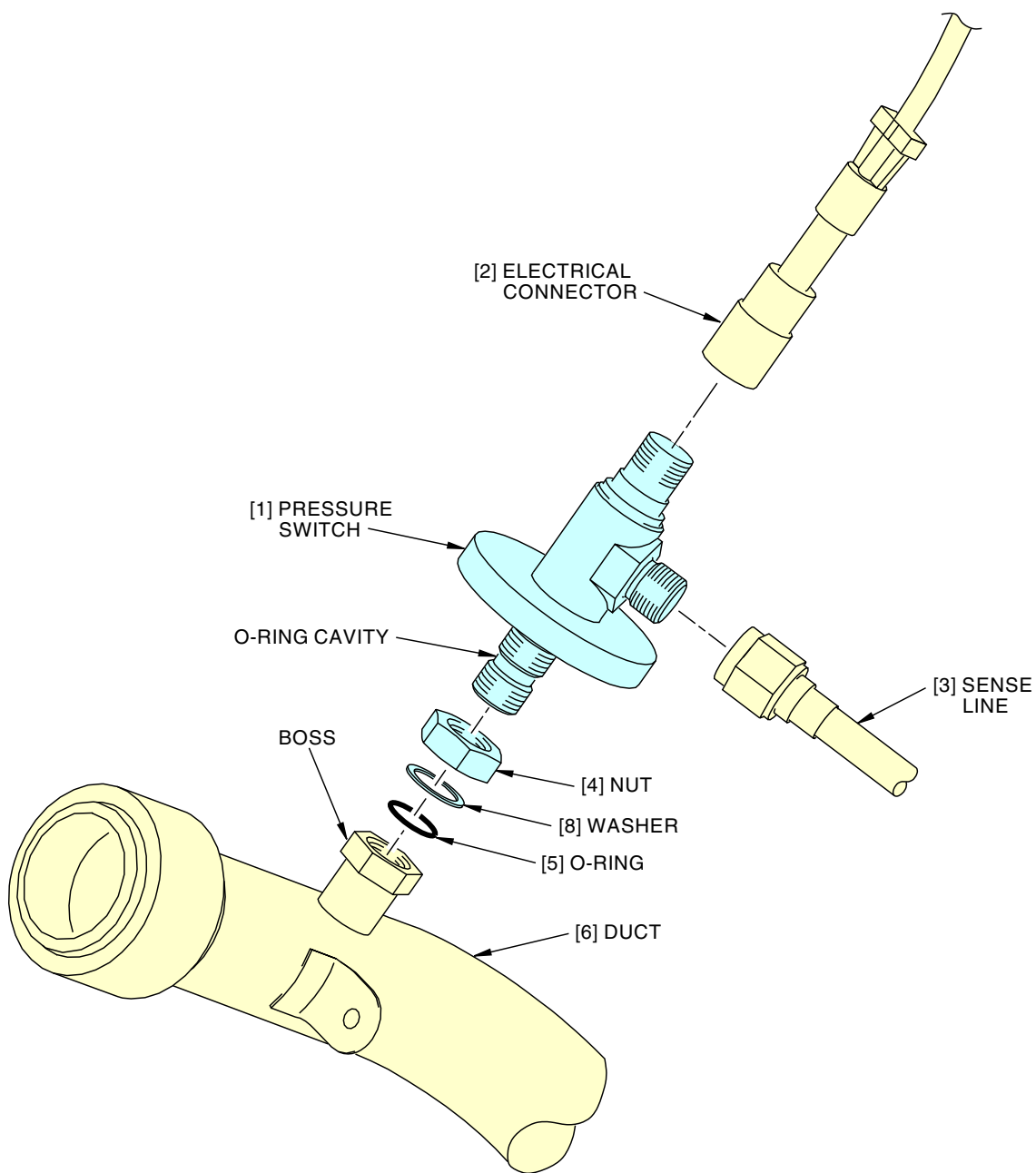
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FILTER DIFFERENTIAL PRESSURE SWITCH



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Filter Differential Pressure Switch
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)

A. General

(1) This task gives the steps to install the filter differential pressure switch to the air filter inlet duct.

B. References

Reference	Title
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
47-32-05-400-801	Ram Air Valve Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure switch	47-43-01-01-065	SIA ALL
5	O-ring	47-43-01-01-060	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Install the Pressure Switch

SUBTASK 47-43-01-090-001

(1) Remove the protective cap from the sense line [3].

SUBTASK 47-43-01-430-001

(2) 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 [5] cavity.

SUBTASK 47-43-01-420-001

(3) Install the washer [8] on the pressure switch [1] in its position between the nut [4] and o-ring [5].

SUBTASK 47-43-01-640-001

(4) Lubricate the new o-ring [5] with water.

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SUBTASK 47-43-01-430-002

- (5) Install the new o-ring [5] in its position on the pressure switch [1] groove.

SUBTASK 47-43-01-420-002

- (6) Install the pressure switch [1] into the boss of the duct [6].
- (a) Continue to turn the pressure switch [1] until the o-ring [5] is in its position in the groove of the boss of the duct [6].

SUBTASK 47-43-01-420-003

- (7) Do these steps to install the sense line [3]:
- (a) Align the pressure switch [1] with the sense line [3].
- (b) Apply corrosion inhibiting material, G50136, on the treads.
- (c) Connect the sense line [3] to the pressure switch [1].
- NOTE: Use a second wrench on the pressure switch [1] when you tighten the sense line [3].

SUBTASK 47-43-01-430-003

- (8) Tighten the nut [4] to 90 $\pm$ 3 in-lb (10.2 $\pm$ 0.4 N·m).
- NOTE: Use a second wrench on the boss of duct [6] 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 47-43-01-420-004

- (9) Install MS20995N32 lockwire, G50177 between the boss of the duct [6] and nut [4].

SUBTASK 47-43-01-420-005

- (10) Connect the electrical connector [2].

SUBTASK 47-43-01-410-001

- (11) Do the steps and this task to install the ram air valve exhaust duct [10] and clamps [9]: Ram Air Valve Installation, TASK 47-32-05-400-801.

H. Operational Test for the Pressure Switch

SUBTASK 47-43-01-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-43-01-860-002

- (2) Remove the DO-NOT-OPERATE tags from the L PACK and R PACK selector switches.
- (a) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-43-01-740-001

- (3) Do this task: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Make sure that the test is good and the BITE message for the pressure switch [1] does not show.
- (b) With the NGS pressurized, use the leak detector, G50135, to do a check for leaks around the pressure switch [1].
- (c) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.

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(d) Repair the leaks that you find.

I. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-01-410-002

(1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

———— **END OF TASK** ————

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THERMAL SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal of the thermal switch
- (2) An installation of the thermal switch.

 47-AWL-04: ALI

TASK 47-43-02-000-801

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
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door

F. Prepare for the Removal

SUBTASK 47-43-02-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
 - (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-43-02-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
 - (a) Install DO NOT OPERATE tags, STD-858, on the L PACK and R PACK switches.

EFFECTIVITY
SIA ALL

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SUBTASK 47-43-02-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-43-02-010-001

- (4) Open these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door

SUBTASK 47-43-02-910-001



WARNING

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.



WARNING

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.



CAUTION

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.

- (5) Obey the nitrogen generation system (NGS) precautions (TASK 47-00-00-010-801).

G. Thermal Switch Removal

SUBTASK 47-43-02-020-001

- (1) Disconnect the electrical connector [1].

SUBTASK 47-43-02-020-002

- (2) Do these steps to remove the thermal switch [2]:

- (a) Remove the lockwire (TASK 20-10-44-000-801).
- (b) Remove the thermal switch [2] from the duct [4].

NOTE: Use a second wrench on the duct [4] when you disconnect the thermal switch [2].

- (c) Discard the O-ring [3].
- (d) Put a protective cap on the thermal switch port of the duct [4].

————— END OF TASK —————

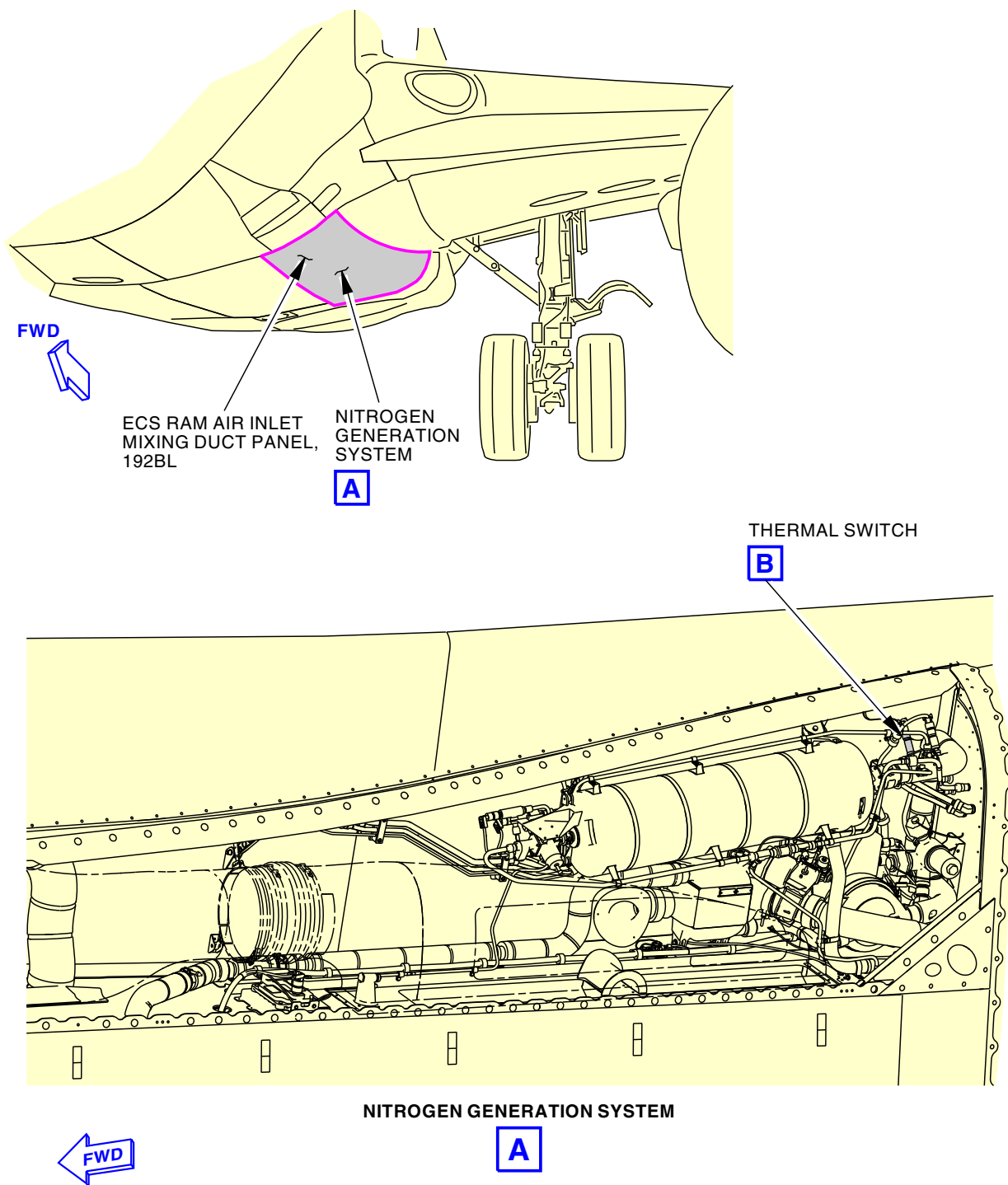
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Thermal Switch Installation
Figure 401/47-43-02-990-801 (Sheet 1 of 2)

EFFECTIVITY
SIA ALL

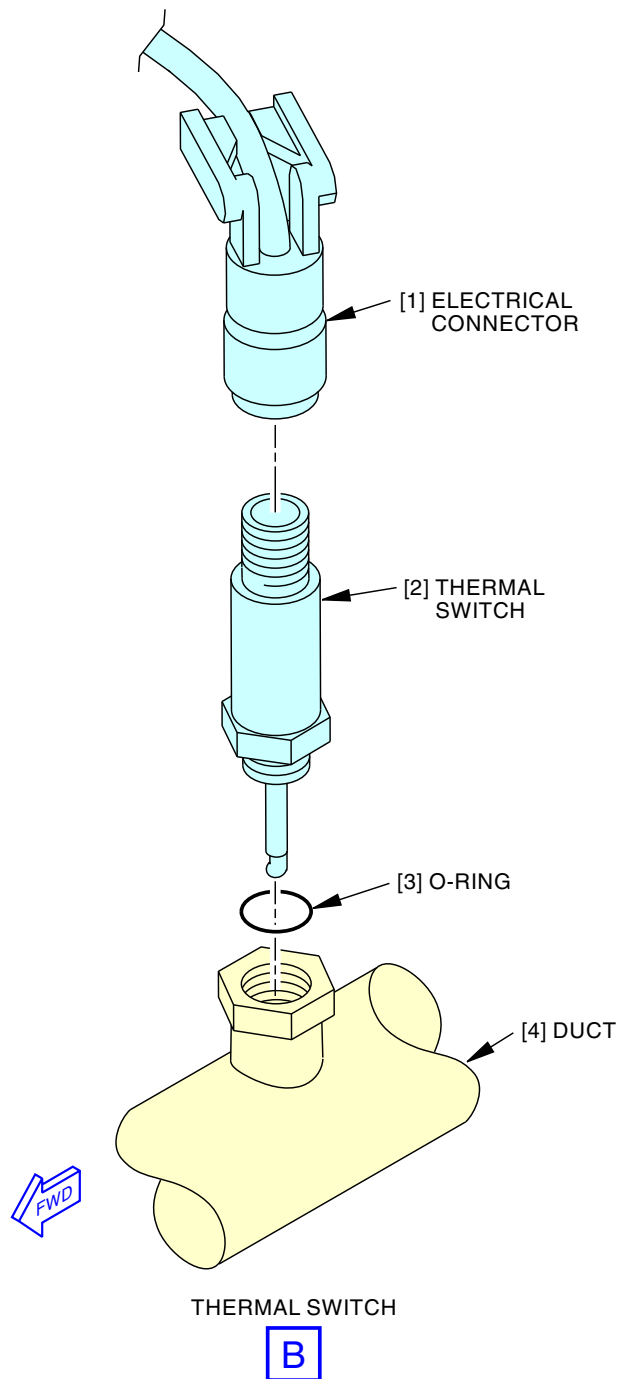
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Thermal Switch Installation
Figure 401/47-43-02-990-801 (Sheet 2 of 2)

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47-AWL-04: ALI

TASK 47-43-02-400-801

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
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-25-14	ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS
SWPM 20-25-15	ASSEMBLY OF COMPOSITE HEX COUPLING NUT BACKSHELLS THAT HAVE OR DO NOT HAVE A BRAIDED SHIELD SOCK

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)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Thermal switch	47-43-02-01-010	SIA ALL
3	O-ring	47-43-02-01-005	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door

EFFECTIVITY
SIA ALL

47-43-02

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G. Thermal Switch Installation

SUBTASK 47-43-02-020-003

- (1) Remove the protective cap.

SUBTASK 47-43-02-400-001



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) Apply a thin layer of Krytox 240AC perfluoropolyether grease, D50063, or water on the new O-ring [3].

SUBTASK 47-43-02-420-001

- (3) Install the O-ring [3] on the thermal switch [2].

SUBTASK 47-43-02-420-002

- (4) Carefully install the thermal switch [2] into the thermal switch port.

- (a) Use a second wrench on the nut attached to the duct [4] to tighten the thermal switch [2].

SUBTASK 47-43-02-420-003

- (5) Torque the thermal switch [2] to 100 ±10 in-lb (11 ±1 N·m).

SUBTASK 47-43-02-420-004

- (6) Install the MS20995N32 lockwire, G50177, between the thermal switch [2] and thermal switch port on the duct [4] (TASK 20-10-44-400-801).

SUBTASK 47-43-02-430-001

- (7) Connect the electrical connector [1] to the thermal switch [2].

SUBTASK 47-43-02-210-001

- (8) Make sure that there is a shield band on the electrical connector [1].
 - (a) If there is no shield band, install a shield band on the electrical connector [1] (SWPM 20-25-14 and SWPM 20-25-15).
 - (b) If the shield band is damaged, repair the shield band (SWPM 20-25-14 and SWPM 20-25-15).

H. Thermal Switch Installation Test

SUBTASK 47-43-02-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

EFFECTIVITY
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SUBTASK 47-43-02-860-002

- (2) On the P5-10 bleed air control module, remove the DO NOT OPERATE tags on the L PACK and the R PACK switches.

SUBTASK 47-43-02-740-001

- (3) Do this task to do a check of the thermal switch: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Make sure that the test is good and the Built-In-Test Equipment (BITE) message for the thermal switch [2] does not show.
 - (b) With the Nitrogen Generation System (NGS) pressurized, use the leak detector, G50135, to do a check for leaks around the thermal switch [2].
 - (c) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.
 - (d) Repair the leaks that you find.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 47-43-02-410-001

- (1) Close these access panels:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward
192CR	ECS Access Door

————— **END OF TASK** —————

EFFECTIVITY
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THERMAL SWITCH - ADJUSTMENT/TEST

1. General

A. This procedure contains Thermal Switch Functional Test.

TASK 47-43-02-720-801

2. Thermal Switch Functional Test

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure contains Thermal Switch Functional Test.

B. References

Reference	Title
47-43-02-000-801	Thermal Switch Removal (P/B 401)
47-43-02-400-801	Thermal Switch Installation (P/B 401)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. Functional Test

SUBTASK 47-43-02-000-001

(1) Do this task: Thermal Switch Removal, TASK 47-43-02-000-801.

SUBTASK 47-43-02-720-001

(2) Test the switch (S01129) per the manufacturer's instructions.

SUBTASK 47-43-02-400-002

(3) Do this task: Thermal Switch Installation, TASK 47-43-02-400-801.

———— **END OF TASK** ————

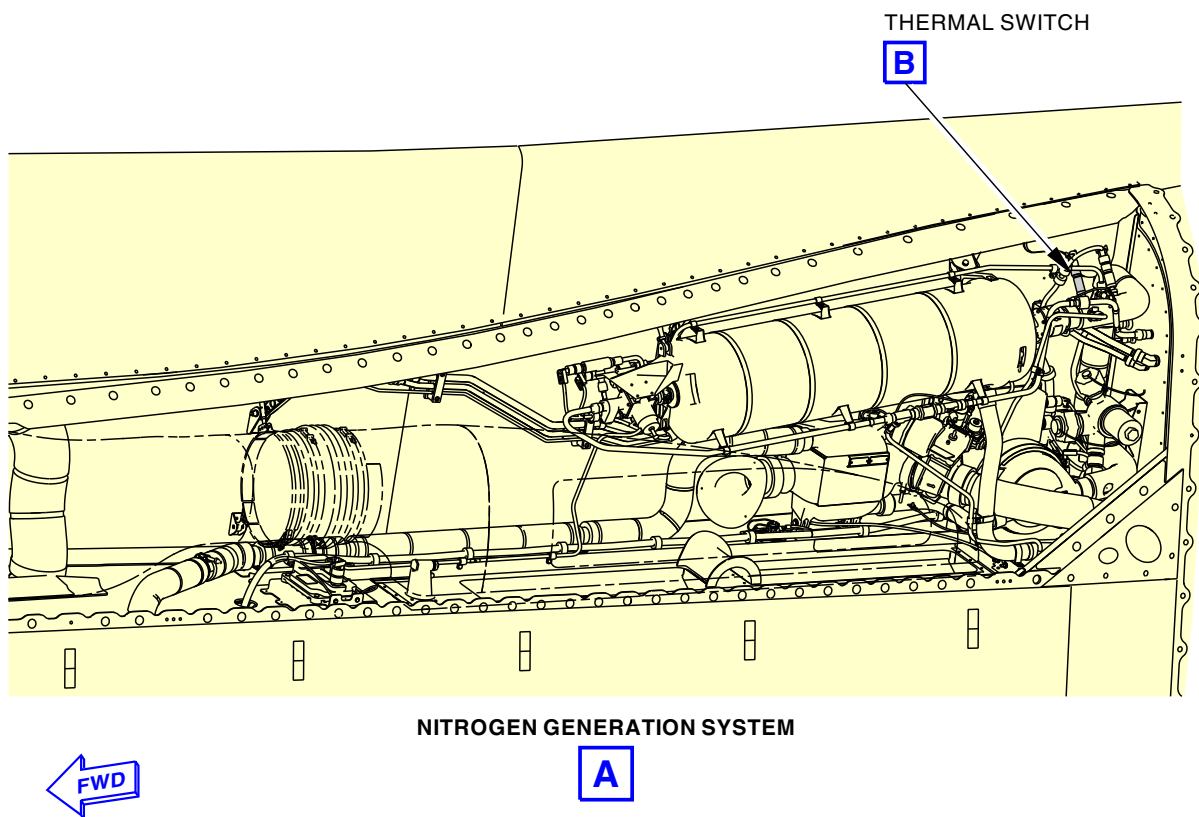
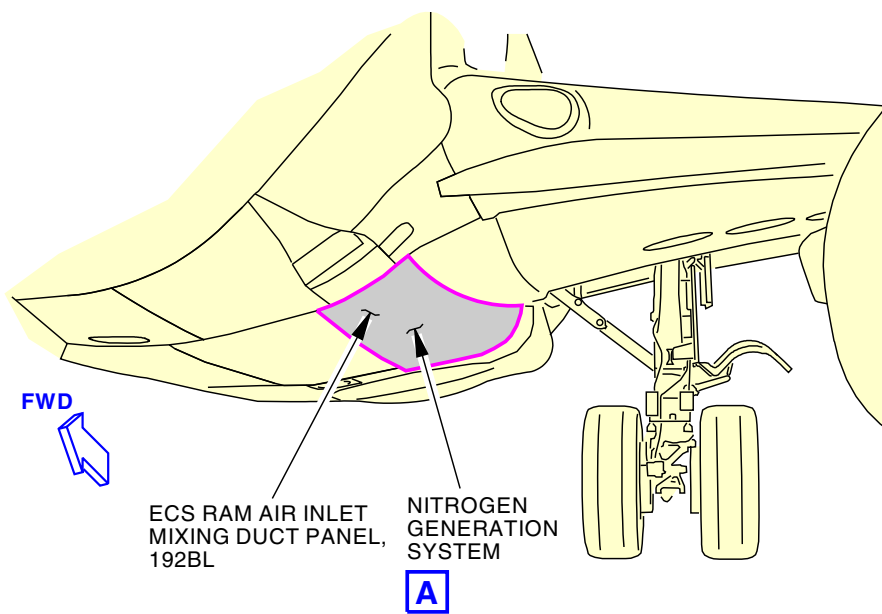
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Thermal Switch Adjustment
Figure 501/47-43-02-990-802 (Sheet 1 of 2)

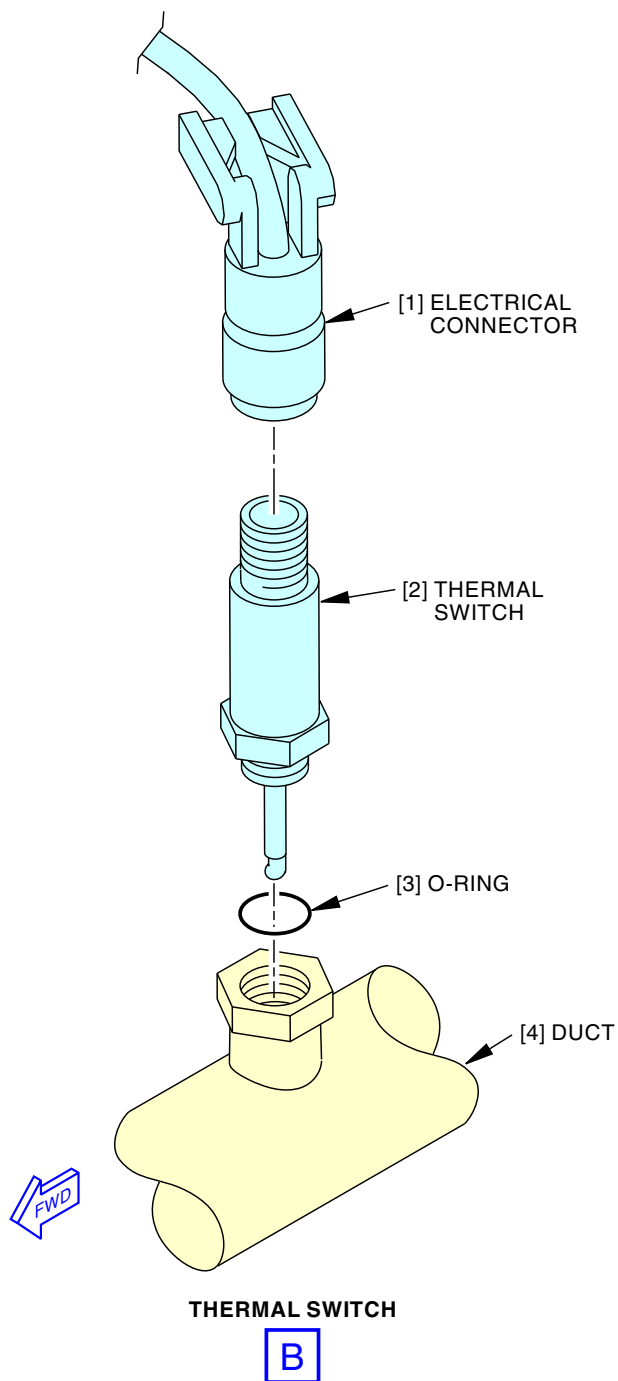
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Thermal Switch Adjustment
Figure 501/47-43-02-990-802 (Sheet 2 of 2)

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AIRCRAFT MAINTENANCE MANUAL

TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) Temperature Sensor Removal
 - (2) Temperature Sensor Installation

TASK 47-43-03-000-801

2. Temperature Sensor Removal

(Figure 401)

A. **References**

Reference	Title
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

E. **Prepare for the Removal**

SUBTASK 47-43-03-864-001

- (1) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-43-03-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
- (a) Install DO NOT OPERATE tags, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-43-03-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

EFFECTIVITY
SIA ALL

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SUBTASK 47-43-03-010-001



WARNING

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.

- (4) Open this access panel:

Number

Name/Location

192BL

ECS Ram Air Inlet Mixing Duct Panel - Forward

F. Temperature Sensor Removal

SUBTASK 47-43-03-800-001



WARNING

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.



WARNING

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.



CAUTION

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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-43-03-010-002

- (2) Go to the temperature sensor [2] location.

NOTE: The temperature sensor [2] is on the inlet duct aft of the air separation module, upstream of and adjacent to the overtemperature shutoff valve.

SUBTASK 47-43-03-030-001

- (3) Disconnect the electrical connector [1].

SUBTASK 47-43-03-030-002

- (4) Do these steps to remove the temperature sensor [2]:

- (a) Remove the lockwire.

- (b) Remove the temperature sensor [2] from the duct [4].

NOTE: Use a second wrench on the duct [4] when you disconnect the temperature sensor [2].

- (c) Discard the o-ring [3].

- (d) Put a protective cap on the port for the duct [4].

————— **END OF TASK** —————

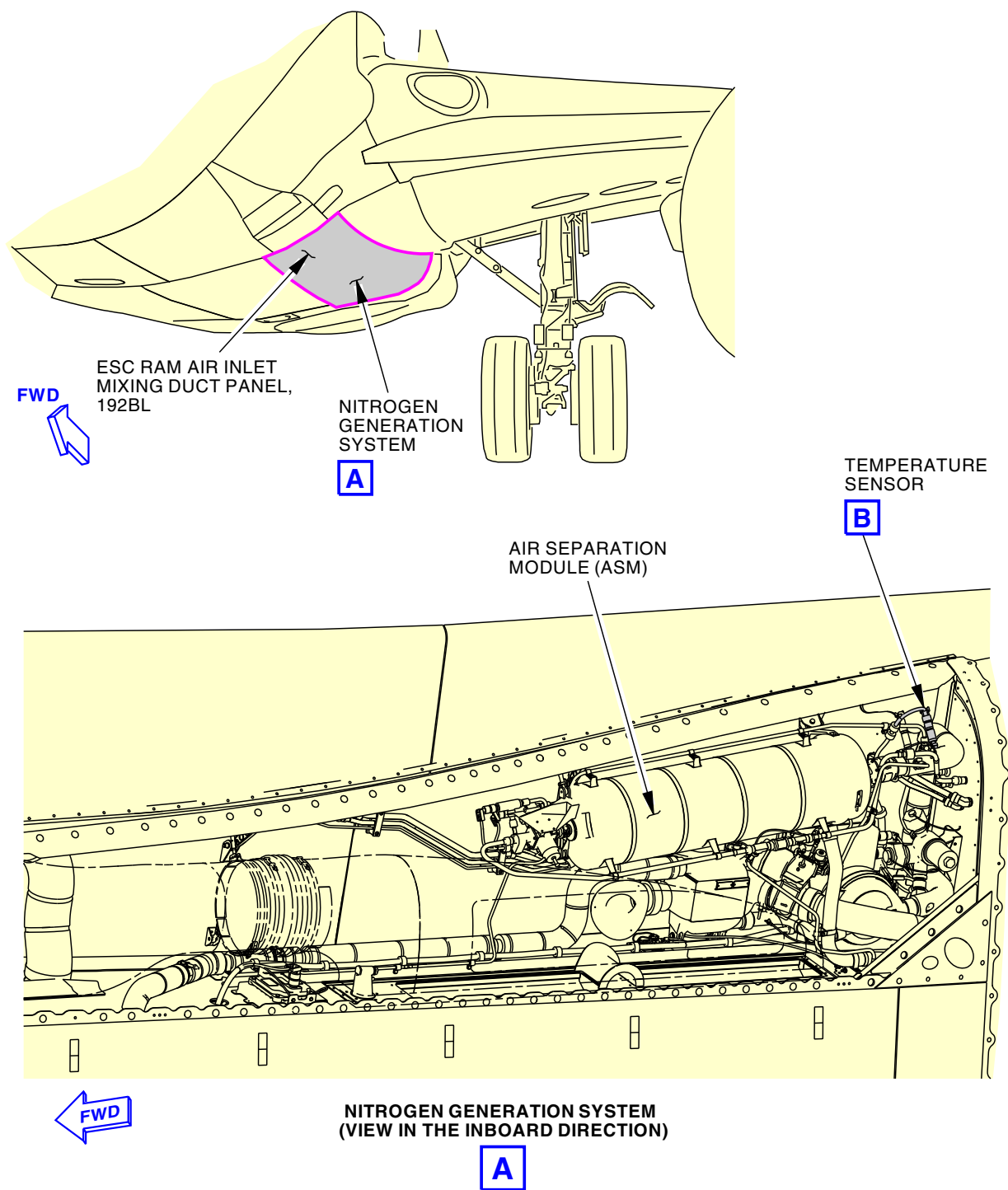
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Temperature Sensor
Figure 401/47-43-03-990-801 (Sheet 1 of 2)

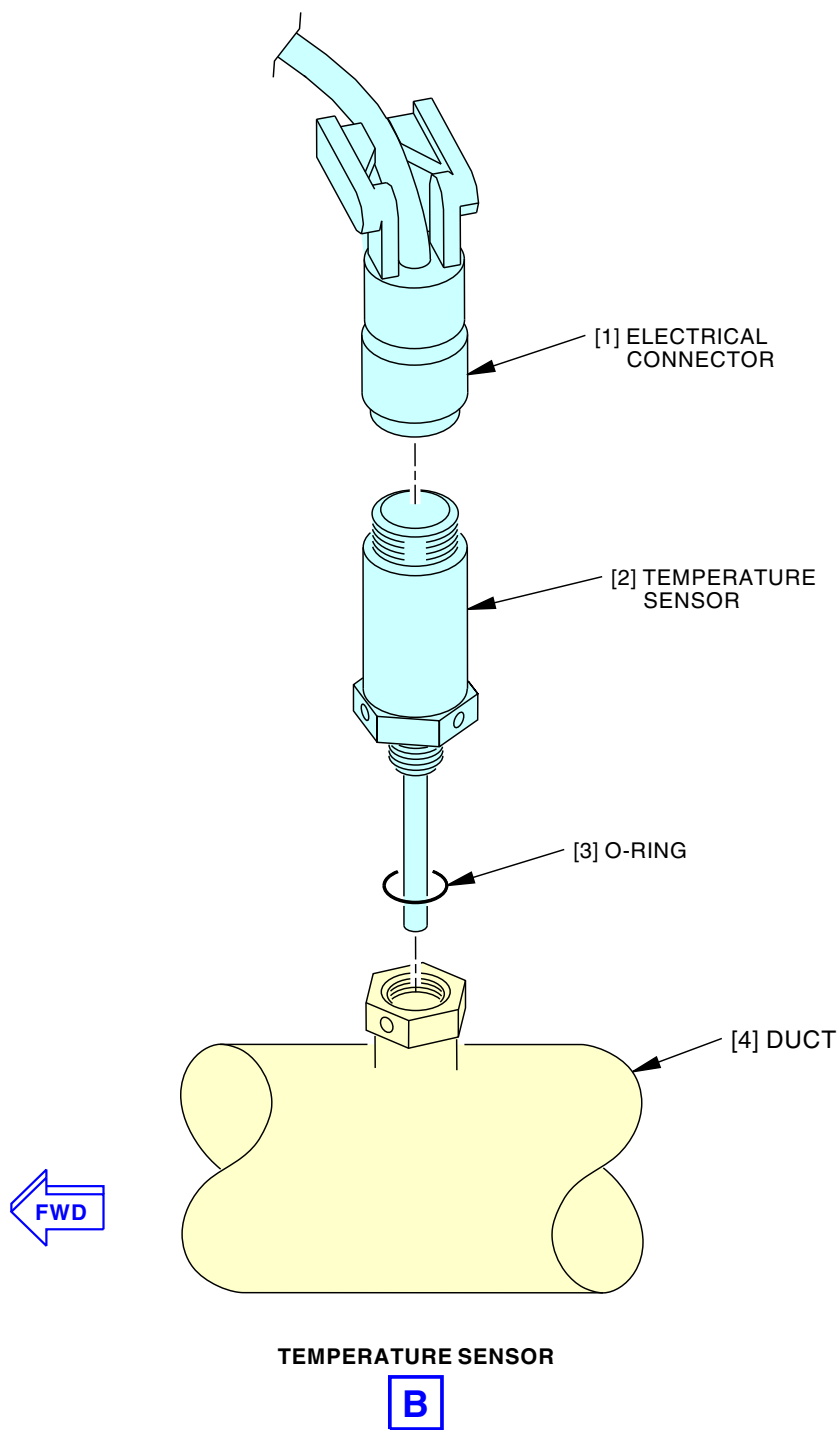
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Temperature Sensor
Figure 401/47-43-03-990-801 (Sheet 2 of 2)

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TASK 47-43-03-400-801

3. Temperature Sensor Installation

(Figure 401)

A. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)
SWPM 20-25-14	ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS
SWPM 20-25-15	ASSEMBLY OF COMPOSITE HEX COUPLING NUT BACKSHELLS THAT HAVE OR DO NOT HAVE A BRAIDED SHIELD SOCK

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CLA)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Temperature sensor	47-43-03-01-010	SIA ALL
3	O-ring	47-43-03-01-005	SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

G. Temperature Sensor Installation

SUBTASK 47-43-03-090-001

(1) Remove the protective cap.

SUBTASK 47-43-03-640-001

(2) Lubricate the new o-ring [3] with water.

SUBTASK 47-43-03-430-001

(3) Install the o-ring [3] on the temperature sensor [2].

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SUBTASK 47-43-03-420-001

- (4) Install the temperature sensor [2] in its position.

NOTE: Use a second wrench on the nut attached to the duct [4] when you tighten the temperature sensor [2].

- (a) Tighten the temperature sensor [2] to 80 ± 8 in-lb (9.0 ± 0.9 N·m).

SUBTASK 47-43-03-430-002

- (5) Install a MS20995N32 lockwire, G50177, on the temperature sensor [2] and the duct [4] (TASK 20-10-44-400-801).

SUBTASK 47-43-03-430-003

- (6) Connect the electrical connector [1] to the temperature sensor [2].

SUBTASK 47-43-03-210-001

- (7) Make sure that there is a shield band on the electrical connector [1].
- (a) If there is no shield band, install a shield band on the electrical connector [1] (SWPM 20-25-14 and SWPM 20-25-15).
- (b) If the shield band is damaged, repair the shield band (SWPM 20-25-14 and SWPM 20-25-15).

H. Operational Test of the Temperature Sensor

SUBTASK 47-43-03-865-002

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-43-03-440-001

- (2) On the P5-10 Bleed Air Control Module, remove the DO NOT OPERATE tags, STD-858 from the L PACK and R PACK switches.
- (a) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-43-03-740-001

- (3) Do this task to do a check of the temperature sensor [2]: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.
- (a) Make sure that the test is good and the BITE message for the temperature sensor [2] does not show.
- (b) With the NGS pressurized, use the leak detector, G50135, to do a check for leaks around the temperature sensor [2].
- (c) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.
- (d) Repair the leaks that you find.

I. Put the Airplane Back to the Usual Condition

SUBTASK 47-43-03-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192BL	ECS Ram Air Inlet Mixing Duct Panel - Forward

————— END OF TASK —————

EFFECTIVITY
SIA ALL

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NGS PRESSURE SENSOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) NGS Pressure Sensor Removal
 - (2) NGS Pressure Sensor Installation

TASK 47-43-04-000-801

2. NGS Pressure Sensor Removal

(Figure 401)

A. **References**

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
47-00-00-010-801	Nitrogen Generation System (NGS) Precautions (P/B 201)

B. **Tools/Equipment**

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. **Location Zones**

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

D. **Access Panels**

Number	Name/Location
192CL	ECS Access Door

E. **Prepare for the Removal**

SUBTASK 47-43-04-864-001

- (1) Do this task to prepare for removal: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.
- (a) On the P5-10 Bleed Air Control Module, make sure that the DUCT PRESS L and R indicators show 0.50 psig (3.45 kPa) or less.

SUBTASK 47-43-04-860-001

- (2) On the P5-10 Bleed Air Control Module, put the L PACK and R PACK switches to the OFF position.
- (a) Install DO NOT OPERATE tags, STD-858 on the L PACK and R PACK switches.

SUBTASK 47-43-04-865-001

- (3) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

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SUBTASK 47-43-04-010-001

- (4) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

F. NGS Pressure Sensor Removal

SUBTASK 47-43-04-860-002



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.



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 Nitrogen Generation System (NGS) precautions (TASK 47-00-00-010-801).

SUBTASK 47-43-04-010-002

- (2) Go to the pressure sensor [1] location.

NOTE: The NGS pressure sensor [1] is attached to a bracket assembly [3] on the left side front spar in the left air conditioning pack bay.

SUBTASK 47-43-04-030-001

- (3) Disconnect the electrical connector [6].

SUBTASK 47-43-04-020-001

- (4) Do these steps to remove the pressure sensor [1]:

- (a) Do this task to disconnect the pressure sense line [7]: Flareless Tubing Assembly Removal, TASK 20-10-51-000-801.

NOTE: Use a second wrench on the pressure sensor [1] when you disconnect the pressure sense line [7].

- (b) Hold the pressure sensor [1] in its position.
(c) Remove the screws [5], washers [4], and the clamps [2].
(d) Remove the pressure sensor [1].
(e) Keep the washers [4], screws [5], and the clamps [2] for the installation.

————— **END OF TASK** —————

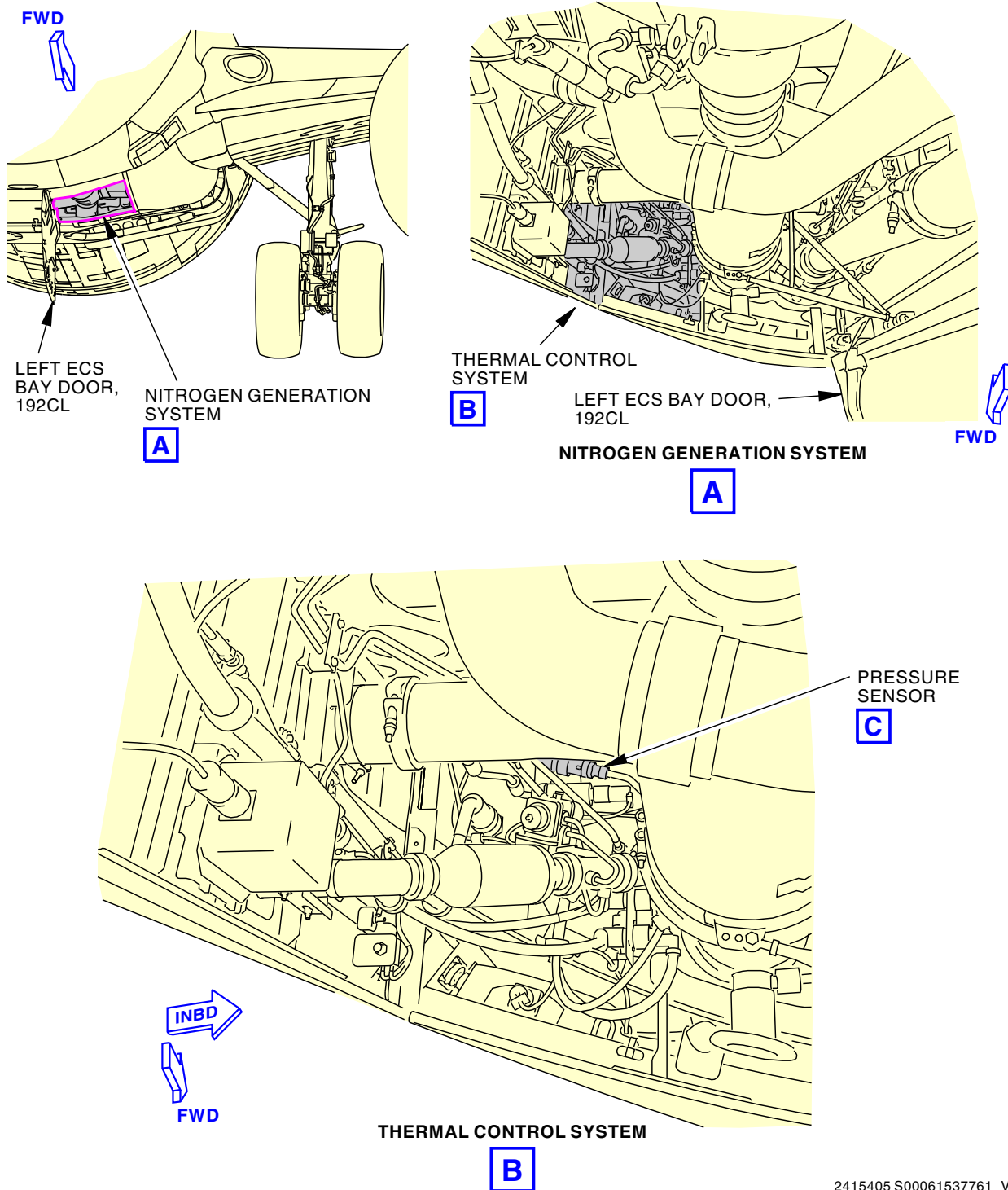
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2415405 S00061537761_V1

Pressure Sensor
Figure 401/47-43-04-990-801 (Sheet 1 of 2)

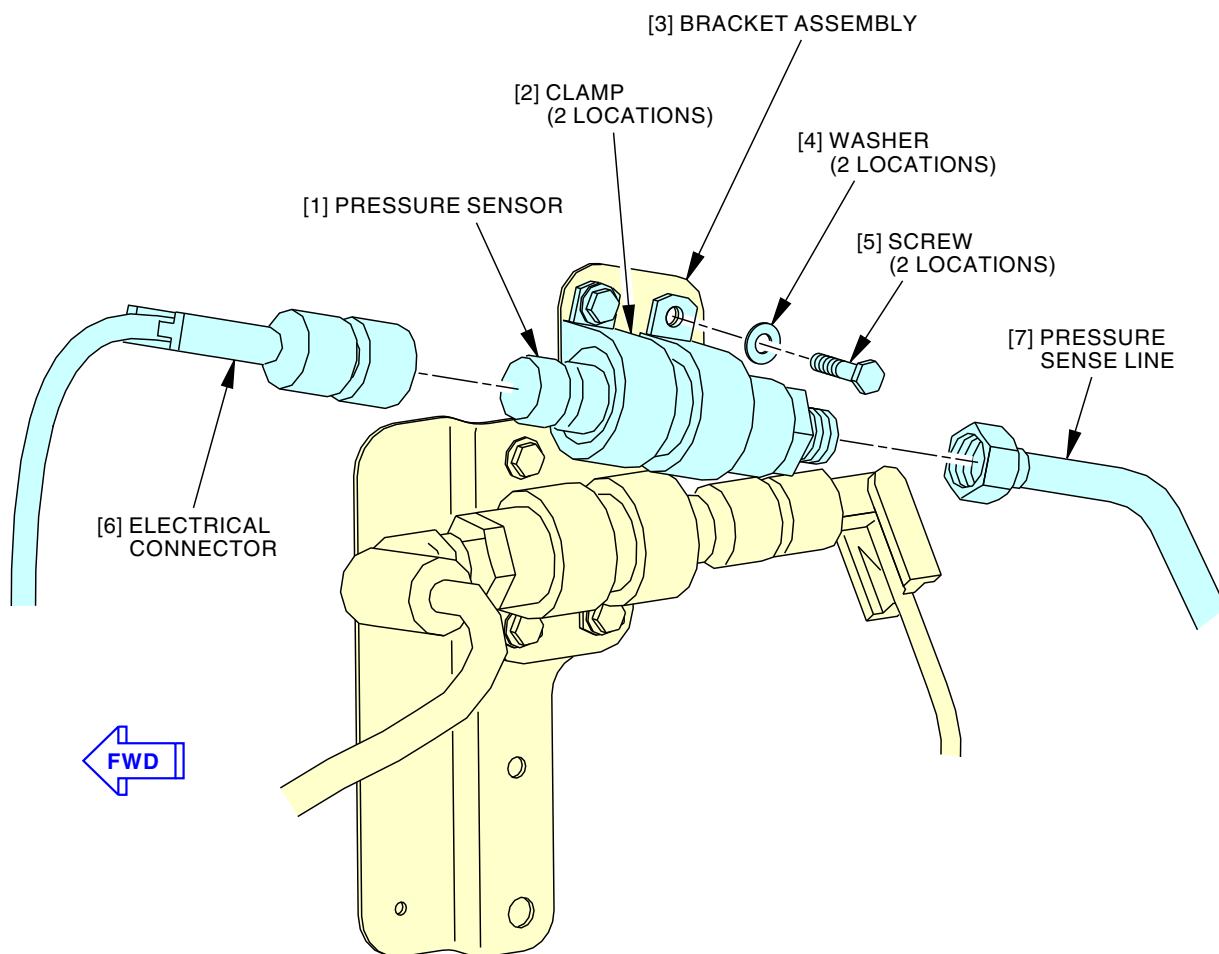
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PRESSURE SENSOR

C

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Pressure Sensor
Figure 401/47-43-04-990-801 (Sheet 2 of 2)

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TASK 47-43-04-400-801

3. **NGS Pressure Sensor Installation**

(Figure 401)

A. References

Reference	Title
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
47-00-00-800-801	Nitrogen Generation System Ground Operation (P/B 201)

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure sensor	21-51-53-01-205 47-43-04-02-040	SIA ALL SIA ALL

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
212	Flight Compartment - Right

F. Access Panels

Number	Name/Location
192CL	ECS Access Door

G. NGS Pressure Sensor Installation

SUBTASK 47-43-04-420-001



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.

(1) Do these steps to install the pressure sensor [1]:

- (a) Put the clamps [2] and the pressure sensor [1] into their position on the bracket assembly [3].
- (b) Install the clamps [2] and pressure sensor [1] with the two washers [4] and two screws [5].

NOTE: Do not tighten the screws [5] until the pressure sense line [7] is attached to the pressure sensor [1].

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AIRCRAFT MAINTENANCE MANUAL

- (c) Do this task to attach the pressure sense line [7] to the pressure sensor [1]: Flareless Tubing Assembly Installation, TASK 20-10-51-400-801.

NOTE: Use a second wrench on the pressure sensor [1] when you connect the pressure sense line [7].

- (d) Tighten the screws [5].
(e) Connect the electrical connector [6].

H. Operational Test of the Pressure Sensor

SUBTASK 47-43-04-090-001

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

CAPT Electrical System Panel, P18-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 47-43-04-865-002

- (2) On the P5-10 Bleed Air Control Module, remove the DO NOT OPERATE tags, STD-858 from the L PACK and R PACK switches.

- (a) Put the L PACK and R PACK selector switches to the AUTO position.

SUBTASK 47-43-04-710-001

- (3) Do this task to do a check of the pressure sensor [1]: Nitrogen Generation System Ground Operation, TASK 47-00-00-800-801.

- (a) Make sure that the test is good and the BITE message for the pressure sensor [1] does not show.
(b) With the NGS pressurized, use the leak detector, G50135, to do a check for leaks around the pressure sensor [1].
(c) Use a clean cotton wiper, G00034, to remove the leak detector, G50135.
(d) Repair the leaks that you find.

I. Put the Airplane Back to its Usual Condition

SUBTASK 47-43-04-410-001

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	ECS Access Door

————— **END OF TASK** —————

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