

CHAPTER

73

**ENGINE FUEL AND
CONTROL**

**737-600/700/800/900
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**CHAPTER 73
ENGINE FUEL AND CONTROL**

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ENGINE FUEL AND CONTROL - 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 Procedures Guide (DDPG). These tasks prepare the airplane for flight with systems/components that are inoperative.
- B. This procedure also has the tasks that put the airplane back to its usual condition.
- C. These are the tasks for the components in the engine fuel and control system:
 - (1) MMEL 73-10 (DDPG) Preparation - Fuel Control, ENG VALVE CLOSED Light Inoperative
 - (2) MMEL 73-10 (DDPG) Restoration - Fuel Control, ENG VALVE CLOSED Light Inoperative.
 - (3) MMEL 73-4 (DDPG) Verify the Fuel Filter Differential Pressure Warning System.

TASK 73-00-00-040-801-F00**2. MMEL 73-10 (DDPG) Preparation - Fuel Control, ENG VALVE CLOSED Light Inoperative**

A. General

- (1) This task gives the maintenance steps which prepare the airplane for flight with the Engine Valve Closed light inoperative.
- (2) This is the condition for this task:
 - (a) The two ENG VALVE CLOSED lights may be inoperative provided that the High Pressure ShutOff Valves (HPSOV) will operate correctly.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

C. Location Zones

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

D. Engine Fuel HPSOV Operational Test

SUBTASK 73-00-00-860-001-F00

- (1) Do these steps to make sure that the HPSOV operates correctly:
 - (a) Start the applicable engine, do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.
 - 1) Let the engine become stable at idle.
 - (b) For engine 1, do this step;
 - Open this circuit breaker:
 - F/O Electrical System Panel, P6-3
- | Row | Col | Number | Name |
|-----|-----|--------|-----------------------|
| B | 4 | C00359 | FUEL SPAR VALVE ENG 1 |
- (c) For engine 2, do this step;

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Open this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

CAUTION: DO NOT ROTATE THE FIRE HANDLE AS YOU DO THESE STEPS. IF YOU ROTATE THE FIRE HANDLE, THEN THE FIRE EXTINGUISHING BOTTLE WILL DISCHARGE.

- (d) Push the fire handle release button and pull the fire handle for the applicable engine.

NOTE: The fire handle release button is located below the fire handle for the applicable engine.

- (e) Make sure that the engine immediately begins to decelerate and continues to decelerate at the usual rate to a complete stop.

NOTE: If the engine does not immediately begin to decelerate, then there is a problem in the HPSOV system.

- 1) If the engine does not decelerate correctly, then do these steps:

- a) If it is necessary, do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

NOTE: The operation of the fire handle stops the flow of the hydraulic fluid from the hydraulic pump. The operation of the hydraulic pump without fluid must be limited to five minutes.

- b) Do the fault isolation for fault code 730 050 51 (Eng 1) or 730 050 52 (Eng 2).

- (f) Make sure that the Start Lever is in the CUTOFF position.
 (g) Push the applicable fire handle.
 (h) For engine 1, do this step;

Close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

- (i) For engine 2, do this step;

Close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 73-00-00-860-002-F00

- (2) For engine 1, do this step;

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	6	C01395	ENGINE FUEL ENGINE 1 HPSOV IND

SUBTASK 73-00-00-860-003-F00

- (3) For engine 2, do this step;

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Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND

————— END OF TASK —————

TASK 73-00-00-040-802-F00

3. MMEL 73-10 (DDPG) Restoration - Fuel Control, ENG VALVE CLOSED Light Inoperative

A. General

- (1) This task puts the airplane back to its usual condition after operation with the ENG VALVE CLOSED Light, LX1, inoperative.

B. Location Zones

<u>Zone</u>	<u>Area</u>
211	Flight Compartment - Left
212	Flight Compartment - Right

C. ENG VALVE CLOSED Light Repair

SUBTASK 73-00-00-860-004-F00

- (1) For engine 1, do this step;

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	6	C01395	ENGINE FUEL ENGINE 1 HPSOV IND

SUBTASK 73-00-00-860-005-F00

- (2) For engine 2, do this step;

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND

SUBTASK 73-00-00-810-001-F00

- (3) Do these steps to correct the fault:

(a) Find the fault code, or the description of the fault that occurred.

(b) If you find a fault code, then do these steps:

- 1) Go to the Fault Code Index in the applicable chapter of the FIM, and find the fault code.

NOTE: The first two digits of the fault code are the FIM chapter.

- 2) Find the task number on the same line as the fault code.

- 3) Go to the task in the FIM and do the steps in the task.

(c) If you find a description of the fault, then do these steps:

- 1) Go to the Observed Fault List at the start of the FIM, and find the best description for the fault.

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- 2) Find the task number on the same line as the fault description.
- 3) Go to the task in the FIM, and do the steps in the task.

————— **END OF TASK** —————

TASK 73-00-00-200-801-F00**4. MMEL 73-4 (DDPG) - Fuel Filter Differential Pressure Warning System**

A. General

- (1) This task gives the maintenance steps to make sure that the fuel filter bypass warning system light is illuminated and to return the airplane to service.

B. References

Reference	Title
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)
FIM 73-05 TASK 801	Fuel FILTER BY PASS Light is On - Fault Isolation

C. Procedure

SUBTASK 73-00-00-200-001-F00

- (1) Make sure that the malfunction is in the fuel filter bypass warning system.
 - (a) If the FILTER BYPASS light illuminates with the engine not in operation, the fuel filter bypass warning system is faulty.

NOTE: To energize the system with the engine not in operation, put the Engine START Switch to the CONTposition.

- (b) Do this task: FIM 73-05 TASK 801.

SUBTASK 73-00-00-900-001-F00

- (2) Replace the fuel filter. Do these tasks: Fuel Filter Removal, TASK 73-11-02-000-801-F00 and Fuel Filter Installation, TASK 73-11-02-400-801-F00.

NOTE: For Non-ER operations, one flight is permitted before filter replacement only if the fuel drained from filter housing drain plug is free of visible gross contamination.

————— **END OF TASK** —————

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FUEL PUMP PACKAGE - MAINTENANCE PRACTICES**1. General**

A. This procedure contains one task:

- (1) The preservation of the fuel pump.

TASK 73-11-01-600-801-F00**2. Fuel Pump Preservation**

A. General

- (1) Do this procedure when you send a fuel pump to storage.

B. References

Reference	Title
73-11-01-000-801-F00	Fuel Pump Package Removal (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-2338	Adapter - Drive Spline, Fuel Pump (Part #: 856A3471P02, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

E. Fuel Pump Preservation

SUBTASK 73-11-01-620-001-F00

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (1) Do these steps to preserve the fuel pump with oil, D00623 [CP5066] (oil):

NOTE: You can not do this procedure if the fuel pump is installed on the engine. Refer to this task (TASK 73-11-01-000-801-F00) to remove the fuel pump.

- (a) Make sure that the oil that you use for the procedure is clean.

NOTE: If it is necessary, put the oil through a 10 micron filter to clean it.

- (b) Pour the oil into the inlet port of the pump.
 (c) Use the adapter, SPL-2338 to turn the fuel pump main drive shaft until the oil flows out of the discharge port.
 (d) Tilt the pump and drain as much of the oil as possible.
 (e) Lubricate the splines of the main and control drive shafts with grease, D00601 [CP2101].
 (f) Install the shipping closures from the replacement fuel pump.

————— **END OF TASK** —————

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FUEL PUMP PACKAGE - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel pump package
- (2) The installation of the fuel pump package.

TASK 73-11-01-000-801-F00**2. Fuel Pump Package Removal**

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405)

A. General

- (1) The fuel pump package is on the engine at the 8:00 o'clock position below the left fan cowl panel.
- (2) The fuel pump package is made up of the fuel pump, HMU, fuel filter, main oil/fuel heat exchanger, servo fuel heater, and fuel filter differential pressure switch.
- (3) It is easier to complete the procedure if you remove and install the same size tube connectors at the same time.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
72-63-01-000-801-F00	Handcranking Drive Cover Removal (P/B 201)
73-11-01-600-801-F00	Fuel Pump Preservation (P/B 201)
73-11-07-000-801-F00	Servo Fuel Heater Removal (P/B 401)
73-21-10-000-801-F00	HMU Removal (P/B 401)
73-34-01-000-801-F00	Fuel Filter Differential Pressure Switch Removal (P/B 401)
79-21-02-000-801-F00	Main Oil/Fuel Heat Exchanger Removal (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-2189	Block - Jacking, Fuel Pump, MEC/HMU (Part #: 856A2609G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2336	Cradle - Support, Fuel Pump and MEC (Part #: 856A3598G02, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2337	Hoist - Beam, Fuel Pump and MEC, CFM56 Engines (Part #: 856A3560G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1154	Container - 5 Gallon (19 Liters)

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D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Location Zones

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

F. Prepare for Removal

SUBTASK 73-11-01-840-008-F00

(1) Do these steps to prepare the airplane for the removal:

- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- (b) Make sure that the start levers are in the CUTOFF position and install DO-NOT-OPERATE tags.
- (c) Make sure that the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Make sure that the SPAR VALVE CLOSED (fuel spar shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.
- (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

NOTE: The removal of the electrical power is necessary while you disconnect the electrical and fluid connectors. You can reapply electrical power to the airplane after all of the electrical and fluid connectors are disconnected and the protective covers are installed.

(f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

- 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

G. Fuel Pump Package Removal

SUBTASK 73-11-01-680-002-F00

(1) Do these steps to drain the fuel from the fuel pump package [1] (Figure 402).

WARNING: DO NOT GET FUEL IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FUEL. KEEP THE FUEL AWAY FROM SPARKS, FLAME, AND HEAT. FUEL IS A POISONOUS AND FLAMMABLE LIQUID THAT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Put a 5 gallon (19 liter) container, STD-1154 below the fuel pump.
- (b) Remove the drain plug [2] from the fuel filter cover.
- (c) Let the fuel drain in the container.

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(d) Remove and discard the O-ring [3] from the drain plug [2].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

(e) Lubricate a new O-ring [3] with oil, D00623 [CP5066].

(f) Install a new O-ring [3] on the drain plug [2].

(g) Lubricate the threads of the drain plug [2] with oil, D00623 [CP5066].

(h) Install the drain plug [2].

1) Tighten the drain plug [2] to a torque of 45-55 pound-inches (5.0-6.2 Newton-meters).

(i) Install the lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [2].

SUBTASK 73-11-01-020-012-F00

(2) Do this task: Handcranking Drive Cover Removal, TASK 72-63-01-000-801-F00.

SUBTASK 73-11-01-020-013-F00

(3) Disconnect these electrical connectors:

NOTE: If it is necessary, you can use soft-nose pliers to turn the connector nuts.

(a) The DP1203 (MWO312) connector from the HMU

(b) The DP0501 (J5) connector from the HMU

(c) The DP1207 (MWO312) connector from the HMU

(d) The DP0601 (J6) connector from the HMU

(e) The DP0803 (J8) connector from the fuel filter differential pressure switch

(f) Install protective covers on the plugs and the receptacles.

1) Move the electrical connectors out of the way to make sure that they are not damaged.

a) If it is necessary, use lockwire or tape to keep the connectors out of the way.

SUBTASK 73-11-01-210-002-F00

(4) Make sure that the container stays below the fuel pump during the removal procedure.

(a) While you disassemble the fuel pump package [1], let the unwanted fuel and oil drain into the container.

SUBTASK 73-11-01-420-004-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(5) Disconnect these hoses from the HMU:

NOTE: Refer to the HMU Removal, TASK 73-21-10-000-801-F00 for more information about the hoses, if it is necessary.

(a) Use two wrenches to disconnect these hoses:

NOTE: The hose removals are arranged so that same wrenches are used at the same time.

1) The LPT hose [4]

2) The HPT hose [5]

3) The BSV hose [10]

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- 4) The TBV hose [12].
- (b) Use two wrenches to disconnect these hoses:
 - 1) The VSV hose (ROD) [6]
 - 2) The VBV hose (CLOSED) [8]
 - 3) The PCR hose [11].
- (c) Use two wrenches to disconnect these hoses:
 - 1) The VSV hose (HEAD) [7]
 - 2) The VBV hose (OPEN) [9].
- (d) Install protective covers on the hoses and the HMU.
 - 1) If it is necessary, use lockwire or tape to keep the hoses out of the way.

SUBTASK 73-11-01-020-014-F00

WARNING: DO NOT LET ENGINE OIL STAY ON YOUR SKIN. USE ENGINE OIL IN AN AREA WITH GOOD VENTILATION. ENGINE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. ENGINE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (6) Do these steps to remove the oil tube [16] from the fuel pump package [1].
 - (a) Use two wrenches to disconnect the oil tube [16] from the oil tube [15].
 - (b) Remove the four bolts [18] that hold the tube [16] and the gasket [17] to the servo fuel heater.
 - (c) Remove the nut [23], bolt [24] and the two clamps [22] that hold the tubes to the fuel pump package [1].
 - (d) Remove the nut [25], bolt [26] and the clamp [27] that holds the tube to the bracket.
 - (e) Remove the oil tube [16].
 - 1) If the gasket [17] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- (f) Install protective covers on the oil tube [16] and the servo fuel heater.

SUBTASK 73-11-01-020-015-F00

WARNING: DO NOT LET ENGINE OIL STAY ON YOUR SKIN. USE ENGINE OIL IN AN AREA WITH GOOD VENTILATION. ENGINE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. ENGINE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (7) Do these steps to disconnect the oil tube [20] from the fuel pump package [1]:
 - (a) Remove the four bolts [19] that hold the oil tube [20] and the gasket [21] to the servo fuel heater.
 - (b) Move the oil tube [20] out of the way, to make sure that it is not damaged.
 - 1) If it is necessary, use lockwire or tape to keep the tube out of the way.

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- 2) If the gasket [21] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- (c) Install protective covers on the oil tube [20] and the servo fuel heater.

SUBTASK 73-11-01-020-016-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (8) Do these steps to remove the fuel tube [31] and fuel tube [37] from the fuel pump package [1]:

- (a) Use two wrenches to disconnect the fuel tube [31] from the fuel tube [37].
- (b) Remove the four bolts [30] that hold the fuel tube [31] and the gasket [32] to the fuel pump package [1].
- (c) Remove the nut [40], bolt [41], and clamp [42] that hold the tube [31] to the fuel pump package [1].
- (d) Remove the fuel tube [31].
- 1) If the gasket [32] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- (e) Install protective covers on the tube [31] and the fuel pump package [1].
- (f) Use two wrenches to disconnect the fuel tube [37] from the hose [33].
- 1) If it is necessary, use lockwire or tape to keep the hose [33] out of the way.
- (g) Remove the four bolts [39] that hold the fuel tube [37] and the gasket [38] to the fuel pump package [1].
- (h) Remove the nut [35], bolt [36], and clamp [34] that hold the fuel tube [37] to the fuel pump package [1].
- (i) Remove the fuel tube [37].
- 1) If the gasket [38] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- (j) Install protective covers on the tube [37], hose [33], and the fuel pump package [1].

SUBTASK 73-11-01-020-017-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (9) Do these steps to remove the fuel tube [45] and fuel tube [46] from the fuel pump package [1]:

- (a) Use two wrenches to disconnect the fuel tube [45] from the servo fuel heater and the fuel pump.
- (b) Remove the fuel tube [45].
- 1) Install protective covers on the fuel tube [45], servo fuel heater, and fuel pump.

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- (c) Use two wrenches to disconnect the fuel tube [46] from the servo fuel heater.
- (d) Remove the four bolts [48] that hold the fuel tube [46] and the gasket [47] to the fuel pump package [1].
- (e) Remove the fuel tube [46].
 - 1) If the gasket [47] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- 2) Install protective covers on the fuel tube [46], servo fuel heater, and fuel pump package [1].

SUBTASK 73-11-01-020-018-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (10) Do these steps to remove the fuel tube [50] and the bracket [53] from the fuel pump package [1]:
 - (a) Use two wrenches to disconnect the fuel tube [50] from the fuel tube [57].
 - (b) Remove the four bolts [49] that hold the fuel tube [50] and the gasket [51] to the fuel pump package [1].
 - (c) Remove the nut [54], bolt [55], and clamp [56] that hold the fuel tube [50] to the fuel pump package [1].
 - (d) Remove the nut [54], bolt [55], and clamp [56] that hold the fuel tube [57] to the bracket above the fuel pump package [1].
 - (e) Remove the fuel tube [50] and the gasket [51].
 - 1) If the gasket [51] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- (f) Install protective covers on the fuel tube [50], the fuel tube [57], and fuel pump package [1].
- (g) Remove the nuts [52] that hold the bracket [53] and the servo fuel heater to the fuel pump package [1].
 - 1) Remove the bracket [53].
- (h) Install the nuts [52] to hold the servo fuel heater to the fuel pump package [1].
 - 1) Tighten the nuts [52] to 98-110 pound-inches (11.0-12.5 Newton-meters).

SUBTASK 73-11-01-020-019-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (11) Do these steps to remove the drain tube [74] from the fuel pump package [1]:
 - (a) Use two wrenches to disconnect the drain tube [74] from the main oil/fuel heat exchanger.
 - (b) Use two wrenches to disconnect the drain tube [74] from the drain tube [70].
 - (c) Remove the nut [71], bolt [72], and clamp [73] that hold the drain tube [74] to the fuel pump package [1].
 - (d) Remove the drain tube [74].

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- 1) Install protective covers on the drain tube [74] and fuel pump package [1].
- (e) Use two wrenches to disconnect the drain tube [70] from the drain tube [66].
- (f) Remove the drain tube [70].

- 1) Install protective covers on the tube [66], the tube [70], and fuel pump package [1].

SUBTASK 73-11-01-020-020-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (12) Do these steps to remove the fuel tube [75] from the fuel pump package [1]:
 - (a) Use two wrenches to disconnect the fuel tube [75] from the hose [69].
 - (b) Remove the nut [78], bolt [79], and clamp [80] that hold the fuel tube [75] to the bottom of the fuel pump package [1].
 - (c) Remove the 4 bolts [77] that hold the fuel tube [75] and the gasket [76] to the fuel pump package [1].
 - (d) Remove the fuel tube [75].
 - 1) If the gasket [76] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- 2) Install protective covers on the tube [75], the hose [69], and fuel pump package [1].

SUBTASK 73-11-01-020-008-F00

- (13) Do these steps to disconnect the fuel supply hose [60] from the fuel pump inlet tube [63]:
 - (a) Remove the 4 bolts [62] to disconnect the fuel pump inlet tube [63] and the gasket [61] from the fuel supply hose [60].
 - (b) Move the fuel supply hose [60] away from the fuel pump inlet tube [63].
 - 1) If you have difficulty when you try to move the fuel supply hose, then remove the bolts and clamps that hold the fuel supply hose to the fan case.
 - 2) If the gasket [61] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.

- 3) Install the protective covers on the hose [60] and the tube [63].

SUBTASK 73-11-01-020-021-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (14) Remove the drain tube [68]:
 - (a) Use two wrenches to disconnect the drain tube [68] from the bottom of the HMU.
 - (b) Use two wrenches to disconnect the drain tube [68] from the drain tube [67].
 - 1) Remove the drain tube [68].
 - 2) Install the protective covers on the drain tube [68], the drain tube [67] and the HMU.

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SUBTASK 73-11-01-410-003-F00

- (15) Do these steps to remove the fuel pump package [1] (Figure 401, Figure 402, Figure 403, Figure 404, Figure 405).
- (a) Make sure that the protective covers are installed on all of the openings in the fuel pump package [1].
 - (b) Do these steps to install the fuel pump support equipment:
 - 1) Install the cradle, SPL-2336 below the fuel pump package [1].
 - 2) Lift the cradle, SPL-2336 with the beam hoist, SPL-2337 until it seats tightly below the fuel pump.
 - a) If the cradle, SPL-2336 does not seat tightly below the fuel pump, move the handle on the fuel filter cover out of the way.
 - 3) Adjust the sling to keep the clearance between the sling and the bottom of the main oil/fuel heat exchanger flange.
 - 4) Connect the fuel pump to the cradle, SPL-2336 with the strap that comes with the tool.
 - (c) Remove the QAD bolt [81].
 - 1) Install it in the opposite position with the jacking block, SPL-2189.
 - a) Keep the ball seat washer [82] for the subsequent installation.

WARNING: BE CAREFUL WHEN YOU REMOVE THE FUEL PUMP PACKAGE. THE FUEL PUMP PACKAGE WEIGHS APPROXIMATELY 106 POUNDS (48 KG). THE WEIGHT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

CAUTION: DO NOT LIFT THE FUEL PUMP PACKAGE BY THE DRIVE SHAFT. DO NOT LET THE DRIVE SHAFT SUPPORT THE WEIGHT OF THE FUEL PUMP PACKAGE. IF THE DRIVE SHAFT SUPPORTS THE WEIGHT OF THE FUEL PUMP PACKAGE, IT CAN CAUSE DAMAGE TO THE FUEL PUMP SEALS.

CAUTION: YOU MUST HOLD THE WEIGHT OF THE FUEL PUMP PACKAGE AS YOU LOOSEN THE QAD RING. IF YOU DO NOT CORRECTLY HOLD THE WEIGHT (ALL OF THE TIME) AS YOU LOOSEN THE QAD RING, THE QAD RING WILL NOT OPEN.

- (d) Operate the hoist until it holds the weight of the fuel pump package [1].
- (e) Do these steps to loosen the QAD ring (Figure 404).
 - 1) Use a non-metallic hammer to hit the QAD ring boss [83] in the counterclockwise direction.

CAUTION: DO NOT TIGHTEN THE QAD BOLT TO MORE THAN 300 POUND-INCHES (34 NEWTON METERS). IF YOU TIGHTEN THE QAD BOLT TOO MUCH, YOU CAN CAUSE DAMAGE TO THE QAD RING.

- 2) Tighten the QAD bolt [81] to 300 pound-inches (34 Newton-meters).
- 3) Use a non-metallic hammer to hit the QAD ring boss [83] in the counterclockwise direction.
- 4) Tighten the QAD bolt [81] to 300 pound-inches (34 Newton-meters).
- 5) Use a non-metallic hammer to hit the QAD ring boss [83] in the counterclockwise direction.
- 6) Continue to hit the boss [83] and tighten the bolt [81] until the QAD ring moves to the open position.

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- (f) Carefully disengage the fuel pump package [1] drive shaft from the Accessory GearBox (AGB).
- (g) Remove the fuel pump package [1] from the engine.
 - 1) Install covers on the AGB mounting face.
- (h) Remove and discard the gasket [85] from the QAD ring (Figure 405).
- (i) Remove and discard the O-ring [86] from the fuel pump drive shaft.
- (j) Remove the fuel pump package [1] from the cradle, SPL-2336 and the hoist.

SUBTASK 73-11-01-020-024-F00

- (16) Do these steps to remove the fuel pump inlet tube [63] from the fuel pump package [1] (Figure 402).
- (a) Remove the 4 bolts [65] that hold the fuel pump inlet tube [63] and the gasket [64] to the fuel pump package [1].
 - (b) Remove the fuel pump inlet tube [63] and gasket [64].
 - 1) If the gasket [64] is serviceable, then keep it with the tube for the subsequent installation.
- NOTE:** Refer to the Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00 for the gasket and seal maintenance practices.
- 2) Install protective covers on the tube [63] and fuel pump package [1].

SUBTASK 73-11-01-020-011-F00

- (17) If you will replace the fuel pump, do the applicable steps in the given tasks to remove these LRU's from the fuel pump for installation on the replacement fuel pump:
- (a) Do this task: HMU Removal, TASK 73-21-10-000-801-F00.
 - (b) Do this task: Servo Fuel Heater Removal, TASK 73-11-07-000-801-F00.
 - (c) Do this task: Main Oil/Fuel Heat Exchanger Removal, TASK 79-21-02-000-801-F00.
 - (d) Do this task: Fuel Filter Differential Pressure Switch Removal, TASK 73-34-01-000-801-F00.

SUBTASK 73-11-01-620-002-F00

- (18) If it is necessary to preserve the fuel pump, do this task: Fuel Pump Preservation, TASK 73-11-01-600-801-F00.

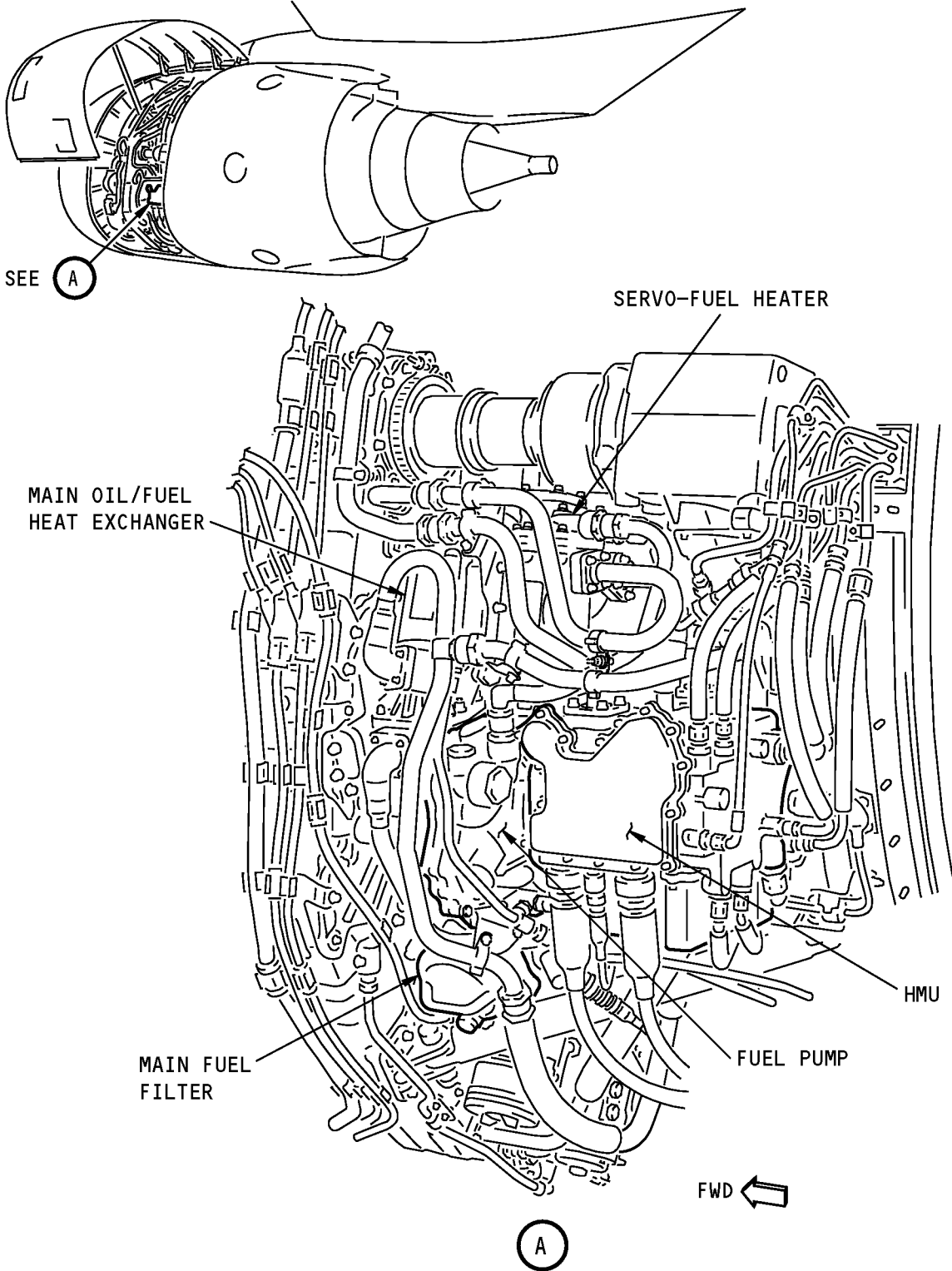
————— **END OF TASK** —————

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Fuel Pump Package Components
Figure 401/73-11-01-990-803-F00

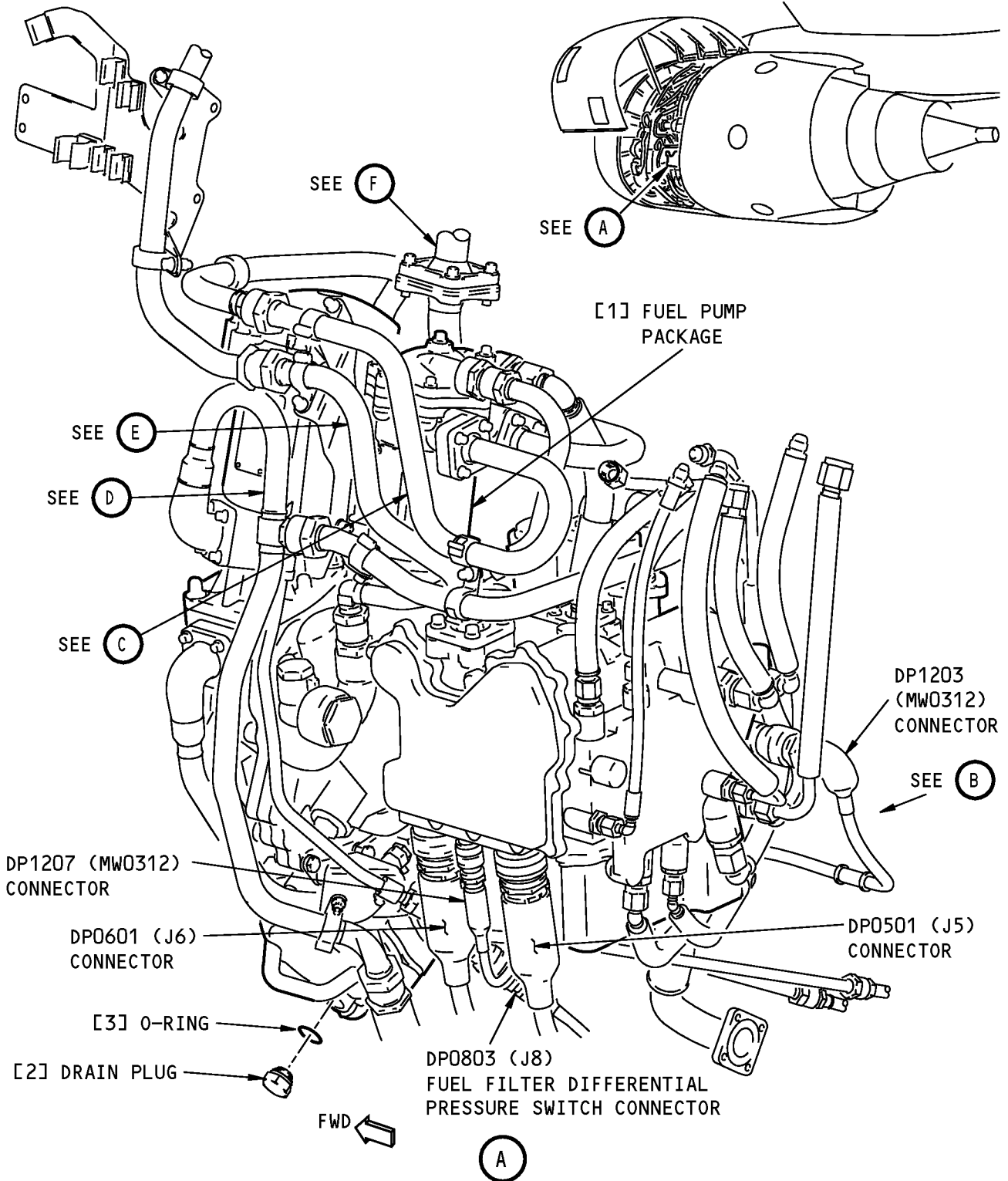
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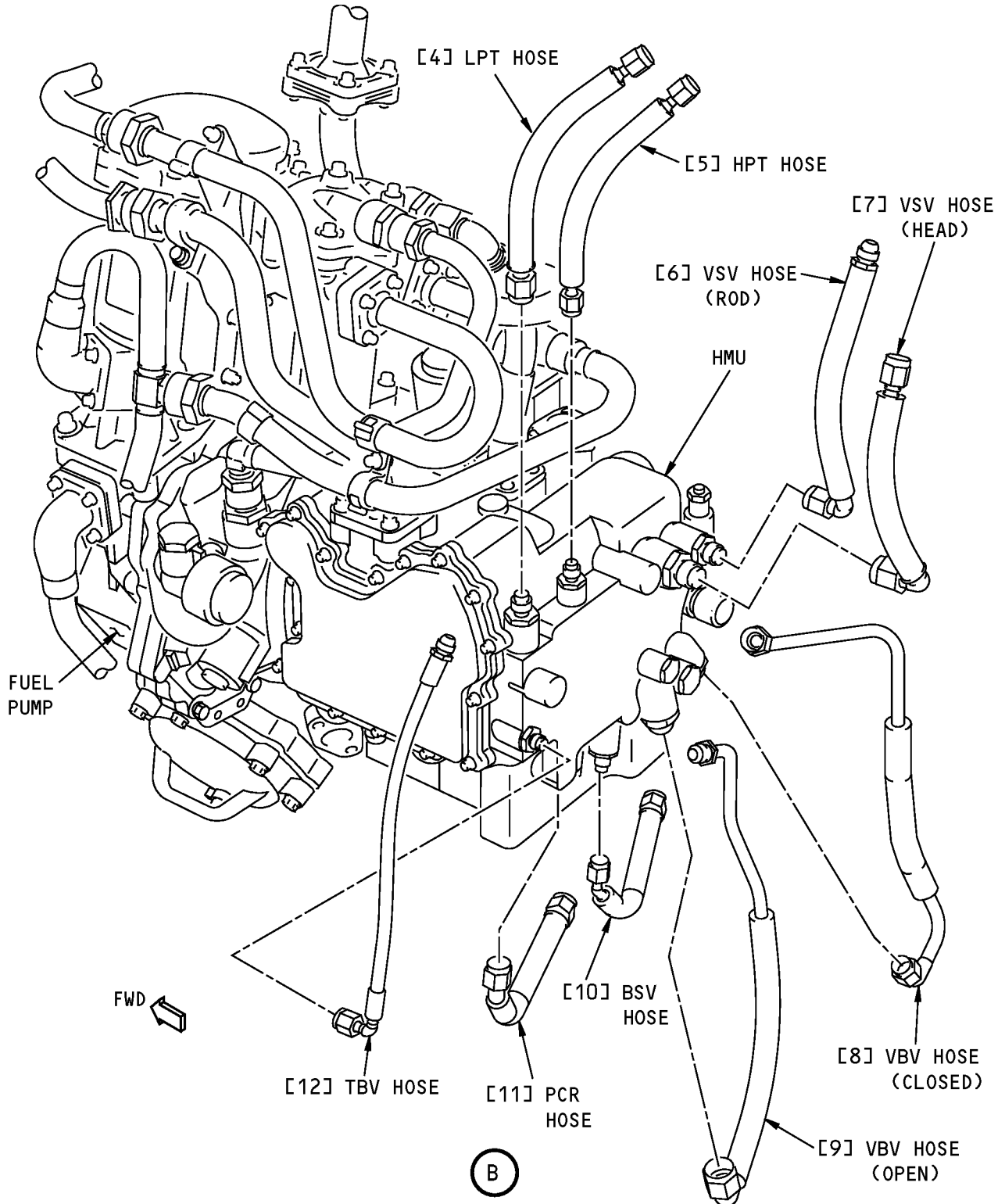


Fuel Pump Package Installation
Figure 402 (Sheet 1 of 6)/73-11-01-990-804-F00

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Fuel Pump Package Installation
Figure 402 (Sheet 2 of 6)/73-11-01-990-804-F00

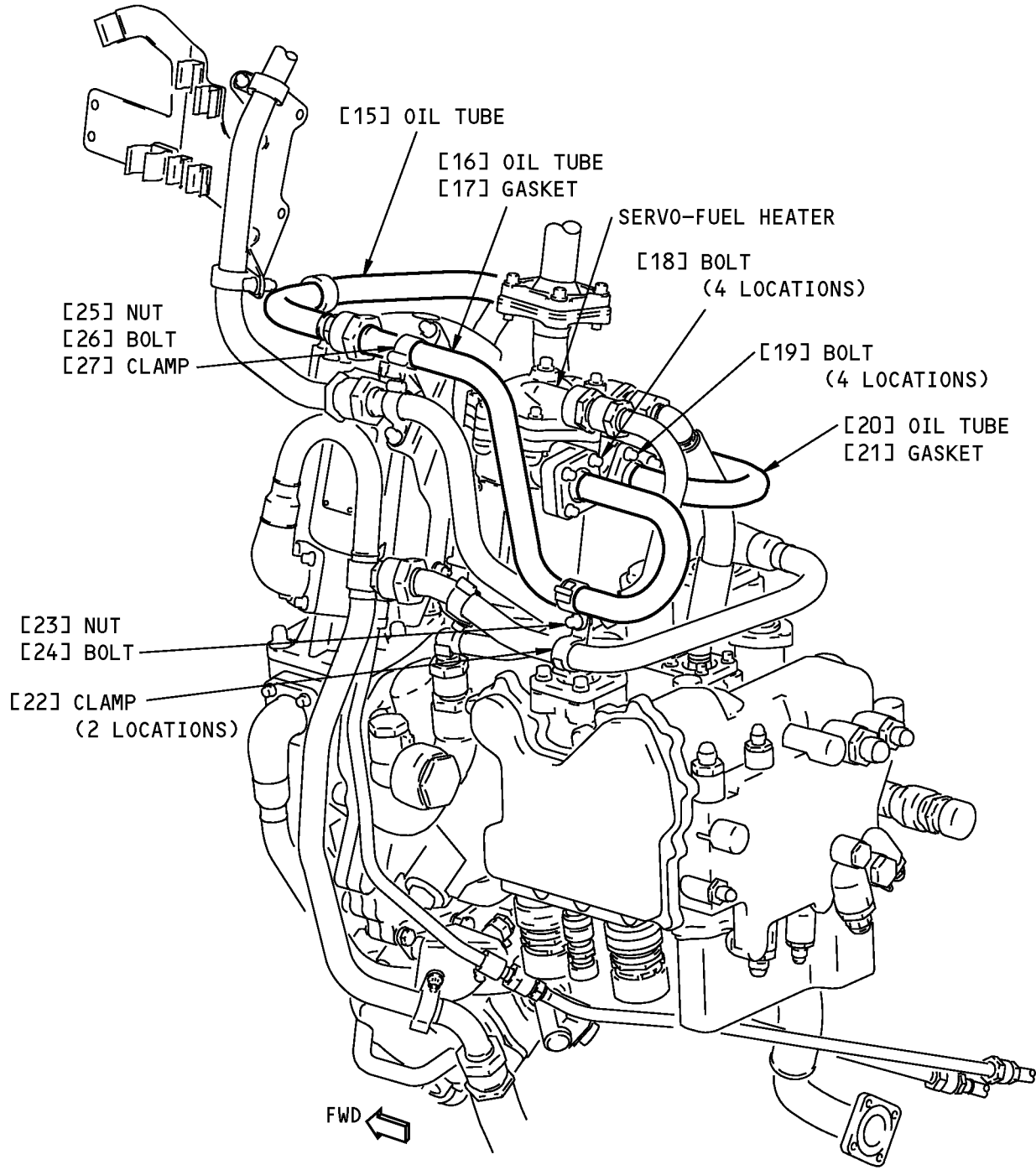
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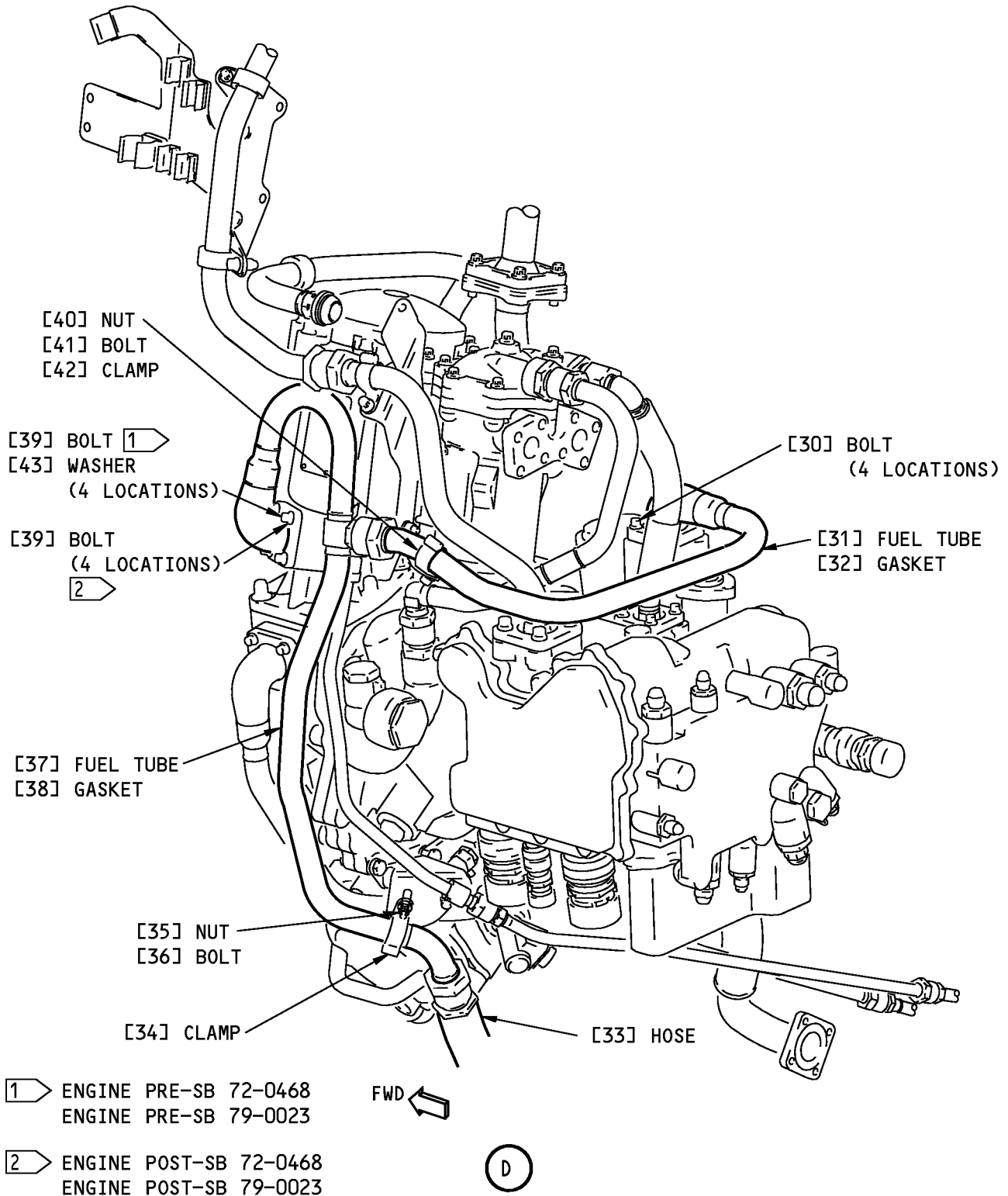


(C)

Fuel Pump Package Installation
Figure 402 (Sheet 3 of 6)/73-11-01-990-804-F00

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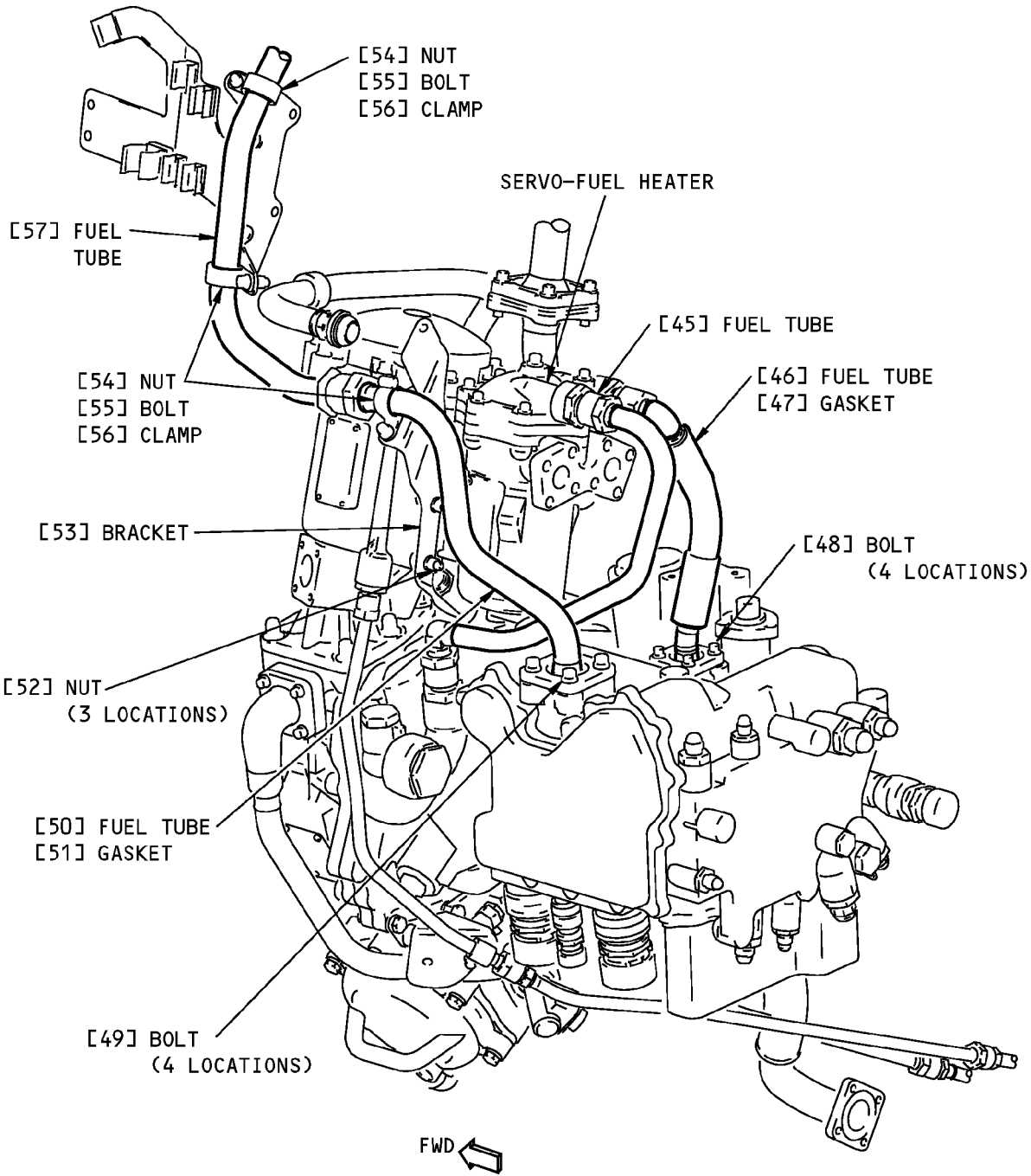
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Fuel Pump Package Installation
Figure 402 (Sheet 4 of 6)/73-11-01-990-804-F00

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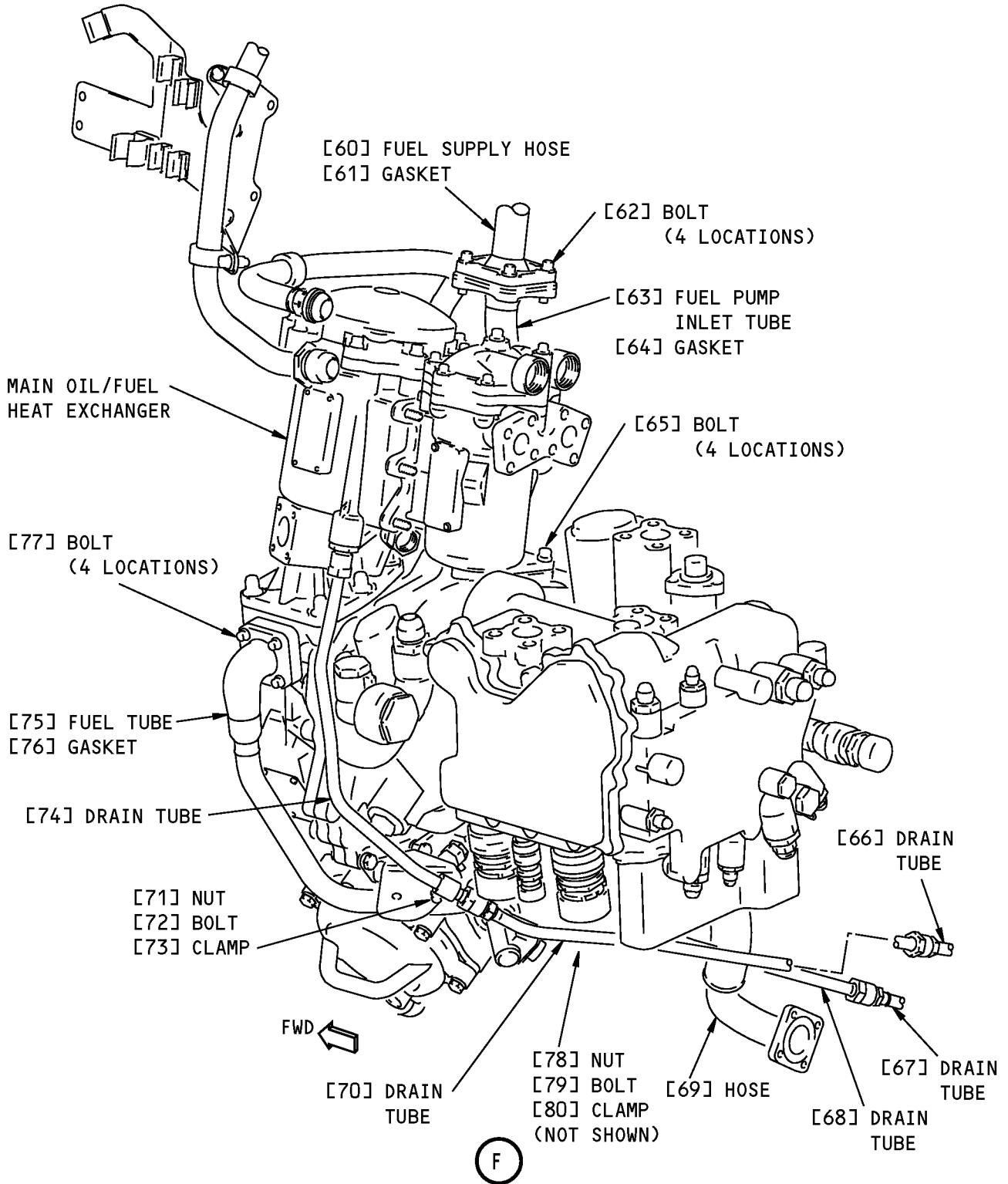
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Fuel Pump Package Installation
Figure 402 (Sheet 5 of 6)/73-11-01-990-804-F00

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Fuel Pump Package Installation
Figure 402 (Sheet 6 of 6)/73-11-01-990-804-F00

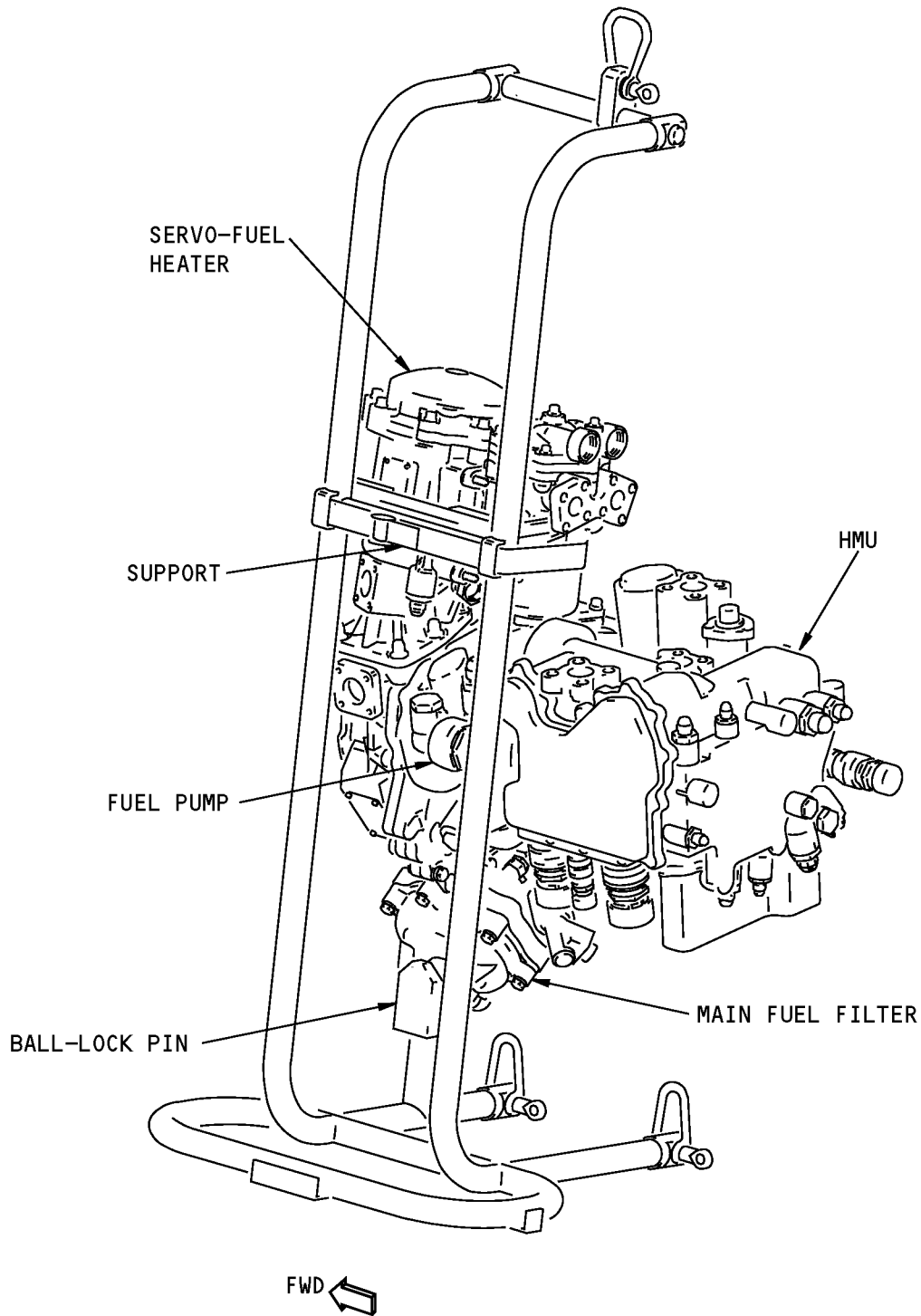
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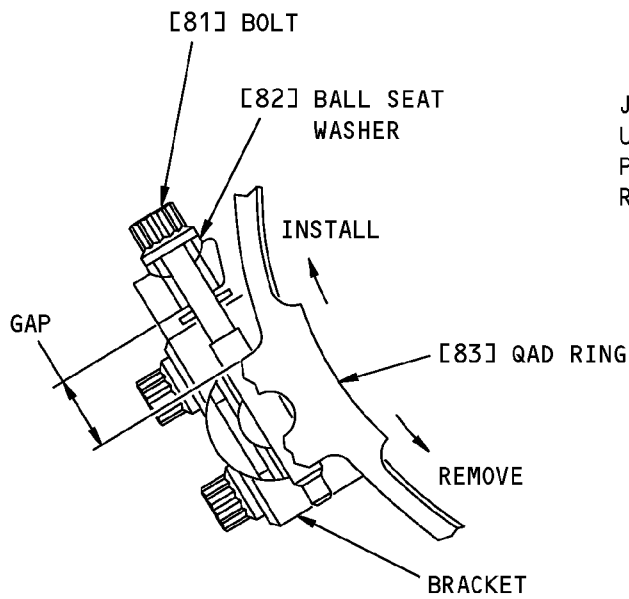
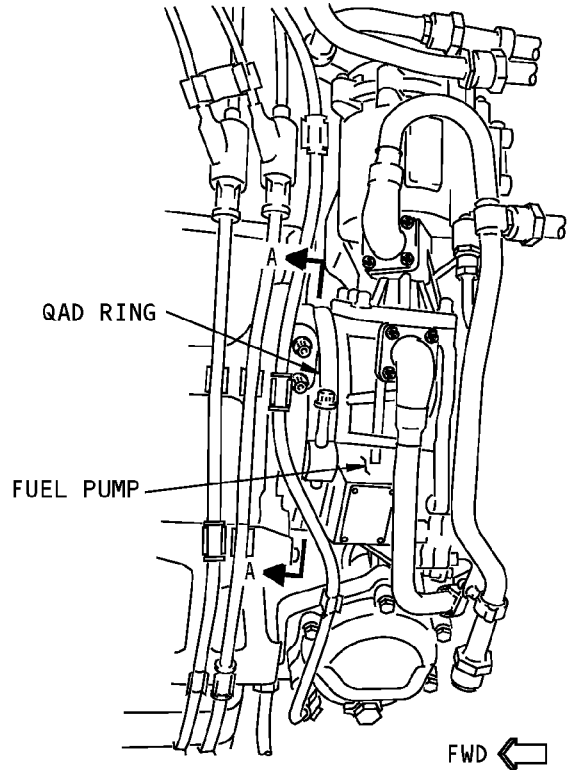
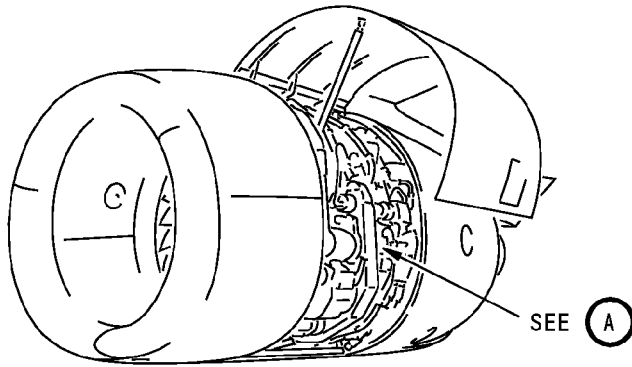
Fuel Pump Package Support Installation
Figure 403/73-11-01-990-805-F00

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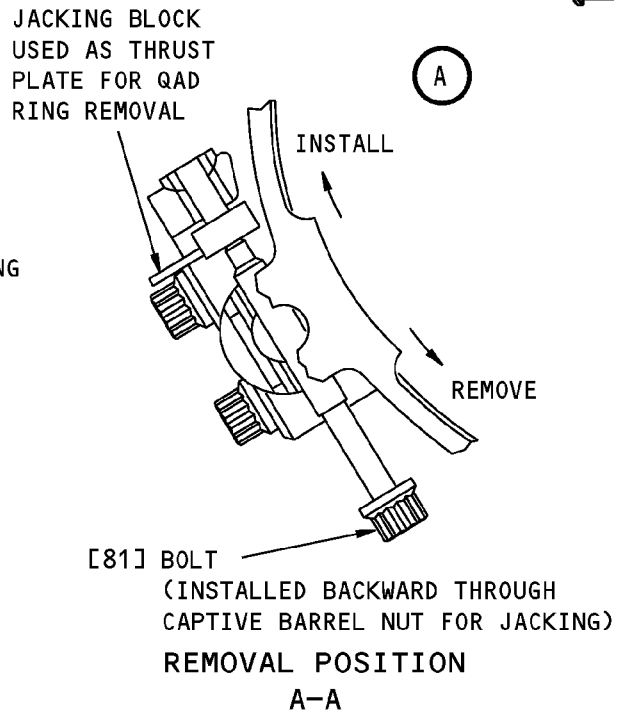
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INSTALL POSITION
A-A



S-M56-MM-03235-00-B

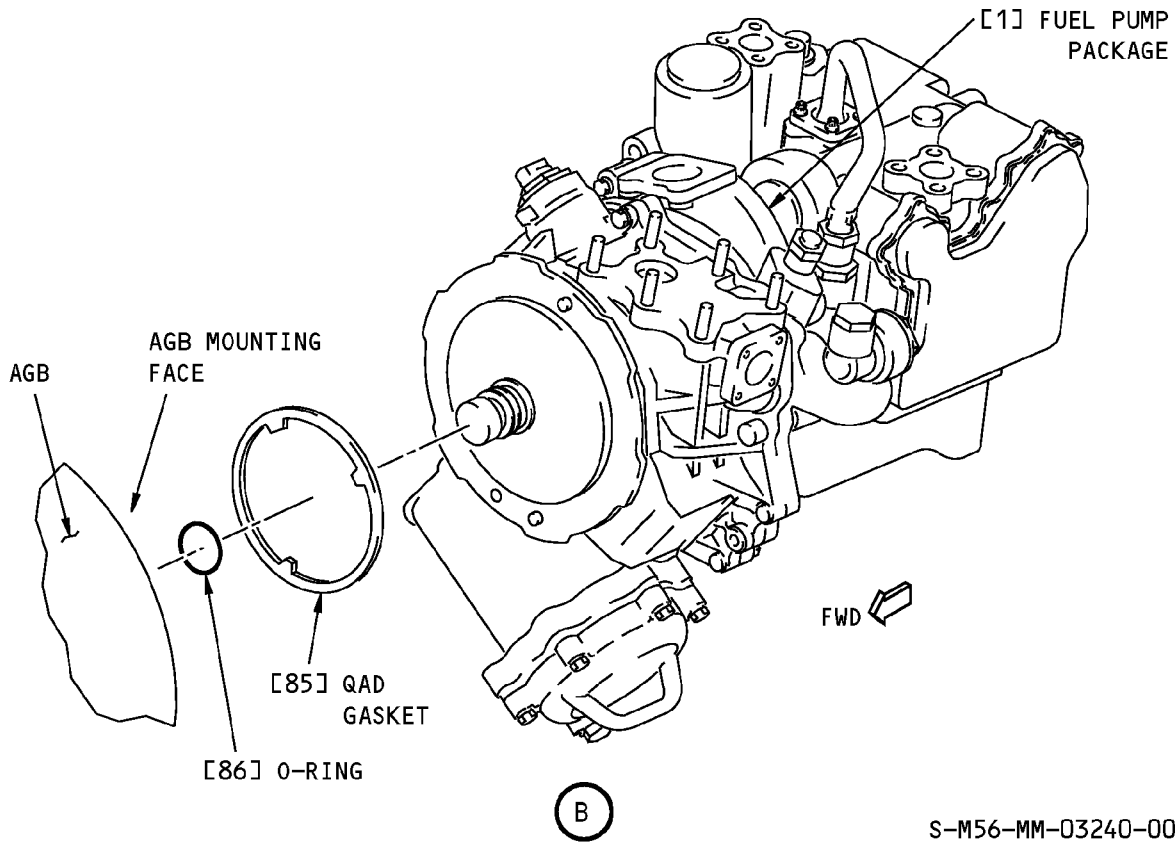
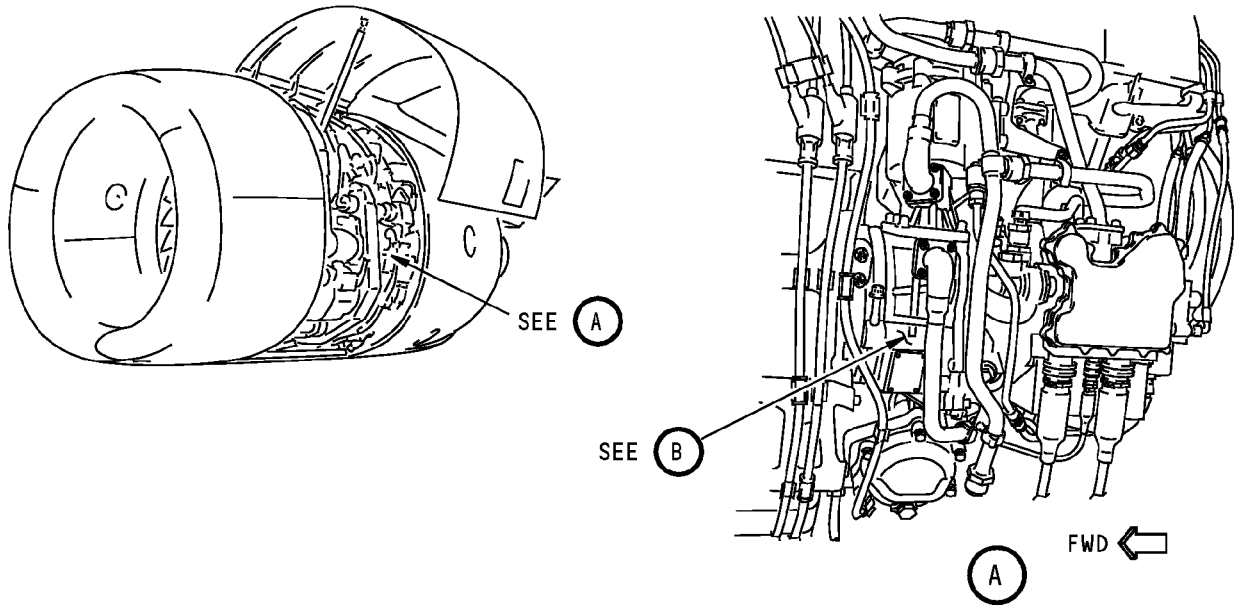
Fuel Pump QAD Ring Installation
Figure 404/73-11-01-990-806-F00

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S-M56-MM-03240-00-B

Fuel Pump Package Sealing
Figure 405/73-11-01-990-807-F00

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TASK 73-11-01-400-801-F00

3. Fuel Pump Package Installation

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-20-02-400-801-F00	Tightening Practices and Torque Values (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-63-01-000-801-F00	Handcranking Drive Cover Removal (P/B 201)
72-63-01-400-801-F00	Handcranking Drive Cover Installation (P/B 201)
73-11-07-400-801-F00	Servo Fuel Heater Installation (P/B 401)
73-21-10-400-801-F00	HMU Installation (P/B 401)
73-34-01-400-801-F00	Fuel Filter Differential Pressure Switch Installation (P/B 401)
79-21-02-400-801-F00	Main Oil/Fuel Heat Exchanger Installation (P/B 401)

B. Tools/Equipment

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

Reference	Description
SPL-2336	Cradle - Support, Fuel Pump and MEC (Part #: 856A3598G02, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2337	Hoist - Beam, Fuel Pump and MEC, CFM56 Engines (Part #: 856A3560G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel pump package	73-11-01-01-045	HAP ALL
2	Plug	73-11-01-01-060	HAP ALL
3	O-ring	73-11-01-01-065	HAP ALL
17	Gasket	79-21-00-01-092	HAP ALL
21	Gasket	79-21-00-01-065	HAP ALL
32	Gasket	73-11-00-02-260	HAP ALL
38	Gasket	73-11-00-02-260	HAP ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
51	Gasket	73-11-00-02-100	HAP ALL
61	Gasket	28-22-51-01-025 28-22-51-01A-020	HAP 001-007 HAP 008-013, 015-026, 028-054, 101-999
64	Gasket	73-11-00-02-270	HAP ALL
76	Gasket	73-11-00-02-260	HAP ALL
85	Gasket	73-11-01-01-035	HAP ALL
86	O-ring	73-11-01-01-030	HAP ALL

E. Location Zones

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

F. Prepare for Installation

SUBTASK 73-11-01-840-006-F00

- (1) Do these steps to install the parts that you have removed from the defective fuel pump:
 - (a) Remove the protective covers from the disconnected parts.
 - (b) Do these steps to examine the parts:
 - 1) Clean the mating surfaces of the parts and the adjacent areas.
 - 2) Examine the mating surfaces of the parts and the adjacent areas.
 - (c) Install the protective covers on the disconnected parts.
 - 1) Examine the gaskets to make sure that they are serviceable (Ref to TASK 70-30-01-910-802-F00).
 - (d) Make sure that the drain plug [2] is correctly installed (Figure 402).
 - 1) If it is not installed or is loose, install the drain plug [2].
 - a) Install a new O-ring [3] on the drain plug [2].
 - b) Install the drain plug [2].
 - c) Tighten the drain plug [2] to 45-55 pound-inches (5.0-6.2 Newton-meters).
 - d) Install the lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [2].

SUBTASK 73-11-01-420-002-F00

- (2) If these LRU's are not installed on the fuel pump, do these steps in the given tasks to install the LRU's:
 - (a) Do this task: HMU Installation, TASK 73-21-10-400-801-F00.
 - (b) Do this task: Main Oil/Fuel Heat Exchanger Installation, TASK 79-21-02-400-801-F00.
 - (c) Do this task: Servo Fuel Heater Installation, TASK 73-11-07-400-801-F00.
 - (d) Do this task: Fuel Filter Differential Pressure Switch Installation, TASK 73-34-01-400-801-F00.

G. Fuel Pump Package Installation

SUBTASK 73-11-01-480-001-F00

- (1) Do these steps to prepare for the installation of the fuel pump package [1] (Figure 405).

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WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate a new O-ring [86] with oil, D00623 [CP5066].
- (b) Install the new O-ring [86] in the groove of the fuel pump drive shaft.
- (c) Lubricate a new QAD gasket [85] with oil, D00623 [CP5066].
- (d) Install the new QAD gasket [85] on the fixed part of the QAD ring.
- (e) Lubricate the threads of the QAD bolt [81] with grease, D00601 [CP2101].

WARNING: BE CAREFUL WHEN YOU INSTALL THE FUEL PUMP PACKAGE. THE FUEL PUMP PACKAGE WEIGHT IS APPROXIMATELY 106 POUNDS (48 KG). THE WEIGHT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

CAUTION: DO NOT LIFT THE FUEL PUMP BY THE DRIVE SHAFT. DO NOT LET THE DRIVE SHAFT SUPPORT THE WEIGHT OF THE FUEL PUMP. IF THE DRIVE SHAFT SUPPORTS THE WEIGHT OF THE FUEL PUMP, IT CAN CAUSE DAMAGE TO THE FUEL PUMP SEALS.

- (f) Use the strap to install the fuel pump package on the cradle, SPL-2336 (Figure 403).
- (g) Move the cradle, SPL-2336 into its correct position below the fuel pump mounting pad.
- (h) Operate the beam hoist, SPL-2337 to align the fuel pump package [1] with the face of the AGB.

SUBTASK 73-11-01-420-016-F00

- (2) Do these steps to install the fuel pump inlet tube [63] on the fuel pump package [1] (Figure 402).
 - (a) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [64] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [65] with grease, D00601 [CP2101].
- (b) Remove the protective covers from the bottom of the fuel pump inlet tube [63] and the applicable cover from the fuel pump package [1].
- (c) Use the 4 bolts [65] to connect the fuel pump inlet tube [63] and the gasket [64] to the fuel pump package [1].
 - 1) Tighten the bolts [65] to 98-110 pound-inches (11.1-12.5 Newton-meters).

SUBTASK 73-11-01-420-005-F00

- (3) Do these steps to install the fuel pump package [1]:
 - (a) If it is necessary, turn the Accessary GearBox (AGB) output shaft to align with the fuel pump drive shaft.
 - 1) Do this task: Handcranking Drive Cover Removal, TASK 72-63-01-000-801-F00.
 - (b) Turn the handcranking drive pad with a 3/4-inch square drive to align the fuel pump drive shaft splines with the AGB drive recess.

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CAUTION: BE CAREFUL WHEN YOU INSTALL THE FUEL PUMP PACKAGE. THE FUEL PUMP PACKAGE WEIGHT IS APPROXIMATELY 106 POUNDS (48 KG). DO NOT LIFT THE FUEL PUMP PACKAGE BY THE DRIVE SHAFT. DO NOT LET THE DRIVE SHAFT SUPPORT THE WEIGHT OF THE FUEL PUMP PACKAGE. IF THE DRIVE SHAFT SUPPORTS THE WEIGHT OF THE FUEL PUMP PACKAGE, IT CAN CAUSE DAMAGE TO THE FUEL PUMP SEALS.

- (c) Engage the fuel pump package [1] in the AGB.
- (d) Turn the QAD ring [83] clockwise until it engages with the fuel pump flange (Figure 404).
- (e) Make sure that the ball seat washer [82] is correctly installed on the QAD ring [83].
- (f) Install the QAD bolt [81] in the QAD ring [83].

CAUTION: DO NOT TIGHTEN THE QAD BOLT TO MORE THAN 320 POUND-INCHES (36 NEWTON METERS). IF YOU TIGHTEN THE QAD BOLT TOO MUCH, YOU CAN CAUSE DAMAGE TO THE QAD RING.

- (g) Tighten the QAD bolt [81] to 310-320 pound-inches (34-36 Newton-meters).
 - 1) Lightly hit all around the outer surface of the QAD ring [83] with a non-metallic hammer or a rubber mallet.
 - 2) Loosen the QAD bolt [81].
- (h) Tighten the QAD bolt [81] to 310-320 pound-inches (34-36 Newton-meters).
 - 1) Lightly hit all around the outer surface of the QAD ring [83] with a non-metallic hammer or a rubber mallet.
 - 2) Loosen the QAD bolt [81].
- (i) Tighten the QAD bolt [81] to 310-320 pound-inches (34-36 Newton-meters).
 - 1) Lightly hit all around the outer surface of the QAD ring [83] with a non-metallic hammer or a rubber mallet.
 - 2) Loosen the QAD bolt [81].
- (j) Tighten the QAD bolt [81] to a final torque of 195-230 pound-inches (22-26 Newton-meters).
- (k) Measure the clearance between the boss of the QAD ring [83] and the flange of the QAD ring [83] support.
 - 1) If the clearance is more than 1.0 inch (25.4 mm) or less than 0.25 inch (6.4 mm), replace the QAD ring [83].
- (l) Install the lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the QAD bolt [81].
- (m) Remove the hoist and the cradle, SPL-2336 from the fuel pump package [1].
- (n) Do this task: Handcranking Drive Cover Installation, TASK 72-63-01-400-801-F00.

SUBTASK 73-11-01-420-006-F00

- (4) Do these steps to connect the fuel supply hose [60] to the fuel pump inlet tube [63] on the fuel pump package [1] (Figure 402).
 - (a) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [61] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [62] with grease, D00601 [CP2101].

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- (b) Remove the protective covers from the fuel supply hose [60] and the upper end of the fuel pump inlet tube [63].
- (c) Put the fuel supply hose [60] and the gasket [61] in the correct position on the fuel pump inlet tube [63].
 - 1) If it is not easy to put the fuel supply hose into its position, remove the bolts and clamps that hold the fuel supply hose to the fan case.
- (d) Use the four bolts [62] to connect the fuel supply hose [60] and the gasket [61] to the fuel pump inlet tube [63].
 - 1) Tighten the bolts [62] to 55-60 pound-inches (6.2-6.8 Newton-meters).
- (e) If you removed or loosened the clamps, install the clamps and the bolts to connect the fuel supply hose [60] to the fan case.
 - 1) Tighten the bolts for the clamps to 72-88 pound-inches (8.1-9.9 Newton-meters).

SUBTASK 73-11-01-420-007-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(5) Do these steps to install the fuel tube [75] on the fuel pump package [1]:

- (a) Remove the protective covers from the hose [69], the fuel tube [75], and the applicable cover from the fuel pump package [1].
- (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [76] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [77] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the fuel tube [75] and the gasket [76] in the correct position between the fuel pump package [1] and hose [69].
- (d) Use your hand to install the 4 bolts [77] that hold the fuel tube [75] and gasket [76] to the fuel pump package [1].
- (e) Use you hands to connect the fuel tube [75] to the hose [69].
- (f) Use the nut [78], bolt [79], and clamp [80] to connect the fuel tube [75] to the bottom of the fuel pump package [1].
- (g) Make sure that the fuel tube [75] does not touch other parts of the engine.
- (h) Tighten the bolts [77] to 49-53 pound-inches (5.5-6.0 Newton-meters).
- (i) Use two wrenches to tighten the coupling nut between fuel tube [75] and hose [69] to 900-1100 pound-inches (100-125 Newton-meters).
- (j) Tighten the nut [78] to 72-88 pound-inches (8.1-9.9 Newton-meters).

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SUBTASK 73-11-01-020-022-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (6) Install the drain tube [68] to the bottom of the HMU:
- (a) Remove the protective covers from the drain tube and the HMU.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (b) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the drain tube [68] in the correct position between the HMU and the drain tube [67].
- (d) Use your hands to connect the drain tube to the bottom of the HMU.
- (e) Use your hands to connect the drain tube [68] to the drain tube [67].
- 1) Make sure that the tube [68] does not touch other components.
- (f) Use two wrenches to tighten the coupling nuts to 257-284 pound-inches (29-32 Newton-meters).

SUBTASK 73-11-01-420-008-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (7) Do these steps to install the drain tubes [70] and [74] on the fuel pump package [1]:
- (a) Remove the protective covers from the tube [74], the tube [70], the tube [66], and the applicable cover from the fuel pump package [1].
- (b) Lubricate these parts:
- 1) Lubricate the threads of the bolt [72] with grease, D00601 [CP2101].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 2) Lubricate the threads of the nipples with oil, D00623 [CP5066].
- (c) Use your hands to connect the drain tube [70] to the drain tube [66].
- (d) Put the drain tube [74] in its correct position between the fuel pump package [1] and tube [70].
- (e) Use your hands to connect the drain tube [74] to the fuel pump package [1] and to the tube [70].
- (f) Use you hands to install the nut [71], bolt [72], and clamp [73] that hold the tube [74] to the bracket.
- (g) Make sure that the fuel tubes [70] and [74] do not touch other components.
- (h) Use two wrenches to tighten the coupling nut, between the drain tube [70] and the tube [66], to 257-284 pound-inches (29-32 Newton-meters).
- (i) Use two wrenches to tighten the coupling nut, between the drain tube [74] and the tube [70], to 257-284 pound-inches (29-32 Newton-meters).

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- (j) Use two wrenches to tighten the coupling nut, between the drain tube [74] and the fuel pump package [1] to 257-284 pound-inches (29-32 Newton-meters).
- (k) Tighten the nut [71] for the clamp [73] to 50-80 pound-inches (5.6-9.0 Newton-meters).

SUBTASK 73-11-01-420-009-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (8) Do these steps to install the bracket [53] and fuel tube [50] to the fuel pump package [1]:
 - (a) Remove the three nuts [52] that hold the servo fuel heater to the fuel pump package [1].
 - (b) Lubricate the threads of the studs for the bracket [53] with grease, D00601 [CP2101].
 - (c) Put the bracket [53] in its correct position on the servo fuel heater and the fuel pump package [1].
 - 1) Use the nuts [52] to connect the bracket [53] to the servo fuel heater and the fuel pump package [1].
 - a) Tighten the nuts [52] to 98-110 pound-inches (11.0-12.5 Newton-meters).
 - (d) Remove the protective covers from the fuel tube [50], the fuel tube [57], and the applicable cover from the fuel pump package [1].
 - (e) Lubricate these parts:

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- 1) Lubricate the gasket [51] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [49] and [55] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].

CAUTION: LOOK AT THE GASKET BEFORE YOU INSTALL IT. OBEY THE INSTRUCTIONS IN SEALS (PERFORMED PACKINGS AND O-RINGS) AND GASKETS, TASK 70-30-01-910-802-F00. DO NOT CAUSE DAMAGE TO THE RUBBER SEAL WHEN YOU INSTALL THE GASKET.

- (f) Put the fuel tube [50] and gasket [51] in its correct position between the tube [57] and the fuel pump package [1].
- (g) Use your hand to install the 4 bolts [49] that hold the fuel tube [50] and gasket [51] to the fuel pump package [1].
- (h) Use your hands to connect fuel tube [50] to the fuel tube [57].
- (i) Make sure that the fuel tube [50] is in its correct position
- (j) Use your hand to install the nut [54], bolt [55], and clamp [56] that hold the fuel tube [50] to the bracket [53].
- (k) Use your hand to install the nuts [54], bolts [55], and clamps [56] that hold the fuel tube [57] to the bracket above the fuel pump package [1].

CAUTION: TIGHTEN THE BOLTS CORRECTLY. REFER TO TIGHTENING PRACTICES AND TORQUE VALUES, TASK 70-20-02-400-801-F00. IF YOU TIGHTEN THEM INCORRECTLY, DAMAGE TO THE PARTS CAN OCCUR.

- (l) Tighten the four bolts [49] to 98-110 pound-inches (11.0-12.5 Newton-meters).

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- (m) Use two wrenches to tighten the coupling nut between fuel tube [50] and [57] to 900-1100 pound-inches (100-125 Newton-meters).
- (n) Tighten the three nuts [54] for the clamps [56] to 98-110 pound-inches (11.0-12.5 Newton-meters).

SUBTASK 73-11-01-420-010-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (9) Do these steps to install the fuel tube [45] on the fuel pump package [1]:
 - (a) Remove the protective covers from the fuel tube [45] and the applicable covers from the servo fuel heater and fuel pump.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (b) Lubricate the threads of the nipples with oil, D00623 [CP5066].
- (c) Put the fuel tube [45] in its correct position between the fuel pump and the servo fuel heater.
- (d) Use your hands to connect fuel tube [45] to the servo fuel heater and the fuel pump.
 - 1) Make sure that the fuel tube [45] does not touch other components.
- (e) Use two wrenches to tighten the coupling nut between fuel tube [45] and the fuel pump to 650-770 pound-inches (75-85 Newton-meters).
- (f) Use two wrenches to tighten the coupling nut between fuel tube [45] and the servo fuel heater to 650-770 pound-inches (75-85 Newton-meters).

SUBTASK 73-11-01-420-011-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (10) Do these steps to install the fuel tube [46] on the fuel pump package [1]:
 - (a) Remove the protective covers from the fuel tube [46] and the applicable covers from the servo fuel heater and the HMU.
 - (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [47] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [48] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the fuel tube [46] and the gasket [47] in the correct position between the HMU and the servo fuel heater.
- (d) Use your hands to connect fuel tube [46] to the servo fuel heater.
- (e) Use your hand to install the four bolts [48] that hold the fuel tube [46] and the gasket [47] to the HMU.

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- 1) Tighten the bolts [48] to 49-53 pound-inches (5.5-6.0 Newton-meters).
- (f) Use two wrenches to tighten the coupling nut between fuel tube [46] and the servo fuel heater to 650-770 pound-inches (75-85 Newton-meters).

SUBTASK 73-11-01-420-012-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (11) Do these steps to install the fuel tube [31] and the fuel tube [37] on the fuel pump package [1]:
 - (a) Remove the protective covers from the fuel tubes [32], fuel tube [37], hose [33], and the applicable cover from the fuel pump package [1].
 - (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [32] and gasket [38] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [30], [36], [39], and [41] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipples with oil, D00623 [CP5066].
- (c) Put the fuel tube [37] and the gasket [38] in the correct position between the fuel pump and the hose [33].

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- (d) Use your hands to install the four bolts [39] that hold the fuel tube [37] and the gasket [38] to the and the four washers [43] to the fuel pump package [1].

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- (e) Use your hands to install the four bolts [39] that hold the fuel tube [37] and the gasket [38] to the fuel pump package [1].

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- (f) Use your hands to connect the fuel tube [37] to the hose [33].
- (g) Use your hand to install the nut [35], bolt [36], and the clamp [34] that hold the fuel tube [37] to the bracket.
- (h) Put the fuel tube [31] and the gasket [32] in the correct position between the fuel pump and the fuel tube [37].
- (i) Use your hands to install the four bolts [30] that hold the fuel tube [31] and the gasket [32] to the fuel pump package [1].
- (j) Use your hands to connect the fuel tube [31] to the fuel tube [37].
 - 1) Use your hands to install the nut [40], bolt [41], and clamp [42] that hold the tube [31] to the bracket [53].
- (k) Make sure that the fuel tube [31] and [37] are in their correct positions and do not touch other components.
- (l) Tighten the bolts [30] (that hold the fuel tube [31] to the fuel pump) to 49-53 pound-inches (5.5-6.0 Newton-meters).

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HAP ALL PRE CFM56-7B-79-0023 OR PRE CFM56-7B-72-0468

- (m) Tighten the bolts [39] (that hold the fuel tube [37] to the fuel pump package [1] to 49-53 pound-inches (5.5-6.0 Newton-meters).

HAP ALL POST CFM56-7B-79-0023 AND POST CFM56-7B-72-0468

- (n) Tighten the bolts [39] (that hold the fuel tube [37] to the fuel pump package [1] as follows:

NOTE: You must apply the following steps at each of the four bolts [39] to cross-tighten them.

Start with the first bolt at the top left side of the port.

The second bolt is at the diagonal opposite location of the first bolt.

The third bolt is at the bottom left side of the port.

The fourth bolt is at the diagonal opposite location of the third bolt.

- 1) Tighten the bolts [39] to 40-45 pound-inches (4.52-5.08 Newton meters).
- 2) Loosen the bolts [39] but do not remove them.
- 3) Measure the locking torque of each bolt [39].
 - a) The torque value must be 2.2-15 pound-inches (0.24-1.69 Newton meters).
 - b) If not, replace the bolt [39].
- 4) The torque value must be 2.2-15 pound-inches (0.24-1.69 Newton meters).
- 5) Add the locking torque value of bolts [39] recorded before.
- 6) Tighten the bolts [39] to a final torque between 42.2-60 pound-inches (4.77-6.78 Newton meters).

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- (o) Make sure that the fuel tubes [31] and [37] stay in their correct positions as you tighten the coupling nuts.
- 1) Use two wrenches to tighten the coupling nut, between fuel tube [37] and the hose [33], to a torque of 900-1100 pound-inches (100-125 Newton meters).
 - 2) Use two wrenches to tighten the coupling nut, between the fuel tubes [31] and [37], to a torque of 900-1100 pound-inches (100-125 Newton-meters).
- (p) Tighten the nuts [35] and [40] that hold the clamps [34] and [42] to 98-110 pound-inches (11.0-12.5 Newton-meters).

SUBTASK 73-11-01-420-013-F00

- (12) Do these steps to connect the oil tube [20] on the fuel pump package [1]:
- (a) Remove the protective cover from the oil tube [20] and the applicable cover from the servo fuel heater.
 - (b) Lubricate these parts:

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- 1) Lubricate the gasket [21] with oil, D00623 [CP5066].
 - 2) Lubricate the threads of the bolts [19] with grease, D00601 [CP2101].
- (c) Put the oil tube [20] and the gasket [21] in its correct position on the servo fuel heater.

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- (d) Use your hand to install the four bolts [19] that hold the oil tube [20] and the gasket [21] to the servo fuel heater.
- 1) Tighten the bolts [19] to 49-53 pound-inches (5.5-6.0 Newton- meters).

SUBTASK 73-11-01-420-014-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (13) Do these steps to install the oil tube [16] on the fuel pump package [1]:

- (a) Remove the protective covers from the oil tube [16], the oil tube [15], and the applicable cover from the servo fuel heater.
- (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [17] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [18], [24], and [26] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the oil tube [16] and the gasket [17] in the correct position between the servo fuel heater and the oil tube [15].
- (d) Use you hand to install the four bolts [18] that hold the tube [16] and the gasket [17] to the servo fuel heater.
- (e) Use your hand to connect the coupling nut between the tubes [15] and [16].

CAUTION: MAKE SURE THAT THE CLAMPS DO NOT INTERFERE WITH THE HMU, THE FUEL TUBES OR THE OIL TUBES. IF INTERFERENCE OCCURS, IT CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (f) Use you hands to install the nut [23], bolt [24] and the clamps [22] that hold the tubes at the top of the HMU.
- (g) Use you hands to install the nut [25], bolt [26] and the clamp [27] that hold the tube [16] to the bracket [53].
- (h) Tighten the bolts [18] to 49-53 pound-inches (5.5-6.0 Newton-meters).
- (i) Make sure that the tube [16] stays in the correct position as you tighten the coupling nut.
 - 1) Use two wrenches to tighten the coupling nut between oil tube [15] and [16] to 900-1100 pound-inches (100-125 Newton-meters).
- (j) Tighten the nut [23] for the clamps [22] to 98-110 pound-inches (11.0-12.5 Newton-meters).
- (k) Tighten the nut [25] for the clamp [27] to 98-110 pound-inches (11.0-12.5 Newton-meters).

SUBTASK 73-11-01-420-015-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (14) Connect these hoses to the HMU [1]:

NOTE: The hose installations are arranged so that same wrenches and torque values are used at the same time.

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- (a) Remove the protective covers from the hoses and the HMU.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (b) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Use your hand to install these hoses:
- 1) The LPT hose [4]
 - 2) The HPT hose [5]
 - 3) The BSV hose [10]
 - 4) The TBV hose [12].
 - 5) Use two wrenches to tighten the coupling nuts on the hoses above to 135-150 pound-inches (15.3-17.0 Newton-meters).
- (d) Use your hand to install these hoses:
- 1) The VSV hose (ROD) [6]
 - 2) The VBV hose (CLOSED) [8]
 - 3) The PCR hose [11].
 - 4) Use two wrenches to tighten the coupling nuts on the hoses above to 270-300 pound-inches (30.0-35.0 Newton meters).
- (e) Use your hand to install these hoses:
- 1) The VSV hose (HEAD) [7]
 - 2) The VBV hose (OPEN) [9].
 - 3) Use two wrenches to tighten the coupling nuts on the hoses above to 450-550 pound-inches (50.0-60.0 Newton-meters).

SUBTASK 73-11-01-210-003-F00

- (15) Make sure that the electrical power is removed from the airplane while you install the electrical connectors.

- (a) If it is necessary, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 73-11-01-020-023-F00

- (16) Connect these electrical connectors to the fuel pump package:

NOTE: If it is necessary, you can use soft-nose pliers to turn the connector nuts.

- (a) Remove the protective covers from the plugs and the receptacles
- (b) The DP0803 (J8) connector from the fuel filter differential pressure switch
- (c) The DP0601 (J6) connector to the HMU
- (d) The DP1207 (MWO312) connector to the HMU
- (e) The DP0501 (J5) connector to the HMU
- (f) The DP1203 (MWO312) connector to the HMU.

H. Put the Airplane in Serviceable Condition

SUBTASK 73-11-01-840-009-F00

- (1) Do these steps to put the airplane in a serviceable condition:

- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

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- (b) Remove the DO-NOT-OPERATE tag from the start lever.
- (c) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

I. Fuel Pump Package Installation Test

SUBTASK 73-11-01-720-003-F00

- (1) Do the tests that are listed in the Power Plant Test Reference Table, TASK 71-00-00-800-811-F00.

————— **END OF TASK** —————

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FUEL PUMP PACKAGE - INSPECTION/CHECK1. General

A. This procedure gives the visual inspection of the impeller rotation.

TASK 73-11-01-200-801-F002. The Visual Inspection of the Impeller Rotation

(Figure 601)

A. General

(1) This procedure contains the instructions for a visual examination of the fuel pump impeller and to make sure that it turns freely.

B. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-63-01-000-801-F00	Handcranking Drive Cover Removal (P/B 201)
72-63-01-400-801-F00	Handcranking Drive Cover Installation (P/B 201)
73-11-01-000-801-F00	Fuel Pump Package Removal (P/B 401)
73-11-01-400-801-F00	Fuel Pump Package Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1154	Container - 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Lubrication flow screen	73-11-01-01-110	HAP ALL
2	Packing	73-11-01-01-115	HAP ALL
3	Packing	73-11-01-01-120	HAP ALL

F. Location Zones

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

G. Prepare for the Inspection

SUBTASK 73-11-01-010-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

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SUBTASK 73-11-01-010-002-F00

(2) Do this task: Handcranking Drive Cover Removal, TASK 72-63-01-000-801-F00.

SUBTASK 73-11-01-020-001-F00

(3) Do these steps to get access to the impeller of the fuel pump:

(a) Do these steps to remove the lubrication flow screen [1] from the fuel pump:

- 1) Put a 5 gallon (19 liter) container, STD-1154 below the fuel pump to catch the fuel that drains from the fuel pump.
- 2) Remove the lubrication flow screen [1].
 - a) Remove and discard the packing [2] and packing [3].

H. Visual Inspection of the Impeller Rotation

SUBTASK 73-11-01-020-002-F00

(1) Do these steps to examine the impeller:

- (a) Look through the opening where the lubrication flow screen (1) was removed to examine the impeller.
- (b) Examine the impeller as you turn the hand cranking drive with a 3/4-inch square drive.
- (c) Make sure that the fuel pump impeller turns freely.
- (d) Make sure that the surface of the impeller is free of visible damage.
 - 1) Visible damage is not acceptable.
- (e) If the impeller is not in the limits, replace the fuel pump.
 - 1) These are the tasks:
Fuel Pump Package Removal, TASK 73-11-01-000-801-F00,
Fuel Pump Package Installation, TASK 73-11-01-400-801-F00.

SUBTASK 73-11-01-020-003-F00

(2) Install the lubrication flow screen [1]]:

- (a) Lubricate the new packing [2] and new packing [3] with oil, D00623 [CP5066].
- (b) Install the new packings [2] and [3] in the grooves in the lubrication flow screen.
- (c) Install the lubrication flow screen [1] in the fuel pump.
 - 1) Tighten the lubrication flow screen [1] to 90-110 pound-inches (10.1-12.4 Newton meters).
- (d) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the lubrication flow screen [1].

SUBTASK 73-11-01-410-001-F00

(3) Do this task: Handcranking Drive Cover Installation, TASK 72-63-01-400-801-F00.

SUBTASK 73-11-01-410-002-F00

(4) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

I. Lubrication Flow Screen Installation Test

SUBTASK 73-11-01-720-001-F00

(1) Do the test that is listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

NOTE: The Minimum Idle Test with a visual examination for leaks is necessary for this procedure.

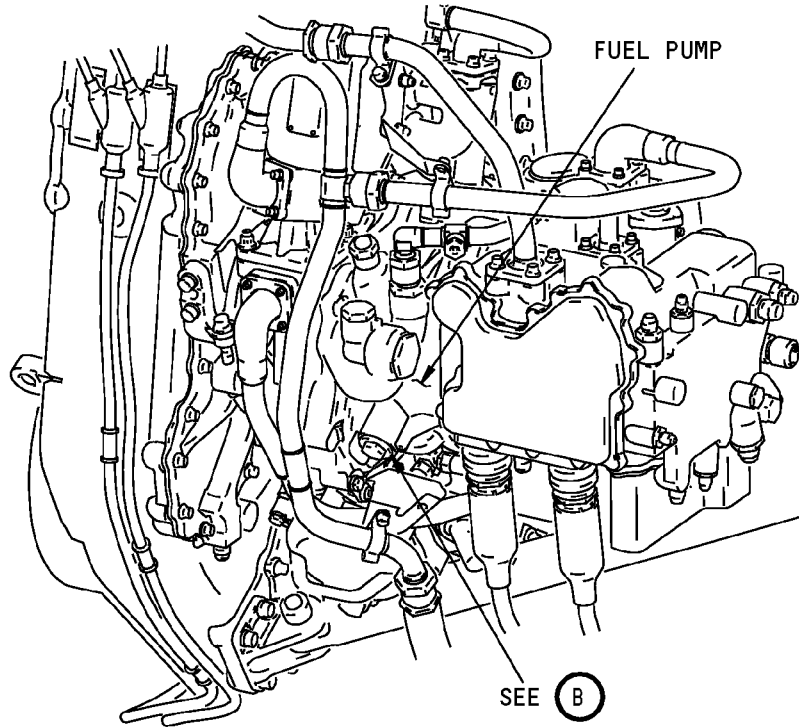
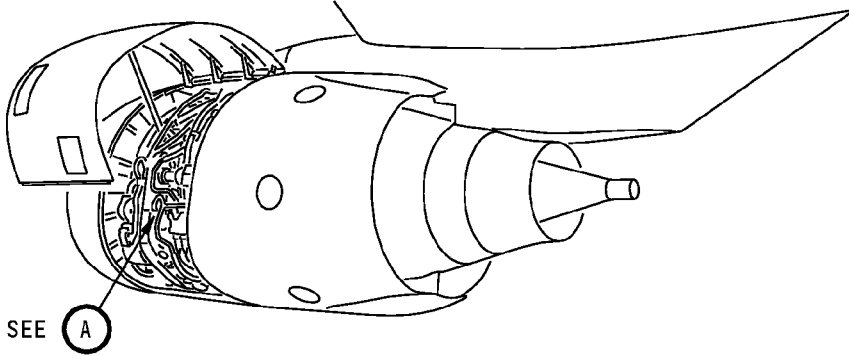
————— END OF TASK —————

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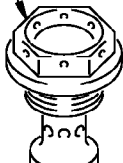
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[1] LUBRICATION
FLOW SCREEN



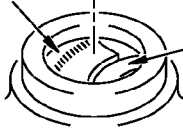
[2] PACKING



[3] PACKING



DARK GREY
ROUGH SURFACE



IMPELLER
LIGHT GREY COLOR
MACHINED COATED
SURFACE



Check of the Impeller Rotation
Figure 601/73-11-01-990-801-F00

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FUEL FILTER - REMOVAL/INSTALLATION**1. General**

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has two tasks:
 - (1) The removal of the fuel filter
 - (2) The installation of the fuel filter.

TASK 73-11-02-000-801-F00**2. Fuel Filter Removal**

(Figure 401, and Figure 402)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) Each engine has one fuel filter element on the fuel pump assembly.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
FIM 73-05 TASK 801	Fuel FILTER BY PASS Light is On - Fault Isolation

C. Tools/Equipment

Reference	Description
STD-1154	Container - 5 Gallon (19 Liters)

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 73-11-02-840-001-F00

- (1) Do these steps to prepare for the removal:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.
 - (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: Bright when the valve is in transition or does not agree with the commanded position; Dim when the valve is closed; and, Off when the valve is opened.
 - (d) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the fuel spar valve has three positions: Bright when the valve is in transition or does not agree with the commanded position; Dim when the valve is closed; and, Off when the valve is opened.

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- (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.
- (f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

F. Fuel Filter Removal

NOTE: There are different configurations of the fuel filter cover.

NOTE: The original design of the fuel pump filter cover attachment (bolts and fuel pump housing inserts) was canceled. It must be reworked by SB CFM56-7B-73-A0034 and SB CFM56-7B-73-0079.

SUBTASK 73-11-02-020-001-F00

HAP ALL POST SB CFM56-7B-73A034

- (1) Do these steps to remove the fuel filter cover:

NOTE: This Subtask is for engines which have a fuel filter cover attachment with five D-Head bolts, five retaining rings, five washers, five nuts and one bolt with its insert (1 location) into the fuel pump housing (the main fuel pump reworked by SB CFM56-7B-73-A034).

WARNING: DO NOT GET FUEL IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FUEL. KEEP THE FUEL AWAY FROM SPARKS, FLAME, AND HEAT. FUEL IS A POISONOUS AND FLAMMABLE LIQUID, THAT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Do these steps to drain the fuel system:
 - 1) Put the 5 gallon (19 liter) container, STD-1154 under the fuel pump assembly.
 - 2) Cut and remove the safety wire or cable from the drain plug [4].
 - 3) Remove the drain plug [4] from the fuel filter cover [6].
 - a) Let the fuel drain in the container.
 - 4) Remove and discard the packing [5] from the drain plug [4].
 - a) Keep the drain plug [4] for the installation.
- (b) Remove the MW0312 wire harness from the Omega clip that is just to the left of the fuel filter cover [6].
- (c) Do these steps to remove the fuel filter cover [6]:
 - 1) Loosen and remove the five nuts [15] and five flat washers [14] that hold the fuel filter cover [6].

NOTE: The five D-Head bolts [12] are captive in the fuel filter cover housing.

 - a) Do an inspection of the nuts [15] for signs of thread damages.
 - < 1 > If there are damages, discard and replace them.
 - b) Do an inspection of the flat washers [14] for signs of damages (nicks, flatness condition).
 - < 1 > If there are damages, discard and replace them.
 - 2) Loosen and remove the bolt [2] and the flat washer [3] that hold the fuel filter cover [6].
 - a) Do an inspection of the bolt [2] for signs of thread damages.
 - < 1 > If there are damages, discard and replace it.

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HAP ALL POST SB CFM56-7B-73A034 (Continued)

b) Do an inspection of the flat washer [3] for signs of damages (nicks, flatness condition).

< 1 > If there are damages, discard and replace it.

c) Do an inspection of the main fuel pump housing insert for signs of damages while you put the pulled out insert, insert movement, and the thread insert damages.

NOTE: If the insert is damaged, replace the main fuel pump or apply SB CFM56-7B-73-0079.

NOTE: There is only one insert in the main fuel pump housing, located in the hole adjacent to the nameplate.

3) Remove the fuel filter cover [6] from the fuel filter housing.

NOTE: When you remove the fuel filter cover [6], the filter element [11] remains attached to it.

a) Do an inspection of the attached parts as follows:

< 1 > Do an inspection of five D-Head bolts [12] for signs of damages.

< a > If there are damages, discard and replace them with their retaining ring [13].

4) Remove and discard the packing [7] from the fuel filter cover [6].

5) Remove the fuel filter element [11] from the fuel filter cover [6].

a) Do the inspection of the fuel filter cover [6] for contamination.

b) Do the inspection the fuel filter element [11] for contamination.

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

< 1 > If you find usual contamination.

< a > Discard the fuel filter element [11] and the packing [1] and the packing [1] that are attached to the filter element [11].

NOTE: Make sure that the packing [1] and [10] are attached to the fuel filter element [11] and are not put into the filter housing.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

< 2 > If you find usual contamination.

< a > Discard the fuel filter element [11] and the packing [1] and the packing [1] that are attached to the fuel filter element [11].

NOTE: Make sure that the packing [1] and [10] are attached to the fuel filter element [11] and are not put into the filter housing.

HAP ALL POST SB CFM56-7B-73A034

c) If you find a large quantities of the contaminations.

< 1 > Do this task: FIM 73-05 TASK 801.

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HAP ALL POST SB CFM56-7B-73A034 (Continued)

HAP ALL POST SB CFM56-7B-73-079

SUBTASK 73-11-02-020-002-F00

WARNING: DO NOT GET FUEL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FUEL. PUT ON GOGGLES, AND GLOVES WHEN YOU USE FUEL. KEEP FUEL AWAY FROM SPARKS, FLAME, AND HEAT. FUEL IS POISONOUS AND FLAMMABLE. FUEL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

NOTE: This Subtask is for engines which have a fuel filter cover attachment with five D-Head bolts, five retaining rings, five flat washers, five nuts and one bolt with one washer, one self aligning washer, one self aligning nut (the main fuel pump reworked by SB CFM56-7B-73-079).

- (2) Do these steps to remove the fuel filter cover [6].
- (a) Do these steps to drain the fuel system:
- 1) Put the 5 gallon (19 liter) container, STD-1154 under the fuel pump assembly.
 - 2) Cut and remove the safety wire or cable from the drain plug [4].
 - 3) Remove the drain plug [4] from the fuel filter cover [6].
 - a) Let the fuel drain in the container.
 - 4) Remove and discard the packing [5] from the drain plug [4].
 - a) Keep the drain plug [4] for installation.
- (b) Remove the MW0312 wire harness from the Omega clip that is just to the left of the fuel filter cover [6].
- (c) Do these steps to remove the fuel pump filter cover [6]:
- 1) Loosen and remove the five nuts [15] and the five washers [14] that hold the fuel filter cover [6].

NOTE: If there are damages, discard and replace them.

 - a) Do an inspection of nuts [15] for signs of thread damages.

< 1 > If there are damages, discard and replace it.
 - b) Do an inspection of flat washers [14] for signs of damages (nicks, flatness condition).

< 1 > If there are damages, discard and replace it.
 - 2) Loosen and remove the bolt [16], the flat washers [17], the self aligning washer [18] and the self aligning nut [19] that hold the fuel filter cover [6].
 - a) Do an inspection of the bolt [16] for signs of thread damages.

< 1 > If there are damages, discard and replace it.
 - b) Do an inspection of the flat washer [17] for signs of damages (nicks, flatness condition).

< 1 > If there are damages, discard and replace it.
 - c) Do an inspection of the self aligning washer [18] for signs of thread as spherical face damages.

< 1 > If there are damages, discard and replace it.

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HAP ALL POST SB CFM56-7B-73-079 (Continued)

- d) Do an inspection of the self aligning nut [19] for signs of thread and spherical face damages.
- < 1 > If there are damages, discard and replace it.
- 3) Remove the fuel filter cover [6] from the fuel filter housing.
- NOTE:** When you remove the fuel filter cover [6], the fuel filter element [11] that remains attached to it.
- a) Do an inspection of the attached parts as follows:
- < 1 > Do an inspection of the five D-Head bolts [12] for signs of thread damages.
- < a > If there are damages, discard and replace it with the retaining rings [13].
- 4) Remove and discard the packing [7] from the fuel filter cover [6].
- 5) Remove the fuel filter element [11] from the fuel filter cover [6].
- 6) Do an inspection of the fuel filter cover [6]. for the contamination.
- 7) Do an inspection of the fuel filter element [11] for the contamination.

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- a) If you find usual contamination.
- < 1 > Discard the fuel filter element [11], packing [1], and the packing [10] that are attached to the fuel filter element [11].

NOTE: Make sure that the packing [1] and packing [10] are attached to the fuel filter element [11] and they are not into the fuel filter housing.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- b) If you find usual contamination.
- < 1 > Discard the fuel filter element [11] and the packings that are attached to the fuel filter element [11].

NOTE: Make sure that the packings are attached to the fuel filter element [11] and they are not into the fuel filter housing.

HAP ALL POST SB CFM56-7B-73-079

- 8) If you find the large quantities of the contamination.
- a) Do this task: FIM 73-05 TASK 801.

HAP ALL

————— END OF TASK —————

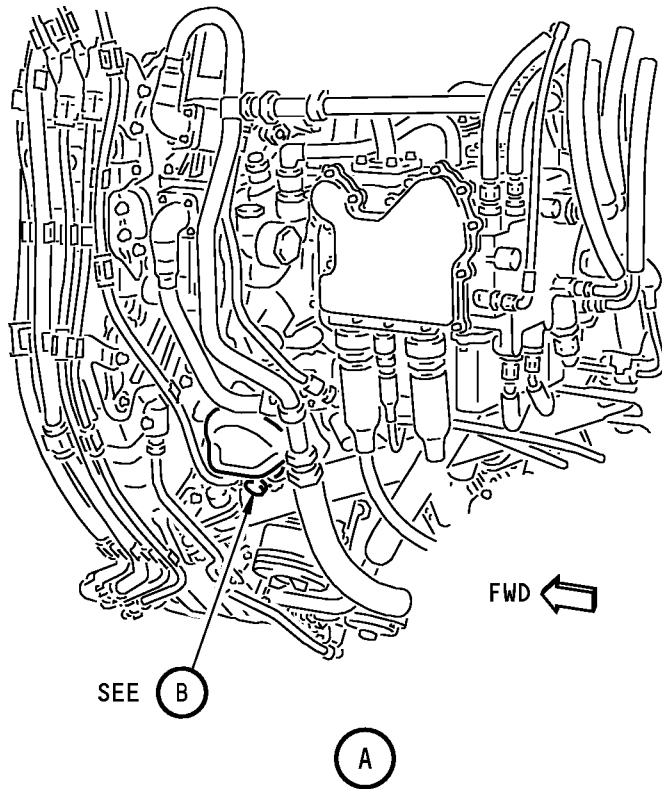
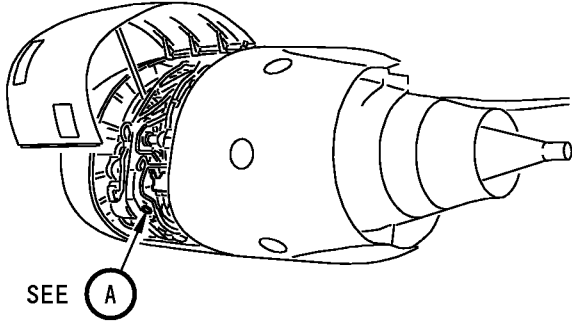
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MM-00203-00-B

Fuel Filter Installation
Figure 401 (Sheet 1 of 4)/73-11-02-990-801-F00

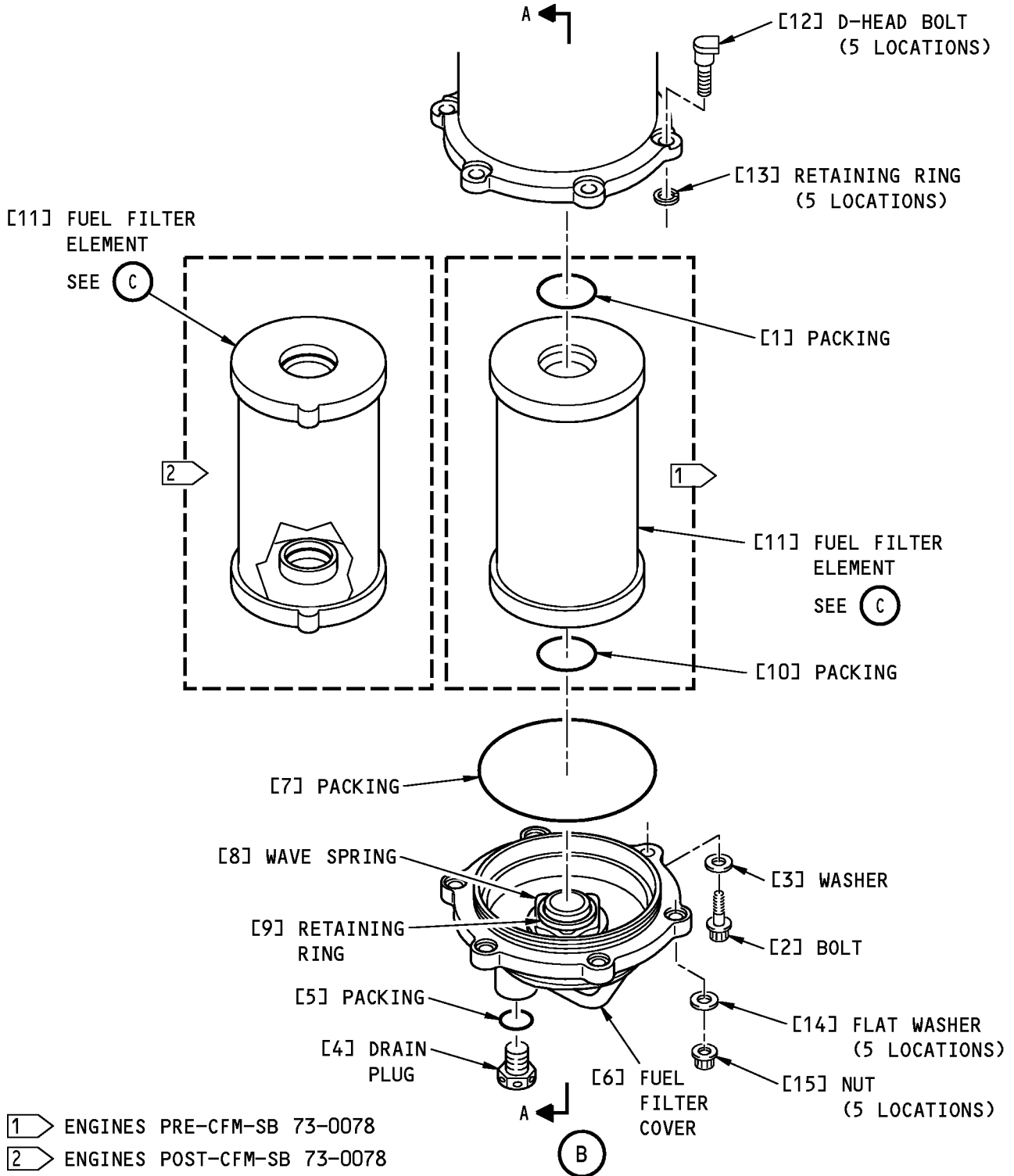
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- 1 ENGINES PRE-CFM-SB 73-0078
- 2 ENGINES POST-CFM-SB 73-0078

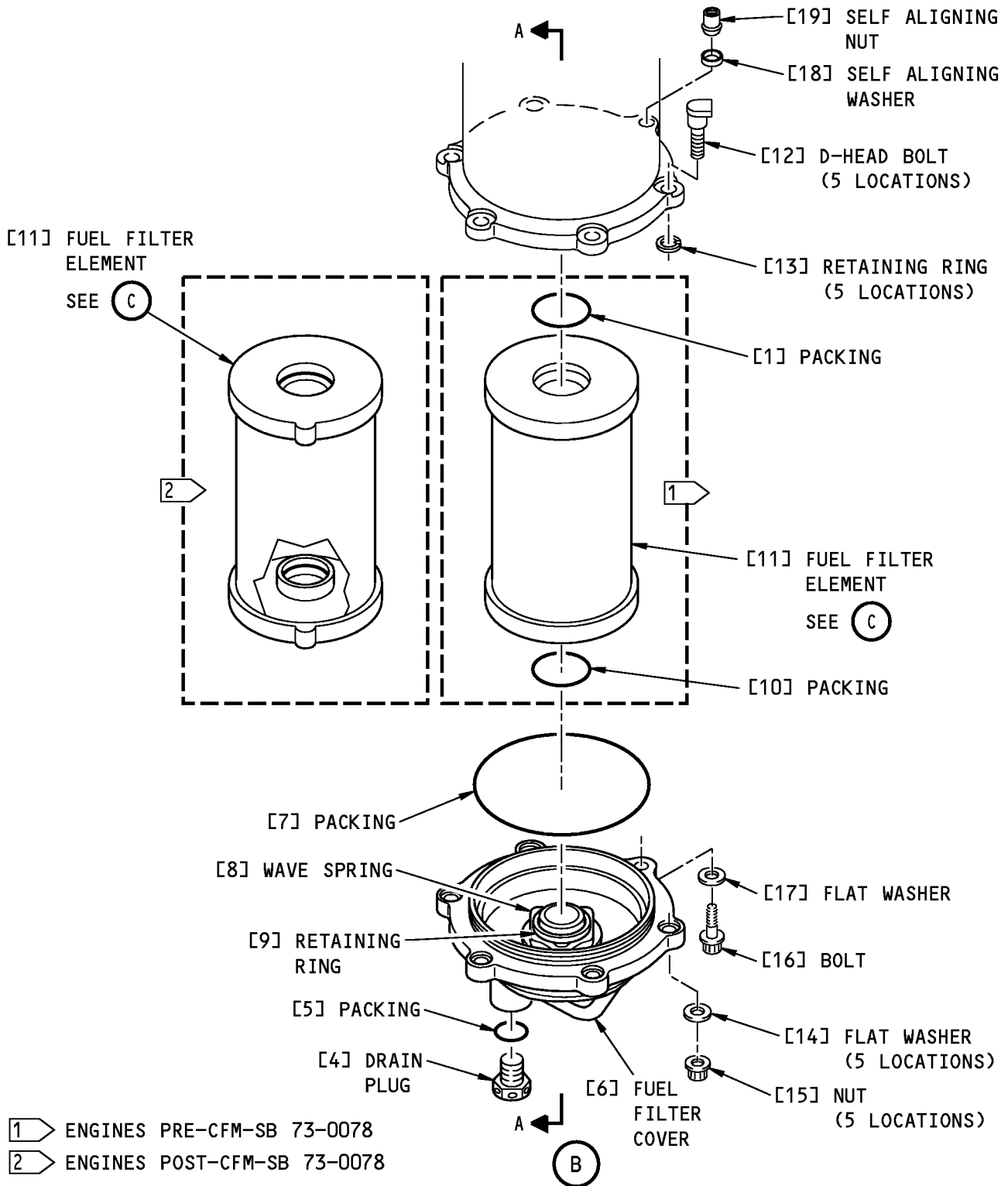
Fuel Filter Installation
Figure 401 (Sheet 2 of 4)/73-11-02-990-801-F00

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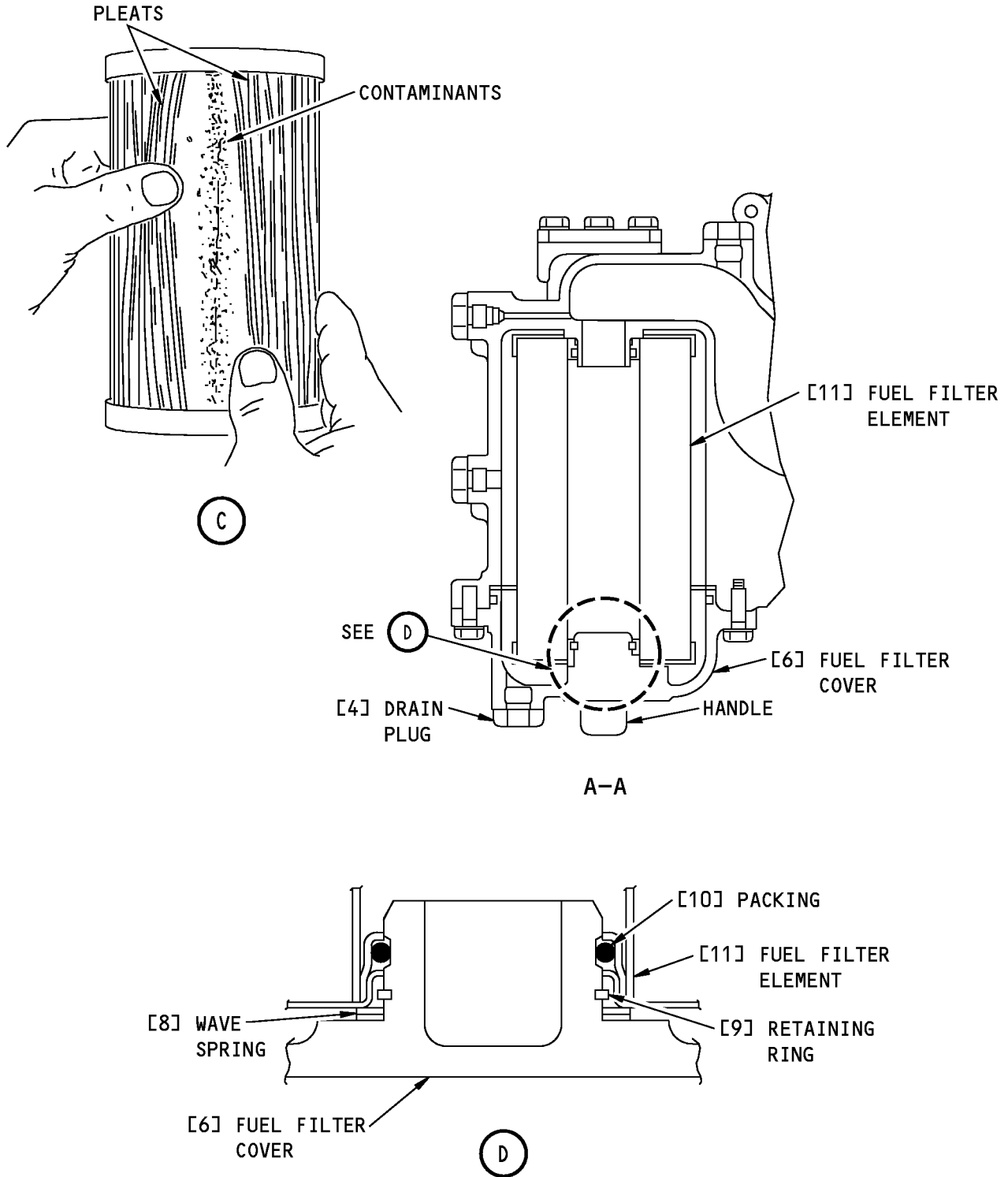
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Fuel Filter Installation
Figure 401 (Sheet 3 of 4)/73-11-02-990-801-F00

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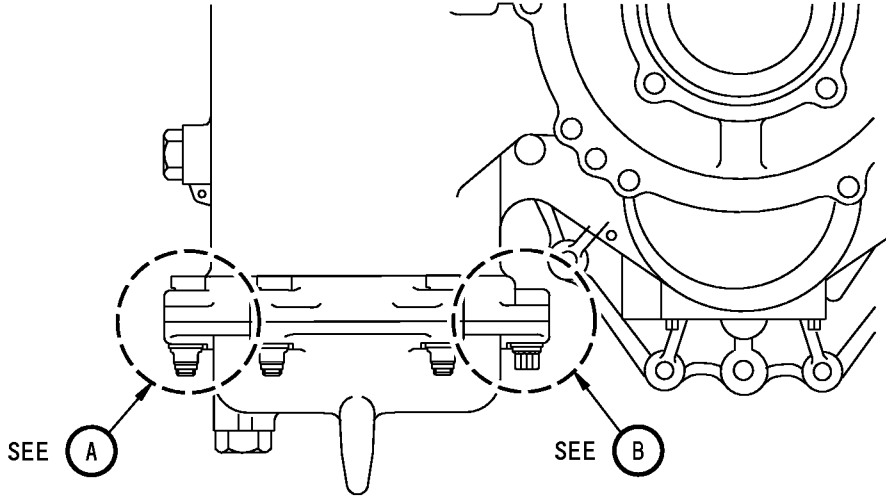


Fuel Filter Installation
Figure 401 (Sheet 4 of 4)/73-11-02-990-801-F00

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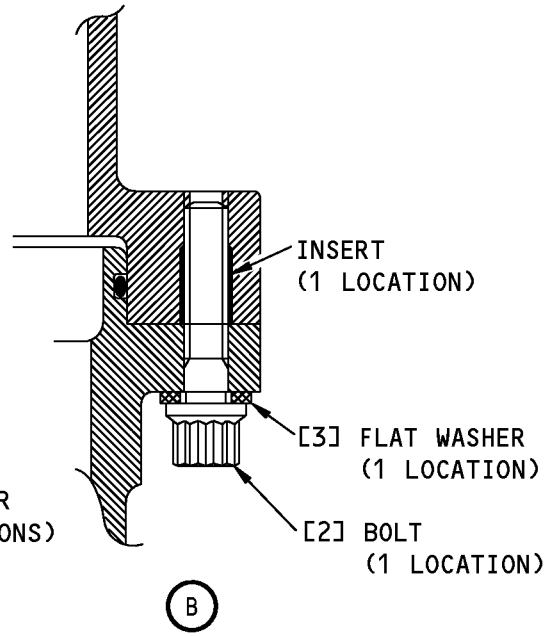
[12] D-HEAD BOLT
(5 LOCATIONS)

[13] RETAINING
RING
(5 LOCATIONS)

[15] NUT
(5 LOCATIONS)

(A)

[14] FLAT WASHER
(5 LOCATIONS)

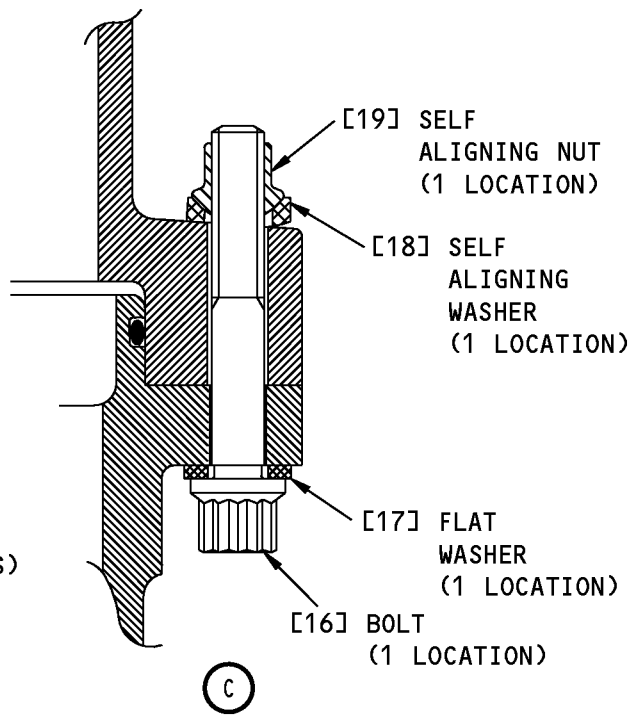
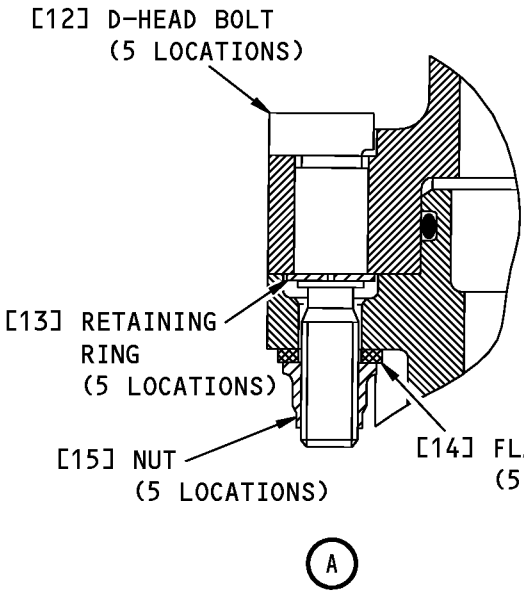
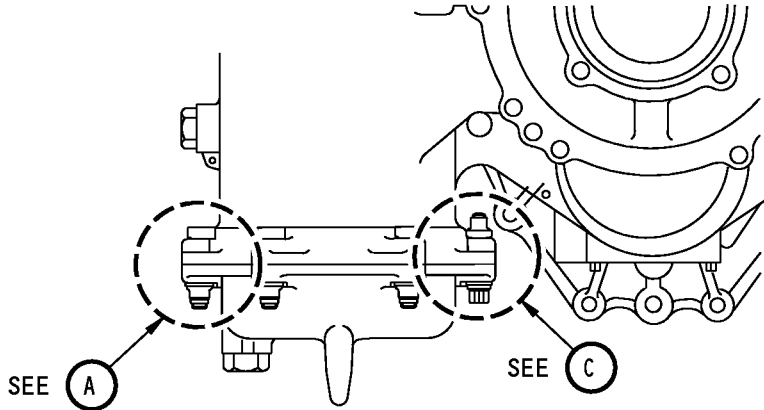


Fuel Filter Attachment Installation
Figure 402 (Sheet 1 of 2)/73-11-02-990-802-F00

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B-73A034</p>

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DO NOT INTERMIX THE DIFFERENT SUPPLIERS HARDWARE (SELF ALIGNING WASHER AND SELF ALIGNING NUT FROM KIT PH030035-4 OR KIT NAS1727-4D) AND BOLT

Fuel Filter Attachment Installation
Figure 402 (Sheet 2 of 2)/73-11-02-990-802-F00

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HAP ALL POST SB CFM56-7B-73-079

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TASK 73-11-02-400-801-F00

3. Fuel Filter Installation

(Figure 401)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
70-20-02-400-801-F00	Tightening Practices and Torque Values (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G02272	Fuel - Turbine, Aviation (Grades JP-4, JP-5, JP-5/JP-8ST)	MIL-DTL-5624
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Packing	73-11-01-01-100	HAP ALL
4	Plug	73-11-01-01-060	HAP ALL
5	Packing	73-11-01-01-065	HAP ALL
7	Packing	73-11-01-01-085	HAP ALL
10	Packing	73-11-01-01-100	HAP ALL
11	Filter element	73-11-01-01-105	HAP ALL

E. Location Zones

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

F. Prepare for the Installation

SUBTASK 73-11-02-840-002-F00

(1) Do these steps to prepare for the installation:

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WARNING: THE SOLVENT IS FLAMMABLE. DO NOT USE THE SOLVENT NEAR AN OPEN FLAME. DO NOT BREATHE THE FUMES OF THE SOLVENT. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Use fuel, G02272 and cotton wiper, G00034 to clean the fuel filter housing and the fuel filter cover [6].
- (b) Examine all mating surfaces and adjacent areas of the fuel filter housing to make sure that they are clean and in a good condition.

G. Fuel Filter Installation

HAP ALL POST SB CFM56-7B-73A034

SUBTASK 73-11-02-420-001-F00

- (1) Do these steps to install the fuel filter:

NOTE: There are different configurations of the fuel filter cover.

NOTE: The original design of the fuel pump filter cover attachment (bolts and fuel pump housing inserts) was cancelled. It must be reworked by SB CFM56-7B-73-A0034 and SB CFM56-7B-73-0079.

- (a) Install the packing [7] in the fuel filter cover [6]:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate a new packing [7] with oil, D00623 [CP5066].
- 2) Install the packing [7] in the groove of the fuel filter cover [6].

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

- (b) Lubricate and install the new packing [1] and new packing [10] on the new fuel filter element [11]:
 - 1) Lubricate the new packing [1] with oil, D00623 [CP5066].
 - 2) Install the packing [1] in the groove at the top of the new fuel filter element [11].
 - 3) Lubricate the packing [10] with oil, D00623 [CP5066].
 - 4) Install the packing [10] in the groove at the bottom of the fuel filter element [11].

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

- (c) Lubricate the packings of the new fuel filter element [11] with oil, D00623 [CP5066].

NOTE: The packings are already installed by the manufacturer in their grooves on the new fuel filter element [11].

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- (d) Lightly lubricate the threads of the bolt [2] with grease, D00601 [CP2101].
- (e) Lightly lubricate the thread of the five D-Head bolts [12] with grease, D00601 [CP2101].

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HAP ALL POST SB CFM56-7B-73A034 (Continued)

CAUTION: MAKE SURE THAT THE WAVE SPRING AND THE RETAINING RING ARE CORRECTLY INSTALLED ON THE FUEL FILTER COVER. IF THE WAVE SPRING AND THE RETAINING RING ARE NOT CORRECTLY INSTALLED, THE FUEL FILTER ELEMENT COULD BE DAMAGED.

- (f) Make sure that the wave spring [8] and the retaining ring [9] are correctly installed into the fuel filter cover [6].

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

- (g) Carefully install the fuel filter element [11] in the fuel filter cover [6].
- 1) Make sure that the packing [10] stay in its correct position in the groove in the fuel filter element [11].
 - 2) Make sure that the packing [7] stay in its correct position in the groove in the fuel filter cover [6].
 - 3) Make sure that the fuel filter element [11] does not move.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

- (h) Carefully install the fuel filter element [11] in the fuel filter cover [6].
- 1) Make sure that the packings stay in their grooves in the fuel filter element [11].
 - 2) Make sure that the packing [7] stay in its correct position in the groove in the fuel filter cover [6].
 - 3) Make sure that the fuel filter element [11] does not move.

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- (i) Carefully install the fuel filter cover [6] and the fuel filter element [11] into the fuel filter housing.
- 1) Make sure that the fuel filter element [11] is correctly installed on the guide of the fuel filter housing.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73A034

- 2) Adjust the tabs of the fuel filter element [11] to the ribs of the fuel filter housing.

HAP ALL POST SB CFM56-7B-73A034

- 3) Make sure that the fuel filter cover [6] is correctly engaged into the fuel filter housing.
- (j) Before the bolt installation, make sure that the cover is correctly installed against the housing flange.

NOTE: Do not use the bolts to help cover the filter engagement. Damage on insert will occur. A wood or plastic hammer may help to engage the cover, if it is necessary.

- (k) Install the five flat washers [14] and the five nuts [15] on the five D-Head bolts [12] that hold the fuel filter cover [6] to the fuel filter housing.
- 1) Make sure that the nuts [15] screw freely by hand as follows:

NOTE: No tool is permitted.

- a) Rotate each nut for two complete turns minimum.

< 1 > If the attached part is in a good condition, it should not be possible to fully hand tighten the nut.

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HAP ALL POST SB CFM56-7B-73A034 (Continued)

CAUTION: BE CAREFUL AS YOU TIGHTEN THE BOLTS THAT HOLD THE FUEL FILTER COVER TO THE HOUSING. MAKE SURE THAT YOU USE PROPER TORQUE TECHNIQUES AS YOU TIGHTEN THE BOLTS. IF YOU DO NOT USE PROPER TORQUE TECHNIQUES, YOU CAN CAUSE DAMAGE TO THE FUEL FILTER COVER OR CAUSE A FUEL LEAK.

2) Tighten the five nuts [15] to 70-80 pound-inches (8-9 Newton meters).

NOTE: Refer to this task (TASK 70-20-02-400-801-F00), for the torque techniques.

(l) Install the bolt [2] and the flat washer [3] that hold the fuel filter cover [6] to the fuel filter housing.

NOTE: Only one bolt is used in the hole adjacent to the nameplate.

1) Make sure that the bolt engages freely by hand as follows:

NOTE: No tool is permitted.

a) Hold the bolt head between your fingers, and rotate the bolt minimum for two turns.

< 1 > If the insert is in a good condition, it should not be possible to fully hand tighten the bolt.

CAUTION: MAKE SURE TO TIGHTEN THE BOLTS TO THE CORRECT TORQUE RANGE. IF YOU DO NOT DO SO, IT MAY DAMAGE THE HARDWARE AND CAN CAUSE SEVERE EXTERNAL FUEL LEAKAGE.

2) Tighten the bolt [2] to 70-80 pound-inches (8-9 Newton meters).

NOTE: Refer to this task (TASK 70-20-02-400-801-F00), for the torque techniques.

(m) Install the MW0312 wire harness in the Omega clip that is immediately to the left of the fuel filter cover [6].

(n) Install the drain plug [4] on the fuel filter cover [6]:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

1) Lubricate a new packing [5] with oil, D00623 [CP5066].

2) Install the packing [5] in the groove of the drain plug [4].

3) Lubricate the threads of the drain plug [4] with oil, D00623 [CP5066].

4) Install the drain plug [4] in the fuel filter cover [6].

a) Tighten the drain plug [4] to 45-55 pound-inches (5-6 Newton meters).

5) Install the lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [4].

HAP ALL POST SB CFM56-7B-73-079

SUBTASK 73-11-02-420-002-F00

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. THE SYNTHETIC OIL CONTAINS ADDITIVES THAT CAN BE POISONOUS IF THEY ARE ABSORBED THROUGH THE SKIN. CLEAN AWAY ALL OIL THAT GETS ON THE SKIN.

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HAP ALL POST SB CFM56-7B-73-079 (Continued)

(WARNING PRECEDES)

- (2) Do these steps to install the fuel filter cover [6].

NOTE: This Subtask is for engines which have a fuel filter cover attachment with five D-Head bolts, five retaining rings, five flat washers, five nuts, one bolt, one flat washer one self aligning washer, and one self aligning nut (the main fuel pump reworked by SB CFM56-7B-73-079).

- (a) Install the packing [7] in the fuel filter cover [6].
- 1) Lubricate the packing [7] with oil, D00623 [CP5066].
 - 2) Install the packing [7] in the groove of the fuel filter cover [6].

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- (b) Lubricate and install the new packing [1] and the new packing [10] on the new fuel filter element [11].
- 1) Lubricate the new packing [1] with oil, D00623 [CP5066].
 - 2) Install the packing [1] in the groove at the top of the new fuel filter element [11].
 - 3) Lubricate the new packing [10] with oil, D00623 [CP5066].
 - 4) Install the packing [10] in the groove at the bottom of the new fuel filter element [11].

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- (c) Lubricate the packings of the new fuel filter element [11] with oil, D00623 [CP5066].

NOTE: The packings are already installed by the manufacturer in their grooves on the new fuel filter element [11].

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- (d) Lightly lubricate the thread of the bolt [16] and the self aligning washer [18] with grease, D00601 [CP2101].
- (e) Lightly lubricate the thread of the five D-Head bolts [12] with grease, D00601 [CP2101].
- (f) Make sure that the wave spring [8] and the retaining ring [9] are correctly installed into the fuel filter cover [6].

NOTE: Make sure that the wave spring and the retaining ring are correctly installed on the fuel filter cover. If the wave spring and the retaining ring are not correctly installed, the fuel filter element could be damaged.

HAP ALL PRE SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- (g) Carefully install the fuel filter element [11] on the fuel filter cover [6].
- 1) Make sure that the fuel filter element [11] on the fuel filter cover [6].
 - a) Make sure that the packing [10] stay in its correct position in the groove in the fuel filter cover [6].
 - b) Make sure that the packing [7] stay in its correct position in the groove in the fuel filter cover [6].
 - c) Make sure that the fuel filter element [11] does not move.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- (h) Carefully install the fuel filter element [11] on the fuel filter cover [6].

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HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079 (Continued)

- 1) Make sure that the packings stay in their grooves in the fuel filter element [11].
- 2) Make sure that the packing [7] stay in its correct position in the groove in the fuel filter cover [6].
- 3) Make sure that the fuel filter element [11] does not move.

HAP ALL POST SB CFM56-7B-73-079

- (i) Carefully install the fuel filter [6] with its fuel filter element [11] into the fuel filter housing.
 - 1) Make sure that the fuel filter element [11] is correctly installed on the guide of the fuel filter housing.

HAP ALL POST SB CFM56-7B-73-078 AND POST SB CFM56-7B-73-079

- 2) Adjust the tabs of the fuel filter element [11] to the ribs of the fuel filter housing.

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- 3) Make sure that the fuel filter cover [6] is correctly engaged into the fuel filter housing.

NOTE: Do not use the bolts to help cover the filter engagement. Damage on insert will occur. A wood or plastic hammer may help to engage the cover, if it is necessary.

- (j) Before the bolts installation, make sure that the cover is correctly installed against the housing flange.
- (k) Install the five flat washers [14] and the five nuts [15] on the five D-Head bolts [12] that hold the fuel filter cover [6] to the fuel filter housing.
 - 1) Make sure that the nuts [15] screw freely turn by hand as follows:

NOTE: No tool is permitted.

- a) Rotate each nut for two complete turns minimum.

< 1 > If the attached part is in a good condition, it should not be possible to fully hand tighten the nut.

CAUTION: MAKE SURE TO TIGHTEN THE BOLTS TO THE CORRECT TORQUE RANGE. IF YOU DO NOT DO SO, IT MAY DAMAGE THE HARDWARE AND CAN CAUSE SEVERE EXTERNAL FUEL LEAKAGE.

- b) Tighten the five nuts [15] to 70-80 pound-inches (8-9 Newton-meters).

NOTE: Refer to this task (TASK 70-20-02-400-801-F00), for the torque techniques.

- (l) Install the bolt [16], the flat washer [17], the self aligning washer [18] and the self aligning nut [19] that hold the fuel filter cover [6] to the fuel filter housing.

NOTE: There are two attachment designs that are not interchangeable. The spherical profile of the nuts and washers is different (two suppliers hardware)

NOTE: This step is for the fuel filter cover attachment with Kit PH030035-4 or Kit NAS1727-4D.

NOTE: Only one bolt is used in the hole adjustment to the nameplate.

- 1) Lubricate the head faces of the bolt [16] in contact with the flat washer [17].
 - a) Lubricate the thread of the bolt and the spherical side of the self aligning nut [19] with grease, D00601 [CP2101].

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HAP ALL POST SB CFM56-7B-73-079 (Continued)

- 2) Install the bolt [16], the flat washer [17], the self aligning washer [18] and the self aligning nut [19] for each assembly configuration.

NOTE: An improper bolt, nut and washer installation can lead to damages. Pay special attention to the self aligning nut and washer installation.

NOTE: Do not intermix bolt, self aligning nut and self aligning washer from the different suppliers on the fuel pump which attach the fuel filter cover.

CAUTION: MAKE SURE TO TIGHTEN THE BOLTS TO THE CORRECT TORQUE RANGE. IF YOU DO NOT DO SO, IT MAY DAMAGE THE HARDWARE AND CAN CAUSE SEVERE EXTERNAL FUEL LEAKAGE.

- 3) Tighten the bolt [16] and the self aligning nut [19] to 70-80 pound-inches (8-9 Newton-meters).

NOTE: Refer to this task (TASK 70-20-02-400-801-F00), for the torque techniques.

WARNING: DO NOT LET OIL STAY ON YOUR SKIN. THE SYNTHETIC OIL CONTAINS ADDITIVES THAT CAN BE POISONOUS IF THEY ARE ABSORBED THROUGH THE SKIN. CLEAN AWAY ALL OIL THAT GETS ON THE SKIN.

- (m) Install the MW0312 wire harness in Omega clip that is immediately to the left of the fuel filter cover [6].

- 1) Install the drain plug [4] on the fuel filter cover [6]:

- a) Lubricate the new packing [5] with oil, D00623 [CP5066].
- b) Install the packing [5] in the groove of the drain plug [4].
- c) Lubricate the threads of the drain plug [4] with oil, D00623 [CP5066].
- d) Install the drain plug [4] in the fuel filter cover [6].

< 1 > Tighten the drain plug [4] to 45-55 pound-inches (5-6 Newton-meters).
- e) Install the lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [4].

HAP ALL

H. Put the Airplane in a Serviceable Condition

SUBTASK 73-11-02-840-003-F00

- (1) Do these steps to put the airplane in a serviceable condition:

- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
- (b) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.
- (c) Remove the DO-NOT-OPERATE tag from the applicable engine start lever.

I. Fuel Filter Replacement Test

SUBTASK 73-11-02-790-001-F00

- (1) Do the test that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— END OF TASK —————

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FUEL NOZZLE FILTER - REMOVAL/INSTALLATION**1. General**

A. This procedure has these tasks:

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES

- (1) The removal of the fuel nozzle filter (SAC).
- (2) The installation of the fuel nozzle filter (SAC).

TASK 73-11-03-000-802-F00**2. Fuel Nozzle Filter Removal (SAC)**

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

B. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-11-03-840-005-F00

- (1) Make sure that the engine fuel valves are closed:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the start levers are in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable start lever.
 - (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

SUBTASK 73-11-03-840-006-F00

- (2) Prepare the airplane for the procedure:
 - (a) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.
 - (b) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

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AIRCRAFT MAINTENANCE MANUAL**HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES (Continued)**

E. Procedure

SUBTASK 73-11-03-020-002-F00

(1) Remove the fuel outlet tube:

- (a) Remove the nut [6], bolt [8], and clamp [7] that hold the fuel outlet tube [5] to the bracket.

WARNING: DO NOT GET FUEL IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FUEL. KEEP THE FUEL AWAY FROM SPARKS, FLAME, AND HEAT. FUEL IS A POISONOUS AND FLAMMABLE LIQUID THAT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (b) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the connection between the fuel outlet tube [5] from the 9:00 O'clock strut tube.

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (c) Use two wrenches to disconnect the fuel outlet tube [5] from the 9:00 O'clock strut tube.
1) Let the unwanted fuel flow into the container.
- (d) Use two wrenches to disconnect the outlet tube [5] from the fuel nozzle filter [4].
1) Remove the outlet tube [5].
- (e) Install protective covers on the fuel outlet tube [5], the 9:00 O'clock strut tube, and the fuel nozzle filter [4].

SUBTASK 73-11-03-020-003-F00

(2) Remove the fuel nozzle filter:

- (a) Use two wrenches to disconnect the fuel inlet tube [1] from the fuel nozzle filter [4].
- (b) Remove the two bolts [3] and washers [2] that hold the fuel nozzle filter [4] to the brackets.
1) Remove the fuel nozzle filter.
- (c) Install protective covers on the fuel inlet tube [1], and the fuel nozzle filter [4].

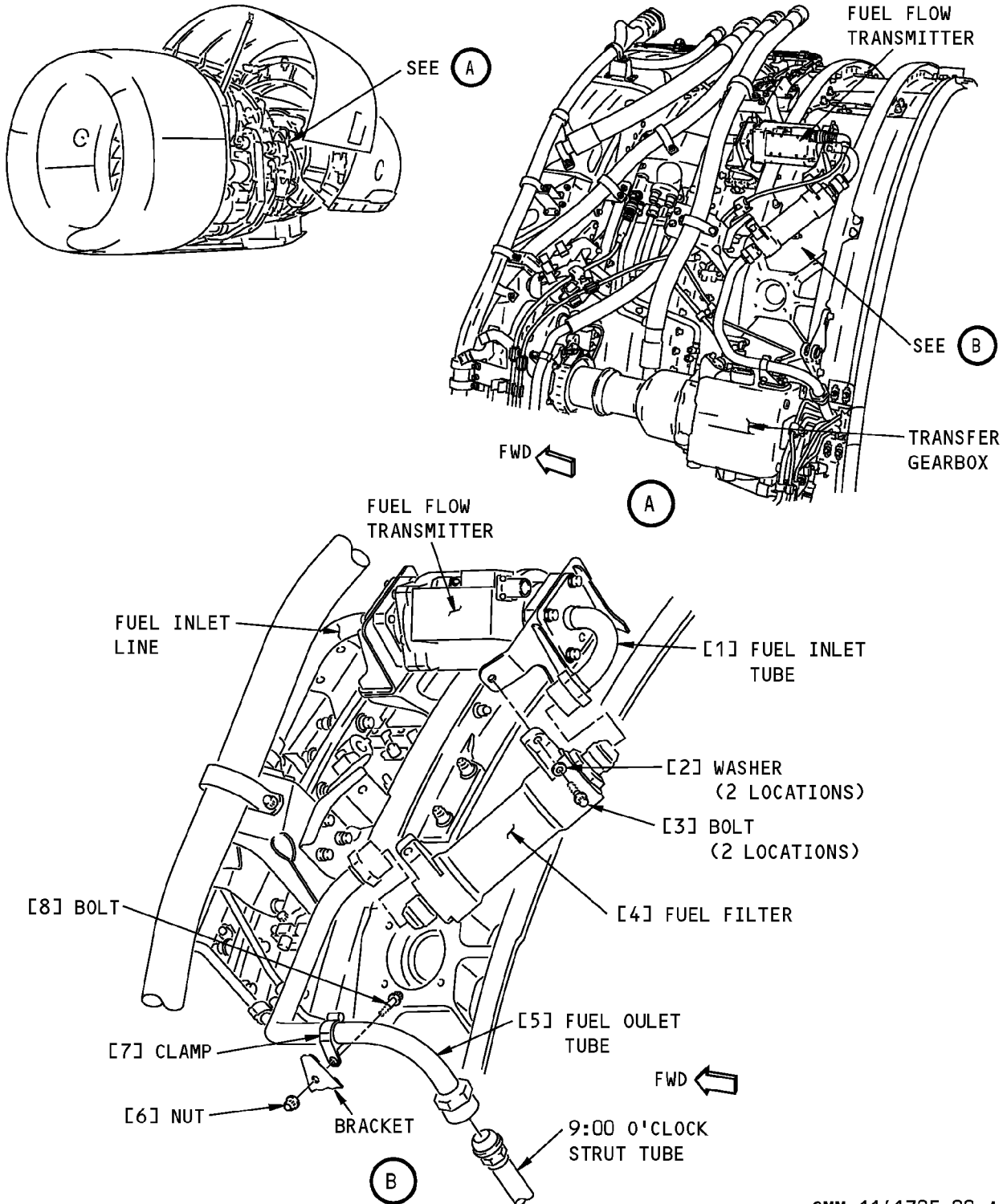
————— **END OF TASK** —————

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GMM-1141705-00-A

Fuel Nozzle Filter Installation (SAC)
Figure 401/73-11-03-990-801-F00

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HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES (Continued)

TASK 73-11-03-400-802-F00

3. Fuel Nozzle Filter Installation (SAC)

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Fuel nozzle filter	73-11-03-01-020	HAP ALL

D. Location Zones

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

E. Procedure

SUBTASK 73-11-03-420-002-F00

(1) Connect the fuel nozzle filter [4] to the fuel inlet tube [1] and the bracket:

- (a) Remove the protective covers from the fuel inlet tube [1] and the inlet of the fuel nozzle filter [4].
- (b) Use grease, D00601 [CP2101] to lubricate the threads of the two bolts [3].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (c) Use oil, D00623 [CP5066] to lubricate the inlet threads of the fuel nozzle filter [4].
- (d) Loosen the four bolts that hold the fuel inlet tube [1] to the bracket and the fuel flow transmitter.
- (e) Put the fuel nozzle filter [4] in its correct position on the engine.
- (f) Use your hand to connect the fuel nozzle filter [4] to the fuel inlet tube [1].
- (g) Use your hand to install the two bolts [3] and washers [2] that hold the fuel nozzle filter [4] to the brackets.

SUBTASK 73-11-03-420-003-F00

(2) Connect the fuel outlet tube [5] to the fuel nozzle filter [4]:

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HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES (Continued)

- (a) Remove the protective covers from the fuel outlet tube [5], the 9:00 O'clock strut tube, and the outlet of the fuel nozzle filter [4].
- (b) Use grease, D00601 [CP2101] to lubricate the threads of the bolt [8].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (c) Use oil, D00623 [CP5066] to lubricate the outlet threads of the fuel nozzle filter [4].
- (d) Use oil, D00623 [CP5066] to lubricate the threads of the 9:00 O'clock strut tube.
- (e) Use your hand to connect the fuel outlet tube [5] to the fuel nozzle filter [4] and the 9:00 O'clock strut tube.
- (f) Use the clamp [7], nut [6], and bolt [8] to connect the fuel outlet tube [5] to the bracket.

SUBTASK 73-11-03-210-001-F00

- (3) Make sure that the fuel nozzle filter [4] aligns correctly with the fuel inlet tube, the fuel outlet tube, and the bracket.

SUBTASK 73-11-03-420-004-F00

- (4) Tighten these connections:

- (a) Tighten the four bolts that hold the fuel inlet tube [1] to the bracket to 98-110 pound-inches (11-12.5 Newton meters).
- (b) Tighten the two bolts [3] to 98-110 pound-inches (11-12.5 Newton meters).

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUTS. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (c) Tighten the coupling nut between the fuel nozzle filter [4] and the inlet tube [1] to 900-1100 pound-inches (100-125 Newton meters).
- (d) Tighten the coupling nut between the fuel nozzle filter [4] and the fuel outlet tube [5] to 900-1100 pound-inches (100-125 Newton meters).
- (e) Tighten the coupling nut between the fuel outlet tube [5] and the 9:00 O'clock strut tube to 900-1100 pound-inches (100-125 Newton meters).
- (f) Tighten the nut [6] to 98-110 pound-inches (11-12.5 Newton meters).

SUBTASK 73-11-03-840-007-F00

- (5) Put the airplane in a serviceable condition:

- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
- (b) Remove a DO-NOT-OPERATE tag on the applicable start lever.
- (c) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

SUBTASK 73-11-03-800-002-F00

- (6) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— END OF TASK —————

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AIRCRAFT MAINTENANCE MANUAL

FUEL NOZZLES/NO BSV INSTALLED - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel nozzles, SAC engines with the no BSV installed.
- (2) The installation of the fuel nozzles, SAC engines with the no BSV installed.
- (3) SAC engines with the BSV removed the engine has only one fuel manifold. With the BSV installed the engines have two fuel manifolds, one going to every other fuel nozzle.

TASK 73-11-04-000-805-F01**2. Fuel Nozzle Removal**

A. General

- (1) The engine has twenty fuel nozzles.
 - (a) To remove the fuel nozzle from positions 1, 2, and 20, it is necessary to partially remove the bleed air precooler.
 - (b) To remove the nozzle from position 7, you must remove the LPT duct.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
36-11-03-000-801	Bleed Air Regulator Removal (P/B 401)
36-12-01-800-801	Bleed Air Precooler Disconnection (For Engine Component Removal) (P/B 201)
72-00-00-200-805-F00	Borescope Inspection of the Combustion Chamber (P/B 601)
73-21-07-000-801-F00	T3 Sensor Removal (P/B 401)
75-21-01-000-801-F00	HPTACC Valve Removal (P/B 401)
75-22-04-000-802-F00	LPTACC Valve Removal (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-11-04-840-013-F01

- (1) Make sure that the engine fuel valves are closed:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the start levers are in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable start lever.
 - (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

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(2) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 73-11-04-860-008-F00

(3) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

SUBTASK 73-11-04-010-003-F00

WARNING: DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

E. Fuel Nozzle Removal

SUBTASK 73-11-04-020-049-F01

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

(1) Do these steps to remove the fuel nozzle [24] from position 1 (Figure 401, Figure 402, Figure 403):

(a) Do this task: Bleed Air Precooler Disconnection (For Engine Component Removal), TASK 36-12-01-800-801.

(b) Do the applicable steps in the T3 Sensor removal task to disconnect the T3 line from the combustion case and from the support bracket (TASK 73-21-07-000-801-F00).

NOTE: Access to the fuel nozzle is easier when the T3 line is disconnected from the combustion case and the support bracket.

1) Carefully move the T3 line out of the way.

(c) Disconnect the shroud [27] from the fuel nozzle [24].

1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

(d) Disconnect the coupling nut [25] from the fuel nozzle [24].

(e) Remove the bolt [44] that holds the loop clamp [43] to the support bracket [42].

(f) Remove the three bolts [23] and [41] from the fuel nozzle flange.

1) Remove the support bracket [42].

(g) Do these steps to remove the fuel nozzle from the combustion case:

1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

(h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

1) Discard the seal [28].

(i) Remove and discard the preformed packing [22] from the fuel nozzle [24].

(j) Remove and discard the preformed packing [26] from the fuel manifold [21].

(k) Visually examine the fuel nozzle wear sleeves.

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- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-050-F01

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

- (2) Do these steps to remove the fuel nozzle from position 2 (Figure 401, Figure 402, Figure 404):

- (a) Do this task: Bleed Air Precooler Disconnection (For Engine Component Removal), TASK 36-12-01-800-801.

- (b) Do the applicable steps in the T3 Sensor removal task to disconnect the T3 line from the combustion case and from the support bracket (TASK 73-21-07-000-801-F00).

NOTE: Access to the fuel nozzle is easier when the T3 line is disconnected from the combustion case and the support bracket.

- 1) Carefully move the T3 line out of the way.

- (c) Disconnect the shroud [27] from the fuel nozzle [24].

- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

- (d) Disconnect the coupling nut [25] from the fuel nozzle [24].

- (e) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.

- (f) Move the hinged bracket [61] away from the flange of the fuel nozzle.

- (g) Do these steps to remove the fuel nozzle from the combustion case:

- 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

- 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

- 1) Discard the seal [28].

- (i) Remove and discard the preformed packing [22] from the fuel nozzle [24].

- (j) Remove and discard the preformed packing [26] from the fuel manifold [21].

- (k) Visually examine the fuel nozzle wear sleeves.

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- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-051-F01

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

- (3) Do these steps to remove the fuel nozzle from position 3 (Figure 401, Figure 402, Figure 405):

- (a) Disconnect the LPT cooling air tube.

NOTE: Access to the fuel nozzle is easier when the LPT cooling air tube is disconnected.

- (b) Install protective covers on the LPT cooling air tube, combustion case and compressor case.

- (c) Disconnect the shroud [27] from the fuel nozzle [24].

1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

- (d) Disconnect the coupling nut [25] from the fuel nozzle [24].

- (e) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.

- (f) Loosen the bolts [82] on the tube bracket [81].

1) Move the tube bracket [81] away from the fuel nozzle.

- (g) Do these steps to remove the fuel nozzle from the combustion case:

1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

- 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

1) Discard the seal [28].

- (i) Remove and discard the preformed packing [22] from the fuel nozzle [24].

- (j) Remove and discard the preformed packing [26] from the fuel manifold [21].

- (k) Visually examine the fuel nozzle wear sleeves.

1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

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- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-061-F00

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

- (4) Do these steps to remove the fuel nozzle from position 4 (Figure 401, Figure 402, Figure 404):

- (a) Do the applicable steps in the HPTACC Valve Removal Task to disconnect the 9th stage inlet tube from the combustion case and the HPTACC Valve (TASK 73-21-07-000-801-F00).

NOTE: Access to the fuel nozzle is easier when the 9th stage inlet tube is disconnected from the combustion case and HPTACC valve.

- 1) Remove the two bolts on the EGT harness and carefully move the EGT harness out of the way.
- 2) Make sure that you install protective covers on the 9th stage inlet tube and the HPTACC valve.

- (b) Disconnect the shroud [27] from the fuel nozzle [24].

- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

- (c) Disconnect the coupling nut [25] from the fuel nozzle [24].

- (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.

- (e) Move the hinged bracket [61] away from the flange of the fuel nozzle.

- (f) Do these steps to remove the fuel nozzle from the combustion case:

- 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
- 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

- 1) Discard the seal [28].

- (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].

- (i) Remove and discard the preformed packing [26] from the fuel manifold [21].

- (j) Visually examine the fuel nozzle wear sleeves.

- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

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- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
 - < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-052-F01

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

- (5) Do these steps to remove the fuel nozzle from position 5 (Figure 401, Figure 402, Figure 406):
 - (a) Do the applicable steps in the HPTACC Valve Removal Task to disconnect the 9th stage inlet tube from the combustion case and the HPTACC valve (TASK 75-21-01-000-801-F00).

NOTE: Access to the fuel nozzle is easier when the 9th stage inlet tube is disconnected from the combustion case and the HPTACC valve.

 - 1) Remove the two bolts on the EGT harness and carefully move the EGT harness out of the way.
 - 2) Make sure that you install protective covers on the 9th stage inlet tube and the HPTACC valve.
 - (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (c) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (e) Remove the nut [104] and bolt [102] that hold the loop clamp [101] to the bracket [103].
 - 1) Remove the bracket [103].
 - (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (i) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (j) Visually examine the fuel nozzle wear sleeves.

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- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-062-F00

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

- (6) Do these steps to remove the fuel nozzle from positions 6 (Figure 401, Figure 402, Figure 404):

- (a) Do the applicable steps in the HPTACC Valve Removal Task to disconnect the TCC manifold (TASK 75-21-01-000-801-F00).

NOTE: Access to the fuel nozzle is easier when the TCC manifold is disconnected.

Make sure that you install protective covers on the TCC manifold and the HPTACC valve.

- (b) Disconnect the shroud [27] from the fuel nozzle [24].

1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

- (c) Disconnect the coupling nut [25] from the fuel nozzle [24].

- (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.

- (e) Move the hinged bracket [61] away from the flange of the fuel nozzle.

- (f) Do these steps to remove the fuel nozzle from the combustion case:

1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

1) Discard the seal [28].

- (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].

- (i) Remove and discard the preformed packing [26] from the fuel manifold [21].

- (j) Visually examine the fuel nozzle wear sleeves.

1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

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- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
 - < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:
 - NOTE:** Fuel nozzles that have four interrupted weld design are not serviceable.
 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-053-F01

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

- (7) Do these steps to remove the fuel nozzle from position 7 (Figure 401, Figure 402, Figure 407):
 - (a) Do the applicable steps in the LPTACC Valve Removal task to remove the LPT duct (TASK 75-22-04-000-802-F00).
 - NOTE:** You must remove the LPT duct to get access to the number 7 fuel nozzle.
 - 1) Make sure that you install protective covers on the LPT duct, the LPT manifold, and the LPTACC valve.
 - (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (c) Disconnect the coupling nut [25] of the fuel manifold [21] from the fuel nozzle [24].
 - (d) Remove the bolts [143] that hold the loop clamps [142] to the support bracket [141].
 - (e) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [141].
 - (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.
 - NOTE:** You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (i) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:
 - NOTE:** Fuel nozzles with wear sleeves that are dislodged are not serviceable.
 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

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- < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:
- NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.
- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-054-F01

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

- (8) Do these steps to remove the fuel nozzle from position 8 (Figure 401, Figure 402, Figure 408):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].
- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (c) Remove the bolts [163] that holds the strap clamp [162] to the cooling tube bracket [161].
- 1) Remove the strap clamp [162].
- (d) Remove the three bolts [41] from the flange of the fuel nozzle.
- 1) Remove the cooling tube bracket [161].
- (e) Move the hinged bracket [164] away from the fuel nozzle.
- (f) Do these steps to remove the fuel nozzle from the combustion case:
- 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
- 2) Remove the fuel nozzle.
- NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
- 1) Discard the seal [28].
- (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (i) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (j) Visually examine the fuel nozzle wear sleeves.
- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:
- NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.
- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
- < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:
- NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

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- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-055-F01

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

- (9) Do these steps to remove the fuel nozzle from position 9 (Figure 401, Figure 402, Figure 409):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the bolt [182] that holds the loop clamp [181] to the igniter cable bracket [183A].
 - (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - 1) Remove the igniter cable bracket [183A].
 - (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (g) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (h) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
 - < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
 - (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

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SUBTASK 73-11-04-020-063-F00

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

- (10) Do these steps to remove the fuel nozzle from position 10 (Figure 401, Figure 402, Figure 404):
- (a) Disconnect the shroud [27] from the fuel nozzle [24]].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (d) Move the hinged bracket [61] away from the flange of the fuel nozzle.
 - (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (g) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (h) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
 - (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-056-F01

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

- (11) Do these steps to remove the fuel nozzle from position 11 (Figure 401, Figure 402, Figure 410):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].

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- 1) Move the shroud [27] to get access the coupling nut [25] on the fuel manifold [21].
- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (c) Remove the three bolts [23] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [203].
- (d) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
- (e) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
- (f) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (g) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (h) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (i) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-057-F01

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

- (12) Do these steps to remove the fuel nozzle from position 12 (Figure 401, Figure 402, Figure 411):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the nut [224] and bolt [221] that hold the loop clamps [222] and [223] to the support bracket [228].
 - (d) Remove the bolt [226] that holds the loop clamp [225] to the support bracket [228].
 - (e) Remove the three bolts [41] and [227] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [228].

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- (f) Move the hinged bracket [229] away from the fuel nozzle.
- (g) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
- (i) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (j) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (k) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:
 - NOTE:** Fuel nozzles with wear sleeves that are dislodged are not serviceable.
 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-058-F01

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

- (13) Do these steps to remove the fuel nozzle from position 13 (Figure 401, Figure 402, Figure 412):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] from the flange of the fuel nozzle.
 - (d) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.
 - NOTE:** You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (e) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

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- 1) Discard the seal [28].
- (f) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (g) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (h) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
 - < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (i) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-064-F00

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

- (14) Do these steps to remove the fuel nozzle from position 14 (Figure 401, Figure 402, Figure 404):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (d) Move the hinged bracket [61] away from the flange of the fuel nozzle.
 - (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (g) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (h) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

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- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-059-F01

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

- (15) Do these steps to remove the fuel nozzle from position 15 (Figure 401, Figure 402, Figure 413):

- (a) Disconnect the shroud [27] from the fuel nozzle [24].

- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].

- (c) Remove the bolt [209] that holds the loop clamp [207] to the support bracket [205].

- (d) Remove the three bolts [23] and [41] from the fuel nozzle flange.

- 1) Remove the support bracket [205].

- (e) Do these steps to remove the fuel nozzle from the combustion case:

- 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

- 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

- 1) Discard the seal [28].

- (g) Remove and discard the preformed packing [22] from the fuel nozzle [24].

- (h) Remove and discard the preformed packing [26] from the fuel manifold [21].

- (i) Visually examine the fuel nozzle wear sleeves.

- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

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- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-065-F00

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

(16) Do these steps to remove the fuel nozzle from position 16 (Figure 401, Figure 402, Figure 404):

- (a) Disconnect the PS3 line from the combustion case and from the two PS3 brackets closest to the combustion case.

NOTE: Access to the fuel nozzle is easier when the PS3 line is disconnected.

- (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (c) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
- (e) Move the hinged bracket [61] away from the flange of the fuel nozzle.
- (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
- (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (i) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

- 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

- a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

AIRCRAFT MAINTENANCE MANUAL

SUBTASK 73-11-04-020-066-F00

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

- (17) Do these steps to remove the fuel nozzle from position 17 (Figure 401, Figure 402, Figure 412):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] from the flange of the fuel nozzle.
 - (d) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (e) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Discard the seal [28].
 - (f) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (g) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (h) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

 - a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
 - (i) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-060-F01

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

- (18) Do these steps to remove the fuel nozzle from position 18 (Figure 401, Figure 402, Figure 414):

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- (a) Do the applicable steps in the bleed Aair regulator task to turn the bleed air regulator valve body out of the way (TASK 36-11-03-000-801).

NOTE: Access to the fuel nozzle is easier when the bleed air regulator valve body is d out of the way.

- 1) Disconnect the two B-nuts of the bleed regulator valve.
 - 2) Loosen the two clamps on the bleed valve tube
 - 3) the bleed air regulator valve body out of the way.
- (b) Disconnect the shroud [27] from the fuel nozzle [24].
- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (c) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (d) Remove the bolt [264] that holds the loop clamp [265] to the cooling tube bracket [261].
- (e) Remove the two bolts [262] that hold the cooling tube bracket [261] to the hinged bracket [263].
- 1) Remove the cooling tube bracket [261].
- (f) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
- (g) Move the hinged bracket [263] away from the fuel nozzle.
- (h) Do these steps to remove the fuel nozzle from the combustion case:
- 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (i) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
- 1) Discard the seal [28].
- (j) Remove and discard the preformed packing [22] from the fuel nozzle [24].
- (k) Remove and discard the preformed packing [26] from the fuel manifold [21].
- (l) Visually examine the fuel nozzle wear sleeves.
- 1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

- a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).
 - < 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.
 - 2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

 - a) If you do not replace the fuel nozzle, continue-in-service for five cycles.
- (m) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

AIRCRAFT MAINTENANCE MANUAL

SUBTASK 73-11-04-020-067-F00

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

(19) Do these steps to remove the fuel nozzle [24] from position 19 (Figure 401, Figure 402, Figure 403):

(a) Disconnect the LPT cooling air tube.

NOTE: Access to the fuel nozzle is easier when the LPT cooling air tube is disconnected.

(b) Install protective covers on the LPT cooling air tube, combustion case and compressor case.

(c) Disconnect the shroud [27] from the fuel nozzle [24].

1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

(d) Disconnect the coupling nut [25] from the fuel nozzle [24].

(e) Remove the bolt [44] that holds the loop clamp [43] to the support bracket [42].

(f) Remove the three bolts [23] and [41] from the fuel nozzle flange.

1) Remove the support bracket [42].

(g) Do these steps to remove the fuel nozzle from the combustion case:

1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

(h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

1) Discard the seal [28].

(i) Remove and discard the preformed packing [22] from the fuel nozzle [24].

(j) Remove and discard the preformed packing [26] from the fuel manifold [21].

(k) Visually examine the fuel nozzle wear sleeves.

1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

(l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

AIRCRAFT MAINTENANCE MANUAL

SUBTASK 73-11-04-020-068-F00

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

(20) Do these steps to remove the fuel nozzle from position 20 (Figure 401, Figure 402, Figure 404):

(a) Do this task: Bleed Air Precooler Disconnection (For Engine Component Removal), TASK 36-12-01-800-801.

(b) Disconnect the LPT cooling air tube.

NOTE: Access to the fuel nozzle is easier when the LPT cooling air tube is disconnected.

(c) Install protective covers on the LPT cooling air tube, combustion case and compressor case.

(d) Disconnect the shroud [27] from the fuel nozzle [24].

1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].

(e) Disconnect the coupling nut [25] from the fuel nozzle [24].

(f) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.

(g) Move the hinged bracket [61] away from the flange of the fuel nozzle.

(h) Do these steps to remove the fuel nozzle from the combustion case:

1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.

2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

(i) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.

1) Discard the seal [28].

(j) Remove and discard the preformed packing [22] from the fuel nozzle [24].

(k) Remove and discard the preformed packing [26] from the fuel manifold [21].

(l) Visually examine the fuel nozzle wear sleeves.

1) If the wear sleeves are dislodged, replace the fuel nozzles and do this step:

NOTE: Fuel nozzles with wear sleeves that are dislodged are not serviceable.

a) Do a borescope inspection of the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00).

< 1 > If you cannot do the borescope inspection, continue-in-service for five cycles.

2) If the wear sleeves have four interrupted weld design, replace the fuel nozzle:

NOTE: Fuel nozzles that have four interrupted weld design are not serviceable.

a) If you do not replace the fuel nozzle, continue-in-service for five cycles.

(m) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

————— END OF TASK —————

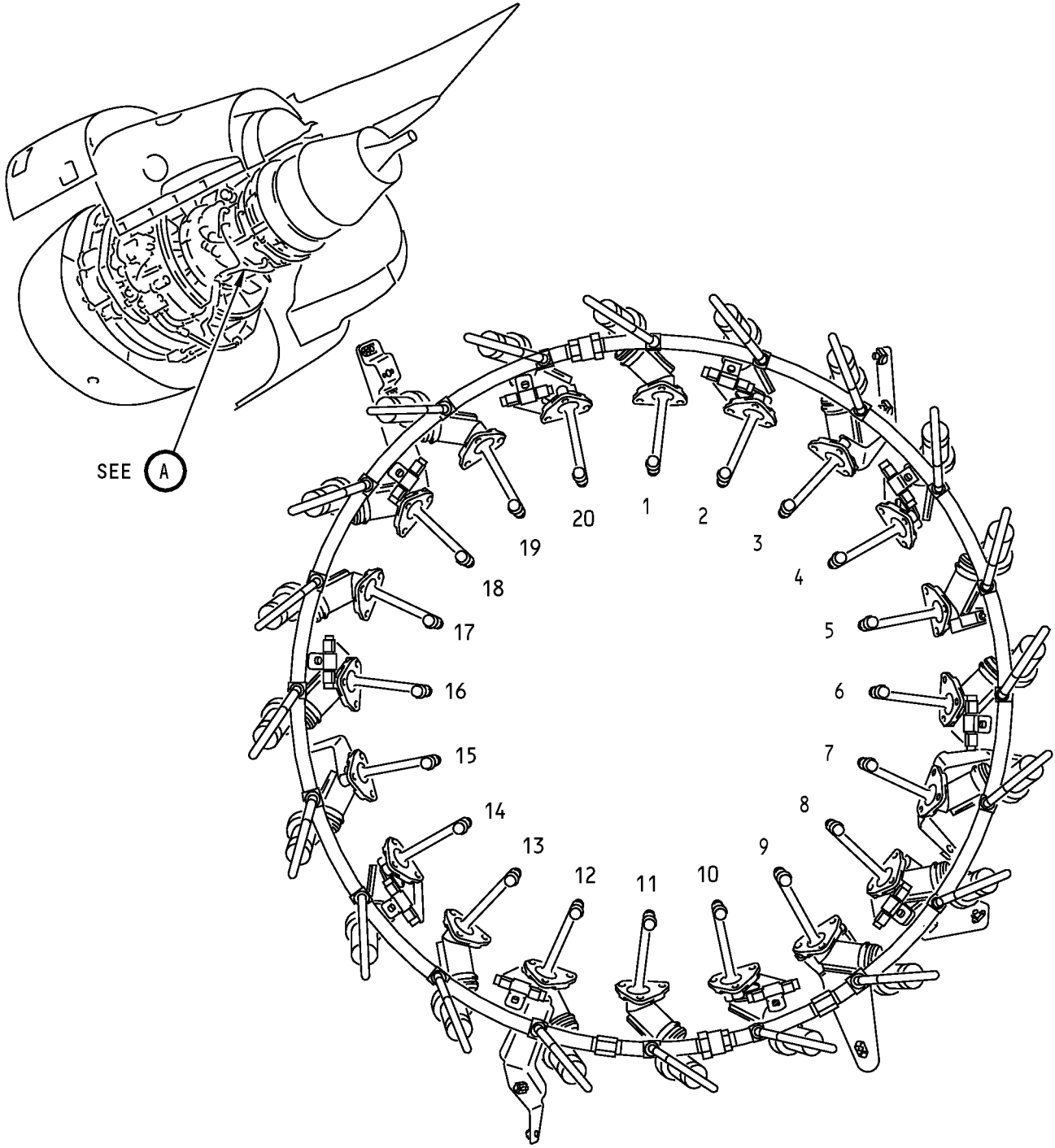
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(VIEW IN THE FORWARD DIRECTION)

A

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Fuel Nozzle Location
Figure 401/73-11-04-990-857-F01

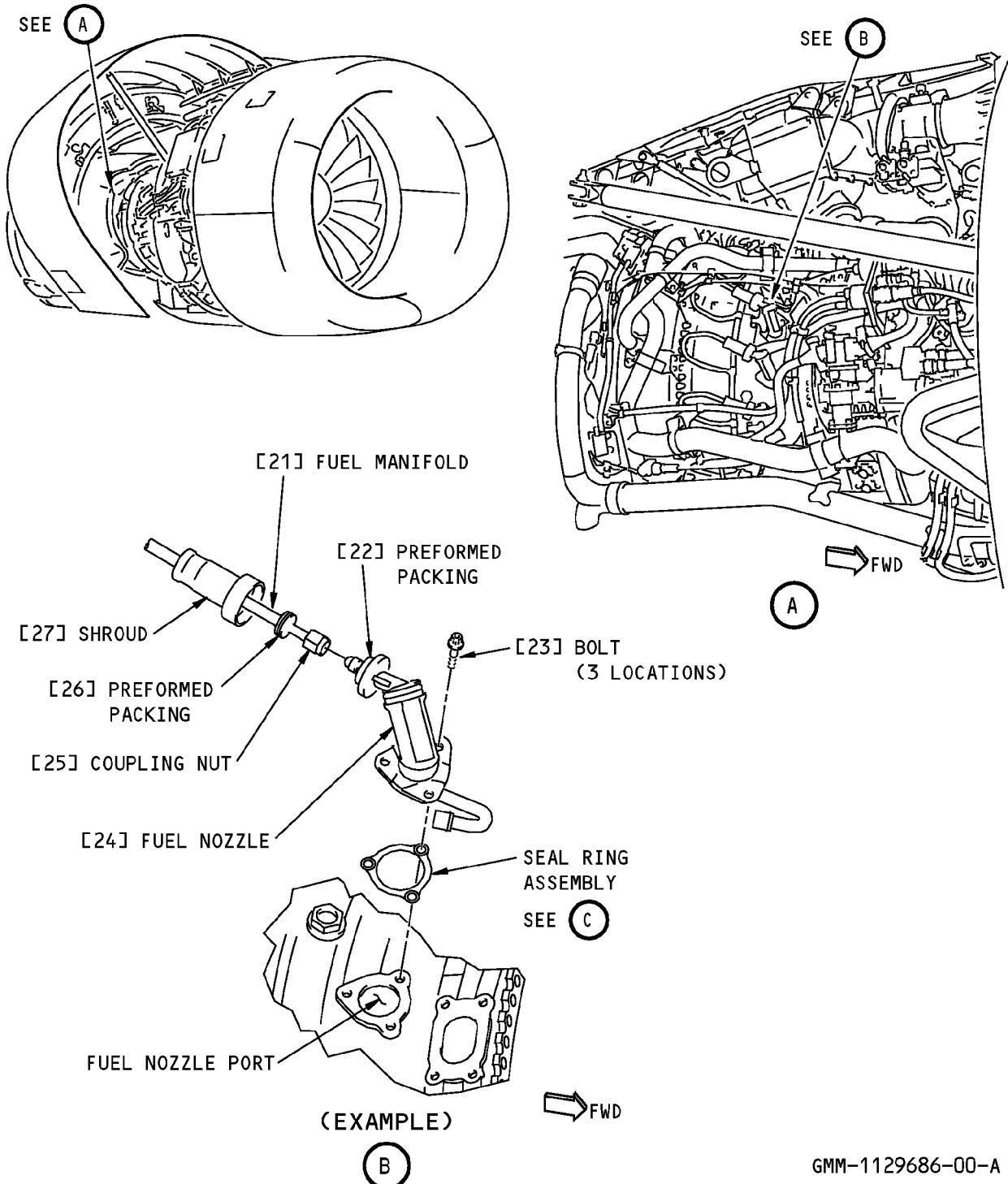
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GMM-1129686-00-A

Fuel Nozzle Installation
Figure 402 (Sheet 1 of 2)/73-11-04-990-858-F01

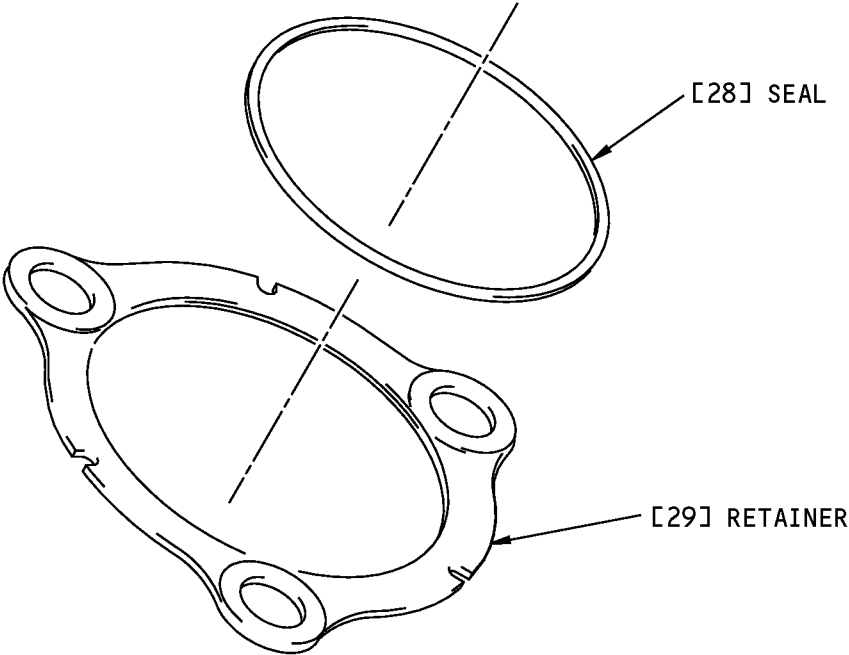
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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SEAL RING ASSEMBLY
(EXAMPLE)



GMM-1129687-00-A

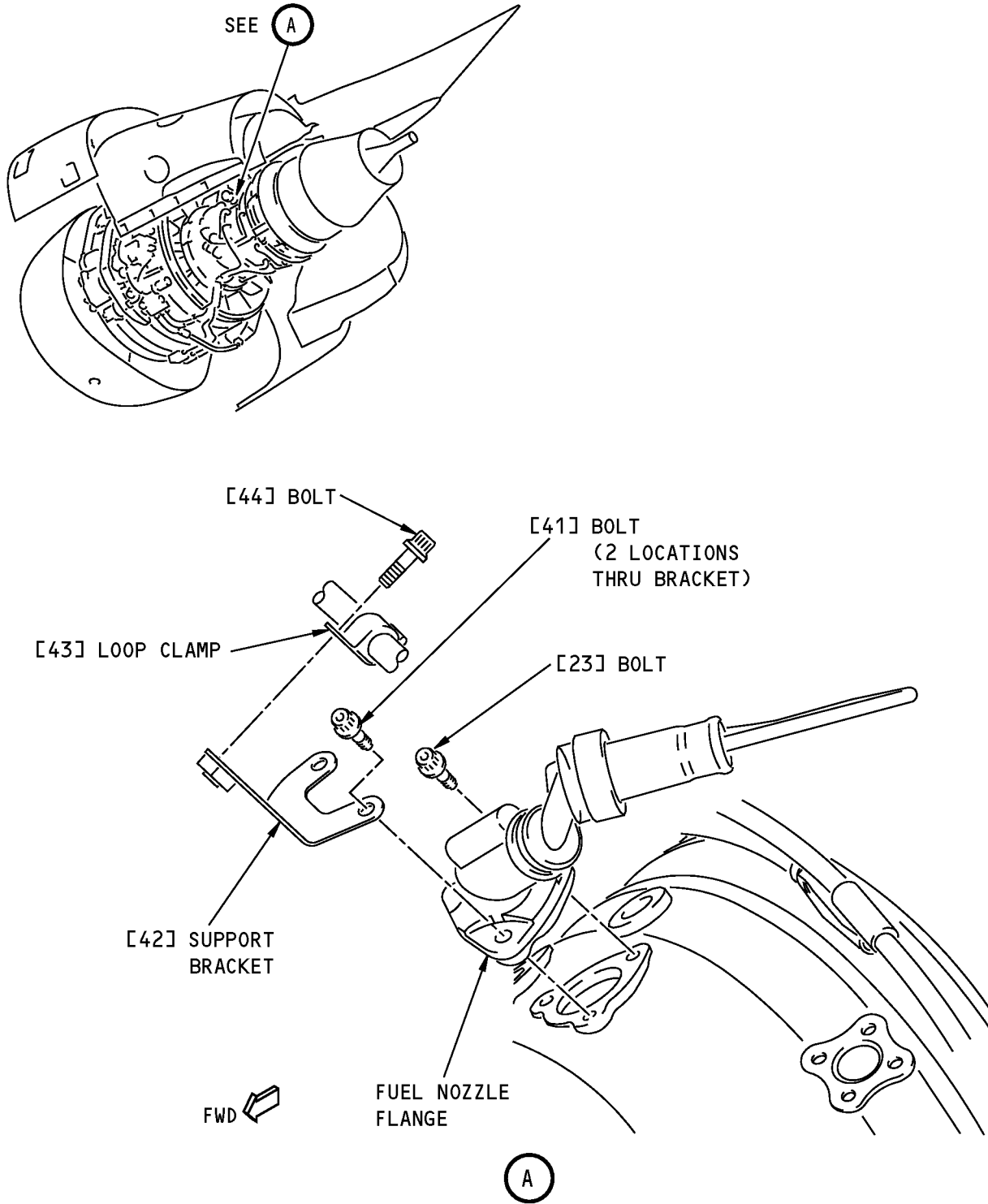
Fuel Nozzle Installation
Figure 402 (Sheet 2 of 2)/73-11-04-990-858-F01

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HAP ALL POST SB CFM56-7B 73-44

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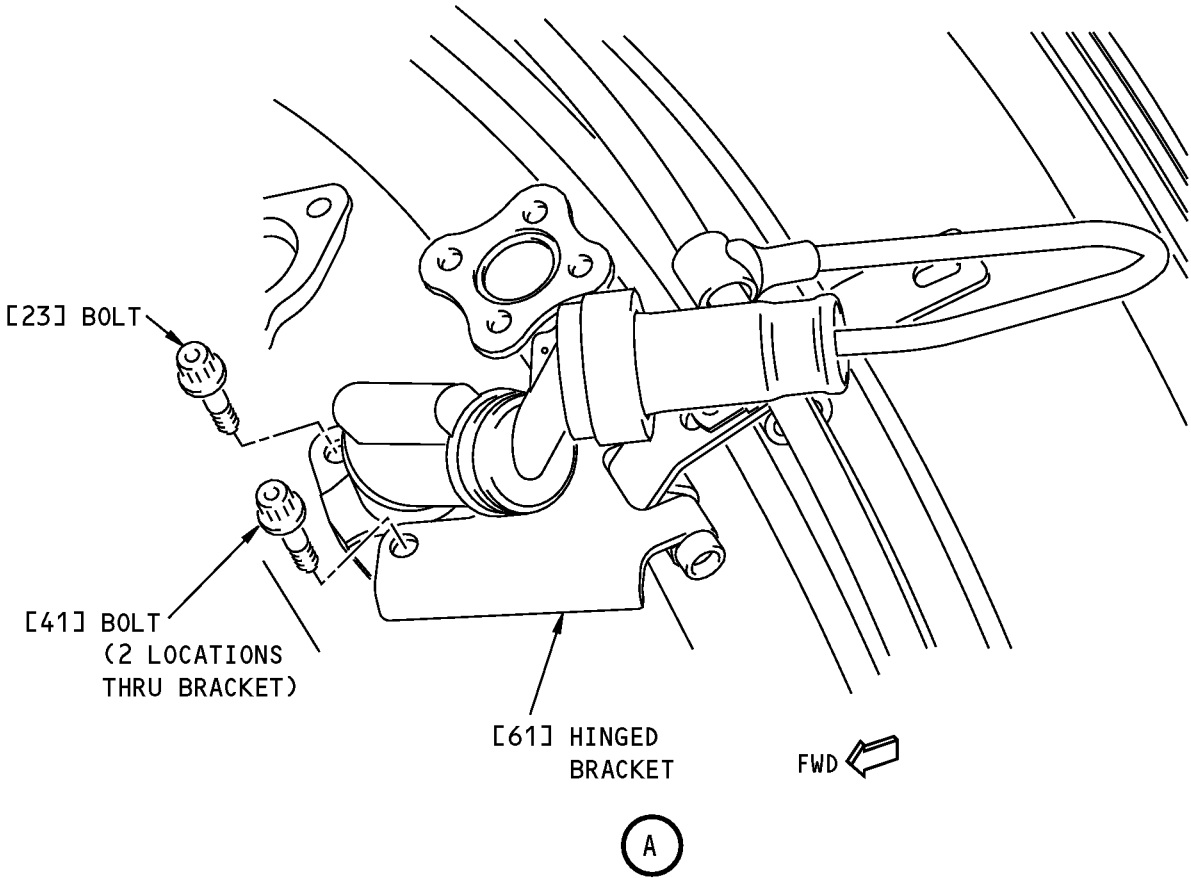
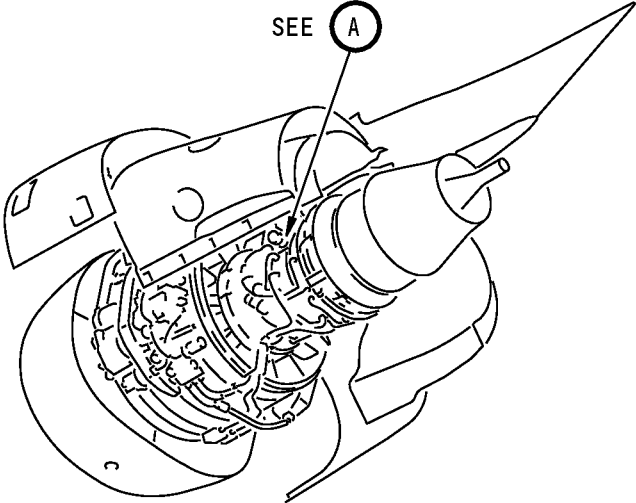
Fuel Nozzle Position 1 and 19 Installation
Figure 403/73-11-04-990-859-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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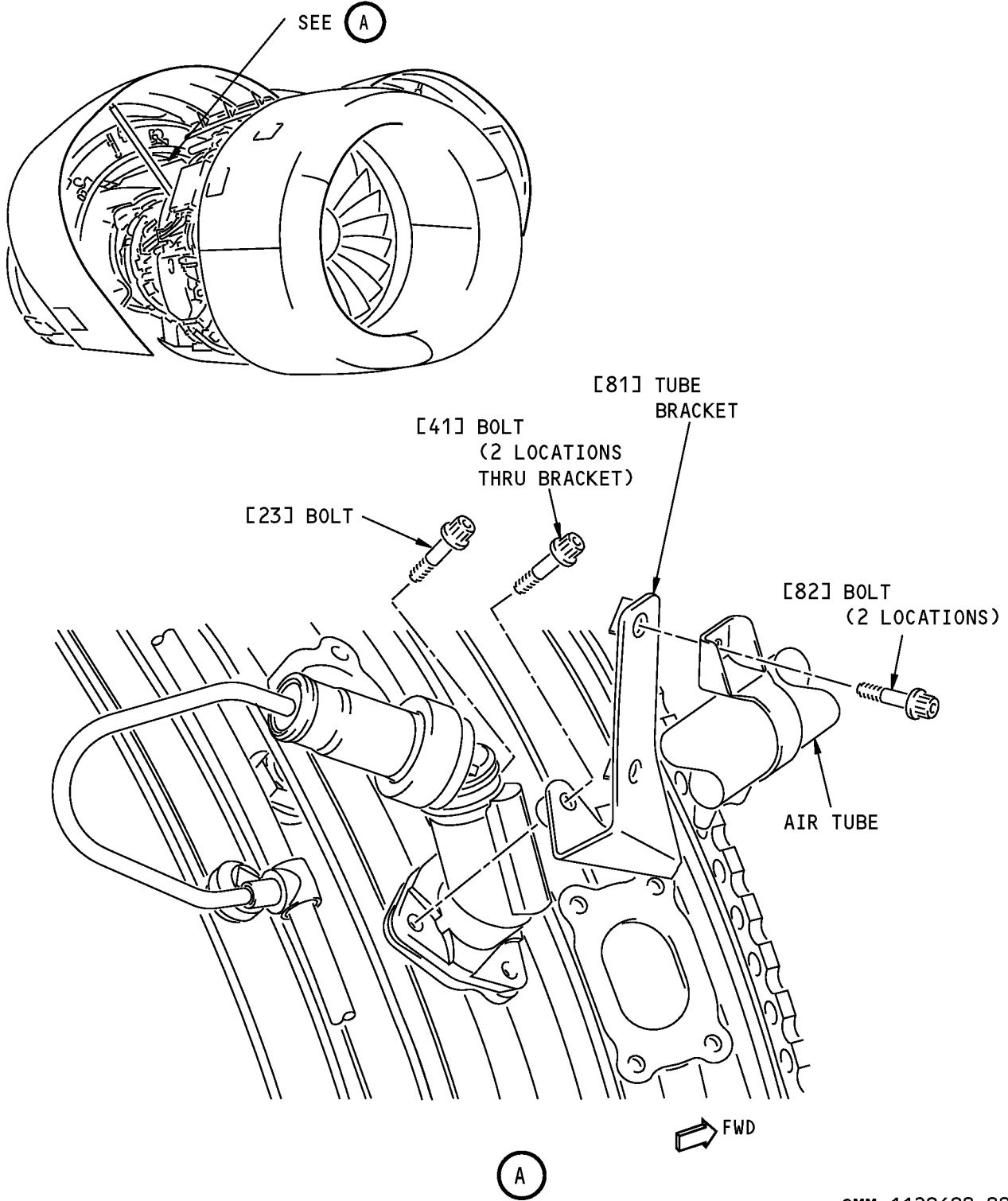
Fuel Nozzle Position 2, 4, 6, 10, 14, 16 and 20 Installation
Figure 404/73-11-04-990-860-F01

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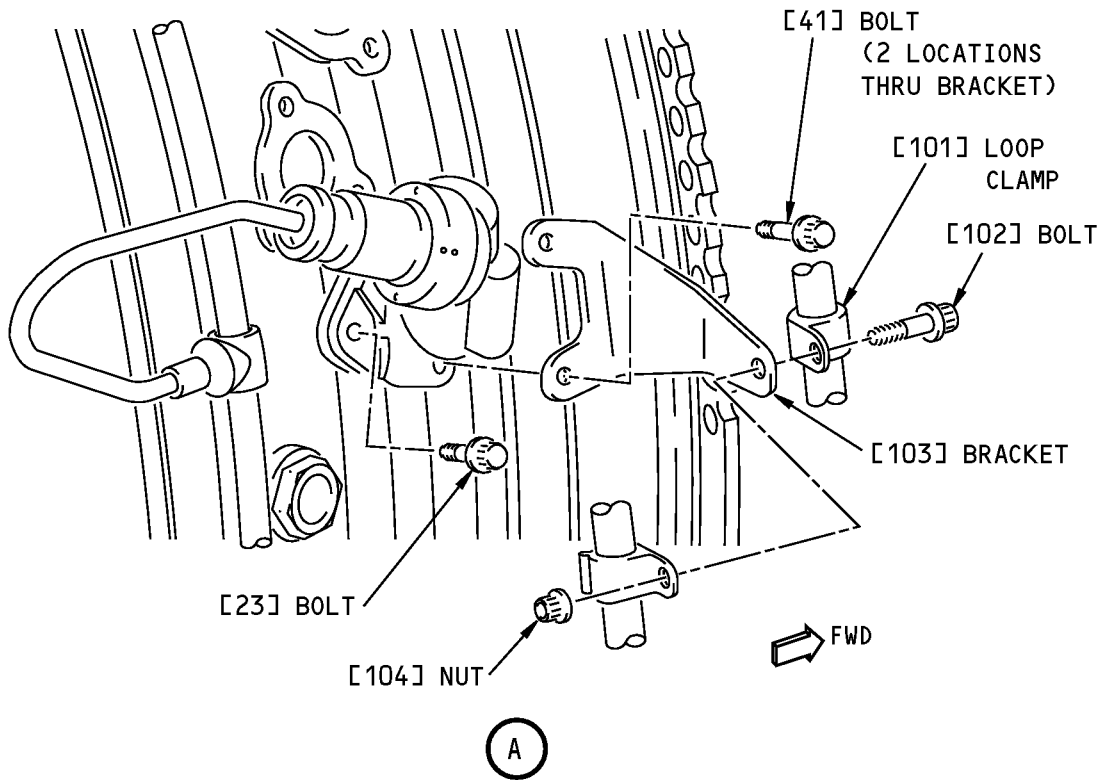
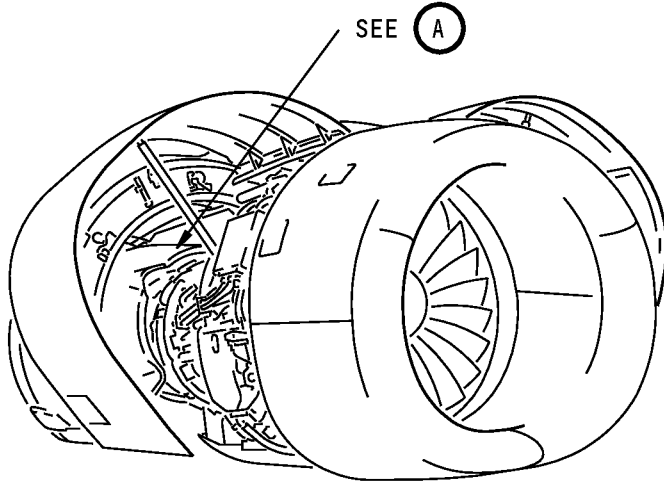
GMM-1129690-00-A

Fuel Nozzle Position 3 Installation
Figure 405/73-11-04-990-861-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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GMM-1129691-00-A

Fuel Nozzle Position 5 Installation
Figure 406/73-11-04-990-862-F01

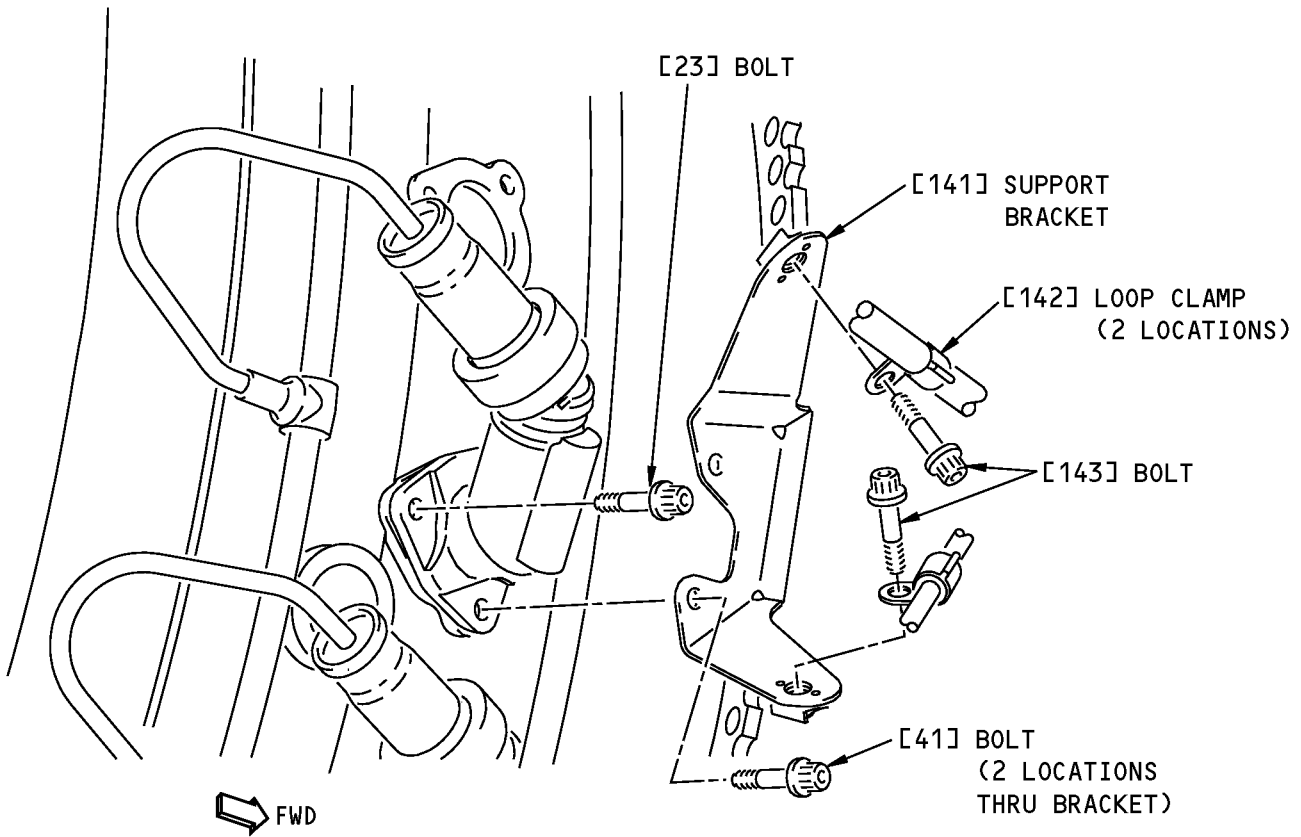
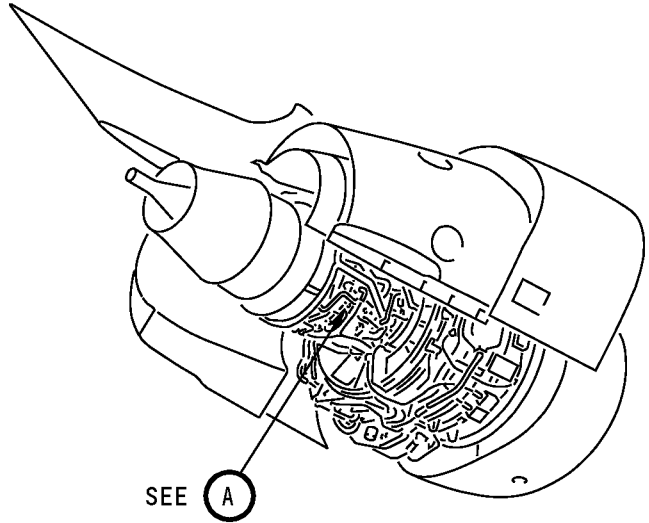
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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GMM-1129693-00-A

Fuel Nozzle Position 7 Installation
Figure 407/73-11-04-990-863-F01

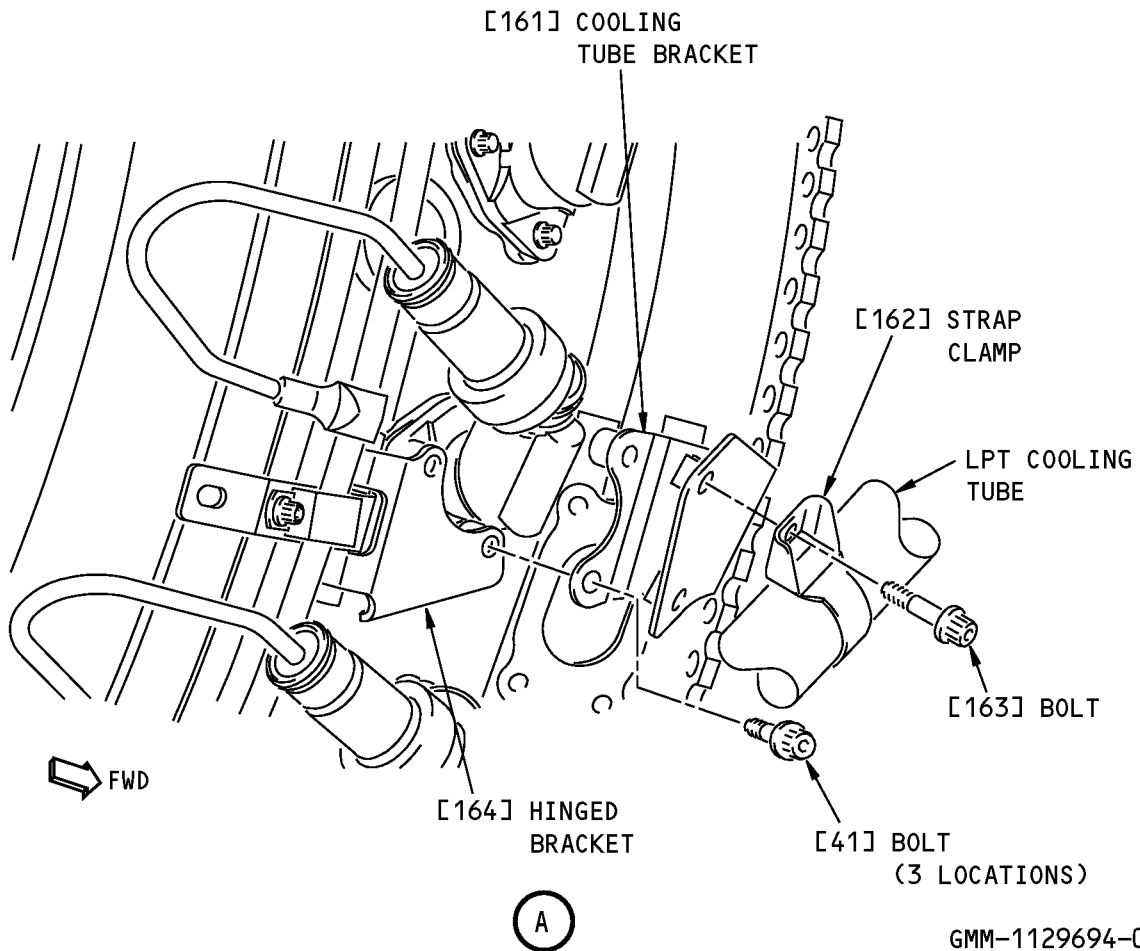
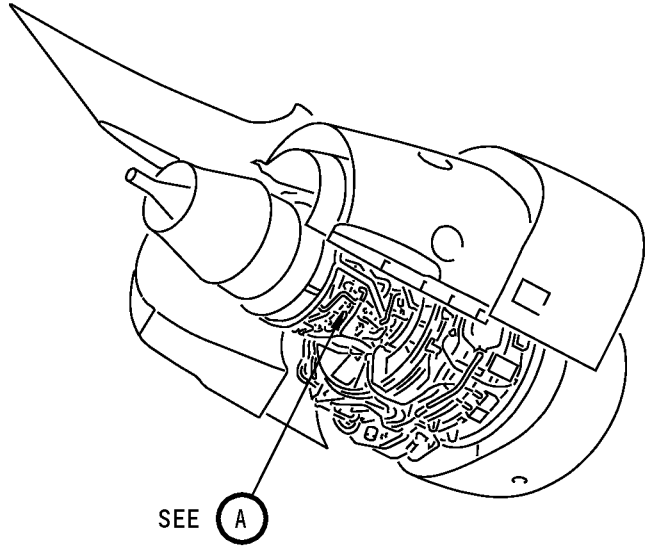
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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Fuel Nozzle Position 8 Installation
Figure 408/73-11-04-990-864-F01

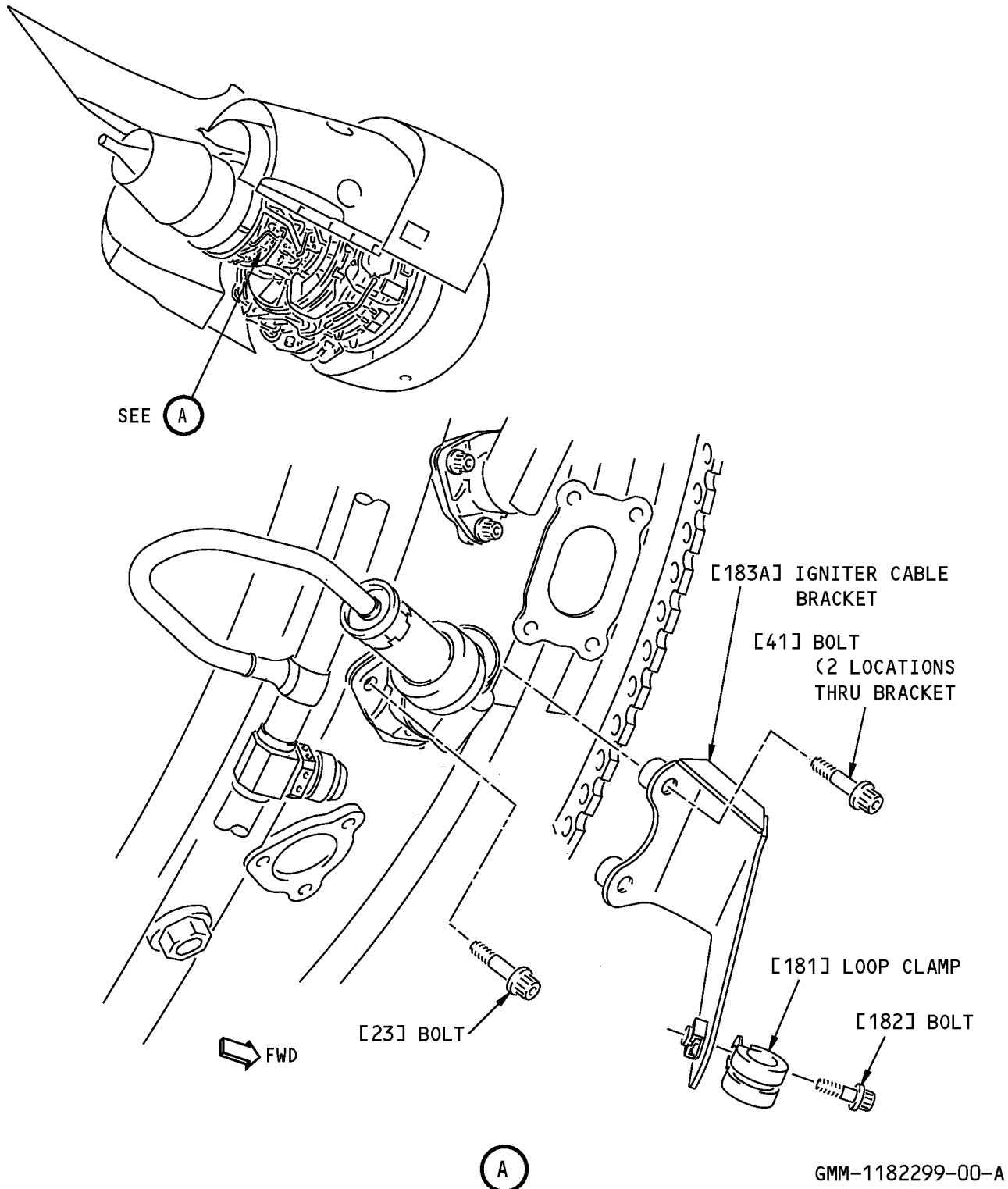
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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Fuel Nozzle Position 9 Installation
Figure 409/73-11-04-990-865-F01

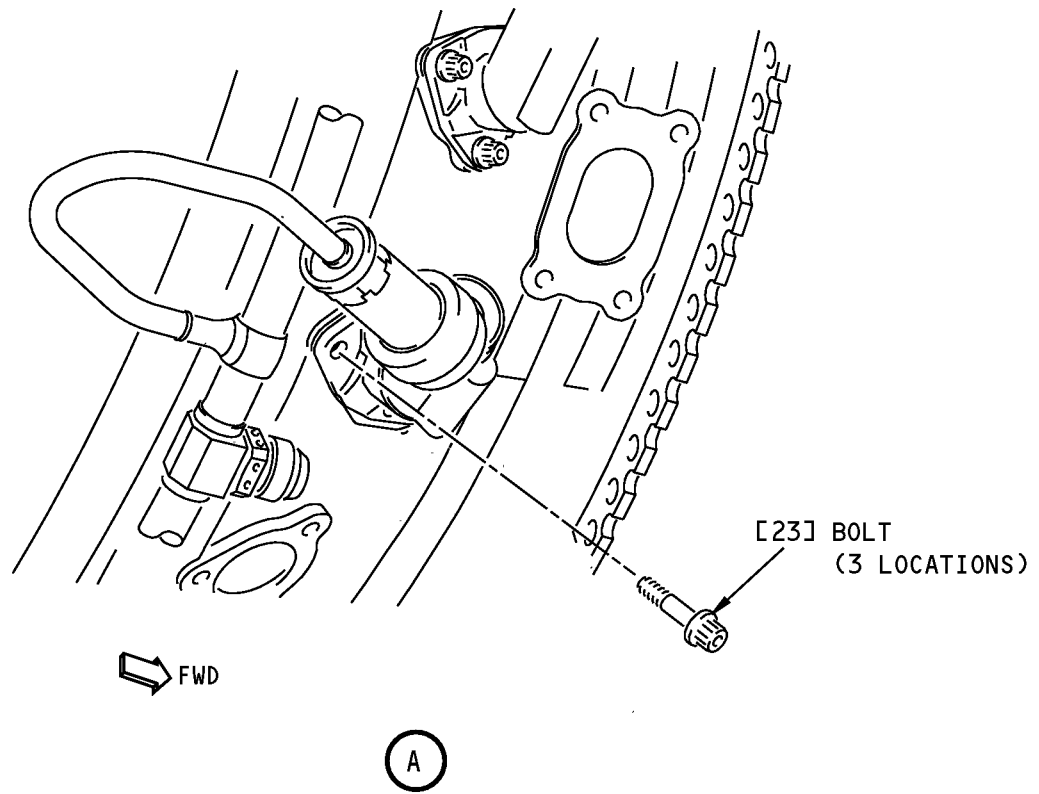
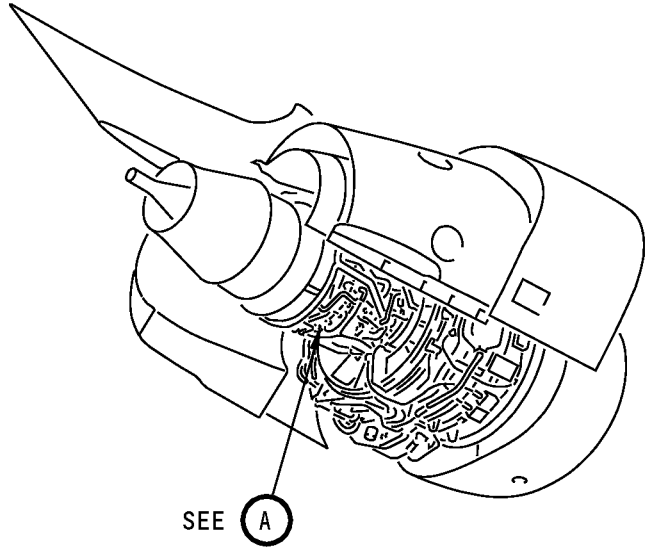
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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GMM-1182300-00-A

Fuel Nozzle Position 11 Installation
Figure 410/73-11-04-990-866-F01

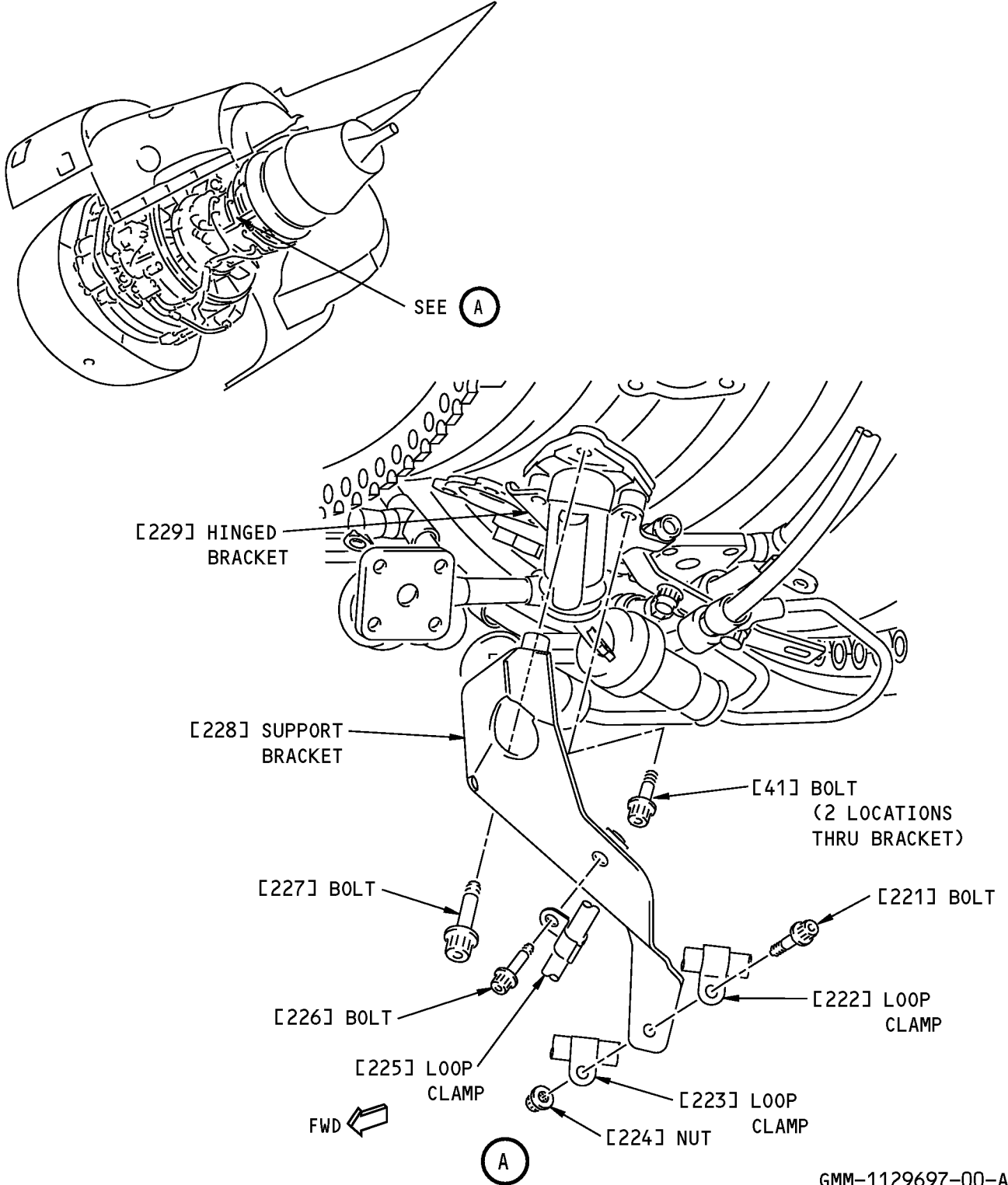
<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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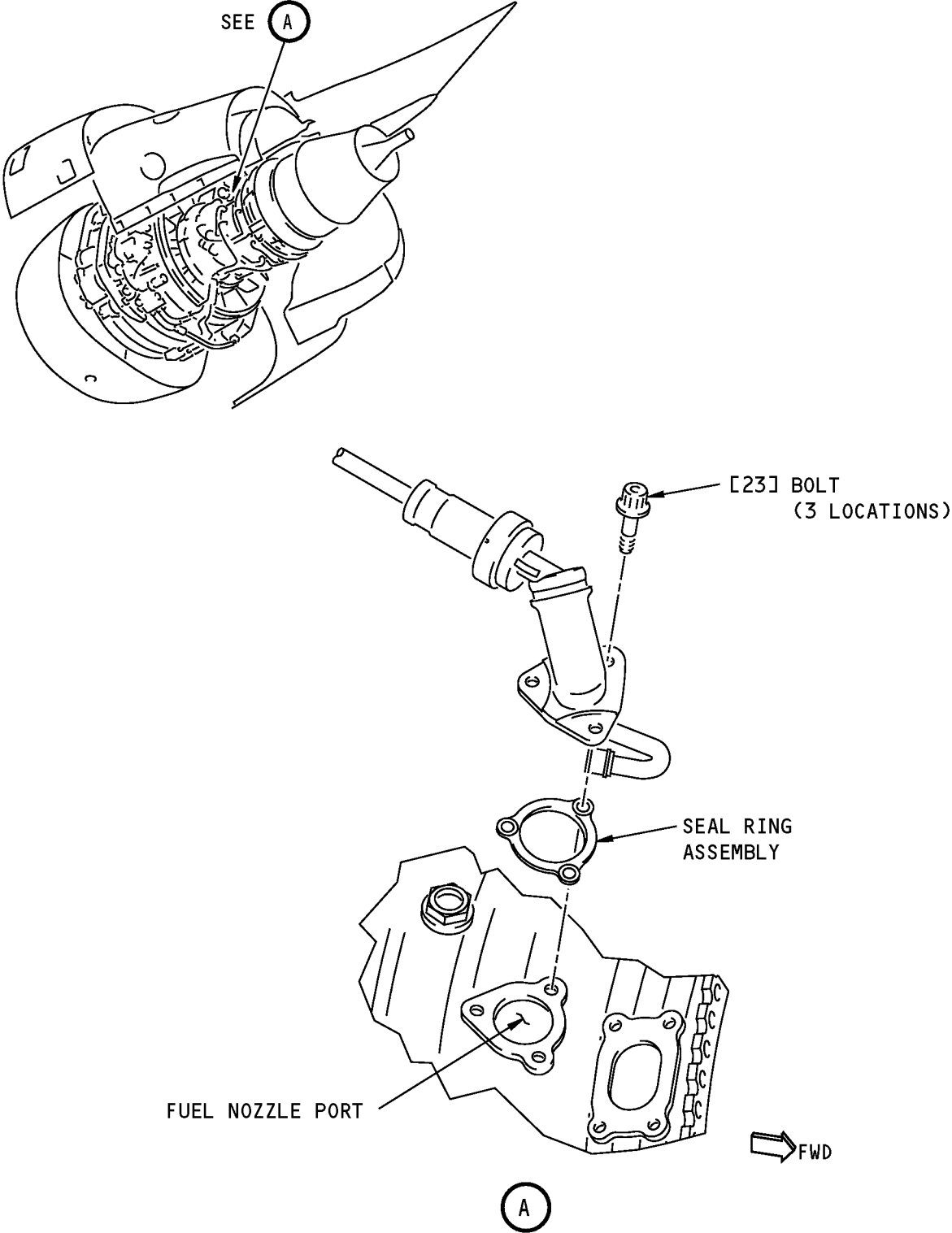
GMM-1129697-00-A

Fuel Nozzle Position 12 Installation
Figure 411/73-11-04-990-867-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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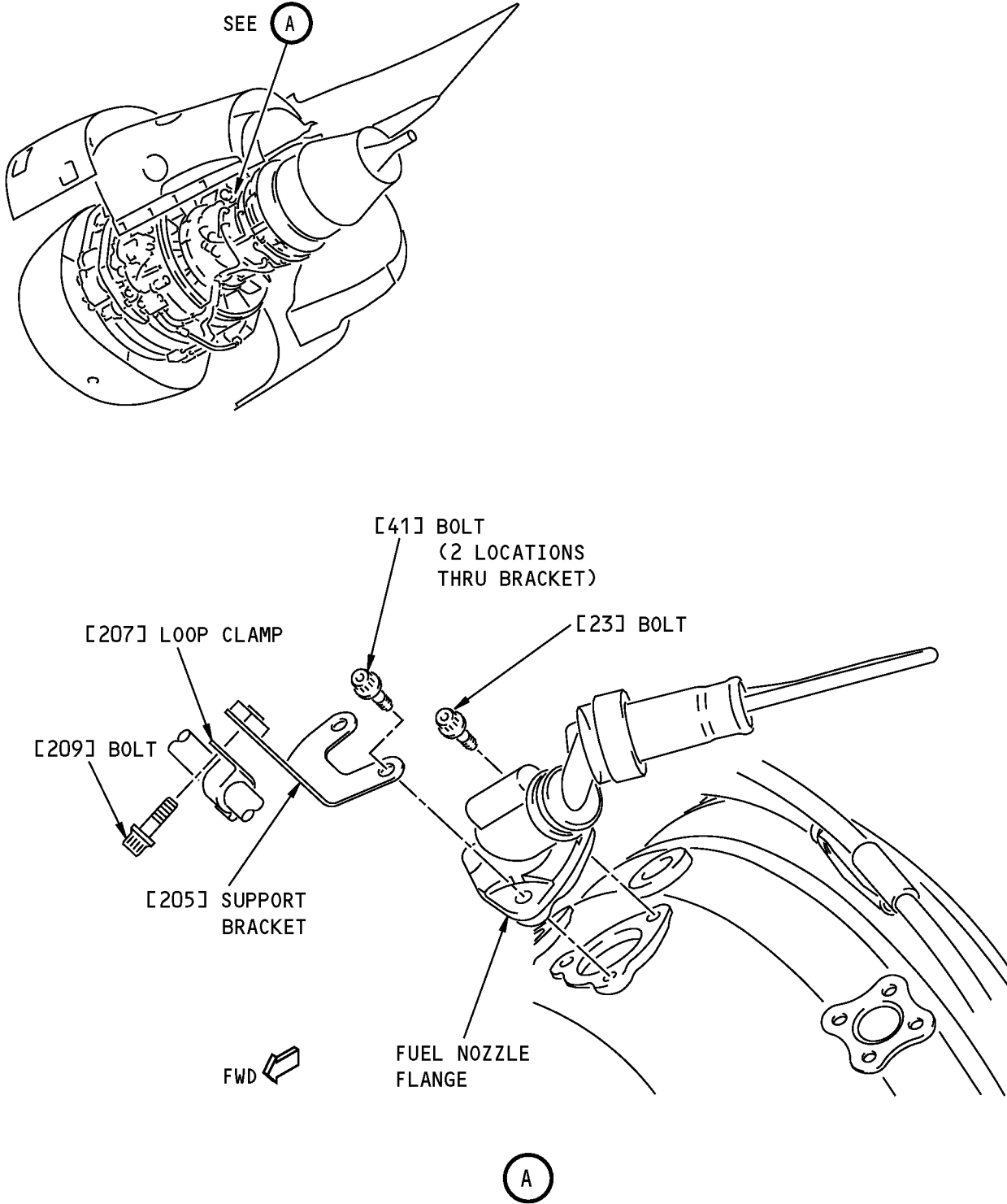
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Fuel Nozzle Position 13 and 17 Installation
Figure 412/73-11-04-990-868-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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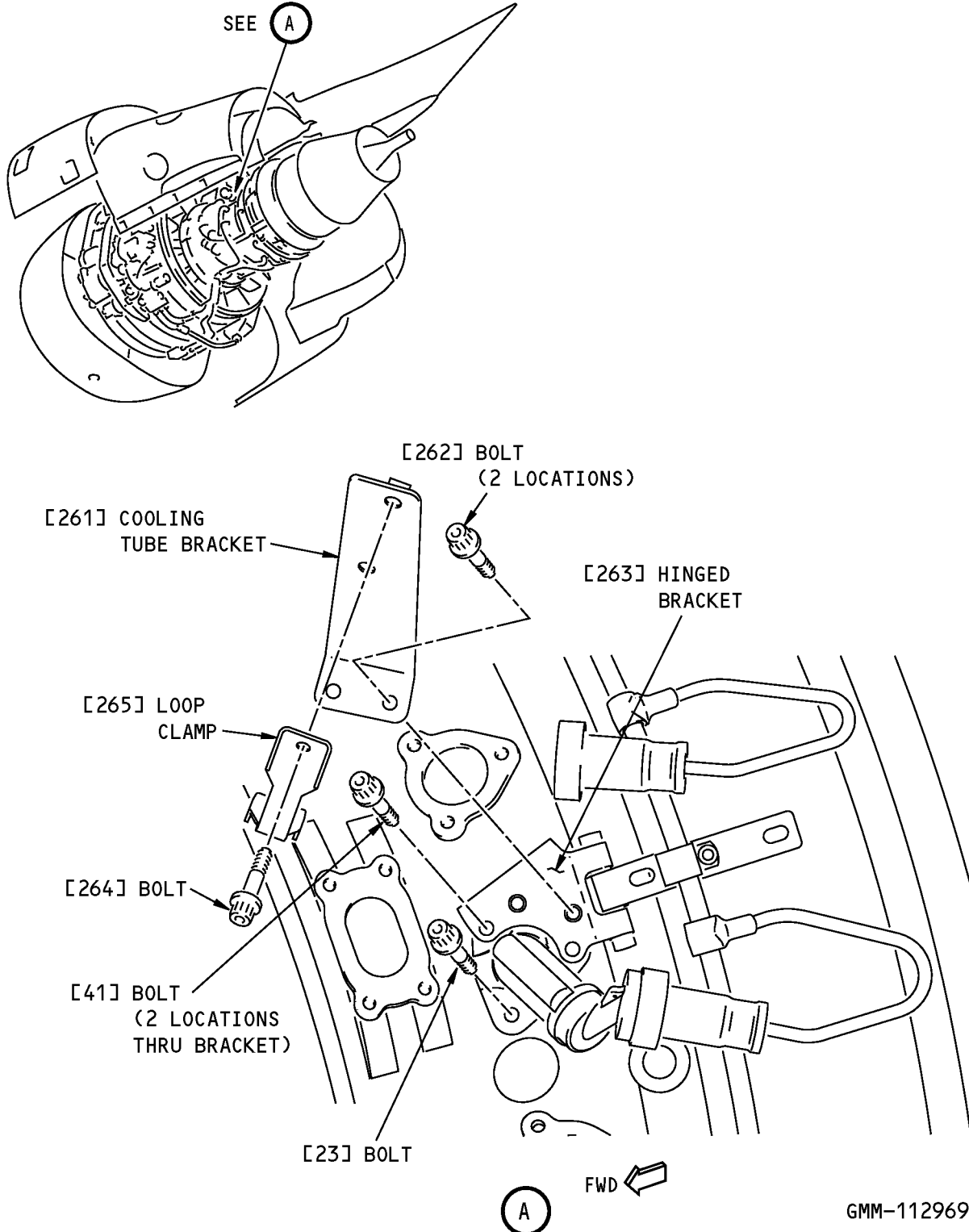
Fuel Nozzle Position 15 Installation
Figure 413/73-11-04-990-869-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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Fuel Nozzle Position 18 Installation
Figure 414/73-11-04-990-870-F01

<p>EFFECTIVITY</p> <p>HAP ALL POST SB CFM56-7B 73-44</p>
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TASK 73-11-04-400-805-F01

3. Fuel Nozzle Installation

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
36-11-03-400-801	Bleed Air Regulator Installation (P/B 401)
36-12-01-400-801	Bleed Air Precooler Reconnection (After Engine Component Installation) (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-11-04-200-801-F00	Fuel Nozzle and Fuel Manifold Leak Check (P/B 601)
73-21-07-400-801-F00	T3 Sensor Installation (P/B 401)
75-21-01-400-801-F00	HPTACC Valve Installation (P/B 401)
75-22-04-400-802-F00	LPTACC Valve Installation (P/B 401)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00672 [CP5070]	Grease - Petrolatum	VV-P-236
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G02495 [CP8002]	Lockwire - 0.032 inch Dia., AMS 5689	NASM20995~ C32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
22	Preformed packing	73-11-04-01-120	HAP 001-013, 015-026, 028-040, 042
		73-11-04-04-110	HAP ALL
24	Fuel nozzle	73-11-04-01-085	HAP 001-013, 015-026, 028-040, 042
		73-11-04-04-085	HAP ALL
26	Preformed packing	73-11-04-01-115	HAP 001-013, 015-026, 028-040, 042
		73-11-04-04-105	HAP ALL
28	Seal	73-11-04-01-110	HAP 001-013, 015-026, 028-040, 042
		73-11-04-04-100	HAP ALL

D. Location Zones

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

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AIRCRAFT MAINTENANCE MANUAL**E. Fuel Nozzle Installation**

SUBTASK 73-11-04-420-049-F01

- (1) Do these steps to install the fuel nozzle at position 1 (Figure 401, Figure 402, Figure 403):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Put the support bracket [42] in its correct position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Install the bolt [44] that holds the loop clamp [43] to the support bracket [42].
 - 1) Tighten the bolt [44] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (k) Do the applicable steps in the T3 Sensor Installation task to re-connect the T3 line to the combustion case and to the support bracket (TASK 73-21-07-400-801-F00).

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- (l) Do this task: Bleed Air Precooler Reconnection (After Engine Component Installation), TASK 36-12-01-400-801.

SUBTASK 73-11-04-420-050-F01

- (2) Do these steps to install the fuel nozzle at position 2 (Figure 401, Figure 402, Figure 404):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (j) Do the applicable steps in the T3 Sensor Installation task to re-connect the T3 line to the combustion case and to the support bracket (TASK 73-21-07-400-801-F00).
 - (k) Do this task: Bleed Air Precooler Reconnection (After Engine Component Installation), TASK 36-12-01-400-801.

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SUBTASK 73-11-04-420-051-F01

- (3) Do these steps to install the fuel nozzle at position 3 (Figure 401, Figure 402, Figure 405):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the tube bracket [81] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters)
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Tighten the bolts [82] on the tube bracket to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (k) Reconnect the LPT cooling air tube to the combustion case and compressor case as follows:
 - 1) Make sure that the metal ring seal is in place.
 - 2) Apply grease, D00601 [CP2101] to the bolts

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- 3) Tighten the bolts to 62-68 lb in. (7.0-7.7 N.m) and safety with lockwire, G02345 [CP8001] or lockwire, G02495 [CP8002].

SUBTASK 73-11-04-420-061-F00

- (4) Do these steps to install the fuel nozzle at position 4 (Figure 401, Figure 402, Figure 404):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (j) Do the applicable steps in the HPTACC Valve installation task to re-connect the 9th stage inlet tube to the combustion case and the HPTACC valve (TASK 75-21-01-400-801-F00).
 - 1) Install the two bolts on the EGT harness bracket.

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SUBTASK 73-11-04-420-052-F01

- (5) Do these steps to install the fuel nozzle at position 5 (Figure 401, Figure 402, Figure 406):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
 - (f) Put the bracket [103] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Use the bolt [102] and nut [104] to connect the loop clamp [101] to the bracket [103].
 - 1) Tighten the nut [104] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (k) Do the applicable steps in the HPTACC Valve installation task to re-connect the 9th stage inlet tube to the combustion case and the HPTACC valve (TASK 75-21-01-400-801-F00).
 - 1) Install the two bolts on the EGT harness bracket.

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SUBTASK 73-11-04-420-062-F00

- (6) Do these steps to install the fuel nozzle at position 6 (Figure 401, Figure 402, Figure 404):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (j) Do the applicable steps in the HPTACC Valve installation task to re-connect the TCC Air Manifold (TASK 75-21-01-400-801-F00).

SUBTASK 73-11-04-420-053-F01

- (7) Do these steps to attach the fuel nozzle at position No. 7 to the combustion case (Figure 401, Figure 402, Figure 407):

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- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
- (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
- (f) Put the support bracket [141] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [143].
- (i) Install the bolts [143] to attach the loop clamps [142] to the support bracket [141].
 - 1) Tighten the bolts [143] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (j) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (k) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (l) Do the applicable steps in the LPTACC Valve installation task to install the LPT duct (TASK 75-22-04-400-802-F00).

SUBTASK 73-11-04-420-054-F01

- (8) Do these steps to install the fuel nozzle at position 8 (Figure 401, Figure 402, Figure 408):

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- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
- (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [41].
- (f) Move the hinged bracket [164] into its position on the fuel nozzle flange.
- (g) Put the cooling tube bracket [161] on the fuel nozzle flange and hinged bracket [164].
- (h) Install the bolts [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (i) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolt [163].
- (j) Put the strap clamp [162] on the LPT cooling tube.
- (k) Use the bolts [163] to connect the strap clamp [162] to the cooling tube bracket [161].
 - 1) Tighten the bolts to 62-68 pound-inches (7.0-7.7 Newton meters).
- (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-055-F01

- (9) Do these steps to install the fuel nozzle at position 9 (Figure 401, Figure 402, Figure 409):

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- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
- (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
- (f) Put the igniter cable bracket [183A] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolt [182].
- (i) Use the bolt [182] to connect the loop clamp [181] to the igniter cable bracket [183A].
 - 1) Tighten the bolt [182] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (j) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (k) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-063-F00

- (10) Do these steps to install the fuel nozzle at position 10 (Figure 401, Figure 402, Figure 404):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

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- (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
- (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-056-F01

- (11) Do these steps to install the fuel nozzle at position 11 (Figure 401, Figure 402, Figure 410):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].

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- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23].
- (f) Install the three bolts [23] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (g) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (h) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-057-F01

- (12) Do these steps to install the fuel nozzle at position 12 (Figure 401, Figure 402, Figure 411):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [41] and [227].

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- (f) Move the hinged bracket [229] into its position on the fuel nozzle flange.
- (g) Put the support bracket [228] into its position on the hinged bracket [229] and the fuel nozzle flange.
- (h) Install the bolts [41] and [227] in the fuel nozzle flange.
 - 1) Tighten the bolts [41] and [227] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (i) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [221] and [226].
- (j) Use bolt [226] to install the loop clamp [225] to the support bracket [228].
 - 1) Tighten the bolt [226] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (k) Use the bolt [221] and nut [224] to install the loop clamps [222] and [223] to the support bracket [228].
 - 1) Tighten the nut [224] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-058-F01

- (13) Do these steps to install the fuel nozzle at position 13 (Figure 401, Figure 402, Figure 412):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.

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- 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23].
- (f) Install the bolts [23] in the fuel nozzle flange.
 - 1) Tighten the bolts [23] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (g) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (h) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-064-F00

- (14) Do these steps to install the fuel nozzle at position 14 (Figure 401, Figure 402, Figure 404):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.

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- (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-059-F01

- (15) Do these steps to install the fuel nozzle at position 15 (Figure 401, Figure 402, Figure 413):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Put the PS3 signal tube support bracket [205] in its correct position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Install the bolt [209] that holds the loop clamp [207] to the support bracket [205].
 - 1) Tighten the bolt [209] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).

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- 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (j) Attach the shroud [27] to the fuel nozzle [24]:
- 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-065-F00

- (16) Do these steps to install the fuel nozzle at position 16 (Figure 401, Figure 402, Figure 404):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].

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- (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (j) Connect the PS3 line to the combustion case, and to the two PS3 brackets closest to the combustion case.
 - 1) Apply grease, D00601 [CP2101] to all tube coupling threads and bolt threads.
 - 2) Tighten the PS3 line connection to 137-152 lb. in. (1.5-17.2 N.m) and safety with lockwire, G02345 [CP8001] or lockwire, G02495 [CP8002].

SUBTASK 73-11-04-420-066-F00

- (17) Do these steps to install the fuel nozzle [24] at position 17 (Figure 401, Figure 402, Figure 412):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23].
 - (f) Install the bolts [23] in the fuel nozzle flange.
 - 1) Tighten the bolts [23] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (g) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (h) Attach the shroud [27] to the fuel nozzle [24]:

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- 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
- 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
- 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
- 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-060-F01

- (18) Do these steps to install the fuel nozzle at position 18 (Figure 401, Figure 402, Figure 414):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [263] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts [23] and [41] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [262] and [264].
 - (i) Put the cooling tube bracket [261] in its position on the hinged bracket [263].
 - (j) Use the bolts [262] to install the cooling tube bracket [261] to the hinged bracket [263].
 - 1) Tighten the bolts [262] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (k) Use the bolt [264] to install the loop clamp [265] to the cooling tube bracket [261].
 - 1) Tighten the bolt [264] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].

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- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (n) Do the applicable steps in the bleed air regulator task to turn the bleed air regulator valve body back into position (TASK 36-11-03-400-801).
 - 1) Connect the two B-nuts of the bleed regulator valve, and tighten the two clamps on bleed regulator valve tube.

SUBTASK 73-11-04-420-067-F00

- (19) Do these steps to install the fuel nozzle at position 19 (Figure 401, Figure 402, Figure 403):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Put the support bracket [42] in its correct position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Install the bolt [44] that holds the loop clamp [43] to the support bracket [42].
 - 1) Tighten the bolt [44] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].

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- (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (k) Reconnect the LPT cooling air tube to the combustion case and compressor case as follows:
 - 1) Make sure that the metal ring seal is in place.
 - 2) Apply grease, D00601 [CP2101] to the bolts
 - 3) Tighten the bolts to 62-68 lb in. (7.0-7.7 N.m) and safety with lockwire, G02345 [CP8001] or lockwire, G02495 [CP8002].

SUBTASK 73-11-04-420-068-F00

- (20) Do these steps to install the fuel nozzle at position 20 (Figure 401, Figure 402, Figure 404):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the new preformed packing [22] and preformed packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].

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- (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the preformed packing [22] and preformed packing [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (j) Do the applicable steps in the T3 Sensor Installation task to re-connect the T3 line to the combustion case and to the support bracket (TASK 73-21-07-400-801-F00).
- (k) Reconnect the LPT cooling air tube to the combustion case and compressor case as follows:
 - 1) Make sure that the metal ring seal is in place.
 - 2) Apply grease, D00601 [CP2101] to the bolts
 - 3) Tighten the bolts to 62-68 lb in. (7.0-7.7 N.m) and safety with lockwire, G02345 [CP8001] or lockwire, G02495 [CP8002].

F. Fuel nozzle leak check

SUBTASK 73-11-04-200-003-F01

- (1) Do this task: Fuel Nozzle and Fuel Manifold Leak Check, TASK 73-11-04-200-801-F00.

G. Put the Airplane in a Serviceable Condition

SUBTASK 73-11-04-860-006-F01

- (1) Do these steps to put the airplane in a serviceable condition:
 - (a) Do these steps to put the airplane in a serviceable condition:
 - 1) Remove the DO-NOT-OPERATE tag from the engine start lever.

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

- 2) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.
- 3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
- (b) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

H. Fuel Nozzle Installation Test

SUBTASK 73-11-04-700-005-F01

- (1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— END OF TASK —————

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FUEL NOZZLES/BSV INSTALLED - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel nozzles, SAC engines with the BSV installed.
- (2) The installation of the fuel nozzles, SAC engines with the BSV installed.
- (3) SAC engines with the BSV installed have two fuel manifolds, one going to every other fuel nozzle. With the BSV removed the engine has only one fuel manifold.

TASK 73-11-04-000-804-F02**2. Fuel Nozzle Removal**

A. General

- (1) The engine has twenty fuel nozzles.
 - (a) To remove the fuel nozzle from positions 1, 2, and 20, it is necessary to partially remove the bleed air precooler.
 - (b) To remove the nozzle from position 7, you must remove the LPT duct.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
36-12-01-800-801	Bleed Air Precooler Disconnection (For Engine Component Removal) (P/B 201)
72-00-00-200-805-F00	Borescope Inspection of the Combustion Chamber (P/B 601)
75-22-04-000-802-F00	LPTACC Valve Removal (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-11-04-840-011-F02

- (1) Make sure that the engine fuel valves are closed:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the start levers are in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable start lever.
 - (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

SUBTASK 73-11-04-840-012-F02

- (2) Prepare the airplane for the procedure:
 - (a) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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- 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

E. Fuel Nozzle Removal

SUBTASK 73-11-04-020-038-F02

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

- (1) Do these steps to remove the fuel nozzle [24] from position 1 or 19 (Figure 401, Figure 402, Figure 403):
 - (a) For fuel nozzle [24] in position 1, do this task: Bleed Air Precooler Disconnection (For Engine Component Removal), TASK 36-12-01-800-801.
 - (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (c) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (d) Remove the bolt [44] that holds the loop clamp [43] to the support bracket [42].
 - (e) Remove the three bolts [23] and [41] from the fuel nozzle flange.
 - 1) Remove the support bracket [42].
 - (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
 - (h) Remove and discard the preformed packing [22] from the fuel nozzle [24].
 - (i) Remove and discard the preformed packing [26] from the fuel manifold [21].
 - (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.

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- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-039-F02

- (2) Do these steps to remove the fuel nozzles from positions 2, 4, 6, 10, 14, 16, or 20 (Figure 401, Figure 402, Figure 404):
- (a) For fuel nozzle position 2 or 20, do this task: Bleed Air Precooler Disconnection (For Engine Component Removal), TASK 36-12-01-800-801.
 - (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (c) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (e) Move the hinged bracket [61] away from the flange of the fuel nozzle.
 - (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
 - (h) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
 - (i) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
 - (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
 - (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-040-F02

- (3) Remove the fuel nozzle from position 3 (Figure 401, Figure 402, Figure 405):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (d) Loosen the bolts [82] on the tube bracket [81].

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- 1) Move the tube bracket [81] away from the fuel nozzle.
- (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
- (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (g) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (h) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-041-F02

- (4) Remove the fuel nozzle from position 5 (Figure 401, Figure 402, Figure 406):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - (d) Remove the nut [104] and bolt [102] that hold the loop clamp [101] to the bracket [103].
 - 1) Remove the bracket [103].
 - (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
 - (g) Remove the packing [22] from the fuel nozzle [24].

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- 1) Discard the packing [22].
- (h) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-042-F02

(5) Do these steps to remove the fuel nozzle from position 7 (Figure 401, Figure 402, Figure 407):

- (a) Do the applicable steps in the LPTACC Valve Removal task to remove the LPT duct (TASK 75-22-04-000-802-F00).

NOTE: You must remove the LPT duct to get access to the number 7 fuel nozzle.

- 1) Make sure that you install protective covers on the LPT duct, the LPT manifold, and the LPTACC valve.
- (b) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (c) Disconnect the coupling nut [25] of the fuel manifold [21] from the fuel nozzle [24].
- (d) Remove the bolts [143] that hold the loop clamps [142] to the support bracket [141].
- (e) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [141].
- (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (h) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (i) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.

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- b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
- 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-043-F02

(6) Remove the fuel nozzle from position 8 (Figure 401, Figure 402, Figure 408):

- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (c) Remove the bolts [163] that holds the strap clamp [162] to the cooling tube bracket [161].
 - 1) Remove the strap clamp [162].
- (d) Remove the three bolts [41] from the flange of the fuel nozzle.
 - 1) Remove the cooling tube bracket [161].
- (e) Move the hinged bracket [164] away from the fuel nozzle.
- (f) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

- (g) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (h) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (i) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (j) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (k) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-044-F02

(7) Do these steps to remove the fuel nozzle from position 9 (Figure 401, Figure 402, Figure 409):

- (a) Disconnect the shroud [27] from the fuel nozzle [24].

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- 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (c) Remove the bolt [182] that holds the loop clamp [181] to the fuel supply bracket [183].
- (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - 1) Remove the fuel supply bracket [183].
- (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
- (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (g) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (h) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-045-F02

(8) Remove the fuel nozzle from position 11 (Figure 401, Figure 402, Figure 410):

- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access the coupling nut [25] on the fuel manifold [21].
- (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
- (c) Remove the bolt [201] that holds the loop clamp [202] to the support bracket [203].
- (d) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [203].
- (e) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.

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- (f) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (g) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (h) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (i) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (j) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-046-F02

- (9) Remove the fuel nozzle from position 12 (Figure 401, Figure 402, Figure 411):
 - (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the nut [224] and bolt [221] that hold the loop clamps [222] and [223] to the support bracket [228].
 - (d) Remove the bolt [226] that holds the loop clamp [225] to the support bracket [228].
 - (e) Remove the three bolts [41] and [227] from the flange of the fuel nozzle.
 - 1) Remove the support bracket [228].
 - (f) Move the hinged bracket [229] away from the fuel nozzle.
 - (g) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
 - (i) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
 - (j) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
 - (k) Visually examine the fuel nozzle wear sleeves.

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- 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
- 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-047-F02

- (10) Remove the fuel nozzle from position 13, 15, or 17 (Figure 401, Figure 402, Figure 412):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].
 - (c) Remove the three bolts [23] from the flange of the fuel nozzle.
 - (d) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
 - (e) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
 - (f) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
 - (g) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
 - (h) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
 - (i) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

SUBTASK 73-11-04-020-048-F02

- (11) Remove the fuel nozzle from position 18 (Figure 401, Figure 402, Figure 413):
- (a) Disconnect the shroud [27] from the fuel nozzle [24].
 - 1) Move the shroud [27] to get access to the coupling nut [25] on the fuel manifold [21].
 - (b) Disconnect the coupling nut [25] from the fuel nozzle [24].

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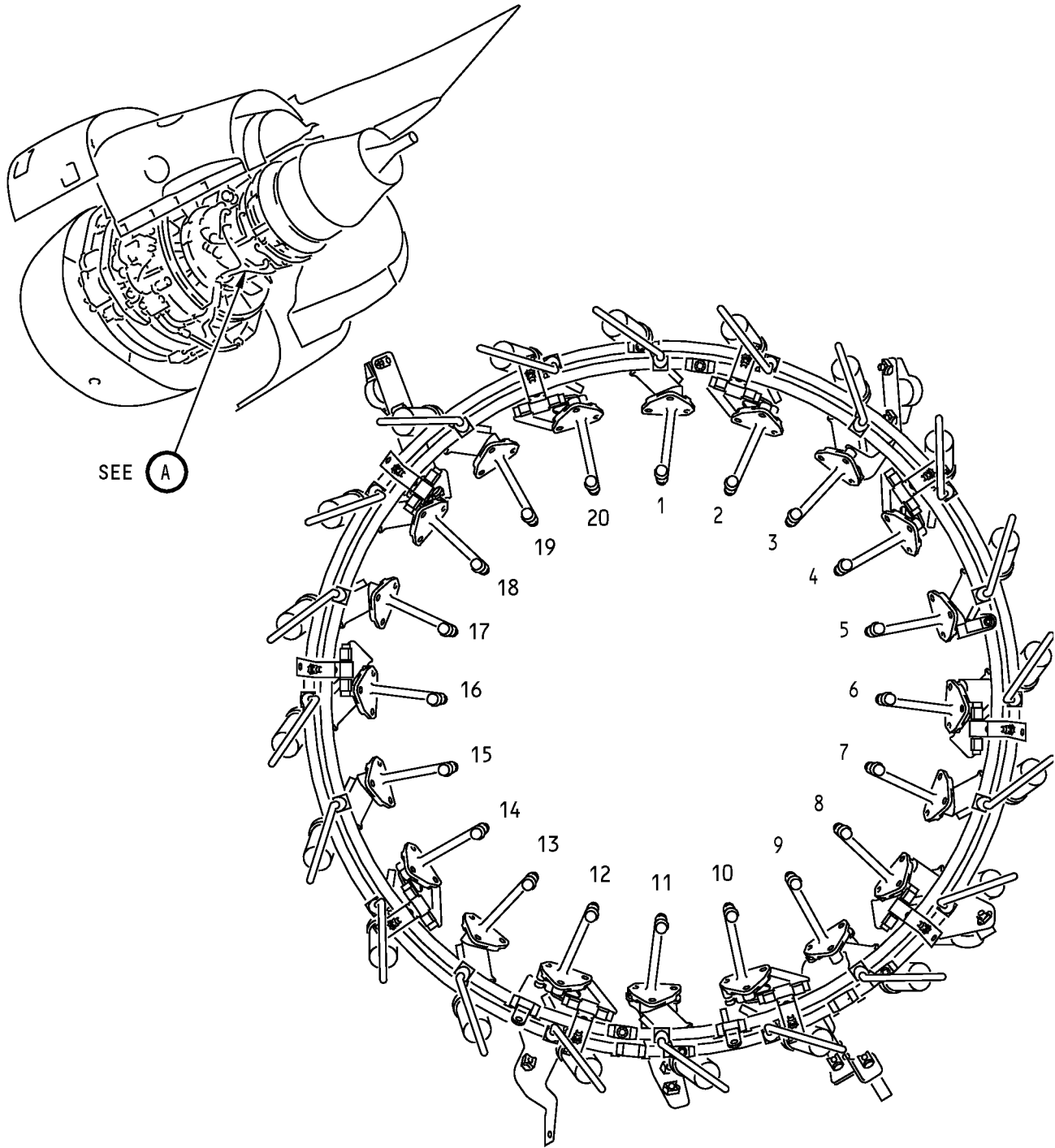
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- (c) Remove the bolt [264] that holds the loop clamp [265] to the cooling tube bracket [261].
- (d) Remove the two bolts [262] that hold the cooling tube bracket [261] to the hinged bracket [263].
 - 1) Remove the cooling tube bracket [261].
- (e) Remove the three bolts [23] and [41] from the flange of the fuel nozzle.
- (f) Move the hinged bracket [263] away from the fuel nozzle.
- (g) Do these steps to remove the fuel nozzle from the combustion case:
 - 1) Move the fuel nozzle forward to disengage the fuel nozzle tip from the combustion chamber.
 - 2) Remove the fuel nozzle.

NOTE: You must turn the fuel nozzle 180 degrees clockwise as you remove it from the engine. The tip of the nozzle will point forward as it comes out of the engine.
- (h) Remove the seal [28] and retainer [29] assembly from the fuel nozzle port on the combustion case.
 - 1) Remove and discard the seal [28].
- (i) Remove the packing [22] from the fuel nozzle [24].
 - 1) Discard the packing [22].
- (j) Remove the packing [26] from the fuel manifold [21].
 - 1) Discard the packing [26].
- (k) Visually examine the fuel nozzle wear sleeves.
 - 1) If the wear sleeves are dislodged, they are not serviceable.
 - a) Replace the fuel nozzles.
 - b) Use a borescope to examine the combustion chamber for downstream damage (TASK 72-00-00-200-805-F00) or continue-in-service for five (5) cycles.
 - 2) If the wear sleeves have four (4) interrupted weld design, they are not serviceable.
 - a) Replace the fuel nozzles or continue-in-service for five (5) cycles.
- (l) Install protective covers on the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

————— **END OF TASK** —————

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SEE (A)

(VIEW IN THE FORWARD DIRECTION)

(A)

GMM-1129685-00-A

Fuel Nozzle Location
Figure 401/73-11-04-990-844-F02

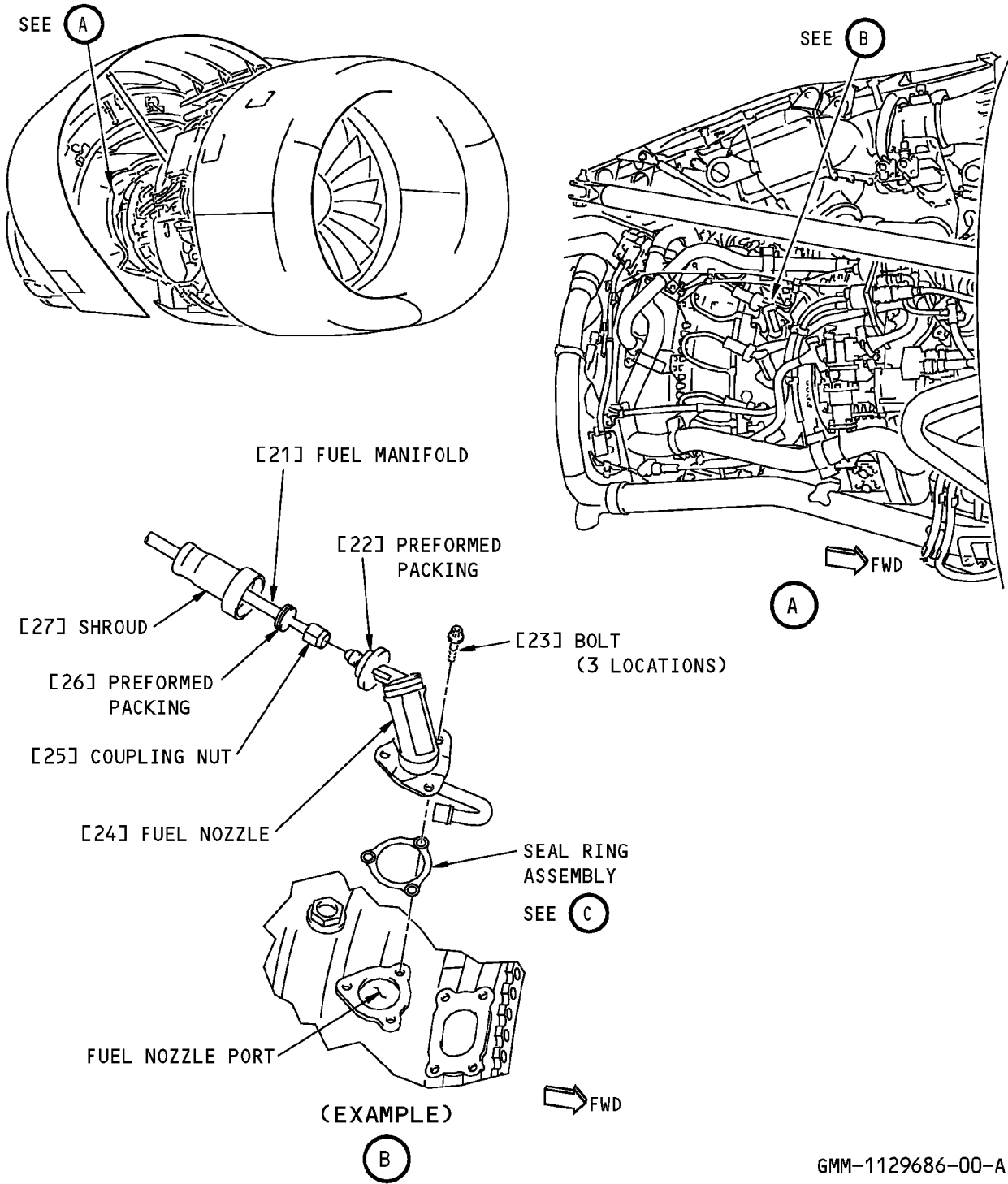
<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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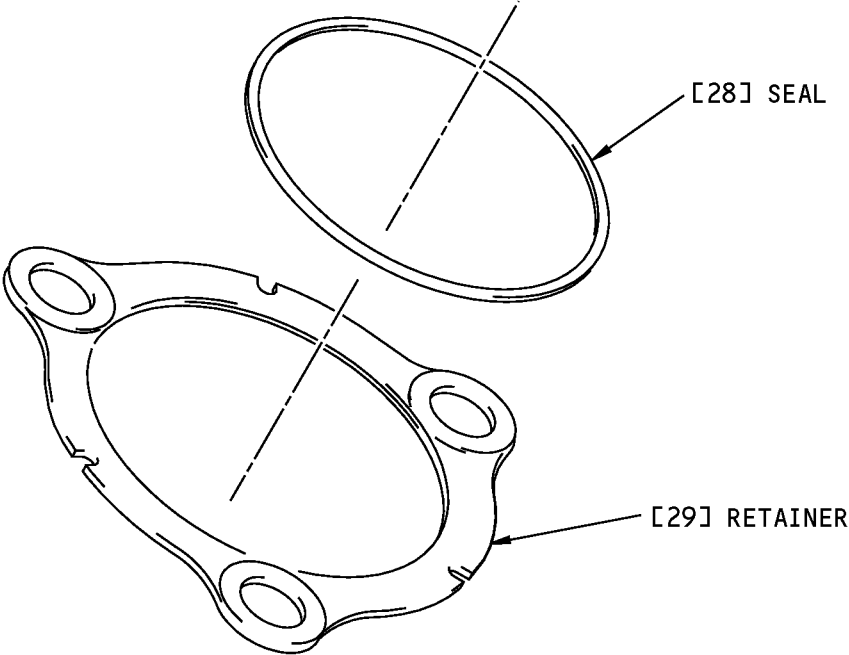
GMM-1129686-00-A

Fuel Nozzle Installation
Figure 402 (Sheet 1 of 2)/73-11-04-990-845-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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SEAL RING ASSEMBLY
(EXAMPLE)



GMM-1129687-00-A

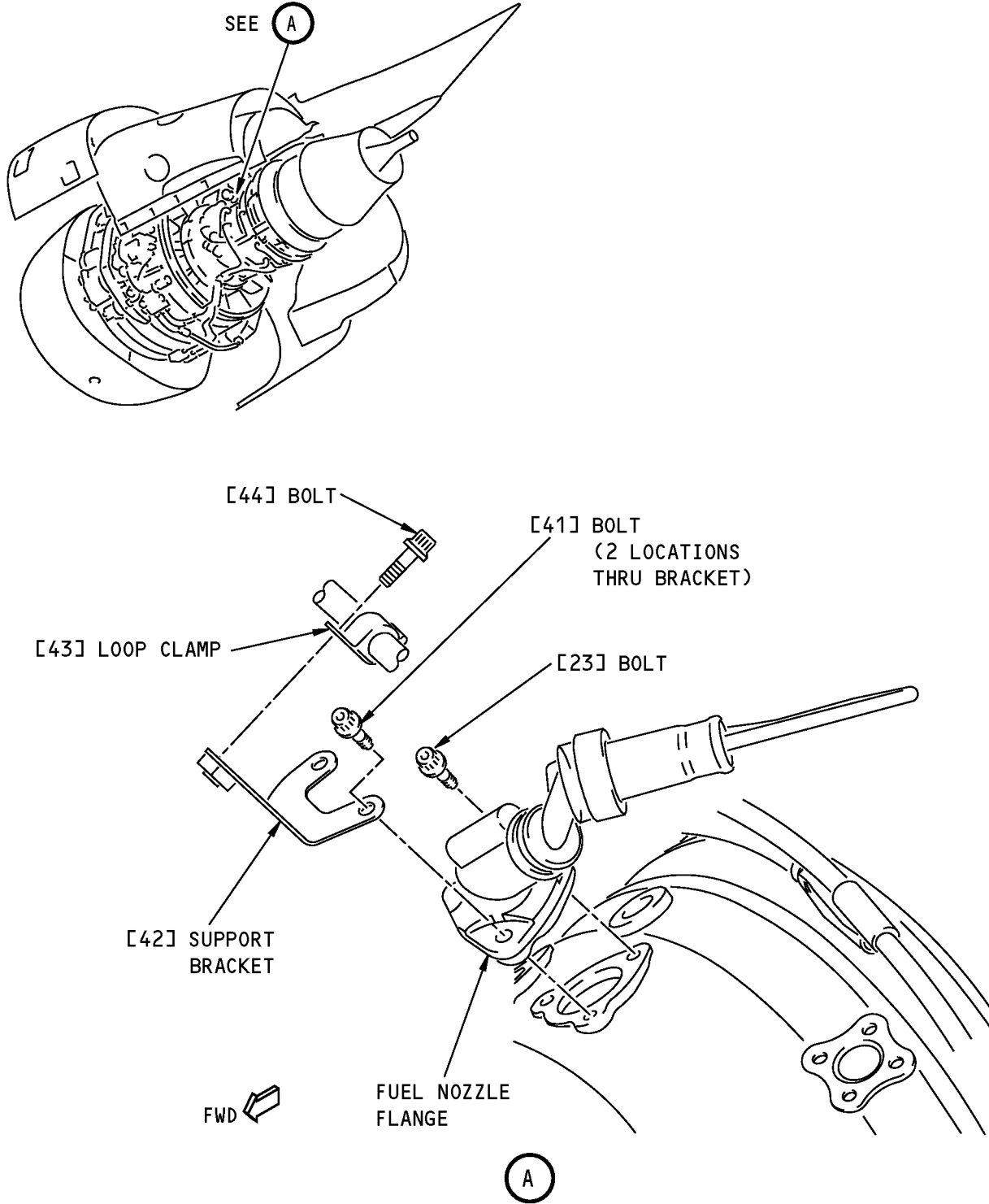
Fuel Nozzle Installation
Figure 402 (Sheet 2 of 2)/73-11-04-990-845-F02

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GMM-1129688-00-A

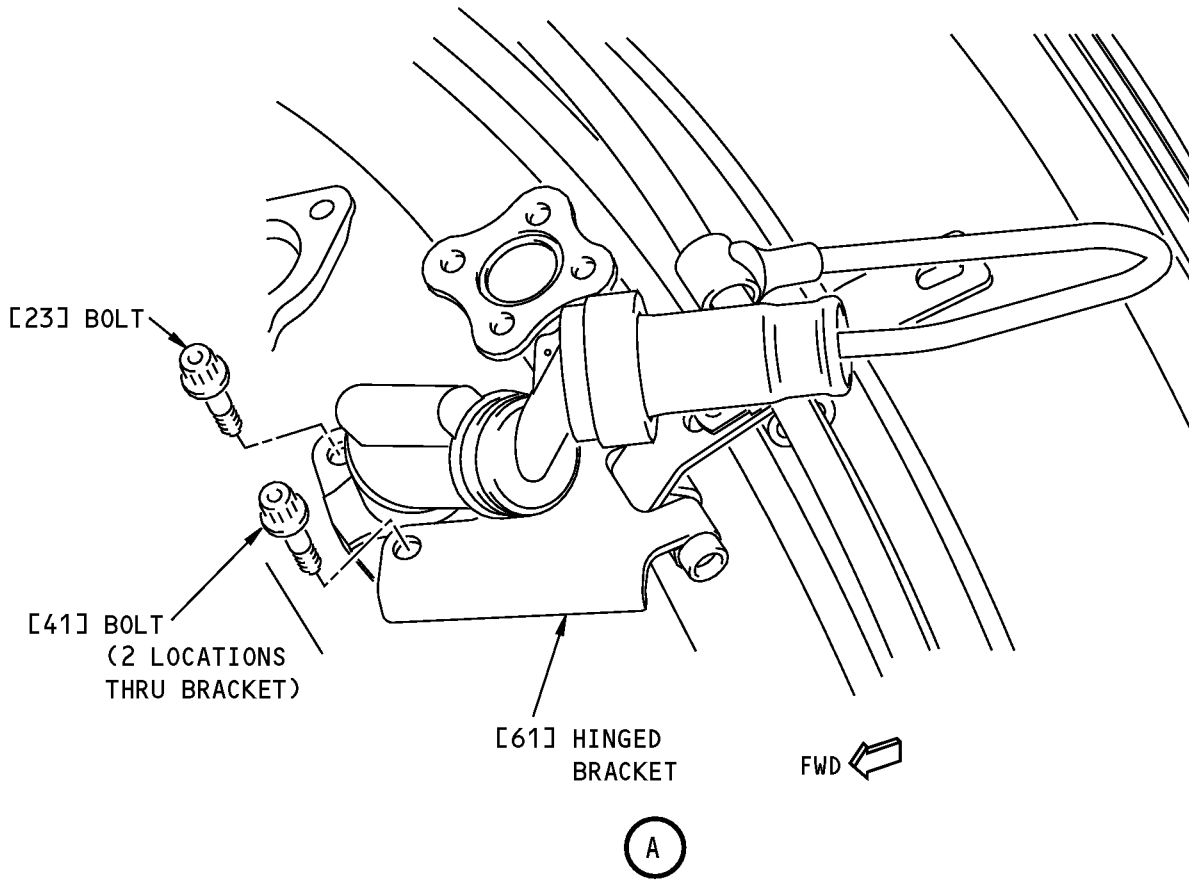
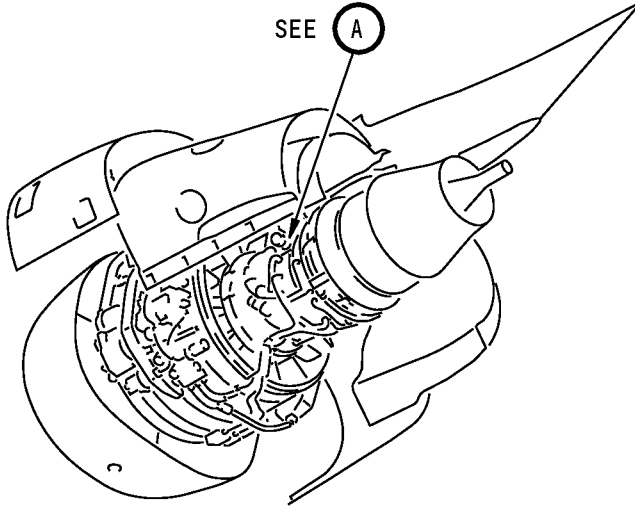
Fuel Nozzle Position 1 and 19 Installation
Figure 403/73-11-04-990-846-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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GMM-1129689-00-A

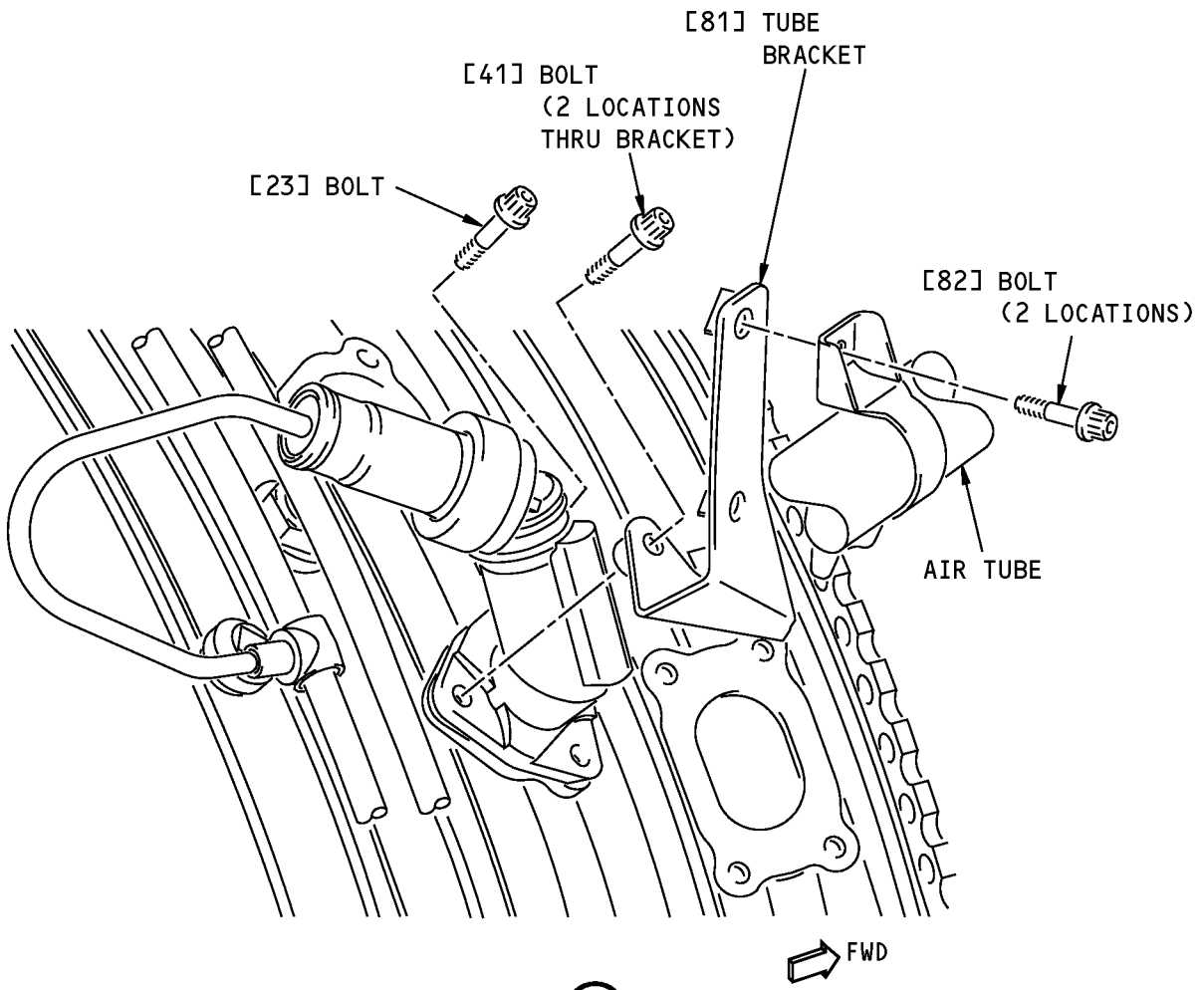
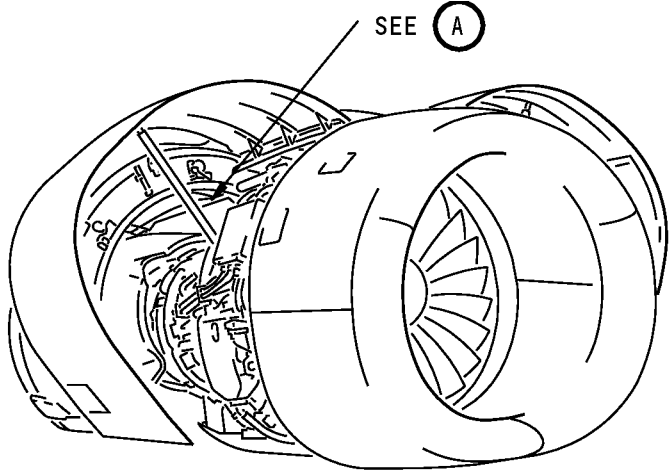
Fuel Nozzle Position 2, 4, 6, 10, 14, 16 and 20 Installation
Figure 404/73-11-04-990-847-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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GMM-1129690-00-A

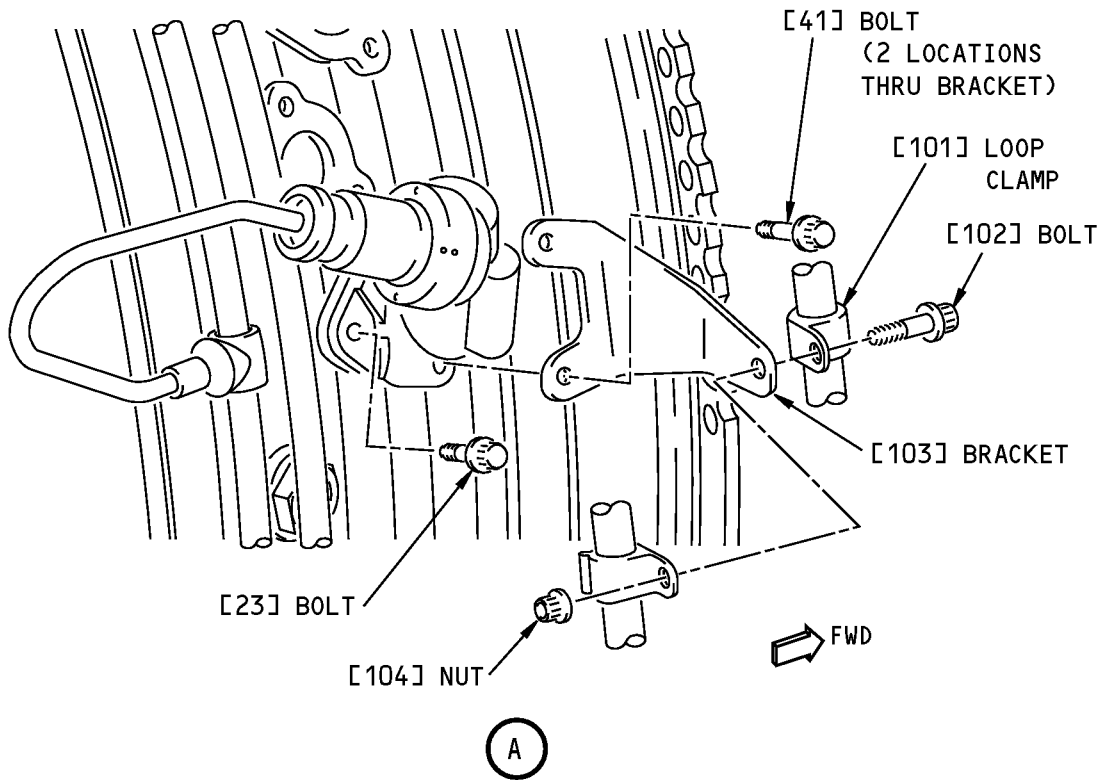
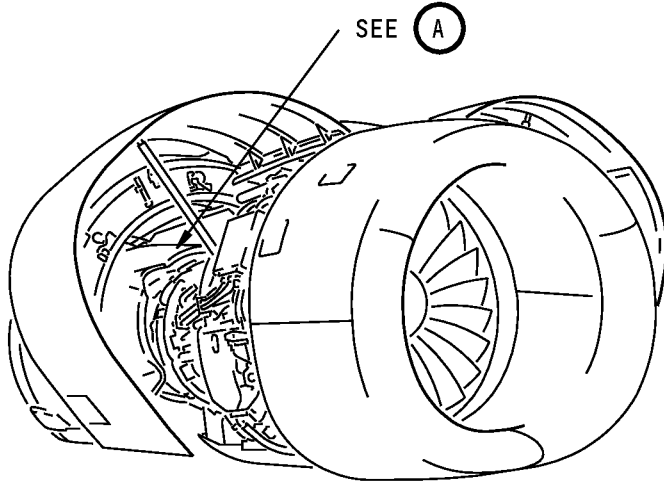
Fuel Nozzle Position 3 Installation
Figure 405/73-11-04-990-848-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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Fuel Nozzle Position 5 Installation
Figure 406/73-11-04-990-849-F02

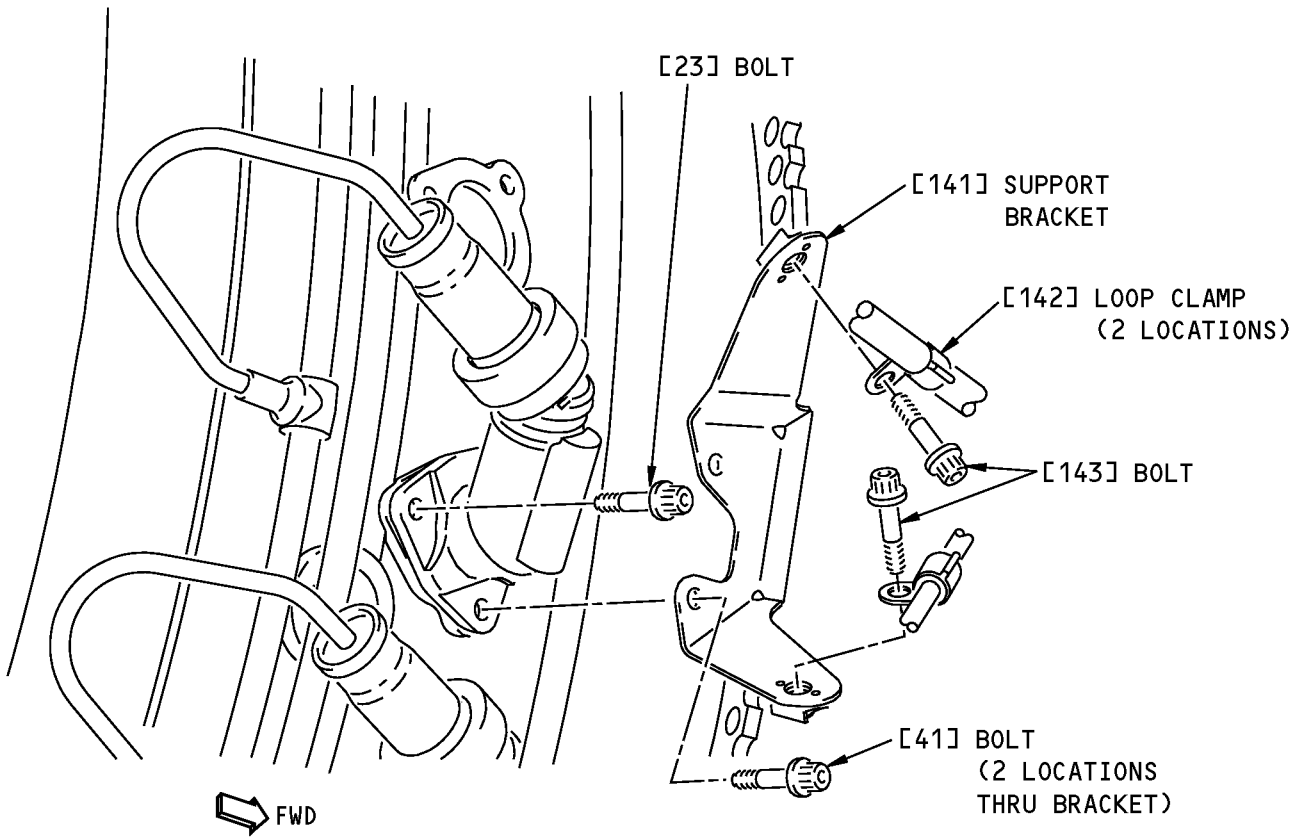
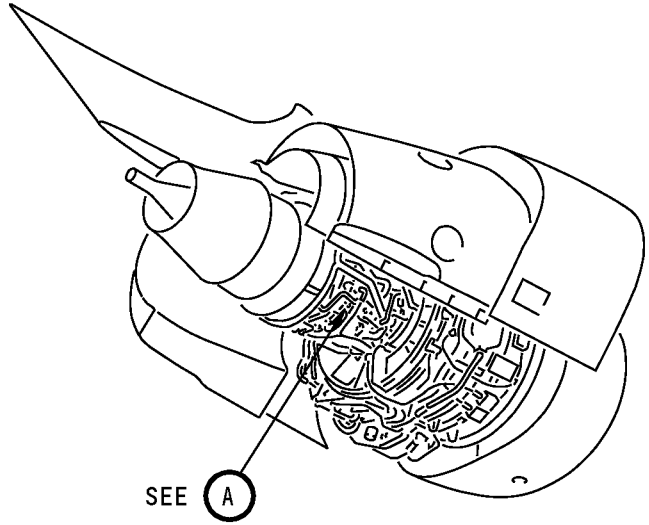
<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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Fuel Nozzle Position 7 Installation
Figure 407/73-11-04-990-850-F02

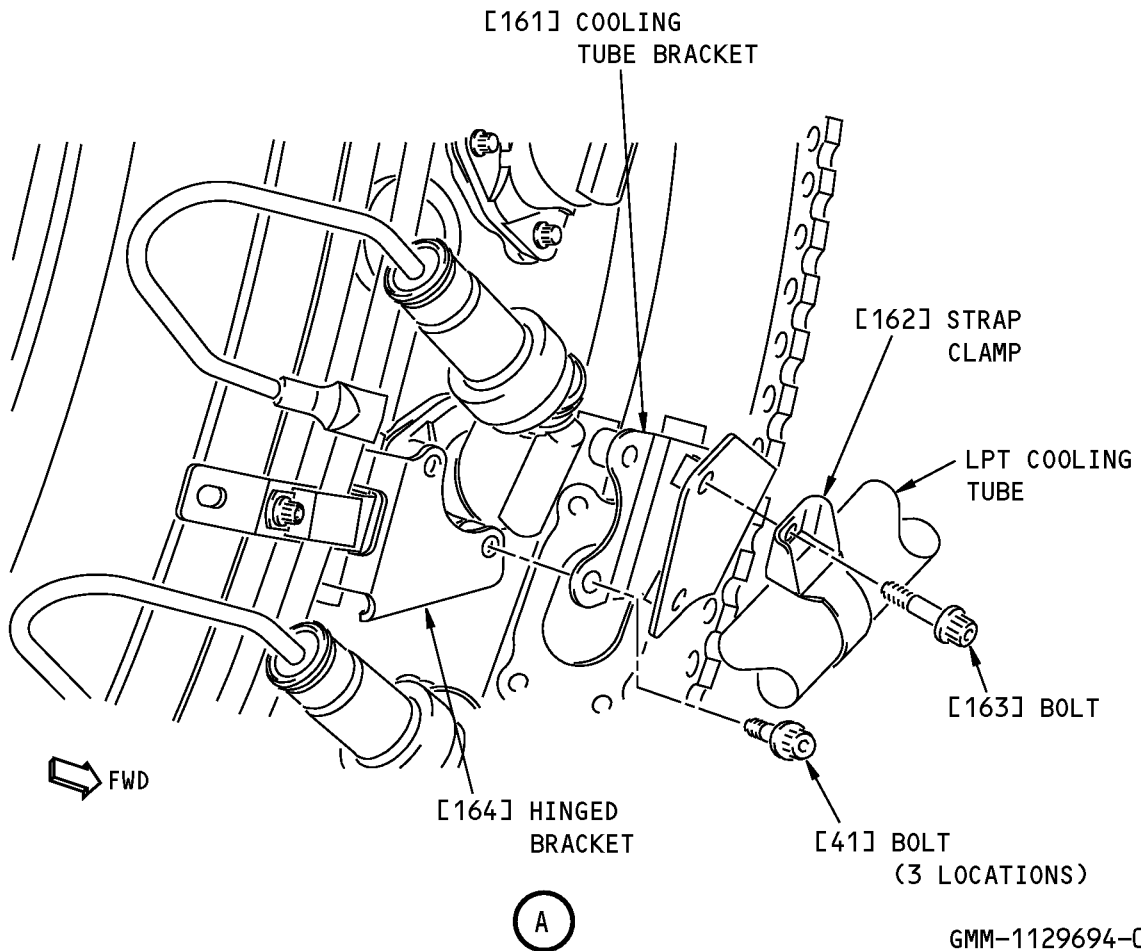
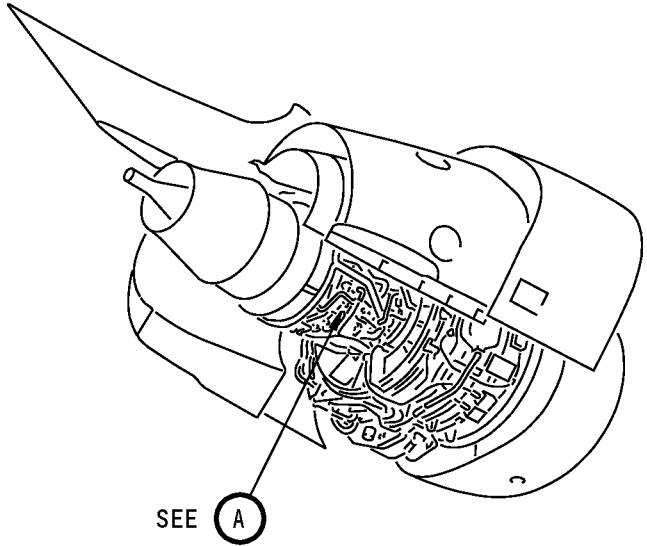
<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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Fuel Nozzle Position 8 Installation
Figure 408/73-11-04-990-851-F02

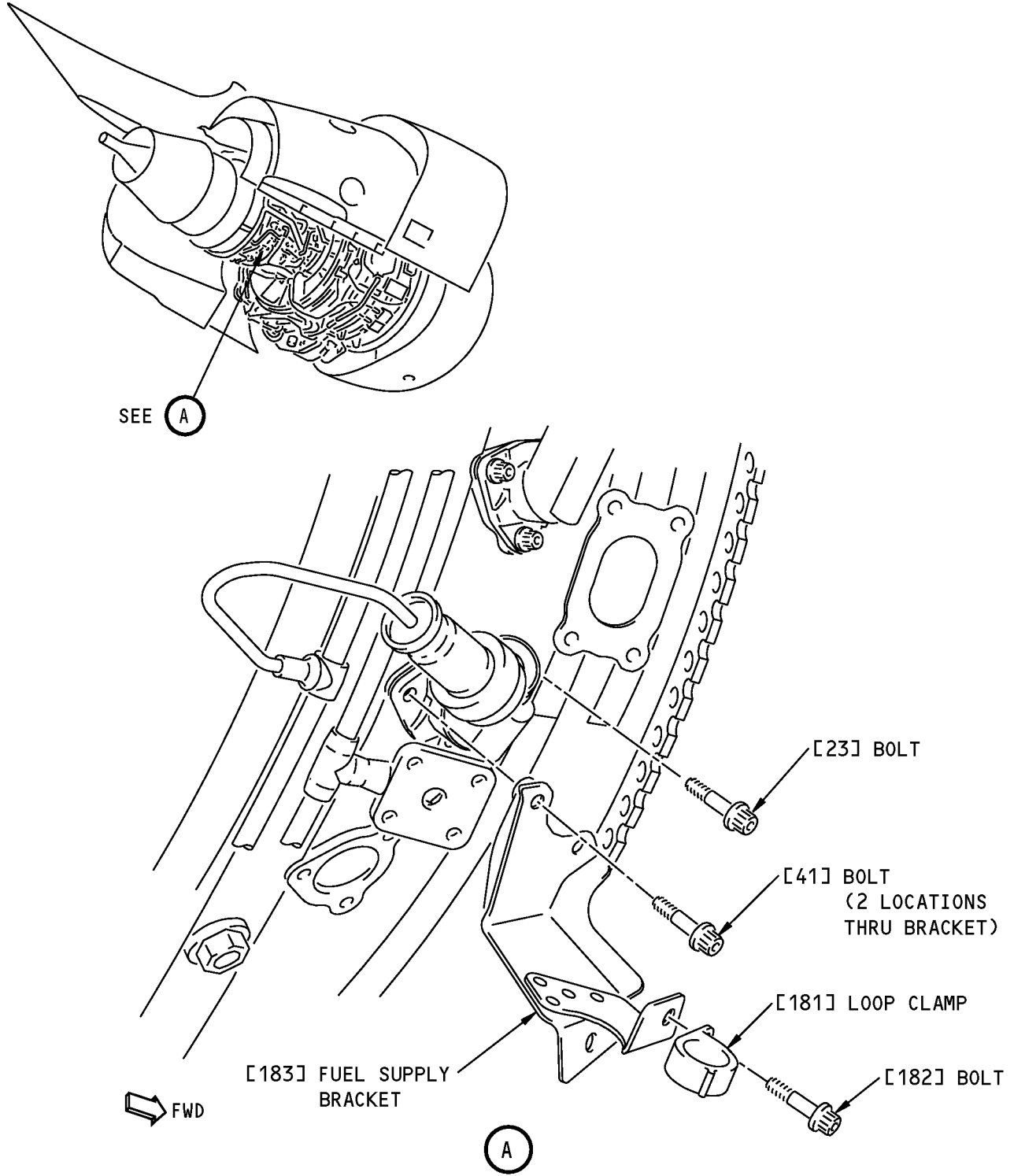
<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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Fuel Nozzle Position 9 Installation
Figure 409/73-11-04-990-852-F02

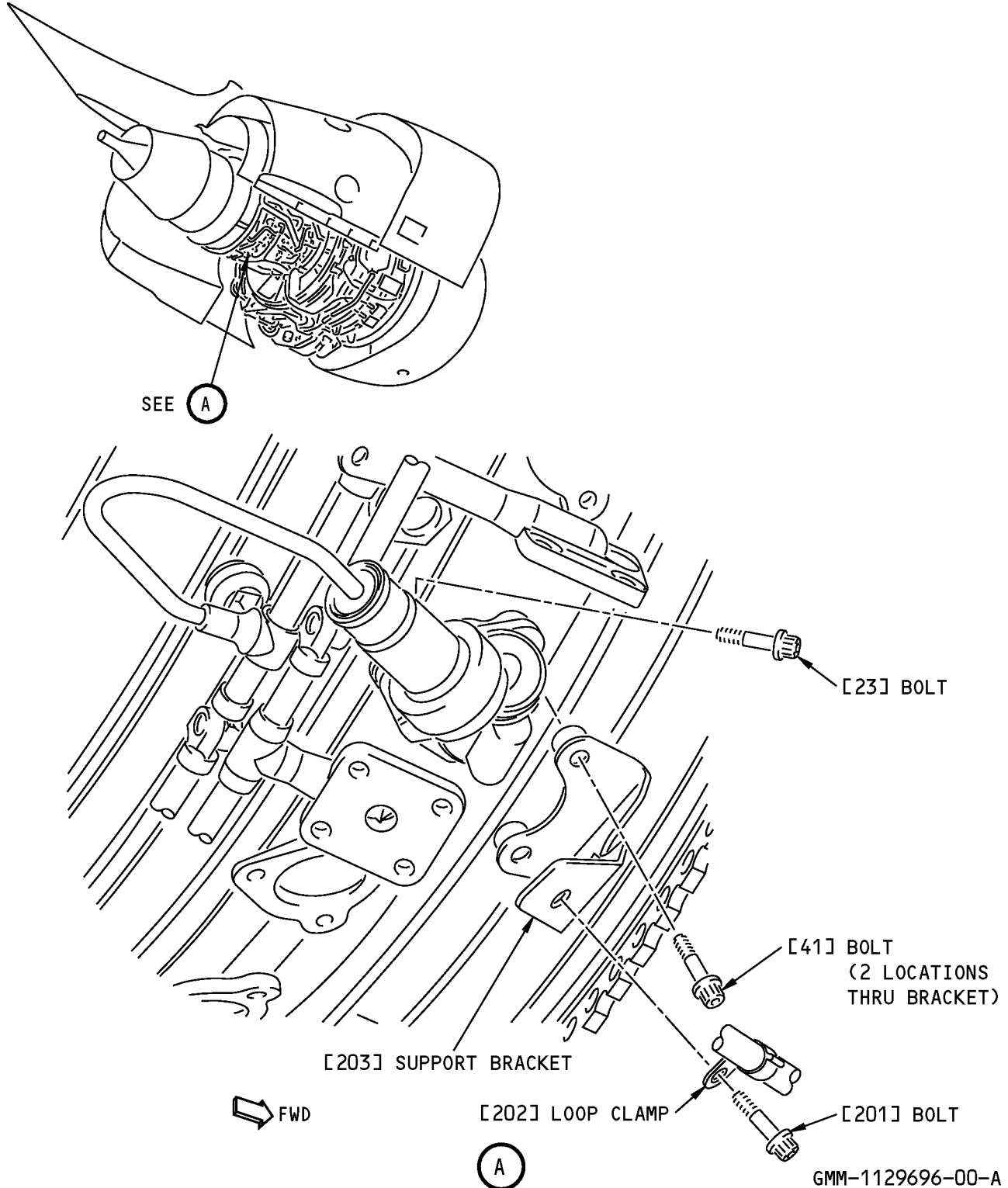
<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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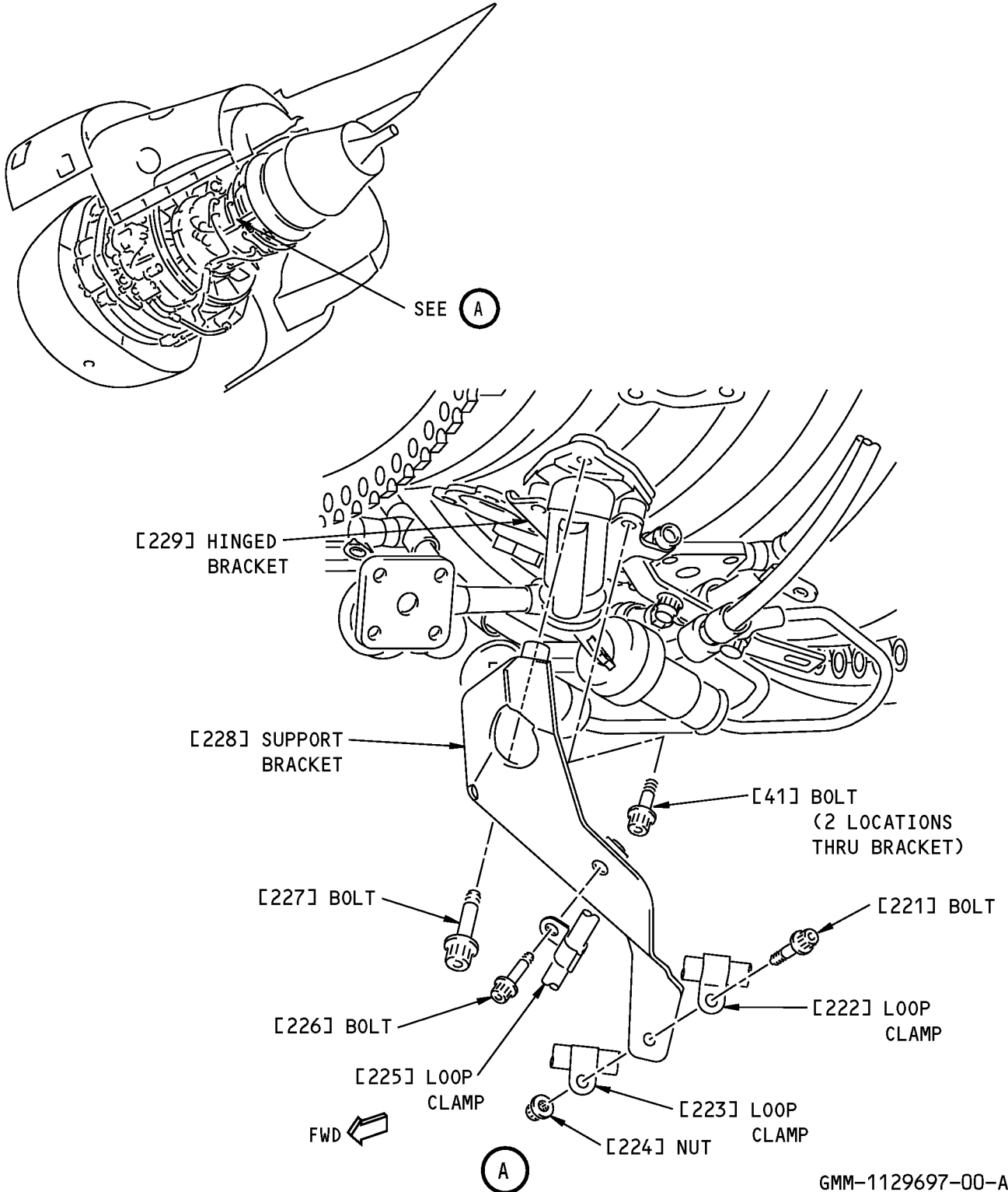


Fuel Nozzle Position 11 Installation
Figure 410/73-11-04-990-853-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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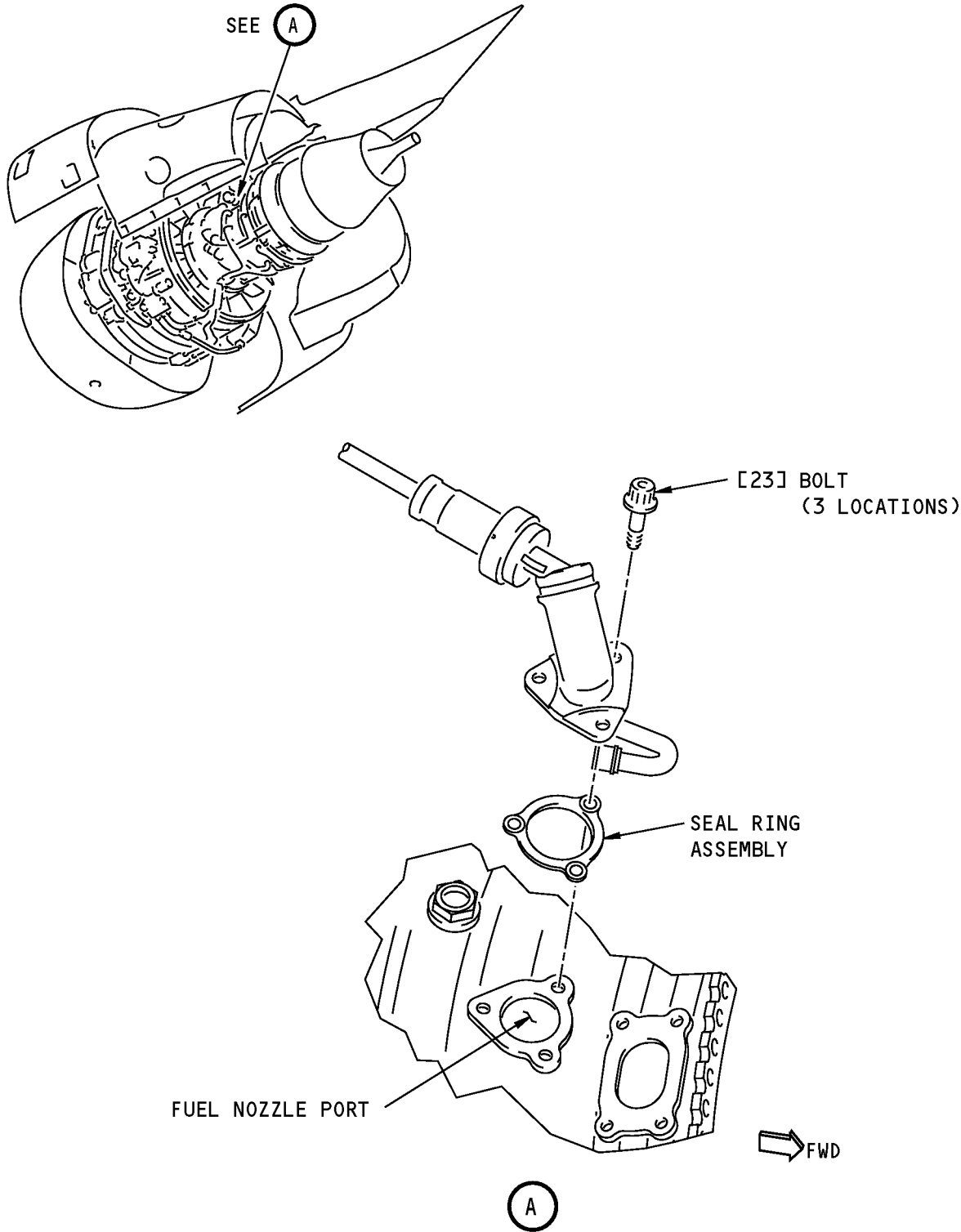
Fuel Nozzle Position 12 Installation
Figure 411/73-11-04-990-854-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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Fuel Nozzle Position 13, 15 and 17 Installation
Figure 412/73-11-04-990-855-F02

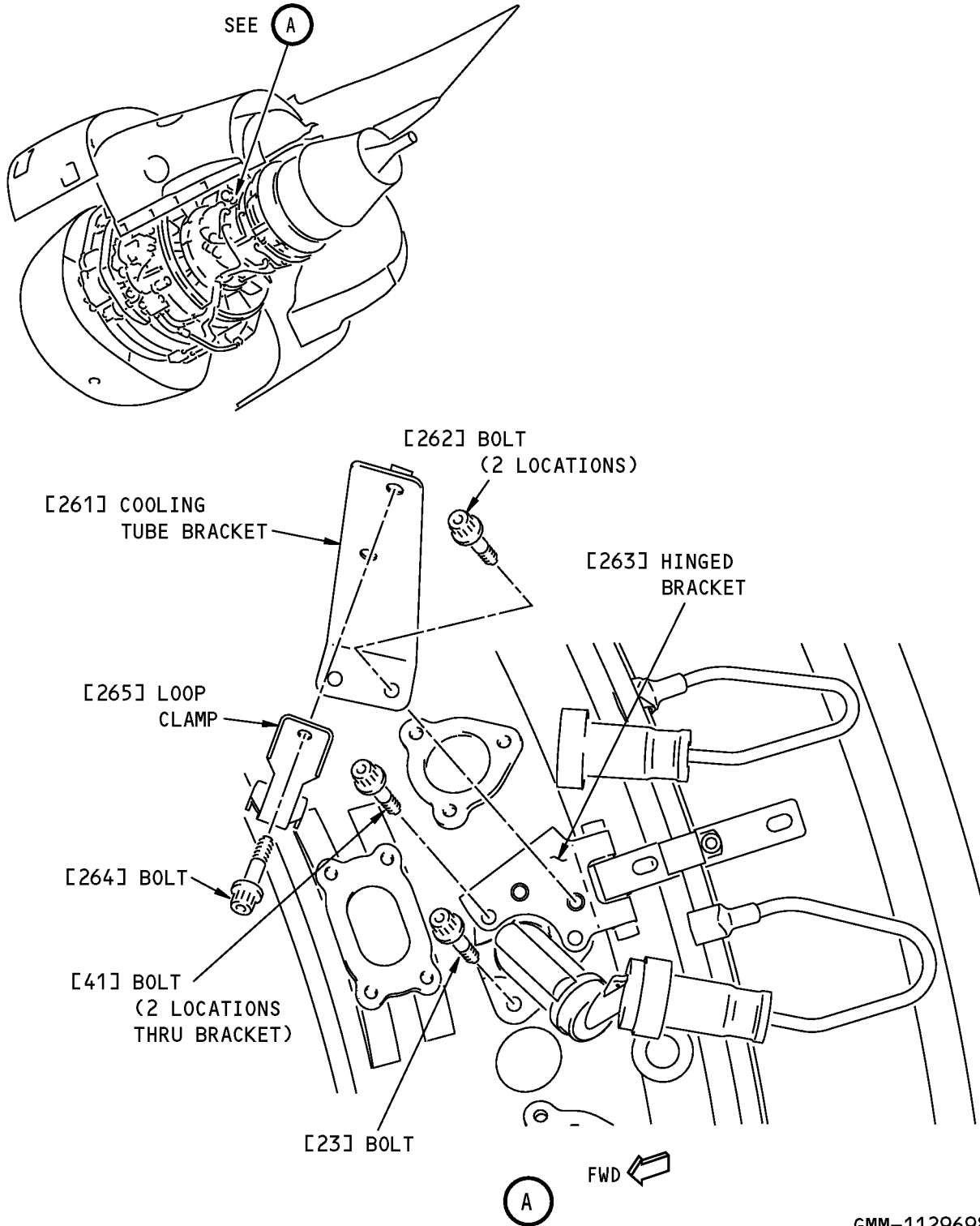
EFFECTIVITY
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Fuel Nozzle Position 18 Installation
Figure 413/73-11-04-990-856-F02

<p>EFFECTIVITY</p> <p>HAP ALL PRE SB CFM56-7B 73-44</p>

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TASK 73-11-04-400-804-F02

3. Fuel Nozzle Installation

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
36-12-01-400-801	Bleed Air Precooler Reconnection (After Engine Component Installation) (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-11-04-200-801-F00	Fuel Nozzle and Fuel Manifold Leak Check (P/B 601)
75-22-04-400-802-F00	LPTACC Valve Installation (P/B 401)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00672 [CP5070]	Grease - Petrolatum	VV-P-236
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
22	Preformed packing	73-11-04-01-120	HAP 001-013, 015-026, 028-040, 042
24	Fuel nozzle	73-11-04-04-110	HAP ALL
		73-11-04-01-085	HAP 001-013, 015-026, 028-040, 042
26	Preformed packing	73-11-04-04-085	HAP ALL
		73-11-04-01-115	HAP 001-013, 015-026, 028-040, 042
28	Seal	73-11-04-04-105	HAP ALL
		73-11-04-01-110	HAP 001-013, 015-026, 028-040, 042
		73-11-04-04-100	HAP ALL

D. Location Zones

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

E. Fuel Nozzle Installation

SUBTASK 73-11-04-420-038-F02

(1) Do these steps to install the fuel nozzle [24] at position 1 or 19 (Figure 401, Figure 402, Figure 403):

- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.

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- (b) Do these steps to install the packing [22] and packing [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the preformed packing [22] on the fuel nozzle [24].
 - 3) Install the preformed packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle [24] into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
- (f) Put the support bracket [42] in its correct position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Install the bolt [44] that holds the loop clamp [43] to the support bracket [42].
 - 1) Tighten the bolt [44] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (k) For fuel nozzle position 1, do this task: Bleed Air Precooler Reconnection (After Engine Component Installation), TASK 36-12-01-400-801.

SUBTASK 73-11-04-420-039-F02

- (2) Do these steps to install the fuel nozzle at position 2, 4, 6, 10, 14, 16, or 20 (Figure 401, Figure 402, Figure 404):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].

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- 2) Install the packing [22] on the fuel nozzle [24].
- 3) Install the packing [26] on the fuel manifold [21].
- (c) Install a new seal [28] into the retainer [29].
- (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle counter-clockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
- (f) Move the hinged bracket [61] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (i) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
- (j) For fuel nozzle positions 2 and 20, do this task: Bleed Air Precooler Reconnection (After Engine Component Installation), TASK 36-12-01-400-801.

SUBTASK 73-11-04-420-040-F02

- (3) Do these steps to install the fuel nozzle at position 3 (Figure 401, Figure 402, Figure 405):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:

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- 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
- (f) Move the tube bracket [81] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
- 1) Tighten the bolts to 110-120 pound-inches (12.4-13.6 Newton meters)
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Tighten the bolts [82] on the tube bracket to 62-68 pound-inches (7.0-7.7 Newton meters).
- (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
- 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (j) Attach the shroud [27] to the fuel nozzle [24]:
- 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-041-F02

- (4) Do these steps to install the fuel nozzle at position 5 (Figure 401, Figure 402, Figure 406):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.

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- (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
- (f) Put the bracket [103] into its position on the fuel nozzle flange.
- (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Use the bolt [102] and nut [104] to connect the loop clamp [101] to the bracket [103].
 - 1) Tighten the nut [104] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (i) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (j) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-042-F02

- (5) Do these steps to attach the fuel nozzle at position No. 7 to the combustion case (Figure 401, Figure 402, Figure 407):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
 - (f) Put the support bracket [141] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.

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- 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
- 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [143].
 - (i) Install the bolts [143] to attach the loop clamps [142] to the support bracket [141].
 - 1) Tighten the bolts [143] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (j) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
 - (k) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].
 - (l) Do the applicable steps in the LPTACC Valve R/I to install the LPT duct (TASK 75-22-04-400-802-F00).

SUBTASK 73-11-04-420-043-F02

- (6) Do these steps to install the fuel nozzle at position 8 (Figure 401, Figure 402, Figure 408):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [41].
 - (f) Move the hinged bracket [164] into its position on the fuel nozzle flange.
 - (g) Put the cooling tube bracket [161] on the fuel nozzle flange and hinged bracket [164].
 - (h) Install the bolts [41] in the fuel nozzle flange.

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- 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
- 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (i) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolt [163].
- (j) Put the strap clamp [162] on the LPT cooling tube.
- (k) Use the bolts [163] to connect the strap clamp [162] to the cooling tube bracket [161].
 - 1) Tighten the bolts to 62-68 pound-inches (7.0-7.7 Newton meters).
- (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-044-F02

- (7) Do these steps to install the fuel nozzle at position 9 (Figure 401, Figure 402, Figure 409):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
 - (f) Put the fuel supply bracket [183] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).

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- 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
- (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolt [182].
- (i) Use the bolt [182] to connect the loop clamp [181] to the fuel supply bracket [183].
 - 1) Tighten the bolt [182] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (j) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (k) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-045-F02

- (8) Do these steps to install the fuel nozzle at position 11 (Figure 401, Figure 402, Figure 410):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolts [23] and [41].
 - (f) Put the support bracket [203] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 on the threads of the bolt [201].

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- (i) Use the bolt [201] to install the loop clamp [202] to the support bracket [203].
 - 1) Tighten the bolt [201] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (j) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (k) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-046-F02

- (9) Do these steps to install the fuel nozzle at position 12 (Figure 401, Figure 402, Figure 411):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [41] and [227].
 - (f) Move the hinged bracket [229] into its position on the fuel nozzle flange.
 - (g) Put the support bracket [228] into its position on the hinged bracket [229] and the fuel nozzle flange.
 - (h) Install the bolts [41] and [227] in the fuel nozzle flange.
 - 1) Tighten the bolts [41] and [227] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (i) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [221] and [226].
 - (j) Use bolt [226] to install the loop clamp [225] to the support bracket [228].

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- 1) Tighten the bolt [226] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (k) Use the bolt [221] and nut [224] to install the loop clamps [222] and [223] to the support bracket [228].
 - 1) Tighten the nut [224] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-047-F02

- (10) Do these steps to install the fuel nozzle [24] at position 13, 15, or 17 (Figure 401, Figure 402, Figure 412):
 - (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23].
 - (f) Install the bolts [23] in the fuel nozzle flange.
 - 1) Tighten the bolts [23] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (g) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].
 - a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).

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- 2) Loosen the coupling nut [25].
 - 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 4) Loosen the coupling nut [25].
 - 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
 - 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (h) Attach the shroud [27] to the fuel nozzle [24]:
- 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

SUBTASK 73-11-04-420-048-F02

- (11) Do these steps to install the fuel nozzle [24] at position 18 (Figure 401, Figure 402, Figure 413):
- (a) Remove the protective cover from the fuel nozzle, the fuel nozzle port, and the fuel manifold connection.
 - (b) Do these steps to install the packings [22] and [26]:
 - 1) Apply grease, D00672 [CP5070] on the new packings [22] and [26].
 - 2) Install the packing [22] on the fuel nozzle [24].
 - 3) Install the packing [26] on the fuel manifold [21].
 - (c) Install a new seal [28] into the retainer [29].
 - (d) Do these steps to install the fuel nozzle:
 - 1) Put the retainer [29] on the fuel nozzle port.
 - 2) Put the fuel nozzle into the fuel nozzle port, with the tip forward.
 - 3) Turn the fuel nozzle 180 degrees counterclockwise while you move it on to the combustion case pad.
 - 4) Move the fuel nozzle aft to engage the tip in the combustion chamber.
 - (e) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [23] and [41].
 - (f) Move the hinged bracket [263] into its position on the fuel nozzle flange.
 - (g) Install the bolts [23] and [41] in the fuel nozzle flange.
 - 1) Tighten the bolts [23] and [41] to 110-120 pound-inches (12.4-13.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts.
 - (h) Apply grease, D00601 [CP2101] or Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [262] and [264].
 - (i) Put the cooling tube bracket [261] in its position on the hinged bracket [263].
 - (j) Use the bolts [262] to install the cooling tube bracket [261] to the hinged bracket [263].
 - 1) Tighten the bolts [262] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (k) Use the bolt [264] to install the loop clamp [265] to the cooling tube bracket [261].
 - 1) Tighten the bolt [264] to 62-68 pound-inches (7.0-7.7 Newton meters).
 - (l) Do these steps to install the coupling nut [25] of the fuel manifold [21] to the fuel nozzle [24]:
 - 1) Connect the coupling nut [25] to the nipple on the fuel nozzle [24].

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- a) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
- 2) Loosen the coupling nut [25].
- 3) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
- 4) Loosen the coupling nut [25].
- 5) Tighten the coupling nut [25] to 121-133 pound-inches (13.7-15.1 Newton meters).
- 6) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the coupling nut [25].
- (m) Attach the shroud [27] to the fuel nozzle [24]:
 - 1) Apply grease, D00672 [CP5070] on the packings [22] and [26].
 - 2) Slide the shroud [27] over the coupling nut [25] of the fuel manifold [21].
 - 3) Tighten the shroud [27] on the fuel nozzle until no more than two threads are seen.
 - 4) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud [27].

F. Fuel nozzle leak check

SUBTASK 73-11-04-200-004-F01

- (1) Do this task: Fuel Nozzle and Fuel Manifold Leak Check, TASK 73-11-04-200-801-F00.

G. Put the Airplane in a Serviceable Condition

SUBTASK 73-11-04-860-005-F02

- (1) Do these steps to put the airplane in a serviceable condition:

- (a) Do these steps to put the airplane in a serviceable condition:

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

- 1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.
- 2) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
- (b) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

H. Fuel Nozzle Installation Test

SUBTASK 73-11-04-700-004-F02

- (1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— END OF TASK —————

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FUEL NOZZLES - INSPECTION/CHECK**1. General**

A. This procedure has one task, the leak check of the fuel nozzles and fuel manifold.

TASK 73-11-04-200-801-F00**2. Fuel Nozzle and Fuel Manifold Leak Check**

A. General

(1) Do this procedure when you replace one or more of the fuel nozzles.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
73-11-03-000-802-F00	Fuel Nozzle Filter Removal (SAC) (P/B 401)
73-11-03-400-802-F00	Fuel Nozzle Filter Installation (SAC) (P/B 401)
73-11-04-000-804-F02	Fuel Nozzle Removal (P/B 401)
73-11-04-000-805-F01	Fuel Nozzle Removal (P/B 401)
73-11-04-400-804-F02	Fuel Nozzle Installation (P/B 401)
73-11-04-400-805-F01	Fuel Nozzle Installation (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)
STD-1115	Source - Nitrogen, 0-100 PSIG

D. Consumable Materials

Reference	Description	Specification
D00672 [CP5070]	Grease - Petrolatum	VV-P-236
G00091	Compound - Oxygen System Leak Detection - Snoop Leak Detector	MIL-PRF-25567
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Location Zones

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

F. Prepare for the Check

SUBTASK 73-11-04-840-003-F00

(1) Make sure that the engine fuel valves are closed:

(a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

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- (b) Make sure the start levers are in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable start lever.
- (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

G. Do the Check

SUBTASK 73-11-04-010-001-F00

- (1) Do this task: Fuel Nozzle Filter Removal (SAC), TASK 73-11-03-000-802-F00.

SUBTASK 73-11-04-680-001-F00

- (2) Do these steps to drain the fuel manifold:

- (a) Put the 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel nozzle at the 6:00 O'clock position.

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (b) Disconnect the manifold from the fuel nozzle at the 6:00 O'clock position:
 - 1) Disconnect the shroud from the fuel nozzle at the 6:00 O'clock position.
 - a) Move the shroud to get access to the coupling nut on the fuel manifold.
 - 2) Use two wrenches to disconnect the coupling nut from the fuel nozzle at the 6:00 O'clock position.
- (c) Disconnect the manifold from the fuel nozzle at the 12:00 O'clock position:
 - 1) Disconnect the shroud from the fuel nozzle at the 12:00 O'clock position.
 - a) Move the shroud to get access to the coupling nut on the fuel manifold.
 - 2) Use two wrenches to disconnect the coupling nut from the fuel nozzle at the 12:00 O'clock position.
- (d) Let the fuel drain into the container.
- (e) Use your hand to connect the manifold coupling nut to the nipple on the two fuel nozzles at the 6:00 and 12:00 O'clock positions.
- (f) Do these steps to tighten the coupling nuts at the 6:00 O'clock and 12:00 O'clock positions:

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CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- 1) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- 2) Use two wrenches to loosen the coupling nut.
- 3) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- 4) Use two wrenches to loosen the coupling nut.
- 5) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).

(g) Do not attach the shrouds to the fuel nozzle at this time.

SUBTASK 73-11-04-480-001-F00

- (3) Connect 0-100 PSIG nitrogen source, STD-1115 to the fuel manifold fitting where the fuel nozzle filter was removed.

SUBTASK 73-11-04-160-001-F00

- (4) Do these steps to remove fuel that remains in the manifold:

WARNING: MAKE SURE THAT THERE IS NO OPEN FLAME OR OTHER SOURCE OF IGNITION NEAR THE ENGINE. THE FUEL VAPORS CAN CATCH FIRE. IF THERE IS A FIRE, IT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

- (a) Put 80 to 100 psig (551 to 689 kPa) of nitrogen through the fuel manifold.
- (b) Decrease the pressure to zero.

H. Leak Check

SUBTASK 73-11-04-790-001-F00

- (1) Do the Leak Check of the Fuel Nozzle:
 - (a) Disconnect the shrouds from all of the fuel nozzles.

WARNING: MAKE SURE THAT THERE IS NO OPEN FLAME OR OTHER SOURCE OF IGNITION NEAR THE ENGINE. THE FUEL VAPORS CAN CATCH FIRE. IF THERE IS A FIRE, IT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

- (b) Put 10 psig (69 kPa) of nitrogen into the fuel manifold.
 - 1) Make sure that the check valves in the fuel nozzles do not open at this pressure.
 - 2) Slowly increase the pressure to 15 psig (104 kPa).
 - 3) Make sure that the check valves in the fuel nozzles do not open as the pressure increases.
 - a) If a check valve opens, then replace the fuel nozzle.

These are the tasks:

Fuel Nozzle Removal, TASK 73-11-04-000-805-F01 or Fuel Nozzle Removal, TASK 73-11-04-000-804-F02,

Fuel Nozzle Installation, TASK 73-11-04-400-805-F01 or Fuel Nozzle Installation, TASK 73-11-04-400-804-F02.

- (c) Slowly increase the pressure until one of the check valves in the fuel nozzles opens.

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- 1) Make sure that a check valve opens before you reach 60 psig (414 kPa).

NOTE: A check valve will usually open before you reach 30 psig (207 kPa).

- (d) Slowly decrease the pressure until the check valves in the fuel nozzles are closed.
- (e) Use Snoop Leak Detector compound, G00091 to look for leaks at the fuel nozzle coupling nuts and the fuel manifold.
 - 1) If you find a leak, then continue.
 - 2) If you do not find a leak, then do the steps below to Put the Airplane in a Serviceable Condition.

SUBTASK 73-11-04-900-001-F00

- (2) If you find a leak in the tubes of the fuel manifold, then replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 73-11-04-200-001-F00

- (3) If you find a leak at the fuel nozzle coupling nuts, then do these steps:

- (a) Use two wrenches to disconnect the fuel nozzle coupling nut.
- (b) Visually examine the ferrule and seat of the coupling nut and the seat of the fuel nozzle.
 - 1) If the ferrule and seat of the coupling nut is damaged, then replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

- 2) If the seat of the fuel nozzle is damaged, then replace the fuel nozzle.

These are the tasks:

Fuel Nozzle Removal, TASK 73-11-04-000-805-F01 or Fuel Nozzle Removal,
TASK 73-11-04-000-804-F02,

Fuel Nozzle Installation, TASK 73-11-04-400-805-F01 or Fuel Nozzle Installation,
TASK 73-11-04-400-804-F02.

- (c) If no problem is found, then use your hand to connect the manifold coupling nut to the fuel nozzle.

- 1) Do these steps to tighten the coupling nut:

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- a) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- b) Use two wrenches to loosen the coupling nut.
- c) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- d) Use two wrenches to loosen the coupling nut.
- e) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).

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- (d) Do the Leak Check (above) again.
 - 1) If you find a leak, then continue.
 - 2) If you do not find a leak, then do the steps below to Put the Airplane in a Serviceable Condition.

SUBTASK 73-11-04-200-002-F00

- (4) If the leak continues, then do these steps:
 - (a) Use two wrenches to disconnect the fuel nozzle coupling nut.
 - (b) Install a metal conical seal in the fuel nozzle fitting.
 - (c) Use your hand to connect the manifold coupling nut to the fuel nozzle.
 - 1) Do these steps to tighten the coupling nut:

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- a) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
 - b) Use two wrenches to loosen the coupling nut.
 - c) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
 - d) Use two wrenches to loosen the coupling nut.
 - e) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- (d) Do the Leak Check (above) again.
 - 1) If you find a leak, then replace the applicable fuel nozzle.

These are the tasks:

Fuel Nozzle Removal, TASK 73-11-04-000-805-F01 or Fuel Nozzle Removal, TASK 73-11-04-000-804-F02,

Fuel Nozzle Installation, TASK 73-11-04-400-805-F01 or Fuel Nozzle Installation, TASK 73-11-04-400-804-F02.

- 2) If you do not find a leak, then do the Put the Airplane in a Serviceable Condition.

I. Put the Airplane in a Serviceable Condition

SUBTASK 73-11-04-800-001-F00

- (1) If you loosened a fuel nozzle coupling nut, then make sure that you correctly tightened it.
 - (a) Do these steps to correctly tighten the coupling nut:

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- 1) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- 2) Use two wrenches to loosen the coupling nut.

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- 3) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).
- 4) Use two wrenches to loosen the coupling nut.
- 5) Use two wrenches to tighten the coupling nut to 121-133 pound-inches (13.7-15.1 Newton meters).

SUBTASK 73-11-04-410-001-F00

- (2) Attach the shrouds to the fuel nozzles:
 - (a) Apply grease, D00672 [CP5070] on the preformed packings.
 - (b) Slide the shrouds over the coupling nuts of the fuel manifold.
 - (c) Tighten the shrouds until no more than two threads are seen.
 - (d) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the shroud.

SUBTASK 73-11-04-080-001-F00

- (3) Remove the 0-100 PSIG nitrogen source, STD-1115 from the fuel manifold fitting.

SUBTASK 73-11-04-410-002-F00

- (4) Do this task: Fuel Nozzle Filter Installation (SAC), TASK 73-11-03-400-802-F00.

SUBTASK 73-11-04-840-004-F00

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

- (5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 73-11-04-840-005-F00

- (6) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (a) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

SUBTASK 73-11-04-840-006-F00

- (7) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

————— **END OF TASK** —————

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FUEL MANIFOLD - INSPECTION/CHECK**1. General**

A. This procedure has one task, the inspection of the fuel manifold.

TASK 73-11-05-700-801-F00**2. Fuel Manifold - Inspection/Check**

(Figure 601)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
73-11-04-000-804-F02	Fuel Nozzle Removal (P/B 401)
73-11-04-000-805-F01	Fuel Nozzle Removal (P/B 401)
73-11-04-400-804-F02	Fuel Nozzle Installation (P/B 401)
73-11-04-400-805-F01	Fuel Nozzle Installation (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Location Zones

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

C. Procedure

SUBTASK 73-11-05-840-001-F00

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 73-11-05-900-001-F00

(2) If you find damage to the fuel manifold that is not in the limits, then replace the engine, unless you are given other instructions.

NOTE: The fuel manifold is not a Line Replaceable Unit (LRU). To remove the fuel manifold, you must disassemble the engine.

(a) These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,
Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 73-11-05-210-001-F00

(3) Visually examine the fuel manifold tubes:

(a) Cracks, splits, or kinks in the manifold tubes are not acceptable.

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- (b) Wrinkles in the bends of the manifold tubes are acceptable with this limit:
 - 1) The depth of the wrinkle must be less than 3 percent of the outside diameter of the tube.
- (c) Dents in the manifold are acceptable with these limits:
 - 1) Not more than one dent in one linear foot (0.305 M) of the tube.
 - 2) The depth of the dent must be less than 20 percent of the outside diameter of the tube.
 - 3) The minimum radius of the dent must be greater than 0.070 inch (1.78 mm).
- (d) Nicks, scratches, scores, and chafed areas are acceptable with this limit:
 - 1) The depth of the nick, scratch, score, and chafed area must be less than 0.005 inch (0.13 mm) in depth after the tube is blended to a smooth radius.

SUBTASK 73-11-05-210-002-F00

- (4) Examine the fuel nozzle supply tubes:
 - (a) Cracks, splits, or kinks in the nozzle supply tubes are not acceptable.
 - (b) Wrinkles in the bends of the nozzle supply tubes are acceptable with these limits:
 - 1) The depth of the wrinkle must be less than 3 percent of the outside diameter of the tube.
 - (c) Dents in the nozzle supply tubes are acceptable with these limits:
 - 1) Not more than one dent in each of the tubes.
 - 2) The depth of the dent must be less than 10 percent of the outside diameter of the tube.
 - 3) The minimum radius of the dent must be greater than 0.070 inch (1.78 mm).
 - (d) Flattened areas in the nozzle supply tubes are acceptable with these limits:
 - 1) The length of the flattened area must be less than 2 times the outside diameter of the tube.
 - 2) The flattened area must change the contour of the tube by less than 10 percent of its outside diameter.
 - (e) Nicks, scratches, scores, and chafed areas are acceptable with this limit:
 - 1) The depth of the nick, scratch, score, and chafed area must be less than 0.005 inch (0.13 mm) in depth after the tube is blended to a smooth radius.

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SUBTASK 73-11-05-210-004-F00

NOTE: Do this inspection if the fuel manifold shroud coupling nut has been disconnected from its mating surface.

- (5) Visually examine the threads of the fuel manifold shroud coupling nut for damage.
 - (a) Damage must be less than one-half of a thread, cumulative or continuous.

SUBTASK 73-11-05-900-005-F00

- (6) If you find damage to the shroud coupling nut thread that is not in limits, then replace the shroud coupling nut. These are the steps:
 - (a) Remove the fuel nozzle that mates with the damaged shroud coupling nut. Do this task, Fuel Nozzle Removal, TASK 73-11-04-000-805-F01 or Fuel Nozzle Removal, TASK 73-11-04-000-804-F02.
 - (b) With applicablr tool, remove the retaining ring from the shroud.
 - (c) Slide the shroud aft and remove it from the fuel manifold tube.

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HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES (Continued)

- (d) Slide the shroud coupling nut off the shroud. If the shroud coupling nut does not remove easily from the shroud, replace the shroud coupling nut and the shroud.
- (e) Install the shroud coupling nut on the shroud. Make sure that the open portion of the nut will face aft when the shroud is installed on the fuel manifold tube.
- (f) Install the shroud on the fuel manifold tube. Make sure that the open portion of the shroud faces aft after installation.
- (g) With the applicable tool, install the retaining ring in the shroud. After installation, apply pressure to the retaining ring to make sure it is retained in the groove in the shroud.
- (h) Install the fuel nozzle, do this task Fuel Nozzle Installation, TASK 73-11-04-400-805-F01 or Fuel Nozzle Installation, TASK 73-11-04-400-804-F02.

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SUBTASK 73-11-05-900-003-F00

- (7) If you find damage to the fuel manifold that is not in the limits, then replace the engine, unless you are given other instructions.

NOTE: The fuel manifold is not a Line Replaceable Unit (LRU). To remove the fuel manifold, you must disassemble the engine.

- (a) These are the tasks:
 - Power Plant Removal, TASK 71-00-02-000-801-F00,
 - Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 73-11-05-900-002-F00

- (8) Do these steps to prepare to examine the nipples and ferrules:

NOTE: Do this portion of the fuel manifold inspection if you think you have a leak or if you find damage after you removed a fuel nozzle.

- (a) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

SUBTASK 73-11-05-210-003-F00

- (9) Examine the mating surfaces of the nipples and ferrules:
 - (a) If not already done, disconnect the fuel supply tube from the applicable fuel nozzle (TASK 73-11-04-000-805-F01 or TASK 73-11-04-000-804-F02).
 - (b) Axial scratches in Areas A and C are acceptable after the surface is blended smooth.
 - (c) Axial scratches in Area B are not acceptable.
 - (d) Circumferential scratches in Areas A and C are acceptable after the surface is blended smooth.
 - (e) Circumferential scratches in Area B are acceptable with these limits:
 - 1) The surface is blended smooth.
 - 2) The scratch is too small to measure with a 0.040 inch (1.02 mm) radius ball scribe.
 - (f) Nicks and pits in Areas A, B, and C are not acceptable.
 - (g) Damaged threads are acceptable with these limits:
 - 1) Use a tap or a die to chase the damaged threads.

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2) After you chase the threads, the damage must be less than one-half of a thread, cumulative or continuous.

(h) Connect the fuel supply tube to the applicable fuel nozzle (TASK 73-11-04-400-805-F01 or TASK 73-11-04-400-804-F02).

SUBTASK 73-11-05-900-004-F00

(10) If you find damage to the fuel nozzle that is not in the limits, then replace the Fuel Nozzle.

(a) These are the tasks:

Fuel Nozzle Removal, TASK 73-11-04-000-805-F01 or Fuel Nozzle Removal, TASK 73-11-04-000-804-F02,

Fuel Nozzle Installation, TASK 73-11-04-400-805-F01 or Fuel Nozzle Installation, TASK 73-11-04-400-804-F02.

SUBTASK 73-11-05-840-002-F00

(11) Put the airplane in a serviceable condition:

(a) If you want to supply electrical power, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

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

(b) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

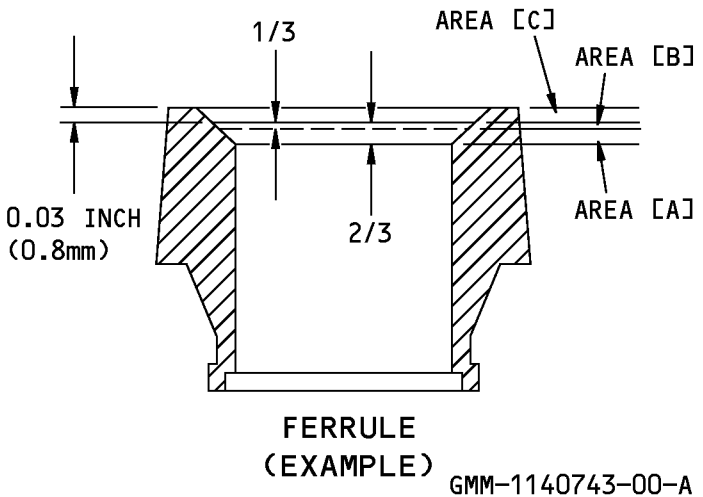
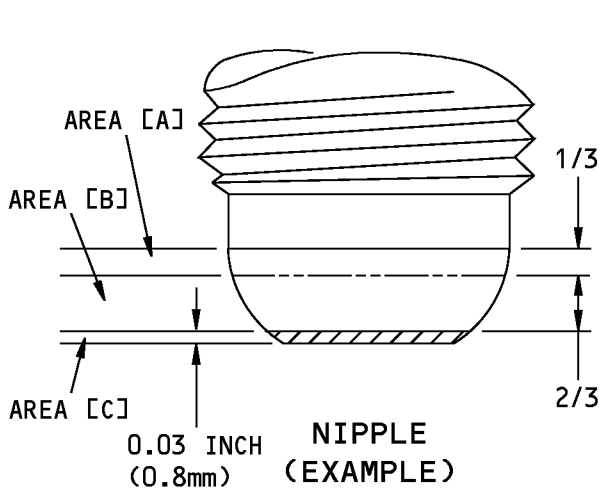
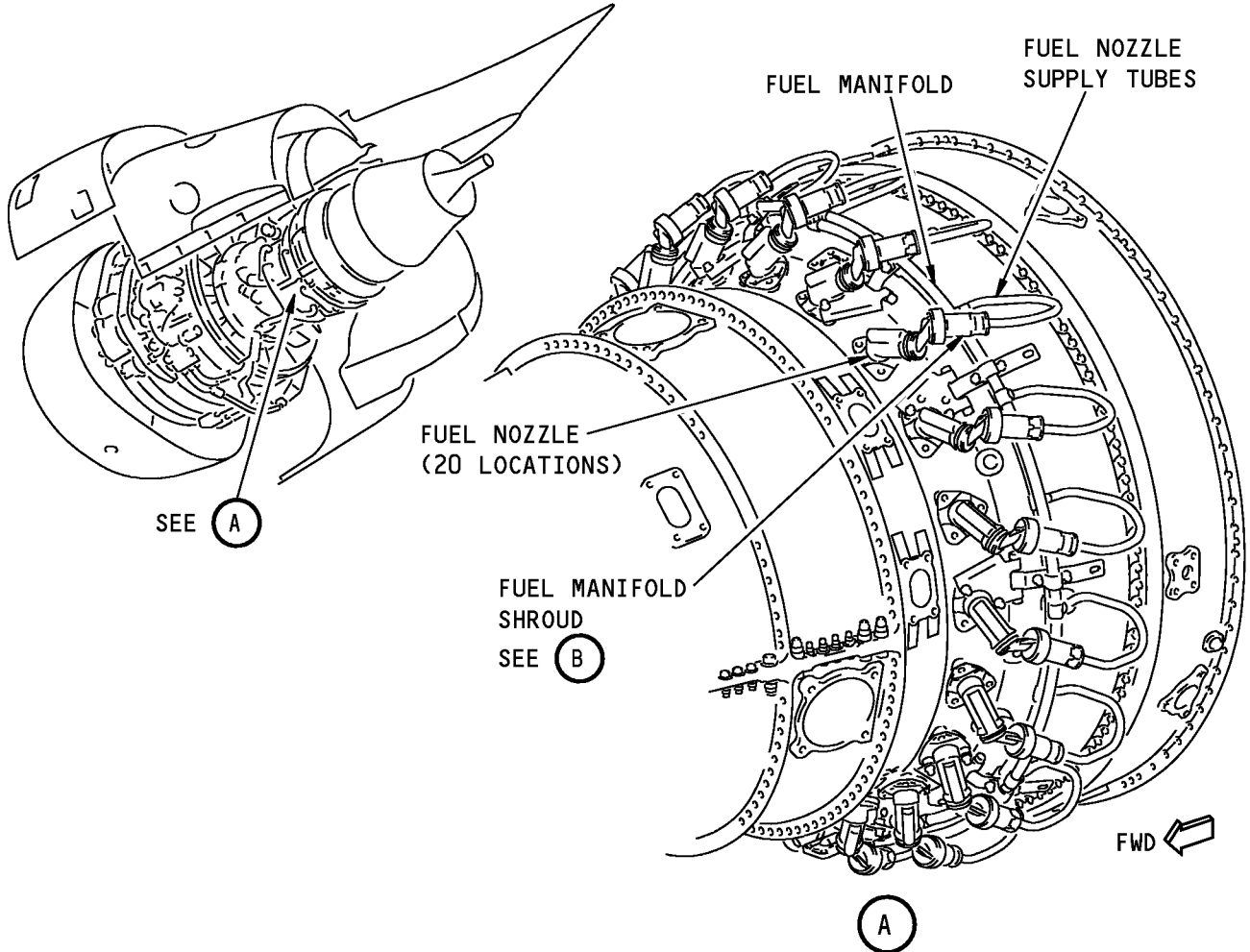
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Fuel Manifold and Nozzles Inspection
 Figure 601 (Sheet 1 of 2)/73-11-05-990-801-F00

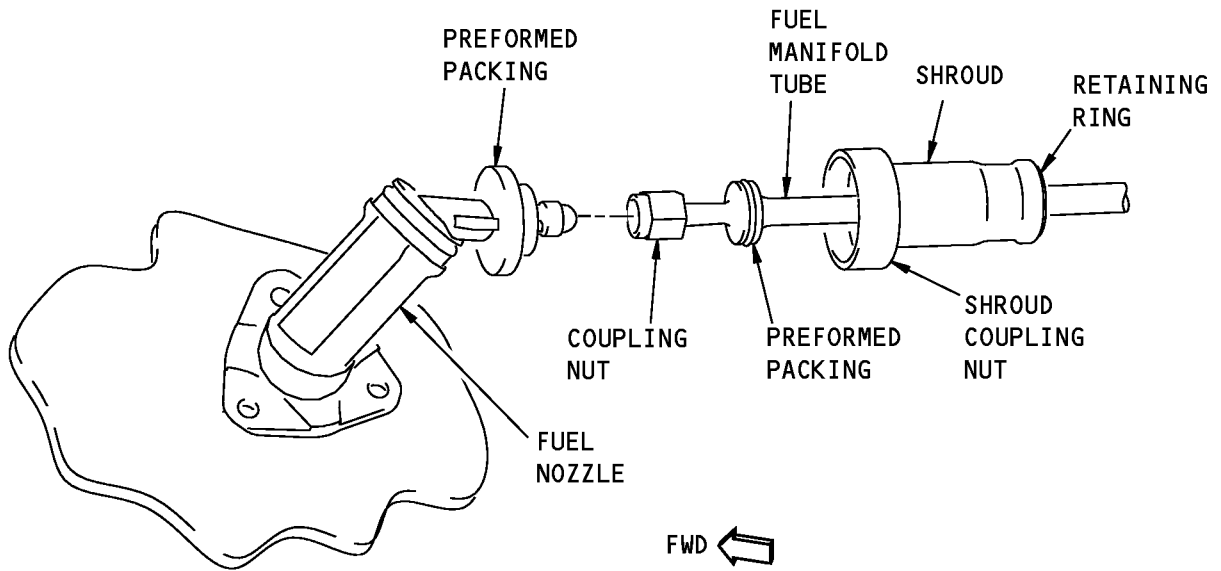
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FUEL MANIFOLD SHROUD
(EXAMPLE)

(B)

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Fuel Manifold and Nozzles Inspection
Figure 601 (Sheet 2 of 2)/73-11-05-990-801-F00

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IDG OIL COOLER - REMOVAL/INSTALLATION**1. General**

A. This procedure has these tasks:

- (1) The removal of the IDG oil cooler
- (2) The installation of the IDG oil cooler.

TASK 73-11-06-000-801-F00

2. IDG Oil Cooler Removal

(Figure 401)

A. General

- (1) The engine has one IDG oil cooler.
- (2) The IDG oil cooler is on the fan frame, aft of the lubrication unit, at the 7:00 o'clock position.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 73-11-06-840-001-F00

(1) Do these steps to prepare for the procedure:

- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.
- (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the spar shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

(f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

F. IDG Oil Cooler Removal

SUBTASK 73-11-06-020-002-F00

(1) Open the four 1/4-turn Omega clamps [10].

(a) Remove the J5, J6, J7, and J8 wire harnesses from the Omega clamps [10].

(b) Move the wire harnesses away from the IDG oil cooler [5].

1) If it is necessary, use string or tape to hold the wires out of your way.

SUBTASK 73-11-06-680-001-F00

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

WARNING: DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE ENGINE IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING: DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE SHUTDOWN. A PRESSURIZED ENGINE CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING: DO NOT LET HOT OIL GET ON YOU. PUT ON GOGGLES AND OTHER EQUIPMENT FOR PROTECTION OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

CAUTION: DO NOT LET HOT OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE COMPONENT IF OIL FALLS ON IT. OIL CAN CAUSE DAMAGE TO PAINT AND RUBBER.

(2) Do these steps to drain the IDG oil cooler [5]:

(a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the IDG oil cooler [5].

(b) Remove the drain plug [20].

1) Let the oil drain into the container.

(c) Remove and discard the o-ring [15] from the drain plug [20].

(d) Keep the drain plug [20] for the subsequent installation.

SUBTASK 73-11-06-020-003-F00

(3) Remove the bracket [25]:

(a) Remove the bolt [40], washer [45], and the clamp [35] that hold the oil-out tube [30] to the bracket [25].

(b) Remove the four bolts [50] and the four washers [55] that hold the bracket [25] to the IDG oil cooler [5].

1) Remove the bracket [25] from the IDG oil cooler.

(c) Keep the container below the IDG oil cooler [5] to catch the unwanted fuel and oil that flows during the removal procedure.

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SUBTASK 73-11-06-020-004-F00

- (4) Do these steps to disconnect the fuel-in tube [60] from the IDG oil cooler [5]:
- (a) Remove the four bolts [70] that hold the fuel-in tube [60] and the gasket [65] to the IDG oil cooler.
 - (b) Move the fuel-in tube [60] out of the way, to make sure that it is not damaged.
 - 1) If it is necessary, use lockwire or tape to keep the tube out of the way.
 - 2) If the gasket [65] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to this task (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- (c) Install protective covers on the fuel-in tube [60] and the IDG oil cooler [5].

SUBTASK 73-11-06-020-005-F00

- (5) Do these steps to disconnect the fuel-out tube [80] from the IDG oil cooler [5]:
- (a) Remove the four bolts [75] that hold the fuel-out tube [80] and the gasket [85] to the IDG oil cooler.
 - (b) Move the fuel-out tube [80] out of the way, to make sure that it is not damaged.
 - 1) If it is necessary, use lockwire or tape to keep the tube out of the way.
 - 2) If the gasket [85] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to this task (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- (c) Install protective covers on the fuel-out tube [80] and the IDG oil cooler [5].

SUBTASK 73-11-06-020-006-F00

CAUTION: MAKE SURE THAT YOU USE TWO WRENCHES TO LOOSEN TUBE COUPLING NUTS. ONE WRENCH TO HOLD THE FITTING, THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (6) Disconnect the oil tubes [30] and [90] from the IDG oil cooler [5]:
- (a) Use two wrenches to disconnect the oil-out tube [30] from the IDG oil cooler [5].
 - (b) Use two wrenches to disconnect the oil-in tube [90] from the IDG oil cooler [5].

SUBTASK 73-11-06-020-001-F00

- (7) Remove the IDG oil cooler [5]:

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- (a) Loosen the two nuts [97] and two bolts [95] that hold the cooler to the forward bracket.

HAP ALL POST SB CFM56-7B-72-040

- (b) Loosen the two bolts [95] that hold the cooler to the forward bracket.

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- (c) Loosen the two bolts [110] that hold the cooler to the aft bracket.

HAP ALL PRE SB CFM56-7B-72-040

- (d) Hold the cooler with your hand and remove the bolts [95], washers [96] and nuts [97].

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AIRCRAFT MAINTENANCE MANUAL**HAP ALL PRE SB CFM56-7B-72-040 (Continued)****HAP ALL POST SB CFM56-7B-72-040**

- (e) Hold the cooler with your hand and remove the bolts [95] and washers [96].

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- (f) Hold the cooler with your hand and remove the bolts [110] and washers [111].
- (g) Carefully remove the IDG oil cooler from the engine.
- 1) Make sure that you do not damage the electrical harnesses as you remove the cooler.
- (h) Install protective covers on the oil tube nipples [120] and [135], the oil-out tube [30] and the oil-in tube [90].

SUBTASK 73-11-06-020-007-F00

- (8) Remove the oil tube nipples [120] and [135], for installation on the replacement IDG oil cooler:
- (a) Remove the four bolts [130] that hold the oil-out nipple [120] to the IDG oil cooler.
- (b) Remove the four bolts [145] that hold the oil-in nipple [135] to the IDG oil cooler.
- (c) Install protective covers on the oil-out nipple [120], the oil-in nipple [135], and the IDG oil cooler [5].

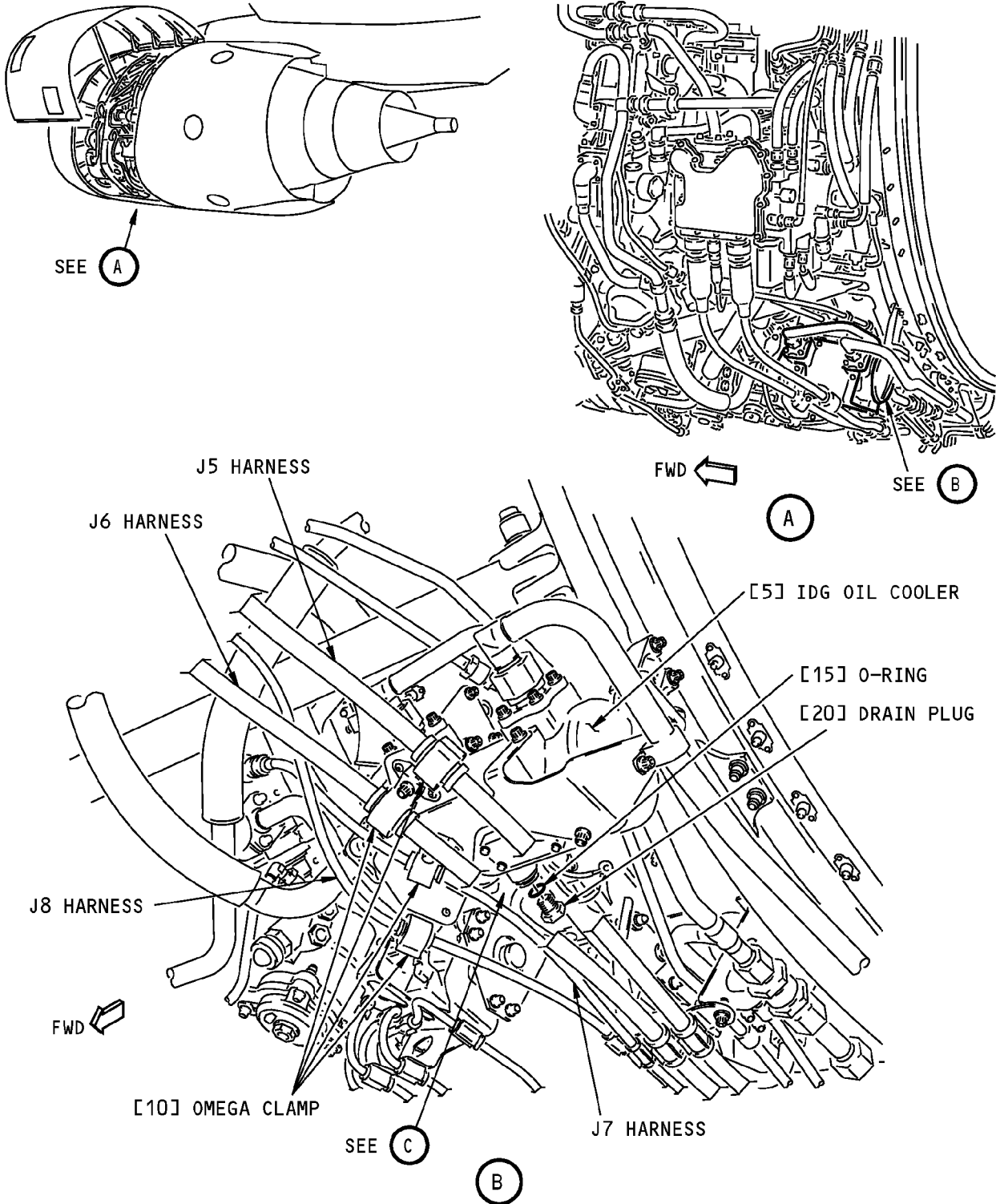
————— **END OF TASK** —————

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IDG Oil Cooler Installation
Figure 401 (Sheet 1 of 3)/73-11-06-990-801-F00

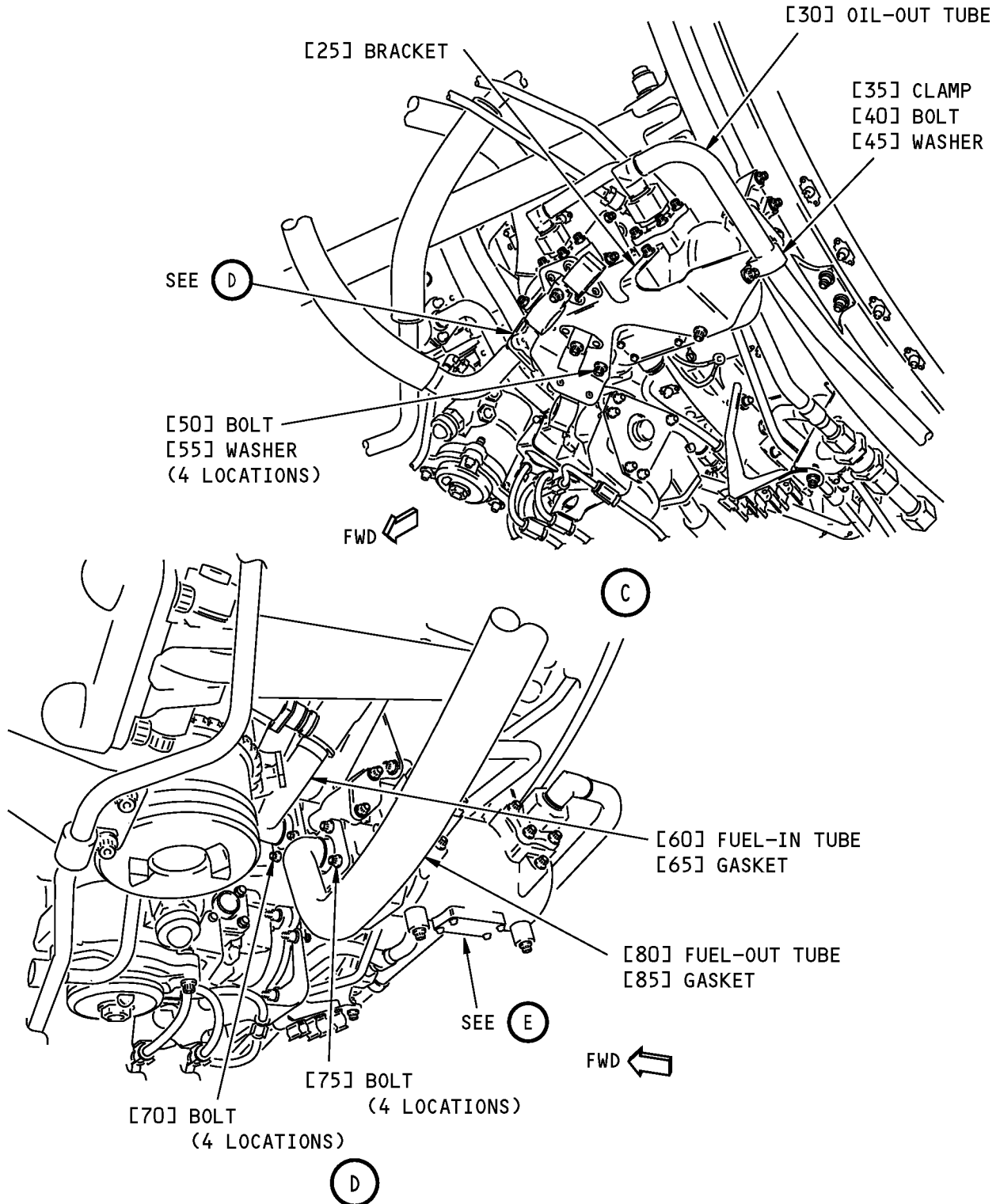
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IDG Oil Cooler Installation
Figure 401 (Sheet 2 of 3)/73-11-06-990-801-F00

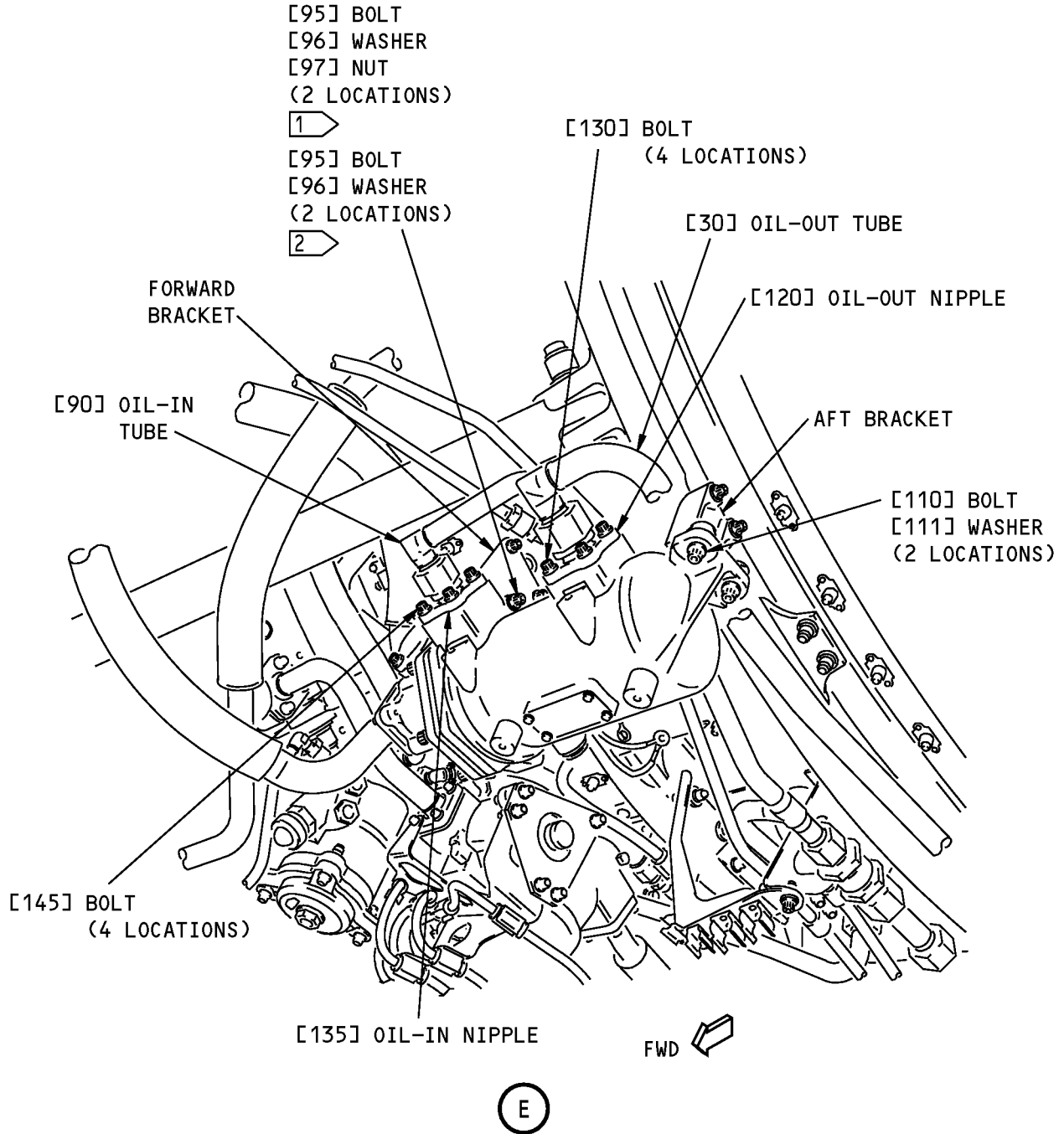
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(E)

- 1 IDG OIL COOLER FORWARD BRACKET PRE-CFMI-SB 72-040
- 2 IDG OIL COOLER FORWARD BRACKET POST-CFMI-SB 72-040

IDG Oil Cooler Installation
Figure 401 (Sheet 3 of 3)/73-11-06-990-801-F00

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TASK 73-11-06-400-801-F00

3. IDG Oil Cooler Installation

(Figure 401)

A. References

Reference	Title
12-13-21-600-801	IDG Servicing (Oil Fill) (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Cooler	73-11-06-01-080	HAP ALL
65	Gasket	73-11-00-02-262	HAP ALL
85	Gasket	73-11-00-02-262	HAP ALL

D. Location Zones

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

E. Prepare for the Installation

SUBTASK 73-11-06-840-002-F00

(1) Do these steps to prepare for the procedure:

- (a) Remove the protective covers from the IDG oil cooler [5] and its oil and fuel tubes.
- (b) Make sure that the mating surfaces of the oil cooler are clean.
- (c) Examine all of the component mating surfaces and the adjacent areas.
 - 1) Make sure that the mating surfaces are clean.
 - 2) Make sure that the components are not damaged.
- (d) Re-install the protective covers on the IDG oil cooler [5] and its oil and fuel tubes.

SUBTASK 73-11-06-420-002-F00

(2) Install the drain plug [20] in the IDG oil cooler [5]:

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WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate a new O-ring [15] with oil, D00623 [CP5066].
- (b) Install the new O-ring [15] on the drain plug [20].
- (c) Lubricate the threads of the drain plug [20] with oil, D00623 [CP5066].
- (d) Install the drain plug [20].
 - 1) Tighten the drain plug to a torque of 45-55 pound-inches (5.0-6.2 Newton meters).
- (e) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [20].

SUBTASK 73-11-06-020-008-F00

- (3) Install the oil tube nipples [120] and [135] on the IDG oil cooler [5]:
 - (a) Remove the protective covers from the oil-out nipple [120], the oil-in nipple [135], and the oil ports on the IDG oil cooler [5].
 - (b) Lubricate the threads of the bolts [130] and [145] with grease, D00601 [CP2101]
 - (c) Put the the oil-out nipple [120] in the correct position on the IDG oil cooler.
 - 1) Use the the four bolts [130] to connect the oil-out nipple [120] to the IDG oil cooler.
 - 2) Tighten the bolts [130] to 49-53 pound-inches (5.5-6.0 Newton meters).
 - (d) Put the oil-in nipple [135] in the correct position on the IDG oil cooler.
 - 1) Use the four bolts [145] to connect the oil-in nipple [135] to the IDG oil cooler.
 - 2) Tighten the bolts [145] to 49-53 pound-inches (5.5-6.0 Newton meters).

F. IDG Oil Cooler Installation

SUBTASK 73-11-06-420-003-F00

- (1) Install the IDG oil cooler [5] on the engine:
 - (a) Lubricate the threads of the bolts [95] and [110] with grease, D00601 [CP2101].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (b) Lubricate the threads of the nipples [120] and [135] with oil, D00623 [CP5066].
- (c) Put the IDG oil cooler [5] in the correct position on the engine.
 - 1) Connect the oil-in tube [90] to the oil-in nipple [135].
 - a) Do not tighten the coupling nut at this time.
 - 2) Connect the oil-out tube [30] to the oil-out nipple [120].
 - a) Do not tighten the coupling nut at this time.

HAP ALL PRE SB CFM56-7B-72-040

- (d) Loosely install the two bolts [95], two washer [96], and two nuts [97] to connect the cooler to the forward bracket.

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HAP ALL PRE SB CFM56-7B-72-040 (Continued)

HAP ALL POST SB CFM56-7B-72-040

- (e) Loosely install the two bolts [95] and two washer [96] to connect the cooler to the forward bracket.

HAP ALL

- (f) Use the two bolts [110] and two washers [111] to connect the cooler to the aft bracket.
- (g) Make sure that the IDG oil cooler [5] is in its correct position.
 - 1) Tighten the bolts [110] to 98-110 pound-inches (11-12.5 Newton meters).

HAP ALL PRE SB CFM56-7B-72-040

- 2) Tighten the nuts [97] to 98-110 pound-inches (11-12.5 Newton meters).

HAP ALL POST SB CFM56-7B-72-040

- 3) Tighten the bolts [95] to 98-110 pound-inches (11-12.5 Newton meters).

HAP ALL

SUBTASK 73-11-06-420-004-F00

- (2) Install the fuel tubes [60] and [80] to the forward end of the IDG oil cooler:

- (a) Remove the protective covers from the fuel-in tube [60], the fuel-out tube [80], and the fuel ports in the forward end of the IDG oil cooler [5].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (b) Lubricate the gasket [65] and gasket [85] with oil, D00623 [CP5066].
- (c) Lubricate the threads of the bolts [70] and [75] with grease, D00601 [CP2101].
- (d) Put the gasket [65] and the fuel-in tube [60] in the correct position on the IDG oil cooler.
 - 1) Use the the four bolts [70] to connect the fuel-in tube [60] and the gasket [65] to the IDG oil cooler.
 - 2) Tighten the bolts [70] to 49-53 pound-inches (5.5-6.0 Newton meters).
- (e) Put the gasket [85] and the fuel-in tube [80] in the correct position on the IDG oil cooler.
 - 1) Use the the four bolts [75] to connect the fuel-in tube [80] and the gasket [85] to the IDG oil cooler.
 - 2) Tighten the bolts [75] to 49-53 pound-inches (5.5-6.0 Newton meters).

SUBTASK 73-11-06-420-005-F00

CAUTION: MAKE SURE THAT YOU USE TWO WRENCHES TO TIGHTEN TUBE COUPLING NUTS. ONE WRENCH TO HOLD THE FITTING, THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (3) Tighten the coupling nuts on the oil tubes:

- (a) Tighten the coupling nut on the oil-out tube [30] to 650-770 pound-inches (73.5-87.0 Newton meters).
- (b) Tighten the coupling nut on the oil-in tube [90] to 900-1100 pound-inches (101.5-124.5 Newton meters).

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SUBTASK 73-11-06-020-009-F00

- (4) Install the bracket [25]:
- (a) Lubricate the threads of the bolts [40] and [50] with grease, D00601 [CP2101].
 - (b) Use the four bolts [50] and the four washers [55] to connect the bracket [25] to the IDG oil cooler [5].
 - 1) Tighten the bolts [50] to 98-110 pound-inches (11-12.5 Newton meters).
 - (c) Use the bolt [40], washer [45], and the clamp [35] to connect the oil-out tube [30] to the bracket [25].
 - 1) Tighten the bolt [40] to 49-53 pound-inches (5.5-6.0 Newton meters).

SUBTASK 73-11-06-420-001-F00

- (5) Put the J5, J6, J7 and J8 harnesses in the four 1/4-turn Omega clamps [10].
- (a) Close the four 1/4-turn Omega clamps [10].

G. Put the airplane in a Serviceable Condition

SUBTASK 73-11-06-730-001-F00

- (1) Do these steps to put the airplane in a serviceable condition:
- (a) Do this task: IDG Servicing (Oil Fill), TASK 12-13-21-600-801.
 - (b) Remove the DO-NOT-OPERATE tag from the applicable engine start lever.
 - (c) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
 - (d) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.
 - (e) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— **END OF TASK** —————

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SERVO FUEL HEATER - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the servo fuel heater
- (2) The installation of the servo fuel heater.

TASK 73-11-07-000-801-F00**2. Servo Fuel Heater Removal**

(Figure 401)

A. General

- (1) The servo fuel heater is on the engine, below the left fan cowl panel, at the 8:00 o'clock position.
- (2) The servo fuel heater is mounted on the top of the fuel pump package, adjacent to the main oil/fuel heat exchanger.
- (3) The servo fuel heater is attached to the HMU and the main oil/fuel heat exchanger.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Plug	73-11-01-01-060	HAP ALL
4	O-ring	73-11-01-01-065	HAP ALL

F. Location Zones

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

G. Prepare for Removal

SUBTASK 73-11-07-840-001-F00

- (1) Do these steps to prepare the airplane for the removal:

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- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- (b) Make sure the applicable start lever is in the CUTOFF position and install a DO-NOT-OPERATE tag.
- (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the spar shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.
- (f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

H. Servo Fuel Heater Removal

SUBTASK 73-11-07-680-001-F00

- (1) Do these steps to drain the fuel from the fuel pump [5]:

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

- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump.
- (b) Remove the drain plug [3] from the fuel filter cover.
- (c) Let the fuel drain in the container.
- (d) Remove and discard the O-ring [4] from the drain plug [3].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (e) Lubricate a new O-ring [4] with oil, D00623 [CP5066].
- (f) Install a new O-ring [4] on the drain plug [3].
- (g) Lubricate the threads of the drain plug [3] with oil, D00623 [CP5066].
- (h) Install the drain plug [3].
 - 1) Tighten the drain plug to a torque of 45-55 pound-inches (5.0-6.2 Newton meters).
- (i) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [3].

SUBTASK 73-11-07-210-001-F00

- (2) Make sure that the container stays below the fuel pump during the removal procedure.
 - (a) As you disassemble the servo fuel heater [1], let the unwanted fuel and oil drain into the container.

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SUBTASK 73-11-07-020-001-F00

WARNING: DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE ENGINE IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING: DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE SHUTDOWN. A PRESSURIZED ENGINE CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING: DO NOT LET HOT OIL GET ON YOU. PUT ON GOGGLES AND OTHER EQUIPMENT FOR PROTECTION OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

WARNING: DO NOT LET ENGINE OIL STAY ON YOUR SKIN. USE ENGINE OIL IN AN AREA WITH GOOD VENTILATION. ENGINE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. ENGINE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION: DO NOT LET HOT OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE COMPONENT IF OIL FALLS ON IT. OIL CAN CAUSE DAMAGE TO PAINT AND RUBBER.

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(3) Do these steps to remove the oil tube [11] from the servo fuel heater [1]:

(a) Remove the nut [15], bolt [16] and the clamp [17] that hold the oil tube [11] to the bracket.

NOTE: The nut [15] and the bolt [16] also holds a clamp for the fuel tube [14].

1) Let the other clamp stay on the fuel tube [14].

(b) Remove the nut [18], bolt [19] and clamp [20] that holds the oil tube [11] to the bracket.

(c) Remove the nut [18], bolt [19] and clamp [20] that holds the fuel tube [21] to the bracket.

(d) Use two wrenches to disconnect oil tube [11] from oil tube [10].

(e) Remove the four bolts [13] that hold the oil tube [11] and the gasket [12] to the servo fuel heater [1].

1) If the gasket [12] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

2) Remove the oil tube [11].

a) Install protective covers on the oil tube [11], oil tube [10] and the servo fuel heater [1].

SUBTASK 73-11-07-020-002-F00

(4) Do these steps to disconnect the oil tube [27] from the servo fuel heater [1]:

(a) Remove the four bolts [26] that hold the oil tube [27] and the gasket [25] to the servo fuel heater [1].

1) Move the oil tube [27] out of the way, to make sure that it is not damaged.

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- a) If it is necessary, use string or tape to keep the tube out of the way.
- 2) If the gasket [25] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- a) Install protective covers on the oil tube [27] and the servo fuel heater [1].

SUBTASK 73-11-07-020-003-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (5) Do these steps to remove the fuel tube [30] and fuel tube [31] from the servo fuel heater [1]:
 - (a) Use two wrenches to disconnect fuel tube [30] from the servo fuel heater and the fuel pump.
 - 1) Remove fuel tube [30].
 - 2) Install protective covers on the fuel tube [30], servo fuel heater, and fuel pump.
 - (b) Use two wrenches to disconnect fuel tube [31] from the servo fuel heater.
 - (c) Remove the four bolts [32] that hold the fuel tube [31] and the gasket [33] to the HMU [2].
 - 1) Remove fuel tube [31].
 - a) If the gasket [33] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- 2) Install protective covers on the fuel tube [31], servo fuel heater, and HMU [2].

SUBTASK 73-11-07-020-004-F00

- (6) Do these steps to remove the servo fuel heater [1]:
 - (a) Remove the nut [45], the bolt [46] and the clamp [47] that hold fuel tube [14] to the bracket [44].
 - (b) Remove the three nuts [42] that hold the servo fuel heater [1] and the bracket [44] to the out-board side of the main oil/fuel heat exchanger [40].
 - (c) Remove the three nuts [42] and washers [43] that hold the servo fuel heater [1] to the in-board side of the main oil/fuel heat exchanger [40].
 - (d) Carefully remove the servo fuel heater [1], bracket [44] and the gasket [41] from the main oil/fuel heat exchanger [40].
 - 1) If the gasket [41] is serviceable, then keep it with the servo fuel heater for the subsequent installation.
- NOTE:** Refer to (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.
- 2) Remove the two nipples [48].
 - a) Remove and discard the O-rings from the nipples [48].
 - 3) Install protective covers on the main oil/fuel heat exchanger [40] and the servo fuel heater [1].

————— END OF TASK —————

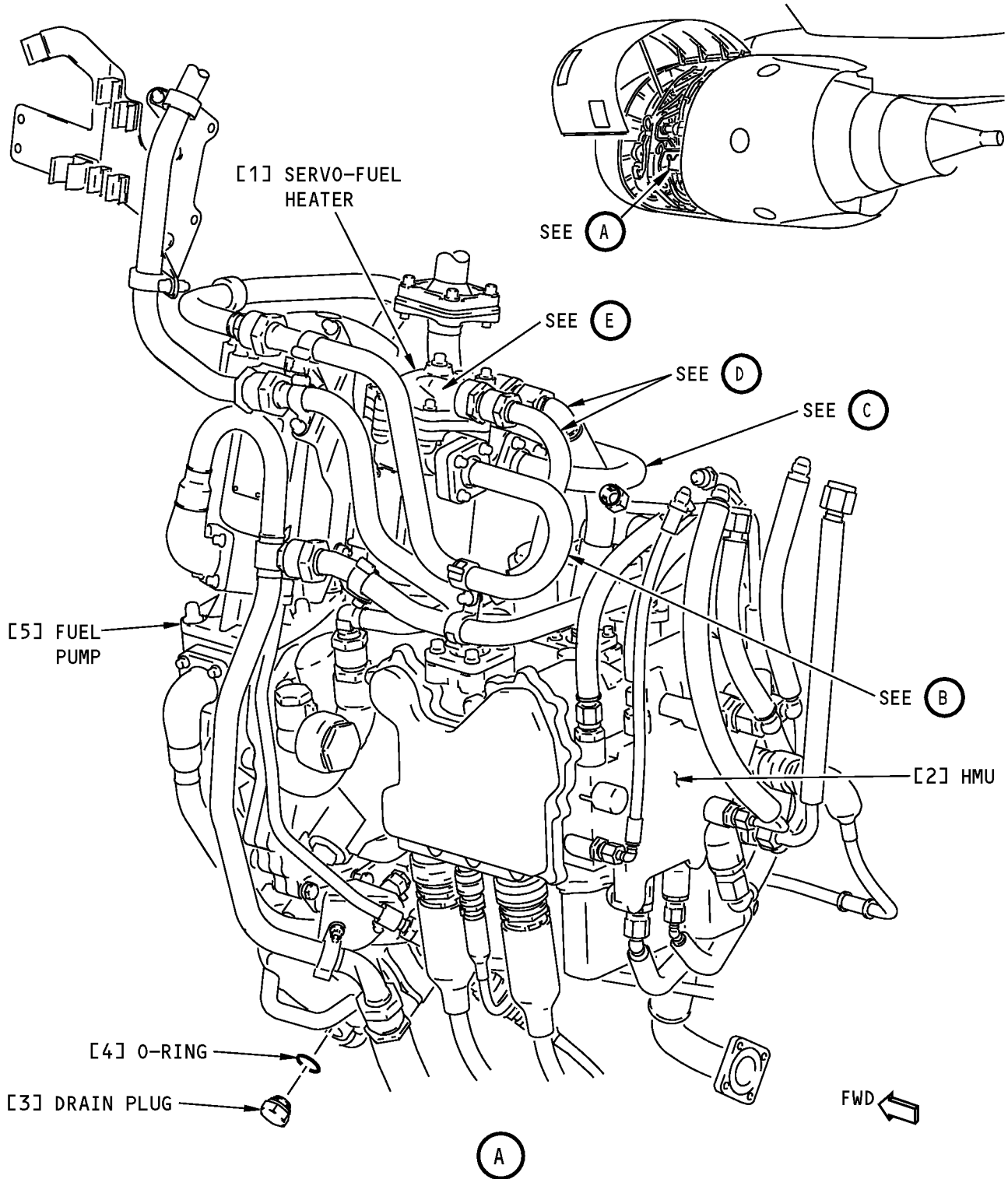
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Servo-Fuel Heater Installation
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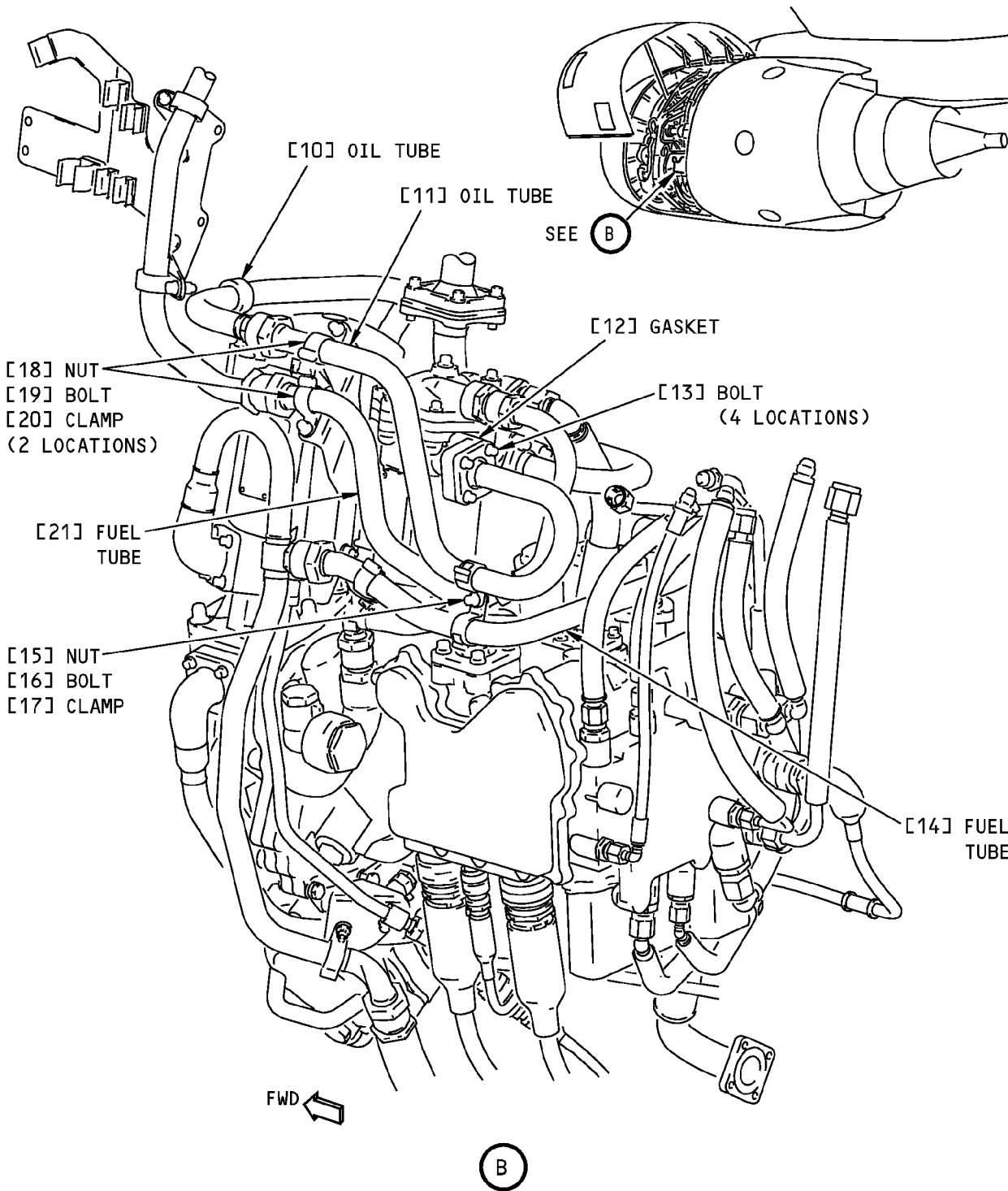
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Servo-Fuel Heater Installation
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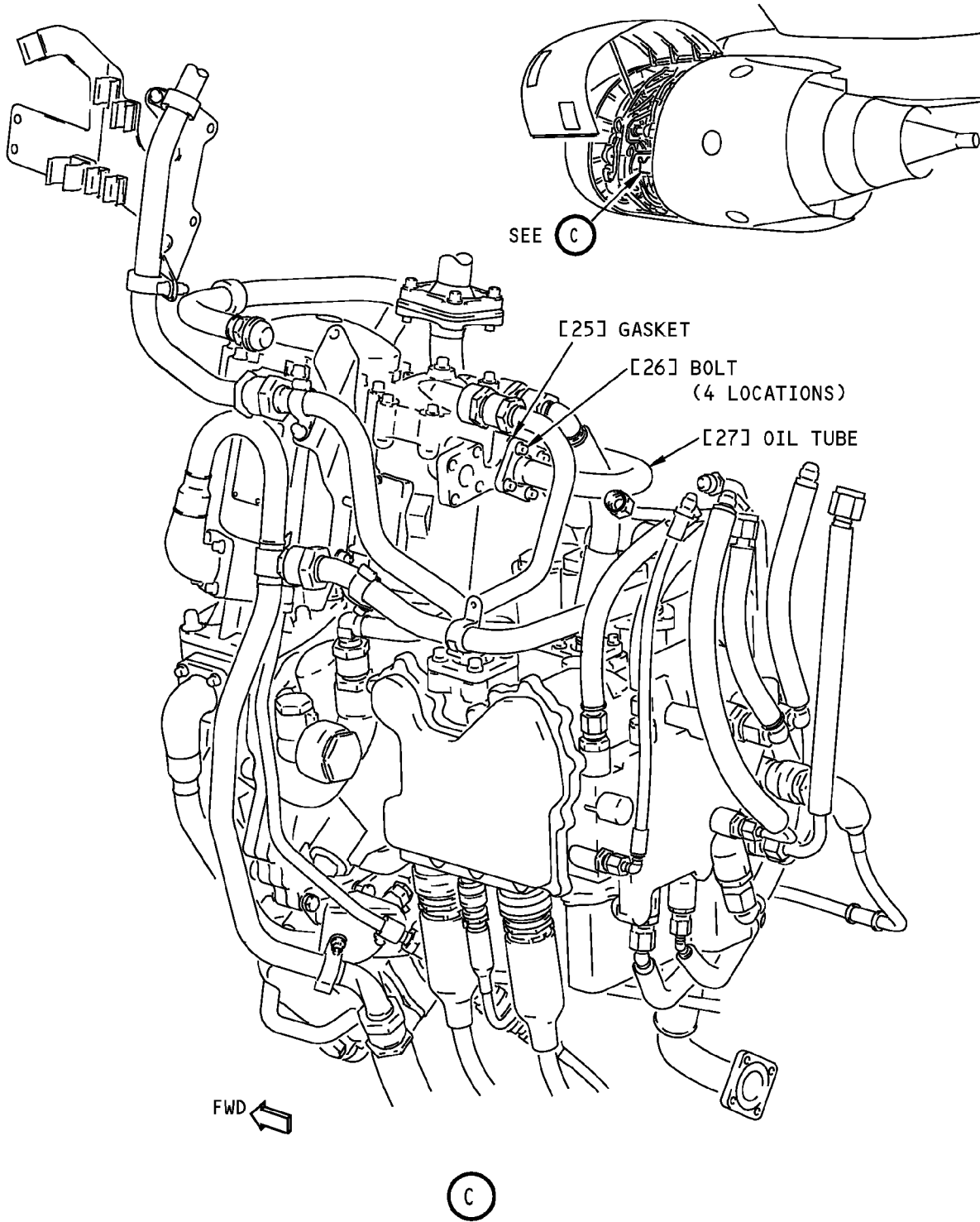
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Servo-Fuel Heater Installation
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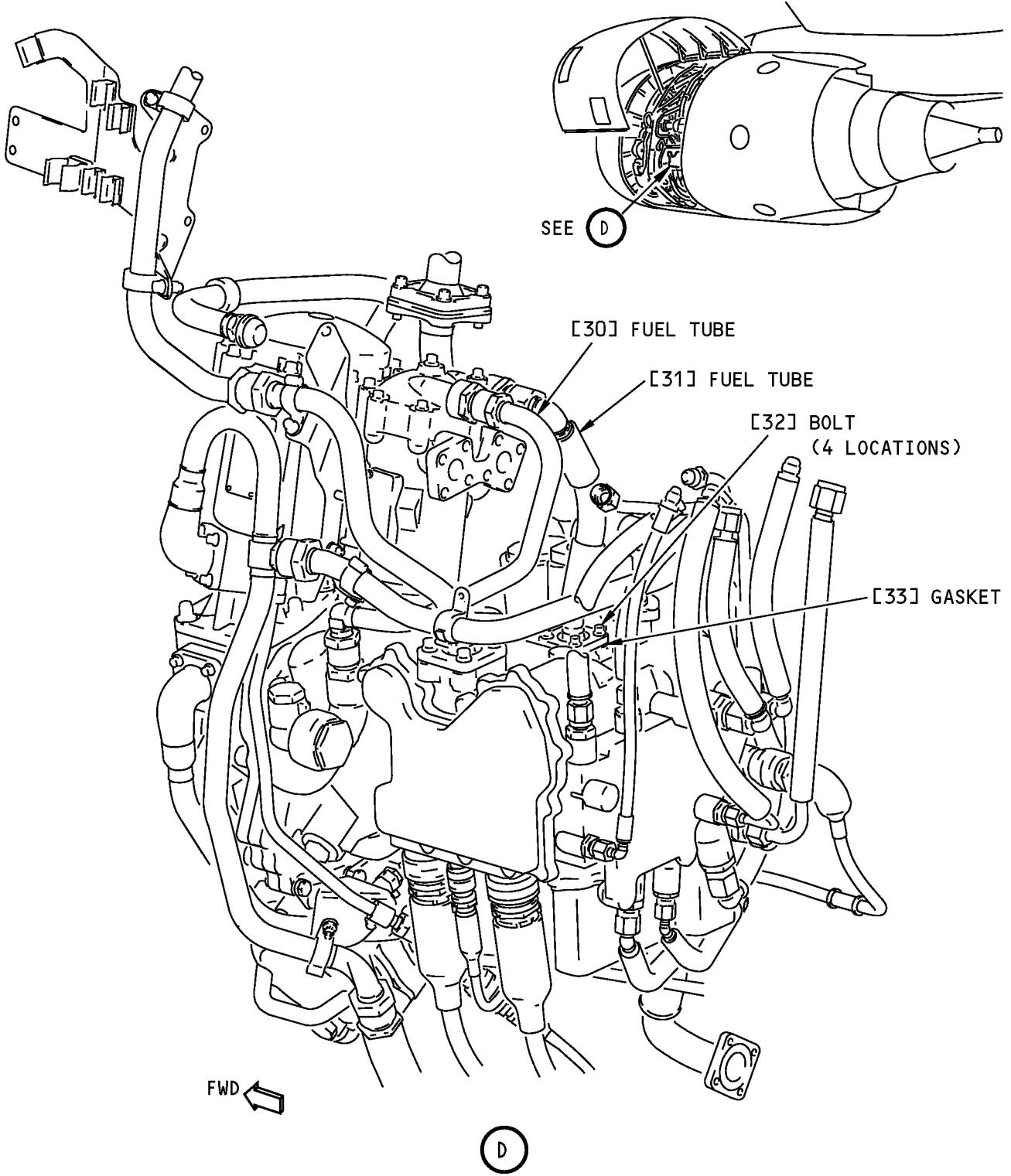
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Servo-Fuel Heater Installation
Figure 401 (Sheet 4 of 5)/73-11-07-990-801-F00

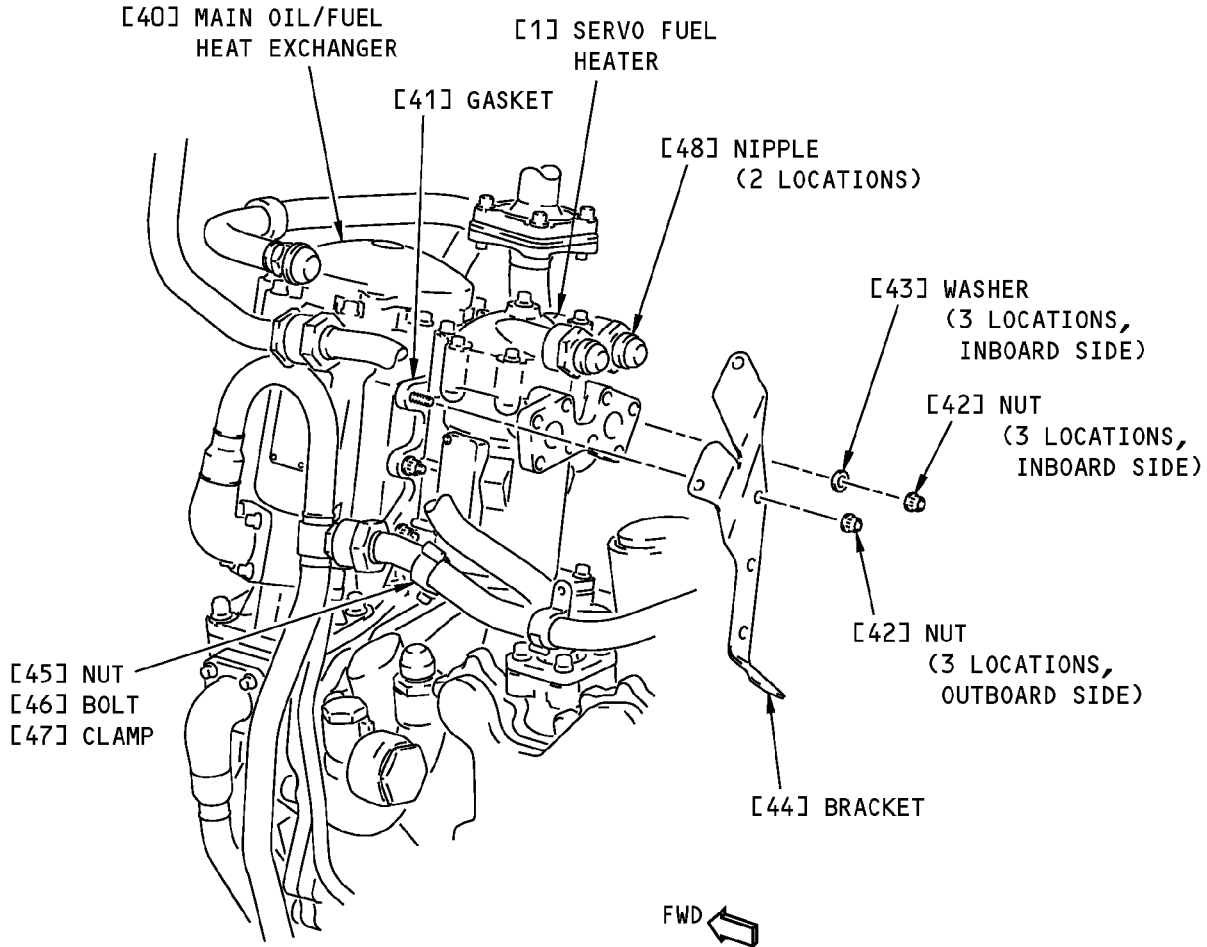
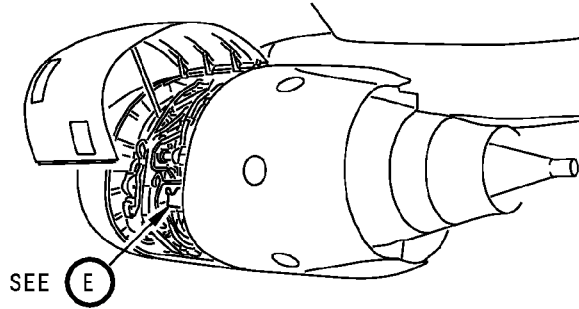
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Servo-Fuel Heater Installation
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TASK 73-11-07-400-801-F00

3. Servo Fuel Heater Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Heater	79-21-02-01-030	HAP ALL
12	Gasket	79-21-00-01-092	HAP ALL
		79-21-00-01-120	HAP ALL
25	Gasket	79-21-00-01-115	HAP ALL
33	Gasket	73-11-00-02-270	HAP ALL

D. Location Zones

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

E. Procedure

SUBTASK 73-11-07-020-005-F00

(1) Install the servo fuel heater [1] on the main oil/fuel heat exchanger [40].

- (a) Remove the protective covers from mating surfaces of the main oil/fuel heat exchanger [40] and the servo fuel heater [1].
- (b) Lubricate the applicable parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [41] with oil, D00623 [CP5066].
 - 2) Lubricate the threads of the studs on the main oil/fuel heat exchanger [40] with grease, D00601 [CP2101].
- (c) Put the gasket [41], the servo fuel heater [1], and the bracket [44] in the correct position on the main oil/fuel heat exchanger [40].

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- (d) Install the three nuts [42] that hold the servo fuel heater [1] and bracket [44] to the out-board side of the main oil/fuel heat exchanger [40].
- (e) Install the three nuts [42] and washer [43] that hold the servo fuel heater [1] to the in-board side of the main oil/fuel heat exchanger [40].
 - 1) Tighten the six nuts [42] to 98-110 pound-inches (11.0-12.5 Newton meters).
- (f) Install the nut [45], the bolt [46] and the clamp [47] that hold fuel tube [14] to the bracket [44].
 - 1) Tighten the nut [45] to 98-110 pound-inches (11.0-12.5 Newton meters).

SUBTASK 73-11-07-420-001-F00

- (2) Do these steps to install the two nipples [48]:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate two new O-rings with oil, D00623 [CP5066].
- (b) Install the O-rings in the grooves on the nipples.
- (c) Lubricate the threads of the nipples [48] with oil, D00623 [CP5066].
- (d) Install the nipples in the servo fuel heater ports.
- (e) Tighten the nipples to 361-399 pound-inches (41-45 Newton meters).
- (f) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] between the two nipples.

SUBTASK 73-11-07-020-006-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (3) Do these steps to install the fuel tube [30] and fuel tube [31] on the servo fuel heater [1]:
 - (a) Remove the protective covers from the fuel tube [30] and fuel tube [31].
 - (b) Remove the applicable protective covers from the servo fuel heater, HMU, and fuel pump.
 - (c) Lubricate the applicable parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [33] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [32] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipples with oil, D00623 [CP5066].
- (d) Put the fuel tube [30] in the correct position between the servo fuel heater and the fuel pump.
- (e) Use your hands to connect the fuel tube [30] to the servo fuel heater and the fuel pump.
- (f) Use two wrenches to tighten the coupling nut between fuel tube [30] and the fuel pump to 650-770 pound-inches (75-85 Newton meters).
- (g) Use two wrenches to tighten the coupling nut between fuel tube [30] and the servo fuel heater to 650-770 pound-inches (75-85 Newton meters).

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- (h) Put the fuel tube [31] and the gasket [33] in the correct position between the servo fuel heater and the HMU.
- (i) Use your hand to connect fuel tube [31] to the servo fuel heater.
- (j) Install the four bolts [32] that hold the fuel tube [31] and the gasket [33] to the servo fuel heater [1].
 - 1) Tighten the bolts [32] to 49-53 pound-inches (5.5-6.0 Newton meters).
- (k) Use two wrenches to tighten the coupling nut between fuel tube [31] and the servo fuel heater to 650-770 pound-inches (75-85 Newton meters).

SUBTASK 73-11-07-020-007-F00

- (4) Do these steps to connect the oil tube [27] on the servo fuel heater [1]:
 - (a) Remove the protective cover from the oil tube [27].
 - (b) Remove the applicable protective cover from the servo fuel heater [1].
 - (c) Lubricate the applicable parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [25] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [26] with grease, D00601 [CP2101].
- (d) Put the oil tube [27] and the gasket [25] in the correct position on the servo fuel heater.
- (e) Install the four bolts [26] that hold the oil tube [27] and the gasket [25] to the servo fuel heater [1].
 - 1) Tighten the bolts [26] to 49-53 pound-inches (5.5-6.0 Newton meters).

SUBTASK 73-11-07-020-008-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (5) Do these steps to install the oil tube [11] on the servo fuel heater [1]:
 - (a) Remove the protective covers from the oil tube [11], oil tube [10], and servo fuel heater.
 - (b) Lubricate the applicable parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [12] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [13], [16] and [19] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the oil tube [11] and gasket [12] in the correct position between the oil tube [10] and the servo fuel heater [1].
- (d) Loosely connect oil tube [11] to oil tube [10].
- (e) Install the four bolts [13] that hold the tube [11] and the gasket [12] to the servo fuel heater.
- (f) Make sure that the clamp on the fuel tube [14] aligns with the bracket.

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CAUTION: MAKE SURE THAT THE CLAMPS DO NOT INTERFERE WITH THE HMU, THE FUEL TUBES OR THE OIL TUBES. IF INTERFERENCE OCCURS, IT CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (g) Install the nut [15], bolt [16] and the clamp [17] that holds the oil tube [11] and the fuel tube [14].
- (h) Install the nut [18], bolt [19] and the clamp [20] that holds the oil tube [11] to the bracket.
- (i) Install the nut [18], bolt [19] and the clamp [20] that holds the fuel tube [21] to the bracket.
- (j) Tighten the four bolts [13] to 49-53 pound-inches (5.5-6.0 Newton meters).
- (k) Use two wrenches to tighten the coupling nut between oil tubes [11] and [10] to 900-1100 pound-inches (100-125 Newton meters).
- (l) Make sure that the oil tube [11] is in its correct position and does not touch other part of the engine.
- (m) Tighten the three nuts [15] and [18] to 98-110 pound-inches (11.0-12.5 Newton meters).

F. Put the Airplane in Serviceable Condition

SUBTASK 73-11-07-840-002-F00

- (1) Do these steps to put the airplane in a serviceable condition:
 - (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
 - (b) Remove the DO-NOT-OPERATE tag from the start lever.
 - (c) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

G. Servo Fuel Heater Installation Test

SUBTASK 73-11-07-720-001-F00

- (1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— **END OF TASK** —————

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BURNER STAGING VALVE - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the burner staging valve
- (2) The installation of the burner staging valve.

TASK 73-11-08-000-801-F00

2. Burner Staging Valve Removal

(Figure 401)

A. General

- (1) The burner staging valve is found on the lower side of engine, forward of the fuel nozzles.
- (2) For this procedure the burner staging valve will be referred to as the BSV.

HAP ALL POST SB CFM56-7B-73-054 AND POST SB CFM56-7B 73-44

- (3) Engines with CFMI SB 73-044 do not have the Burner Staging Valve installed.

HAP ALL POST SB CFM56-7B-73-054

- (4) Engines with CFMI SB 73-054 do not have the Burner Staging Valve installed. The Burner Staging Valve is replaced by a fuel cover.

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B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 73-11-08-840-001-F00

- (1) Do these steps to prepare for the procedure:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

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- (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
- 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

F. Burner Staging Valve Removal (BSV)

SUBTASK 73-11-08-020-001-F00

- (1) Do these steps to remove the BSV [4] from the engine:
- (a) Disconnect the electrical connectors DP0906 [1] and DP1006 [5] from the BSV [4].
- (b) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the BSV [4].

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

- (c) Remove the four bolts [3] that hold the burner staging valve [4] to the fuel supply manifold.
- (d) Remove the BSV [4].
- (e) Remove the gasket [2].
- (f) Examine the gasket [2] (TASK 70-30-01-910-802-F00).
- 1) If the gasket [2] is damaged, discard the gasket.
- 2) If there is no damage, keep the gasket [2] for the subsequent installation.
- (g) Install protective covers on the BSV [4] openings and the fuel supply manifold.

————— END OF TASK —————

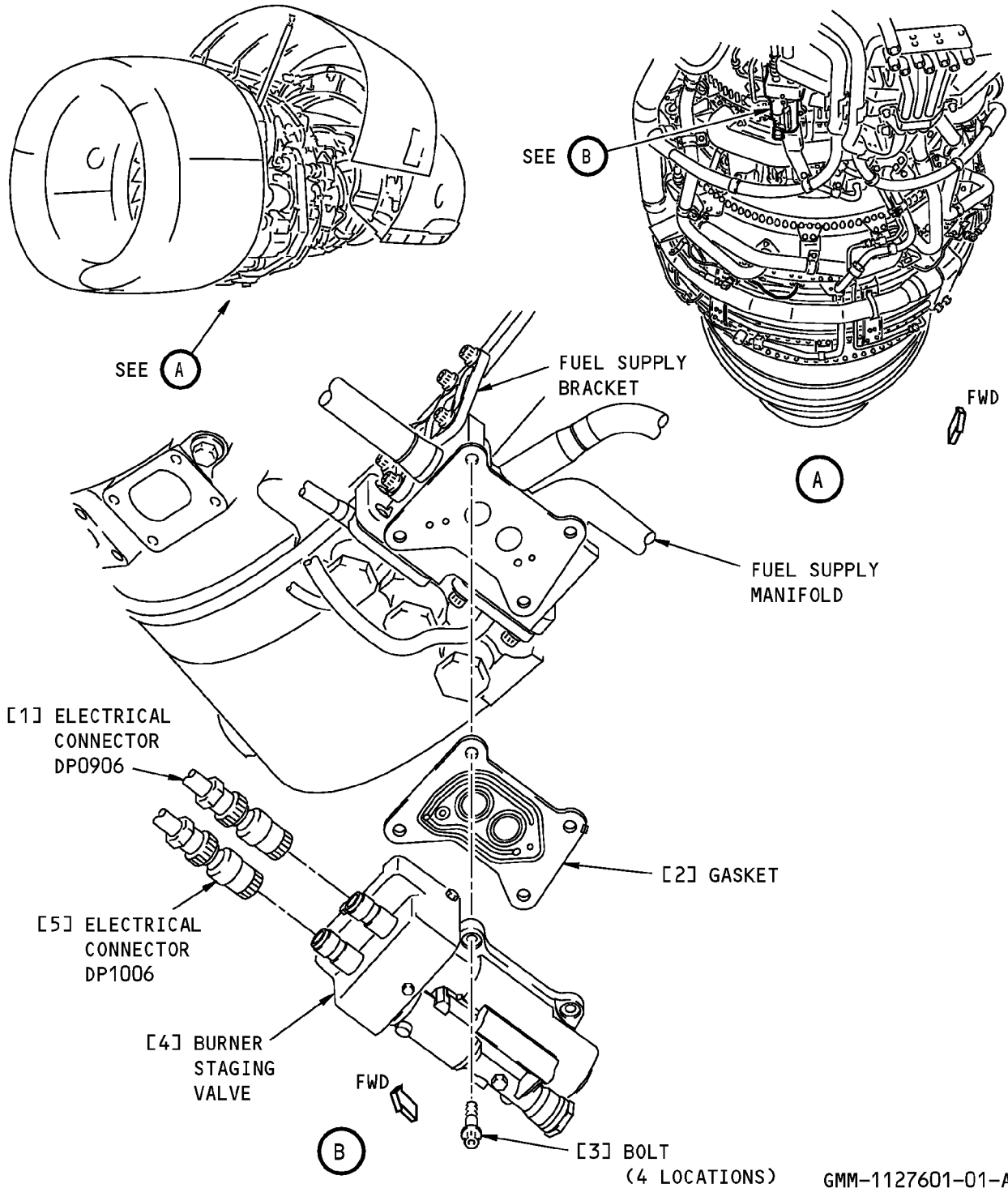
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Burner Staging Valve Installation
Figure 401/73-11-08-990-801-F00

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TASK 73-11-08-400-801-F00

3. Burner Staging Valve Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Gasket	73-11-00-06A-180	HAP 001-013, 015-026, 028-040, 042
		73-11-08-01-020	HAP 001-013, 015-026, 028-040, 042
4	Valve	73-11-00-06A-175	HAP 001-013, 015-026, 028-040, 042
		73-11-08-01-015	HAP 001-013, 015-026, 028-040, 042

D. Location Zones

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

E. Prepare for the Installation

SUBTASK 73-11-08-840-002-F00

- (1) Remove the protective covers from the BSV [4] and the fuel supply manifold.

F. Burner Staging Valve Installation

SUBTASK 73-11-08-420-001-F00

- (1) Do these steps to install the BSV [4]:
 - (a) Put the gasket [2] on the BSV [4].
 - (b) Lubricate the threads of the bolts [3] with grease, D00601 [CP2101].
 - (c) Use the four bolts [3] to install the burner staging valve [4] on the fuel supply manifold.
 - 1) Tighten the bolts [3] to 55-70 pound-inches (6-8 Newton meters).
 - (d) Install the electrical connectors DP0906 [1] and DP1006 [5] in the BSV receptacles.

G. Put the Airplane in a Serviceable Condition

SUBTASK 73-11-08-720-001-F00

- (1) Do these steps to put the airplane in a serviceable condition:

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WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER(S). IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.
- (b) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.
- (c) Remove the DO-NOT-OPERATE tag from the engine start lever.
- (d) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— **END OF TASK** —————

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FUEL SUPPLY HOSE - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel supply hose
- (2) The installation of the fuel supply hose.

TASK 73-11-10-000-801-F00**2. Fuel Supply Hose Removal**

(Figure 401)

A. General

- (1) The engine has one fuel supply hose.
- (2) The fuel supply hose is between the fuel supply fitting in the strut and the engine fuel tube at the fuel pump package.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Location Zones

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

F. Prepare for the Removal

SUBTASK 73-11-10-840-001-F00

- (1) Do these steps to prepare for the procedure:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

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- (c) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the spar fuel shutoff valve has three positions: 1) bright when the valve is in transition or does not agree with the commanded position; 2) dim when the valve is closed; or 3) off when the valve is opened.

- (d) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

- (e) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

G. Fuel Supply Hose Removal

SUBTASK 73-11-10-680-001-F00

- (1) Do these steps to drain the fuel from the fuel system:

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

- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump.
 (b) Remove the drain plug [20] from the fuel filter cover.
 (c) Let the fuel drain in the container.
 (d) Remove and discard the packing [21] from the drain plug.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (e) Lubricate a new packing [21] with oil, D00623 [CP5066].
 (f) Install a new packing [21] on the drain plug [20].
 (g) Lubricate the threads of the drain plug [20] with oil, D00623 [CP5066].
 (h) Install the drain plug [20].
 1) Tighten the drain plug [20] to a torque of 45-55 inch-pounds (5.0-6.2 newton-meters).
 (i) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [20].
 (j) Keep the container below the engine to catch the unwanted fuel that flows.

SUBTASK 73-11-10-020-001-F00

- (2) Remove the bolts [3] and strap clamps [2] that hold the fuel supply hose [1] to the fan case.

(a) Keep the bolts [3] and strap clamps [2] for the subsequent installation.

SUBTASK 73-11-10-020-002-F00

- (3) Do these steps to disconnect the fuel supply hose [1] from the engine fuel tube:

- (a) Make sure that the container (5 gal.) is in a position to catch the remaining fuel that can flow from the fuel supply hose.
 (b) Remove the four bolts [5] that hold the fuel supply hose [1] and the gasket [6] to the engine fuel tube.
 1) Discard the gasket [6].
 2) Keep the bolts [5] for the subsequent installation.

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SUBTASK 73-11-10-020-004-F00

- (4) Do these steps to disconnect the fuel supply hose [1] from the strut fitting:
- (a) Use two wrenches to disconnect the B-nut from the strut fitting.

NOTE: One wrench to hold the fuel supply hose and one wrench to turn the B-nut.

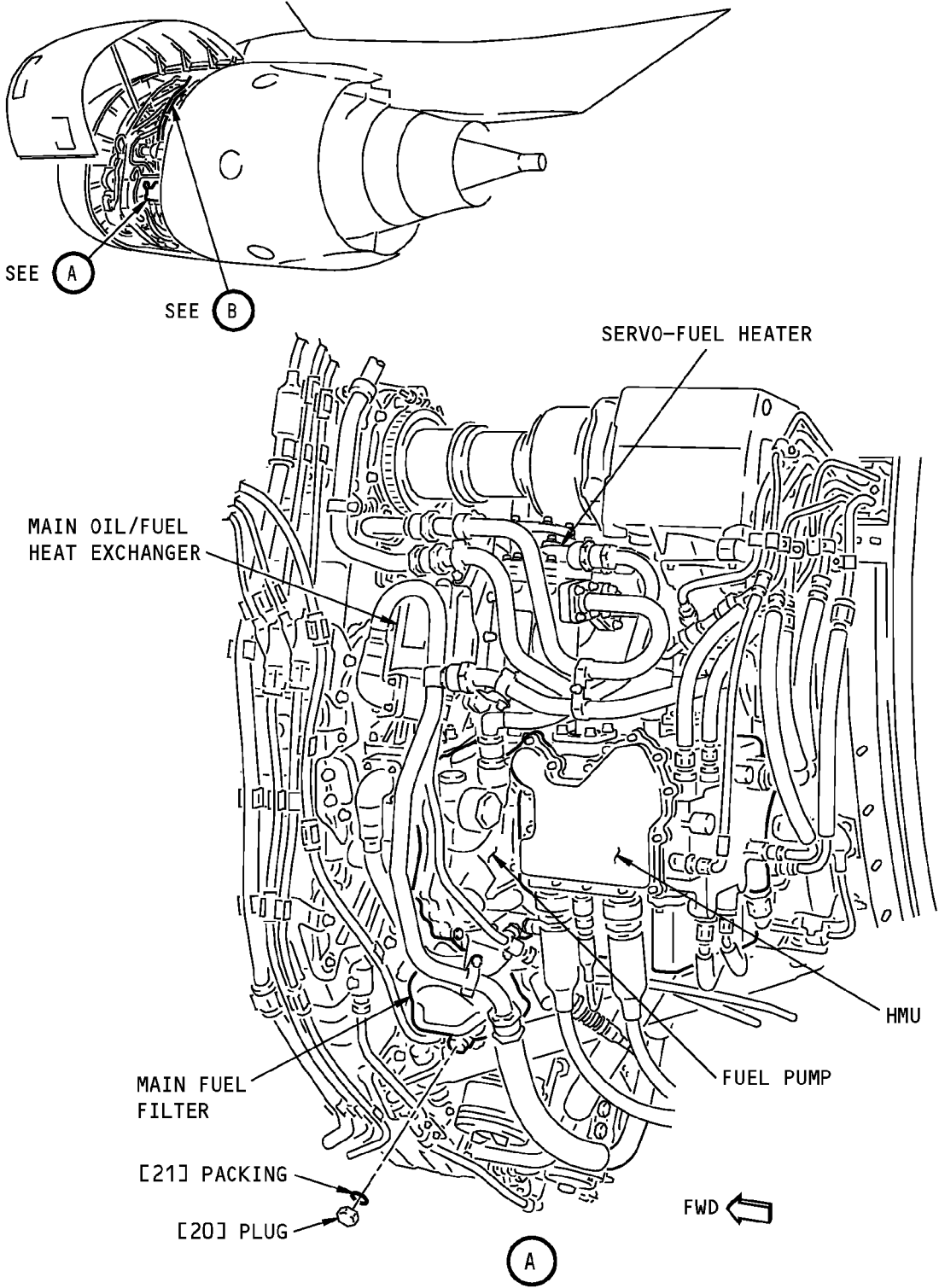
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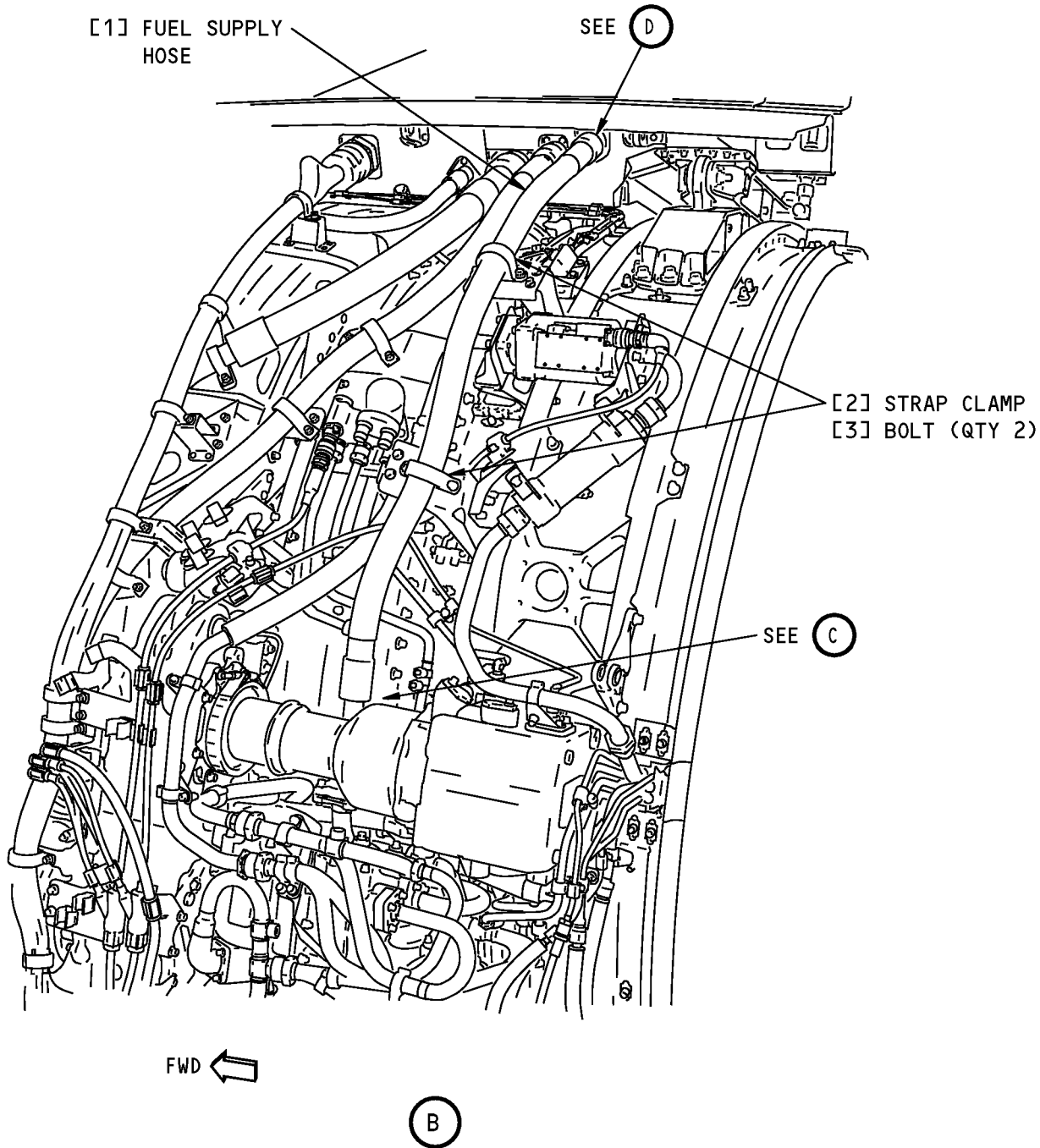


Fuel Supply Hose Installation
Figure 401 (Sheet 1 of 4)/73-11-10-990-801-F00

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Fuel Supply Hose Installation
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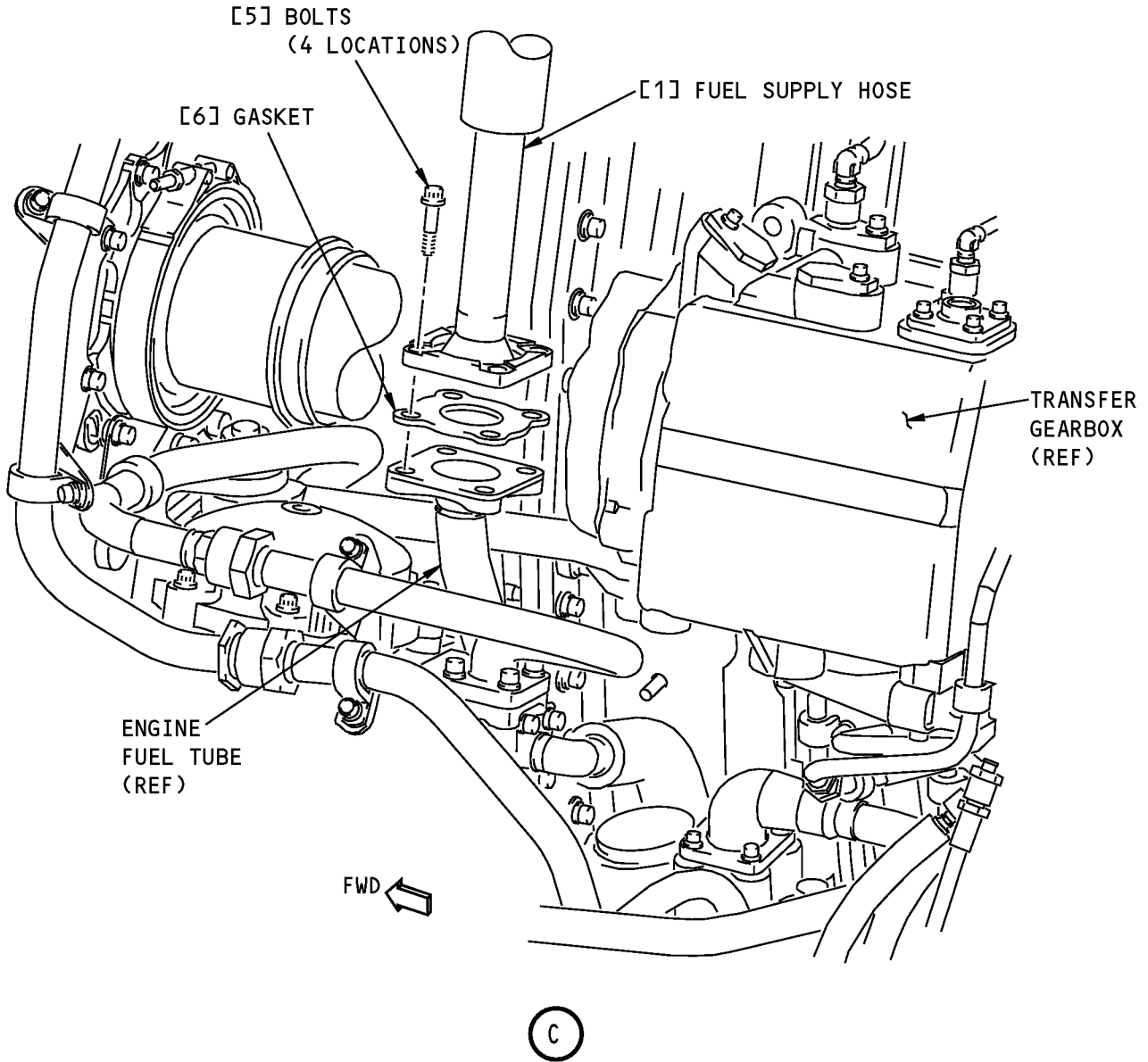
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Fuel Supply Hose Installation
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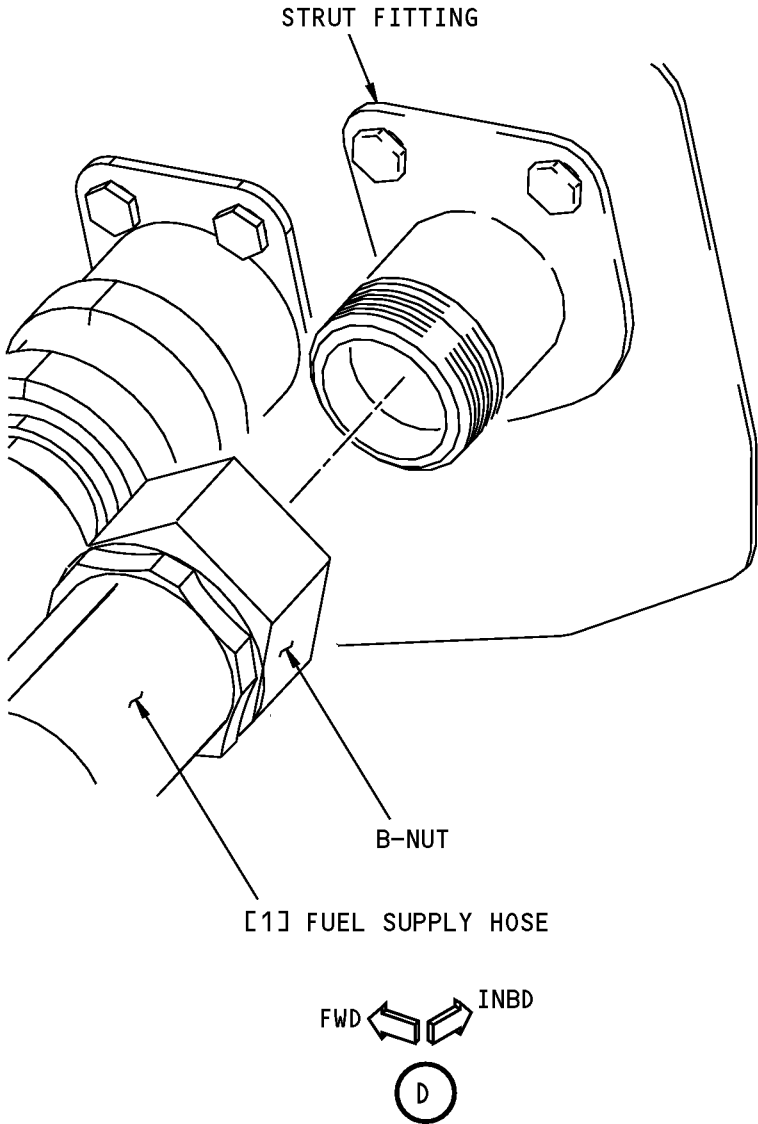
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**Fuel Supply Hose Installation
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TASK 73-11-10-400-801-F00

3. Fuel Supply Hose Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00672 [CP5070]	Grease - Petrolatum	VV-P-236

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Hose assembly	28-22-51-01-030	HAP 001-007
		28-22-51-01A-025	HAP 008-013, 015-026, 028-054, 101-999
6	Gasket	28-22-51-01-025	HAP 001-007
		28-22-51-01A-020	HAP 008-013, 015-026, 028-054, 101-999

D. Install the Fuel Supply Hose

SUBTASK 73-11-10-420-001-F00

- (1) Install the fuel supply hose assembly [1] in its correct position on the engine fan case:
 - (a) Do these steps to connect the fuel supply hose to the strut fitting:
 - 1) Use your hand to connect the B-nut to the strut fitting.
 - 2) Use two wrenches to tighten the B-nut to a torque of 1140 to 1260 inch-pounds (129.0 to 142.5 newton-meters).

NOTE: One wrench to hold the fuel supply hose and one wrench to turn the B-nut.
 - 3) Use two wrenches to loosen the B-nut fitting.
 - 4) Use two wrenches to re-tighten the B-nut to a torque of 1140 to 1260 inch-pounds (129.0 to 142.5 newton-meters).
 - (b) Lubricate the new gasket [6] with grease, D00672 [CP5070].
 - (c) Put the fuel supply hose [1] and the gasket [6] in their correct position on the engine fuel tube.
 - (d) Use the four bolts [5] to connect the fuel supply hose [1] and the gasket [6] to the engine fuel tube.
 - 1) Tighten the bolts [5] to 55 to 60 inch-pounds (6.2 to 6.8 newton-meters).
 - (e) Use the strap clamps [2] and the bolts [3] to loosely connect the fuel supply hose [1] to the fan case.
 - 1) Adjust the hose to distribute the hose equally.
 - 2) Tighten the bolts [3] to 65 to 100 inch-pounds (7.3 to 11.3 newton-meters).

E. Installation Test

SUBTASK 73-11-10-790-001-F00

- (1) Do these steps to prepare for the installation test:

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- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

- (b) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

- (c) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

- (d) Do these steps to apply the boost pump pressure to the fuel pump inlet of the applicable engine:

- 1) Make sure that the two Engine Start Switches on the P5 Overhead Panel are in the OFF position.

a) Attach DO-NOT-OPERATE tags to the two Engine Start Switches.

- 2) For engine 1, do this step:

Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

- 3) For engine 2, do this step:

Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

- 4) Move the applicable start lever to the IDLE position.

- 5) Make sure the applicable SPAR VALVE CLOSED light on the overhead panel, P5, comes on bright (valve in transition or when the valve does not agree with the commanded position) and then goes off (valve open).

a) The applicable ENG VALVE CLOSED light will change to bright and not go off because engine fuel pump pressure (N2 turns) is necessary to open the valve.

- 6) For engine 1, do this step:

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

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7) For engine 2, do this step:

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

8) Move the applicable start lever to the CUTOFF position.

(e) For engine 1, do this step:

Put these switches of the overhead panel, P5, to the ON position:

1) FUEL PUMP 1 FWD

2) FUEL PUMP 1 AFT.

(f) For engine 2, do this step:

Put these switches of the overhead panel, P5, to the ON position:

1) FUEL PUMP 2 FWD

2) FUEL PUMP 2 AFT.

SUBTASK 73-11-10-210-001-F00

(2) Examine the fittings on the fuel supply hose [1] for leaks.

(a) If you find a leak, then repair the fitting as it is necessary.

(b) If you do not find a leak, then continue.

SUBTASK 73-11-10-840-003-F00

(3) Do these steps to put the airplane in a serviceable condition:

(a) For engine 1, do this step:

Put these switches of the overhead panel, P5, to the OFF position:

1) FUEL PUMP 1 FWD

2) FUEL PUMP 1 AFT.

(b) For engine 2, do this step:

Put these switches of the overhead panel, P5, to the OFF position:

1) FUEL PUMP 2 FWD

2) FUEL PUMP 2 AFT.

(c) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

(d) For engine 2, do this step:

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Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

- (e) Remove the DO-NOT-OPERATE tags from the two Engine Start Switches.
- (f) do this step: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

————— **END OF TASK** —————

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FUEL CONTROL SYSTEM - ADJUSTMENT/TEST**1. General**

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
 - (1) EEC BITE TEST - RECENT FAULTS
 - (2) EEC BITE TEST - FAULT HISTORY
 - (3) Prepare for the Tests
 - (4) The FADEC System Test
 - (5) The EEC TEST
 - (6) The T/R LEVER INTLK (Interlock) TEST
 - (7) Thrust Lever Adjustment and Thrust Reverser Position Adjustment Tests
 - (8) Engine 1 and Engine 2 Thrust Lever Angle Resolver Alignment Test
 - (9) The IDENT/CONFIG
 - (10) The EEC Discretes Test
 - (11) Erase All EEC Faults
 - (12) The FADEC 2 or FADEC 3 Identification.

TASK 73-21-00-740-803-F00**2. EEC BITE TEST - RECENT FAULTS**

(Figure 501)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) Use the Flight Management Computer/Control Display Unit (FMCS CDU) to do the Engine EEC BITE TEST.
- (3) The EEC BITE - Recent Faults procedure shows maintenance messages for the three most recent flight legs.
 - (a) The maintenance messages are stored in the EEC and show on the FMCS CDU.
 - (b) The FMCS CDU shows the maintenance messages for only one engine at a time.
- (4) The FMCS CDU shows only one maintenance message on each screen.
 - (a) The FMCS CDU shows the page you are on and the total number of pages.

NOTE: If the FMCS CDU screen shows 2/4, you are on page 2 of 4 pages.

- (5) There are five categories of maintenance messages. The time limited dispatch limits which are given below are for on-condition events.

NOTE: The CFM56-7B Engine Shop Manual (CFMI-TP.SM.10), ATA 05-17-01 is the certified authority for the Time Limited Dispatch.

- (a) ENGINE CONTROL LIGHT Faults - You can not dispatch the airplane with this fault.

NOTE: These faults cause the ENGINE CONTROL Light to come ON.

- (b) ALTERNATE MODE LIGHT Fault - Refer to the Minimum Equipment List (MEL) for the dispatch limits.

NOTE: These faults cause the ALTN Mode Light to come ON.

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- (c) SHORT TIME Fault - Calculate the remaining flight hours that you can operate with this fault as follows:
- 1) The remaining Flight Hours (R) = 150 flight hours - "Q", where "Q" is the scheduled maintenance interval your airline uses to check the EEC BITE TEST - RECENT FAULTS, SHORT TIME category.

NOTE: If your airline looks for EEC faults every 70 flight hour, then "Q" = 70. If your airline looks for EEC faults every 150 flight hours, then "Q" = 150.
- (d) LONG TIME Fault - Calculate the remaining flight hours that you can operate with this fault as follows:
- 1) The remaining Flight Hours (T) = 500 flight hours - "S/2", where "S/2" is one half of the scheduled maintenance interval your airline uses to check the EEC BITE TEST - RECENT FAULTS, LONG TIME category.

NOTE: If your airline looks for EEC faults every 70 flight hour, then "S/2" = 35. If your airline looks for EEC faults every 150 flight hours, then "S/2" = 75.
- (e) ECONOMIC Awareness Fault - There are no time limits for dispatch. Repair the problem at a convenient time.
- (6) The recent faults function will show the maintenance message numbers for the most recent three flight legs and one ground operation.
- (a) Flight Legs 1 through 3 are the three most recent flight legs.
 - (b) Flight Leg 0:
 - 1) Can show maintenance messages that occur more than 30 seconds after landing from the last flight leg.
 - 2) Can show the most recent ground run of the engine.

NOTE: If the engine is started and stopped more than once between flights, Flight Leg 0 will contain data from the last ground run of the engine.
 - (c) The X below the flight leg number indicates that the fault occurred on that flight leg.
 - 1) For flight legs that did not have the fault, the space below the flight legs number is blank.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation
FIM 73-22 TASK 806	Engine Position Signal is out of Range - Fault Isolation

C. Location Zones

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

D. Procedure

SUBTASK 73-21-00-740-003-F00

- (1) Do these steps to get the RECENT FAULTS data for Engine 1 or Engine 2:
- (a) Make sure that the airplane has electrical power.
 - 1) If it is necessary, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

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- (b) Get access to the FMCS CDU in the flight compartment.
- (c) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

- (d) Push these line select keys (LSK) on the FMCS CDU:

- 1) INDEX
- 2) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

- 3) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

- 4) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

- (e) Push the RECENT FAULTS LSK.

NOTE: This LSK causes the RECENT FAULTS screen to show. The HISTORY LSK, on the Recent Faults screen, will show the fault history for the maintenance message that shows on the screen. The NEXT PAGE key will continue to show the other faults in the RECENT FAULTS format. The INDEX LSK will send you to the ENGINE X BITE TEST MAIN MENU.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.
- 2) Record this data from each screen:
 - a) The Dispatch Level

NOTE: The dispatch level will show at the top of the screen. The FMCS CDU will display the faults in the order of their dispatch level. The ENGINE CONTROL light faults will show first, then the ALTERNATE MODE LIGHT faults, then the SHORT TIME faults, then the LONG TIME faults, and last the ECONOMIC awareness faults. Refer to the CFM56-7B Engine Shop Manual 05-17-01, or the General Statement of this procedure for the Time Limited Dispatch capabilities for each category of message.

- b) Maintenance Message Number

NOTE: A seven digit number with this format: AA - XDDDN. AA = ATA Chapter, X = EEC Channel (1=Channel A, 2=Channel B, 3=Channels A and B), DDD = a unique fault number, and N = Engine Position (1=Engine 1, 2=Engine 2). If the message is reported with an engine position equal to zero, then for the applicable engine, do the corrective action for Engine Position Signal is out of Range (73-X138N) (FIM 73-22 TASK 806).

- 3) Push the NEXT PAGE key to see the subsequent maintenance message.
 - a) Continue to push the NEXT PAGE key until you record all of the faults.
- 4) If you want to go back to the previous message, push the PREV PAGE key.

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- 5) If the ENGINE CONTROL light was ON and none of the ENGINE CONTROL light messages show during the EEC BITE Test, then, do this task: EEC TEST, TASK 73-21-00-700-804-F00.
- a) Look for one or more of these Maintenance Message:
- b) 73-10201, 73-10202, 73-20201 73-20202, 73-30201, 73-30202, 73-10211, 73-10212, 73-20211 73-20212, 73-30211, 73-30212, 73-10221, 73-10222, 73-20221 73-20222, 73-30221 or 73-30222.

NOTE: These INTERNAL EEC messages can set the ENGINE CONTROL light, but the problem that causes the fault also causes problems with the EEC BITE Test. When this occurs, the EEC cannot write to the EEC fault memory.

- c) Do the corrective action in the FIM for the messages that you find.
- (f) If the fault data is not available from one of the two channels (A and B) of the EEC, the screen will show the EEC channel that has data.
- 1) Example:
FOR CH B (A) ONLY, CH A (B) EEC DATA NOT AVAILABLE, CAN NOT ACCESS CH A (B)
- (g) If you are in RECENT FAULTS and there are no faults stored for the flight legs 0 through 3, the screen will show NO RECENT FAULTS STORED.
- (h) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.
- (i) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

————— **END OF TASK** —————

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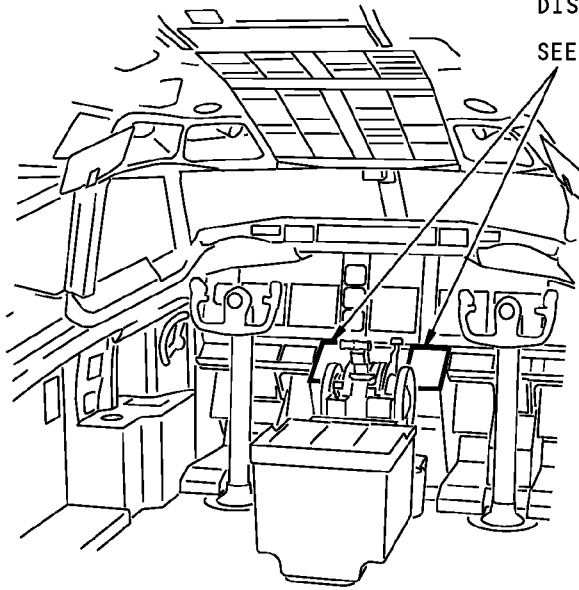
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FMCS CONTROL
DISPLAY UNIT (CDU)

SEE (A)



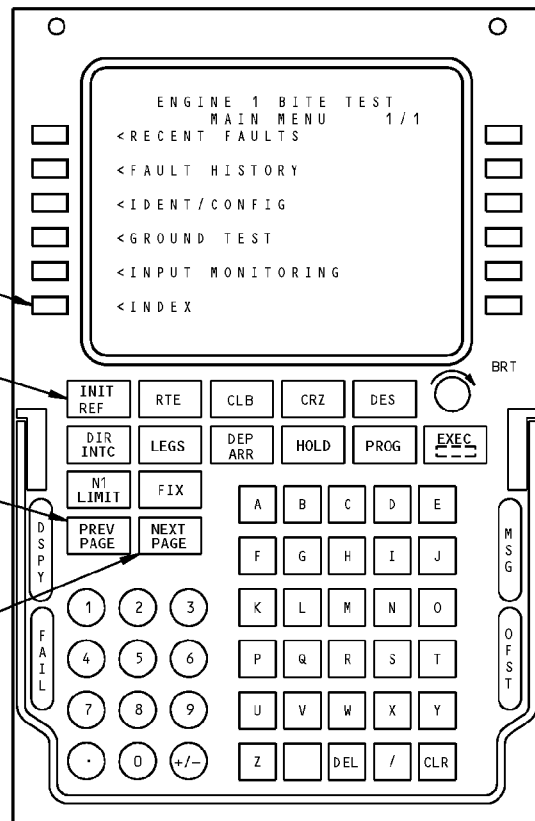
FLIGHT COMPARTMENT

LINE SELECT KEY (LSK)
(12 LOCATIONS)

INIT REF
FUNCTION KEY

PREVIOUS
PAGE KEY

NEXT PAGE KEY



FMCS CONTROL DISPLAY UNIT (CDU)

(A)

**Engine 1 BITE Test Main Menu
Figure 501/73-21-00-990-801-F00**

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TASK 73-21-00-740-801-F00

3. EEC BITE TEST - FAULT HISTORY

(Figure 501)

A. General

- (1) Use the Flight Management Computer/Control Display Unit (FMCS CDU) to do the EEC BITE TEST - FAULT HISTORY.
- (2) The EEC BITE TEST - FAULT HISTORY procedure shows maintenance messages for the ten most recent flight legs.
 - (a) The maintenance messages are stored in the EEC and displayed on the FMCS CDU.
 - (b) The FMCS CDU shows the maintenance messages for only one engine at a time.
- (3) The FMCS CDU shows only one maintenance message on each screen.
 - (a) The FMCS CDU shows the page you are on and the total number of pages.

NOTE: If the FMCS CDU screen shows 2/4, you are on page 2 of 4 pages.
- (4) There are five categories of maintenance messages. The time limited dispatch limits which are given below are for on-condition events.

NOTE: The CFM56-7B Engine Shop Manual (CFMI-TP.SM.10), ATA 05-17-01 is the certified authority for the Time Limited Dispatch.

- (a) ENGINE CONTROL LIGHT Faults - You can not dispatch the airplane with this fault.

NOTE: These faults cause the ENGINE CONTROL Light to come ON.
- (b) ALTERNATE MODE LIGHT Fault - Refer to the Minimum Equipment List (MEL) for the dispatch limits.

NOTE: These faults cause the ALTN Mode Light to come ON.
- (c) SHORT TIME Fault - Calculate the remaining flight hours that you can operate with this fault as follows:
 - 1) The remaining Flight Hours (R) = 150 flight hours - "Q", where "Q" is the scheduled maintenance interval your airline uses to check the EEC BITE TEST - RECENT FAULTS, SHORT TIME category.

NOTE: If your airline looks for EEC faults every 70 flight hour, then "Q" = 70. If your airline looks for EEC faults every 150 flight hours, then "Q" = 150.
- (d) LONG TIME Fault - Calculate the remaining flight hours that you can operate with this fault as follows:
 - 1) The remaining Flight Hours (T) = 500 flight hours - "S/2", where "S/2" is one half of the scheduled maintenance interval your airline uses to check the EEC BITE TEST - RECENT FAULTS, LONG TIME category.

NOTE: If your airline looks for EEC faults every 70 flight hour, then "S/2" = 35. If your airline looks for EEC faults every 150 flight hours, then "S/2" = 75.
- (e) ECONOMIC Awareness Fault - There are no time limits for dispatch. Repair the problem at a convenient time.
- (5) The fault history function will show the maintenance message numbers for the ten most recent flight legs and one ground operation.
 - (a) Flight Leg 1 shows the data for the most recent flight leg.
 - (b) Flight Leg 10 shows the data for the oldest flight leg that is stored in the system.

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(c) Flight Leg 0:

- 1) Can show maintenance messages that occur more than 30 seconds after landing from the last flight leg.
- 2) Can show the most recent ground run of the engine.

NOTE: If the engine is started and stopped more than once between flights, Flight Leg 0 will contain data from the last ground run of the engine.

(6) The X below the flight leg number indicates that the fault occurred on that flight leg.

- (a) For flight legs that did not have the fault, the space below the flight legs number is blank.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation
FIM 73-22 TASK 806	Engine Position Signal is out of Range - Fault Isolation

C. Location Zones

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

D. Procedure

SUBTASK 73-21-00-740-001-F00

(1) Do these steps to get the FAULT HISTORY data for Engine 1 or Engine 2:

- (a) Make sure that the airplane has electrical power.
 - 1) If it is necessary, do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- (b) Get access to the FMCS CDU in the flight compartment.
- (c) Push the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

(d) Push these line select keys (LSK) on the FMCS CDU:

- 1) INDEX
- 2) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

3) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

4) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

(e) Push the FAULT HISTORY LSK.

NOTE: This LSK causes the FAULT HISTORY screen to show. The INDEX LSK will send you to the ENGINE X BITE TEST MAIN MENU.

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- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.
- 2) Record this data from each maintenance message screen:
 - a) The Dispatch Level

NOTE: The dispatch level will show at the top of the screen. The FMCS CDU will display the faults in the order of their dispatch level. The ENGINE CONTROL light faults will show first, then the ALTERNATE MODE LIGHT faults, then the SHORT TIME faults, then the LONG TIME faults, and last the ECONOMIC awareness faults. Refer to the CFM56-7B Engine Shop Manual 05-17-01, or the General Statement of this procedure for the Time Limited Dispatch capabilities for each category of message.

- b) Maintenance Message Number

NOTE: A seven digit number with this format: AA - XDDDN. AA = ATA Chapter, X = EEC Channel (1 = Channel A, 2 = Channel B, 3 = Channels A and B), DDD = a unique fault number, and N = Engine Position (1 = Engine 1, 2 = Engine 2). If the message is reported with an engine position equal to zero, then for the applicable engine, do the corrective action for Engine Position Signal is out of Range (73-X138N)(FIM 73-22 TASK 806).

- 3) Push the NEXT PAGE key to see the subsequent maintenance message.
 - a) Continue to push the NEXT PAGE key until you record all of the applicable maintenance message data that is stored in the system.
 - 4) If you want to go back to the previous message, push the PREV PAGE key.
 - 5) If the ENGINE CONTROL light was ON and none of the ENGINE CONTROL light messages show during the EEC BITE Test, then, do this task: EEC TEST, TASK 73-21-00-700-804-F00.
 - a) Look for one or more of these Maintenance Message:
 - b) 73-10201, 73-10202, 73-20201 73-20202, 73-30201, 73-30202, 73-10211, 73-10212, 73-20211 73-20212, 73-30211, 73-30212, 73-10221, 73-10222, 73-20221 73-20222, 73-30221 or 73-30222.

NOTE: These INTERNAL EEC messages can set the ENGINE CONTROL light, but the problem that causes the fault also causes problems with the EEC BITE Test. When this occurs, the EEC cannot write to the EEC fault memory.

- c) Do the corrective action in the FIM for the messages that you find.
- (f) If the fault data is not available from the two channels (A and B) of the EEC, the screen will show the EEC channel that has data.
 - 1) Example:

FOR CH B (A) ONLY, CH A (B) EEC DATA NOT AVAILABLE, CAN NOT ACCESS CH A (B)
- (g) If you are in FAULT HISTORY and there are no faults stored for the flight legs 0 through 10, the screen will show NO FAULT HISTORY STORED.
- (h) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.

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- (i) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

————— END OF TASK —————

TASK 73-21-00-840-801-F00

4. Prepare for the Tests

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)

B. Location Zones

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

C. Prepare for the Tests

SUBTASK 73-21-00-840-001-F00

- (1) Do these steps to prepare for the test:

- (a) Make sure that the airplane has electrical power.

1) If it is necessary, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

- (b) For engine 1, do this step:

Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-1

Row	Col	Number	Name
E	5	C01009	ADIRU LEFT DC
E	7	C01007	ADIRU LEFT AC

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
A	6	C01017	FMCS CMPTR 1
D	2	C01372	DISPLAY CTR UPR
D	5	C01359	DISPLAY DEU 1 PRI
E	8	C00425	ADIRU LEFT EXC

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
C	14	C01008	ADIRU RIGHT AC
C	15	C00426	ADIRU RIGHT EXC
C	17	C01010	ADIRU RIGHT DC
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

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F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1
F	13	C01179	INDICATOR MASTER DIM SECT 7

(c) For engine 2, do this step:

Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
E	5	C01009	ADIRU LEFT DC
E	7	C01007	ADIRU LEFT AC

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	6	C01017	FMCS CMPTR 1
D	2	C01372	DISPLAY CTR UPR
D	5	C01359	DISPLAY DEU 1 PRI
E	8	C00425	ADIRU LEFT EXC

F/O Electrical System Panel, P6-1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	14	C01008	ADIRU RIGHT AC
C	15	C00426	ADIRU RIGHT EXC
C	17	C01010	ADIRU RIGHT DC
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2
F	13	C01179	INDICATOR MASTER DIM SECT 7

- (d) Make sure that the Engine START LEVERS are in the CUTOFF position.
- (e) Make sure that the ENGINE START switches are in the off position.
- (f) Make sure that the thrust levers are at the IDLE stop.
- (g) Make sure that the thrust reversers are in the retracted (stowed) position.
- (h) Get access to the FMCS CDU in the flight compartment.
- (i) Push the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

————— END OF TASK —————

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TASK 73-21-00-700-802-F00

5. FADEC System Test

(Figure 501)

A. General

- (1) This task is the complete test of the FADEC (Full Authority Digital Engine Controller) system.
- (2) The task is used when the EEC or the Engine is replaced.

B. References

Reference	Title
71-00-00-700-807-F00	Test 12 - Actuators Test (P/B 501)
73-21-60-470-801-F00	EEC Software Load (P/B 201)

C. Location Zones

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

D. FADEC System Test

SUBTASK 73-21-00-700-002-F00

- (1) When you do the FADEC system test, you must make sure the configuration of the engine and EEC is compatible with the opposite engine and EEC, the airplane and thrust reversers.

NOTE: Refer to Boeing SB 737-71-1588 for concurrent requirements necessary for installation of a Tech Insertion (TI) CFM56-7BXX/3 engine or CFM56-7BXX SAC engine incorporating CFM-SB 72-0583 on 737-600/700/800/900/BBJ airplanes from Line Positions 1 through 2229.

NOTE: Refer to Boeing SB 737-71-1551 for concurrent requirements necessary for installation of TI CFM56-7BXX/3 engine or CFM56-7BXX SAC engine incorporating CFM-SB 72-0583 on 737-700/800 airplanes from Line Positions 2230 through 2252.

NOTE: Refer to Boeing SB 737-71-1582 for concurrent requirements necessary for installation of non-TI engine (CFM56-7BXX) engine or CFM56-7BXX SAC engines incorporating CFM-SB 72-0583 on airplanes delivered with TI engines (CFM56-7BXX/3) on 737-600/700/800/900/BBJ airplanes from Line Positions 2253 and on and all 737-900ER airplanes.

NOTE: A Tech Insertion (TI) engine has a “/3” after the thrust rating on the engine data plate. An example of a Singular Annular Combustor (SAC) Engine with TI is CFM56-7B22/3. An example of a non-TI engine is CFM56-7B22. The “XX” in CFM56-7BXX/3 is the thrust rating of the engine.

- (a) Make sure the EEC software version on each engine is compatible with the other engine, thrust reverser and airplane. Refer to the task EEC Software Load, TASK 73-21-60-470-801-F00.
 - 1) Intermix of some EEC software versions is not permitted.
 - 2) Some EEC software versions must be installed on both engines at the same time.
 - 3) Some EEC software versions require concurrent changes to the airplane configuration.

SUBTASK 73-21-00-740-004-F00

- (2) For an EEC replacement, do this task: Erase All EEC Faults, TASK 73-21-00-800-801-F00

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SUBTASK 73-21-00-730-001-F00

- (3) Do these steps to do the FADEC System Test:
- (a) Do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
 - (b) Do this task: EEC TEST, TASK 73-21-00-700-804-F00.
 - (c) Do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.
 - (d) Do this task: Test 12 - Actuators Test, TASK 71-00-00-700-807-F00.
 - (e) Do this task: EEC Discrettes Test, TASK 73-21-00-700-809-F00.

————— **END OF TASK** —————

TASK 73-21-00-700-804-F00**6. EEC TEST**

(Figure 501)

A. General

- (1) The EEC Test causes each channel of the EEC to do an internal EEC test.
- (2) To make sure that the technician can see the correct operation of the EEC, the test causes these fight deck effects:
- (a) ENGINE CONTROL light
NOTE: This light is found on the Engine Module in the P5 Aft Overhead Panel.
 - (b) ALTN light
NOTE: This light is found on the EEC MODE Switch in the P5 Aft Overhead Panel.
 - (c) Fuel FILTER BYPASS light
NOTE: This light is found on the Fuel Control Module in the P5 Fwd Overhead Panel.
 - (d) OIL FILTER BYPASS message
NOTE: This message is found on the Engine Display.
- (3) If faults are found during the test, the FMCS CDU will show the faults at the end of the test.

B. References

Reference	Title
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

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

D. Procedure

SUBTASK 73-21-00-730-002-F00

- (1) Do these steps to do the EEC Test:
- (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
 - (b) If the FMCS CDU is not active from other EEC tests, do these steps:
 - 1) Get access to the FMCS CDU in the flight compartment.

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- 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

- 3) Push these line select keys (LSK) on the FMCS CDU:

- a) INDEX
- b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

- 4) Push these line select keys (LSK) on the FMCS CDU:

- a) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

- b) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

- c) GROUND TESTS

NOTE: This LSK causes the ENGINE X BITE TEST GROUND TEST menu to show.

- d) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

- e) EEC TEST

- f) START TEST.

NOTE: You can stop the test at this time if you push the ABORT LSK. The screen will show the test is not completed because ABORT was selected.

- (c) If the FMCS CDU is active from other EEC tests, do this step:

- 1) Push the INDEX LSK to get access to the ENGINE X BITE TEST GROUND TEST MENU.

- (d) Make sure that these indications are off:

- 1) The ENG CONTROL light

NOTE: This light is found on the Engine Module in the P5 Aft Overhead Panel.

- 2) The ALTN light

NOTE: This light is found on the EEC MODE Switch in the P5 Aft Overhead Panel.

- 3) The fuel FILTER BYPASS light

NOTE: This light is found on the Fuel Control Module in the P5 Fwd Overhead Panel.

- 4) OIL FILTER BYPASS message.

NOTE: This message is found on the Engine Display. The oil filter message will flash for a few seconds and then stay on.

- (e) Push the CONTINUE LSK and the test screen tells you CH A Test Is In Progress.

NOTE: The test should take less than one minute.

- (f) Make sure that these indications are on for EEC channel A:

- 1) The ENG CONTROL light

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- 2) The ALTN light
 - 3) The fuel FILTER BYPASS light
 - 4) The OIL FILTER BYPASS message.
- (g) Push the CONTINUE LSK.
- (h) Make sure that these indications are off:
- 1) The ENG CONTROL light
 - 2) The ALTN light
 - 3) The fuel FILTER BYPASS light
 - 4) The OIL FILTER BYPASS message.
- (i) Push the CONTINUE LSK and the test screen tells you CH B Test Is In Progress.
- NOTE: The test should take less than one minute.
- (j) Make sure that these indications are on for EEC channel B:
- 1) The ENG CONTROL light
 - 2) The ALTN light
 - 3) The fuel FILTER BYPASS light
 - 4) The OIL FILTER BYPASS message.
- (k) Push the CONTINUE LSK.
- (l) Make sure that these indications are off:
- 1) The ENG CONTROL light
 - 2) The ALTN light
 - 3) The fuel FILTER BYPASS light
 - 4) The OIL FILTER BYPASS message.
- (m) If all of the indications above do not agree with the expected value (light was on when expected off or light was off when expected on), the test is not valid.
- 1) You must correct the problem with the applicable indication and do the test again.
- NOTE: Refer to the Observed Fault Index for the applicable ATA (Chapter 73 or Chapter 79).
- (n) Push the TEST RESULTS LSK.
- (o) If faults are found, the test screen will show EEC TEST FAILED and you will find the maintenance message number (MSG NBR) and a short description of the fault.
- NOTE: If there is more than one fault, the page you are on and the total number of pages will show on the screen. Example: 2/5 shows you are on page 2 of 5 pages.
- 1) Push the NEXT PAGE LSK until you have recorded all of the maintenance messages that show.
 - 2) Do the corrective action in the FIM for the messages that show.
- (p) If there are no faults, then the test screen will show EEC TEST PASSED.
- (q) Push the END TEST LSK
- NOTE: This causes TEST COMPLETED screen to show on the FMCS CDU.

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- (r) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.

————— END OF TASK —————

TASK 73-21-00-700-805-F00**7. T/R LEVER INTLK (Interlock) TEST**

(Figure 501)

A. General

- (1) The T/R Lever Interlock test makes sure that each channel of the EEC can enable and disable the thrust reverser interlock.
- (2) If a problem is found during the test, the FMCS CDU will show the applicable faults at the end of the test.

B. References

Reference	Title
78-31-00-040-802-F00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Tools/Equipment

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

Reference	Description
SPL-2418	Lockpin - Equipment, Thrust Reverser Actuation Module Lockout (Part #: C78004-1, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

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

E. Procedure

SUBTASK 73-21-00-730-003-F00

- (1) Do these steps to do the T/R INTLK TEST:
 - (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00
 - (b) Do these steps to install the lockpin, SPL-2418 in applicable the thrust reverser manual shutoff valve (TASK 78-31-00-040-802-F00):
 - 1) Turn the manual shutoff valve handle clockwise to align the lockpin holes in the manual shutoff valve handle and the control valve module.
 - 2) Install the lockpin.
 - a) Make sure the lockpin is pushed fully in and engages the control valve module.
 - (c) For the applicable engine, do this step:

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Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00276	ENGINE 1 THRUST REVERSER CONT

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

(d) If the FMCS CDU is not active from other EEC tests, do these steps:

- 1) Get access to the FMCS CDU in the flight compartment.
- 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

3) Push these line select keys (LSK) on the FMCS CDU:

- a) INDEX
- b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

d) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

e) GROUND TEST

NOTE: This LSK causes the ENGINE X BITE TEST GROUND TEST menu to show.

- f) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

(e) If the FMCS CDU is active from other EEC tests, do this step:

- 1) Push the INDEX LSK to get access to the ENGINE X BITE TEST GROUND TEST MENU.

(f) Push the T/R INTLK TEST LSK.

NOTE: This will cause screen 1 of the T/R INTLK TEST to show. The screen contains a WARNING about the operation of the thrust reversers during this test.

(g) Push the START TEST LSK.

NOTE: The test can be stopped if you push the ABORT LSK. The screen will show the test is not completed because ABORT was selected.

(h) Do the thrust reverser lever interlock test:

- 1) Type "OK" on the FMCS CDU pad when you are ready to start the test.
- 2) Push the CONTINUE LSK.

NOTE: This starts the check for Channel A.

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- 3) Follow the instructions on the FMCS CDU test screen:
- a) Move the applicable reverse thrust lever rearward to the reverse idle mechanical stop.
 - b) Stop (wait) for a minimum of five seconds.

NOTE: The first channel of the EEC will make sure that the TRA signal from the thrust lever angle resolver does not command a thrust value that is higher than reverse idle thrust. The test may not show the maintenance messages correctly if you stop for less than five seconds.
 - c) Push the CONTINUE LSK.
 - d) Move the reverse thrust lever rearward to the full reverse thrust position. If you cannot move the reverse thrust lever, make sure you stop for at least 5 seconds in the subsequent step to set the maintenance messages.
 - e) Stop (wait) for a minimum of five seconds.

NOTE: The first channel of the EEC will make sure that the TRA signal from the thrust lever angle resolver commands a thrust value that is maximum reverse thrust. The test may not show the maintenance messages correctly if you stop for less than five seconds.
 - f) Push the CONTINUE LSK.
 - g) Move the reverse thrust lever forward to the retracted (stow) position.
 - h) Push the CONTINUE LSK.

NOTE: This starts the check for Channel B.
 - i) Move the reverse thrust lever rearward to the reverse idle mechanical stop.
 - j) Stop (wait) for a minimum of five seconds.

NOTE: The second channel of the EEC will make sure that the TRA signal from the thrust lever angle resolver does not command a thrust value that is higher than reverse idle thrust. The test may not show the maintenance messages correctly if you stop for less than five seconds.
 - k) Push the CONTINUE LSK.
 - l) Move the reverse thrust lever rearward to the full reverse thrust position. If you cannot move the reverse thrust lever, make sure that you stop for at least 5 seconds in the subsequent step to set the maintenance messages.
 - m) Stop (wait) for a minimum of five seconds.

NOTE: The second channel of the EEC will make sure that the TRA signal from the thrust lever angle resolver commands a thrust value that is maximum reverse thrust. The test may not show the maintenance messages correctly if you stop for less than five seconds.
 - n) Push the CONTINUE LSK.
 - o) Move the reverse thrust lever forward to the retracted (stow) position.
- 4) Push the TEST RESULTS LSK.
- a) Look for the T/R LEVER INTLK TEST PASSED screen.

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- (i) If faults are found, the test screen will show T/R LEVER INTLK TEST FAILED and you will find the maintenance message number (MSG NBR) and a short description of the fault.

NOTE: If there is more than one fault, the page you are on and the total number of pages will show on the screen. Example: 2/5 shows that you are on page 2 of 5 pages.

- 1) Push the NEXT PAGE LSK until you have recorded all of the maintenance messages that show.
- 2) Do the corrective action in the FIM for the messages that show.

- (j) Push the END TEST LSK.

NOTE: This causes TEST COMPLETED to show on the FMCS CDU.

- (k) Make sure that the CH A INOP or CH B INOP messages do not show.

NOTE: The CH X INOP is found between the RETURN AIRPLANE TO NORMAL CONDITION and the INDEX prompt on the TEST COMPLETE screen.

- 1) If the CH A INOP or CH B INOP message shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

- (l) Remove the lockpin, SPL-2418 from the thrust reverser manual shutoff valve (TASK 78-31-00-040-802-F00):

- 1) Remove the lock pin from the valve.
- 2) Turn the manual shutoff valve handle counterclockwise to the vertical position.
- 3) Put the lock pin in its cotton bag and put it in its usual storage position on the airplane.
- 4) Do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00276	ENGINE 1 THRUST REVERSER CONT

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	7	C00277	ENGINE 2 THRUST REVERSER CONT

- (m) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.

- (n) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

————— END OF TASK —————

TASK 73-21-00-700-806-F00

8. Thrust Lever Adjustment and Thrust Reverser Position Adjustment Test

A. General

- (1) The Thrust Lever Adjustment and Thrust Reverser Position Adjustment Test makes sure that the two thrust lever position data and the thrust reverser position data agree with the expected indications.
- (2) In the test, the technician monitors the TRA and thrust reverser data inputs.

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B. References

Reference	Title
76-11-05-820-801-F00	Thrust Lever Angle Resolver Adjustment (P/B 501)
78-36-02-820-801-F00	Linear Variable Differential Transformer (LVDT) - Adjustment/Test (P/B 501)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

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

D. Procedure

HAP ALL; AIRPLANES WITH PREDICTIVE WINDSHEAR

SUBTASK 73-21-00-840-006-F00

WARNING: FOR AIRPLANES WITH PREDICTIVE WINDSHEAR, MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF THE THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT IN THE AREA OF THE NOSE RADOME

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

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

HAP ALL

SUBTASK 73-21-00-730-004-F00

- (2) Do these steps to do the Thrust Lever Adjustment and Thrust Reverser Position Adjustment Test:

- (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
 (b) If the FMCS CDU is not active from other EEC tests, do these steps:

- 1) Get access to the FMCS CDU in the flight compartment.
- 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

- 3) Push these line select keys (LSK) on the FMCS CDU:

- a) INDEX
- b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

- c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

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- d) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

- (c) If the FMCS CDU is active from other EEC tests, push these LSKs:

- 1) INDEX

NOTE: This causes the ENGINE X BITE TEST GROUND TEST screen to show.

- 2) INDEX

NOTE: This causes the ENGINE X BITE TEST MAIN MENU screen to show.

- (d) Push the INPUT MONITORING LSK.

- (e) Push the CONTINUE LSK.

NOTE: This LSK causes the ENGINE X INPUT MONITORING menu to show.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803 .

- (f) Push the CONTROL LOOPS LSK.

NOTE: This causes screen 1 of the CONTROL LOOPS to show.

- (g) Push the NEXT PAGE key.

- (h) Push the NEXT PAGE key.

NOTE: This causes screen 3 of the CONTROL LOOPS to show.

- (i) Push the REV LSK.

NOTE: This causes the L REVERSER SLEEVE POSITION screen to show.

- (j) Make sure that the POSITION CH A indication, for the left thrust reverser sleeve, is 0.0 \pm 4%.

- (k) Make sure that the POSITION CH B indication, for the left thrust reverser sleeve, is 0.0 \pm 4%.

- 1) If the indication for the thrust reverser position is not in the limits, do this task: Linear Variable Differential Transformer (LVDT) - Adjustment/Test, TASK 78-36-02-820-801-F00.

- (l) Push the NEXT PAGE key.

NOTE: This causes the R REVERSER SLEEVE POSITION screen to show.

- (m) Make sure that the POSITION CH A indication, for the right thrust reverser sleeve, is 0.0 \pm 4%.

- (n) Make sure that the POSITION CH B indication, for the right thrust reverser sleeve, is 0.0 \pm 4%.

- 1) If the indication for the thrust reverser position is not in the limits, do this task: Linear Variable Differential Transformer (LVDT) - Adjustment/Test, TASK 78-36-02-820-801-F00.

- (o) Push these LSKs:

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1) INDEX

NOTE: This causes screen 3 of the CONTROL LOOPS to show.

2) TRA

NOTE: This causes the Thrust Lever Resolver Angle (TRA) for the two channels to show.

- (p) Make sure that the thrust levers are in the IDLE position.
- (q) Make sure that the POSITION CH A indication is 36.0 ± 0.8 degrees.
- (r) Make sure that the POSITION CH B indication is 36.0 ± 0.8 degrees.
- (s) Make sure that the difference between POSITION CH A and POSITION CH B is ± 0.8 degrees.
 - 1) If the indication for the TRA position is not in the limits, do this task: Thrust Lever Angle Resolver Adjustment, TASK 76-11-05-820-801-F00.
- (t) Move the thrust levers to the full forward thrust position.
 - 1) Stop for a minimum of 2 seconds.
- (u) Make sure that the POSITION CH A indication is 84.0 ± 1.8 degrees.
- (v) Make sure that the POSITION CH B indication is 84.0 ± 1.8 degrees.
- (w) Make sure that the difference between POSITION CH A and POSITION CH B is ± 1.0 degrees.
 - 1) If the indication for the TRA position is not in the limits, do this task: Thrust Lever Angle Resolver Adjustment, TASK 76-11-05-820-801-F00.
- (x) Move the thrust levers to the IDLE position.
- (y) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.
- (z) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

SUBTASK 73-21-00-840-007-F00

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

F/O Electrical System Panel, P6-1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	13	C00120	WEATHER RADAR RT

HAP ALL

————— **END OF TASK** —————

TASK 73-21-00-700-807-F00**9. Engine 1 and Engine 2 Thrust Lever Angle Resolver Alignment Test**

A. General

- (1) The Engine 1 and Engine 2 Thrust Lever Angle Resolver Alignment test makes sure that the two thrust level angle resolvers show the same data when they are in the same position.

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- (2) The test examines channel A for the two thrust levers. To make sure that channels A and B are equal, you can do the thrust lever adjustment in the Thrust Lever Adjustment and Thrust Reverser Position Adjustment Test.

B. References

Reference	Title
76-11-05-820-801-F00	Thrust Lever Angle Resolver Adjustment (P/B 501)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

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

D. Procedure

HAP ALL; AIRPLANES WITH PREDICTIVE WINDSHEAR

SUBTASK 73-21-00-840-008-F00

WARNING: FOR AIRPLANES WITH PREDICTIVE WINDSHEAR, MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF THE THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT IN THE AREA OF THE NOSE RADOME

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

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

HAP ALL

SUBTASK 73-21-00-710-001-F00

- (2) Do these steps to set the Engine 1 thrust lever:
- (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
 - (b) If the FMCS CDU is not active from other EEC tests, do these steps:
 - 1) Get access to the FMCS CDU in the flight compartment.
 - 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.
 - 3) Push these line select keys (LSK) on the FMCS CDU:
 - a) INDEX
 - b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.
 - c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

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d) ENGINE 1

NOTE: This LSK causes the ENGINE 1 BITE TEST MAIN MENU to show. Also, the ENGINE 1 LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC 1 and EEC 1 SORTING FAULT HISTORY DATA, for a short time, just before the ENGINE 1 BITE TEST MAIN MENU shows.

e) GROUND TESTS

NOTE: This causes the ENGINE 1 BITE TEST GROUND TEST menu to show.

(c) If the FMCS CDU is active from other EEC tests, do these steps:

- 1) Push the INDEX LSK several times, until the MAINT BITE INDEX shows.
- 2) Push the ENGINE LSK.

NOTE: This causes the ENGINE/EXCEED BITE INDEX screen to show.

- 3) Push the ENGINE 1 LSK.

NOTE: This causes the ENGINE 1 BITE TEST MAIN MENU to show. Also, the ENGINE 1 LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC 1 and EEC 1 SORTING FAULT HISTORY DATA, for a short time, just before the ENGINE 1 BITE TEST MAIN MENU shows.

(d) Push the INPUT MONITORING LSK.

NOTE: This will cause the INPUT MONITORING menu to show.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

(e) Push the CONTROL LOOPS LSK.

NOTE: This will cause screen 1 of the CONTROL LOOPS to show.

- (f) Push the NEXT PAGE key two times, to get access to screen 3 of the CONTROL LOOPS.
- (g) Push the TRA LSK on screen 3 of the CONTROL LOOPS.

NOTE: This causes the Thrust Lever Resolver Angle (TRA) for channels A and B, of Engine 1, to show.

CAUTION: DO NOT LET THE SEL POSITION DISPLAY SHOW GREATER THAN 80.0 DEGREES, AS YOU DO THIS STEP. IF THE DISPLAY SHOWS MORE THAN 80.0 DEGREES, YOU MUST MOVE THE THRUST LEVER TO THE IDLE STOP AND START AGAIN. IF YOU DO NOT OBEY THESE INSTRUCTIONS, THE RESULTS OF THE TEST ARE NOT ACCURATE.

(h) Slowly move the Engine 1 thrust lever forward until the SEL POSITION display shows 78.0 \pm 2.0 degrees.

- 1) Make sure that the Engine 1 thrust lever does not move from this position for the remainder of the test.

(i) Record the value that shows in the POSITION CH A line to the nearest tenth of a degree.

SUBTASK 73-21-00-720-001-F00

(3) Do these steps to set the Engine 2 thrust lever:

- (a) Push the INDEX LSK four times, to get access to the MAINT BITE INDEX screen.

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- (b) Push the ENGINE LSK.

NOTE: This causes the ENGINE/EXCEED BITE INDEX screen to show.

- (c) Push the ENGINE 2 LSK.

NOTE: This causes the ENGINE 2 BITE TEST MAIN MENU to show. Also, the ENGINE 2 LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC 2 and EEC 2 SORTING FAULT HISTORY DATA, for a short time, just before the ENGINE 2 BITE TEST MAIN MENU shows.

- (d) Push the INPUT MONITORING LSK.

NOTE: This will cause the INPUT MONITORING menu to show.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803 .

- (e) Push the CONTROL LOOPS LSK.

NOTE: This will cause screen 1 of the CONTROL LOOPS to show.

- (f) Push the NEXT PAGE key two times, to get access to screen 3 of the CONTROL LOOPS.
 (g) Push the TRA LSK on screen 3 of the CONTROL LOOPS.

NOTE: This causes the Thrust Lever Resolver Angle (TRA) for channels A and B, of Engine 2, to show.

CAUTION: MAKE SURE THAT YOU DO NOT MOVE THE ENGINE 1 THRUST LEVER AS YOU DO THIS STEP. DO NOT LET THE ENGINE 2 THRUST LEVER GO TO A THRUST POSITION THAT IS GREATER THAN THE ENGINE 1 THRUST LEVER. IF THE ENGINE 2 THRUST LEVER GOES TO A THRUST POSITION THAT IS GREATER THAN THE ENGINE 1, YOU MUST MOVE THE ENGINE 2 THRUST LEVER TO THE IDLE STOP AND START AGAIN. IF YOU DO NOT OBEY THESE INSTRUCTIONS, THE RESULTS OF THE TEST ARE NOT ACCURATE.

- (h) Slowly move the Engine 2 thrust lever forward until the knob aligns with the knob on the Engine 1 thrust lever, $\pm 1/16$ of a knob width.
 (i) Record the value that shows in the POSITION CH A line to the nearest tenth of a degree.
 (j) Calculate the difference between Engine 1 POSITION CH A and Engine 2 POSITION CH A.

NOTE: Engine 1 POSITION CH A - Engine 2 POSITION CH A = difference.

- (k) Make sure that the difference is 0.0 ± 1.0 degrees.

- 1) If the difference is not in the specified range, adjust one of the TLA resolvers, do this task: Thrust Lever Angle Resolver Adjustment, TASK 76-11-05-820-801-F00.

- (l) If the difference is in the specified range, the test is completed.
 (m) Move the two thrust levers to the idle stop.
 (n) If you wish to do other tests, push the INDEX LSK several times, until the correct menu shows.
 (o) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

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SUBTASK 73-21-00-840-009-F00

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

F/O Electrical System Panel, P6-1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	13	C00120	WEATHER RADAR RT

HAP ALL

————— END OF TASK —————

TASK 73-21-00-700-808-F00**10. IDENT/CONFIG**

A. General

- (1) The Ident/Config test is used to identify the engine configuration.
- (2) Each EEC channel has a dedicated screen that shows this information:
 - (a) Airplane model
 - (b) Engine Model
 - (c) BUMP
 - (d) N1 trim
 - (e) EEC software Part Number
 - (f) EEC software version number
 - (g) Start Mode
 - (h) Engine serial number
 - (i) PMUX INSTALLED
 - 1) Engines without the PMUX sensors have one pneumatic line at the bottom of the EEC. Engines with the optional PMUX sensors have three pneumatic lines at the bottom of the EEC.
 - (j) DMS KIT INSTALLED
 - 1) Engines with the Debris Monitoring system have electrical wiring connected to the magnetic chip detectors

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES

- (k) BSV INSTALLED

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- (l) IGNITION MODE.
 - 1) The engine start switch with the OFF position is the standard ignition. The engine start switch with the AUTO position and without the OFF position is the AUTO ignition.
- (3) The engine serial number is the only item that you can change with Flight Management Computer/Control Display Unit (FMCS CDU) inputs.

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B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

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

D. Procedure

SUBTASK 73-21-00-210-001-F00

(1) Do these steps to get the Engine Data for the applicable engine:

- (a) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.
- (b) Record this data from the Engine Model Plate and the Engine Data Plate:

NOTE: The Engine Model Plate and Engine Data Plate are aft of the oil tank. The Engine Data Plate is found just below the Engine Model Plate.

1) Record the CONFIG (Configuration) Number from the Engine Data Plate.

NOTE: Examples of the Configuration Number are 7B22, 7B22/B1, or 7B22/B1/2.
CONFIG = _____

2) Record the N1 TRIM NUMBER from the Engine Data Plate.

NOTE: N1 TRIM = _____

3) Record the Engine Serial Number from the Engine Data Plate.

NOTE: The Engine Serial Number is a 6 digit number that may or may not have a hyphen (Example; 524-001, 524 001 or 524001). ENG S/N = _____

(c) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

SUBTASK 73-21-00-800-001-F00

(2) Do the rest of the steps in this procedure at the FMCS CDU in the flight compartment.

SUBTASK 73-21-00-730-005-F00

(3) Do these steps to examine the IDENT/CONFIG:

- (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
- (b) If the FMCS CDU is not active from other EEC tests, do these steps:
 - 1) Get access to the FMCS CDU in the flight compartment.
 - 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

3) Push these line select keys (LSK) on the FMCS CDU:

- a) INDEX
- b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

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c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

d) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MENU screen to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU can show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MENU shows.

(c) If the FMCS CDU is active from other engine tests, push this LSK:

1) INDEX

NOTE: This causes the ENGINE X BITE TEST Menu to show.

(d) Push the IDENT/CONFIG LSK.

NOTE: This causes Screen 1 of the IDENT/CONFIG test to show.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

(e) Make sure that these displays show on the FMCS CDU:

- 1) Make sure that the AIRPLANE MODEL line shows the applicable model.

NOTE: 737-600, 737-700, 737-700IGW, 737-800, or 737-900

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- 2) Make sure that the ENGINE MODEL display agrees with the Engine Data Plate and is acceptable for your AIRPLANE MODEL.

NOTE: An example is CFM56-7B22. The -7B22 describes the SAC engines.

- a) If the engine, EEC, or engine rating plug was replaced, do this test again for the other engine at the end of this task to make sure that the same ENGINE MODEL shows for the two engines.

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- 3) Compare the BUMP display with the Configuration Number, "B" number.

- a) Engines with a BUMP number = 0 (Example; CFM56-7B22 where there is no "B" number in the Configuration Number. The "B" number is BLANK).
- b) Engines with the BUMP number = 1 (Example: CFM56-7B22/B1, where the B1 in the Configuration Number is the "B" number).
- c) Engines with the BUMP number = 2 (Example: CFM56-7B22/B2, where the B2 in the Configuration Number is the "B" number).

- 4) Make sure that the BUMP display and the Configuration Number, "B" number agree with the Table (below).

Table 501/73-21-00-993-801-F00

CONFIGURATION NUMBER, "B" NUMBER	BUMP
BLANK	0
B1	1
B2	2

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- 5) Make sure that the N1 TRIM displays agrees with the Engine Data Plate.
- 6) If the EEC software was replaced by a CFMI Service Bulletin, then make sure that the EEC S/W P/N (EEC Software Part Number) display agrees with the label on the Working Copy Disk.
 - a) If the the EEC Software Part Number does not agree with the label on the Working Copy Disk, then re-install the EEC software.

NOTE: To install the EEC software please refer to the applicable CFMI Service Bulletin.

- 7) If the engine or EEC was replaced, make sure that the ENG S/N (serial number) display agrees with the Engine Data Plate.
 - a) If the Serial Number is not correct, push the LSK adjacent to the ENG S/N display.
 - b) Enter the correct serial number on the FMCS CDU keyboard.
 - c) Push the CONTINUE LSK.
- 8) Make sure that the START MODE lines shows ENHANCED.

- (f) Push the NEXT PAGE key on the FMCS CDU.

NOTE: This causes Screen 2 of the IDENT/CONFIG test to show.

- (g) Make sure that the data on screen 2/2 agrees with the Engine Model Plate and your airplane installation:
- 1) PMUX INSTALLED: NO
 - 2) DMS KIT INSTALLED: YES or NO
 - 3) BSV INSTALLED: YES or NO

NOTE: Airplanes with S/W Part Number 1853M78P16 or later, the IDENT/CONFIG page 2 will show BSV INSTALLED. If the indication is YES, then the BSV is installed and active. If the indication is NO, then the BSV is deactivated and either installed or removed.

- 4) IGNITION MODE: STANDARD

- (h) If the displays are not in the limits, do this task: EEC TEST, TASK 73-21-00-700-804-F00.
- 1) Do the Fault Isolation Procedures for the maintenance messages that show for the applicable system.
 - 2) The EEC TEST does not look at these systems:
 - a) START MODE
 - b) PMUX INSTALLED
 - c) DMS KIT INSTALLED.
- (i) To end the test, push the INIT REF key.

NOTE: This causes the test to stop and automatically removes electrical power from the EEC.

————— END OF TASK —————

TASK 73-21-00-700-809-F00

11. EEC Discrettes Test

A. General

- (1) This test examines the EEC to make sure that it receives the reset signal before an engine start.

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(2) This test also makes sure that the Alternate Mode switch operates correctly.

B. Location Zones

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

C. Procedure

SUBTASK 73-21-00-840-002-F00

(1) Do these steps to prepare for the procedure:

(a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.

(b) Do these steps to prepare for the CH A EEC Discretes Test:

1) For engine 1, do this step:

Open these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

2) For engine 2, do this step:

Open these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

3) Make sure that the Engine START LEVER, for the applicable engine, is in the CUTOFF position.

SUBTASK 73-21-00-730-006-F00

(2) Do these steps to do the CH A EEC Discretes Test:

NOTE: The Ch B circuit breaker is open, which permits only Ch A data to show.

(a) Get access to the FMCS CDU in the flight compartment.

(b) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

(c) Push these line select keys (LSK) on the FMCS CDU:

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1) INDEX

2) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

(d) Push these line select keys (LSK) on the FMCS CDU:

1) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

2) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

3) INPUT MONITORING

NOTE: This LSK causes the ENGINE X INPUT MONITORING TEST FOR CH A ONLY to show.

4) CONTINUE

NOTE: This LSK causes the INPUT MONITORING NOTICE SCREEN to show.

5) CONTINUE

NOTE: This LSK causes Screen 1 of the INPUT MONITORING Menu to show.

(e) Push the NEXT PAGE key.

NOTE: The NEXT PAGE key is below the FMCS CDU screen, above the numeric key pad.
The NEXT PAGE key causes Screen 2 of the INPUT MONITORING Menu to show.

(f) Push the DISCRETES LSK.

NOTE: This LSK causes Screen 1 of the GMM DISCRETES to show.

(g) Make sure that the ALTN MODE SW display shows OFF.

(h) Set the applicable engine EEC MODE Switch, on the Power Management Control panel (P5), to ALTN.

1) Make sure that the ALTN MODE SW display shows ON.

(i) Set the applicable engine EEC MODE Switch to ON.

1) Make sure that the ALTN MODE SW display shows OFF.

(j) Make sure that the START LEVER POS display shows CUTOFF.

(k) Move the applicable Engine START LEVER to the IDLE position.

1) Make sure that the START LEVER POS display shows IDLE.

(l) Press the INIT REF key.

(m) Move the applicable Engine START LEVER to the CUTOFF position.

NOTE: This will stop the test and remove the electrical power from the EEC.

SUBTASK 73-21-00-840-003-F00

(3) Do these steps to prepare for the CH B EEC Discrettes Test:

(a) For engine 1, do this step:

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- 1) Close this circuit breaker:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B

- 2) Open this circuit breaker:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

- 1) Close this circuit breaker:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B

- 2) Open this circuit breaker:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-00-730-007-F00

- (4) Do these steps to do the CH B EEC Discretes Test:

NOTE: The Ch A circuit breaker is open, which permits only Ch B data to show.

- (a) Get access to the FMCS CDU in the flight compartment.
 (b) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

- (c) Push these LSKs on the FMCS CDU:

- 1) INDEX
 2) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

- (d) Push these LSKs on the FMCS CDU:

- 1) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

- 2) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU will show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

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3) INPUT MONITORING

NOTE: This LSK causes the ENGINE X INPUT MONITORING TEST FOR CH B ONLY to show.

4) CONTINUE

NOTE: This LSK causes the INPUT MONITORING NOTICE SCREEN to show.

5) CONTINUE

NOTE: This LSK causes Screen 1 of the INPUT MONITORING Menu to show.

(e) Push the NEXT PAGE key.

NOTE: The NEXT PAGE key is below the FMCS CDU screen, above the numeric key pad.
The NEXT PAGE key causes Screen 2 of the INPUT MONITORING Menu to show.

(f) Push the DISCRETES LSK.

NOTE: This LSK causes Screen 1 of the GMM DISCRETES to show.

(g) Make sure that the ALTN MODE SW display shows OFF.

(h) Set the applicable engine EEC MODE Switch, on the Power Management Control panel (P5), to ALTN.

1) Make sure that the ALTN MODE SW display shows ON.

(i) Set the applicable engine EEC MODE Switch to ON.

1) Make sure that the ALTN MODE SW display shows OFF.

(j) Make sure that the START LEVER POS display shows CUTOFF.

(k) Move the applicable Engine START LEVER to the IDLE position.

(l) Make sure that the START LEVER POS display shows IDLE.

(m) Press the INIT REF key.

(n) Move the applicable Engine START LEVER to the CUTOFF position.

NOTE: This will stop the test and remove the electrical power from the EEC.

SUBTASK 73-21-00-840-004-F00

(5) For engine 1, do this step:

Close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 73-21-00-840-005-F00

(6) For engine 2, do this step:

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Close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

————— **END OF TASK** —————

TASK 73-21-00-800-801-F00

12. Erase All EEC Faults

A. General

- (1) This task will erase all of the faults that are stored in Recent Faults, Fault History, and will reset the HPTACC thermal history that is stored in Non-Volatile Memory (NVM) to zero.
 - (a) Once this task is initialized there are no other options, all five EEC memory zones are set to zero. The memory will be erased and the data will be lost.
- (2) Do this task after you replace the EEC or the engine.

B. References

<u>Reference</u>	<u>Title</u>
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

<u>Zone</u>	<u>Area</u>
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Procedure

SUBTASK 73-21-00-710-002-F00

- (1) Do these steps to get access to the IDENT/CONFIG page:
 - (a) If not already done, do this task: Prepare for the Tests, TASK 73-21-00-840-801-F00.
 - (b) If the FMCS CDU is not active from other EEC tests, do these steps:
 - 1) Get access to the FMCS CDU in the flight compartment.
 - 2) Press the INIT REF key to show the PERF INIT screen on the FMCS CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.
 - 3) Push these line select keys (LSK) on the FMCS CDU:
 - a) INDEX
 - b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

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c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

d) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MENU screen to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The FMCS CDU can show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA for a short time, just before the ENGINE X BITE TEST MENU shows.

(c) IDENT/CONFIG LSK

NOTE: This causes Screen 1 of the IDENT/CONFIG to show.

- 1) If the FOR CH A ONLY or FOR CH B ONLY screen shows, then, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803 .

SUBTASK 73-21-00-070-001-F00

(2) Push the ERASE LSK

NOTE: This will cause the IDENT/CONFIG ERASE screen to show.

- (a) Type "OK" on the FMCS CDU keyboard.

CAUTION: ONCE YOU PUSH THE "ERASE ALL" LSK YOU CAN NOT STOP THE PROCEDURE. DO NOT PUSH THE "INIT REF" KEY OR REMOVE THE ELECTRICAL POWER FROM THE EEC WHILE THE "EEC ERASING FAULTS" SCREEN SHOWS. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE MEMORY IN THE EEC.

- (b) Push the ERASE ALL LSK.

NOTE: This will cause the EEC ERASING FAULTS screen to show.

- (c) After the EEC ERASING FAULTS screen goes away, push the INIT REF key to end the procedure.

NOTE: This will remove the electrical power from the EEC.

————— **END OF TASK** —————

TASK 73-21-00-700-810-F00**13. FADEC 2 or FADEC 3 Identification**

A. General

- (1) The FADEC 2 or FADEC 3 Identification task is used to identify the FADEC version.
- (2) There are two ways to identify the FADEC version:
 - (a) By the EEC software part number or
 - (b) By the EEC hardware part number.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

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C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Procedure

SUBTASK 73-21-00-700-001-F00

- (1) To identify the FADEC version, do the EEC software check or the EEC hardware check that follows.

SUBTASK 73-21-00-740-005-F00

- (2) Do these steps to identify the FADEC version by the EEC software part number:

- (a) Do this task (IDENT/CONFIG, TASK 73-21-00-700-808-F00).
- (b) Record the EEC software part number.
 - 1) The EEC software part number for FADEC 2 is 1853M78PXX.
 - 2) The EEC software part number for FADEC 3 is 2044M25PXX.

SUBTASK 73-21-00-212-001-F00

- (3) Do these steps to identify the FADEC version by the EEC hardware part number:

- (a) Do this task (Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00).
- (b) Find the EEC on the right side of the fan case at the 2 o'clock position.
- (c) Record the EEC hardware part number.
 - 1) The EEC hardware part number for FADEC 2 is:
 - a) 1853M33PXX
 - 2) The EEC hardware part number for FADEC 3 is:
 - a) 2042M67PXX
- (d) Do this task (Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00).

————— **END OF TASK** —————

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PT25 SENSOR - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the PT25 sensor
- (2) The installation of the PT25 sensor.

TASK 73-21-02-000-801-F00**2. PT25 Sensor Removal**

(Figure 401)

A. General

- (1) Each engine has one PT25 sensor.
- (2) The PT25 sensor is behind the bleed air deflector panel, between the fan frame struts between the 6:00 and 7:00 o'clock positions.

B. References

Reference	Title
72-23-03-000-802-F00	Shroud Segments Removal (P/B 401)
72-23-07-000-801-F00	Fan Duct Panel Removal (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Procedure

SUBTASK 73-21-02-840-001-F00

(1) Prepare for the removal:

(a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

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WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (c) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.
- (d) Do these steps to get access to the VBV Cavity between the 6:00 and 7:00 o'clock position:
 - 1) Remove the lower left extension ring panel [2] (TASK 72-23-03-000-802-F00).

NOTE: Extension ring panel [2] is on the left side of the engine, between the struts at the 6:00 and 9:00 o'clock positions.

- 2) Remove the fan duct panel [1] (TASK 72-23-07-000-801-F00).

NOTE: Fan cowl panel [1] is between the fan frame struts at the 6:00 and 7:00 o'clock positions.

SUBTASK 73-21-02-020-001-F00

- (2) Do these steps to remove the PT25 Sensor [14]:
 - (a) Disconnect the J9 harness connector [10] and the J10 harness connector [9] from the T25 receptacle (DP1012) [12] and the T25 receptacle (DP1013) [13].

CAUTION: USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

- (b) Disconnect the P25 tube [8] from the pressure tube nipple [3].

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- (c) Loosen the P25 nipple nut [6] from the P25 pressure tube nipple [3].

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- (d) Loosen the P25 nipple nut [6] from the P25 pressure tube nipple [3] and remove the washer [19].

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- (e) Loosen the captive bolt [16].
- (f) Disconnect the P25 pressure tube [15] from the flange of the PT25 sensor [14]. Then, remove the P25 nipple nut [6].
- (g) Disconnect the pressure tube nipple [3] from the fan frame bulkhead and remove P25 pressure tube [15].
 - 1) Remove and discard the O-ring [17].
- (h) Remove the two bolts [7].
- (i) Remove the bracket [5].
- (j) Remove the T25 connector nuts [11].
- (k) Push the bracket [4] up to disengage it from the T25 receptacles.
 - 1) Remove the bracket [4].
- (l) Remove the two T25 receptacles DP1012 [12] and DP1013 [13] from the fan frame bulkhead.

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- (m) Loosen the three captive bolts [18] on the flange of the PT25 sensor [14].
- (n) Remove the PT25 sensor [14] from the VBV cavity.
- (o) Install protective covers on the PT25 sensor [14], the electrical connectors [9] [10] [12] and [13], and the tubes [3] [8] and [15].

————— **END OF TASK** —————

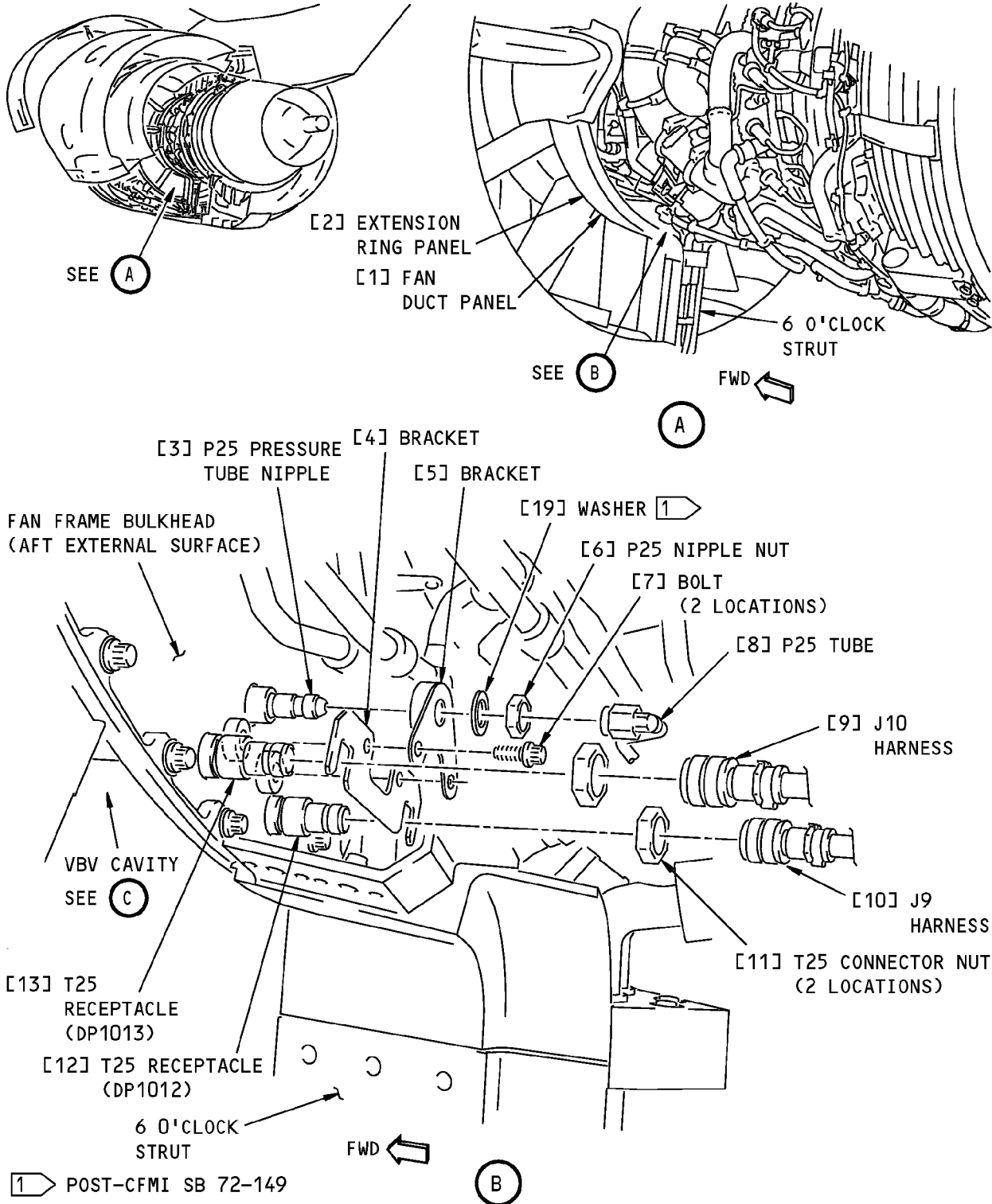
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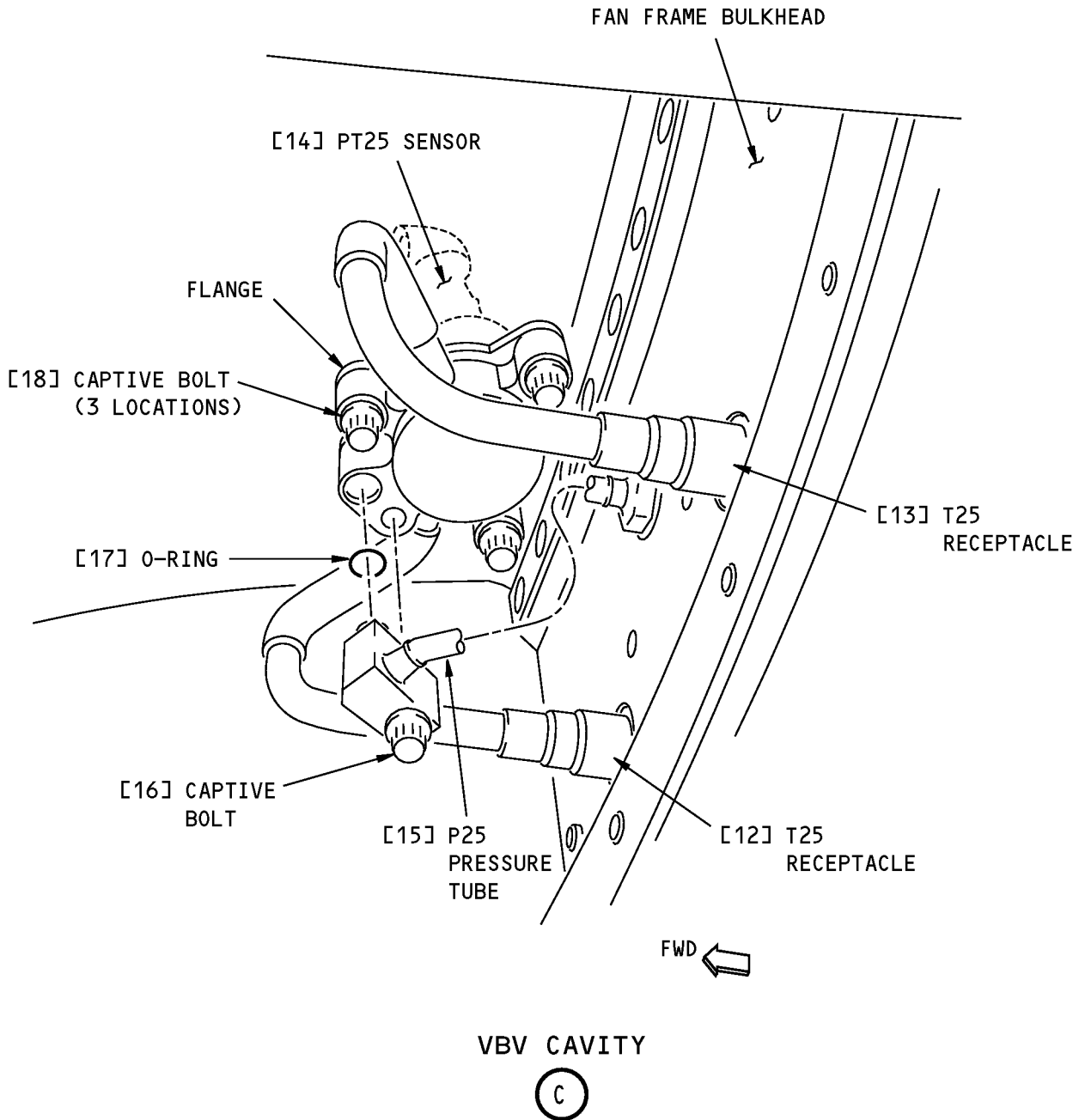


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PT25 Sensor Installation
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TASK 73-21-02-400-801-F00

3. PT25 Sensor Installation

(Figure 401)

A. References

Reference	Title
72-23-03-400-802-F00	Shroud Segments Installation (P/B 401)
72-23-07-400-801-F00	Fan Duct Panel Installation (P/B 401)
73-21-00-700-802-F00	FADEC System Test (P/B 501)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
14	PT25 Sensor	73-21-02-01-010	HAP ALL
17	O-ring	73-21-02-01-035	HAP ALL

D. Location Zones

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

E. Prepare for the Installation

SUBTASK 73-21-02-840-002-F00

(1) Do these steps to prepare for the installation:

- (a) Make sure that the component interfaces are clean and in good condition.
- (b) Use grease, D00601 [CP2101] to lubricate the threads of the captive bolts [16] and [18].

F. Install the PT25 Sensor

SUBTASK 73-21-02-420-001-F00

(1) Do these steps to install the PT25 sensor [14]:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate a new O-ring [17] with oil, D00623 [CP5066].
 - 1) Install the O-ring [17] on the P25 pressure tube [15].
- (b) Put the PT25 Sensor [14] in its correct position in the VBV cavity.
 - 1) Tighten the three captive bolts [18] to 110-121 pound-inches (12.5-13.5 Newton meters).
- (c) Install the two T25 receptacles DP1012 [12] and DP1013 [13] through the fan frame bulkhead.
- (d) Install bracket [4] to lock T25 receptacles [12] and [13] in their positions.

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- (e) Put the P25 pressure tube nipple [3] through its passage in the fan frame bulkhead.
- (f) Put the bracket [5] into its position on the P25 pressure tube nipple [3].
 - 1) Make sure that the rubber side of the bracket [5] is towards the fan frame bulkhead.
- (g) Install the two bolts [7] to hold the brackets [4] and [5] in their correct positions.
 - 1) Tighten the bolts [7] to 97-115 pound-inches (11-13 Newton meters).
- (h) Lubricate the threads of the P25 pressure tube nipple [3] with oil, D00623 [CP5066].

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- (i) Install the washer [19].

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- (j) Install and tighten the P25 nipple nut [6] to 135-150 pound-inches (15-17 Newton meters).
- (k) Connect the P25 pressure tube [15] to the flange of the PT25 sensor [14] with the captive bolt [16].
 - 1) Do not tighten the bolt [16] at this time.
- (l) Connect the P25 pressure tube [15] to the P25 pressure tube nipple [3].

CAUTION: USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

 - 1) Use two wrenches to tighten the nipple [3] and the P25 pressure tube [15] to 135-150 pound-inches (15-17 Newton meters).
- (m) Tighten the bolt [16] to 97-115 pound-inches (11-13 Newton meters).
- (n) Connect the T25 receptacles [12] and [13] to the bracket assembly [4] with the two T25 connector nuts [11].
 - 1) Tighten the T25 connector nuts [11] to 62-71 pound-inches (7-9 Newton meters).
- (o) Connect P25 tube [8] to the P25 pressure tube nipple [3] hand tight.
- (p) Use two wrenches to tighten the P25 tube [8] to the P25 pressure tube nipple [3] to a torque of 98-110 pound-inches (11-12.5 Newton meters).
- (q) Connect the J9 harness connector [10] to the T25 receptacle DP1012 [12].
- (r) Connect the J10 harness connector [9] to the T25 receptacle DP1013 [13].

G. PT25 Sensor Installation Test

SUBTASK 73-21-02-720-001-F00

- (1) Do these steps for the PT25 sensor installation test:

- (a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

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Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Do this task: FADEC System Test, TASK 73-21-00-700-802-F00.

SUBTASK 73-21-02-730-001-F00

(2) Put the airplane in a serviceable condition:

- (a) Install the fan duct panel [1] (TASK 72-23-07-400-801-F00).
- (b) Install the lower left extension ring panel [2] (TASK 72-23-03-400-802-F00).

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER(S). IF YOU DO NOT OBEY THE INSTRUCTIONS, YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

(c) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

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T12 SENSOR - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks as follows:

- (1) The removal of the T12 sensor
- (2) The installation of the T12 sensor.

TASK 73-21-05-000-801-F00**2. T12 Sensor Removal**

(Figure 401)

A. General

- (1) This task is the removal task for the T12 sensor. The sensor is behind an access door on the inlet cowl at the 2:30 o'clock position.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

D. Prepare for the Removal

SUBTASK 73-21-05-840-001-F00

- (1) Do these steps to prepare for the procedure:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (c) Do this step:

Open the applicable T12 access panels on the inlet cowl:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

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**737-600/700/800/900
AIRCRAFT MAINTENANCE MANUAL****E. T12 Sensor Removal**

SUBTASK 73-21-05-020-002-F00

- (1) Do these steps to remove the T12 sensor [1]:
 - (a) Disconnect the T12 Channel A sensor connector [9] from the J7 harness receptacle [10] (DP0704).
 - (b) Disconnect the T12 Channel B sensor connector [8] from the J8 harness receptacle [7] (DP0804).
 - (c) Remove the nut [3] and washer [4] to disconnect the bonding jumper [5] from the T12 sensor [1].
 - (d) Loosen the four captive bolts [2] that hold the T12 sensor [1] to the inlet cowl.
 - 1) Remove the T12 sensor [1] from the inlet.

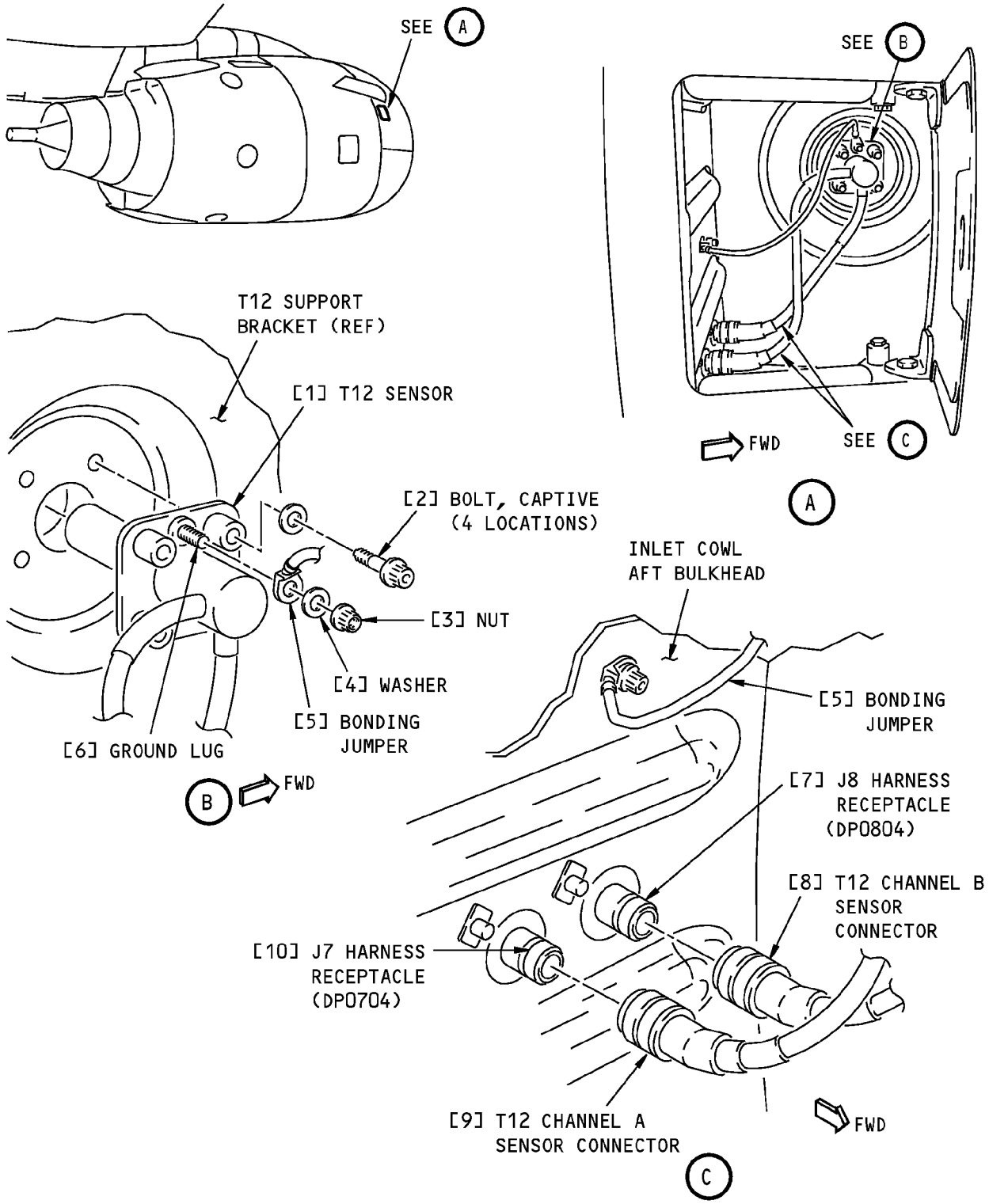
————— **END OF TASK** —————

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TASK 73-21-05-400-801-F00

3. T12 Sensor Installation

(Figure 401)

A. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
SWPM Ch 20	Standard Wiring Practices Manual

B. Tools/Equipment

Reference	Description
STD-1081	Flashlight - Explosion Proof

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00625 [CP2338]	Grease - Conductive - Brisal OX	

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	T12 sensor	73-21-05-01-030	HAP ALL

E. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

F. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

G. Prepare for the Installation

SUBTASK 73-21-05-840-002-F00

(1) Do these steps to prepare for the installation:

(a) Use a explosion proof flashlight, STD-1081 to visually examine these areas:

- 1) Make sure that the sensor receptacles and harness connectors are clean and in good condition.
- 2) Make sure that the bonding jumper [5], the ground lug [6] terminal, the washer [4] and the nut [3] are clean and in good condition.
- 3) Make sure that the mounting surface of the T12 support bracket is clean and in good condition.
- 4) Make sure that shock mount surface of the sensor is clean and smooth.

(b) Do these steps to lubricate the parts for the installation:

- 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts [2].
- 2) Use Brisal OX grease, D00625 [CP2338] to lubricate the bonding jumper [5], the ground lug [6] terminal, the washer [4] and the nut [3].

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H. T12 Sensor Installation

SUBTASK 73-21-05-420-001-F00

- (1) Do these steps to install the T12 sensor [1]:
- (a) Put the T12 sensor [1] in its correct position on the inlet.
 - 1) Tighten the captive bolts [2] to 110-120 pound-inches (12.5-13.5 Newton meters).
 - (b) Use the washer [4] and the nut [3] to install the bonding jumper [5] on the ground lug [6].
 - 1) Make sure that the Brisal OX grease, D00625 [CP2338] is applied to all of the mating surfaces of the jumper parts.
 - 2) Tighten the nut [3] to 98-110 pound-inches (11-12.5 Newton meters).
 - (c) Connect the T12 Channel A sensor connector [9] to the J7 harness receptacle [10] (DP0704).
 - (d) Connect the T12 Channel B sensor connector [8] to the J8 harness receptacle [7] (DP0804).

I. Put the Airplane in a Serviceable Condition

SUBTASK 73-21-05-840-003-F00

- (1) Do these steps to put the airplane in a serviceable condition:
- (a) Do the electrical bond check on the bonding jumper (SWPM Ch 20).
 - (b) Do this step:

Close the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

- (c) Close the applicable circuit breaker:
- 1) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- 2) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (d) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— END OF TASK —————

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T12 SENSOR - INSPECTION/CHECK**1. General**

A. This procedure contains the inspection of the T12 sensor.

TASK 73-21-05-200-801-F00**2. T12 Sensor Inspection/Check**

(Figure 601)

A. References

Reference	Title
73-21-05-000-801-F00	T12 Sensor Removal (P/B 401)
73-21-05-400-801-F00	T12 Sensor Installation (P/B 401)

B. Tools/Equipment

Reference	Description
STD-3911	Brush - Bristle, Medium Nylon

C. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

D. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

E. T12 Sensor Inspection

SUBTASK 73-21-05-210-001-F00

(1) From the inlet cowl, visually examine the T12 sensor [1] for damage:

(a) Cracks

1) Cracks are not serviceable.

a) Replace the T12 sensor.

These are the tasks:

T12 Sensor Removal, TASK 73-21-05-000-801-F00,

T12 Sensor Installation, TASK 73-21-05-400-801-F00.

(b) Nicks, Dents, and Scratches.

1) Nicks, dents, and scratches are serviceable if the depth is less than or equal to 0.03 inches (0.7 mm).

2) If the nicks, dents, or scratches are not in the limit, replace the T12 Sensor.

These are the tasks:

T12 Sensor Removal, TASK 73-21-05-000-801-F00,

T12 Sensor Installation, TASK 73-21-05-400-801-F00.

(c) Dirt build-up in the air inlet or exit slots

1) Blockage of the air passages is not serviceable.

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- a) Use a solution of water, household detergent and medium nylon bristle brush, STD-3911 to clean the air inlet and exit slots.
- b) Rinse the area with clean water.
- (d)
- 1) Do this step:
Open the applicable T12 access panels on the inlet cowl:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|---------------------------|
| 412AR | T12 Access Door, Engine 1 |
| 422AR | T12 Access Door, Engine 2 |
- 2) Visually examine the T12 electrical connectors:
- a) Make sure that the J7 and J8 harness connectors and the J7 and J8 receptacles are clean, free of damage, and are correctly connected.
- < 1 > If it is necessary clean the J7 and J8 harness connectors and receptacles.
- < 2 > If the J7 or J8 harness connector is damaged, then repair it.
- < 3 > If the J7 or J8 receptacle is damaged, then replace the T12 sensor.
- These are the tasks:
T12 Sensor Removal, TASK 73-21-05-000-801-F00,
T12 Sensor Installation, TASK 73-21-05-400-801-F00.
- 3) Do this step:
Close the applicable access panels:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|---------------------------|
| 412AR | T12 Access Door, Engine 1 |
| 422AR | T12 Access Door, Engine 2 |

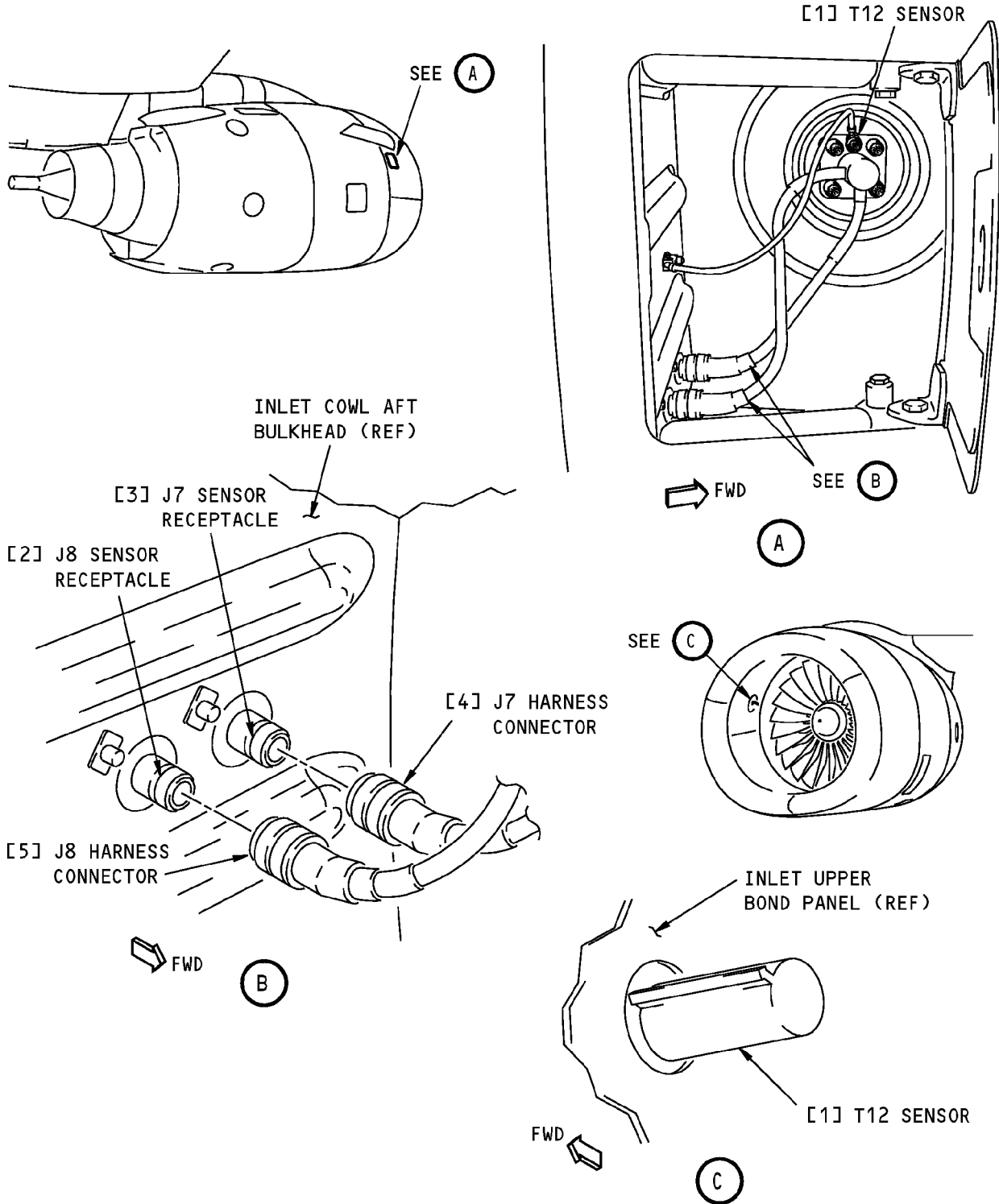
————— **END OF TASK** —————

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T12 Sensor Inspection/Check
Figure 601/73-21-05-990-801-F00

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WIRING HARNESSSES - REMOVAL/INSTALLATION**1. General**

A. This procedure contains six tasks:

- (1) The removal of the fan wiring harnesses (J5, J6, J7 and J8 harnesses)
- (2) The installation of the fan wiring harnesses (J5, J6, J7 and J8 harnesses)
- (3) The removal of the 3:00 o'clock strut harnesses
- (4) The installation of the 3:00 o'clock strut harnesses
- (5) The removal of the core engine harnesses
- (6) The installation of the core engine harnesses.

TASK 73-21-06-000-801-F00**2. Fan Wiring Harness Removal**

(Figure 401, Figure 402, Figure 403, Figure 404)

A. General

- (1) The fan wiring harnesses are the J5, J6, J7 and J8 harnesses.

B. References

Reference	Title
70-70-01-200-801-F00	Standard Engine Wiring and Equipment Check (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Prepare for the Procedure

SUBTASK 73-21-06-840-001-F00

- (1) Do these steps to prepare for the removal:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (c) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

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AIRCRAFT MAINTENANCE MANUAL**E. Fan Wiring Harnesses Removal**

SUBTASK 73-21-06-020-001-F00

- (1) Do these steps to remove the J5 harness (Figure 401):
- (a) If you find fuel wetting or leakage, refer to this task, Standard Engine Wiring and Equipment Check, TASK 70-70-01-200-801-F00.
 - (b) Disconnect these J5 harness connectors from the receptacles at these locations:
 - 1) EEC, J5 - DP0505
 - 2) HMU Ch A, DP0501
 - 3) Fuel flowmeter, DP0502
 - 4) N2 sensor Ch A, DP0503.
 - (c) Open the 1/4-turn hinge clamps that hold the J5 harness [1].
 - (d) Remove the nuts, bolts, washers, and clamps that hold the J5 harness [1] to the fan case.
NOTE: Make a note of the locations and orientation of all of the parts that hold the J5 harness [1]. The part location and orientation is important for the subsequent installation.
 - (e) Disengage the J5 harness from the spring clips.
 - (f) Carefully remove the J5 harness [1] from the engine.

SUBTASK 73-21-06-020-002-F00

- (2) Do these steps to remove the J6 harness [2] (Figure 402):
- (a) If you find fuel wetting or leakage, refer to this task, Standard Engine Wiring and Equipment Check, TASK 70-70-01-200-801-F00.
 - (b) Disconnect these J6 harness connectors from the receptacles at these locations:
 - 1) EEC, J6 - DP0606
 - 2) HMU Ch B, DP0601
 - 3) Oil temperature sensor, DP0602
 - 4) N2 sensor Ch B, DP0603.
 - (c) Open the 1/4-turn hinge clamps that hold the J6 harness [2].
 - (d) Remove the nuts, bolts, washers, and clamps that hold the J6 harness [2] to the fan case.
NOTE: Make a note of the locations and orientation of all of the parts that hold the J6 harness. The part location and orientation is important for the subsequent installation.
 - (e) Disengage the J6 harness from the spring clips.
 - (f) Carefully remove the J6 harness [2] from the engine.

SUBTASK 73-21-06-020-003-F00

- (3) Do these steps to remove the J7 harness [3] (Figure 403):
- (a) Disconnect these J7 harness connectors from the receptacles:
 - 1) EEC, J7 - DP0707
 - 2) N1 sensor Ch A, DP0701
 - 3) Alternator Ch A, DP0702
 - 4) Oil filter Bypass Warning, DP0703
 - 5) T12 sensor Ch A, DP0704

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- 6) Oil pressure sensor Ch A, DP0705.
- (b) Open the 1/4-turn hinge clamps that hold the J7 harness [3].
- (c) Remove the nuts, bolts, washers, and clamps that hold the J7 harness [3] to the fan case.

NOTE: Make a note of the locations and orientation of all of the parts that hold the J7 harness. The part location and orientation is important for the subsequent installation.

- (d) Disengage the J7 harness from the spring clips.
- (e) Carefully remove the J7 harness [3] from the engine.

SUBTASK 73-21-06-020-004-F00

- (4) Do these steps to remove the J8 harness [4] (Figure 404):

- (a) Disconnect these J8 harness connectors from the receptacles.

- 1) EEC, J8 - DP0808
- 2) N1 sensor Ch B, DP0801
- 3) Alternator Ch B, DP0802
- 4) Fuel Filter Bypass Warning, DP0803
- 5) T12 sensor Ch B, DP0804
- 6) Oil pressure sensor Ch B, DP0805
- 7) DPM box, DP0806.

- (b) Open the 1/4-turn hinge clamps that hold the J8 harness [4].
- (c) Remove the nuts, bolts, washers, and clamps that hold the J8 harness [4] to the fan case.

NOTE: Make a note of the locations and orientation of all of the parts that hold the J8 harness. The part location and orientation is important for the subsequent installation.

- (d) Disengage the J8 harness from the spring clips.
- (e) Carefully remove the J8 harness [4] from the engine.

————— **END OF TASK** —————

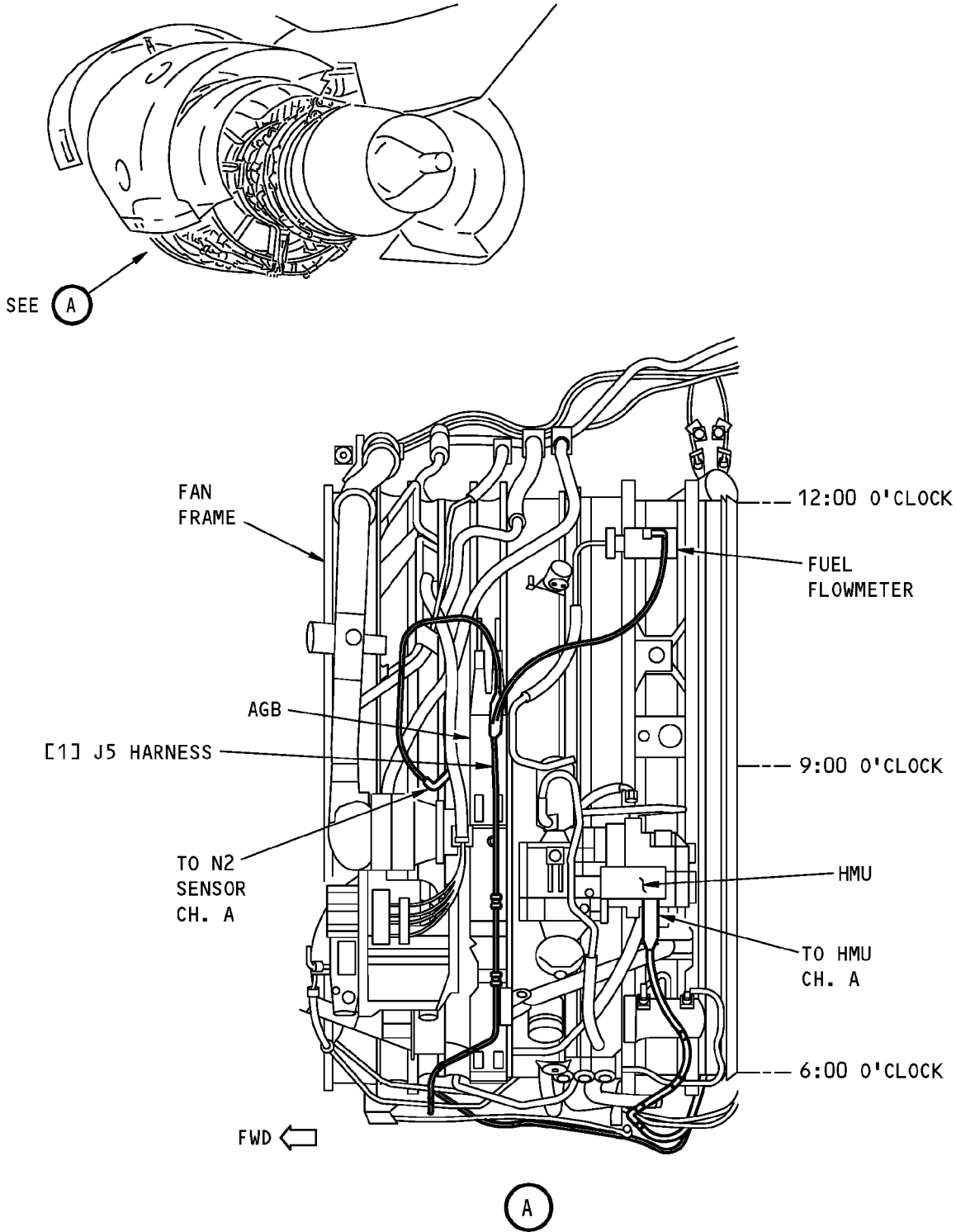
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S-M56-MM-03436-00-B

J5 Harness Installation
Figure 401 (Sheet 1 of 2)/73-21-06-990-801-F00

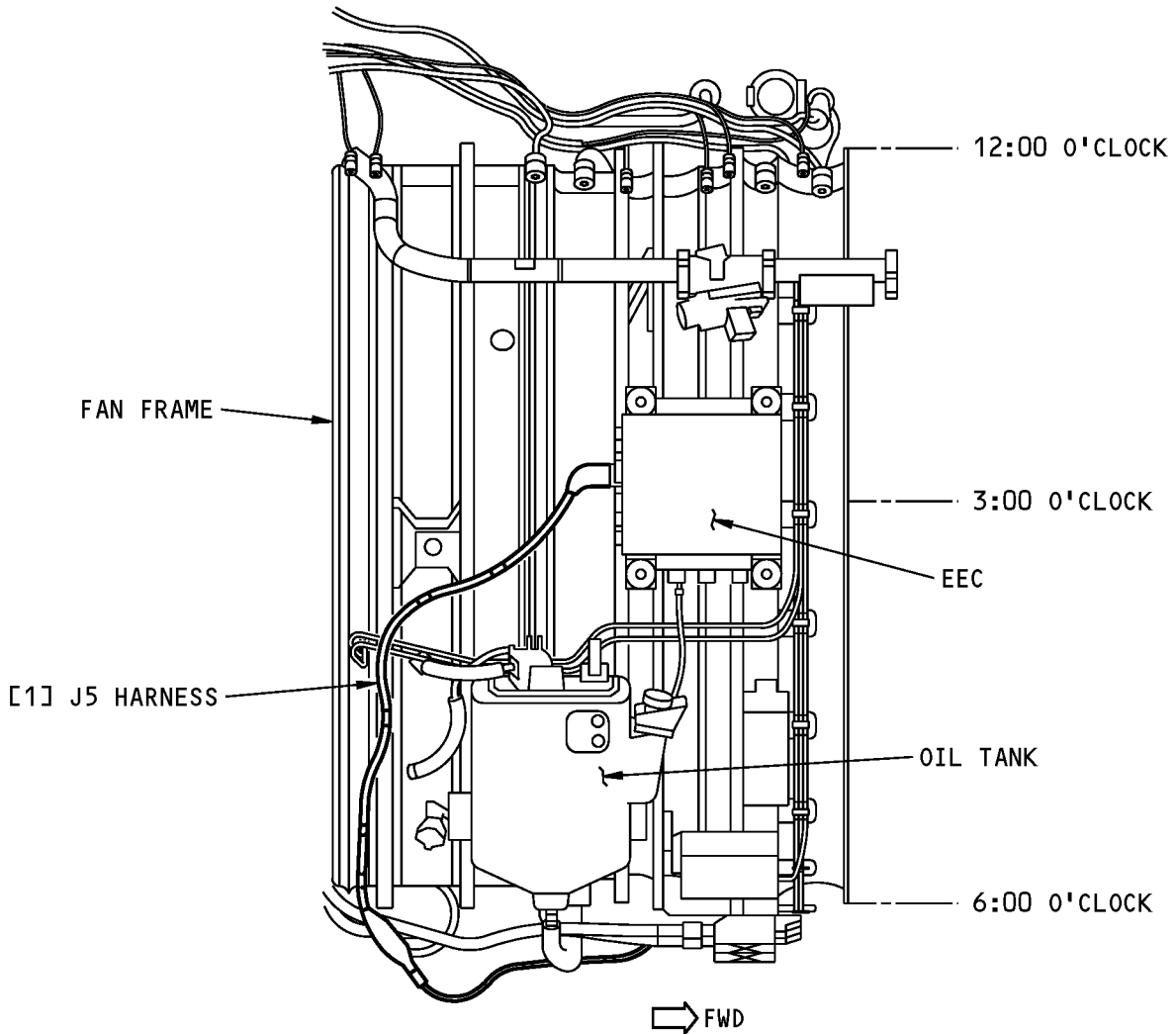
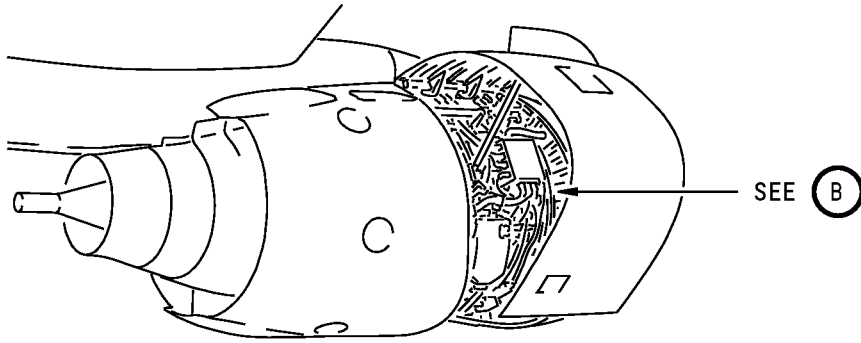
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S-M56-MM-03437-00-B

J5 Harness Installation
Figure 401 (Sheet 2 of 2)/73-21-06-990-801-F00

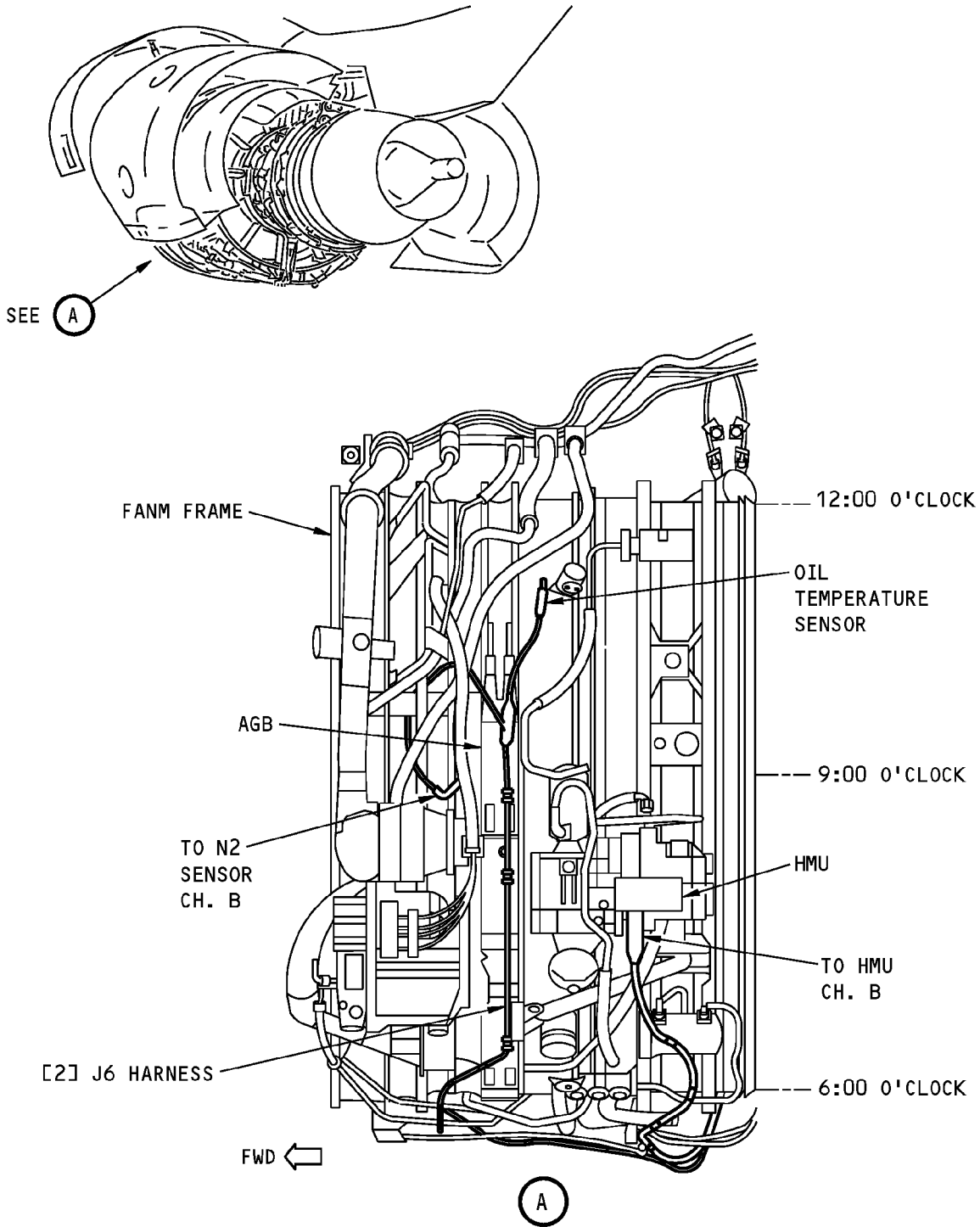
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S-M56-MM-03427-00-B

J6 Harness Installation
Figure 402 (Sheet 1 of 3)/73-21-06-990-802-F00

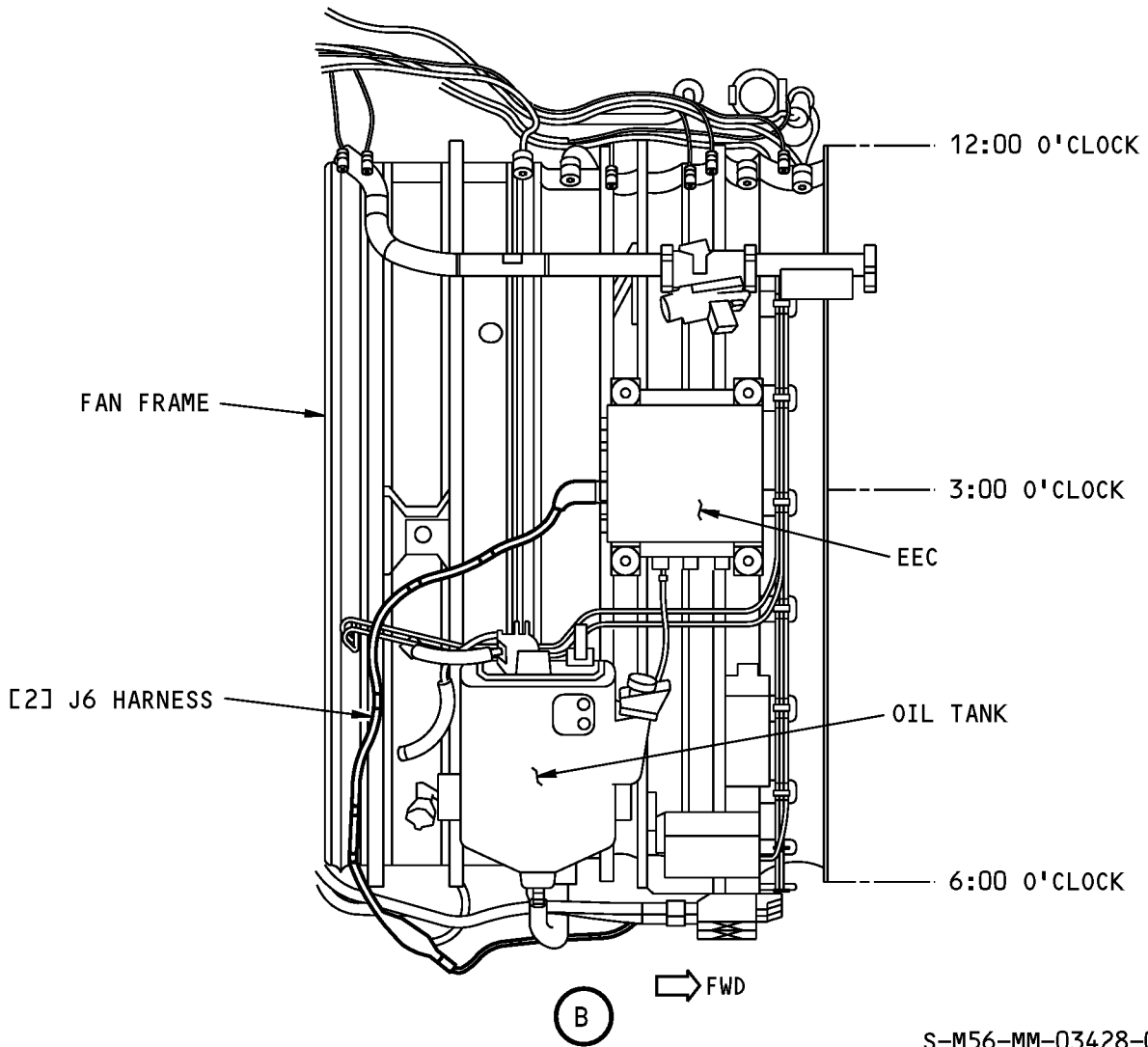
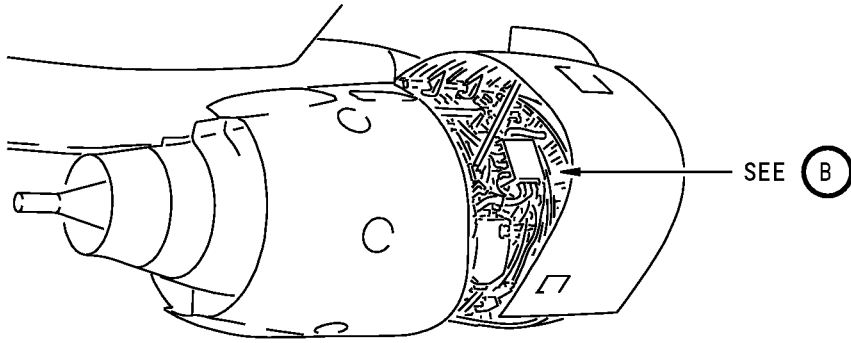
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S-M56-MM-03428-00-B

J6 Harness Installation
Figure 402 (Sheet 2 of 3)/73-21-06-990-802-F00

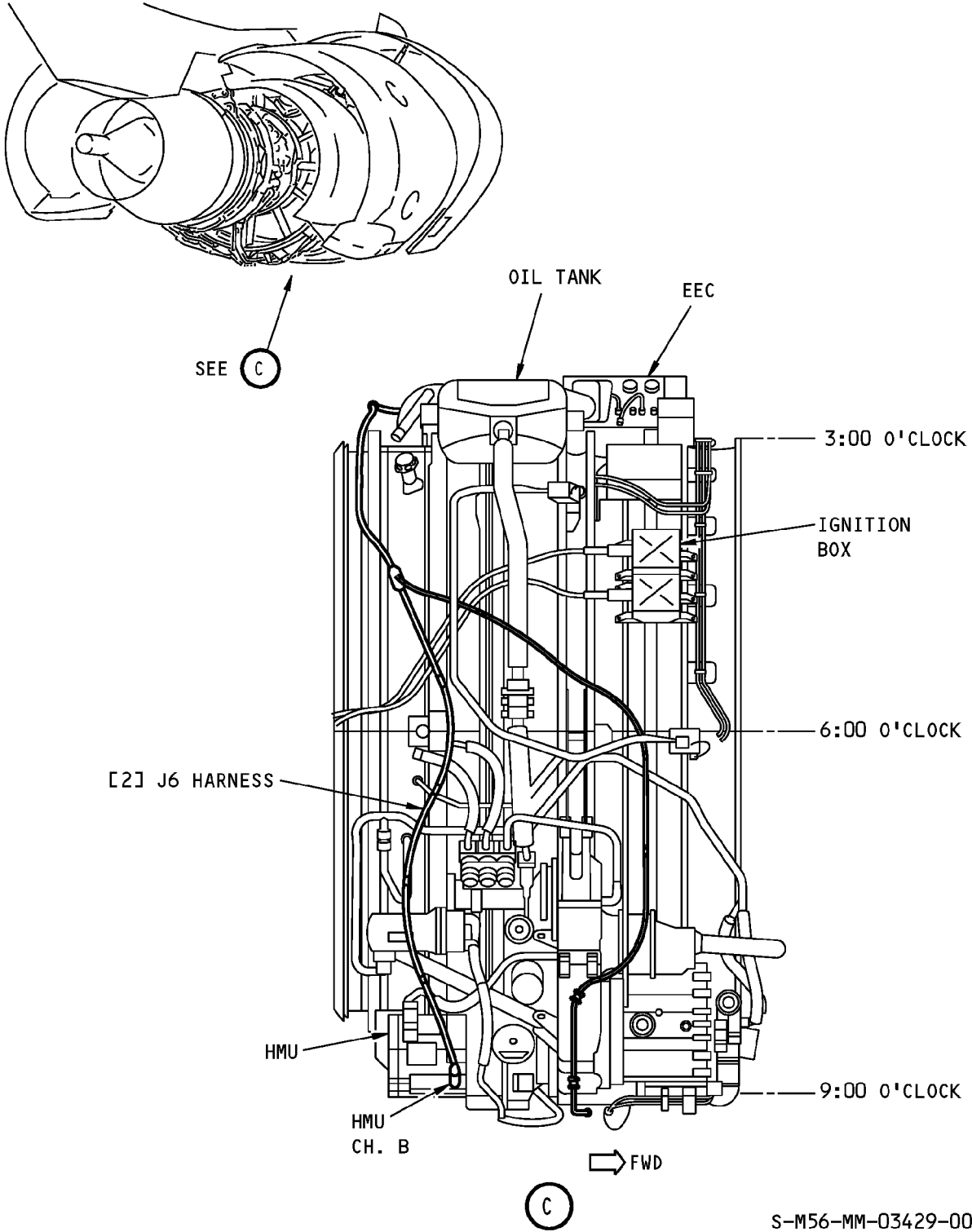
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S-M56-MM-03429-00-B

J6 Harness Installation
Figure 402 (Sheet 3 of 3)/73-21-06-990-802-F00

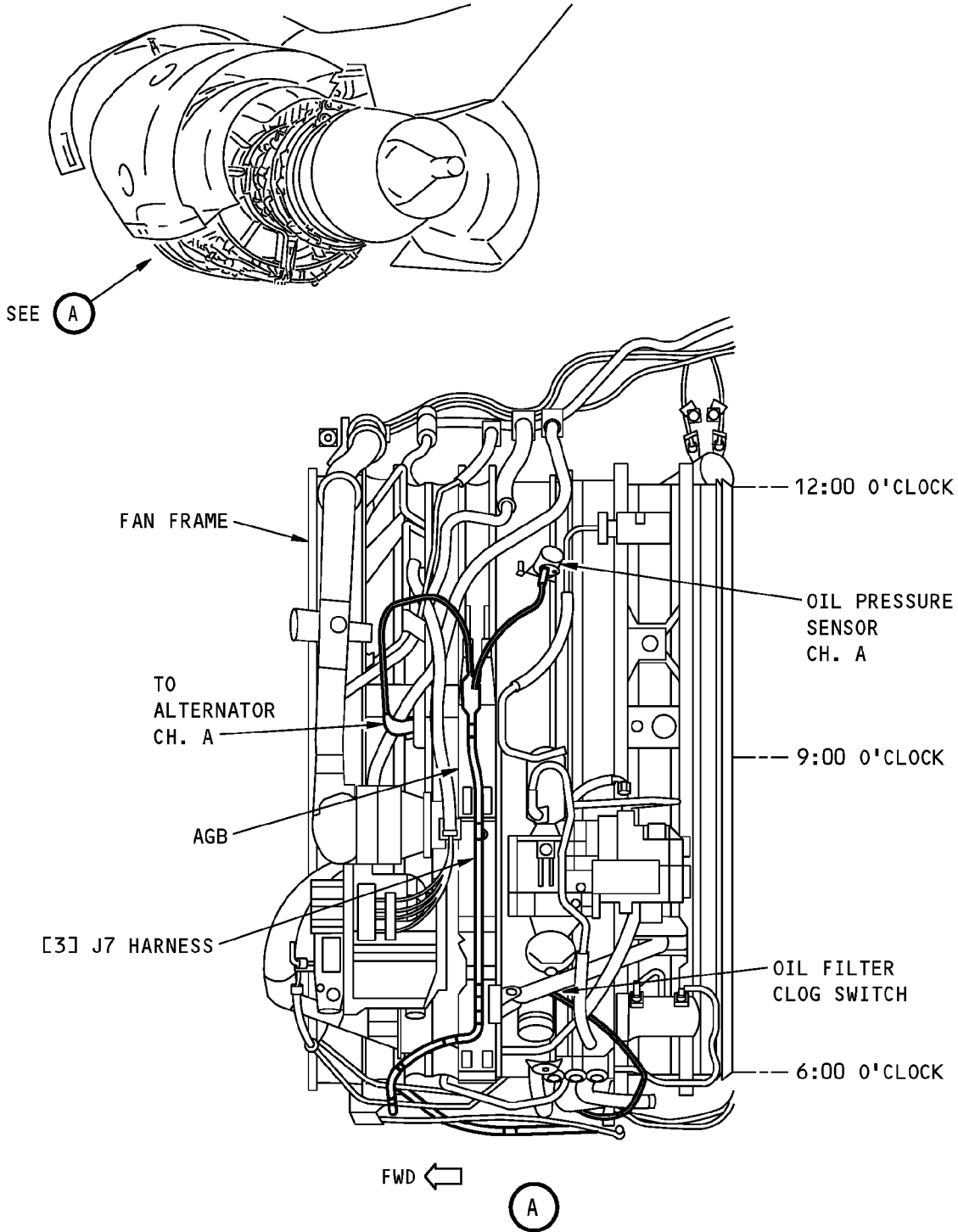
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S-M56-MM-03430-00-B

J7 Harness Installation
Figure 403 (Sheet 1 of 3)/73-21-06-990-803-F00

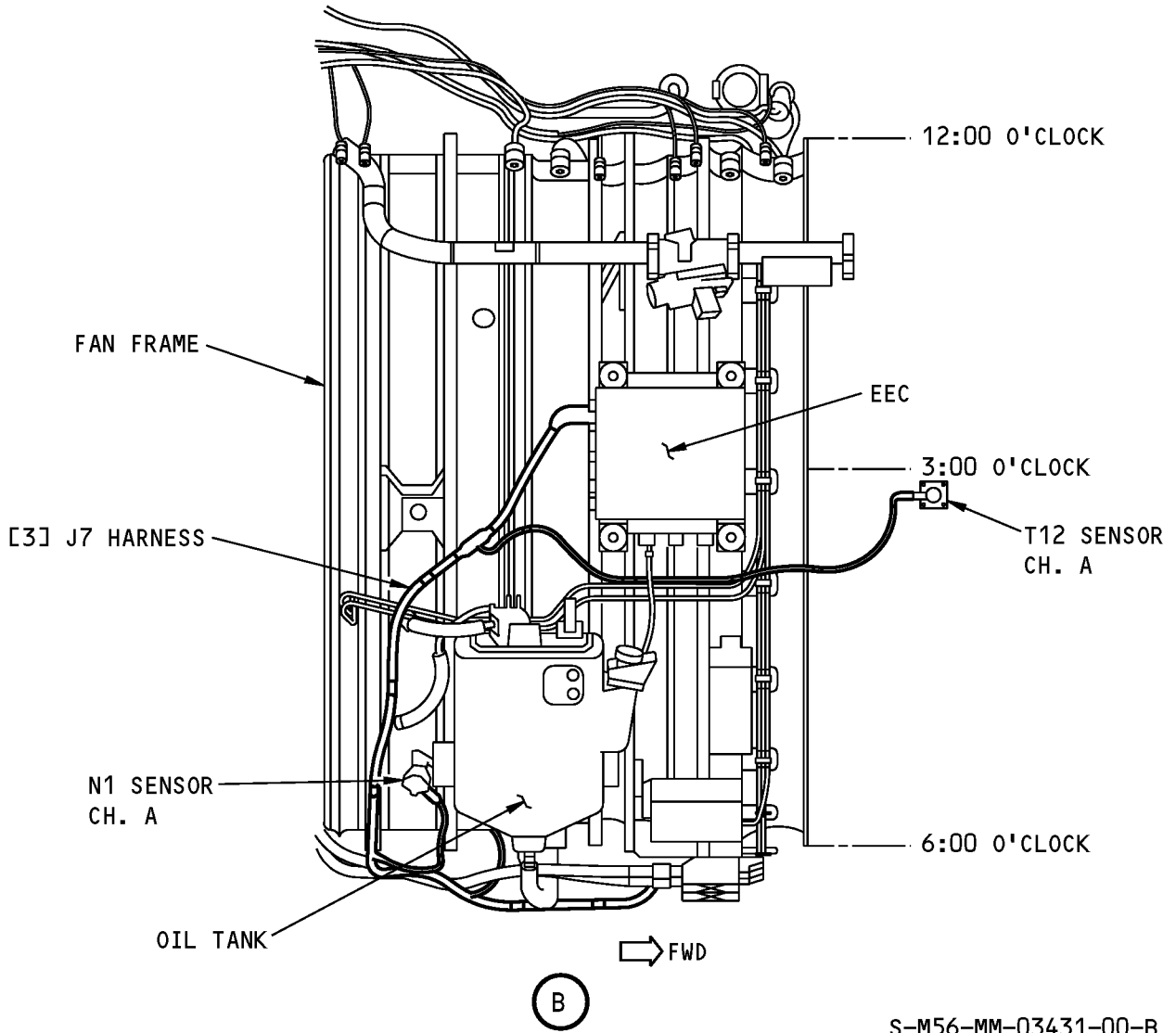
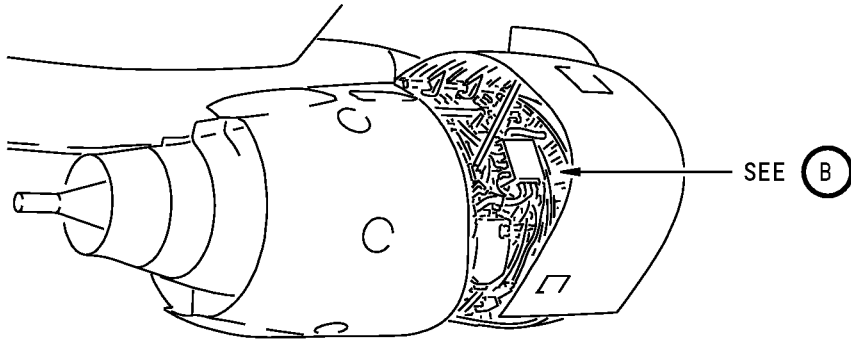
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S-M56-MM-03431-00-B

J7 Harness Installation
Figure 403 (Sheet 2 of 3)/73-21-06-990-803-F00

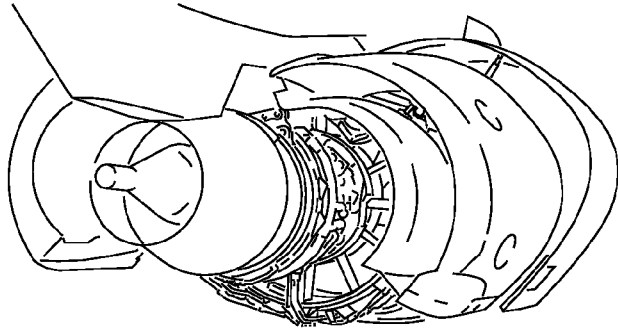
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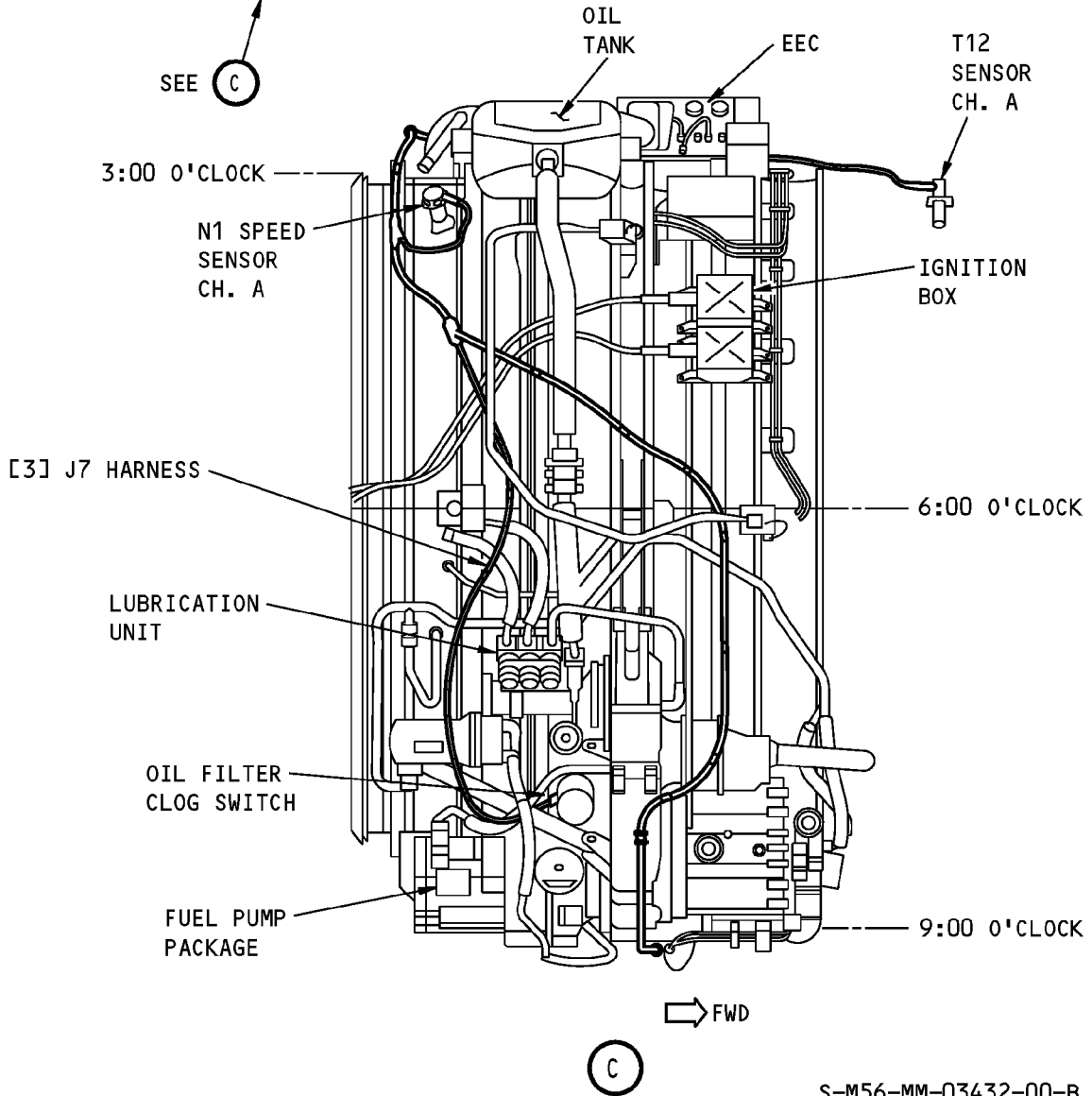
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SEE (C)



S-M56-MM-03432-00-B

J7 Harness Installation
Figure 403 (Sheet 3 of 3)/73-21-06-990-803-F00

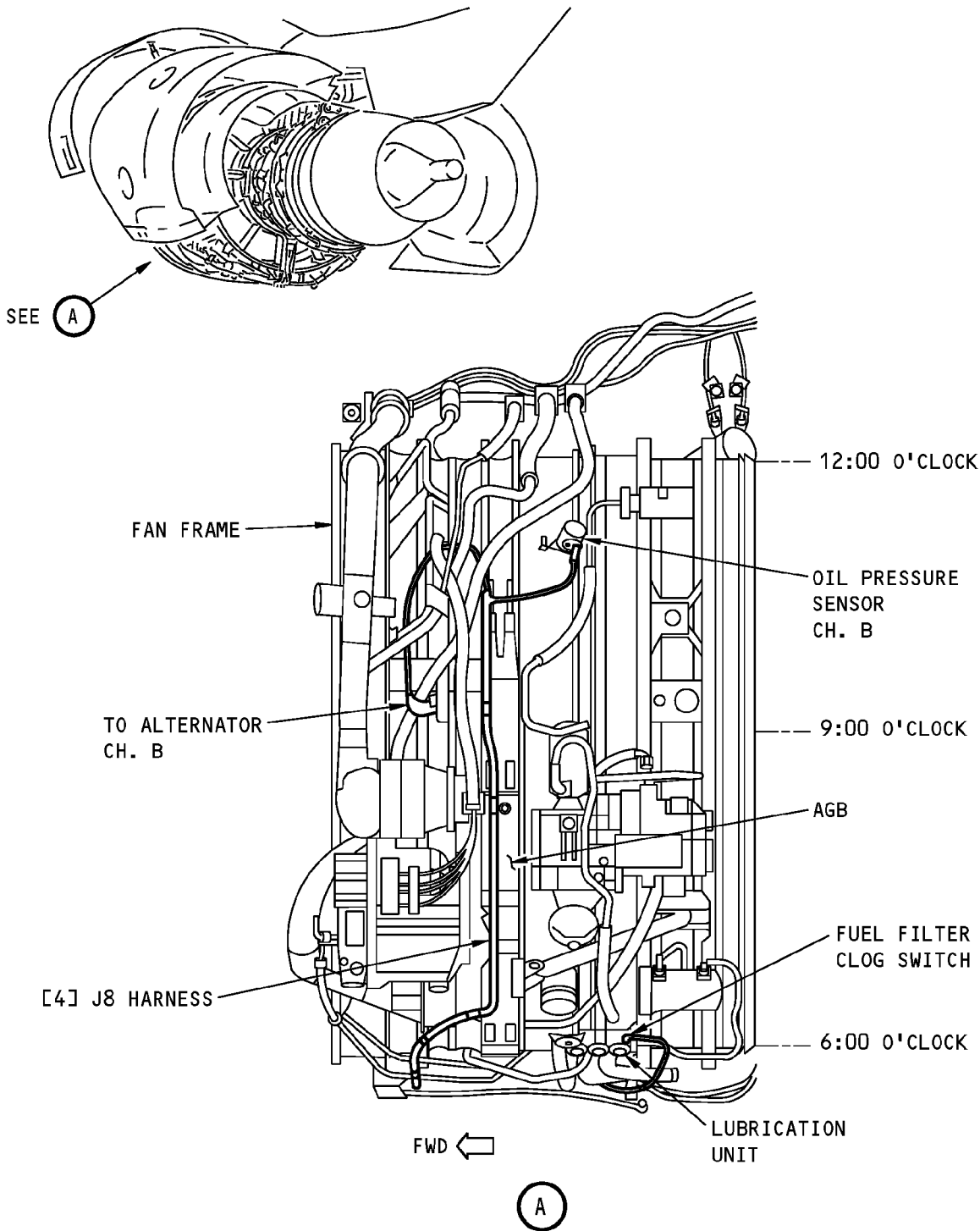
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S-M56-MM-03433-00-B

J8 Harness Installation
Figure 404 (Sheet 1 of 3)/73-21-06-990-804-F00

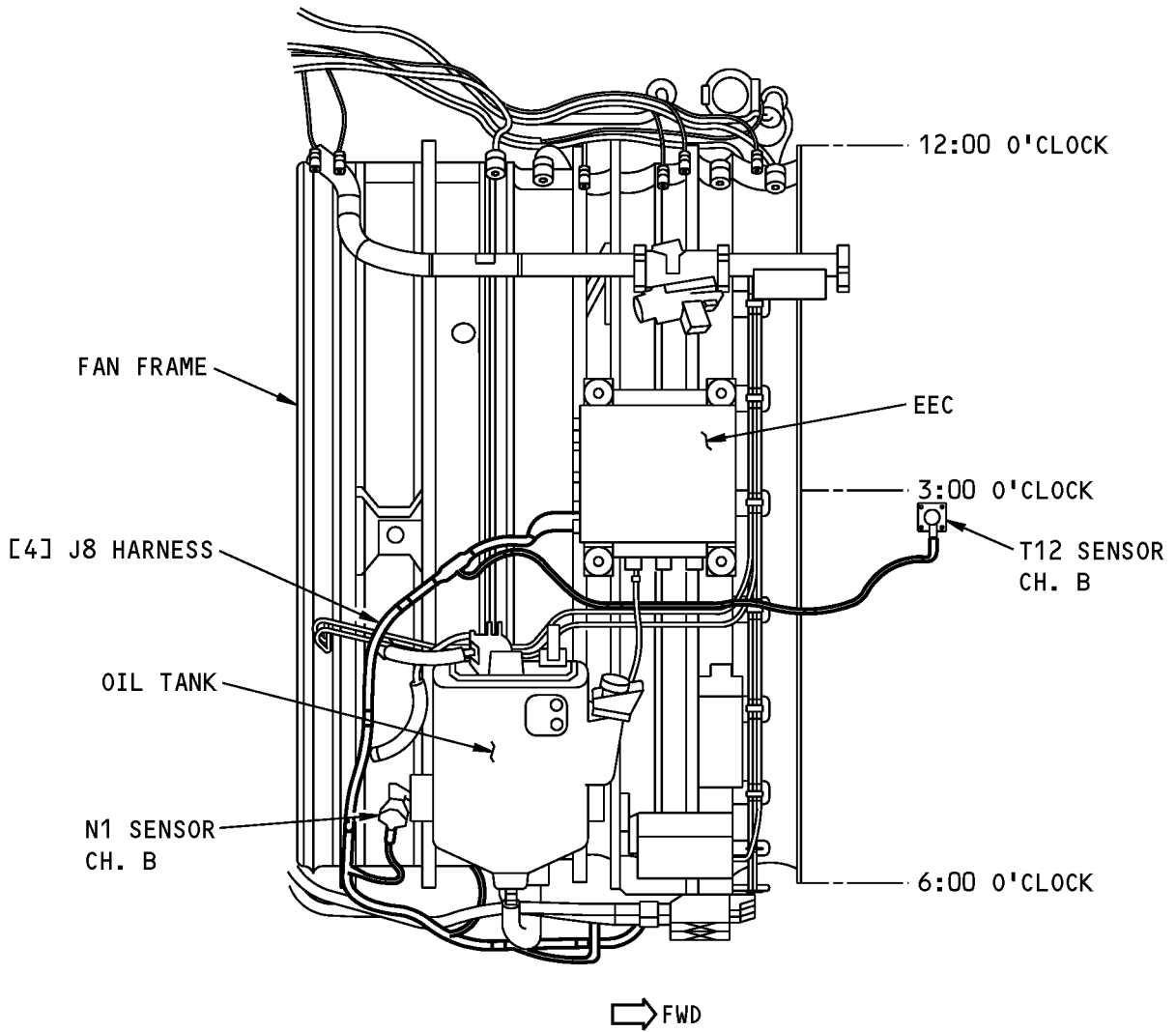
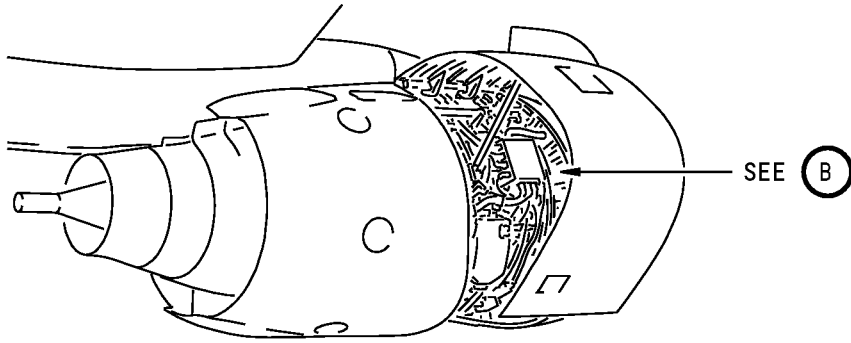
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B

S-M56-MM-03434-00-B

J8 Harness Installation
Figure 404 (Sheet 2 of 3)/73-21-06-990-804-F00

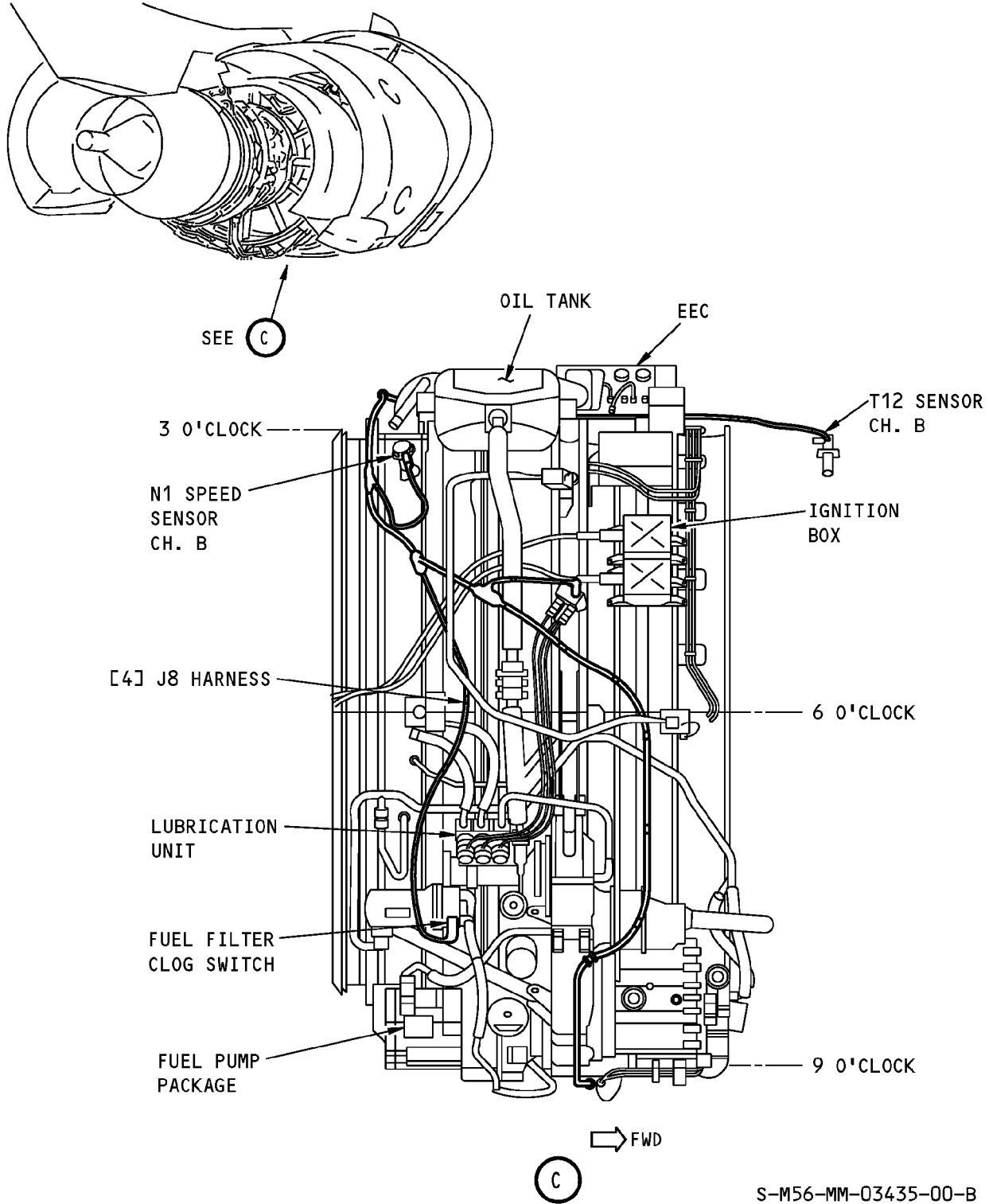
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S-M56-MM-03435-00-B

J8 Harness Installation
Figure 404 (Sheet 3 of 3)/73-21-06-990-804-F00

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TASK 73-21-06-400-801-F00

3. Fan Wiring Harness Installation

(Figure 401, Figure 402, Figure 403, Figure 404)

A. References

Reference	Title
71-00-00-700-807-F00	Test 12 - Actuators Test (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-00-700-804-F00	EEC TEST (P/B 501)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Harness	73-21-06-01-075	HAP ALL
2	Harness	73-21-06-01-060	HAP ALL
3	Harness	73-21-06-01-085	HAP ALL
4	Harness	73-21-06-01-105	HAP ALL

D. Location Zones

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

E. Fan Wiring Harnesses Installation

SUBTASK 73-21-06-420-001-F00

(1) Do these steps to install the J5 harness [1] (Refer to Figure 401):

- (a) Put the J5 harness [1] in its position on the engine.
- (b) Connect the J5 electrical connectors to their receptacles:
 - 1) EEC, J5 - DP0505
 - 2) HMU Ch A, DP0501
 - 3) Fuel Flow Transmitter, DP0502
 - 4) N2 sensor Ch A, DP0503.

(c) Distribute the slack of the harness along the length of the run.

NOTE: This will make sure that the harness is not damaged by stress.

(d) Do these steps to connect the wire harness to the fan case:

- 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors.
- 2) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
- 3) Use the bolts, washers, nuts, and clamps to connect the harness to the fan case.
 - a) Tighten the bolts with captive nuts to 72-88 inch-pounds (8.1-9.9 newton-meters).
 - b) Tighten the bolts with nuts to 50-80 inch-pounds (5.6-9 newton-meters).

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SUBTASK 73-21-06-420-002-F00

- (2) Do these steps to install the J6 harness [2] (Refer to Figure 402):
- (a) Put the J6 harness [2] in its position on the engine.
 - (b) Connect the J6 electrical connectors to their receptacles:
 - 1) EEC, J6 - DP0606
 - 2) HMU Ch B, DP0601
 - 3) Oil temperature sensor, DP0602
 - 4) N2 sensor Ch B, DP0603.
 - (c) Distribute the slack of the harness along the length of the run.
NOTE: This will make sure that the harness is not damaged by stress.
 - (d) Do these steps to connect the wire harness to the fan case:
 - 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors.
 - 2) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 3) Use the bolts, washers, nuts, and clamps to connect the harness to the fan case.
 - a) Tighten the bolts with captive nuts to 72-88 inch-pounds (8.1-9.9 newton-meters).
 - b) Tighten the bolts with nuts to 50-80 inch-pounds (5.6-9 newton-meters).

SUBTASK 73-21-06-420-003-F00

- (3) Do these steps to install the J7 harness [3] (Refer to Figure 403):
- (a) Put the J7 harness [3] in its position on the engine.
 - (b) Connect the J7 electrical connectors to their receptacles:
 - 1) EEC, J7 - DP0707
 - 2) N1 sensor Ch A, DP0701
 - 3) Alternator Ch A, DP0702
 - 4) Oil filter bypass warning, DP0703
 - 5) T12 sensor Ch A, DP0704
 - 6) Oil pressure sensor Ch A, DP0705.
 - (c) Distribute the slack of the harness along the length of the run.
NOTE: This will make sure that the harness is not damaged by stress.
 - (d) Do these steps to connect the wire harness to the fan case:
 - 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors.
 - 2) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 3) Use the bolts, washers, nuts, and clamps to connect the harness to the fan case.
 - a) Tighten the bolts with captive nuts to 72-88 inch-pounds (8.1-9.9 newton-meters).
 - b) Tighten the bolts with nuts to 50-80 inch-pounds (5.6-9 newton-meters).

SUBTASK 73-21-06-020-005-F00

- (4) Do these steps to install the J8 harness [4] (Refer to Figure 404):
- (a) Put the J8 harness [4] in its position on the engine.

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(b) Connect the J8 electrical connectors to their receptacles:

- 1) EEC, J8 - DP0808
- 2) N1 sensor Ch B, DP0801
- 3) Alternator Ch B, DP0802
- 4) Fuel filter bypass warning, DP0803
- 5) T12 sensor Ch B, DP0804
- 6) Oil pressure sensor Ch B, DP0805
- 7) DPM box, DP0806.

(c) Distribute the slack of the harness along the length of the run.

NOTE: This will make sure that the harness is not damaged by stress.

(d) Do these steps to connect the wire harness to the fan case:

- 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors to 62-71 inch-pounds (7-8 newton-meters).
- 2) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
- 3) Use the bolts, washers, nuts, and clamps to connect the harness to the fan case.
 - a) Tighten the bolts with captive nuts to 72-88 inch-pounds (8.1-9.9 newton-meters).
 - b) Tighten the bolts with nuts to 50-80 inch-pounds (5.6-9 newton-meters).

F. Put the Airplane in a Serviceable Condition

SUBTASK 73-21-06-840-002-F00

(1) Do these steps to put the airplane in a serviceable condition:

(a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Do these tasks after the installation of the J5, J6, J7 and J8 harnesses.

- 1) Do this test: EEC TEST, TASK 73-21-00-700-804-F00.
- 2) Do this test: Test 12 - Actuators Test, TASK 71-00-00-700-807-F00.

(d) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

————— **END OF TASK** —————

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TASK 73-21-06-000-802-F00

4. 3 O'clock Strut Harness Removal

(Figure 405, Figure 406, Figure 407, Figure 408)

A. General

- (1) The 3 o'clock strut harnesses are the J9, J10 and MW0311 harnesses.

B. References

Reference	Title
72-23-03-000-802-F00	Shroud Segments Removal (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Procedure

SUBTASK 73-21-06-840-003-F00

- (1) Do these steps to prepare for the removal:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DEACTIVATE THE LEADING EDGE, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (c) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.
- (d) Do this step for the removal of the J9 harness [5] or J10 harness [6] wire harness:
- 1) Remove the lower-left inner panel of the thrust reverser extension ring (TASK 72-23-03-000-802-F00).
- (e) Do these steps to remove the cowl from the 3:00 o'clock strut (strut) (Figure 405):
- 1) Remove the 14 screws that hold the strut cowl to the strut.

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- 2) Remove the strut cowl.
- 3) Remove the two bolts and two washers that hold the 3:00 O'clock strut seal.
 - a) Remove the 3:00 O'clock strut seal.
- 4) Remove the two bolts that hold the upper half-firewall to the lower half-firewall.
 - a) Remove the upper half-firewall.
- 5) Remove the two bolts that hold the lower half-firewall to the strut.
 - a) Remove the lower half-firewall.

E. 3 o'clock Strut Harness Removal

SUBTASK 73-21-06-020-006-F00

- (1) Do these steps to remove the J9 harness [5] (Figure 405, Figure 406):

NOTE: The tasks for the removal of the J9, the J10, or the MW0311 harnesses can be completed at the same time.

- (a) Disconnect these J9 electrical connectors from the receptacles:

- 1) EEC, J9 - DP0909
- 2) VSV position transducer Ch A, DP0902
- 3) HPTACC valve position transducer Ch A, DP0903
- 4) LPTACC valve position transducer Ch A, DP0904
- 5) T3 probe Ch A, DP0905
- 6) BSV switch Ch A, DP0906
- 7) TBV position transducer Ch A, DP0907
- 8) VBV position transducer Ch A, DP0908
- 9) T25 sensor Ch A, DP0910
- 10) CJ9 receptacle, DP0901.

- (b) Do these steps to disconnect the J9 harness [5] (Figure 405):

- 1) Disconnect the [7] MW0311 harness from the omega clamps on the J9 harness box.
- 2) Remove the bolts that hold the J9 and J10 harness boxes to the bracket on the 3:00 O'clock strut wall.
- 3) Open the 1/4-turn hinged clamps that hold the J9 harness [5] to the engine.
- 4) Pull the flexible clamp, with the harness, from the strut and disconnect the J9 harness [5].
 - a) Carefully move the J9 harness [5] through the strut, towards the center of the engine.

- (c) Remove the J9 harness [5].

SUBTASK 73-21-06-020-007-F00

- (2) Do these steps to remove the J10 harness [6] (Figure 405, Figure 407):

NOTE: The tasks for the removal of the J9, the J10, or the MW0311 harnesses can be completed at the same time.

- (a) Disconnect these J10 electrical connectors from the receptacles:

- 1) EEC, J10 - DP1010
- 2) VSV position transducer Ch B, DP1002
- 3) HPTACC valve position transducer Ch B, DP1003

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- 4) LPTACC valve position transducer Ch B, DP1004
 - 5) T3 probe Ch B, DP1005
 - 6) BSV switch Ch B, DP1006
 - 7) TBV position transducer Ch B, DP1007
 - 8) VBV position transducer Ch B, DP1008
 - 9) T25 sensor Ch B, DP1009
 - 10) CJ10 receptacle, DP1001.
- (b) Do these steps to disconnect the J10 harness [6]:
- 1) Remove the bolts that hold the J9 and J10 harness boxes to the bracket on the strut wall.
 - 2) Open the 1/4-turn hinged clamps that hold the J10 harness [6] to the engine.
 - 3) Pull the flexible clamp, with the harness, from the strut and disconnect the J10 harness [6].
 - a) Carefully move the J10 harness [6] through the 3:00 O'clock strut, towards the center of the engine.
- (c) Remove the J10 harness [6].

SUBTASK 73-21-06-020-008-F00

- (3) Do these steps to remove the MW0311 harness [7] (Figure 405, Figure 408):

NOTE: The tasks for the removal of the J9, the J10 or the MW0311 harnesses can be completed at the same time.

- (a) Disconnect these MW0311 electrical connectors from the receptacles:
- 1) Bleed air controller, DP1102
 - 2) Ground wing thermal anti-ice solenoid valve, DP1103
 - 3) FFCC vibration sensor, DP1101
 - 4) Engine disconnect panel, DP1104.
- (b) Do these steps to disconnect the MW0311 harness [7]:
- 1) Disconnect the MW0311 harness [7] from the omega clamp of the J9 harness box.
 - 2) Open the 1/4-turn hinged clamps that hold the MW0311 harness [7] to the engine.
 - 3) Pull the flexible clamp, with the harness, from the strut and disconnect the MW0311 harness [7].
 - a) Carefully move the MW0311 harness [7] through the 3:00 O'clock strut, towards the center of the engine.
- (c) Remove the MW0311 harness [7].

————— **END OF TASK** —————

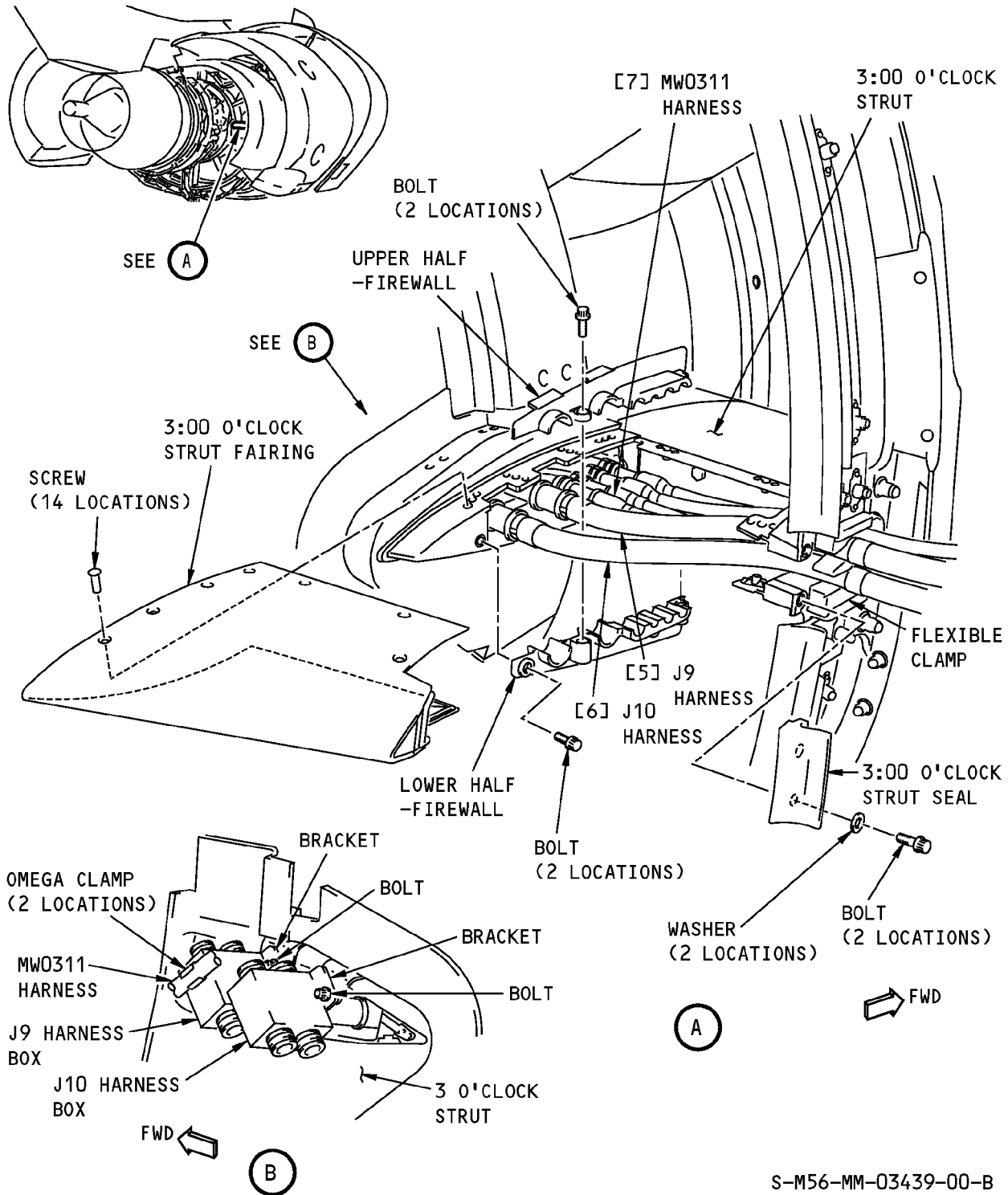
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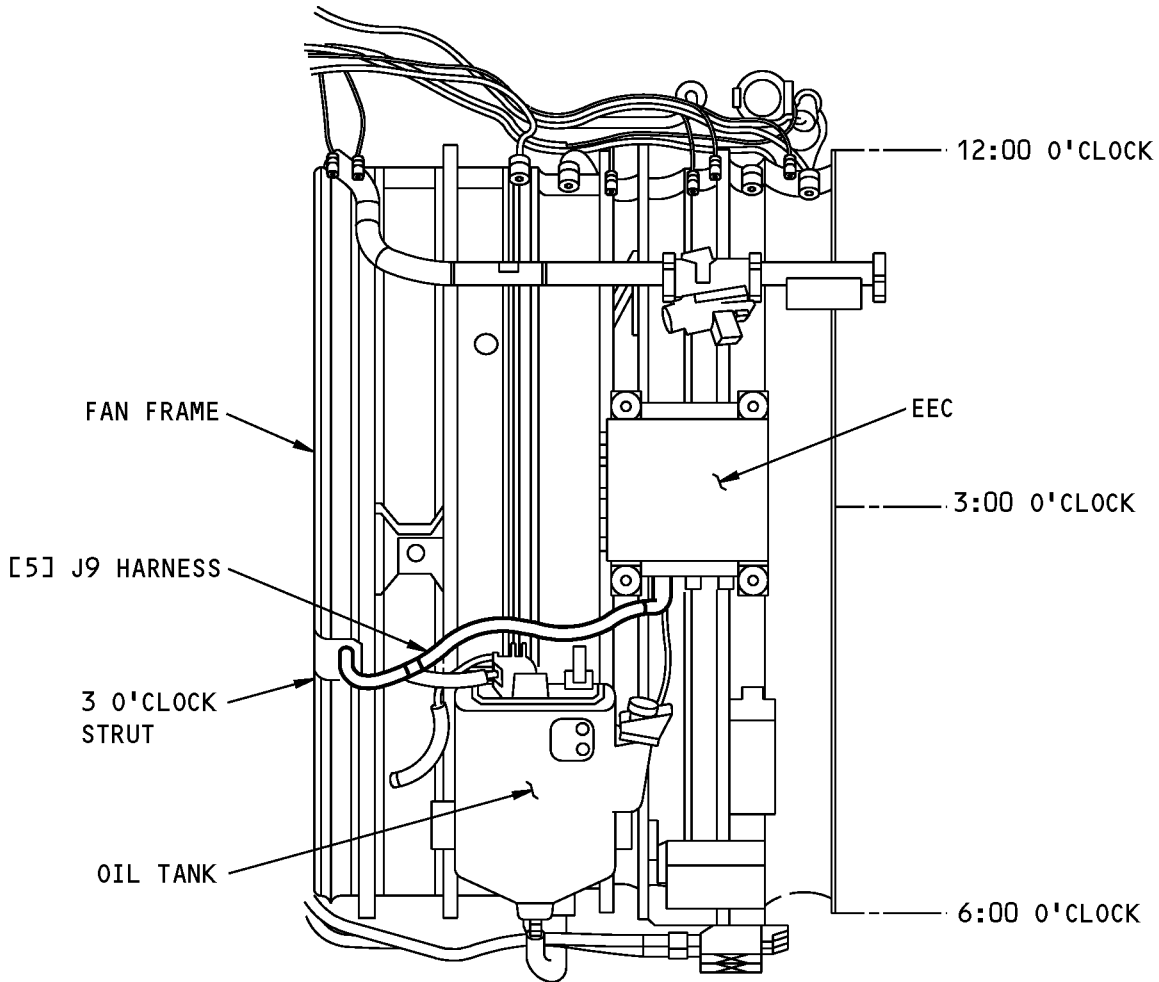
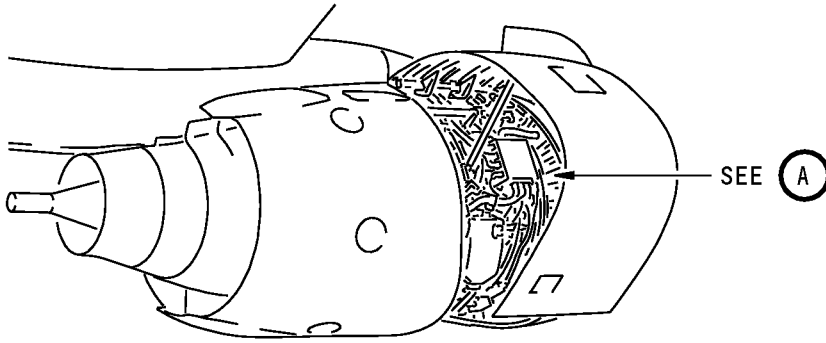
S-M56-MM-03439-00-B

3:00 O'Clock Strut Harness Installation
Figure 405/73-21-06-990-805-F00

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→ FWD

A

S-M56-MM-03440-00-B

J9 Harness Installation
Figure 406 (Sheet 1 of 3)/73-21-06-990-806-F00

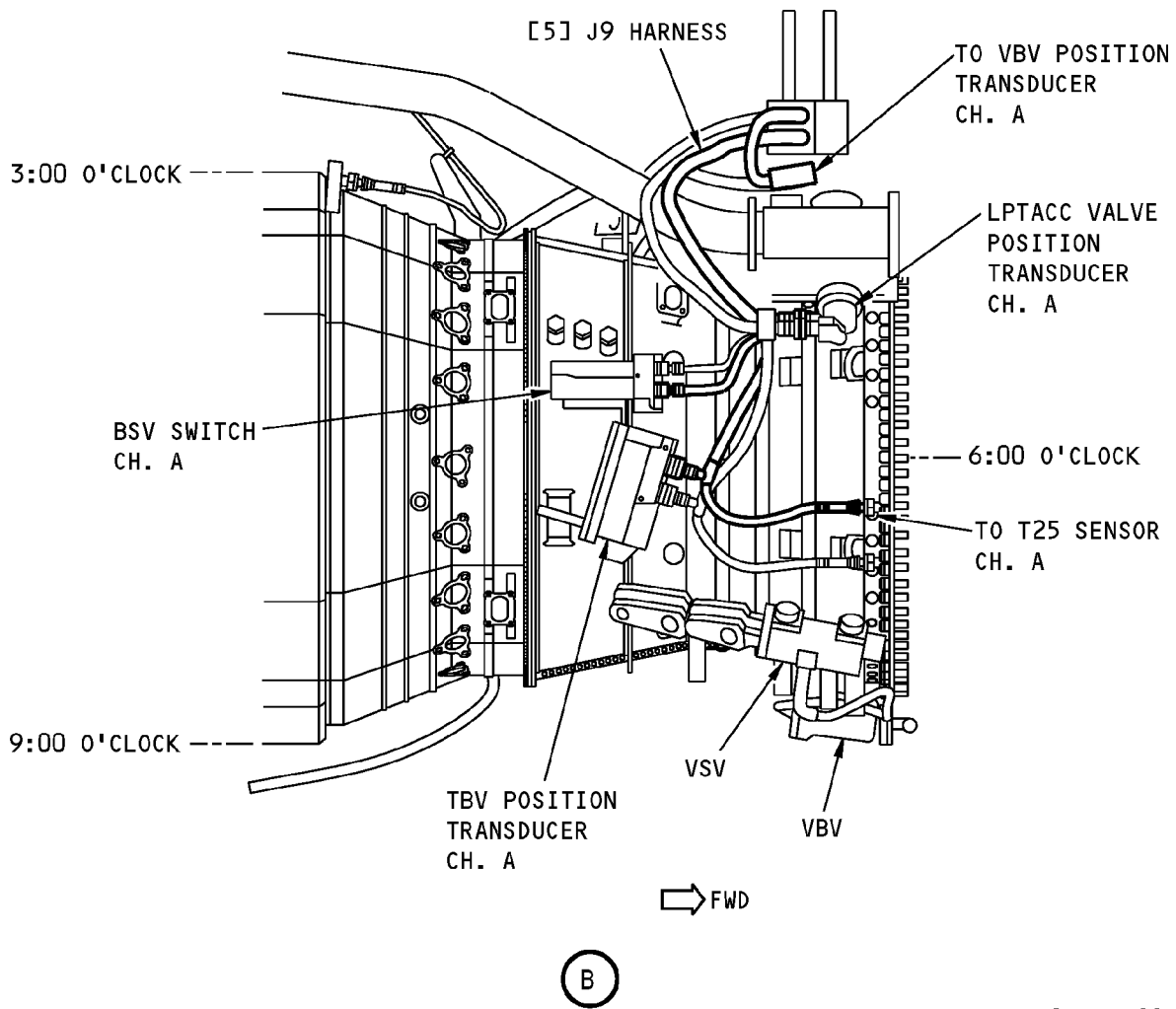
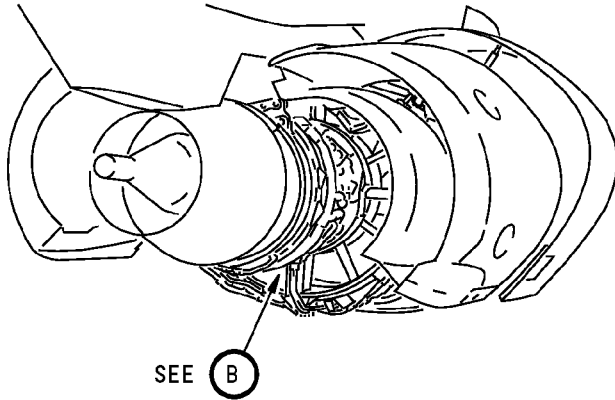
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S-M56-MM-03441-00-B

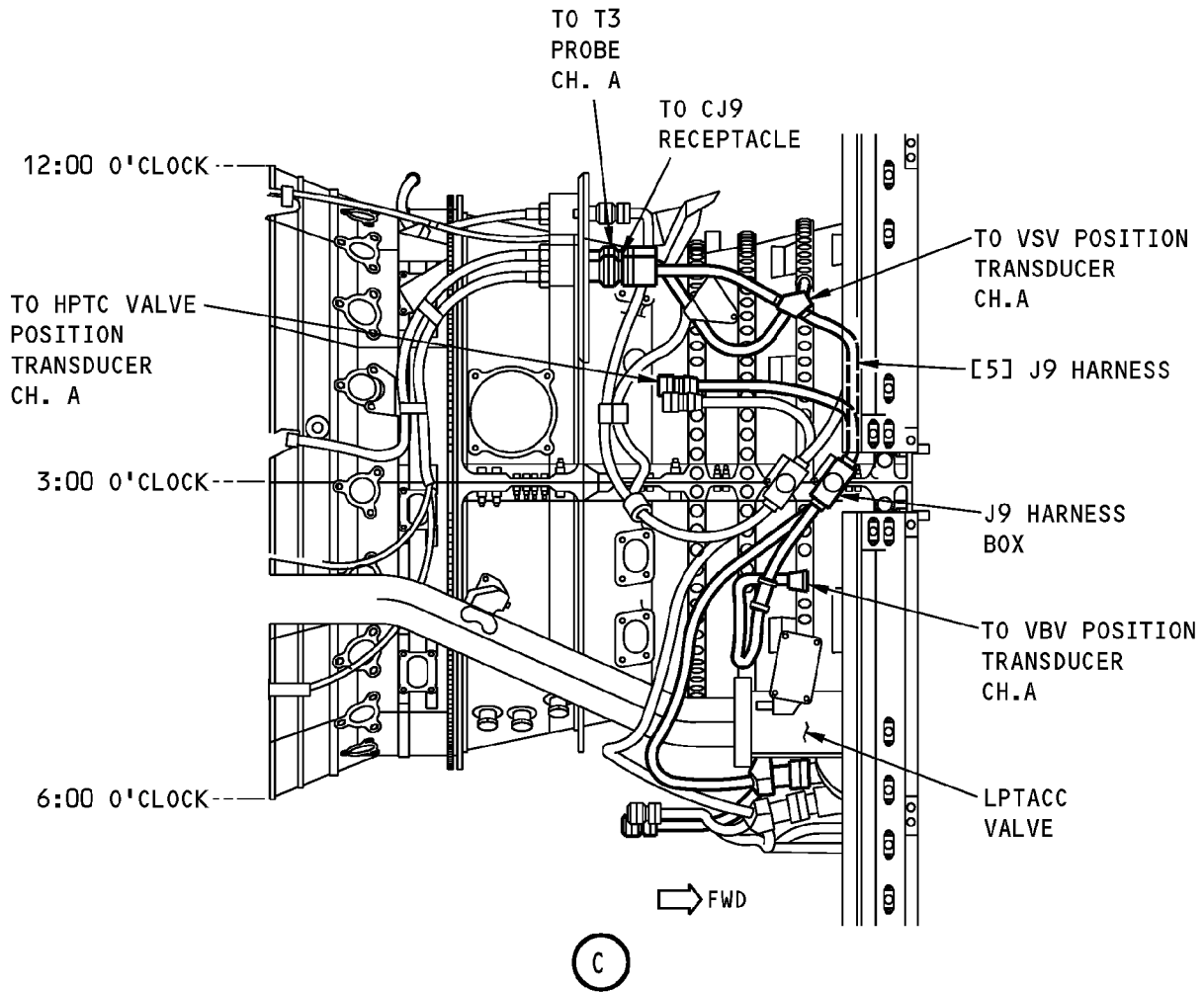
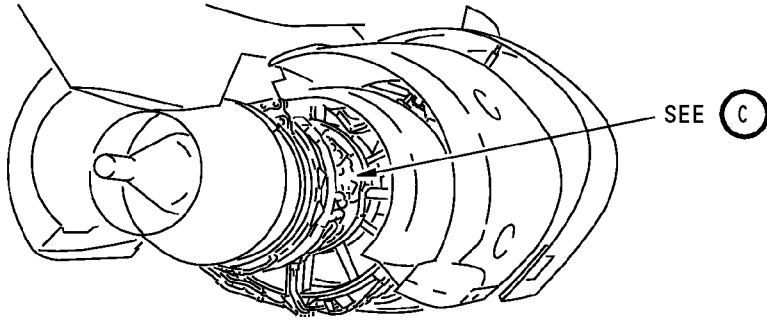
J9 Harness Installation
Figure 406 (Sheet 2 of 3)/73-21-06-990-806-F00

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S-M56-MM-03442-00-B

J9 Harness Installation
Figure 406 (Sheet 3 of 3)/73-21-06-990-806-F00

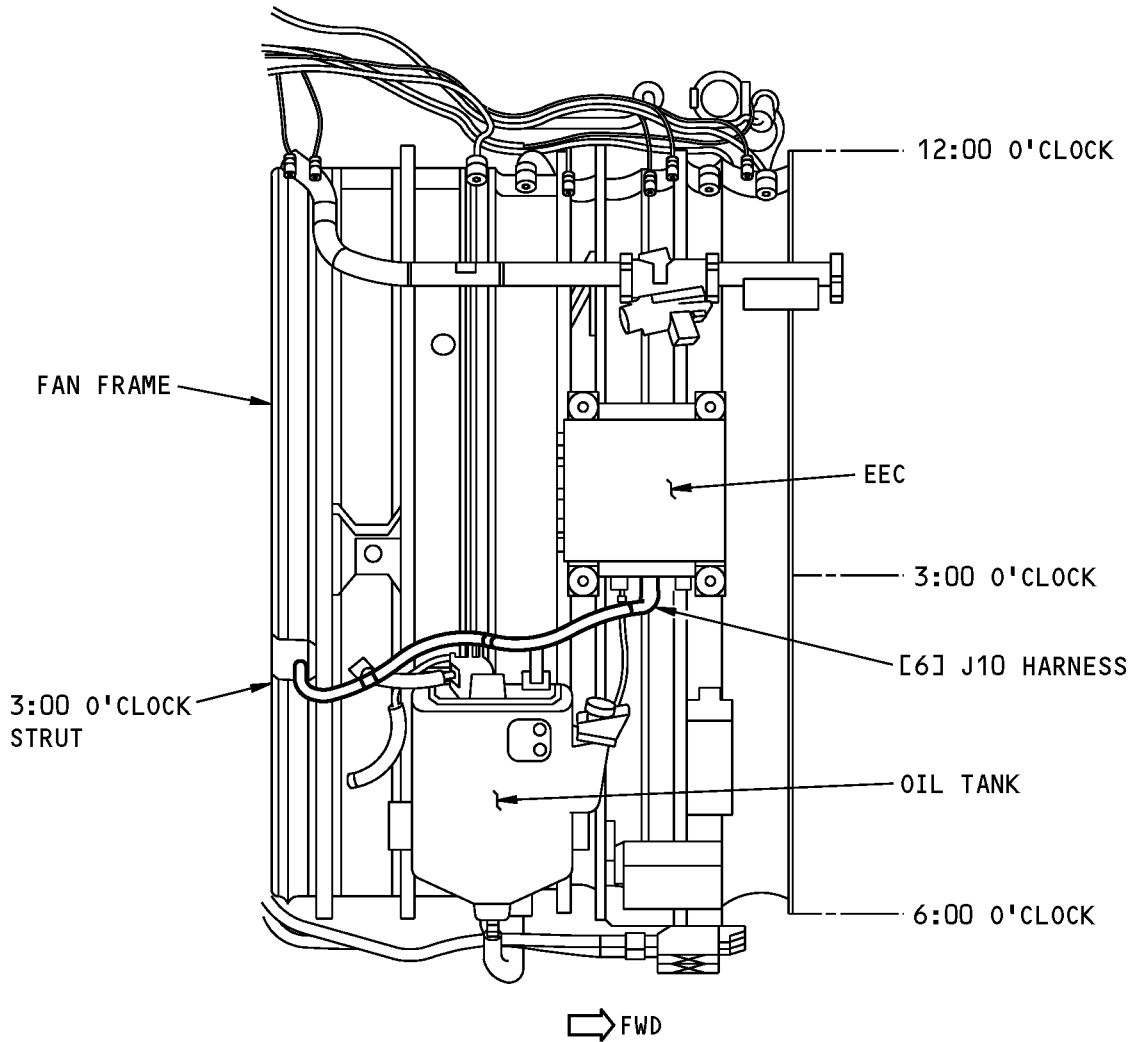
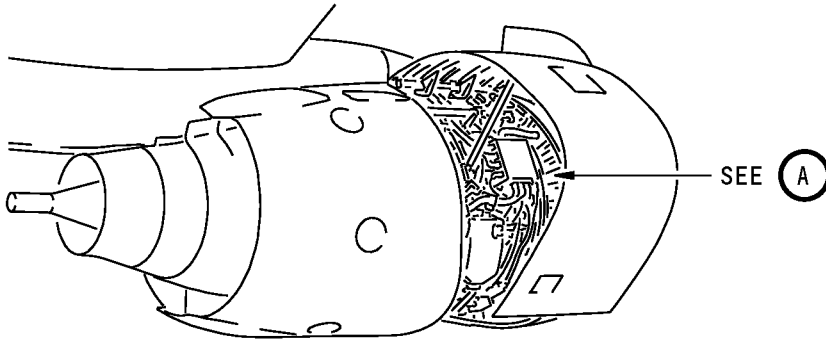
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(A)

S-M56-MM-03443-00-B

J10 Harness Installation
Figure 407 (Sheet 1 of 4)/73-21-06-990-807-F00

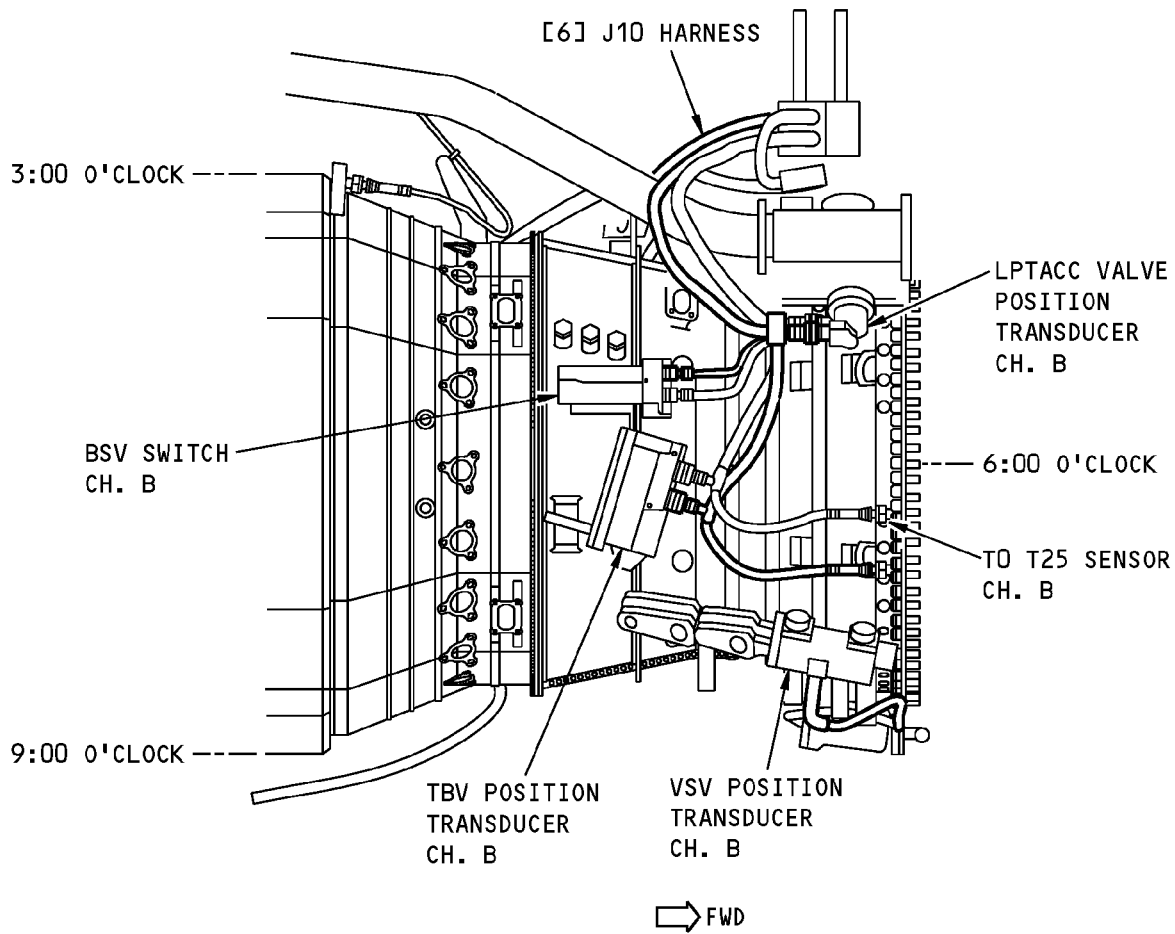
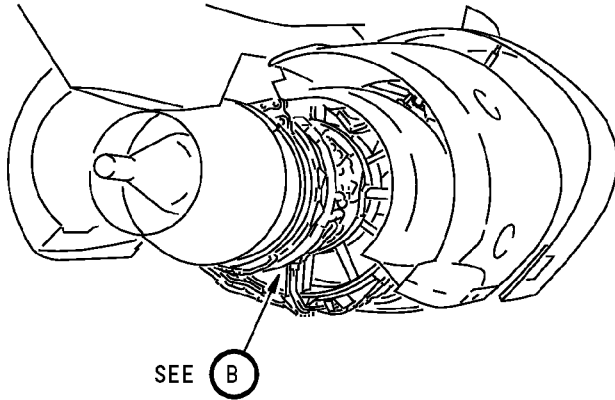
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B

S-M56-MM-03444-00-B

J10 Harness Installation
Figure 407 (Sheet 2 of 4)/73-21-06-990-807-F00

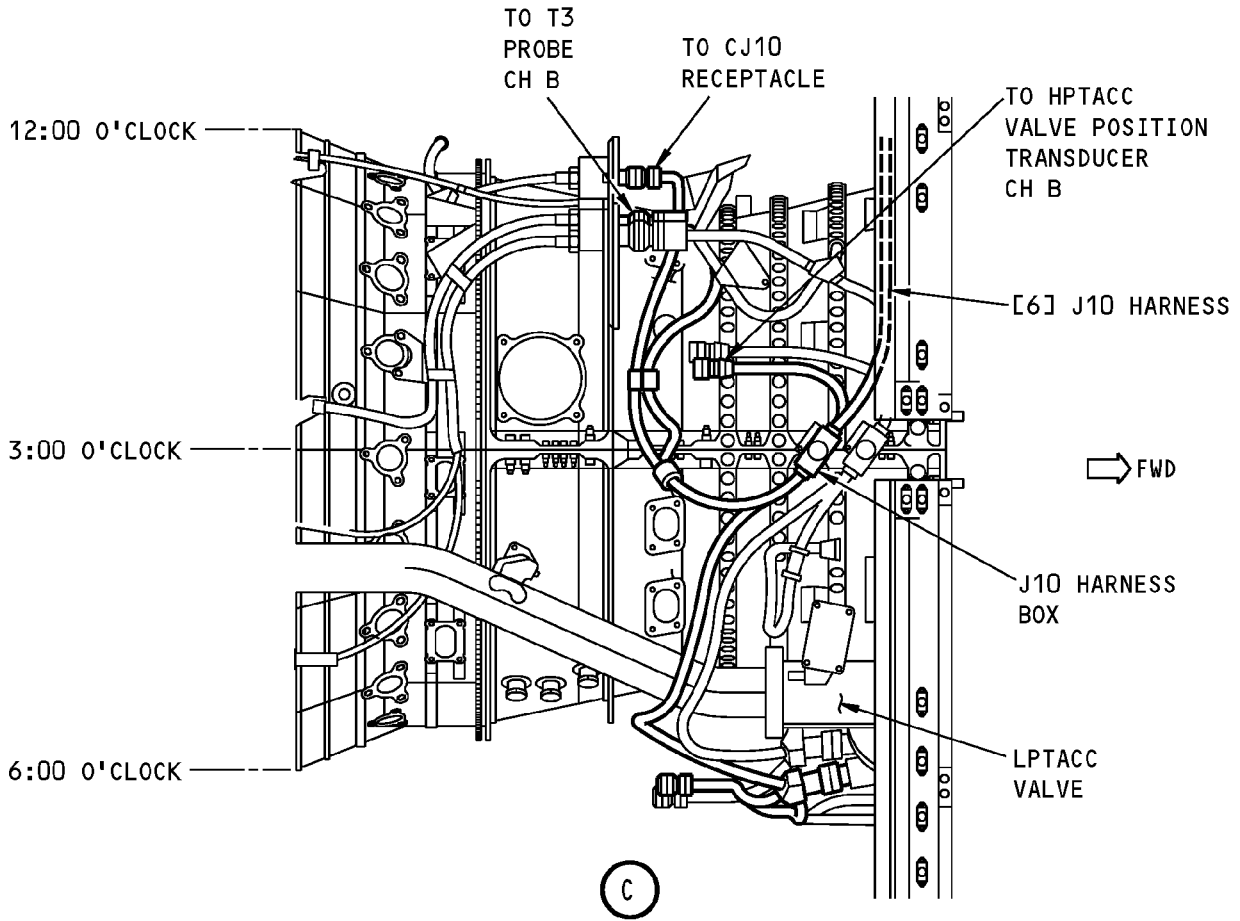
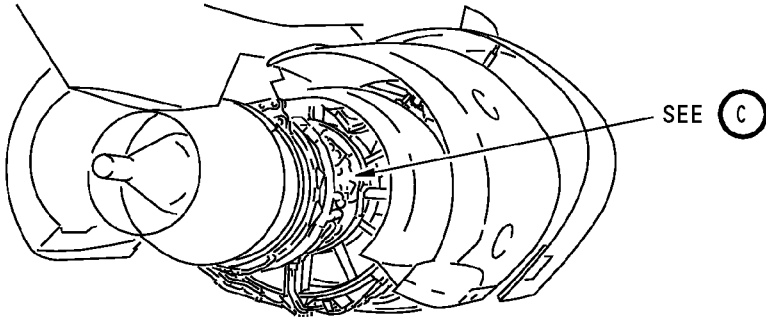
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S-M56-MM-03445-00-B

J10 Harness Installation
Figure 407 (Sheet 3 of 4)/73-21-06-990-807-F00

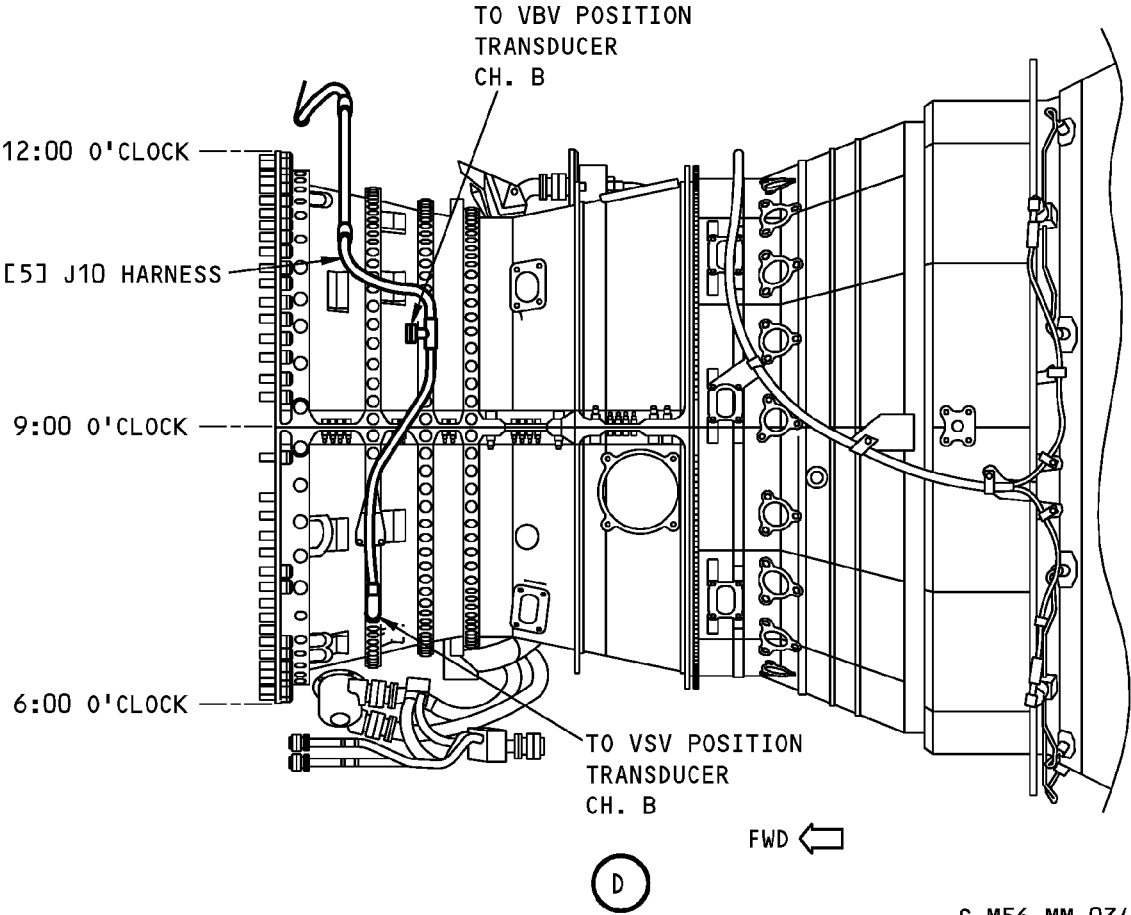
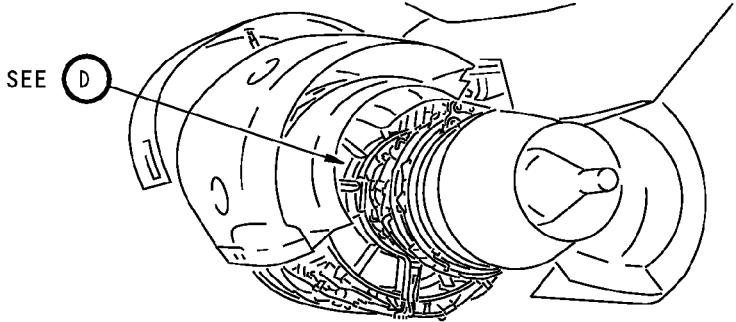
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S-M56-MM-03446-00-B

J10 Harness Installation
Figure 407 (Sheet 4 of 4)/73-21-06-990-807-F00

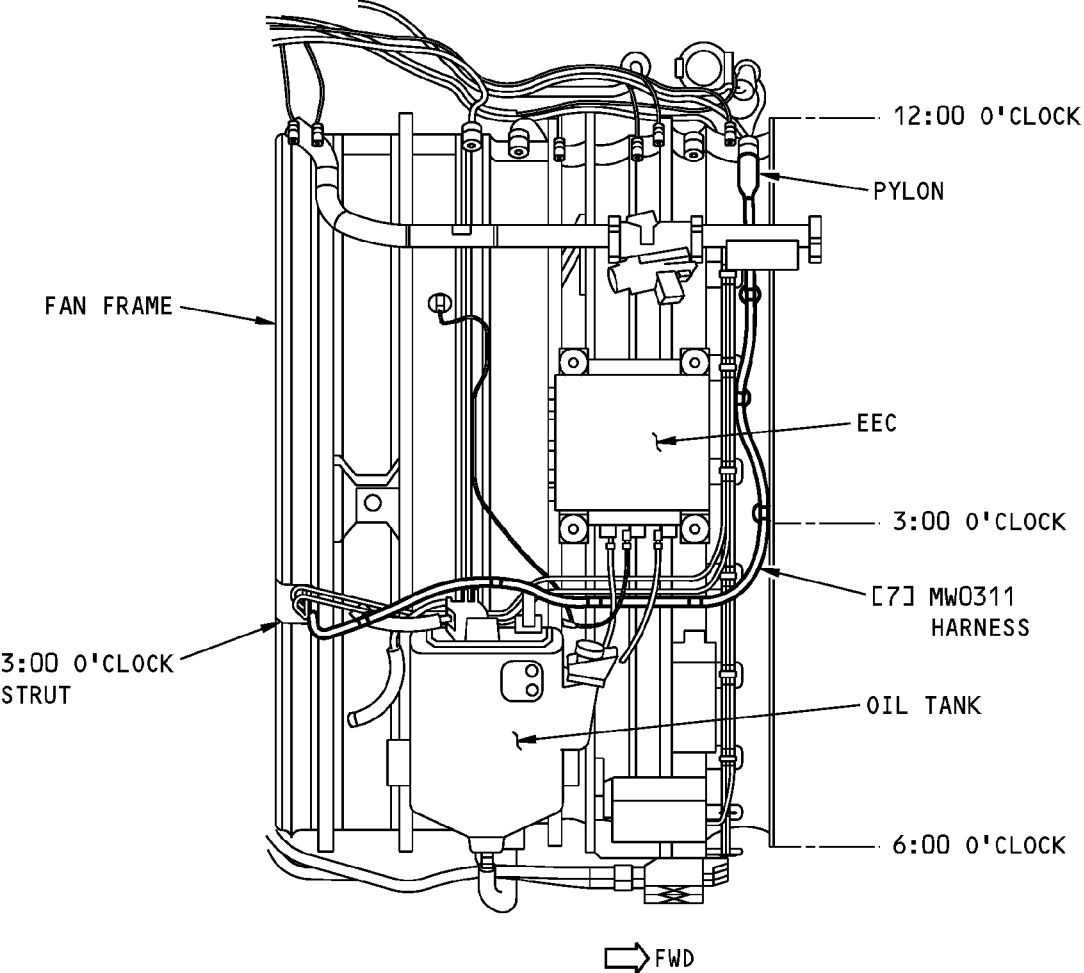
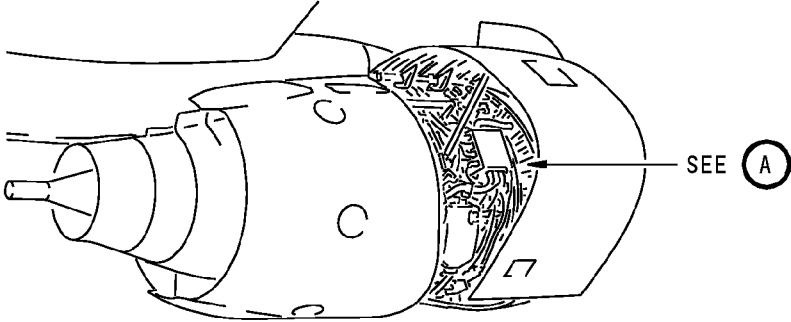
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(A)

S-M56-MM-03447-00-B

MW0311 Harness Installation
Figure 408 (Sheet 1 of 2)/73-21-06-990-808-F00

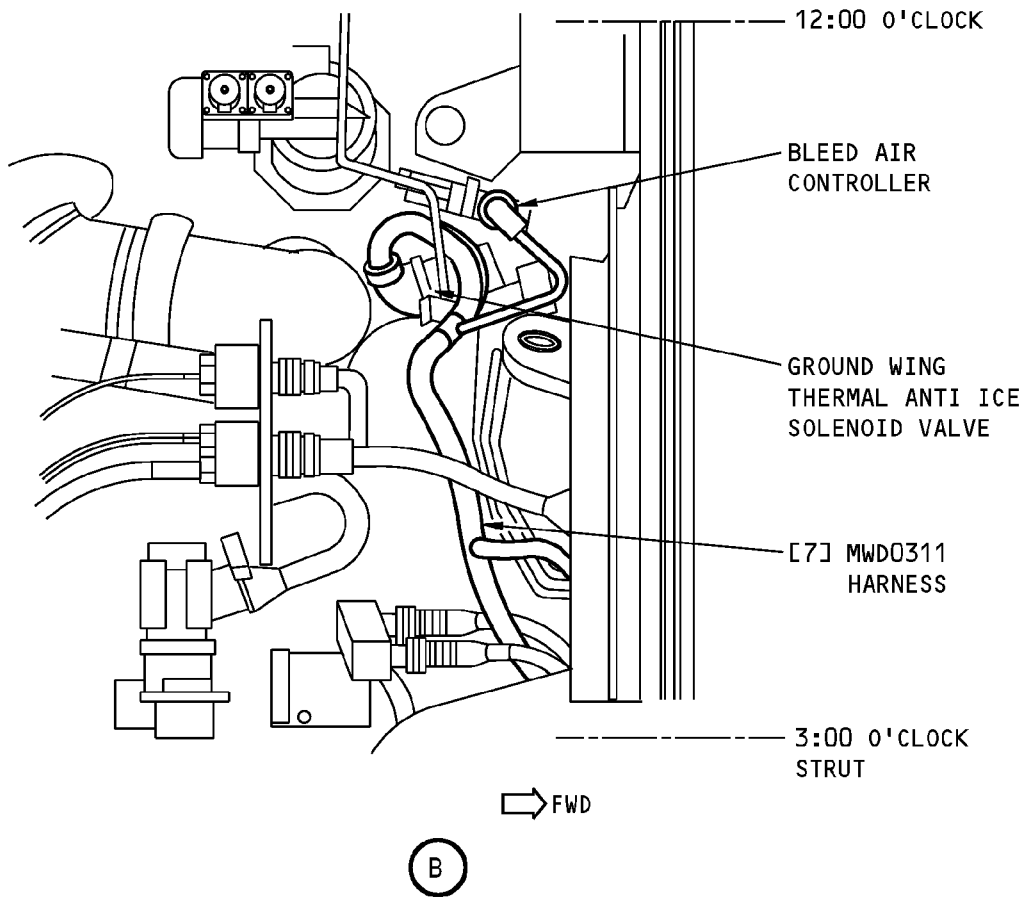
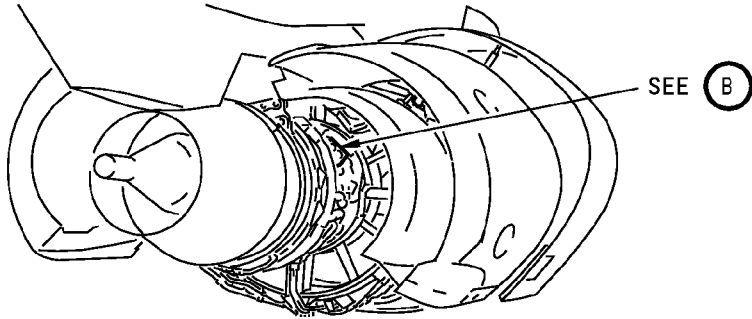
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S-M56-MM-03448-00-B

MW0311 Harness Installation
Figure 408 (Sheet 2 of 2)/73-21-06-990-808-F00

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TASK 73-21-06-400-802-F00

5. 3 O'clock Strut Harness Installation

(Figure 405, Figure 406, Figure 407, Figure 408)

A. References

Reference	Title
30-11-12-710-801	Ground Wing Thermal Anti-Icing (TAI) Solenoid Valve Test (P/B 501)
36-11-03-400-801	Bleed Air Regulator Installation (P/B 401)
72-23-03-400-802-F00	Shroud Segments Installation (P/B 401)
73-21-00-700-802-F00	FADEC System Test (P/B 501)
77-31-04-400-801-F00	FFCC Vibration Sensor Installation (P/B 401)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Harness	73-21-06-01-015	HAP ALL
6	Harness	73-21-06-01-025	HAP ALL
7	Harness	71-51-03-01-055	HAP ALL
		71-51-03-01-065	HAP ALL

D. Location Zones

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

E. 3:00 O'clock Strut Harness Installation

SUBTASK 73-21-06-420-004-F00

(1) Do these steps to install the J9 harness [5] (Figure 405, Figure 406):

NOTE: The tasks for the installation of the J9, the J10, or the MW0311 harnesses can be completed at the same time.

- (a) Carefully install the J9 harness [5] through the 3:00 o'clock strut, from the inside to the outside of the engine.
 - 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Use the bolts to install the J9 and J10 harness boxes to the bracket on the strut.
 - a) Tighten the bolts to 98-110 inch-pounds (11-12.5 newton-meters).
 - 3) Pull the flexible clamp from the strut.
 - a) Put the J9 harness [5] in its correct position in the flexible clamp.
 - 4) Install the flexible clamp in the strut.
 - a) Make sure that there is no pre-load on the J9, J10, or MW0311 harnesses.

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- b) Make sure that the J9 harness [5] does not touch the other harnesses or the structure of the strut.
- 5) Connect the MW0311 harness [7] in the omega clamps on the J9 box.
- (b) Connect these J9 electrical connectors to their receptacles:
 - 1) EEC, J9 - DP0909
 - 2) VSV position transducer Ch A, DP0902
 - 3) HPTACC valve position transducer Ch A, DP0903
 - 4) LPTACC valve position transducer Ch A, DP0904
 - 5) T3 probe Ch A, DP0905
 - a) Tighten the DP0905 connector to 168-186 inch-pounds (19-21 newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connector.
 - 6) BSV switch Ch A, DP0906
 - 7) TBV position transducer Ch A, DP0907
 - 8) VBV position transducer Ch A, DP0908
 - 9) T25 sensor Ch A, DP0910
 - 10) CJ9 receptacle, DP0901.
- (c) Distribute the slack of the harness along the length of the run.

NOTE: This will make sure that the harness is not damaged by stress.
- (d) Do these steps to connect the wire harness to the engine:
 - 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors to 62-71 inch-pounds (7-8 newton-meters).

SUBTASK 73-21-06-420-005-F00

- (2) Do these steps to install the J10 harness [6] (Figure 405, Figure 407):

NOTE: The tasks for the installation of the J9, the J10, or the MW0311 harnesses can be completed at the same time.

- (a) Carefully install the J10 harness [6] through the 3:00 o'clock strut, from the inside to the outside of the engine.
 - 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Use the bolts to install the J9 and J10 harness boxes to the bracket on the strut.
 - a) Tighten the bolt to 98-110 inch-pounds (11-12.5 newton-meters).
 - 3) Pull the flexible clamp, with the harnesses, from the strut.
 - a) Put the J10 harness [6] in its correct position in the flexible clamp.
 - 4) Install the flexible clamp in the strut.
 - a) Make sure that there is no pre-load on the J10, J9, or MW0311 wire harnesses.
 - b) Make sure that the J10 harness [6] does not touch the other harnesses or the structure of the strut.
- (b) Connect these J10 electrical connectors to their receptacles:
 - 1) EEC, J10 - DP1010
 - 2) VSV position transducer Ch B, DP1002

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- 3) HPTACC valve position transducer Ch B, DP1003
 - 4) LPTACC valve position transducer Ch B, DP1004
 - 5) T3 probe Ch B, DP1005
 - a) Tighten the DP1005 connector to 168-186 inch-pounds (19-21 newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connector.
 - 6) BSV switch Ch B, DP1006
 - 7) TBV position transducer Ch B, DP1007
 - 8) VBV position transducer Ch B, DP1008
 - 9) T25 sensor Ch B, DP1009
 - 10) CJ10 receptacle, DP1001.
- (c) Distribute the slack of the harness along the length of the run.
- NOTE: This will make sure that the harness is not damaged by stress.
- (d) Put the harness in the 1/4-turn hinged clamps.
- 1) Tighten the 1/4-turn connectors.

SUBTASK 73-21-06-420-006-F00

- (3) Do these steps to install the MW0311 harness [7] (Figure 405, Figure 408):

NOTE: The tasks for the installation of the J9, the J10, or the MW0311 harnesses can be completed at the same time.

- (a) Carefully install the MW0311 harness [7] through the 3:00 o'clock strut (strut), from the inside to the outside of the engine.
 - 1) Pull the flexible clamp, with the harnesses, from the strut.
 - a) Put the MW0311 harness [7] in its correct position in the flexible clamp.
 - 2) Install the flexible clamp in the strut.
 - a) Make sure that there is no pre-load on the MW0311, J9, or J10 wire harnesses.
 - b) Make sure that the MW0311 harness [7] does not touch the other harnesses or the structure of the strut.
 - 3) Engage the MW0311 harness [7] in the omega clamp on the J9 harness box.
 - (b) Connect the [7] MW0311 electrical connectors to their receptacles:
 - 1) Bleed air controller, DP1102
 - 2) Ground wing thermal anti-ice solenoid valve, DP1103
 - 3) FFCC vibration sensor, DP1101
 - 4) Engine disconnect panel, DP1104.
 - (c) Distribute the slack of the harness along the length of the run.
- NOTE: This will make sure that the harness is not damaged by stress.
- (d) Do these steps to connect the wire harness to the engine:
- 1) Put the harness in the 1/4-turn hinged clamps.
 - a) Tighten the 1/4-turn connectors to 62-71 inch-pounds (7-8 newton-meters).

SUBTASK 73-21-06-410-001-F00

- (4) Do these steps to install the cowl on the 3:00 O'clock strut (Figure 405):

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CAUTION: MAKE SURE THAT THE HARNESSSES ARE IN THE CORRECT POSITION IN THE FIRE WALLS. IF THE HARNESSSES ARE NOT IN THE CORRECT POSITION, IT CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (a) Install the lower half-firewall:
 - 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Use the two bolts to connect the lower half-firewall to the strut.
 - a) Tighten the bolts to 110-120 inch-pounds (12.0-14.0 newton-meters).
- (b) Install the upper half-firewall (SIN 9510Z):
 - 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Connect it to the lower half-firewall with the two bolts.
 - a) Tighten the bolts to 110-120 inch-pounds (12.0-14.0 newton-meters).
- (c) Put the 3:00 O'clock strut seal in its correct position on the strut.
 - 1) Use the two bolts and two washers to install the 3:00 O'clock strut seal on the strut.
 - a) Tighten the bolts to 110-120 inch-pounds (12.0-14.0 newton-meters).
- (d) Put the fairing in its correct position on the strut.
 - 1) Use the 14 screws to connect the fairing to the strut.
 - a) Tighten the screws to 30-35 inch-pounds (3.5-4.0 newton-meters).
- (e) Install the lower-left inner panel of the thrust reverser extension ring (TASK 72-23-03-400-802-F00).

F. Put the Airplane in a Serviceable Condition

SUBTASK 73-21-06-840-004-F00

- (1) Do these steps to put the airplane in a serviceable condition:

- (a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (c) Do this test after the installation of the harnesses:

- 1) For the J9 and J10 harnesses.
 - a) Do this task: FADEC System Test, TASK 73-21-00-700-802-F00.
- 2) For the MW0311 harness.
 - a) Do this task: FADEC System Test, TASK 73-21-00-700-802-F00.
 - b) Do this task: Bleed Air Regulator Installation, TASK 36-11-03-400-801.

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- c) Do this task: Ground Wing Thermal Anti-Icing (TAI) Solenoid Valve Test, TASK 30-11-12-710-801.
- d) Do this task: FFCC Vibration Sensor Installation, TASK 77-31-04-400-801-F00.

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

- (d) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

TASK 73-21-06-000-803-F00**6. Core Engine Harness Removal**

(Figure 409, Figure 410)

A. General

- (1) The core engine harnesses are the CJ9 and the CJ10 harnesses.

B. References

Reference	Title
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-21-06-860-002-F00

- (1) Do these steps to prepare for the procedure:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

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WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: DEACTIVATE THE LEADING EDGE, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

E. Core Engine Harness Removal

SUBTASK 73-21-06-020-009-F00

(1) Do these steps to remove the CJ9 harness [8] (Figure 409):

(a) Disconnect these electrical connectors:

- 1) The right T49.5 thermocouple harness, DP0912 and DP0913
- 2) TCC sensor, DP0914
- 3) J9 harness, DP0911.

(b) Remove the two bolts that hold the CJ9 junction box to the bracket.

NOTE: The CJ9 junction box is found on the engine core at the 1:00 o'clock position.

(c) Remove the nuts, bolts, washers, and clamps that hold the CJ9 harness [8] to the engine.

NOTE: Make a note of the locations and orientation of all of the parts that hold the CJ9 harness. The part location and orientation is important for the subsequent installation.

- 1) Remove the CJ9 harness [8] from the engine.

SUBTASK 73-21-06-020-010-F00

(2) Do these steps to remove the CJ10 harness [9] (Figure 410):

(a) Disconnect these electrical connectors:

- 1) Left T49.5 thermocouple harness connections, DP1012 and DP1013
- 2) J10 harness electrical connector, DP1011.

(b) Remove the two bolts that hold the CJ10 junction box to the bracket.

NOTE: The CJ10 junction box is found on the engine core at the 1:00 o'clock position.

(c) Remove the nuts, bolts, washers, and clamps that hold the CJ10 harness [9] to the engine.

NOTE: Make a note of the locations and orientation of all of the parts that hold the CJ10 harness. The part location and orientation is important for the subsequent installation.

- 1) Remove the CJ10 harness [9] from the engine.

————— **END OF TASK** —————

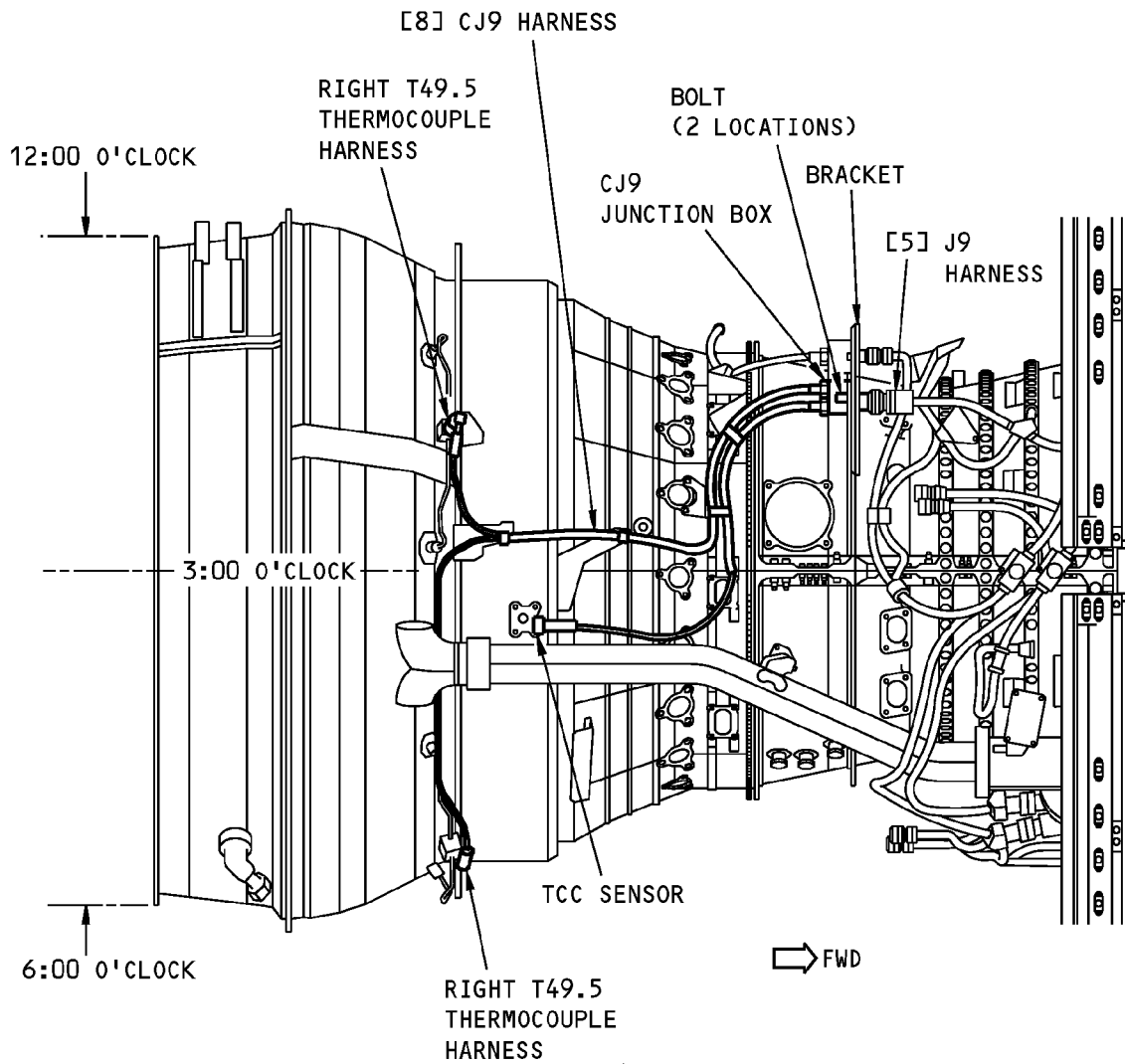
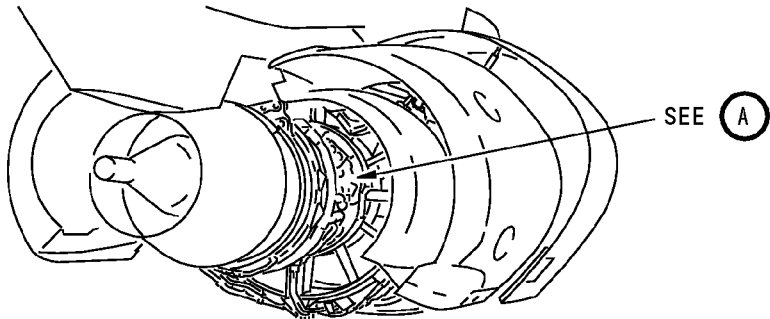
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(A)

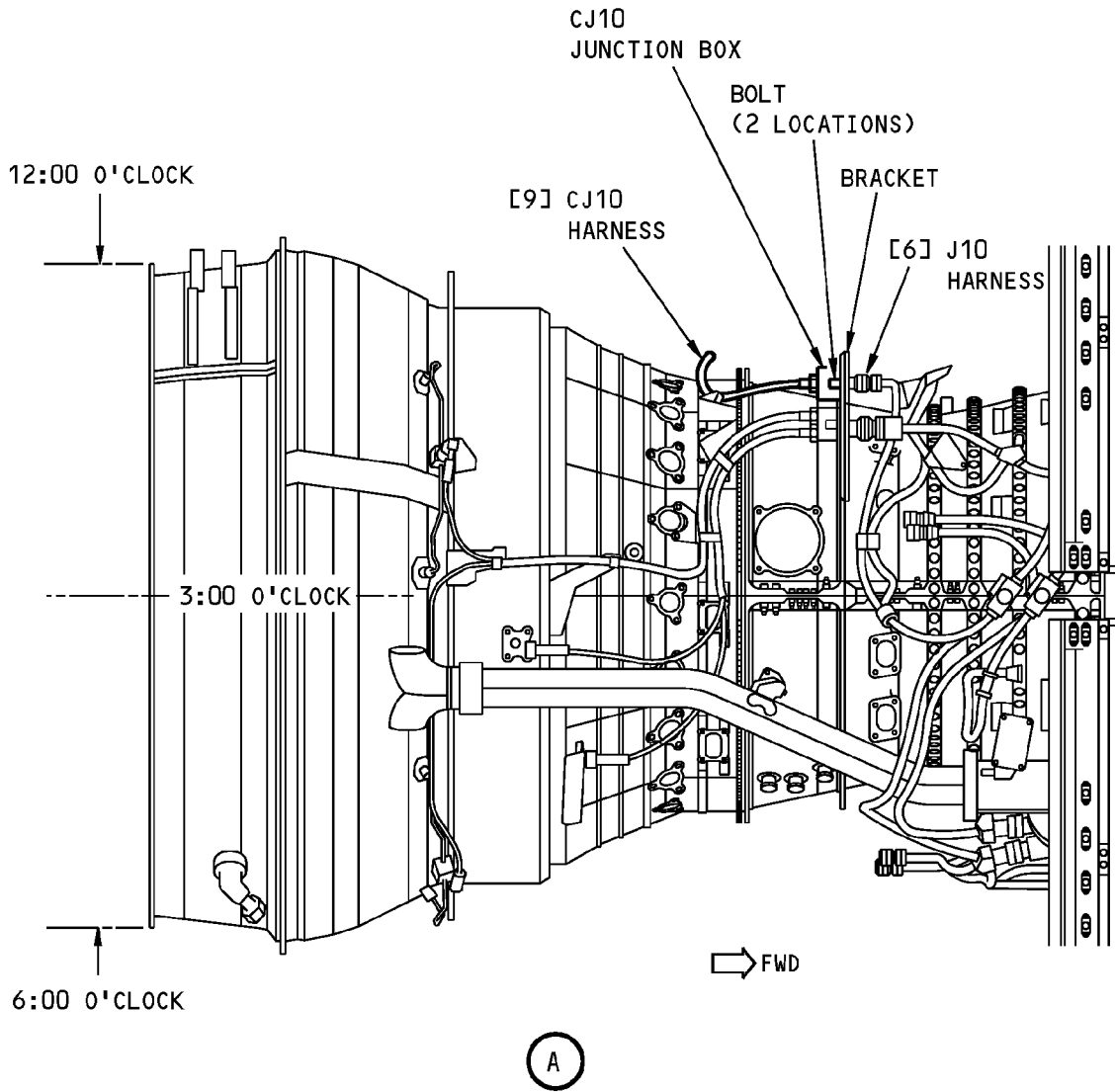
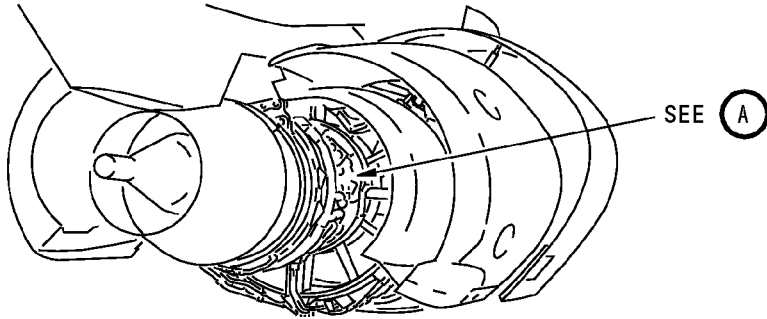
S-M56-MM-03449-00-B

CJ9 Harness Installation
Figure 409/73-21-06-990-809-F00

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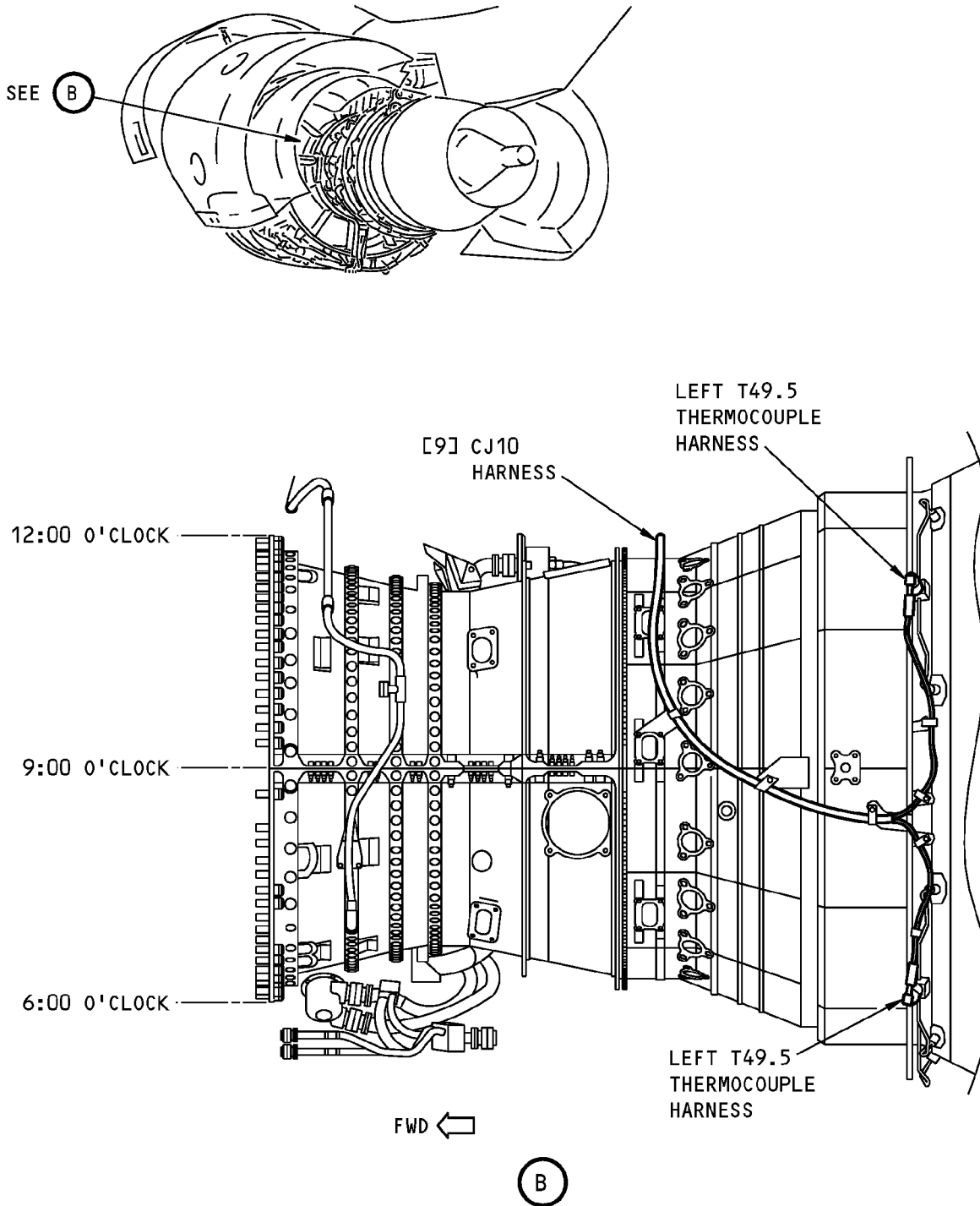
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CJ10 Harness Installation
Figure 410 (Sheet 1 of 2)/73-21-06-990-810-F00

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S-M56-MM-03451-00-B

CJ10 Harness Installation
Figure 410 (Sheet 2 of 2)/73-21-06-990-810-F00

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TASK 73-21-06-400-803-F00

7. Core Engine Harness Installation

(Figure 409, Figure 410)

A. References

Reference	Title
73-21-00-700-802-F00	FADEC System Test (P/B 501)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
8	Harness	73-21-06-01-145	HAP ALL
9	Harness	73-21-06-01-185	HAP ALL

D. Location Zones

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

E. Core Engine Harness Installation

SUBTASK 73-21-06-420-007-F00

(1) Do these steps to install the CJ9 harness [8]:

- (a) Put the CJ9 harness [8] in its correct position on the engine.
- (b) Use the 2 bolts to install the CJ9 junction box to the bracket.
 - 1) Tighten the bolts to 98-110 inch-pounds (11-12.5 newton-meters).
- (c) Connect these CJ9 harness electrical connectors (Figure 409):
 - 1) The right T49.5 thermocouple harness, DP0912 and DP0913
 - a) Tighten the electrical connectors for the right T49.5 thermocouples to 133-170 inch-pounds (15-20 newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on these electrical connectors.
 - 2) TCC sensor, DP0914
 - a) Tighten the electrical connector for the TCC sensor to 168-186 inch-pounds (19-21 newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connector.
 - 3) J9 harness, DP0911.

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- (d) Distribute the slack of the harness along the length of the run.

NOTE: This will make sure that the harness is not damaged by stress.

- (e) Do these steps to connect the wire harness to the fan case:
- 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Use the bolts, washers, nuts, and clamps to connect the harness to the engine.
 - a) Tighten the bolts to 98-110 inch-pounds (11-12.5 newton-meters).

SUBTASK 73-21-06-420-008-F00

- (2) Do these steps to install the CJ10 harness [9] (Figure 410):
- (a) Put the CJ10 harness [9] in its correct position on the engine.
 - (b) Use the two bolts to install the CJ10 junction box to the bracket.
 - 1) Tighten the bolts to 98-110 inch-pounds (11-12.5 newton-meters).
 - (c) Connect these electrical connectors:
 - 1) The left T49.5 thermocouple harness connectors, DP1012 and DP1013
 - a) Tighten the electrical connectors to 133-177 inch-pounds (15-20 newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connectors.
 - 2) The J10 harness electrical connector, DP1011.
 - (d) Distribute the slack of the harness along the length of the run.

NOTE: This will make sure that the harness is not damaged by stress.
 - (e) Do these steps to connect the wire harness to the engine:
 - 1) Use grease, D00601 [CP2101] to lubricate the threads of the bolts.
 - 2) Use the bolts, washers, nuts, and clamps to connect the harness to the engine.
 - a) Tighten the bolts to 98-110 inch-pounds (11-12.5 newton-meters).

F. Installation Test

SUBTASK 73-21-06-840-005-F00

- (1) Prepare for the Test:
- (a) For engine 1, do this step:
Remove the safety tags and close these circuit breakers:
CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
 - (b) For engine 2, do this step:
Remove the safety tags and close these circuit breakers:
F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-06-710-001-F00

- (2) Do this task: FADEC System Test, TASK 73-21-00-700-802-F00.

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

- (a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

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WIRING HARNESSSES - REPAIR

1. General

A. This procedure contains one task to repair the CJ9 and CJ10 wiring harnesses.

TASK 73-21-06-300-801-F00

2. Repair of Worn CJ9 and CJ10 Wiring Harness

A. General

(1) Refer to this procedure, Engine Wiring Harnesses Repair, TASK 70-70-01-350-801-F00.

B. References

Reference	Title
70-70-01-350-801-F00	Engine Wiring Harnesses Repair (P/B 801)

C. Location Zones

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

————— END OF TASK —————

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T3 SENSOR - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the T3 sensor
- (2) The installation of the T3 sensor.

TASK 73-21-07-000-801-F00**2. T3 Sensor Removal**

(Figure 401)

A. General

- (1) This is the removal task for the T3 sensor.
- (2) The T3 sensor is on the right side of the engine, at the 1:00 o'clock position.

B. References

Reference	Title
36-12-01-800-801	Bleed Air Precooler Disconnection (For Engine Component Removal) (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the procedure

SUBTASK 73-21-07-840-001-F00

(1) Do these steps to prepare for the procedure:

(a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

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WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (c) For the right thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.
- (d) Disconnect the precooler duct to get access to the T3 sensor conduit (TASK 36-12-01-800-801).
- (e) Do these steps to remove the CJ9 junction box:
 - 1) Disconnect the electrical connector from the CJ9 junction box.
 - 2) Remove the two bolts that hold the CJ9 junction box to the support bracket.
 - 3) Move the CJ9 junction box out of the way of the T3 sensor interface box.

E. T3 Sensor Removal

SUBTASK 73-21-07-020-001-F00

- (1) Do these steps to remove the T3 sensor:
 - (a) Do these steps to remove these electrical connectors from the T3 sensor:
 - 1) Disconnect the electrical connector DP0905 [3] from the T3 sensor receptacle [1].
 - 2) Disconnect the electrical connector DP1005 [4] from the T3 sensor receptacle [2].
 - (b) Do these steps to remove the two clamps [7]:
 - 1) Remove the two bolts [8] that hold the two clamps [7] to the two brackets.
 - 2) Remove the clamps [7].
 - (c) Do these steps to remove the T3 Sensor [9]:
 - 1) Remove the four bolts [10].
 - 2) Remove the two bolts [5] that hold the T3 sensor interface box [6] to the support bracket.

WARNING: MAKE SURE THAT YOU DO NOT DAMAGE THE SENSOR AS YOU REMOVE IT. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE SENSOR AND THE SENSOR CONDUIT.

- 3) Remove the T3 sensor [9].
- 4) Remove the metal gasket [12].
- 5) Examine the metal gasket [12] to make sure that it is serviceable (TASK 70-30-01-910-802-F00).
 - a) If the metal gasket [12] is damaged, replace it.
 - b) If the metal gasket [12] is not damaged, keep it for the subsequent installation.
- (d) Install a protective cover on all of these openings:
 - 1) The T3 sensor probe [11]
 - 2) The electrical receptacles [1] and [2]
 - 3) The electrical connectors [3] and [4]

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- 4) The T3 sensor boss.

————— **END OF TASK** —————

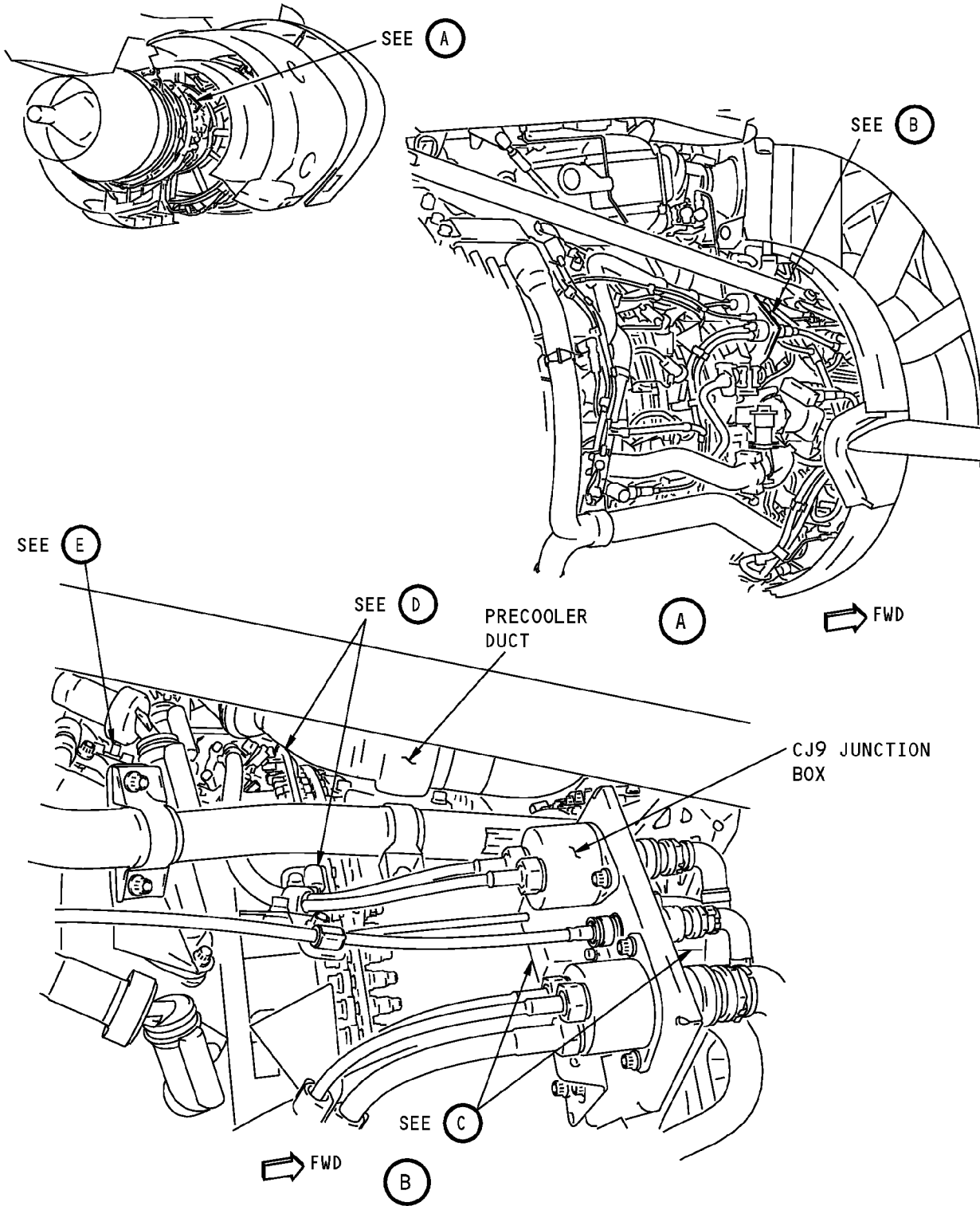
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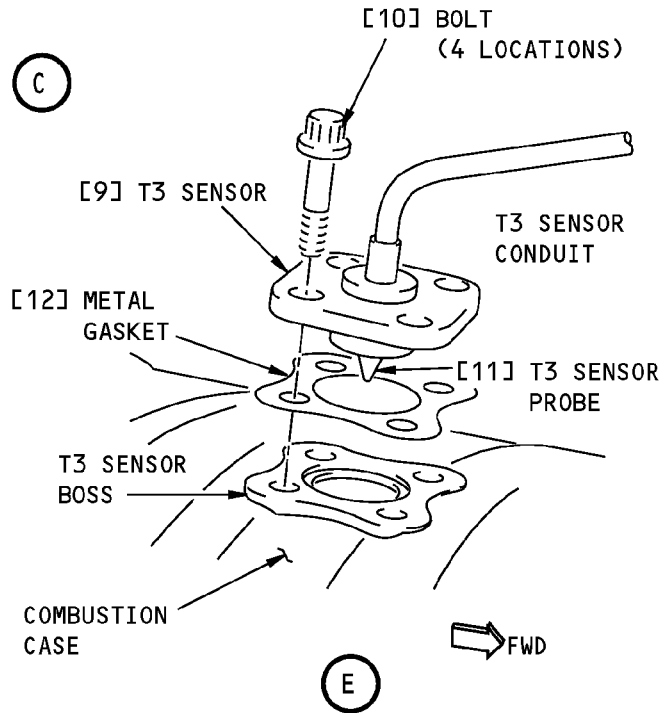
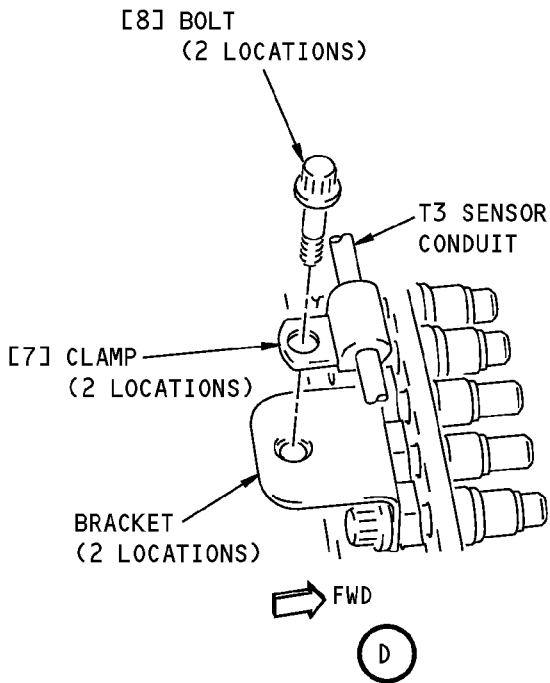
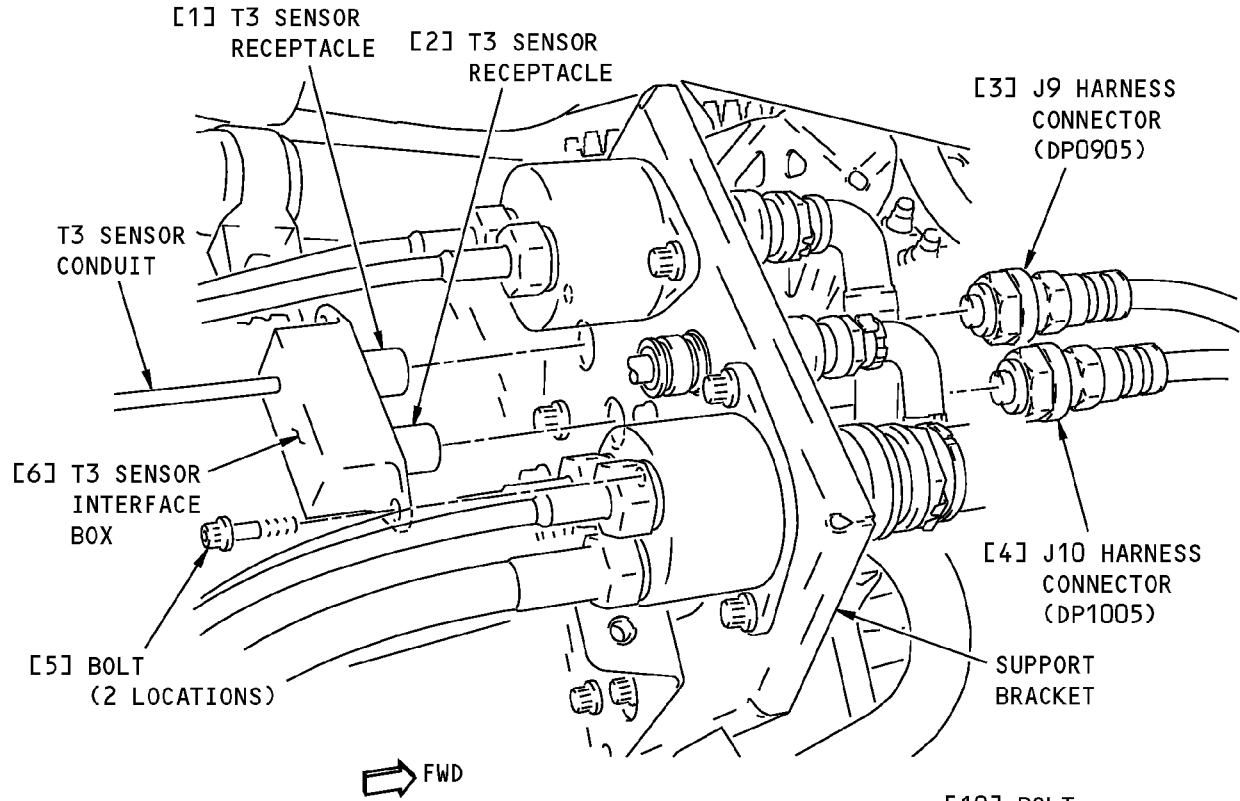


T3 Sensor Installation
Figure 401 (Sheet 1 of 2)/73-21-07-990-801-F00

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T3 Sensor Installation
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TASK 73-21-07-400-801-F00

3. T3 Sensor Installation

(Figure 401)

A. References

Reference	Title
36-12-01-400-801	Bleed Air Precooler Reconnection (After Engine Component Installation) (P/B 201)
73-21-00-700-804-F00	EEC TEST (P/B 501)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
9	T3 Sensor	73-21-07-01-030	HAP ALL
12	Metal gasket	73-21-07-01-035	HAP ALL

D. Location Zones

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

E. Prepare for the Procedure

SUBTASK 73-21-07-840-002-F00

- (1) Do these steps to prepare for the installation:
 - (a) Examine the mating surfaces for the T3 sensor [9] to make sure that they clean and free of damage.
 - 1) If it is necessary, clean or repair the mating surfaces.
 - (b) Lubricate the threads of the bolts [5], [8] and [10] with grease, D00601 [CP2101].

F. T3 Sensor Installation

SUBTASK 73-21-07-420-001-F00

WARNING: MAKE SURE THAT YOU DO NOT DAMAGE THE SENSOR AS YOU INSTALL IT. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE SENSOR AND THE SENSOR CONDUIT.

- (1) Do these steps to install the T3 sensor [9]:
 - (a) Remove the protective cover from the T3 sensor probe [11].
 - (b) Put the metal gasket [12] in its correct position on the T3 sensor boss.
 - (c) Put the T3 Sensor [9] on the sensor boss.
 - (d) Put the T3 sensor interface box [6] in the support bracket.
 - (e) Use your fingers to install the four bolts [10] that attach the T3 sensor [9] to the sensor boss.

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- 1) Do not tighten the bolts [10] at this time.
- (f) Use your fingers to install the two bolts [5] that hold the T3 sensor interface box [6] to the support bracket.
- (g) Examine the T3 sensor [9] and the sensor interface box [6] to make sure that they are in their correct positions.
- (h) Tighten the bolts [5] and [10] to 62-68 pound-inches (7.0-8.0 Newton meters).
 - 1) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the four bolts [10].
- (i) Do these steps to install the two clamps [7]:
 - 1) Install the two bolts [8] to connect the two clamps [7] in their correct positions on the T3 sensor conduit.
 - 2) Tighten the bolts [8] to 62-68 pound-inches (7.0-8.0 Newton meters).
- (j) Do these steps to install the electrical connectors on the T3 sensor:
 - 1) Install the electrical connector DP0905 [3] on the T3 sensor receptacle [1].
 - a) Tighten the electrical connector to 168-186 pound inches (19-21 Newton-meters).
 - b) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connector.
 - 2) Install the electrical connector DP1005 [4] on the T3 sensor receptacle [2].
 - a) Tighten the electrical connector to 168-186 pound inches (19-21 Newton-meters).
 - b) Install lockwire on the electrical connector.
- (k) Do these steps to install the CJ9 junction box:
 - 1) Lubricate the threads of the two bolts that hold the CJ9 junction box with grease, D00601 [CP2101].
 - 2) Put the CJ9 junction box in its correct position on the support bracket.
 - 3) Use the two bolts to connect the CJ9 junction box to the support bracket.
 - a) Tighten the bolts to 62-68 pound-inches (7.0-8.0 Newton meters).
 - 4) Connect the electrical connector from the CJ9 junction box.
- (l) Reconnect the precooler duct (TASK 36-12-01-400-801).

G. T3 Sensor Installation Test

SUBTASK 73-21-07-720-001-F00

- (1) Do these steps for the T3 sensor installation test:

- (a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B

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<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Do this task: EEC TEST, TASK 73-21-00-700-804-F00.

H. Put the Airplane in a Serviceable Condition

SUBTASK 73-21-07-840-004-F00

WARNING: OBEY THE INSTRUCTIONS GIVEN IN THE PROCEDURE TO CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTION, YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) For the right thrust reverser, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

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ELECTRONIC ENGINE CONTROL (EEC) ALTERNATOR - REMOVAL/INSTALLATION**1. General**

A. This procedure contains two tasks:

- (1) The removal of the EEC alternator and the alternator rotor
- (2) The installation of the EEC alternator and the alternator rotor.

TASK 73-21-08-000-801-F00**2. EEC Alternator and Alternator Rotor Removal**

(Figure 401)

A. General

- (1) The EEC alternator is on the forward side of the Accessory Gearbox (AGB) at the 9:00 o'clock position.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
72-63-01-000-801-F00	Handcranking Drive Cover Removal (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8025	Pins - Guide, A.C. Generator Stator (Part #: 856A2953G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 73-21-08-840-001-F00

- (1) Do these steps to prepare the airplane for the removal:

- (a) Make sure that the applicable start lever is in the CUTOFF position and install a DO-NOT-OPERATE tag.
- (b) Set the start switch to the OFF position.
- (c) Install a DO-NOT-OPERATE tag on the start switch.
- (d) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

- (e) For engine 2, do this step:

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Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

(f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

F. EEC Alternator and Alternator Rotor Removal

SUBTASK 73-21-08-020-001-F00

(1) Do these steps to remove the EEC Alternator [1]:

- (a) Disconnect the J7 harness connector [16] and the J8 harness connector [15] from the EEC Alternator [1] receptacles.
- (b) Remove the three bolts [2] and the three washers [3] that hold EEC Alternator [1] to the AGB pad.

CAUTION: MAKE SURE THAT YOU USE THE GUIDE PINS. IF YOU DO NOT USE THE GUIDE PINS TO REMOVE THE ALTERNATOR, YOU CAN CAUSE DAMAGE TO THE ROTOR AND THE STATOR OF THE ALTERNATOR.

- (c) Install the A.C. generator stator guide pins, SPL-8025 through the bolt holes of the EEC Alternator [1].

NOTE: If the guide pins are not available, you can make the guide pins from 0.25 inch (6.35 mm) diameter steel stock that is approximately 4 inches (100 mm) long. Put 1/4-28 threads on one end.

- 1) Thread the guide pins into the AGB pad.
- (d) Carefully slide the EEC Alternator [1] forward, over the guide pins.
- (e) Remove the EEC Alternator [1].
- (f) Remove the A.C. generator stator guide pins, SPL-8025 from the AGB pad.
- (g) Remove the oring [5].
 - 1) Discard the oring [5].
- (h) Do this task: Handcranking Drive Cover Removal, TASK 72-63-01-000-801-F00.
- (i) Install a 3/4-inch drive tool into the handcranking drive.
 - 1) Use the 3/4-inch drive tool to prevent the rotation of the AGB gearshaft [7].
- (j) Remove the nut [4] from the Alternator Rotor [6].
- (k) Remove the Alternator Rotor [6].
- (l) Remove the 3/4-inch drive tool from the handcranking drive.
- (m) Install protective covers on the Alternator Rotor [6], the EEC Alternator [1], the handcranking drive pad, and the end of the AGB gearshaft [7].

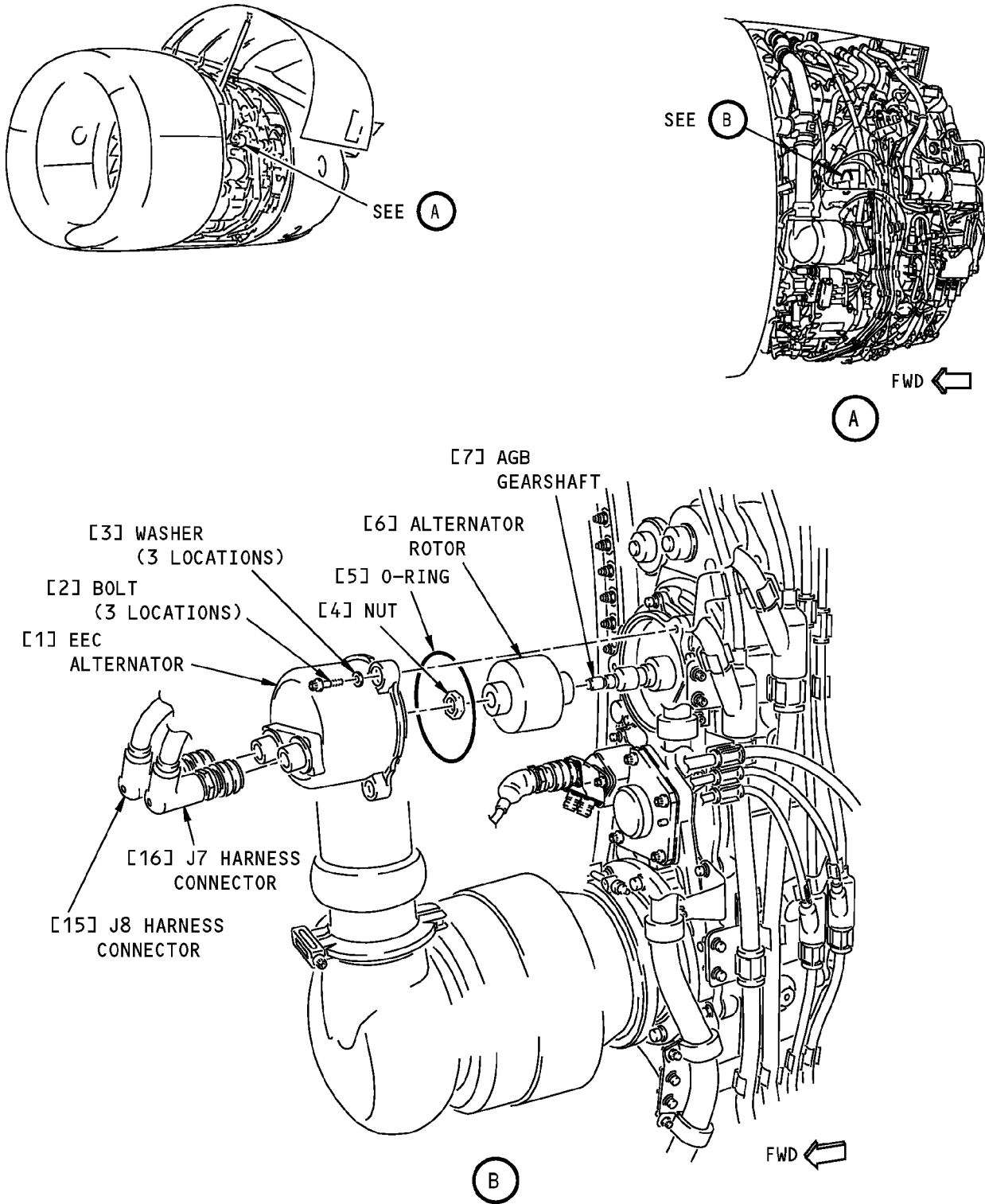
————— **END OF TASK** —————

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EEC Alternator Installation
Figure 401/73-21-08-990-801-F00

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TASK 73-21-08-400-801-F00

3. EEC Alternator and Alternator Rotor Installation

(Figure 401)

A. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-63-01-400-801-F00	Handcranking Drive Cover Installation (P/B 201)

B. Tools/Equipment

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

Reference	Description
SPL-8025	Pins - Guide, A.C. Generator Stator (Part #: 856A2953G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	EEC Alternator	73-21-08-01-025	HAP ALL
6	Alternator Rotor	73-21-08-01-035	HAP ALL

E. Location Zones

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

F. EEC Alternator and the Alternator Rotor Installation

SUBTASK 73-21-08-420-001-F00

(1) Do these steps to install the EEC alternator:

- (a) Remove the protective covers from the Alternator Rotor [6], the EEC Alternator [1], the handcranking drive pad, and the end of the AGB gearshaft [7].
- (b) Apply oil, D00623 [CP5066] to the threads of the AGB gearshaft [7].
- (c) Install a 3/4-inch drive tool into the handcranking drive.
 - 1) Use the 3/4-inch drive tool to prevent the rotation of the AGB gearshaft [7].

CAUTION: DO NOT USE PRE AND POST SERVICE BULLETIN ROTORS AND STATORS TOGETHER. DAMAGE TO THE ENGINE CAN OCCUR.

- (d) Install the Alternator Rotor [6] on the AGB gearshaft [7].

NOTE: PRE-CFM-SB 73-0134 and POST-CFM-SB 73-0134 rotors and stators are not interchangeable.

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- (e) Install the nut [4] on to the AGB gearshaft [7].
 - 1) Tighten the nut to 313.0-346.0 pound-inches (35.4-39.1 Newton meters).
- (f) Remove the 3/4-inch drive tool from the handcranking drive.
- (g) Do this task: Handcranking Drive Cover Installation, TASK 72-63-01-400-801-F00.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (h) Lubricate the new oring [5] with oil, D00623 [CP5066].
- (i) Install the oring [5] on the EEC Alternator [1].

CAUTION: MAKE SURE THAT YOU USE THE GUIDE PINS. IF YOU DO NOT USE THE GUIDE PINS TO INSTALL THE ALTERNATOR, YOU CAN CAUSE DAMAGE TO THE ROTOR AND THE STATOR OF THE ALTERNATOR.

- (j) Install the A.C. generator stator guide pins, SPL-8025 into the bolt holes of the AGB pad.

CAUTION: DO NOT USE PRE AND POST SERVICE BULLETIN ROTORS AND STATORS TOGETHER. DAMAGE TO THE ENGINE CAN OCCUR.

- (k) Install the EEC Alternator [1] over the A.C. generator stator guide pins, SPL-8025 and the Alternator Rotor [6] until the EEC Alternator [1] is aligned on the AGB pad.

NOTE: PRE-CFM-SB 73-0134 and POST-CFM-SB 73-0134 rotors and stators are not interchangeable.

- (l) Remove the A.C. generator stator guide pins, SPL-8025 from the AGB pad.
- (m) Use the three washers [3] and bolts [2] to attach the EEC Alternator [1] to the AGB pad.
 - 1) Tighten the bolts to 60.0-70.0 pound-inches (7.0-8.0 Newton meters).
- (n) Connect the J7 harness connector [16] and the J8 harness connector [15] to the EEC Alternator [1] receptacles.

G. EEC Alternator and the Alternator Rotor Installation Test

SUBTASK 73-21-08-860-002-F00

- (1) Put the airplane in a serviceable condition:

- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
- (b) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

- (c) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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- (d) Remove the DO-NOT-OPERATE tags from the start lever and the start switch.
- (e) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

————— **END OF TASK** —————

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AIRCRAFT MAINTENANCE MANUAL**HIGH PRESSURE SHUTOFF VALVE - MAINTENANCE PRACTICES****1. General**

A. This procedure has these tasks.

- (1) The removal of the high pressure shutoff valve (HPSOV) from the hydromechanical unit (HMU).
- (2) The installation of the HPSOV in the HMU. The HPSOV is inside the HMU.
- (3) It is not necessary to remove the HMU to replace the HPSOV.

TASK 73-21-09-000-801-F00**2. High Pressure Shutoff Valve (HPSOV) Switch Removal**

A. General

- (1) The HPSOV switch is part of the kits, PN 352873-K or 352874-K.
 - (a) Refer to CFM-SB 73-067 or the applicable component manual for the HMU configuration and parts shown.
 - (b) The two wire HPSOV switch with part number 2688072 is installed in HMUs with part number 1853M56P08 and later.
- (2) All tools and parts used during disassembly and assembly must be clean and free of contamination, magnetism, and visual damage.
 - (a) Examine installed components and tools for contamination and visual damage after the component installation into HMU.
 - (b) Replace damaged tools.
 - (c) Do not use magnetic tools.
- (3) Protect components ready for assembly against contamination. Keep them in clean plastic bags or protective containers.
 - (a) If assembly procedures are interrupted, protect components. Protect them with clean plastic sheets or clean lint-free drop cloth.
- (4) Use personal protective equipment, such as safety glasses, to protect against flying debris and extreme heat and/or cold.
 - (a) Supply more illumination and do procedures in a safe, controlled work environment.
 - (b) Do this procedure in an aircraft hangar if inclement weather is experienced.
- (5) Collect all loose parts that are removed or can fall out during disassembly and assembly of the HPSOV switch assembly.
- (6) As parts are removed, look for damage of the HMU components.
- (7) Remove and replace HMU components that are damaged or contaminated.
- (8) Foreign object debris/foreign object damage (FOD) refers to a object/particle that does not belong in the natural or design state of a part, process, or environment.
 - (a) Foreign object debris can be generated during maintenance of the HMU and/or its components.
 - (b) Foreign object debris can cause foreign object damage. The extent of damage can range from minute defects in components to loss of life.
 - (c) All persons in contact with the HMU and its components must be responsible to prevent FOD.
 - (d) Some potential FOD materials are, but not limited to, old safety cables, old safety cable ferrules, lock wire, aluminum seals, cable ties, new part packaging, and parts kit packaging materials.

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(9) Do not use parts that do not meet running torque requirements or show visual damage.

(a) Replace parts that are lost, out of tolerance, or damaged

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-21-09-860-001-F00

(1) Make sure the engine start lever is in the CUTOFF position.

(a) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

SUBTASK 73-21-09-010-001-F00

(2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 73-21-09-210-001-F00

(3) Make sure that the HMU is clean before you remove the connector cover (Figure 201)

NOTE: The HPSOV switch is very sensitive to all contamination. The electrical cover and wire connector areas must be free of possible contamination.

(a) Clean the possible contamination from the HMU connector cover and all electrical connector areas.

(b) If it is necessary, clean applicable HMU surfaces with a clean, lint-free cloth.

E. Procedure

SUBTASK 73-21-09-010-002-F00

(1) Do these steps to remove the electrical connector cover from the HMU(Figure 201) :

(a) Remove the safety cable and ferrule, or optional lockwire and seal, on the electrical connector cover.

(b) Remove the connector cover, screws, and washers from the HMU.

(c) Keep the drilled head screws; used for lockwire, separate from the solid head screws.

(d) Put loose parts in clean plastic bags or containers for later use.

(e) Discard all disconnected and/or missing cable ties from the HMU connector cover cavity.

(f) Examine all wire bundles for loose cable ties, cut lead wires in connector lead wire interface area, overspeed governor (OSG) reed switch assembly damaged insulation, cut pinched, smashed, and/or chaffed wires.

NOTE: Do not try repair electrical wires. Engine damage could occur.

1) Make sure that the internal lead wires are not damaged in connector lead wire interface area.

a) Reject the HMU if any exposed primary lead wire is shown, to prevent a possible short-to-ground condition.

2) External damage to outer OSG switch insulation and wire shielding is permitted.

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- 3) Broken OSG switch shielding wires are not permitted.

NOTE: There is an unconnected green wire with a contact pin bundled inside of the main wire bundle. This wire is not intended to be connected to any connector or electrical component. The appearance of this unconnected, bundled wire is normal.

SUBTASK 73-21-09-030-001-F00

(2) HMU WITHOUT WIRE RETENTION;

Do these steps to remove the cable ties and examine the wire bundles (Figure 203)

- (a) Find the cable ties and make sure it is the cable tie(s) that bundle the HPSOV switch wires with the other wires.
- (b) Carefully cut the cable ties at the locking feature and remove cable tie(s).

NOTE: Be careful not to damage wires under the cable ties when you remove the cable ties.

- 1) Make sure that all cut cable tie(s) are collected and discarded.

NOTE: If the removed cable ties contaminate area, stop all work. Find and remove all FOD.

- (c) Examine the wire bundles where the cable ties were removed as follows:
 - 1) Look for the damage of insulation, OSG switch assembly, insulated braided shield or solder shield termination,.
 - 2) Look for wires that are cut, pinched, smashed, and/or chaffed.
 - 3) If the wires are damaged, replace all damaged components.

SUBTASK 73-21-09-030-002-F00

(3) HMU WITH WIRE RETENTION;

Do these steps to remove the cable ties and examine the wire bundles (Figure 202, Figure 203):

- (a) Examine the HMU connector cover cavity for disconnected and/or missing cable ties.
 - 1) Note the location of disconnected and/or missing cable ties.
 - 2) Collect all disconnected cable ties and discard.
 - 3) Carefully cut the cable ties at the locking feature and remove the cable tie(s).

NOTE: Be careful not to damage wires under the cable ties when you remove the cable ties.

- 4) Carefully remove all of the cable tie pieces around the Teflon chafing sleeve of the wire bundle for the channel B connector.
- (b) Examine the wire bundles where the cable ties were removed as follows:
 - 1) Look for the damage of insulation, OSG switch assembly, insulated braided shield or solder shield termination,.
 - 2) Look for wires that are cut, pinched, smashed, and/or chaffed.
 - 3) If the HMU wires are damaged, reject the HMU.

SUBTASK 73-21-09-030-003-F00

(4) Do these steps to disconnect the HPSOV switch [1] from the HPSOV indicator connector:

- (a) Find the HPSOV switch wires and separate them from the other wires.
- (b) Remove the engine connector DP1203. Use connector cable pliers.

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- (c) Remove the hex socket head cap screws from the HPSOV indicator connector.

NOTE: The use of silicone grease on the end of hex tool will work as a mastic to aid in removal of the hex socket head cap screw.

- (d) Put the loose parts in a clean plastic bag or container for later use.
 (e) Lightly pull the HPSOV indicator connector away from HMU.

SUBTASK 73-21-09-020-001-F00

- (5) Do these steps to remove HPSOV switch [1] from the HMU:

NOTE: Shims are used with the three wire switch, PN 2680287, Shims are are not used with the two wire switch, PN 2688072.

- (a) Remove the screws and washers from the HPSOV switch assembly and put in a clean plastic bag for later use.

NOTE: Use care not to drop small parts during disassembly. If removed screws, washers, and shims contaminate area, stop all work. Find and remove all FOD.

NOTE: Do not use magnetic tools to remove the HPSOV switch parts. Damage to the HPSOV could occur.

- (b) Remove the HPSOV switch assembly from HMU cavity: The switch assembly should come out of the HMU cavity freely, under its own weight.

- (c) If the switch assembly cannot be removed freely from HMU, reject the HMU.

- (d) THREE WIRE HPSOV SWITCH;

If the switch shims stay in the HMU body cavity, remove the shims.

NOTE: Shims are used with the three wire switch, PN 2680287, Shims are are not used with the two wire switch, PN 2688072.

- 1) If petrolatum was used on the shims to help hold them in place, the shims can remain attached to the switch cavity in the HMU body or on the mating side of the switch.
- 2) Use a ball-end dental-type explorer tool, or equivalent.

- (e) If it is necessary, remove the guide pins and examine the HMU body cavity for contamination before installing switch components.

- (f) If contamination is found, clean the HMU body cavity with clean, lint-free wipes until all contaminants are removed.

NOTE: Be careful not to introduce contamination when you clean the switch cavity. The exposed HMU body cavity is sensitive to contamination.

- (g) Remove the contact pins and wires from the connector back shell.

- (h) Examine the sealing grommet and preformed packing on the mating side of connector as follow:

- 1) Look for cuts and other possible damage caused during pin removal.
- 2) If the grommet or preformed packing is damaged, replace them.
- 3) If the connector passes inspection, put the connector in a clean plastic bag.

- (i) Pull loose the HPSOV switch wires from the HMU body cavity.

————— END OF TASK —————

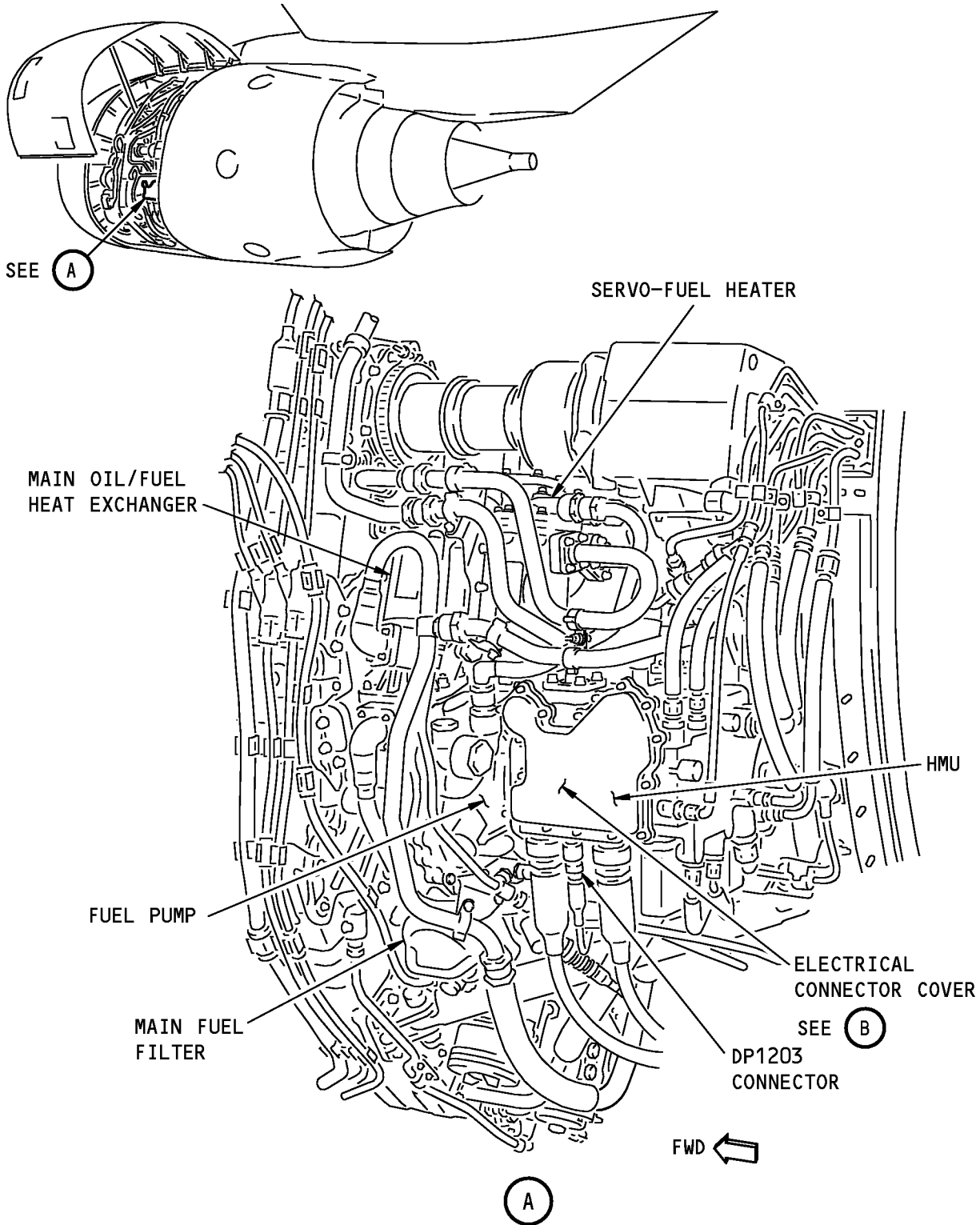
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737-600/700/800/900
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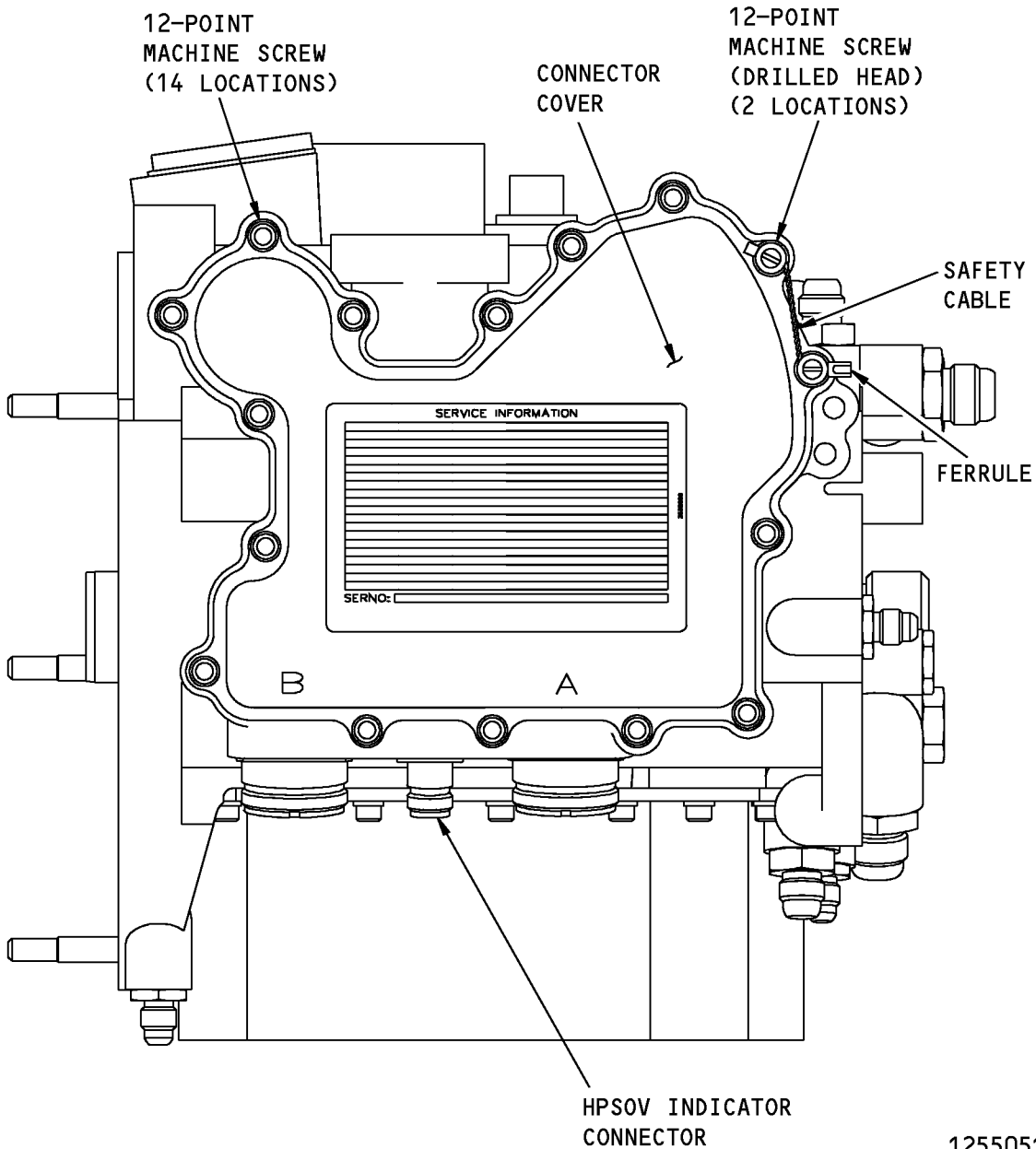
HMU Connector Cover
Figure 201 (Sheet 1 of 2)/73-21-09-990-801-F00

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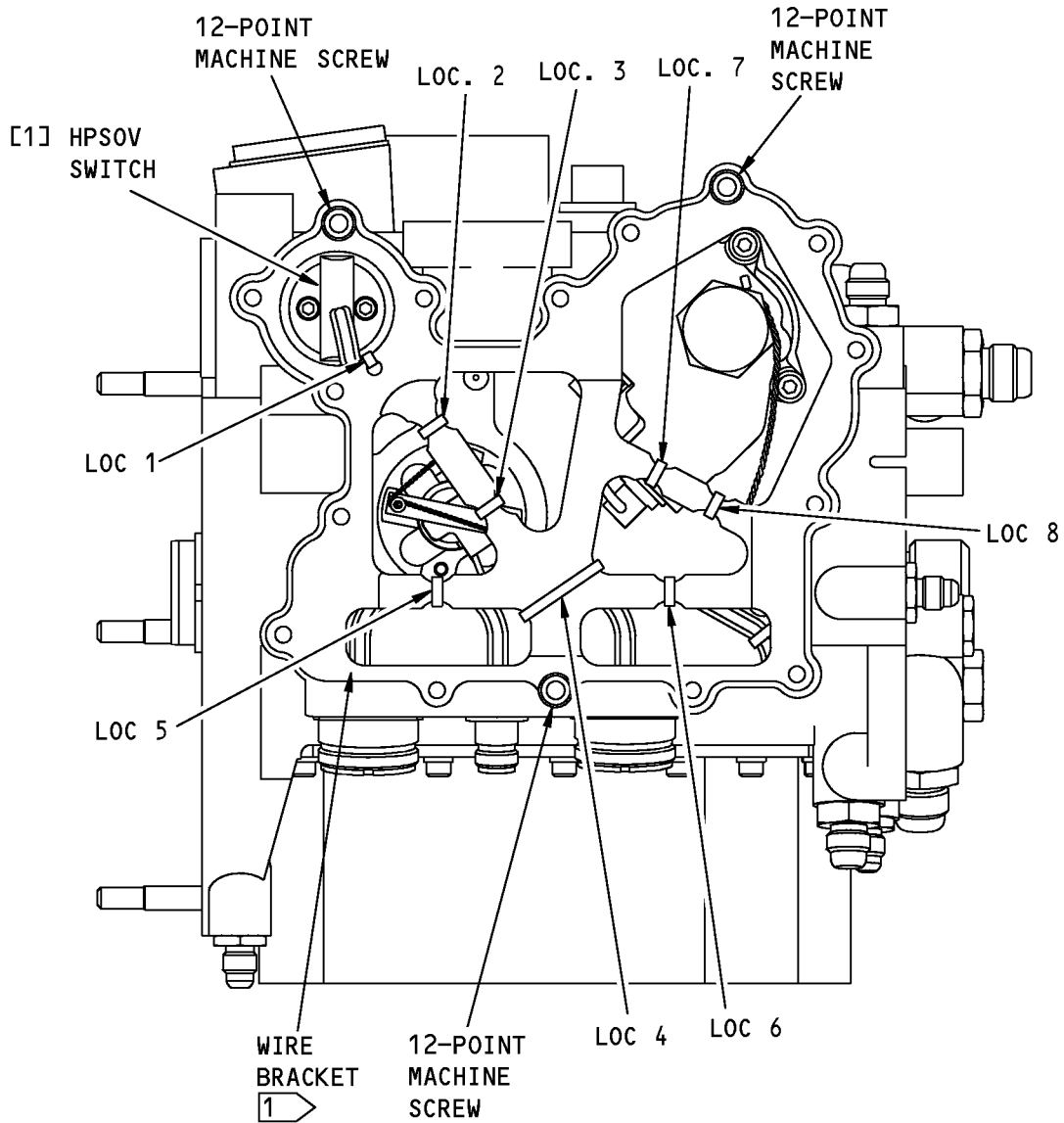


1255051-00-B

HMU Connector Cover
Figure 201 (Sheet 2 of 2)/73-21-09-990-801-F00

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1 HMU WITH WIRE RETENTION

1255052-00-B

HPSOV Switch and Bracket Cable Tie Location
Figure 202/73-21-09-990-802-F00

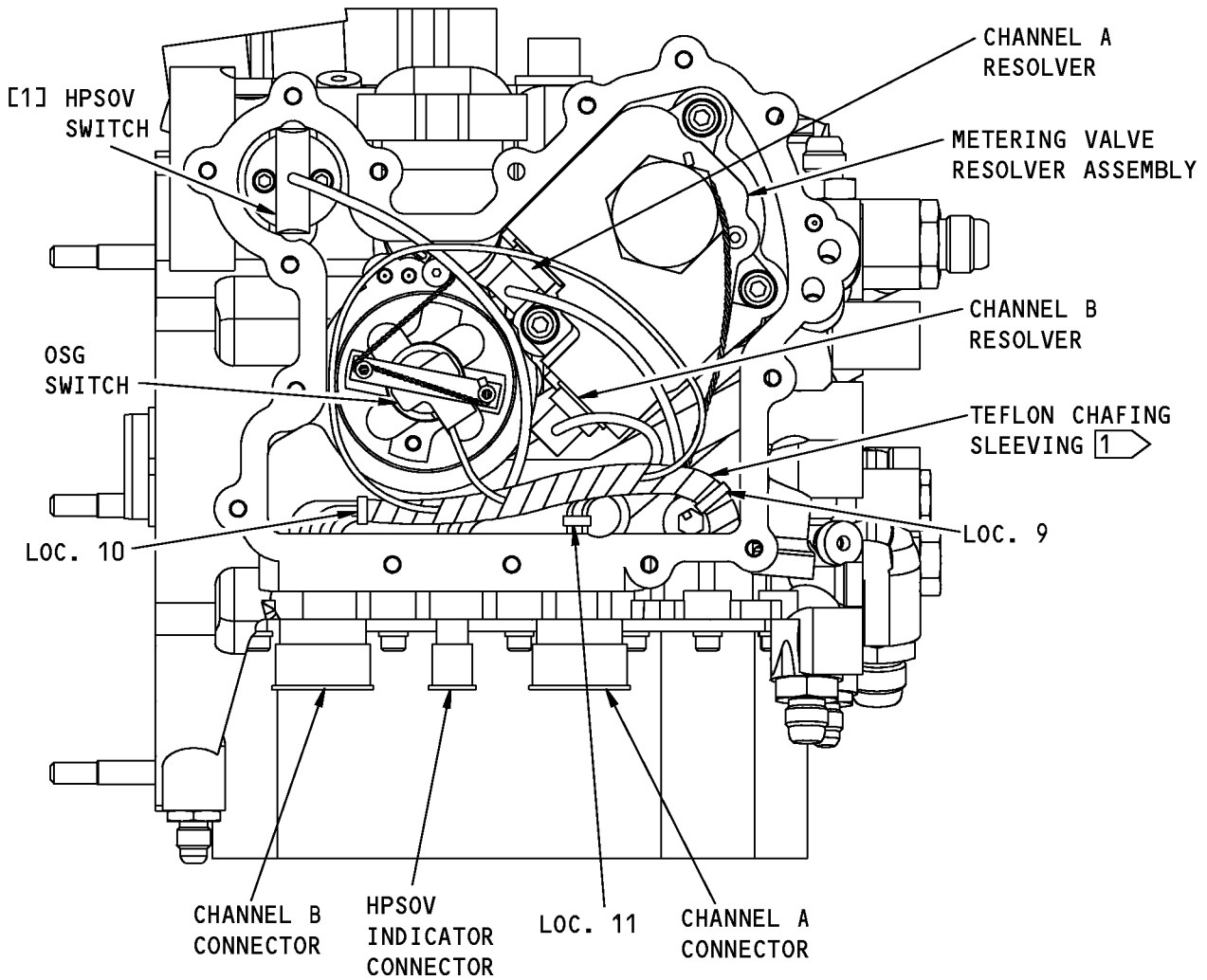
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1 HMU WITH WIRE RETENTION

1255053-00-B

HPSOV Switch and Connector Cavity Cable Tie Location
Figure 203/73-21-09-990-803-F00

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TASK 73-21-09-400-801-F00

3. High Pressure Shutoff Valve (HPSOV) Switch Installation

A. General

- (1) The HPSOV switch is part of the kits PN 352873-K or PN 352874-K.
 - (a) Refer to CFM-SB 73-067 or the applicable component manual for the HMU configuration and parts shown.
 - (b) The two wire HPSOV switch with part number 2688072 is installed in HMUs with GE part number 1853M56P08 and later.
 - (c) This task installs the two wire HPSOV switch.

B. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Procedure

SUBTASK 73-21-09-210-002-F00

- (1) Do these steps to examine the new HPSOV switch assembly:
 - (a) Examine the HPSOV switch assembly for a loose, staked, cover (where the SN is marked).
 - 1) If the switch cover is loose, reject the HPSOV switch assembly.
 - 2) Get a new HPSOV switch assembly and examine for a loose cover.
 - (b) Examine the connector contact pins and sockets on all wires for visible indications of bending and other damage.

NOTE: It is not permitted for you to repair electrical wires

- 1) If the contact pins, sockets, or wires are damaged, reject the HPSOV switch.
- 2) Use a new HPSOV switch assembly.

SUBTASK 73-21-09-420-001-F00

- (2) Do these steps to install the HPSOV switch assembly [1]:
 - (a) Carefully thread the switch wires behind the main wire bundle, away from the over speed governor (OSG) switch safety cable, and through the electrical connector hole in the HMU body.
 - (b) Do these steps to install the wires of the new HPSOV switch in the electrical connector (Figure 205):

NOTE: Do not spread tip, or rotate connector contact insert-extract tool in the electrical connector to avoid damage to the connector and tool,**NOTE:** If it is necessary, use the plastic contact insert-extract tool M81969/14-11 or equivalent.

- 1) Install the contact pin and wire in the insert-extract tool.
- 2) Push the contact pin firmly into seated position in the proper numbered hole in backside of connector.

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- 3) Release the wire and remove insert-extract tool. Make sure that the pin is locked in the connector.
 - 4) Do the above steps again to install the second wire.
 - 5) If it is necessary, insert a blank contact pin PN M39029/4-110 and end seal plug PN MS27488-20 in the HPSOV indicator connector for pin 2.
- (c) Do these steps to install the HPSOV indicator connector on the HMU body(Figure 206)
- 1) Put the HPSOV indicator connector on the HMU body with the master keyway as shown
 - 2) Tuck the slack connector wire into the HMU body.

NOTE: Avoid the overspeed governor safety cable and sharp corners that can cause possible chafing of the wire insulation.
 - 3) Seat the connector on the HMU body in position as shown.

NOTE: Make sure that no wires are trapped between the connector and the HMU body
 - 4) Make sure that the switch wires exit the switch housing face outward towards operator.
 - 5) Install the four hex socket head cap screws.
 - a) Torque screws 4.0-4.5 lb in. (0.45-0.50 N.m) above observed running torque 1.0-5.0 lb in. (0.11-0.56 N.m).
 - b) Use a drive wrench extension, and a 0-25 lb in. (0-2.83 N.m) torque wrench.
- (d) Do these steps to install the HPSOV switch [1] in the HMU cavity
- 1) Look for the locating-rib on the right side of the HPSOV switch.
 - a) Make sure the locating-rib engages the notch in the mounting switch cavity.
 - 2) Install one screw and washer into switch mounting hole as follows:
 - a) Use a thin film of petrolatum or silicon grease applied to the washer to act as a mastic to hold the washer and screw together. Put the washer over the screw.
 - b) Use a thin film of petrolatum or silicon grease applied to the hex end of the screw to act as a mastic to hold the screw and hex tool together. Insert the hex tool into the head of screw.
 - 3) Install the HPSOV switch assembly into the slot in HMU body cavity.

NOTE: Do not use force to install the switch assembly into HMU cavity.

NOTE: For the switch to operate properly, the wires that exit the reed switch assembly must face outward toward the operator when you install the switch in the HMU cavity
 - 4) The HPSOV switch assembly should install freely, under its own weight, into the HMU body cavity.
 - a) If the switch assembly does not install freely, reject the HMU.
 - 5) Do these steps to fully seat the switch body in the slotted seat of the HMU body.
 - a) Make sure that the switch wires that exit the switch housing face outward towards the operator.
 - b) Tighten the installed screw to hold the switch assembly in place.
 - c) Install the remaining washer and screw.
 - d) Torque the two screws 4.0-4.5 lb-in. (0.45-0.50 Nm) above observed running torque 1.0-5.0 lb-in. (0.11-0.56 Nm).

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e) Use a drive wrench extension, and a 0-25 lb-in. (0-2.83 Nm) torque wrench.

SUBTASK 73-21-09-760-001-F00

- (3) Do a continuity and resistance check on the HPSOV connector wire connections with a digital multi-meter
- (a) Compare the meter readout to the continuity and resistance check values (Figure 207)

HPSOV CONNECTOR CONTINUITY CHECK	
CONNECTOR PIN	CONTINUITY
1-2	OPEN
2-3	OPEN

- 1) If a test point is not satisfactory, examine the wire-to-connector pins(Figure 207)
- 2) If the connector pins are correct, remove and replace the HPSOV switch assembly.

SUBTASK 73-21-09-430-001-F00

(4) HMU WITHOUT WIRE RETENTION

Do these steps to bundle and secure the HPSOV switch wires:

- (a) Do these steps to install new, self-locking cable ties.
- 1) Use a cable tie Panduit installation tool GS2B or equivalent at intermediate setting with tension set at three (3) in the handle.
- NOTE:** Stretched cable ties that snap apart instead of being cut cause an unknown restraint condition of the cable tie. A cable tie can become separated and result in a loose wire bundle and cable tie. A loose cable tie can contaminate the HMU and create a FOD condition.
- 2) Examine the Panduit installation tool for proper function of cutting element. If cutting element does not work properly to cut the cable tie, repair or replace the tool.
- (b) Bundle and secure channel A and the switch wire harness with a new cable tie.
- NOTE:** Avoid the overspeed governor safety cable and sharp corners that can cause possible chafing of the wire insulation.
- (c) Bundle and secure channel B and the switch wire harness with a new cable tie.
- NOTE:** Avoid the overspeed governor safety cable and sharp corners that can cause possible chafing of the wire insulation.
- 1) Make sure that a cable tie is installed over the HPSOV switch double-insulated wires and captures all of the loose wire bundles.

SUBTASK 73-21-09-430-002-F00

(5) HMU WITH WIRE RETENTION;

Do these steps to bundle and secure the switch wires:

- (a) Group the OSG and HPSOV switch wires together and capture with the Teflon chafing sleeve.
- 1) Apply one wrap (minimum) of the Teflon chafing sleeve on opposite side of exiting OSG and HPSOV switch wires to secure the wire bundle.
- a) This will separate the switch wires for the wire bracket alignment.
- (b) Put the wire bracket over the partially bundled wires.

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- 1) Make sure that the OSG and AFSSO switch wires align with the web-arm of the bracket for proper cable tie installation.
- (c) Remove the wire bracket and set aside for later use.
- (d) Continue to secure remainder of wire bundle with the Teflon chafing sleeve.
- (e) Make sure that all wires have been captured with the Teflon chafing sleeve and routed away from the safety cable/safety wire.

NOTE: Avoid the overspeed governor safety cable and sharp corners that can cause possible chafing of the wire insulation.

- (f) Install a new, self-locking cable tie PN 2675459-21 over the Teflon sleeve in the approximate location as the previously removed cable tie.

NOTE: Avoid the overspeed governor safety cable and sharp corners that can cause possible chafing of the wire insulation.

- (g) Do these steps to install the Wire bracket cable ties:

- 1) Secure the wire bracket in place over the connector cavity with the three 12-point machine screws Figure 202.

NOTE: Make sure that no wires are trapped between the connector and the HMU body

- a) Secure the screws finger tight.
- (h) Install new cable ties on the wire bracket.

NOTE: Electrical wires can be damaged by sharp edges. Chafed, cut, or nicked wires can make the part unserviceable. Position the wire bundles to prevent contact with HMU components.

- 1) Put the cable ties in the bracket concaves to prevent wire bundle movement.
- 2) Put the locking device of the cable ties below the top surface of the bracket to prevent interference with the connector cover installation.
- 3) Install the wire bracket cable ties at the eight locations.

SUBTASK 73-21-09-430-003-F00

(6) HMU WITHOUT WIRE RETENTION;

Do these steps to install the connector cover (Figure 201):

- (a) Examine the connector cover and mating HMU flanges for general cleanliness. If it is necessary, clean the mating surfaces before you install the cover.
- (b) Do these steps to install the connector cover and screws:
 - 1) Put the connector cover over the HMU and install the two drilled-head screws, used for lockwire, in the two locations.

NOTE: Do not permit electrical wires to be pinched between the connector cover and the HMU connector cover mounting surface. Nicks and/or cuts to the electrical wires can result from contact with sharp edges of the cover and HMU surfaces.

- 2) Install the remaining screws into the cover. Start at the top-most drilled head screw, and in a clockwise direction, run all screws down to one-half turn from bottoming out.
- 3) Torque all screws in the same order and direction (as installed) to 10-15 lb in. (1.13-1.70 N.m) over running torque 1.5-10 lb in. (0.17-1.13 N.m).
 - a) Use a drive wrench extension, and a 0-25 lb-in. (0-2.83 Nm) torque wrench.

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SUBTASK 73-21-09-410-001-F00

(7) HMU WITH WIRE RETENTION

Do these steps to install the connector cover (Figure 201):

- (a) Remove the three 12-point machine screws from the wire bracket and set aside for later use.
- (b) Examine the connector cover and mating HMU flanges for general cleanliness. If it is necessary, clean the mating surfaces before you install the cover.
- (c) Put the connector cover over the wire bracket and install the two 12-point machine drilled-head screws in the two locations

NOTE: Do not permit electrical wires to be pinched between the connector cover and the HMU connector cover mounting surface. Nicks and/or cuts to the electrical wires can result from contact with sharp edges of the cover and HMU surfaces.

- 1) Tighten the two screws finger tight.
- 2) Install the remaining screws into the cover. Start at the top-most drilled head screw, and in a clockwise direction, run all screws down to one-half turn from bottoming out.
- 3) Torque all screws in the same order and direction (as installed) to 10-15 lb in. (1.13-1.70 N.m) over running torque 1.5-10 lb in. (0.17-1.13 N.m).
 - a) Use a drive wrench extension, and a 0-25 lb-in. (0-2.83 Nm) torque wrench

SUBTASK 73-21-09-430-004-F00

(8) Install the engine connector DP1203 connector to the HMU until the full insertion line is hidden.

- (a) Use connector cable pliers to tighten the mating connector.

SUBTASK 73-21-09-430-005-F00

(9) Do these steps to secure the HMU connector cover.

- (a) If die-letter designations are used, mark on the fixed-ferrule end of the safety cable.
- (b) Install new safety cable and safety cable ferrule drilled-head machine screws.
- (c) Use safety cable crimp tool PN SCTR327 to crimp ferrule on cable.
- (d) Fully close the tool handle to properly tighten the cable, crimp the ferrule, and cut off the excess safety cable.
- (e) Release the handle of the crimp tool and remove the excess safety cable from crimp tool.

NOTE: A cut safety cable can contaminate the HMU. Stop all work. Find and remove FOD.

- (f) Discard the excess safety cable.
- (g) Examine the cable and ferrule to make sure it is secure, has proper pull on screws, and is not damaged.

SUBTASK 73-21-09-800-001-F00

(10) Do these steps to mark the identification plate when the HPSOV switch is replaced:

- (a) The HMU identification plates are black or yellow. Black identification plates indicate original equipment manufacturer (OEM). Yellow identification plates indicate previously serviced equipment.

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- (b) If the identification plate has a letter K stamped on it or a serial number of 1285 or higher, do not remove or mark the identification plate.

NOTE: Some HMU units may already have identification plates previously stamped with a K . It is not necessary to remove and mark these plates.

NOTE: Some HMU units have a serial number of 1285 or higher and do not have a K marked on them. It is not necessary to remove and mark these plates.

- (c) If you replace a two wire HPSOV switch with a two wire switch, no action is necessary.
(d) If you replace a three wire HPSOV switch with a two wire switch, refer to CFM SB 73-067.

SUBTASK 73-21-09-840-001-F00

- (11) Put the airplane in a serviceable condition:

- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
(b) Remove the DO-NOT-OPERATE tag from the applicable start lever.

————— **END OF TASK** —————

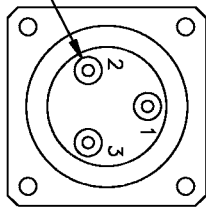
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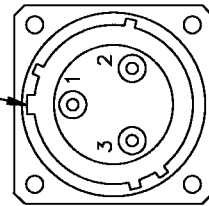
INSERT BLANK CONTACT
PIN AND END SEAL PLUG



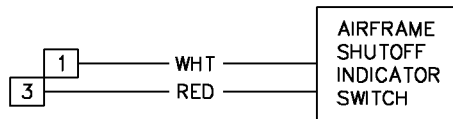
CRIMP PIN INSERT
END OF CONNECTOR

MASTER
KEYWAY
POSITION

MASTER
KEYWAY



MATING END
OF CONNECTOR



1255054-00-B

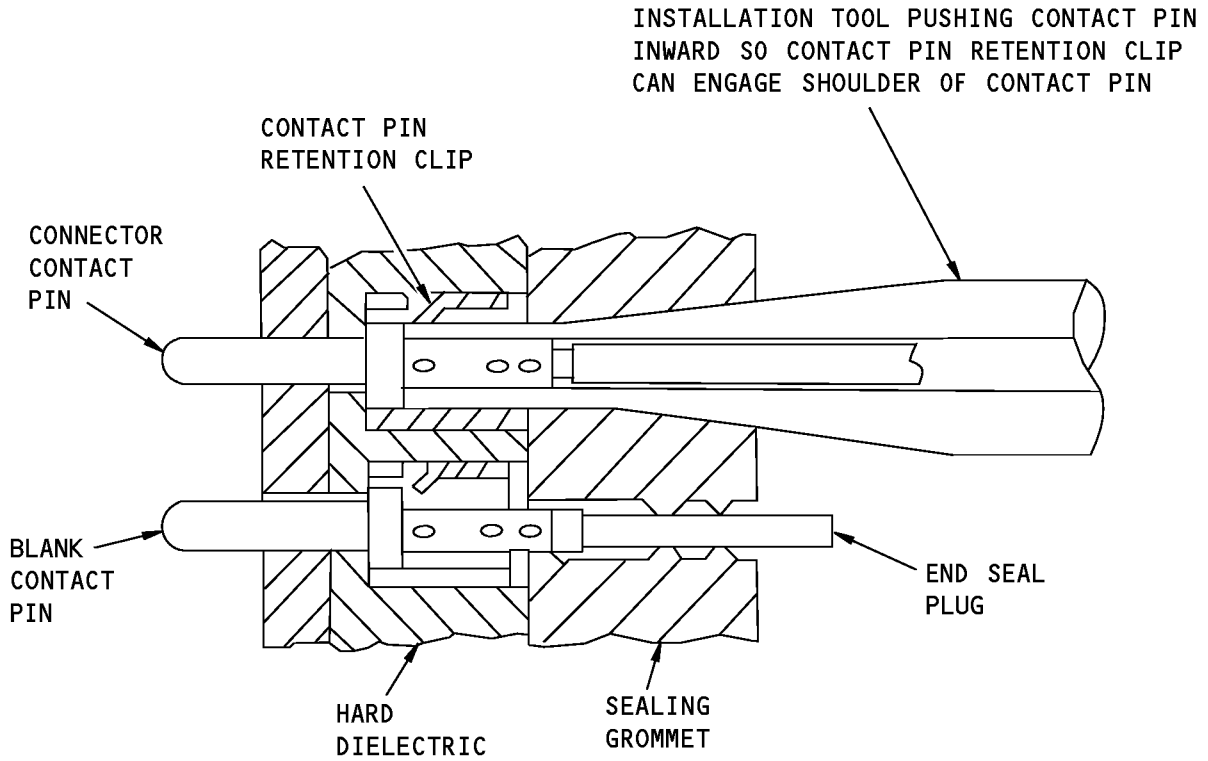
HPSOV Switch Connector Diagram
Figure 204/73-21-09-990-804-F00

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1255055-00-B

Contact Pin And End Seal Plug in Connector Grommet
Figure 205/73-21-09-990-805-F00

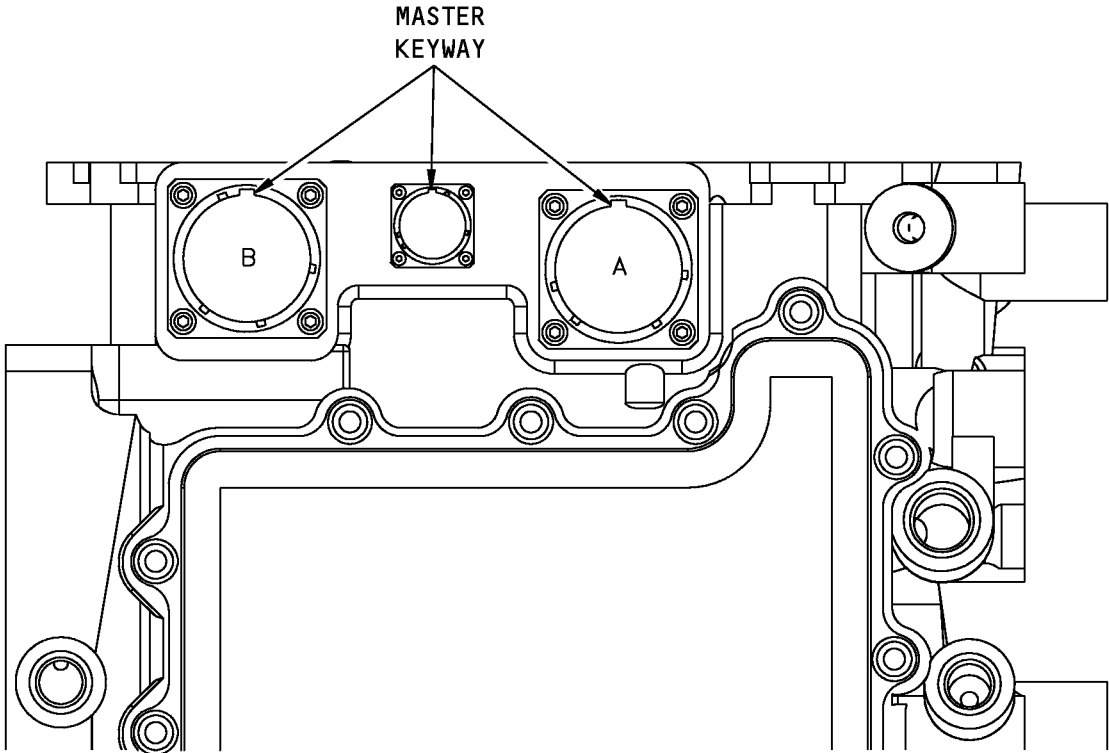
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1255056-00-B

**Electrical Connector Master Keyway Location
Figure 206/73-21-09-990-806-F00**

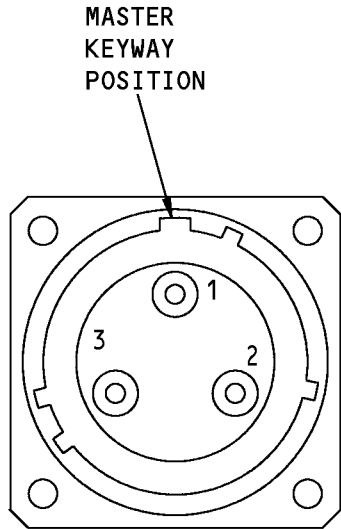
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MATING END OF CONNECTOR

CFM56222

	Resistance	
	Low Limit	High Limit
1-3	0.0 ohm	0.5 ohm
2-Case(GND)	500 Kohms	Infinite
3-Case(GND)	500 Kohms	Infinite

1255057-00-B

HPSOV Connector Check
Figure 207/73-21-09-990-807-F00

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HYDROMECHANICAL UNIT - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the hydromechanical unit (HMU)
- (2) The installation of the hydromechanical unit (HMU).
 - (a) You can install a new high pressure shutoff valve (HPSOV) switch without removing the HMU.
 - 1) Refer to CFM-SB 73-067.
 - 2) or refer to HIGH PRESSURE SHUTOFF VALVE - MAINTENANCE PRACTICES, PAGEBLOCK 73-21-09/201.

TASK 73-21-10-000-801-F00**2. HMU Removal**

(Figure 401)

A. General

- (1) The HMU is connected to the fuel pump assembly that is at the 8:00 o'clock position on the aft side of the accessory gearbox.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-2358	Set - Adapter, Torque Hydromechanical UN & MN Fuel Pump Nuts (Part #: 856A1827G01, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G00624	Bag - Plastic, General Purpose	
G00920	Tape - Waterproof, Packaging	ASTM D5486
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Plug	73-11-01-01-060	HAP ALL
3	O-ring	73-11-01-01-065	HAP ALL

F. Location Zones

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

G. Prepare for the Removal

SUBTASK 73-21-10-840-001-F00

(1) Do these steps to isolate the fuel system:

- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.
- (c) Make sure the FUEL VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition; 2) dim when the valve is closed or 3) off when the valve is opened.
- (d) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the spar shutoff valve has three positions: 1) bright when the valve is in transition; 2) dim when the valve is closed or 3) off when the valve is opened.
- (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

NOTE: The removal of the electrical power is necessary while you disconnect the electrical and fluid connectors. You can reapply electrical power to the airplane after all of the electrical and fluid connectors are disconnected and the protective covers are installed.

 - 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.
- (f) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 73-21-10-680-002-F00

(2) Do these steps to drain the fuel from the fuel pump:

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

- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump.
- (b) Remove the drain plug [2] from the fuel filter cover.
- (c) Let the fuel drain in the container.
- (d) Remove and discard the O-ring [3] from the drain plug [2].

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WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (e) Lubricate a new O-ring [3] with oil, D00623 [CP5066].
- (f) Install a new O-ring [3] on the drain plug [2].
- (g) Lubricate the threads of the drain plug [2] with oil, D00623 [CP5066].
- (h) Install the drain plug [2].
 - 1) Tighten the drain plug to a torque of 45-55 pound-inches (5.0-6.2 Newton meters).
- (i) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug [2].

H. Remove the HMU

SUBTASK 73-21-10-020-001-F00

- (1) Disconnect these electrical connectors from the HMU [1]:

NOTE: If it is necessary, you can use soft-nose connector pliers to loosen the coupling nuts on the connectors.

- (a) The DP1203 (MWO312) connector
- (b) The DP0501 (J5) connector
- (c) The DP1207 (MWO312) connector
- (d) The DP0601 (J6) connector
- (e) The DP0803 (J8) connector on the fuel filter differential pressure switch.
- (f) Install protective covers on the plugs and the receptacles.
 - 1) Move the electrical connectors out of the way, to make sure that they are not damaged.
 - a) If it is necessary, use lockwire or tape to keep the connectors out of the way.

SUBTASK 73-21-10-210-001-F00

- (2) Make sure that the container stays below the HMU during the removal procedure.

- (a) As you disassemble the fuel system, let the unwanted fluids drain into the container.

SUBTASK 73-21-10-010-001-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (3) Disconnect the hoses from the HMU [1]:

- (a) Use two wrenches to disconnect these hoses:

NOTE: The hoses are arranged so that the same wrenches can be used at the same time.

- 1) The LPT hose [4]
- 2) The HPT hose [5]

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- 3) The BSV hose [10]

NOTE: Engines POST CFMI SB 73-044 do not have the BSV hose [10] installed.

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- 4) The TBV hose [12].
- (b) Use two wrenches to disconnect these hoses:
 - 1) The VSV hose (ROD) [6]
 - 2) The VBV hose (CLOSED) [8]
 - 3) The PCR hose [11].
- (c) Use two wrenches to disconnect these hoses:
 - 1) The VSV hose (HEAD) [7]
 - 2) The VBV hose (OPEN) [9].
- (d) Install protective covers on the hoses and the HMU.
 - 1) If it is necessary, use lockwire or tape to keep the hoses out of the way.

SUBTASK 73-21-10-020-007-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (4) Do these steps to remove the fuel tube [17] from the HMU:
 - (a) Use two wrenches to disconnect fuel tube [17] from fuel tube [19].
 - (b) Remove the four bolts [16] that hold the tube [17] and the gasket [18] to the HMU [1].

NOTE: To aid in the removal of the four bolts [16], a 20 inch (50 cm) extension can be used to remove the two inboard bolts. A 2 inch (5 cm) deep-well socket can be used to remove the two outboard bolts.
 - (c) Remove the nut [21], bolt [22] and the clamp [20] that hold the tube [17] to the bracket.

NOTE: The nut [21] and the bolt [22] also hold a clamp for the oil tube [15].

 - 1) Let the additional clamp stay on the oil tube [15].
 - (d) Remove the nut [23], bolt [24], and clamp [25] that hold the tube [17] to the bracket.
 - (e) Remove the fuel tube [17].
 - 1) If the gasket [18] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to this task (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.
 - (f) Install protective covers on the fuel tube [17], fuel tube [19] and the HMU [1].

SUBTASK 73-21-10-030-001-F00

CAUTION: USE TWO WRENCHES WHEN YOU LOOSEN OR TIGHTEN THE CONNECTION. ONE WRENCH WILL HOLD ONE SIDE OF THE CONNECTION IN ITS POSITION. ONE WRENCH WILL TURN THE OTHER SIDE OF THE CONNECTION. IF YOU DO NOT OBEY THIS TWO-WRENCH PROCEDURE, YOU CAN CAUSE DAMAGE TO THE CONNECTION COMPONENTS.

- (5) Do these steps to remove the fuel tube [43] from the servo-fuel heater inlet port.
 - (a) Use two wrenches to disconnect the fuel tube [43] from the servo-fuel heater inlet port.
 - (b) Use two wrenches to disconnect the fuel tube [43] from the fuel pump.
 - (c) Install protective covers on the fuel tube [43], servo-fuel heater and fuel pump.

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SUBTASK 73-21-10-020-008-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (6) Do these steps to remove the fuel tube [39] from the HMU and the servo-fuel heater:
- (a) Use two wrenches to disconnect the fuel tube [39] from the servo-fuel heater.
 - (b) Remove the four bolts [27] that hold the fuel tube [39] and the gasket [26] to the HMU [1].
 - (c) Remove fuel tube [39].
 - 1) If the gasket [26] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to this task (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- (d) Install protective covers on the fuel tube [39], servo-fuel heater, and HMU.

SUBTASK 73-21-10-020-009-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (7) Do these steps to remove the fuel tube [33] from the HMU [1]:
- (a) Use two wrenches to disconnect fuel tube [33] from fuel tube [38].
 - (b) Remove the four bolts [32] that hold the fuel tube [33] and the gasket [34] to the HMU [1].
 - (c) Remove the nut [35], bolt [36], and clamp [37] that hold the fuel tube [33] to the bracket.
 - 1) If it is difficult to remove fuel tube [33], loosen the clamps that hold the fuel tube [38] to the bracket that is above the fuel pump package.

NOTE: This will permit you to move fuel tube [38] and can make it easier to remove the fuel tube [33].

- (d) Remove fuel tube [33].
 - 1) If the gasket [34] is serviceable, then keep it with the tube for the subsequent installation.

NOTE: Refer to this task (TASK 70-30-01-910-802-F00) for gasket and seal maintenance practices.

- (e) Install protective covers on the fuel tube [33], the fuel tube [38], and the HMU.

SUBTASK 73-21-10-020-010-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (8) Remove drain tubes [30] and [31]:
- (a) Use two wrenches to disconnect the drain tube [30] from the drain tube [29].
 - (b) Use two wrenches to disconnect the drain tube [30] from the bottom of the HMU.
 - (c) Remove the drain tube [30].
 - 1) Install protective covers on the drain tube [30], the drain tube [29] and the HMU.
 - (d) Use two wrenches to disconnect the drain tube [31] from the drain tube [28].

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- (e) Use two wrenches to disconnect the drain tube [31] from the drain.
- (f) Remove the drain tube [31].
 - 1) Install protective covers on the drain tube [31], the drain tube [28] and the drain.

SUBTASK 73-21-10-020-005-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE HMU. THE HMU WEIGHS 40 POUNDS (18 KILOGRAMS). THE WEIGHT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

CAUTION: DO NOT LIFT THE HMU BY THE DRIVE SHAFT. DO NOT LET THE DRIVE SHAFT SUPPORT THE WEIGHT OF THE HMU. IF THE DRIVE SHAFT SUPPORTS THE WEIGHT OF THE HMU, IT CAN CAUSE DAMAGE TO THE HMU SEALS.

- (9) Do these steps to disconnect the HMU [1] from the fuel pump:
 - (a) Remove the six nuts [40] and washers [41] that hold the HMU [1] to the fuel pump.

NOTE: The three outboard studs are on the fuel pump and the three inboard studs are on the HMU.

 - 1) Use the set, SPL-2358 to get access to the center and lower inboard studs.

NOTE: If the tool is not available, then you can insert a long extension from the forward side, between the fan case and the accessory gearbox.
 - (b) Remove the HMU [1].
 - (c) Remove the gasket [42].
 - 1) Examine the gasket [42] for scratches, nicks, dents and cuts (TASK 70-30-01-910-802-F00).
 - a) If the gasket is serviceable, keep it for the subsequent installation.
 - b) If the gasket is not serviceable, replace it.
 - (d) Install protective covers on the mating surfaces of the HMU [1] and the fuel pump.
 - (e) To drain the fuel by gravity from the HMU, do these steps:

NOTE: The HMU cannot be shipped with hazardous waste (fuel) inside. The HMU cannot be flushed with oil in the field.

 - 1) Let the HMU sit on each of its four sides for approximately one minute.
 - 2) Install protective covers on the ports and fittings of the HMU. Use the hardware from the installed HMU.
 - (f) Pack the HMU in two to three plastic bag, G00624 or equivalent.
 - 1) Remove as much air as possible from the bags.
 - 2) Seal each bag with waterproof tape, G00920.

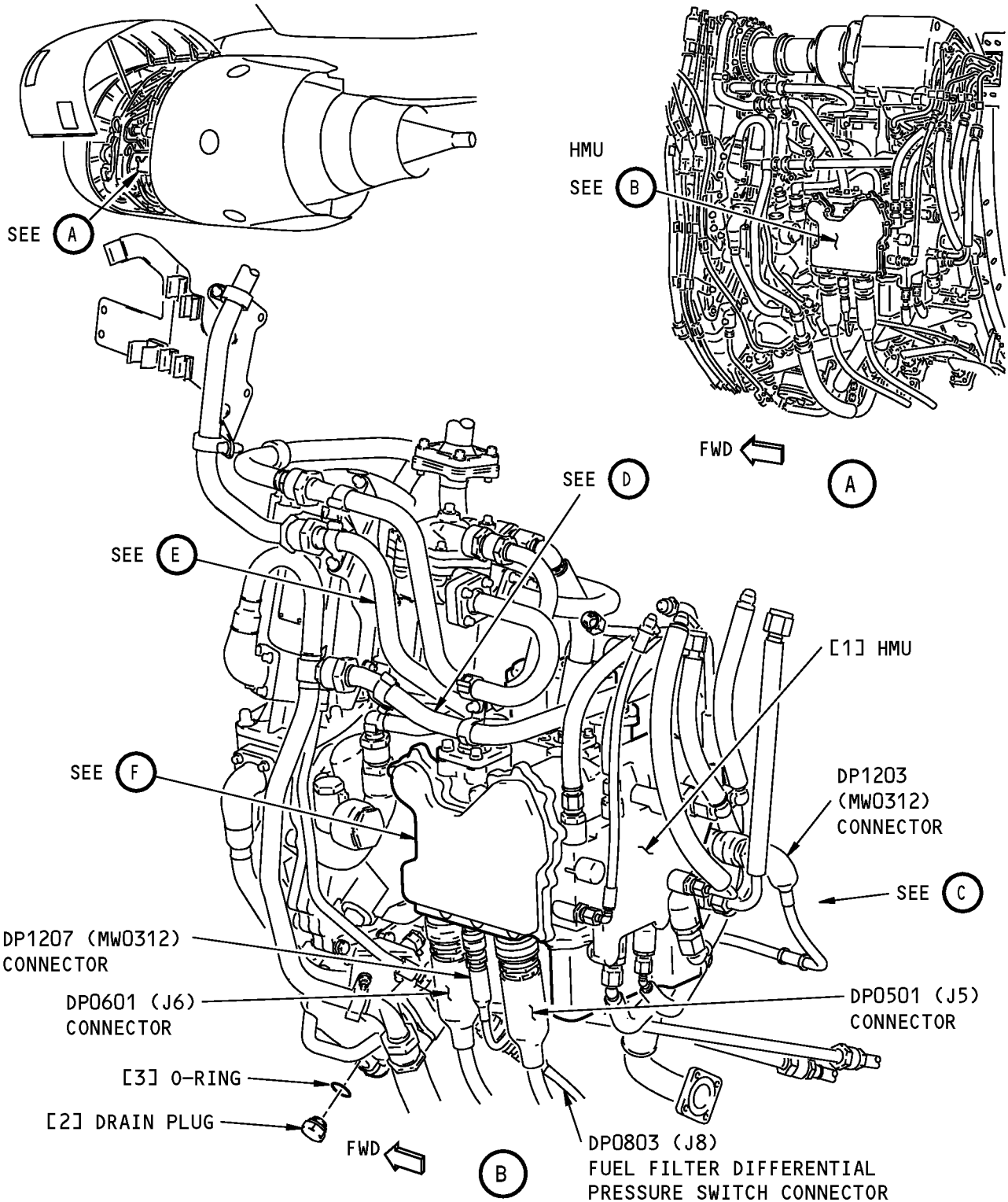
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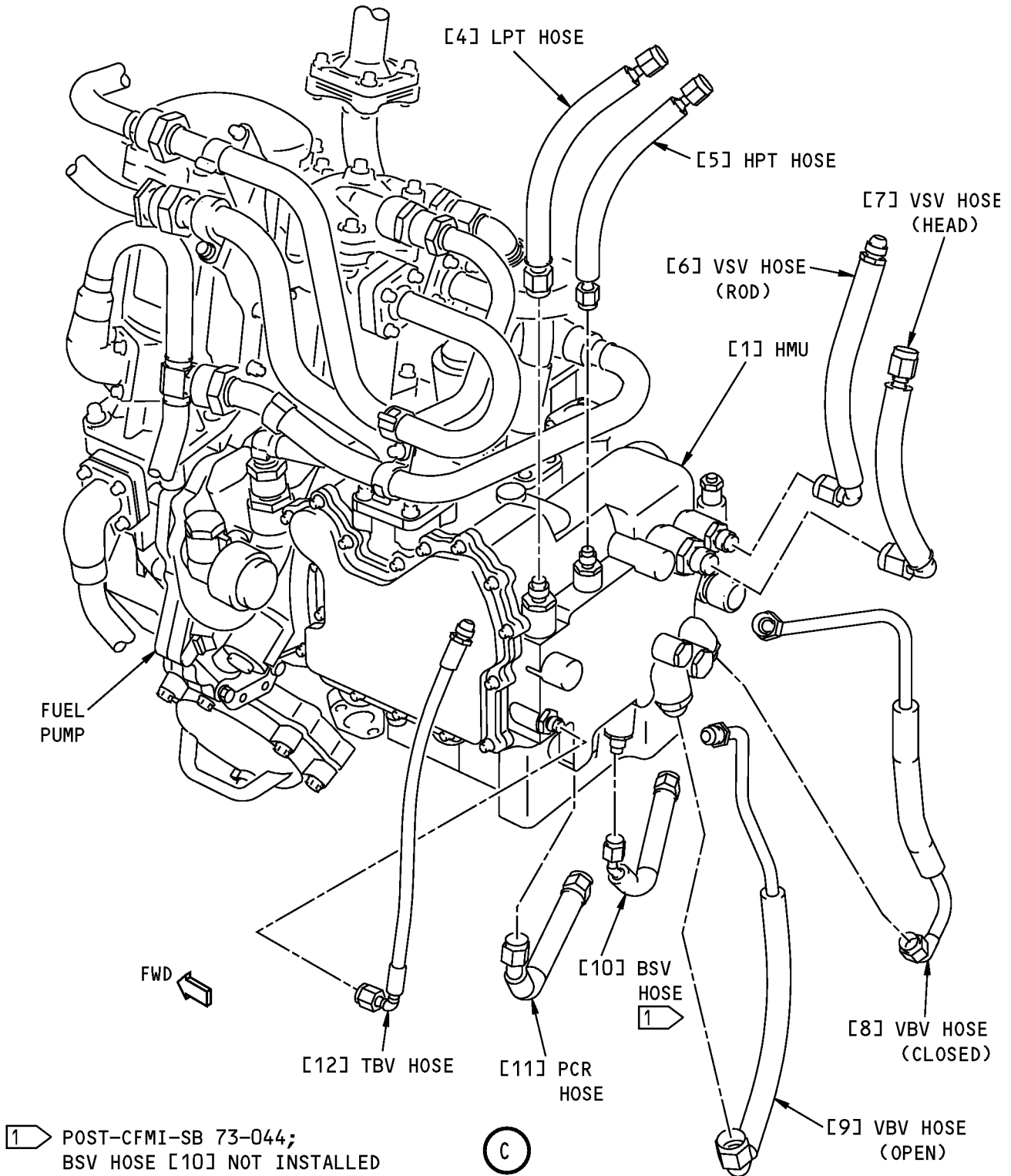
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Hydromechanical Unit (HMU) Installation
Figure 401 (Sheet 1 of 5)/73-21-10-990-801-F00

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Hydromechanical Unit (HMU) Installation
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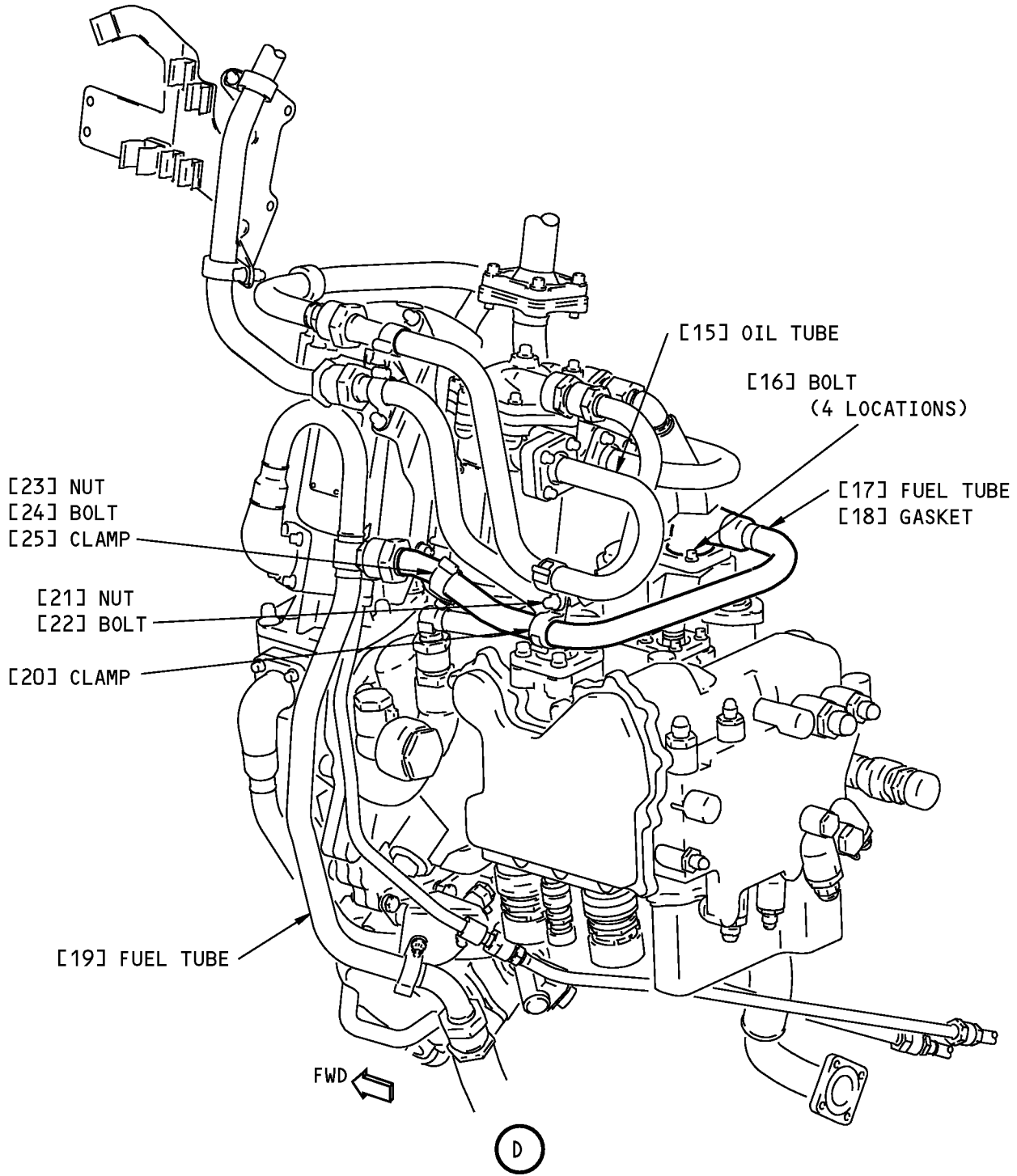
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Hydromechanical Unit (HMU) Installation
Figure 401 (Sheet 3 of 5)/73-21-10-990-801-F00

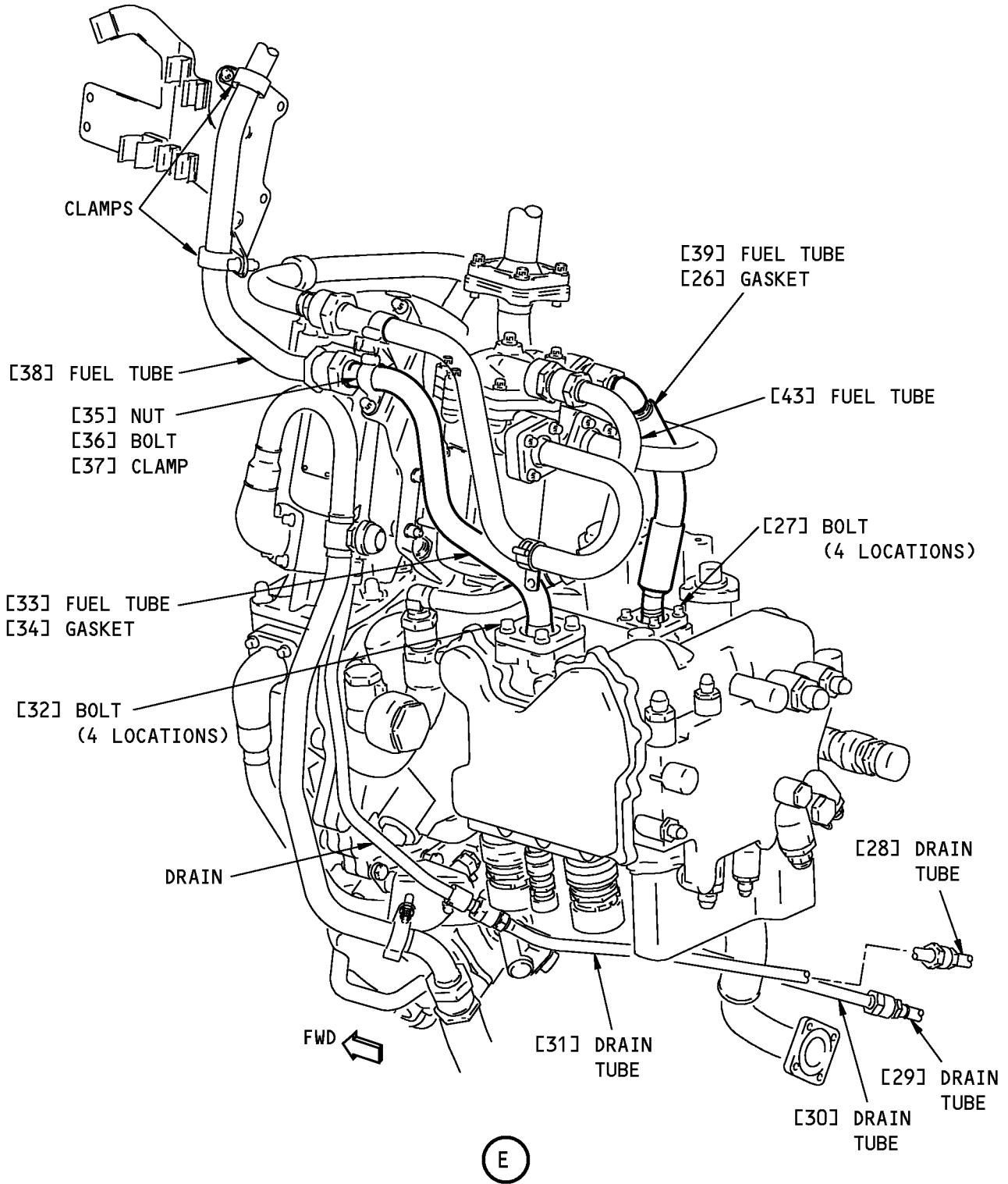
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Hydromechanical Unit (HMU) Installation
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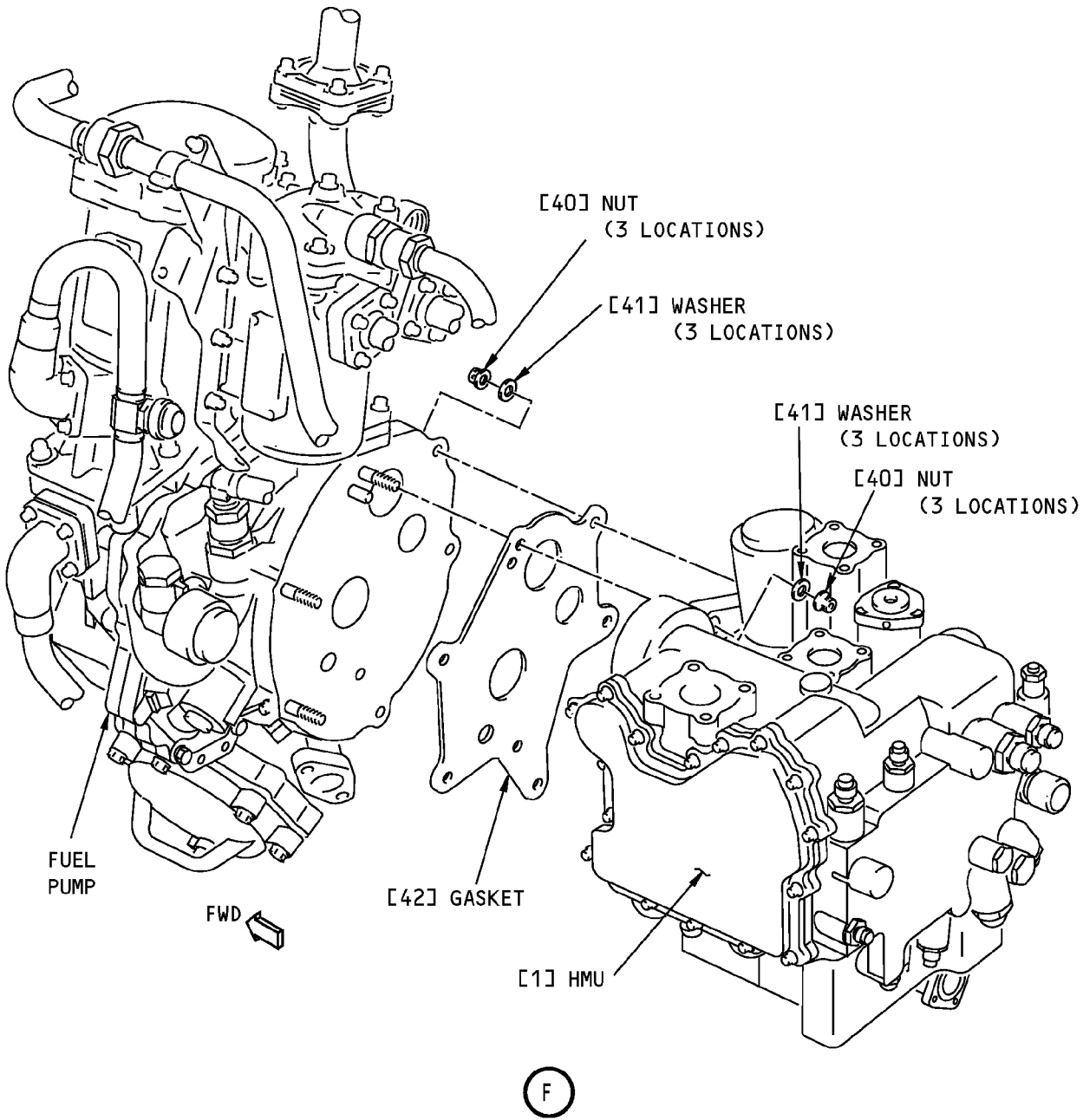
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Hydromechanical Unit (HMU) Installation
Figure 401 (Sheet 5 of 5)/73-21-10-990-801-F00

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TASK 73-21-10-400-801-F00

3. HMU Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-20-02-400-801-F00	Tightening Practices and Torque Values (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-00-00-980-801-F00	Turn the N2 Rotor (P/B 201)
73-11-01-000-801-F00	Fuel Pump Package Removal (P/B 401)
73-11-01-400-801-F00	Fuel Pump Package Installation (P/B 401)
73-21-09-000-801-F00	High Pressure Shutoff Valve (HPSOV) Switch Removal (P/B 201)
73-21-09-400-801-F00	High Pressure Shutoff Valve (HPSOV) Switch Installation (P/B 201)

B. Tools/Equipment

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

Reference	Description
SPL-2358	Set - Adapter, Torque Hydromechanical UN & MN Fuel Pump Nuts (Part #: 856A1827G01, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	HMU	73-21-10-01-025	HAP 001-013, 015-026, 028-040, 042
18	Gasket	73-11-00-02-260	HAP ALL
26	Gasket	73-11-00-02-125	HAP ALL
		73-11-00-02-270	HAP ALL
34	Gasket	73-11-00-02-100	HAP ALL
42	Gasket	73-21-10-01-020	HAP ALL

E. Location Zones

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

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F. Prepare for Installation

SUBTASK 73-21-10-840-002-F00

(1) Do these steps to clean and examine the components for the HMU [1] installation:

- (a) Remove the protective covers from the HMU [1], the fuel pump, and the fuel tube connections.
- (b) Thoroughly clean the mating surfaces and the adjacent areas of the components.

NOTE: Failure to clean the adjacent area can cause bubbles after HMU installation is complete.

- (c) Examine the component mating surfaces and the adjacent areas to make sure that they are serviceable.
 - 1) Replace the components that are not serviceable.
- (d) Re-install the protective covers on the HMU [1], the fuel pump, and the fuel tube connections.

SUBTASK 73-21-10-210-003-F00

(2) Examine the studs on the fuel pump:

- (a) If the threads on the fuel pump studs are not serviceable, then replace the fuel pump.

These are the tasks:

Fuel Pump Package Removal, TASK 73-11-01-000-801-F00,

Fuel Pump Package Installation, TASK 73-11-01-400-801-F00.

- (b) Use your hand to move the ends of the fuel pump studs.

NOTE: The three studs on the fuel pump are key locked studs. Due to the locking mechanism, you can feel a small lateral movement of the end of the studs.

1) If the ends of the studs move 0.062 inch (1.6 mm) or greater, then do these steps:

- a) Use a small hammer and a punch to lightly hit the studs keys into the fuel pump housing.
- b) Continue to lightly hit the keys until the stud movement is in the limits, or the key is flush with the inserted end of the stud.
- c) If you can not get the stud movement into the limits, then replace the fuel pump.

These are the tasks:

Fuel Pump Package Removal, TASK 73-11-01-000-801-F00,

Fuel Pump Package Installation, TASK 73-11-01-400-801-F00.

2) If the stud movement is in the limits, then continue.

SUBTASK 73-21-10-430-001-F00

(3) ENGINES PRE-CFMI-SB 73-067;

If it is necessary, install a new high pressure shutoff valve (HPSOV) switch per the service bulletin.

- (a) Or do these tasks, High Pressure Shutoff Valve (HPSOV) Switch Removal, TASK 73-21-09-000-801-F00, and High Pressure Shutoff Valve (HPSOV) Switch Installation, TASK 73-21-09-400-801-F00.

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HAP 001-013, 015-026, 028 PRE SB 737-28-1179

SUBTASK 73-21-10-210-005-F00

- (4) Do a check of the Fuel Control Module, P5-2 and the HMU for the correct operation of the ENGINE VALVE CLOSED light.

NOTE: The ENGINE VALVE CLOSED light will stay ON bright during engine operation if the P5-2 module and the HMU are not compatible

- (a) If the P5-2 module is replaced by the service bulletin, no action is necessary.
- (b) If the P5-2 module is not replaced by the service bulletin, do the applicable step:
- 1) If the installation HMU has a part number that ends with P07 and prior, no action is necessary.
 - 2) If the installation HMU has a part number that ends with P08 and on (CFM-SB-73-067), do one of these steps:
 - a) Change the P5-2 module, refer to the service bulletin.
 - b) Change the P08 HMU to a P07 HMU, refer to CFM-SB-73-068.

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SUBTASK 73-21-10-210-007-F00

- (5) ENGINES PRE-CFM-SB 73-0108;

Make sure that you install the correct HMU, refer to the AIPC.

- (a) HMUs with part number 1853M56P10 or P12 do not have the Burner Staging Valve solenoid. The BSV must be deactivated for this HMU installation, refer to CFM-SB 73-0108.

G. HMU Installation

SUBTASK 73-21-10-420-002-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE HMU. THE HMU WEIGHS 40 POUNDS (18 KILOGRAMS). THE WEIGHT CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

CAUTION: DO NOT LIFT THE HMU BY THE DRIVE SHAFT. DO NOT LET THE DRIVE SHAFT SUPPORT THE WEIGHT OF THE HMU. IF THE DRIVE SHAFT SUPPORTS THE WEIGHT OF THE HMU, IT CAN CAUSE DAMAGE TO THE HMU SEALS.

- (1) Install the HMU [1] on the fuel pump:
- (a) Lubricate the three studs on the fuel pump with grease, D00601 [CP2101].
 - (b) Lubricate the three studs on the HMU grease, D00601 [CP2101].

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (c) Lubricate the gasket [42] with oil, D00623 [CP5066].
- (d) Remove the protective covers from the mating surfaces of the HMU and the fuel pump.
- (e) Put the gasket [42] in its correct position on the fuel pump.
- (f) Put the HMU [1] on the fuel pump.
 - 1) If you cannot get the HMU shaft to align with the fuel pump, manually turn the N2 rotor until the HMU shaft engages the fuel pump (TASK 72-00-00-980-801-F00).

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- (g) Install the six washers [41] and nuts [40] on the studs to connect the HMU to the fuel pump.

NOTE: The three outboard studs are on the fuel pump and the three inboard studs are on the HMU.

CAUTION: MAKE SURE THAT THE TORQUE ADAPTER SET IS NOT DAMAGED. MAKE SURE THAT THE CENTERLINE OF THE ADAPTER ALIGNS WITH THE CENTERLINE OF THE TORQUE WRENCH SQUARE DRIVE. IF THE TORQUE WRENCH IS NOT ALIGNED WITH THE ADAPTER CENTERLINE, YOU WILL GET INCORRECT TORQUE VALUES.

- 1) Use the set, SPL-2358 to get access to the center inboard stud.

NOTE: If the tool is not available, then you can insert a long extension from the forward side, between the fan case and the accessory gearbox.

- 2) Tighten the nuts [40] to 124-136 pound-inches (14.0-15.3 Newton meters).

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after the HMU post-installation test. Bubbles are permitted if the bubbles stop after five minutes of engine operation at idle.

SUBTASK 73-21-10-020-011-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (2) Install the drain tubes [30] and [31]:

- (a) Remove the protective covers from the drain tubes [30] and [31] and the drain.
(b) Remove the applicable protective cover from the HMU.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (c) Lubricate the threads of the nipples with oil, D00623 [CP5066].
(d) Use your hands to connect the drain tube [31] to the drain and the drain tube [28].
1) Make sure that the drain tube [31] does not touch other components.
(e) Use two wrenches to tighten the two coupling nuts to 257-284 pound-inches (29-32 Newton meters).
(f) Use your hands to connect the drain tube [30] to the bottom of the HMU and the drain tube [29].
1) Make sure that the drain tube [30] does not touch other components.
(g) Use two wrenches to tighten the coupling nuts to 257-284 pound-inches (29-32 Newton meters).

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SUBTASK 73-21-10-020-012-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(3) Do these steps to install the fuel tube [33]:

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after installation. Bubbles are acceptable provided the bubbles stop after three cycles.

- (a) Remove the protective covers from the fuel tube [33] and the fuel tube [38].
- (b) Remove the applicable protective covers from the HMU.
- (c) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [34] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [32] and [36] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].

CAUTION: LOOK AT THE GASKET BEFORE YOU INSTALL IT. OBEY THE INSTRUCTIONS IN SEALS (PERFORMED PACKINGS AND O-RINGS) AND GASKETS, TASK 70-30-01-910-802-F00. DO NOT CAUSE DAMAGE TO THE RUBBER SEAL WHEN YOU INSTALL THE GASKET.

- (d) Put the fuel tube [33] and the gasket [34] in the correct position between the HMU and fuel tube [38].
- (e) Install and hand tighten the 4 bolts [32] that hold the fuel tube [33] and gasket [34] to the HMU [1].
- (f) Use your hands to connect fuel tube [33] to the fuel tube [38].
- (g) Install and hand tighten the nut [35], bolt [36], and clamp [37] that hold the tube [33] to the bracket.
- (h) Make sure that the fuel tube [33] is in its correct position.
 - 1) Make sure that there is no gap between the fuel tube [33] and gasket [34] or between the gasket [34] and HMU.

CAUTION: TIGHTEN THE BOLTS CORRECTLY. REFER TO TIGHTENING PRACTICES AND TORQUE VALUES, TASK 70-20-02-400-801-F00. IF YOU TIGHTEN THEM INCORRECTLY, DAMAGE TO THE PARTS CAN OCCUR.

- (i) Tighten the bolts [32] to 98-110 pound-inches (11.0-12.5 Newton meters).
- (j) Use two wrenches to tighten the coupling nut between fuel tube [33] and [38] to 900-1100 pound-inches (100-125 Newton meters).
- (k) If you loosened the clamps that holds the fuel tube [38] to the bracket above the fuel pump package, then tighten the clamp bolts to 98-110 pound-inches (11.0-12.5 Newton meters).
- (l) Tighten the nut [35] to 98-110 pound-inches (11.0-12.5 Newton meters).

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SUBTASK 73-21-10-020-013-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(4) Do these steps to install the fuel tube [39]:

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after installation. Bubbles are acceptable provided the bubbles stop after three cycles.

- (a) Remove the protective covers from the fuel tube [39], servo-fuel heater, and HMU.
- (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [26] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [27] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the fuel tube [39] and the gasket [26] in the correct position between the HMU and the servo-fuel heater.
- (d) Install and hand tighten the four bolts [27] that hold the fuel tube [39] and the gasket [26] to the HMU [1].
- (e) Connect and hand tighten the fuel tube [39] to the servo-fuel heater.
- (f) Tighten the bolts [27] to 49-53 pound-inches (5.5-6.0 Newton meters).
- (g) Use two wrenches to tighten the coupling nut between fuel tube [39] and the servo-fuel heater to 650-770 pound-inches (75-85 Newton meters).

SUBTASK 73-21-10-430-002-F00

CAUTION: USE TWO WRENCHES WHEN YOU LOOSEN OR TIGHTEN THE CONNECTION. ONE WRENCH WILL HOLD ONE SIDE OF THE CONNECTION IN ITS POSITION. ONE WRENCH WILL TURN THE OTHER SIDE OF THE CONNECTION. IF YOU DO NOT OBEY THIS TWO-WRENCH PROCEDURE, YOU CAN CAUSE DAMAGE TO THE CONNECTION COMPONENTS.

(5) Do these steps to install the fuel tube [43]:

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after installation. Bubbles are acceptable provided the bubbles stop after three cycles.

- (a) Remove the protective covers from the fuel tube [43], servo-fuel heater and fuel pump.
- (b) Lubricate the threads of the nipples with oil, D00623 [CP5066]
- (c) Put the fuel tube [43] in the correct position between the servo-fuel heater inlet port and the fuel pump.
- (d) Connect and hand tighten the fuel tube [43] to the servo-fuel heater.
- (e) Connect and hand tighten the fuel tube [43] to the fuel pump.
- (f) Use two wrenches to tighten the two coupling nuts to 650-770 pound-inches (75-85 Newton meters).

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SUBTASK 73-21-10-020-014-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(6) Do these steps to install the fuel tube [17]:

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after installation. Bubbles are acceptable provided the bubbles stop after three cycles.

- (a) Remove the protective covers from the fuel tube [17], fuel tube [19] and the HMU [1].
- (b) Lubricate these parts:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the gasket [18] with oil, D00623 [CP5066].
- 2) Lubricate the threads of the bolts [16], [22], and [24] with grease, D00601 [CP2101].
- 3) Lubricate the threads of the nipple with oil, D00623 [CP5066].
- (c) Put the fuel tube [17] and gasket [18] in the correct position between the fuel tube [19] and the HMU [1].
- (d) Install and hand tighten the four bolts [16] that hold the tube [17] and the gasket [18] to the HMU [1].
- (e) Connect and hand tighten the fuel tube [17] to the fuel tube [19].
- (f) Do these steps to connect the fuel tube [17] and the oil tube [15] to the brackets:
 - 1) Put the clamp on the oil tube [15] in its correct position at the bracket.

CAUTION: MAKE SURE THAT THE CLAMPS DO NOT INTERFERE WITH THE HMU, THE FUEL TUBES OR THE OIL TUBES. IF INTERFERENCE OCCURS, IT CAN CAUSE DAMAGE TO THE EQUIPMENT.

- 2) Put the clamp [20] in its correct position on the fuel tube [17].
 - a) Make sure that the clamp [20], the clamp on the oil tube [15], and the bracket align.
- 3) Use you hand to install nut [21] and bolt [22] that hold the clamps and the tubes [15] and [17] to the bracket.
- (g) Install and hand tighten the nut [23], bolt [24], and clamp [25] that hold the tube [17] to the fuel pump.
- (h) Tighten the bolts [16] to 49-53 pound-inches (5.5-6.0 Newton meters).

NOTE: To aid in the proper installation of the four bolts [16], a 20 inch (50 cm) extension can be used to tighten the 2 inboard bolts. A 2 inch (5 cm) deep-well socket can be used to remove the 2 outboard bolts. Be sure to apply torque at 90 degrees to the centerline of the bolt.

- (i) Use two wrenches to tighten the coupling nut, between the fuel tubes [17] and [19], to a torque of 900-1100 pound-inches (100-125 Newton meters).
- (j) Tighten the nuts [21] and [23] for the clamps [20] and [25] to 98-110 pound-inches (11.0-12.5 Newton meters).

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SUBTASK 73-21-10-420-006-F00

CAUTION: USE TWO WRENCHES TO TIGHTEN THE HOSE COUPLING NUTS. USE ONE TO HOLD THE FITTING, AND THE OTHER TO TIGHTEN THE HOSE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE HOSE AND NIPPLE CAN OCCUR.

(7) Connect these hoses to the HMU [1]:

NOTE: When you connect the lines to the HMU and fuel spills out of the lines, bubbles may occur after installation. Bubbles are acceptable provided the bubbles stop after three cycles.

NOTE: The hose installations are arranged so that same wrenches and torque values are used at the same time.

(a) Remove the protective covers from the hoses and the HMU.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

(b) Lubricate the threads of the nipples with oil, D00623 [CP5066].

(c) Install and hand tighten these hoses:

1) The HPT hose [5]

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2) The BSV hose [10]

NOTE: Engine POST CFMI SB 73-044 do not have the BSV hose [10] installed

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3) The TBV hose [12].

4) Use two wrenches to tighten the coupling nuts on the hoses [5], [10], and [12] to 135-150 pound-inches (15.3-17.0 Newton meters).

NOTE: Engine with CFMI SB 73-044 do not have the BSV hose [10] installed

HAP ALL POST SB CFM56-7B 73-44

(d) If it is necessary, do these steps to install the plug in place of the BSV hose [10].

NOTE: The plug Part Number, refer to IPC 73-21-10.

1) Lubricate the threads of the plug with oil, D00623 [CP5066].

2) Install the plug in place of the BSV hose [10].

3) Tighten the plug to 135-150 pound-inches (15.3-17.0 Newton meters).

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(e) Install and hand tighten these hoses:

1) The LPT hose [4]

2) The VSV hose (ROD) [6]

3) The VBV hose (CLOSED) [8]

4) The PCR hose [11].

5) Use two wrenches to tighten the coupling nuts on the hoses [4], [6], [8], and [11] to 270-300 pound-inches (30.0-35.0 Newton meters).

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- (f) Install and hand tighten these hoses:
- 1) The VSV hose (HEAD) [7]
 - 2) The VBV hose (OPEN) [9].
 - 3) Use two wrenches to tighten the coupling nuts on the hoses [7] and [9] to 450-550 pound-inches (50.0-60.0 Newton meters).

SUBTASK 73-21-10-210-004-F00

- (8) Make sure that the electrical power is removed from the airplane while you install the electrical connectors.

(a) If it is necessary, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 73-21-10-420-007-F00

- (9) Connect these electrical connectors to the HMU:

NOTE: If it is necessary, you can use soft-nose pliers to turn the connector nuts.

- (a) Remove the protective covers from the electrical connectors and the receptacles.
- (b) The DP0803 (J8) connector on the fuel filter differential pressure switch.
- (c) The DP0601 (J6) connector
- (d) The DP1207 (MWO312) connector
- (e) The DP0501 (J5) connector
- (f) The DP1203 (MWO312) connector.

SUBTASK 73-21-10-210-002-F00

- (10) Remove the cranking tool and install the handcranking drive cover on the gearbox drive pad (TASK 72-00-00-980-801-F00).

H. HMU Installation Test

SUBTASK 73-21-10-840-003-F00

- (1) Do these steps to prepare for the installation test:
- (a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.
 - (b) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.

SUBTASK 73-21-10-730-001-F00

- (2) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).
- (a) If bubbling is seen from the HMU front cover or electro-hydraulic servo valve (EHSV) cover parting flanges during the HMU leak check, do these steps:
- NOTE: Residual fuel from the HMU connections can be the cause. The HMU front cover and EHSVs cover are not fluid tight. Heat from the HMU operation forces the air contained in the cavity to escape and create bubbles.
- 1) Dry the area with compressed air along the applicable parting surfaces.
 - 2) Do the leak check again
 - a) If the bubbles continue from the HMU front cover or EHSV's cover flange, create a maintenance carry-over and continue in service
 - b) Do an inspection of the HMU for leaks and bubbling after three flights.
 - c) If bubbles are present after three flights, replace the HMU.

————— END OF TASK —————

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ENGINE CONTROL MODULE - REMOVAL/INSTALLATION**1. General**

A. This procedure contains two tasks:

- (1) The removal of the engine control module
- (2) The installation of the engine control module which also includes a post-installation test.

TASK 73-21-12-000-801-F00**2. Engine Control Module Removal**

(Figure 401)

A. General

- (1) This procedure is for the removal of the engine control module (P5-68).
- (2) The engine control module (P5-68) is on the P5 Aft Overhead Panel in the flight compartment.

B. Location Zones

Zone	Area
211	Flight Compartment - Left

C. Procedure

SUBTASK 73-21-12-840-001-F00

(1) Do these steps:

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	13	C01277	MASTER CAUTION ANNUNCIATOR CONT 3
F	13	C01179	INDICATOR MASTER DIM SECT 7
F	14	C01180	INDICATOR MASTER DIM SECT 8

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-12-000-001-F00

(2) Do these steps to remove the engine control module:

- (a) Loosen the four quarter-turn fasteners on the front of the module.
- (b) Remove the module from the P5 Aft Overhead Panel.
- (c) Remove the two electrical connectors from the rear of the module.

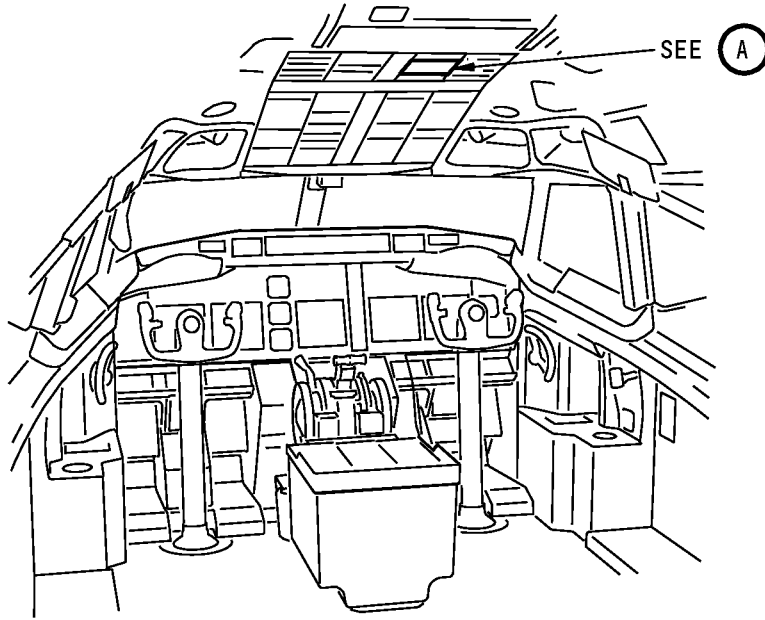
————— **END OF TASK** —————

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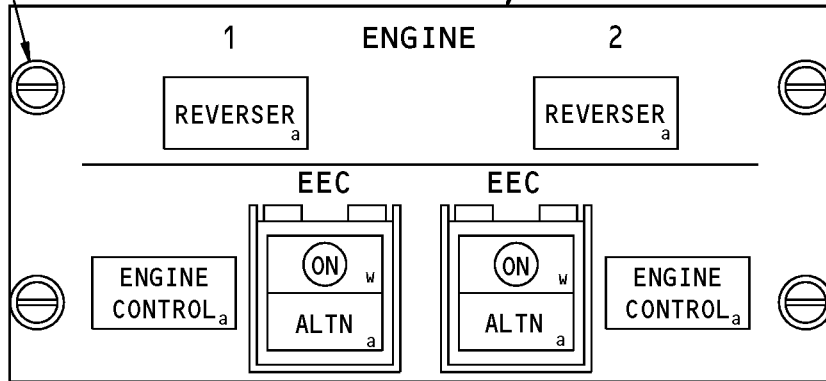
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FLIGHT COMPARTMENT

QUARTER-TURN
FASTENER
(4 LOCATIONS)

[1] ENGINE
CONTROL
MODULE



(A)

Engine Control Module (P5-68) Installation
Figure 401/73-21-12-990-801-F00

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TASK 73-21-12-400-801-F00

3. Engine Control Module Installation

(Figure 401)

A. General

- (1) This procedure is for the installation of the engine control module (P5-68).
- (2) The engine control module (P5-68) is on the P5 Aft Overhead Panel in the flight compartment.

B. References

Reference	Title
73-21-00-700-804-F00	EEC TEST (P/B 501)
78-31-00-700-801-F00	Thrust Reverser Normal Operation Test (P/B 501)

C. Location Zones

Zone	Area
211	Flight Compartment - Left

D. Module Installation

SUBTASK 73-21-12-400-001-F00

- (1) Do these steps to install the engine control module:
 - (a) Connect the two electrical connectors at the rear of the module.
 - (b) Install the module into the P5 Aft Overhead Panel.
 - (c) Tighten the four quarter-turn fasteners on the front of the module.

SUBTASK 73-21-12-840-002-F00

- (2) Do these steps:
 - (a) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	13	C01277	MASTER CAUTION ANNUNCIATOR CONT 3
F	13	C01179	INDICATOR MASTER DIM SECT 7
F	14	C01180	INDICATOR MASTER DIM SECT 8

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

E. Module Installation Test

SUBTASK 73-21-12-860-001-F00

- (1) On the engine control module, put each EEC ON switch to the ON position.

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- (a) Make sure the applicable EEC ON light (white) comes on.

SUBTASK 73-21-12-860-002-F00

- (2) For each EEC, do this task: EEC TEST, TASK 73-21-00-700-804-F00.

- (a) During the test, make sure these applicable lights on the engine control module come ON:
- 1) ENGINE CONTROL (amber)
 - 2) EEC ALTN (amber)
 - 3) The MASTER CAUTION light on the P7 glareshield will also come ON if one of the above amber lights comes on.

SUBTASK 73-21-12-860-004-F00

- (3) Do these steps to examine the EEC ON/ALTN switch:

- (a) Make sure all fuel pump switches are in the OFF position.
- (b) Move the Engine 1 start lever to the IDLE position.
- (c) Push the Engine 1 EEC ON switch so that ON goes off.
- (d) Make sure Engine 1 amber ALTN light comes on.
- (e) Push the Engine 1 EEC ON switch so that the ON shows.
- (f) Make sure Engine 1 amber ALTN light goes off.
- (g) Move the Engine 1 start lever to the CUTOFF position.
- (h) Move the Engine 2 start lever to the IDLE position.
- (i) Push the Engine 2 EEC ON switch so that ON goes off.
- (j) Make sure Engine 2 amber ALTN light comes on.
- (k) Push the Engine 2 EEC ON switch so that the ON shows.
- (l) Make sure Engine 2 amber ALTN light goes off.
- (m) Move the Engine 2 start lever to the CUTOFF position.

SUBTASK 73-21-12-860-003-F00

- (4) For each engine, do this task: Thrust Reverser Normal Operation Test, TASK 78-31-00-700-801-F00.

- (a) During the test, make sure the applicable REVERSER light (amber) on the engine control module come ON.

————— **END OF TASK** —————

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ELECTRONIC ENGINE CONTROL - MAINTENANCE PRACTICES**1. General**

- A. This procedure contains two tasks. The first is the task to load the software into the EEC, as software updates become available. The second is the task to retrieve Non-Volatile Memory (NVM) data from the EEC. Retrieving NVM data from an EEC is also referred to as downloading NVM.

TASK 73-21-60-470-801-F00**2. EEC Software Load**

A. General

- (1) These tools are necessary when reprogramming the EEC:

- (a) ARINC 615 data loader, COM-261, CFMI recommends a Sundstrand, Demo Systems PDL, Demo Systems PMAT 2000 or equivalent.
- (b) CFMI PDL (interface) adapter cable, part number 856A1616G02 or equivalent or Demo Systems PMAT (interface) adapter cable, part number 80046-1 or EEC adapter cable, COM-11091, or equivalent.
- (c) Demo Systems PMAT External CD-ROM, part number 80751-1 (optional) or external CD-ROM drive, COM-11092.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-00-700-804-F00	EEC TEST (P/B 501)
73-21-00-700-808-F00	IDENT/CONFIG (P/B 501)
73-21-00-740-801-F00	EEC BITE TEST - FAULT HISTORY (P/B 501)
73-21-61-000-801-F00	Identification Plug Removal (P/B 401)
73-21-61-400-801-F00	Identification Plug 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
COM-261	Data Loader - ARINC 615 (Part #: 11615-20, Supplier: 0D4J3, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -ALL, -BBJ) (Part #: 30100, Supplier: 0BAW0, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 964-0400-024, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 964-0400-055, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: CEI-715-DL-2, Supplier: 0BPH5, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: 964-0400-020, Supplier: 97896, A/P Effectivity: 737-600, -700, -800) (Opt Part #: 964-0400-025, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-11091	ADAPTER CABLE - EEC DATALODING (Part #: 110602003-00, Supplier: 0D4J3, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 856A1616G02, Supplier: 07482, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

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Reference	Description
COM-11092	DRIVE - EXTERNAL, CD-ROM (PMAT 2000 ONLY) (Part #: 80751-1, Supplier: 0BAW0, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

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

E. EEC Software Interchangeability

SUBTASK 73-21-60-800-003-F00

- (1) Some EEC software is necessary for the airplane (FMC), engine and thrust reversers.
- (a) This EEC software is necessary on airplanes after line number 2230 and on and 737-900ER models.
 - 1) FADEC 2, 1853M78P27 and later
 - 2) FADEC 3, 2044M25P07 and later
 - (b) In-flight idle changes in later EEC software change the necessary FMC-MEDB software. The EEC software and the FMC-MEDB software must be compatible.
 - (c) This EEC software is necessary for substitution/intermix of either a CFM Tech Insertion engine HPC compressor kt or Technology Insertion Engine (/3) on airplane line number before 2230
 - 1) FADEC 2, 1853M78P27 and later
 - 2) FADEC 3, 2044M25P07 and later
 - 3) Refer to the applicable service bulletin for the engine intermix data:
 - a) SAC ENGINES;
71-1588
 - b) DAC ENGINES;
71-1585
 - (d) This EEC software is necessary for thrust reversers modified by 737-SB 78-1079.
 - 1) FADEC 2, 1853M78P27 and later
 - 2) FADEC 3, 2044M25P07 and later
 - 3) Refer to the service bulletin for the thrust reverser changes.

SUBTASK 73-21-60-800-001-F00

- (2) Make sure the EEC software and the Flight Management Computer - Model Engine Data Base (FMC-MEDB) versions are compatible Table 201.

Table 201/73-21-60-993-810-F00 EEC Software and FMC-MEDB Software

EEC Software Part Number	FMC-MEDB Part Number	FMC OPS Version	Retrofit FMC SB
1853M78P12 1853M78P13 ^[1]	BCG-005-78	U10.0	N/A
	BCG-005-06	U10.1	34-1455

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EEC Software Part Number	FMC-MEDB Part Number	FMC OPS Version	Retrofit FMC SB
	BCG-005-70	U10.2 / U10.2A	34-1463
	BCG-005-89	U10.2 / U10.2A	N/A
	BCG-005-B3	U10.2 / U10.2A	34-1501
1853M78P13	BCG-005-B9	U10.2 / U10.2A	34-1522
1853M78P14 to 1853M78P25, and 2044M25P03 to 2044M25P05	BCG-005-B1	U10.3 / U10.4 / U10.4A	N/A
	BCG-005-D2	U10.2 / U10.2A	34-1562
	BCG-005-D3	U10.3 / U10.4 / U10.4A	34-1503
	BCG-005-H6	U10.5 / U10.5A	34-1650
	BCG-00T-N1	U10.5 / U10.5A / U10.6	34-1768
	BCG-005-66	U10.5 / U10.5A / U10.6	N/A
	BCG-014-A2	U10.6 / U10.7	34-1918
	BCG-014-V9	U10.7	N/A
1853M78P27 and later and 2044M25P07 and later	BCG-014-A2	U10.6 / U10.7	34-1918
	BCG-014-V9	U10.7	N/A

*[1] EEC software 1853M78P13 is permitted with these FMC-MEDB part numbers, but concurrent incorporation of MEDB BCG-005-B9 is recommended.

- (a) In-flight idle changes in later EEC software change the necessary FMC-MEDB software.
- (b) The table shows the compatible software.
- (c) Refer to the applicable FMC service bulletin for more data.

SUBTASK 73-21-60-800-002-F00

- (3) Make sure the EEC software versions on the two engines are compatible Table 202 .

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Table 202/73-21-60-993-811-F00 EEC Software Intermix

Engine 1 (Left) Hardware	Software Part Number (Version)	Engine 2 (Right) Hardware	Software Part Number	Installation Restriction Notes
FADEC 2	1853M78P22 (7.B.O)	FADEC 2	1853M78P24	*[1]
FADEC 2	1853M78P22	FADEC 2	1853M78P25	*[1], *[2]
FADEC 2	1853M78P22	FADEC 3	2044M25P03	*[1], *[3]
FADEC 2	1853M78P22	FADEC 3	2044M25P04	*[1], *[2], *[3]
FADEC 2	1853M78P22	FADEC 3	2044M25P05	*[1], *[2], *[3]
FADEC 2	1853M78P24 (7.B.P)	FADEC 2	1853M78P22	*[1]
FADEC 2	1853M78P24	FADEC 2	1853M78P25	*[1], *[2]
FADEC 2	1853M78P24	FADEC 3	2044M25P03	*[1], *[3]
FADEC 2	1853M78P24	FADEC 3	2044M25P04	*[1], *[2], *[3]
FADEC 2	1853M78P24	FADEC 3	2044M25P05	*[1], *[2], *[3]
FADEC 2	1853M78P25 (7.B.QF2)	FADEC 2	1853M78P22	*[1], *[2]
FADEC 2	1853M78P25	FADEC 2	1853M78P24	*[1], *[2]
FADEC 2	1853M78P25	FADEC 3	2044M25P03	*[1], *[2], *[3]
FADEC 2	1853M78P25	FADEC 3	2044M25P04	*[1], *[3]
FADEC 2	1853M78P25	FADEC 3	2044M25P05	*[1], *[3]
FADEC 3	2044M25P03 (7.B.PF3)	FADEC 2	1853M78P22	*[1], *[3]
FADEC 3	2044M25P03	FADEC 2	1853M78P24	*[1], *[3]
FADEC 3	2044M25P03	FADEC 2	1853M78P25	*[1], *[2], *[3]
FADEC 3	2044M25P03	FADEC 3	2044M25P04	*[1], *[2]
FADEC 3	2044M25P03	FADEC 3	2044M25P05	*[1], *[2]
FADEC 3	2044M25P04 (7.B.QF3)	FADEC 2	1853M78P22	*[1], *[2], *[3]
FADEC 3	2044M25P04	FADEC 2	1853M78P24	*[1], *[2], *[3]
FADEC 3	2044M25P04	FADEC 2	1853M78P25	*[1], *[3]
FADEC 3	2044M25P04	FADEC 3	2044M25P03	*[1], *[2]

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Engine 1 (Left) Hardware	Software Part Number (Version)	Engine 2 (Right) Hardware	Software Part Number	Installation Restriction Notes
FADEC 3	2044M25P04	FADEC 3	2044M25P05	*[1]
FADEC 3	2044M25P05 (7.B.Q1F3)	FADEC 2	1853M78P22	*[1], *[2], *[3]
FADEC 3	2044M25P05	FADEC 2	1853M78P24	*[1], *[2], *[3]
FADEC 3	2044M25P05	FADEC 2	1853M78P25	*[1], *[3]
FADEC 3	2044M25P05	FADEC 3	2044M25P03	*[1], *[2]
FADEC 3	2044M25P05	FADEC 3	2044M25P04	*[1]
FADEC 2	1853M78P27 (7.B.R3F2)	FADEC 2	1853M78P28	*[4], *[5]
FADEC 2	1853M78P27	FADEC 3	2044M25P07	*[3], *[4], *[5]
FADEC 2	1853M78P27	FADEC 3	2044M25P08	*[3], *[4], *[5]
FADEC 2	1853M78P28 (7.B.SF2)	FADEC 2	1853M78P27	*[4], *[5]
FADEC 2	1853M78P28	FADEC 3	2044M25P07	*[3], *[4], *[5]
FADEC 2	1853M78P28	FADEC 3	2044M25P08	*[3], *[4], *[5]
FADEC 3	2044M25P07 (7.B.R3F3)	FADEC 2	1853M78P2	*[3], *[4], *[5]
FADEC 3	2044M25P07	FADEC 2	1853M78P28	*[3], *[4], *[5]
FADEC 3	2044M25P07	FADEC 3	2044M25P08	*[4], *[5]
FADEC 3	2044M25P08 (7.B.SF3)	FADEC 2	1853M78P27	*[4], *[5]
FADEC 3	2044M25P08	FADEC 2	1853M78P28	*[3], *[4], *[5]
FADEC 3	2044M25P08	FADEC 3	2044M25P07	*[4], *[5]

*[1] FMC-MEDB software BCG-005-B1, BCG-005-D2, BCG-005-D3, BCG-00N-H6, BCG-00T-N1, or BCG-014-66 is necessary

*[2] Intermix of 1853M78P25 and 2044M25P04 and later with prior approved software is permitted. Refer to CFM-SB 73-0115 for the reverse thrust idle changes.

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*[3] FADEC 2 and FADEC 3 EECs are interchangeable on the engine. However hardware specific software is necessary.

*[4] FMC-MEDB software BCG-014A2 or BCG-014-V9 is necessary.

*[5] EEC software 1853M78P27 (FADEC2) and 1853M25P07 and later include several operational differences with earlier versions. Intermix of these earlier versions with later versions is not permitted.

- (a) Different EEC software can be installed on each of the two engines.
- (b) Applicable FMC-MEDB software can be necessary.
- (c) For EEC software intermix, use the preferred EEC software/hardware configuration:
 - 1) A combination of 1853M78P25 (FADEC2) or 2044M25P05 (FADEC 3)
 - 2) A combination of 1853M78P28 (FADEC2) or 2044M25P08 (FADEC 3)
- (d) The table only shows approved FADEC 2 software versions 1853M78P22 and later which agree with 737-SB-73A1016.

F. Procedure

SUBTASK 73-21-60-560-001-F00

CAUTION: YOU MUST TRANSFER PROGRAMS FROM CD-ROM TO FLOPPY DISK FOR USE IN THE ARINC-615 DATA LOADER UNLESS YOU ARE ABLE TO USE THE EXTERNAL CD-ROM DRIVE WITH THE PMAT OR LOAD THE SOFTWARE DIRECTLY TO THE PMAT HARD DRIVE. DURING THE STEPS THAT REPROGRAM THE EEC, THE DATA LOADER WILL WRITE FOUR (FOR FADEC2) OR TWO (FOR FADEC3) NVM FILES TO THE WORKING FLOPPY DISK, OR TO THE PMAT HARD DRIVE. IF YOU WANT TO SAVE THESE NVM FILES, YOU MUST USE A DIFFERENT WORKING COPY FOR EACH EEC THAT YOU PROGRAM.

- (1) Do these steps to transfer the media to the necessary location:
 - (a) If Working Copy Floppy Disks are necessary to transfer the media, follow the instructions included in the CD-ROM file entitled "Procedures for Making Working Copy Disks" to create one working copy disk for each engine that will be reprogrammed.
 - (b) When you use a Demo Systems PMAT or equivalent, refer to the OEM data loader manufacturer operator's manual for instructions to transfer the media to the internal hard drive.

NOTE: The working copy floppy disks must not be Write Protected.

- (c) Follow the instructions included in the CD-ROM file to make labels for each new disk. All the necessary files are included on the CD-ROM.

NOTE: The EEC part number, the EEC serial number and the Engine serial number should be filled in when you use the working floppy disk.

SUBTASK 73-21-60-740-002-F00

- (2) Look for system faults before you program the EEC. Do this task: EEC BITE TEST - FAULT HISTORY, TASK 73-21-00-740-801-F00.

NOTE: It is recommended that you look for any EEC System faults before you reprogram the EEC.

SUBTASK 73-21-60-840-003-F00

- (3) Do these steps to isolate the applicable EEC:
 - (a) For engine 1, do this step:

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Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 73-21-60-480-001-F00

(4) Do these steps to connect the ARINC-615 data loader (Figure 201):

(a) Do this task: Identification Plug Removal, TASK 73-21-61-000-801-F00.

NOTE: The ID plug is connected to the EEC receptacle, P11.

(b) When you use a Sundstrand or Demo Systems PDL or equivalent, do these steps:

1) Disconnect the DP0202 electrical connector from the EEC receptacle, J2.

NOTE: The DP0202 connector is connected to the EEC J2 receptacle.

2) Connect the EEC/PDL adapter cable connector J2A to the disconnected electrical connector DP0202 on the wire harness.

3) Connect the EEC/PDL adapter cable connector P2A to the EEC receptacle, J2.

4) Connect the PDL adapter cable to the PDL receptacle, J1.

5) Connect the PDL adapter cable to the EEC receptacle, P11.

(c) When you use a Demo Systems PMAT or equivalent, do these steps:

1) Connect the PMAT adapter cable to the receptacle on the PMAT 2000.

2) Before you connect the adapter cable to the FADEC, touch the connector-coupling nut of the PMAT adapter cable (#80046-1) to the connector-coupling nut of electrical connector DP1010 and hold for one (1) second to dissipate any potential electrical charge in the PMAT.

3) Connect the PMAT adapter cable to the P11 receptacle on the EEC.

4) Refer to the OEM data loader manufacturer's instructions to prepare the data loader for reprogramming of the EEC.

SUBTASK 73-21-60-470-001-F00

CAUTION: DO THE STEPS BELOW IN THE ORDER THAT THEY ARE GIVEN. IF YOU DO NOT DO THE STEPS IN THE CORRECT ORDER, THE SOFTWARE COULD LOAD INCORRECTLY.

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(CAUTION PRECEDES)

CAUTION: FOR THE PDL TYPE DATA LOADER ONLY, YOU MUST COMPLETE THE STEPS BELOW TO PUT THE WORKING COPY OF THE DISC INTO THE PDL IN NOT MORE THAN 5 MINUTES. IF YOU DO NOT PUT THE PROGRAM DISC INTO THE PORTABLE DATA LOAD IN 5 MINUTES, THEN YOU MUST OPEN THE CIRCUIT BREAKERS LISTED ABOVE AND START THE TASK AGAIN.

(5) Do these steps to reprogram the EEC:

(a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Set the Engine Start Switch (P5) in the CONT position.

NOTE: This will apply power to the two channels of the EEC.

(d) When you use a Demo Systems PDL or equivalent, do these steps:

- 1) Turn the PDL on.
- 2) Make sure that the WORKING COPY disc is not write protected.
- 3) Insert the WORKING COPY disc into the PDL.
 - a) The PDL will automatically install the operating system into the EEC.
 - b) If the software load is successful, the PDL will show its load completed message in 35 to 50 minutes.
 - c) If the software load is not successful, the PDL will show its fail message in 35 to 50 minutes.

Table 203/73-21-60-993-809-F00

DEMO PDL MESSAGES		SUNDSTRAND PDL MESSAGES
LOAD COMPLETE	----	COMP (GREEN LIGHT)
TRANSFER FAIL	----	XFER (RED LIGHT)
READ/WRITE FAIL	----	R/W (RED LIGHT)

(e) When you use a Demo Systems PMAT or equivalent, do these steps:

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- 1) The PMAT will automatically install the operating system on the EEC after the Engine Start Switch (P5) is put in the CONT position. This process will take approximately 30-50 minutes.

NOTE: For the PMAT type data loader only, if the process does not start in five (5) minutes, then you must open the circuit breakers listed above and start the task again.

- 2) The PMAT will display whether the load was complete or not successful at the end of this time.

SUBTASK 73-21-60-210-001-F00

- (6) If the software load is not successful, then do these steps:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (c) When you use a Demo Systems PDL or equivalent, do these steps:

- 1) Make sure that the cables between the PDL and the EEC are correctly installed.
- 2) Make sure all cable connections are tightened to the proper torque.
- 3) Check to make sure the floppy disk is not write protected.
- 4) Make sure the PDL is powered up before you install the floppy.
- 5) Do the procedure again a maximum of three times before a repair action is necessary.

- (d) When you use a Demo Systems PMAT or equivalent, do these steps:

- 1) Make sure that the cables between the PMAT and the EEC are correctly installed.
- 2) Make sure all cable connections are tightened to the proper torque.
- 3) Make sure the PMAT is ready to download before you do the procedure again.
- 4) Do the procedure again a maximum of three times before a repair action is necessary.

SUBTASK 73-21-60-210-002-F00

- (7) If the software load is successful, then do these steps:

- (a) Only when you use the Demo Systems PDL or equivalent, you must first remove the WORKING COPY disc from the PDL and then turn off the power to the PDL.
- (b) Set the Engine Start Switch (P5) in the OFF position.
- (c) For engine 1, do this step:

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Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (d) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (e) When you use a Demo Systems PDL or equivalent, do these steps:

- 1) Disconnect the PDL adapter cable from the EEC receptacle, P11.
- 2) Disconnect the PDL adapter cable from the PDL receptacle, J1.
- 3) Disconnect the PDL adapter cable connector P2A from the EEC receptacle, J2.
- 4) Disconnect the PDL adapter cable connector J2A from electrical connector DP0202 on the wire harness.
- 5) Connect the DP0202 electrical connector to the EEC receptacle, J2.

- (f) When you use a Demo Systems PMAT or equivalent, do these steps:

- 1) Disconnect the PMAT adapter cable from the P11 receptacle on the EEC.
- 2) Disconnect the PMAT adapter cable from the receptacle on the PMAT.

- (g) Do this task: Identification Plug Installation, TASK 73-21-61-400-801-F00.

- (h) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (i) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (j) Do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.

- 1) Make sure that the correct EEC software part number shows during the test.
- 2) Enter the engine serial number.

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(k) Do this task: EEC TEST, TASK 73-21-00-700-804-F00.

SUBTASK 73-21-60-910-001-F00

(8) Do these steps to identify the new software on the EEC Software Identification Plate (Figure 202).

NOTE: The EEC Software Identification Plate is a metallic sticker that is found on the EEC.

(a) Use a ball point pen to cross out the old S/W part number.

1) Make sure that you can still read the old part number after it has been crossed out.

(b) Use a ball point pen to install the new S/W part number on the identification plate.

————— **END OF TASK** —————

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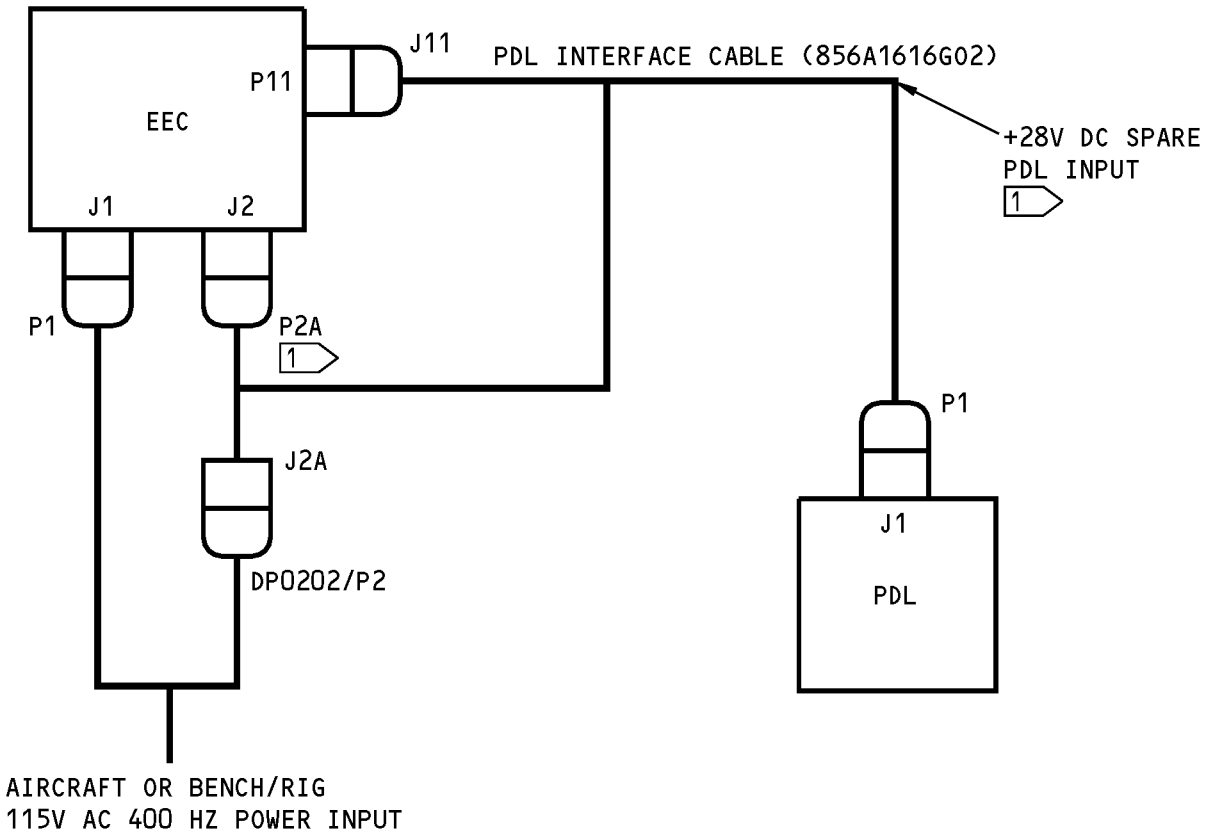
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EEC - PDL INTERFACE OPTION 1

COMMON 115V AC POWER FOR PDL AND EEC



1 THE +28V DC SPARE PDL INPUT SHOWN ABOVE CAN BE USED TO POWER THE PDL INSTEAD OF THE EEC P2/J2 CONNECTION.

1142632-00

EEC Interface (PDL/PMAT Adapter Cable)
Figure 201 (Sheet 1 of 2)/73-21-60-990-803-F00

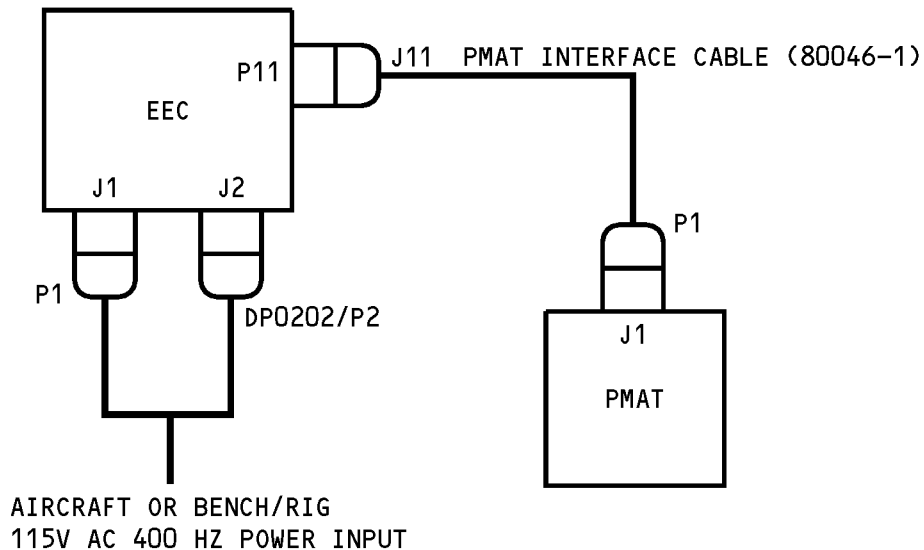
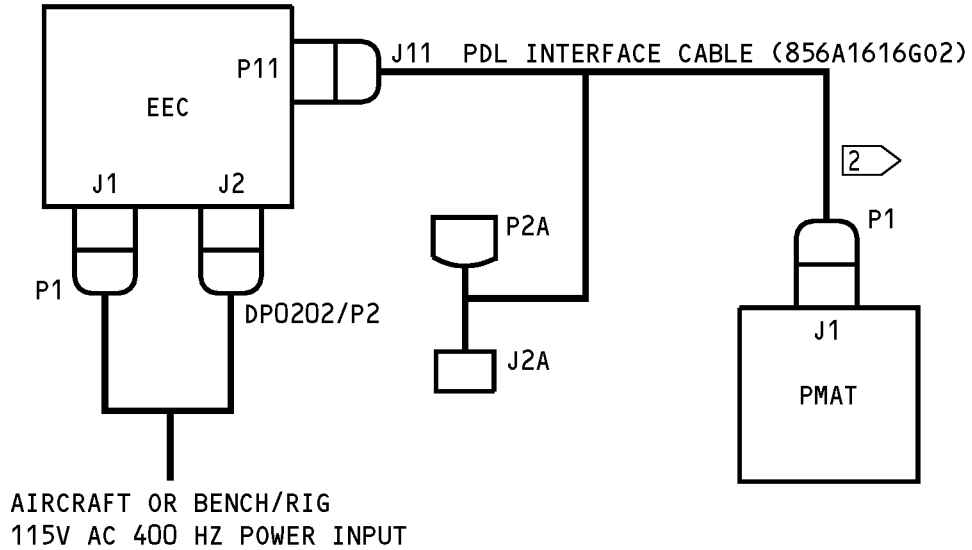
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EEC – PMAT INTERFACE CONNECTION OPTIONS



2 THE PMAT HAS IT'S OWN POWER SUPPLY. THE PMAT CAN USE THE PDL INTERFACE CABLE 856A1616G02 AS AN ALTERNATE METHOD OF CONNECTION TO THE EEC.

1247640-00

EEC Interface (PDL/PMAT Adapter Cable)
Figure 201 (Sheet 2 of 2)/73-21-60-990-803-F00

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INSTALLED SOFTWARE IDENTIFICATION	
SOFTWARE PART NO.	VERSION REFERENCE
1853M78P01	7.B.C (7C02)
1853M78P02	7.B.D (7C04)
1853M78P03	7.B.E (7B25)
1853M78P04	7.B.F (7B2B)

Installed Software Identification (Example)
Figure 202/73-21-60-990-804-F00

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TASK 73-21-60-970-801-F00

3. Retrieve NVM

A. General

(1) These tools are necessary when you retrieve NVM data from the EEC:

- (a) ARINC 615 data loader, COM-261, CFMI recommends a Sundstrand, Demo Systems PDL, Demo Systems PMAT 2000 or equivalent.
- (b) CFMI PDL (interface) adapter cable, part number 856A1616G02 or Demo Systems PMAT (interface) adapter cable, part number 80046-1 or EEC adapter cable, COM-11091, or equivalent.

(2) This task refers to the PDL Procedure for the Portable Data Loader procedure. This task refers to the PMAT 2000 Procedure for the Portable Maintenance Access Terminal procedure.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-00-740-801-F00	EEC BITE TEST - FAULT HISTORY (P/B 501)
73-21-61-000-801-F00	Identification Plug Removal (P/B 401)
73-21-61-400-801-F00	Identification Plug 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
COM-261	Data Loader - ARINC 615 (Part #: 11615-20, Supplier: 0D4J3, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -ALL, -BBJ) (Part #: 30100, Supplier: 0BAW0, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 964-0400-024, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 964-0400-055, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: CEI-715-DL-2, Supplier: 0BPH5, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: 964-0400-020, Supplier: 97896, A/P Effectivity: 737-600, -700, -800) (Opt Part #: 964-0400-025, Supplier: 97896, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-11091	ADAPTER CABLE - EEC DATALODING (Part #: 110602003-00, Supplier: 0D4J3, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 856A1616G02, Supplier: 07482, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

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E. Procedure

SUBTASK 73-21-60-970-001-F00

CAUTION: YOU MUST MAKE WORKING COPIES OF THE MASTER FLOPPY DISK OR CD-ROM. DO NOT USE THE MASTER FLOPPY DISK TO RETRIEVE THE NVM DATA FROM THE EEC. DURING THE STEPS THAT RETRIEVE THE NVM DATA FROM THE EEC, THE DATA LOADER WILL WRITE TWO NVM FILES TO THE WORKING FLOPPY DISK. IF YOU WANT TO SAVE THE TWO NVM FILES, YOU MUST USE A DIFFERENT WORKING COPY FOR EACH EEC NVM THAT YOU RETRIEVE.

CAUTION: YOU MUST USE A FLOPPY DISK IDENTIFIED AS “RETRIEVE ONLY DATA” FOR USE IN THE AIRINC-615 DATA LOADER, OR RETRIEVE THE NVM DATA DIRECTLY TO THE PMAT HARD DRIVE. DURING THE STEPS TO RETRIEVE THE NVM DATA FROM THE EEC, THE DATA LOADER/PMAT WILL WRITE FOUR (FOR FADEC 2) OR TWO (FOR FADEC 3) NVM FILES TO THE FLOPPY DISK, OR TO THE PMAT HARD DRIVE. IF YOU WANT TO SAVE THE NVM FILES FOR BOTH EEC’S TO A FLOPPY DISK, YOU MUST USE A DIFFERENT FLOPPY DISK FOR EACH EEC/ENGINE.

CAUTION: THE FLOPPY DISKS MUST NOT BE WRITE PROTECTED. THE NVM DATA WILL NOT TRANSFER IF THE DISKS ARE WRITE PROTECTED.

(1) PDL Procedure;

Do these steps to prepare the floppy disk.

- (a) Get a 3.5-inch floppy disk that is formatted for PC applications.
- (b) Get the CD-ROM that came with the Engine for the EEC.
- (c) Use the CD-ROM instructions “Procedure for Making Working Copy Disks” to create a working copy for each EEC.
- (d) Install labels on each floppy disk. Make sure the labels say Retrieve Only Data.
- (e) If it is necessary, mark the EEC part number, the EEC serial number, and the Engine serial number on each floppy disk label.

NOTE: The EEC part number, the EEC serial number, and the Engine serial number should be filled in when the working floppy disk is used.

SUBTASK 73-21-60-970-003-F00

(2) PMAT 2000 Procedure;

Do these steps to prepare the PMAT:

- (a) Refer to manufacturer operator’s manual for instructions to retrieve NVM data to the internal hard drive
- (b) If you use a floppy disk and the PMAT, use the instructions in the previous task to prepare the floppy disks

SUBTASK 73-21-60-740-001-F00

(3) Look for any system faults before you retrieve the NVM data from the EEC. Do this task, EEC BITE TEST - FAULT HISTORY, TASK 73-21-00-740-801-F00 .

NOTE: It is recommended that you look for any EEC system faults before you retrieve the NVM data from the EEC.

SUBTASK 73-21-60-860-005-F00

(4) Do these steps to isolate the applicable EEC:

- (a) For engine 1, do this step:

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Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-60-010-001-F00

(5) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 73-21-60-480-002-F00

(6) PDL Procedure;

Do these steps to connect the PDL to the EEC (Figure 201):

(a) Do this task: Identification Plug Removal, TASK 73-21-61-000-801-F00.

NOTE: The ID plug is connected to the EEC receptacle, P11.

(b) Disconnect the DP0202 electrical connector from the EEC.

NOTE: The DP0202 electrical connector is connected to the EEC J2 receptacle.

(c) Connect the PDL adapter cable connector, J2A to the electrical connector DP0202/P2.

(d) Connect the PDL adapter cable connector, P2A to the EEC receptacle, J2.

(e) Connect the PDL adapter cable connector, P1 to the PDL, receptacle J1.

(f) Connect the PDL adapter cable connector, J11 to the EEC receptacle, P11.

SUBTASK 73-21-60-480-003-F00

(7) PMAT 2000 Procedure;

Do these steps to connect the PMAT to the EEC (Figure 201):

(a) Do this task: Identification Plug Removal, TASK 73-21-61-000-801-F00.

NOTE: The ID plug is connected to the EEC receptacle, P11.

(b) Connect the PMAT adapter cable to the receptacle on the PMAT.

(c) Before you connect the PMAT adapter cable to the EEC, touch the coupling nut of the adapter cable to the coupling nut of the connector DP1010.

(d) Hold the adapter coupling nut to the connector DP1010 for one second and dissipate any potential electrical charge

(e) Connect the PMAT adapter cable connector, J11 to the EEC receptacle, P11.

(f) Refer to manufacturer operator's manual for instructions to prepare the data loader for retrieval of NVM data from the EEC.

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SUBTASK 73-21-60-970-002-F00

CAUTION: DO THE STEPS THAT FOLLOW IN THE SEQUENCE THAT THEY ARE GIVEN. IF YOU DO NOT DO THE STEPS IN THE CORRECT SEQUENCE, THE NVM DATA CAN NOT BE RETRIEVED.

CAUTION: PDL PROCEDURE, COMPLETE THE STEPS THAT FOLLOW TO INSERT THE FLOPPY DISK INTO THE PDL IN NOT MORE THAN FIVE MINUTES. IF YOU DO NOT INSERT THE RETRIEVE-ONLY DISK INTO THE PDL IN FIVE MINUTES, THEN YOU MUST OPEN THE CIRCUIT BREAKERS AND START THE TASK AGAIN.

(8) Do these steps to retrieve the NVM data from the EEC:

(a) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(b) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(c) Set the Engine Start Switch (P5) in the CONT position.

NOTE: This will apply power to the two channels of the EEC.

(d) PDL Procedure;

Do these steps:

- 1) Turn on the PDL.
- 2) Make sure the floppy disk is not write protected.
- 3) Put the floppy disk into the PDL.
 - a) The PDL will automatically retrieve the NVM data from the EEC.
 - b) If the NVM is retrieved successfully, the PDL will show its load complete message in less than five minutes (Table 204).
 - c) If the NVM retrieve is not successful, the PDL will show its fail message in less than five minutes (Table 204).

Table 204/73-21-60-993-808-F00

DEMO PDL MESSAGES	SUNDSTRAND PDL MESSAGES
LOAD COMPLETE	COMP (GREEN LIGHT)
TRANSFER FAIL	XFER (RED LIGHT)
READ/WRITE FAIL	R/W (RED LIGHT)

(e) PMAT 2000 Procedure;

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Do these steps:

NOTE: If the process does not start in five minutes, then you must open the circuit breakers listed above and start the task again.

- 1) The PMAT will automatically retrieve the NVM data from the EEC after the engine start switch is put in the CONT position. This process will take less than five minutes.
- 2) The PMAT will display whether the NVM data retrieval was complete or unsuccessful in less than five minutes.

SUBTASK 73-21-60-860-006-F00

(9) If the NVM data is not retrieved successfully, then do these steps:

- (a) Set the Engine Start Switch (P5) in the OFF (or AUTO) position.
- (b) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

(c) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

(d) PDL Procedure;

Do these steps:

- 1) Make sure that the cables between the PDL and the EEC are correctly installed.
- 2) Make sure all the cable connections are tightened to the correct torque.
- 3) Make sure the floppy disk is not write protected.
- 4) Make sure the PDL is powered up before you put the floppy disk in.
- 5) Do the procedure again a maximum of three times before a repair action is necessary.

(e) PMAT 2000 Procedure;

Do these steps:

- 1) Make sure that the cable between the PMAT and the EEC is correctly installed.
- 2) Make sure all the cable connections are tightened to the correct torque.
- 3) Make sure the PMAT is ready to download before you do the procedure again.
- 4) Do the procedure again a maximum of three times before a repair action is necessary.

SUBTASK 73-21-60-080-001-F00

(10) If the NVM data was retrieved successfully, then do these steps:

(a) PDL Procedure;

Remove the floppy disk from the PDL and remove power to the PDL.:

(b) Set the Engine Start Switch (P5) in the OFF (or AUTO) position.

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- (c) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (d) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (e) PDL Procedure;

Disconnect the PDL from the EEC.

- 1) Disconnect the PDL adapter cable from the EEC receptacle, P11.
- 2) Disconnect the PDL adapter cable from the PDL receptacle, J1.
- 3) Disconnect the PDL adapter cable connector, P2A from the EEC receptacle, J2.
- 4) Disconnect the PDL adapter cable connector, J2A from the connector, DP020 on the wire harness.
- 5) Connect the DP0202 electrical connector to the EEC receptacle, J2.

- (f) PMAT 2000 Procedure;

Disconnect the PMAT from the EEC.

- 1) Disconnect the PMAT adapter cable from the EEC receptacle, P11.
- 2) Disconnect the PMAT adapter cable from the PMAT receptacle, J1.
- 3) Connect the DP0202 electrical connector to the EEC receptacle, J2.

- (g) Do this task: Identification Plug Installation, TASK 73-21-61-400-801-F00.

SUBTASK 73-21-60-860-007-F00

- (11) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

SUBTASK 73-21-60-860-008-F00

- (12) For engine 2, do this step:

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Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

END OF TASK

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ELECTRONIC ENGINE CONTROL - REMOVAL/INSTALLATION**1. General**

A. This procedure contains two tasks:

- (1) The removal of the electronic engine control (EEC)
- (2) The installation of the electronic engine control (EEC).

TASK 73-21-60-000-801-F00**2. EEC Removal**

(Figure 401)

A. General

- (1) The electronic engine control (EEC) is on the right side of the fan case at the 2:00 o'clock position.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Prepare for the Procedure

SUBTASK 73-21-60-840-001-F00

- (1) Do these steps to isolate the applicable EEC:

- (a) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- (b) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

- (c) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

E. Remove the EEC

SUBTASK 73-21-60-020-001-F00

- (1) Do these steps to remove the EEC [1]:

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- (a) Remove the four bolts [3] to disconnect the EEC cooling tube [2] from the EEC [1].
- (b) Disconnect these electrical harnesses from the EEC [1]:
 - 1) The MW0301 (J1) [15]
 - 2) The MW0303 (J3) [12]
 - 3) The MW0304 (J4) [10]
 - 4) The MW0302 (J2) [8]
 - 5) The J7 [14]
 - 6) The J5 [13]
 - 7) The J6 [11]
 - 8) The J8 [9]
 - 9) The J9 [7]
 - 10) The J10 [6]
 - 11) The identification plug (P-11) [5].

NOTE: The identification plug will stay attached to the engine.

- (c) Install the protective covers on the electrical connectors and the EEC receptacles.

CAUTION: MAKE SURE THAT YOU USE TWO WRENCHES TO LOOSEN THE TUBE COUPLING NUTS. USE ONE WRENCH TO HOLD THE FITTING AND THE OTHER WRENCH TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

- (d) Disconnect these air tubes from the EEC [1]:
 - 1) The PS3 [20]
- (e) Do these steps to remove the EEC from the fan case:
 - 1) Loosen the bolts [4] that hold the EEC to the fan case brackets.

NOTE: The EEC bonding jumper is connected to the EEC attachment bolt head and will be removed with the EEC.

NOTE: The bolts are captive in the bushings of the EEC.

WARNING: THE EEC WEIGHS 45 POUNDS. BE CAREFUL WHEN YOU REMOVE THE EEC. THE WEIGHT OF THE EEC CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

- 2) Remove the EEC [1].
- (f) Install protective covers on the air tubes and the tube connections of the EEC [1].
- (g) Put a protective cover over the cooling tube opening in the EEC [1].

————— **END OF TASK** —————

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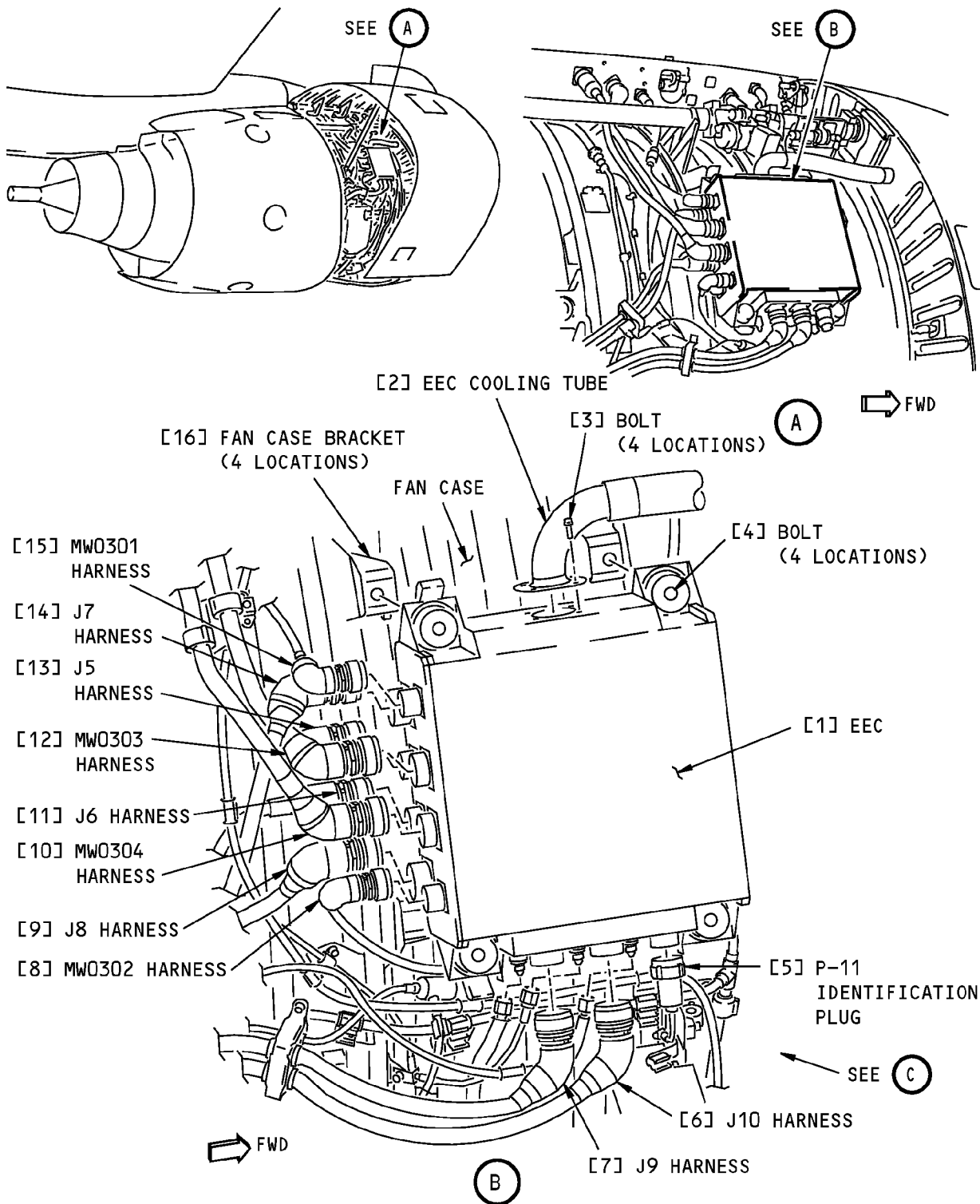
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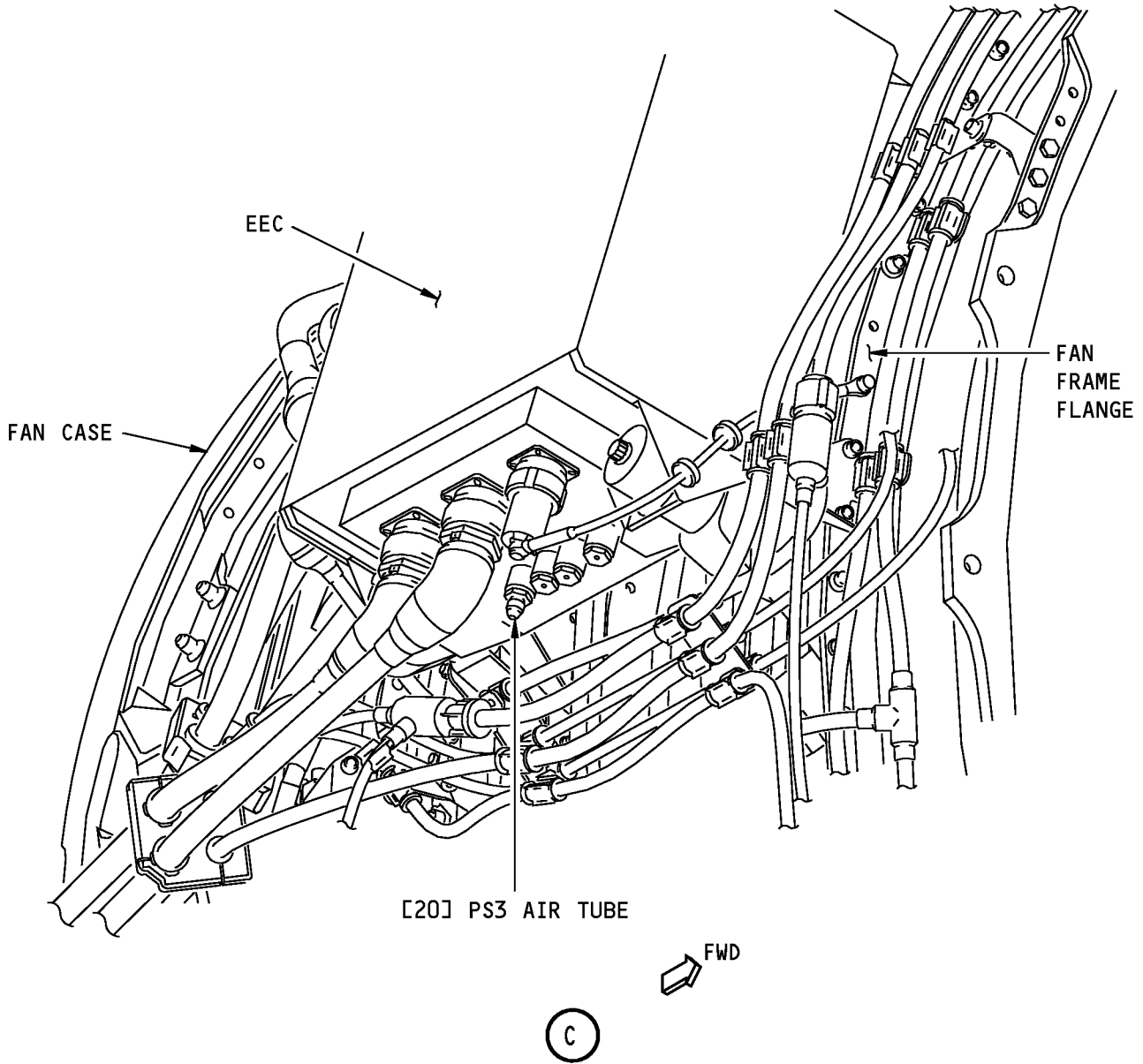


Electronic Engine Control Installation
Figure 401 (Sheet 1 of 2)/73-21-60-990-801-F00

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Electronic Engine Control Installation
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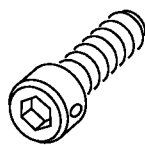
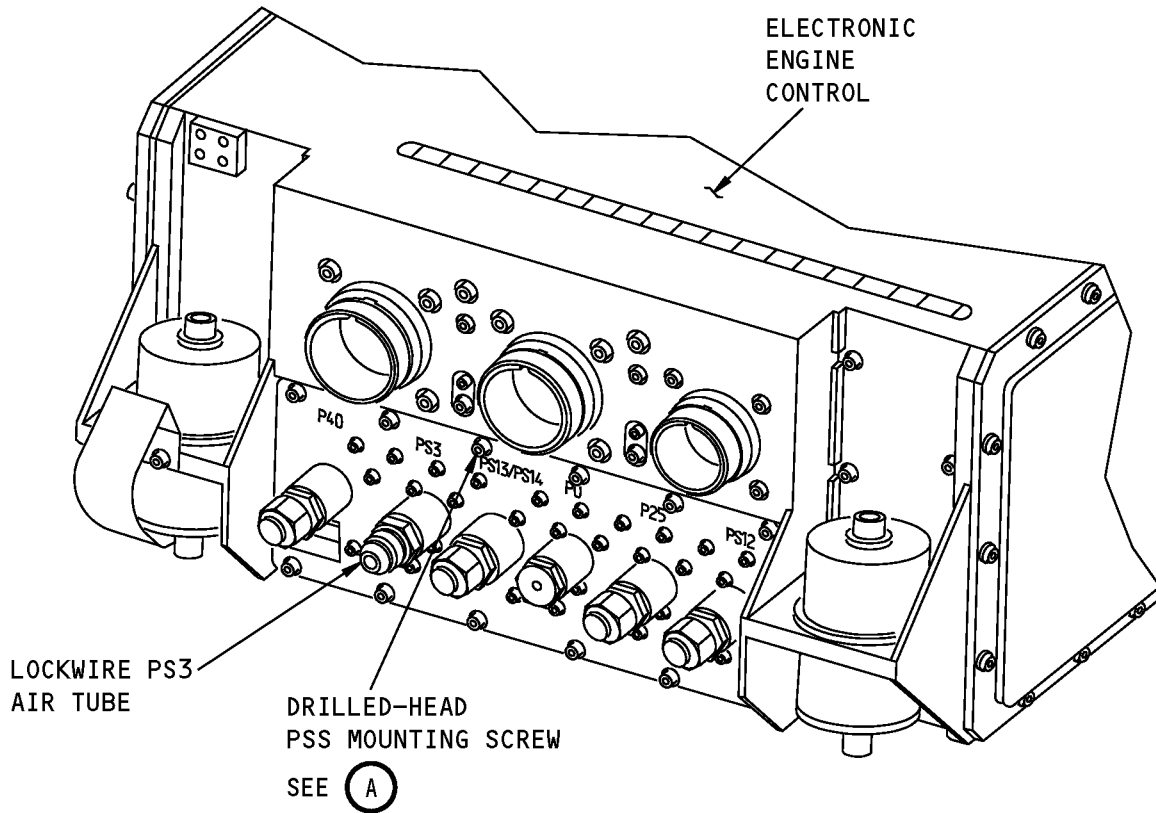
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DRILLED-HEAD PSS MOUNTING SCREW



1219692-00-A

PS3 Air Tube Lockwire Installation
Figure 402/73-21-60-990-805-F01

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TASK 73-21-60-400-801-F00

3. EEC Installation

(Figure 401)

A. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	EEC	73-21-60-01-030	HAP ALL
		73-21-60-01-035	HAP ALL

D. Location Zones

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

E. Procedure

SUBTASK 73-21-60-420-001-F00

(1) Do these steps to install the EEC [1]:

(a) Do these steps to install the EEC on the fan case:

1) Apply grease, D00601 [CP2101] to the threads of the bolts [4].

WARNING: THE EEC WEIGHS 45 POUNDS. BE CAREFUL WHEN YOU INSTALL THE EEC. THE WEIGHT OF THE EEC CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

2) Use the bolts [4] to connect the EEC [1] to the fan case brackets.

a) Tighten the bolts [4] to 190-230 inch-pounds (21.5-26.0 newton-meters).

(b) Remove the protective covers from the air tubes and tube connectors on the EEC [1].

(c) Connect the PS3 [20] air tube to the EEC.

CAUTION: MAKE SURE THAT YOU USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUTS. USE ONE WRENCH TO HOLD THE FITTING AND THE OTHER WRENCH TO TURN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

1) Do these steps to tighten the PS3 [20] air tube coupling:

a) Tighten the PS3 [20] air tube coupling to 270-300 inch-pounds (30.5-33.9 newton-meters).

b) Loosen the PS3 air tube coupling.

c) Retighten the PS3 [20] air tube coupling to 270-300 inch-pounds (30.5-33.9 newton-meters).

d) Loosen the PS3 air tube coupling.

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- e) Retighten the PS3 [20] air tube coupling to 270-300 inch-pounds (30.5-33.9 newton-meters).
- f) ENGINES POST-CFM-SB 73-062;
Install lockwire on the PS3 air tube coupling to the screw on the EEC Figure 402.
- (d) Remove the protective covers from the electrical connectors and the EEC receptacles.
- (e) Connect these electrical harnesses to the EEC [1]:
 - 1) The J8 [9]
 - 2) The J6 [11]
 - 3) The J5 [13]
 - 4) The J7 [14]
 - 5) The MW0302 (J2) [8]
 - 6) The MW0304 (J4) [10]
 - 7) The MW0303 (J3) [12]
 - 8) The MW0301 (J1) [15]
 - 9) The J9 [7]
 - 10) The J10 [6]
 - 11) The identification plug (P-11) [5].

NOTE: The identification plug is attached to the engine.
- 12) Tighten the coupling rings on the electrical connectors with your hand until the electrical connector is correctly seated.
- (f) Connect the EEC cooling tube [2] to the EEC [1]:
 - 1) Remove the protective covers from the connectors for the cooling tube.
 - 2) Apply grease, D00601 [CP2101] to the threads of the bolts [3].
 - 3) Use the four bolts [3] to connect the EEC cooling tube [2] to the EEC.
 - 4) Tighten the four bolts [3] to 33-37 inch-pounds (3.8-4.2 newton-meters).

F. EEC Installation Test

SUBTASK 73-21-60-860-003-F00

- (1) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

SUBTASK 73-21-60-860-004-F00

- (2) For engine 2, do this step:

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Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-60-710-001-F00

- (3) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

SUBTASK 73-21-60-730-002-F00

- (4) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

————— **END OF TASK** —————

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IDENTIFICATION PLUG - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the identification plug
- (2) The installation of the identification plug.

TASK 73-21-61-000-801-F00**2. Identification Plug Removal**

(Figure 401)

A. General

- (1) The engine has one identification plug that is connected to the EEC.
- (2) For the instructions to change the engine thrust rating using the Standard ID plug, refer to CFMI Service Bulletin 72-003 for the selection of the applicable identification plug configuration.
- (3) For the instructions to change the engine thrust rating using the Reconfigurable Hybrid ID plug, refer to CFMI Service Bulletin 72-106 for the selection of the applicable identification plug configuration.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-21-61-840-001-F00

- (1) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

SUBTASK 73-21-61-840-002-F00

- (2) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-61-010-001-F00

- (3) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

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E. Identification Plug Removal

SUBTASK 73-21-61-020-001-F00

(1) Do these steps to remove the identification plug:

- (a) Disconnect the engine assembly [1] (identification plug) from the EEC receptacle [2].
 - 1) Install protective covers on the identification plug and the EEC receptacle.
- (b) Remove the nut [7], the spacer [6], the washer [5], and the bolt [4] that hold the shielding braid [8] to the fan frame flange [3].

NOTE: The nut [7] is the Hi-Lock type. Refer to CFMI SPM 70-43-51/201 to remove the nut.

- 1) Discard the nut [7] and the bolt [4].
 - 2) Keep the washer [5] and spacer [6] for the subsequent installation.
- (c) Remove the identification plug [1].

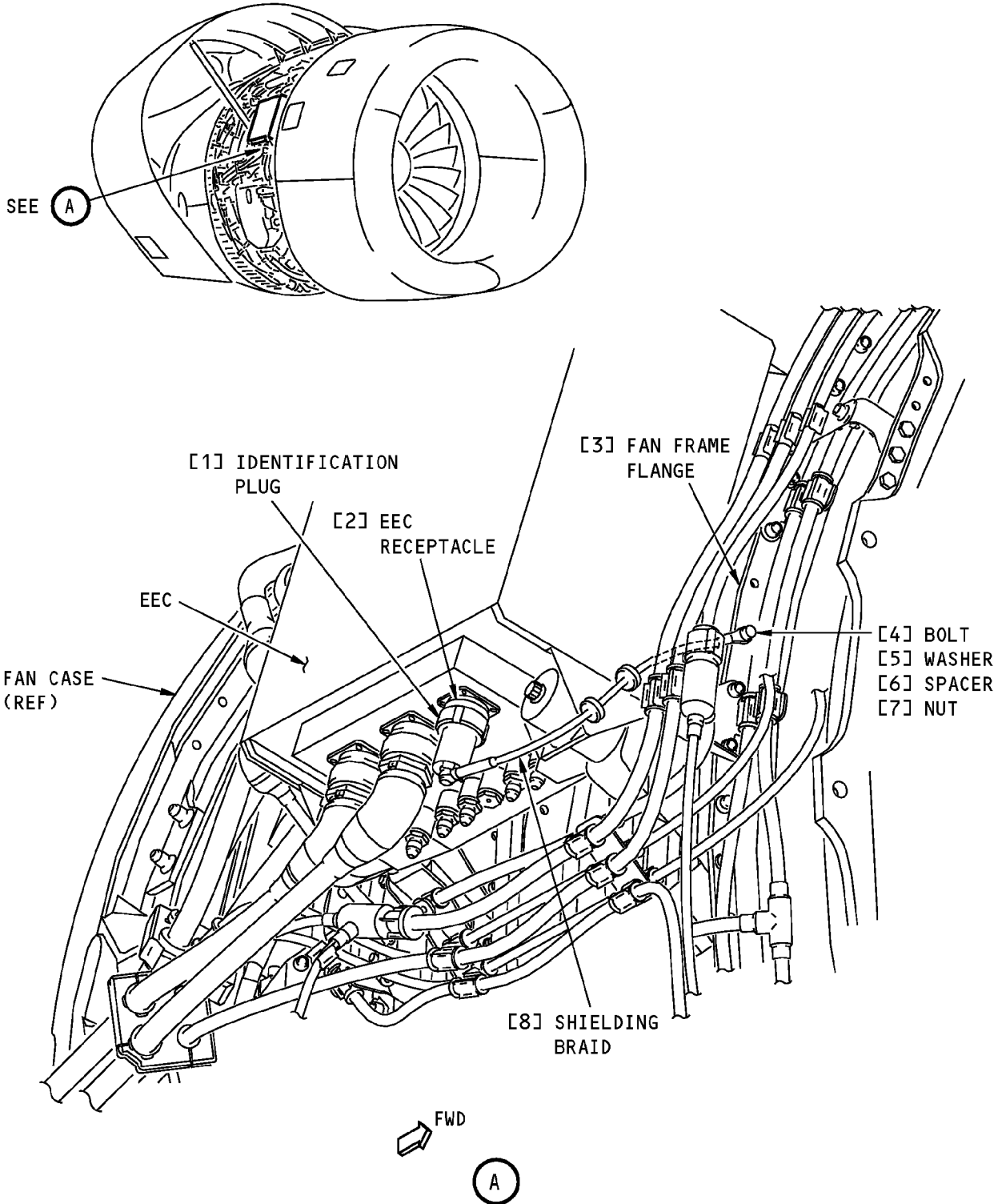
————— **END OF TASK** —————

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Identification Plug Installation
Figure 401/73-21-61-990-801-F00

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TASK 73-21-61-400-801-F00

3. Identification Plug Installation

(Figure 401)

A. General

- (1) For the instructions to change the engine thrust rating, refer to CFMI Service Bulletin 72-003 for the selection of the applicable identification plug configuration.

B. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Engine assembly	Not Specified	

D. Location Zones

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

E. Identification Plug Installation

SUBTASK 73-21-61-420-001-F00

- (1) Do these steps to install the identification plug:
- Connect the engine assembly [1] (identification plug) to the EEC receptacle [2].
 - Use a new bolt [4], the washer [5], the spacer [6] and a new nut [7] to install the shielding braid [8] to the fan frame flange [3].
 - Tighten the nut [7].

NOTE: The nut [7] is the Hi-Lock type. Refer to CFMI SPM 70-43-51/201 to install the nut.

F. Identification Plug Installation Test

SUBTASK 73-21-61-410-002-F00

- (1) Do these steps to prepare for the installation test:
- For engine 1, do this step:
Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

- For engine 2, do this step:
Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

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SUBTASK 73-21-61-720-001-F00

- (2) Do the tests that are listed in the Power Plant Test Reference Table.
(TASK 71-00-00-800-811-F00)

SUBTASK 73-21-61-410-004-F00

- (3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

————— **END OF TASK** —————

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IDENTIFICATION PLUG - ADJUSTMENT/TEST**1. General**

- A. This procedure contains one task for the proper configuration of the programmable inputs into the Identification Connector (Push-Pull design).

TASK 73-21-61-800-801-F00**2. Identification Plug Configuration**

(Figure 501)

A. General

- (1) The engine has one identification plug connected to the EEC.
- (2) For programmable input parameters, push-pull pins are positioned to provide a configuration setup corresponding to a specific engine configuration. The input parameters are given below:
 - (a) The Engine Configuration:
 - 1) The Single Annular Combustor (SAC) without Burner Stage Valve (BSV)
 - 2) The Single Annular Combustor (SAC) with Burner Stage Valve (BSV)
 - 3) The Double Annular Combustor (DAC).
 - 4) The Tech Insertion (/3).
 - (b) The N1 modifier configuration: N1 TRIM level 0 to 7.
NOTE: This parameter is available on the engine nameplate.
 - (c) The PMUX option configuration: available or not available.
 - 1) PMUX engine (4 hoses connected to the EEC) must read "Y"
 - 2) Non-PMUX engine (2 hoses connected to the EEC) must read "N".
 - (d) The spare configuration.
- (3) For the instructions to change the engine thrust rating, refer to CFMI Service Bulletin 72-003 for the selection of the applicable identification plug.

B. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-61-000-801-F00	Identification Plug Removal (P/B 401)
73-21-61-400-801-F00	Identification Plug Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-3936	Tweezers - straight, pointed tips, non-serrated

D. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right

E. Prepare for the procedure.

SUBTASK 73-21-61-020-002-F00

- (1) Do this task: Identification Plug Removal, TASK 73-21-61-000-801-F00.

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F. Programming of the Identification Plug

(Figure 501)

NOTE: To prevent contamination of the electrical contacts inside of the connector, do the procedure in a closed area.

NOTE: The configurations are defined by a specific setup of push-pull contacts. The push-pull pin has two catches corresponding to two contact positions: One in the "Push" position and one in the "Pull" position.

A color band placed on each pin must be fully visible when the pin is in the pull position and fully masked when the pin is in the push position. An intermediate position can cause a bad configuration.

A mechanical stop on the pin limits the travel of the pin.

SUBTASK 73-21-61-860-001-F00

(1) Do these steps to get access to the configurable inputs.

(a) Remove the blanking plug [1] located at the rear of the body [3] of the connector.

NOTE: Removal of the cap located on the rear of the identification connector requires the connector to be installed on its EEC receptacle or onto an antagonist connector receptacle (to be manufactured by the airline).

1) Cut the safety wire securing the body [3] to the blanking cap [1].

2) Unscrew the blanking cap [1] from the body [3] using soft-nose pliers.

(b) Check the O-ring [2] located on the body [3].

1) If damaged, discard it and replace it with a new one.

(c) Pull the pins against their mechanical stop to the "Pull" position.

SUBTASK 73-21-61-860-002-F00

(2) Do these steps to program the combustor configuration:

(a) Locate the applicable push-pull pins (Figure 501)(Refer to View D).

(b) Put the applicable push-pull pins in the position given in the table (Table 501) below using straight point tweezers, STD-3936.

Table 501/73-21-61-993-804-F00

Engine Configuration	Pin No. 20	Pin No. 21	Pin No. 22	Pin No. 28
SAC with BSV	Pull	Pull	Push	Pull
SAC without BSV	Push	Pull	Pull	Pull
DAC	Pull	Push	Pull	Pull
Tech Insertion (/3)	Push	Pull	Push	Push

SUBTASK 73-21-61-860-003-F00

(3) Do these steps to program the N1 modifier configuration (N1 TRIM):

(a) Locate the affected push-pull pins (Figure 501)(Refer to View D).

(b) Put the affected push-pull pins according to the configuration table (Table 502) below using straight point tweezers, STD-3936.

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Table 502/73-21-61-993-805-F00

Trim Level	Pin No. 37	Pin No. 46	Pin No. 47	Pin No. 54
Trim Level = 0	Pull	Pull	Push	Pull
Trim Level = 1	Pull	Pull	Pull	Push
Trim Level = 2	Push	Pull	Pull	Pull
Trim Level = 3	Push	Pull	Push	Push
Trim Level = 4	Pull	Push	Pull	Pull
Trim Level = 5	Pull	Push	Push	Push
Trim Level = 6	Push	Push	Push	Pull
Trim Level = 7	Push	Push	Pull	Push

SUBTASK 73-21-61-860-004-F00

- (4) Do these steps to program the PMUX configuration:
- (a) Locate the affected push-pull pins (Figure 501)(Refer to View D).
 - (b) Put the affected push-pull pins according to the configuration table (Table 503) below using a straight point tweezers, STD-3936.

Table 503/73-21-61-993-806-F00

PMUX Configuration	Pin No. 27
Available	Pull
Not Available	Push

SUBTASK 73-21-61-860-005-F00

- (5) Do these steps to program the SPARE configuration:
- (a) Locate the affected push-pull pins (Figure 501)(Refer to View D).
 - (b) Put the affected push-pull pins according to the configuration table (Table 504) below using a straight point tweezers, STD-3936.

Table 504/73-21-61-993-807-F00

SPARE Configuration	Pin No. 19	Pin No. 30	Pin No. 31	Pin No. 36
OPENED	Pull	Pull	Pull	Pull

SUBTASK 73-21-61-420-002-F00

- (6) Do these steps to close the access of the configurable inputs:

NOTE: The connector is installed on its EEC receptacle or onto an antagonist connector receptacle (to be manufactured by the airline).

- (a) Install the blanking cap [1] at the rear of the body [3] of the connector.
- (b) Screw the blanking cap [1] on the body [3] using a soft-nose pliers.

G. Identification Plug Installation

SUBTASK 73-21-61-420-003-F00

- (1) Do this task: Identification Plug Installation, TASK 73-21-61-400-801-F00.

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SUBTASK 73-21-61-710-001-F00

- (2) Do the test listed in the task to Install the Identification Plug.
- (a) If the test gives an incorrect result, do these steps:
- 1) Note the input parameters fault configuration.
 - 2) Do the blanking cap [1] removal of this procedure.
 - 3) Inspect the affected push-pull pins to make sure that the color band is visible for pins pulled, not visible for pins pushed and according to the determined configuration.
 - 4) If not, pull the pins of the defective configuration against their stop before you do the procedure again.
- (b) If the test gives a correct result, secure the body [3] to the blanking cap [1] of the connector with safety wire.

SUBTASK 73-21-61-410-005-F00

- (3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

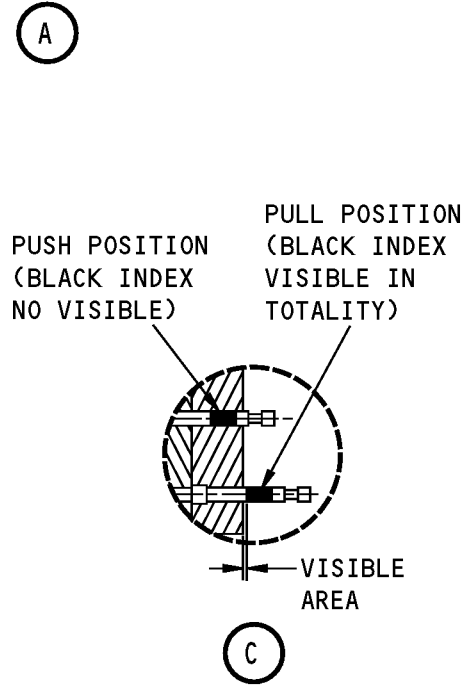
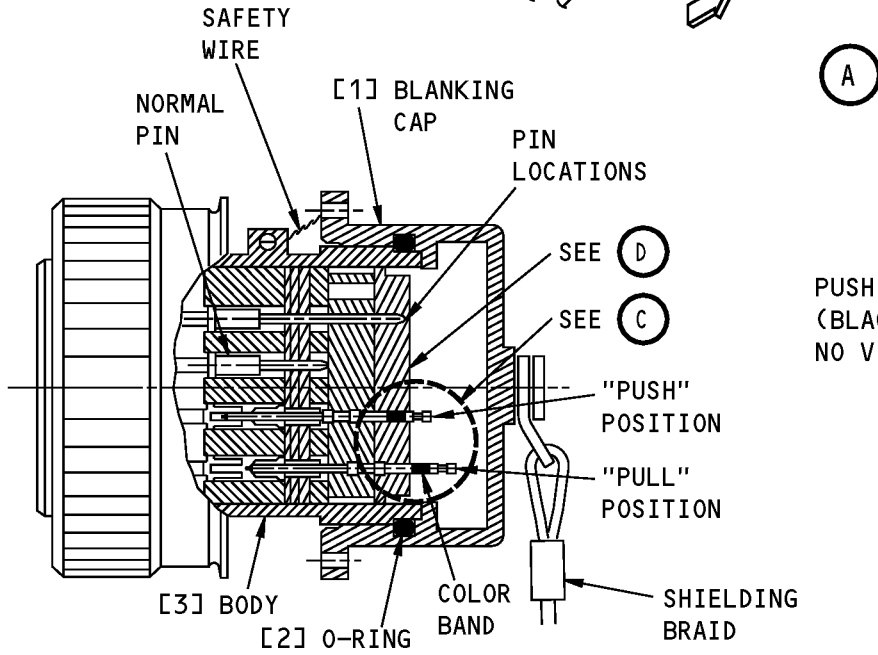
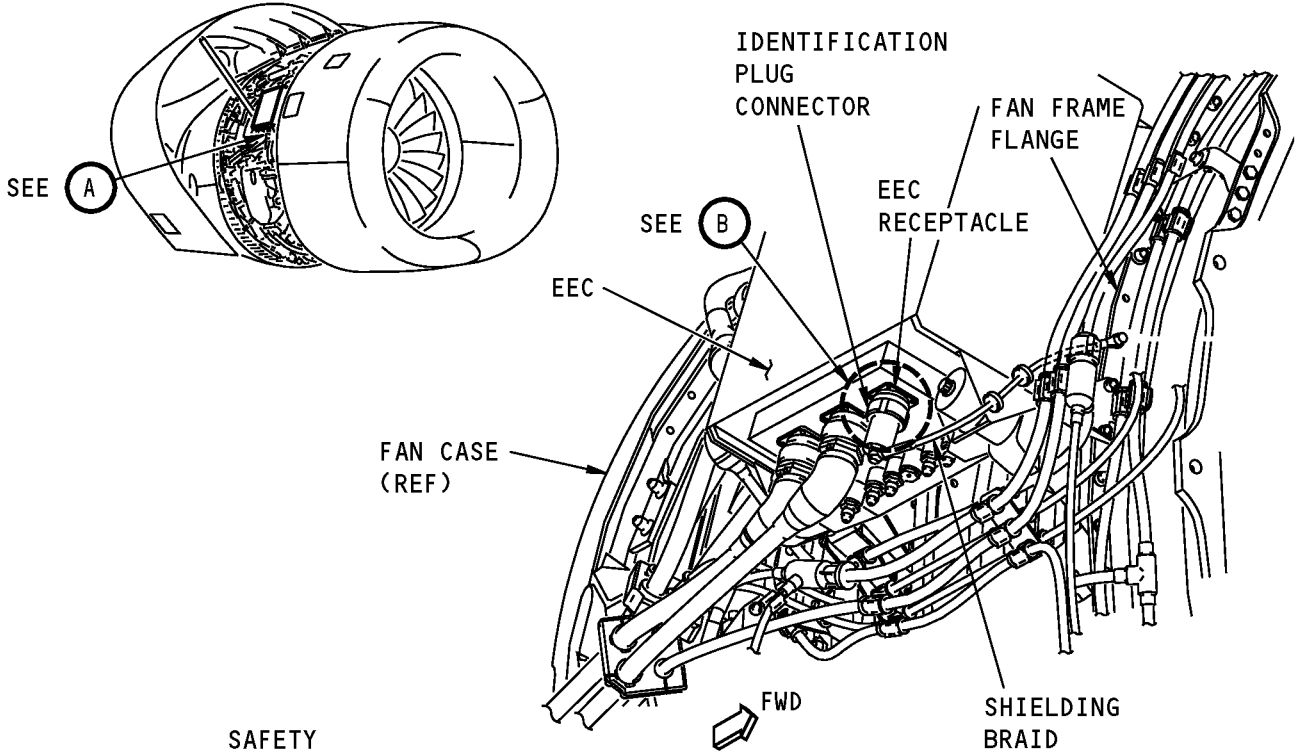
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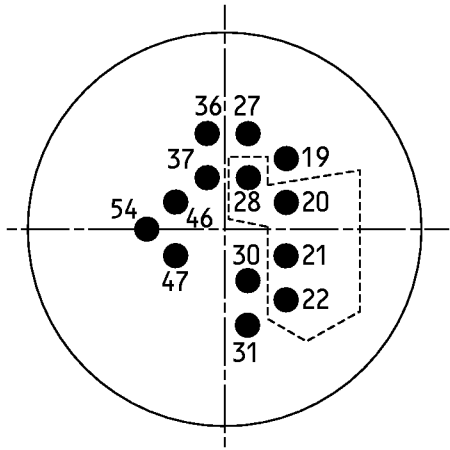
IDENTIFICATION PLUG CONNECTOR

B

Identification Plug Programming
Figure 501 (Sheet 1 of 2)/73-21-61-990-803-F00

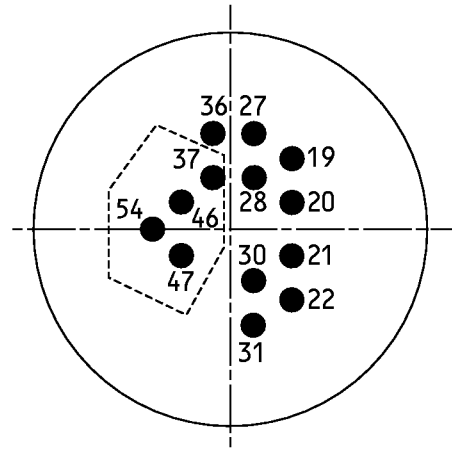
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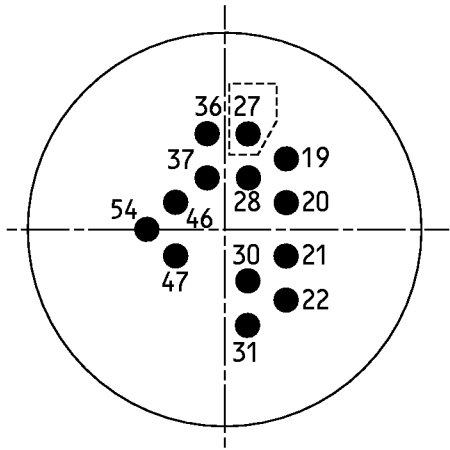
PROGRAMMING OF THE COMBUSTOR CONFIGURATION

(D)



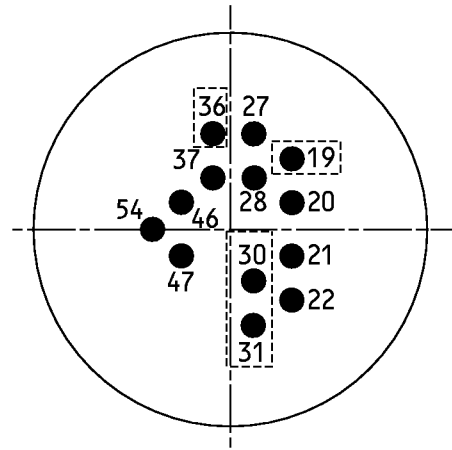
PROGRAMMING OF THE N1 MODIFIER CONFIGURATION (N1 TRIM)

(D)



PROGRAMMING OF THE PMUX OPTION CONFIGURATION

(D)



PROGRAMMING OF THE SPARE CONFIGURATION

(D)

Identification Plug Programming
Figure 501 (Sheet 2 of 2)/73-21-61-990-803-F00

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HPTCC SENSOR - REMOVAL/INSTALLATION**1. General**

- A. This procedure has two tasks:
- (1) The removal of the HPTCC sensor
 - (2) The installation of the HPTCC sensor.

TASK 73-21-70-010-801-F00**2. HPTCC Sensor Removal**

(Figure 401)

A. General

- (1) The HP Turbine Case Temperature (HPTCC) sensor is found on the combustion case at the 4:00 o'clock position.

B. References

Reference	Title
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Removal

SUBTASK 73-21-70-840-001-F00

- (1) For engine 1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

SUBTASK 73-21-70-840-002-F00

- (2) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-70-840-007-F00

- (3) Make sure that the applicable engine start switch is in the OFF position and install a DO-NOT-OPERATE tag.

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SUBTASK 73-21-70-840-003-F00

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DEACTIVATE THE LEADING EDGE, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THIS ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

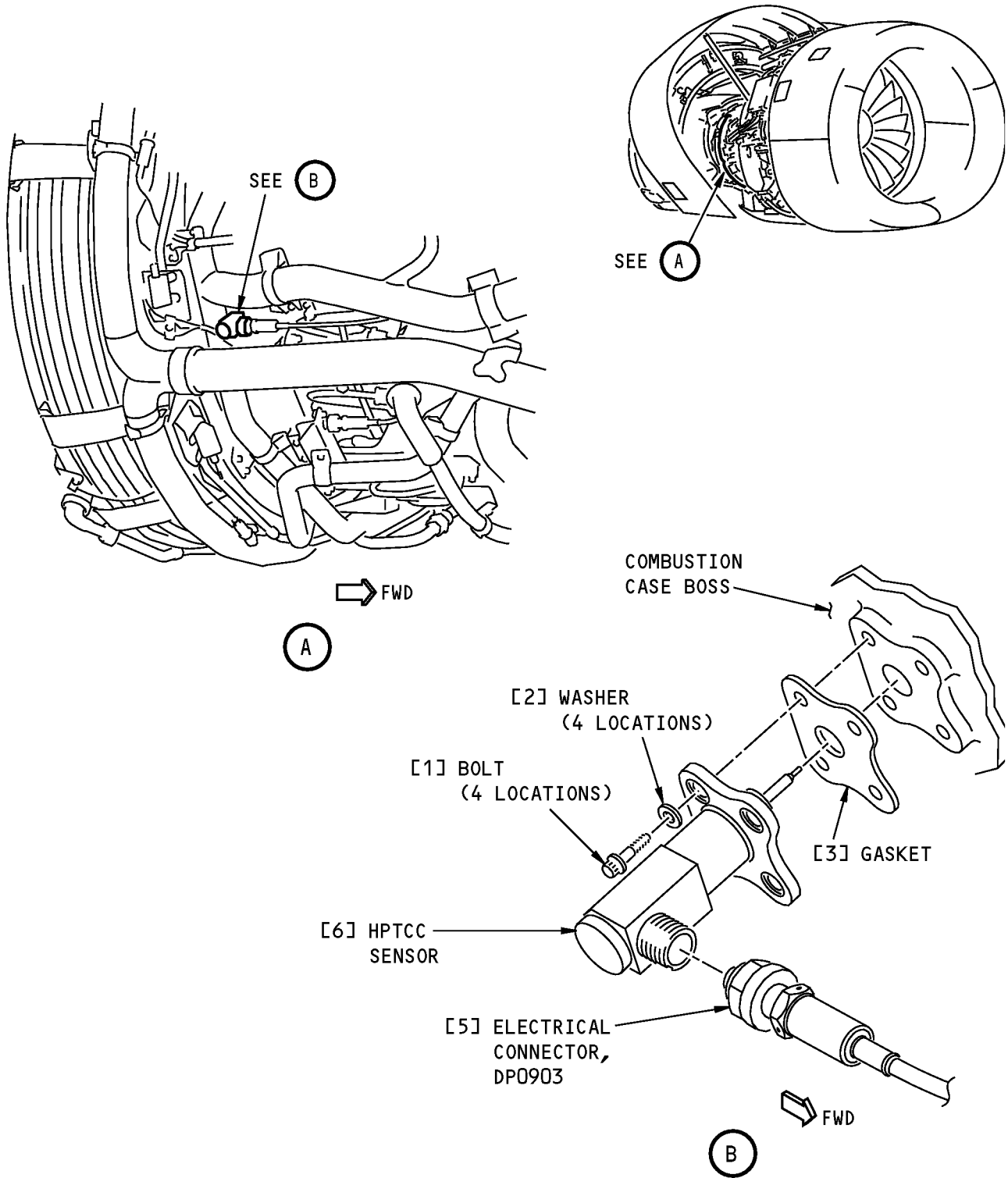
E. HPTCC Sensor Removal

SUBTASK 73-21-70-020-001-F00

- (1) Do these steps to remove the HPTCC sensor:
- (a) Disconnect the electrical connector DP0903 [5] from the HPTCC sensor receptacle.
 - (b) Remove the four bolts [1] and the four washers [2] that hold the HPTCC sensor [6] to the combustion case boss.
 - (c) Remove the HPTCC sensor [6] from the combustion case boss.
 - (d) Remove the gasket [3] from the HPTCC sensor.
 - (e) Visually examine the gasket [3] (TASK 70-30-01-910-802-F00).
 - 1) If the gasket [3] is not in good condition, replace it.
 - 2) If the gasket [3] is in good condition, keep it for the subsequent installation.
 - (f) Put a protective cover or non-adhesive (non-residue) tape on the combustion case boss.

————— **END OF TASK** —————

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HP Turbine Case Temperature (HPTCC) Sensor Installation
Figure 401/73-21-70-990-801-F00

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TASK 73-21-70-400-801-F00

3. HPTCC Sensor Installation

(Figure 401)

A. References

Reference	Title
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Gasket	73-21-70-01-020	HAP ALL
6	Sensor	73-21-70-01-015	HAP 001-013, 015-026, 028-040, 042

D. Location Zones

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

E. HPTCC Sensor Installation

SUBTASK 73-21-70-020-002-F00

(1) Do these steps to install the HPTCC sensor:

- (a) Remove the protective covers or tape from the combustion case boss.
- (b) Install the gasket [3] on the HPTCC sensor [6].
- (c) Install the HPTCC sensor [6] on the combustion case boss.
 - 1) Make sure that the HPTCC sensor electrical connector points in the forward direction.
- (d) Lubricate the threads of the bolts [1] with grease, D00601 [CP2101].
- (e) Install the four bolts [1] and the four washers [2] to the HPTCC sensor [6].
 - 1) Tighten the bolts [1] to 62-68 pound-inches (7.0-7.7 Newton meters).
- (f) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the bolts [1].
- (g) Connect the DP0903 electrical connector [5] to the HPTCC sensor receptacle.
- (h) Tighten the DP0903 electrical connector to 168-186 pound-inches (19-21 Newton meters).
- (i) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the electrical connector.

F. HPTCC Sensor Installation Test

SUBTASK 73-21-70-840-004-F00

(1) For engine 1, do this step:

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Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A

SUBTASK 73-21-70-840-005-F00

(2) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

SUBTASK 73-21-70-840-008-F00

(3) Remove the DO-NOT-OPERATE tag from the engine start switch.

SUBTASK 73-21-70-720-001-F00

(4) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

SUBTASK 73-21-70-840-006-F00

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

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

————— **END OF TASK** —————

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FUEL FLOW TRANSMITTER - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel flow transmitter
- (2) The installation of the fuel flow transmitter.

TASK 73-31-01-000-801-F00

2. Fuel Flow Transmitter Removal

(Figure 401)

A. General

- (1) The fuel flow transmitter is on the left side of the fan case at the 10:00 o'clock position.
- (2) This procedure will refer to the Fuel Flow Transmitter as the FFT.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Location Zones

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

F. Prepare for the Procedure

SUBTASK 73-31-01-840-001-F00

- (1) Do these steps to isolate the Fuel Flow Transmitter (FFT):
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

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- (c) Make sure the FUEL VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or when it does not agree with the commanded position; 2) dim when the valve is closed; or, 3) off when the valve is open.

- (d) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.
- 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

SUBTASK 73-31-01-010-001-F00

- (2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 73-31-01-680-001-F00

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

- (3) Do these steps to drain the fuel from the system:
- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump.
 - (b) Remove the drain plug from the fuel filter cover.
 - 1) Let the fuel drain into the container.
 - (c) Remove the O-ring from the drain plug.
 - 1) Discard the O-ring.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (d) Lubricate a new O-ring with oil, D00623 [CP5066].
- (e) Install the new O-ring on the drain plug.
- (f) Lubricate the threads of the drain plug with oil, D00623 [CP5066].
- (g) Install the drain plug in the fuel filter cover.
 - 1) Tighten the drain plug to 45-55 pound-inches (5-6.2 Newton meters).
 - 2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug.

G. Fuel Flow Transmitter Removal (FFT)

SUBTASK 73-31-01-020-001-F00

- (1) Do these steps to disconnect the FFT [4]:
- (a) Disconnect the electrical connector DP0502 [6] from the FFT receptacle [5].
 - 1) Put protective covers on the connector and receptacle of the FFT [4].
 - (b) Do these steps to disconnect the fuel inlet tube [14] from the forward end of the FFT:
 - 1) Remove the bolt [15] to disconnect the loop clamp [16] from the bracket [11].
 - 2) Remove the four bolts (1) that hold the fuel inlet tube [14] to the bracket [2] and the FFT [4].
 - 3) Pull the fuel inlet tube [14] away from the FFT [4].
 - (c) Put a protective cover on the ends of the fuel inlet tube [14].

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SUBTASK 73-31-01-020-002-F00

(2) Do these steps to remove the FFT [4]:

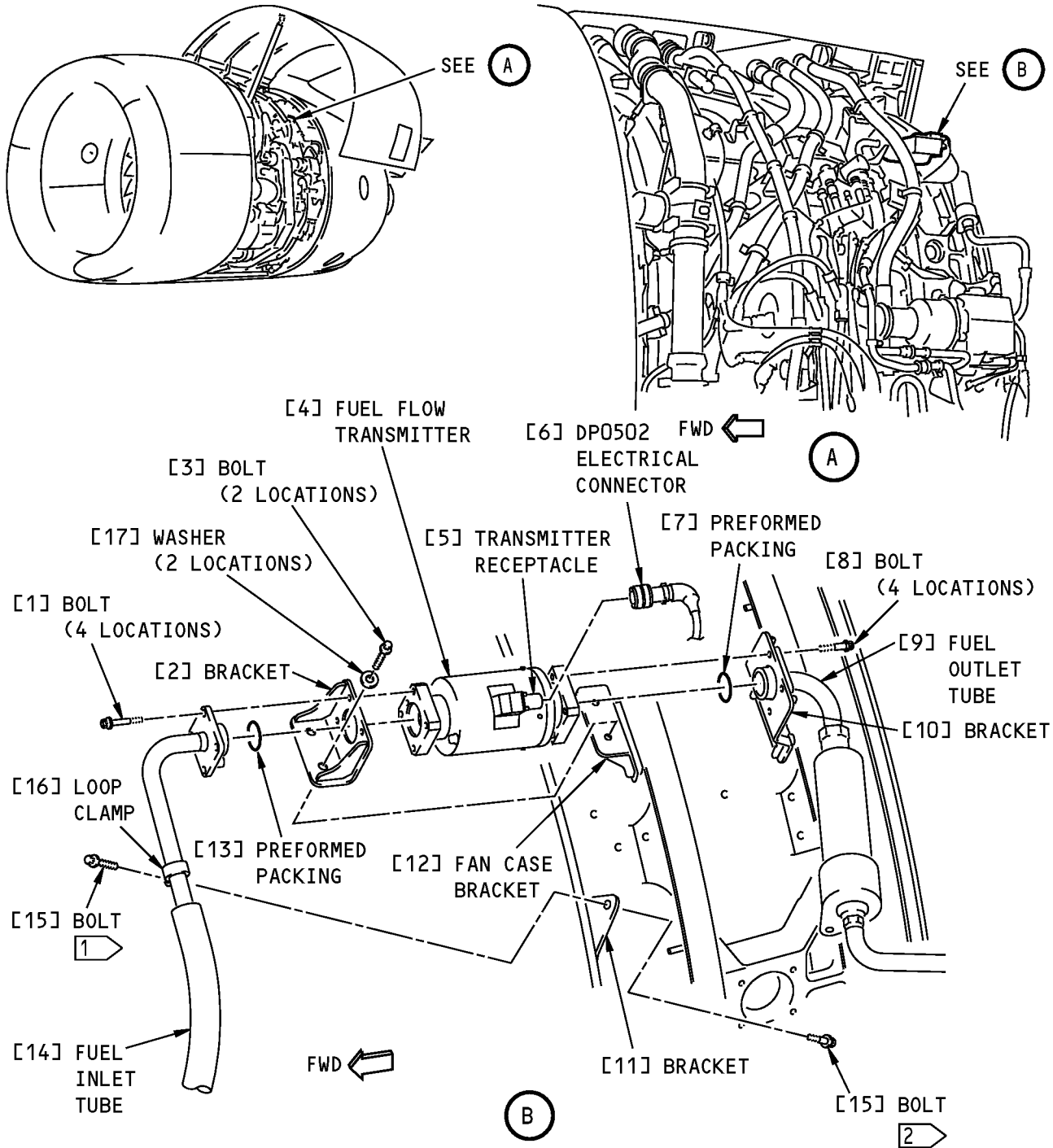
- (a) Remove the two bolts (3) and washers (17) that hold the bracket [2] to the fan case bracket [12].
 - 1) Remove the bracket [2].
- (b) Remove the four bolts [8] that hold the fuel outlet tube [9] to the bracket [10] and the FFT [4].
- (c) Remove the flowmeter [4] (FFT) from the fuel outlet tube [9].
- (d) Remove the preformed packing [7] and packing [13] from the ends of the fuel tubes.
 - 1) Discard the preformed packings [7] and [13].
- (e) Put protective covers on the ends of the fuel outlet tube [9], and the FFT.

————— **END OF TASK** —————

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1 PRE-CFMI-SB 72-200

2 POST-CFMI-SB 72-200

GMM-1129496-00-A

Fuel Flow Transmitter Installation
Figure 401/73-31-01-990-801-F00

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TASK 73-31-01-400-801-F00

3. Fuel Flow Transmitter Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Flowmeter	73-31-01-01-020	HAP ALL
7	Packing	73-31-01-01-015	HAP ALL
13	Packing	73-31-01-01-015	HAP ALL

D. Location Zones

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

E. Prepare for the Procedure

SUBTASK 73-31-01-420-001-F00

(1) Lubricate these items:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate the new preformed packings [7] and [13] with oil, D00623 [CP5066].
- (b) Apply grease, D00601 [CP2101] to the threads of the bolts [1], [3], [8], and [15].

F. Fuel Flow Transmitter (FFT) Installation

SUBTASK 73-31-01-420-002-F00

(1) Do these steps to loosely install the bracket [2]:

NOTE: To make sure that you can align the bracket, do not tighten the bolts.

- (a) Use the two bolts [3] and washers [17] to install the bracket [2] on the fan case bracket [12].
 - 1) Do not tighten the bolts at this time.

SUBTASK 73-31-01-420-003-F00

(2) Do these steps to connect the FFT to the fuel outlet tube [9]:

- (a) Remove the protective cover from the fuel outlet tube [9].
- (b) Install the preformed packing [7] on the end of the fuel outlet tube [9].

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- (c) Remove the protective covers from the FFT [4].
- (d) Put the flowmeter [4] (FFT) in its correct position.
 - 1) Make sure that the fuel flow arrow on the FFT points aft.
 - 2) Make sure that the pin in the aft flange of the FFT goes into the hole in the bracket [10].
 - 3) Make sure that the aft end of the FFT [4] is correctly engaged on the fuel outlet tube [9].
 - 4) Install the four bolts [8] to connect the FFT [4] to the bracket [10] and the fuel outlet tube [9].
 - a) Tighten the bolts [8] to 98-110 pound-inches (11-12.5 Newton meters).

SUBTASK 73-31-01-420-004-F00

- (3) Do these steps to connect the FFT [4] to the fuel inlet tube [14]:
 - (a) Remove the protective covers from the fuel inlet tube [14].
 - (b) Install the new preformed packing [13] on the end of the fuel inlet tube [14].
 - (c) Make sure that the FFT [4] is in its correct position:
 - 1) Make sure that the bracket [2] is correctly aligned with the FFT [4] and the fuel inlet tube [14].
 - 2) Make sure that the forward of the FFT [4] is correctly engaged to the fuel inlet tube [14].
 - (d) Put the fuel inlet tube [14] in its correct position at the FFT [4].
 - (e) Install the four bolts [1] to connect FFT [4] to the fuel inlet tube [14] and the bracket [2].
 - 1) Tighten the bolts [1] to 98-110 pound-inches (11-12.5 Newton meters).
 - (f) Tighten the bolts [3] that hold the bracket [2] to the fan case bracket [11] to 98-110 pound-inches (11-12.5 Newton meters).
 - (g) Install the bolt [15] to connect the loop clamp [16] to the bracket [11].
 - 1) Tighten the bolt [15] to 98-110 pound-inches (11-12.5 Newton meters).
 - (h) Remove the protective covers from the electrical connector and the receptacle of the FFT [4].
 - (i) Connect the electrical connector DP0502 [6] to the FFT receptacle [5].

G. Put the Airplane in a Serviceable Condition

SUBTASK 73-31-01-840-003-F00

- (1) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

H. Fuel Flow Transmitter Installation Test

SUBTASK 73-31-01-730-001-F00

- (1) Do these steps for the FFT installation test:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.
 - (b) Do the tests that show in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00):

————— END OF TASK —————

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FUEL FILTER DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION**1. General**

A. This procedure has two tasks:

- (1) The removal of the fuel filter differential pressure switch
- (2) The installation of the fuel filter differential pressure switch.

TASK 73-34-01-000-801-F00**2. Fuel Filter Differential Pressure Switch Removal**

(Figure 401)

A. General

- (1) The fuel filter differential pressure switch (referred to as the switch) is on the fuel pump fuel filter housing.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Location Zones

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

E. Prepare for the Removal

SUBTASK 73-34-01-840-001-F00

- (1) Do these steps to isolate the fuel from the fuel pump:
 - (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
 - (b) Make sure the engine start lever is in the CUTOFF position.
 - 1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.
 - (c) Make sure the ENG VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or it does not agree with the commanded position; 2) dim when the valve is closed; or, 3) off when the valve is open.
 - (d) Make sure the SPAR VALVE CLOSED light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the spar valve has three positions: 1) bright when the valve is in transition or it does not agree with the commanded position; 2) dim when the valve is closed; or, 3) off when the valve is open.
 - (e) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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- 1) Make sure that the BAT switch on panel P5-13 is set to OFF and install a DO-NOT-OPERATE tag.

SUBTASK 73-34-01-840-002-F00

- (2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

F. Fuel Filter Differential Pressure Switch Removal

SUBTASK 73-34-01-680-001-F00

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

- (1) Do these steps to drain the fuel:

- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump package.
- (b) Remove the drain plug [10] from the fuel filter cover [8].
- (c) Let the fuel drain in the container.
- (d) Remove the O-ring [9] from the drain plug [10].
 - 1) Discard the O-ring [9].

SUBTASK 73-34-01-020-001-F00

- (2) Do these steps to remove the switch [3]:

- (a) Disconnect the electrical connector DP0803 [5] from the switch receptacle.
 - 1) Install protective covers on the electrical connector [5] and the switch receptacle.
- (b) Remove the two bolts [6] and the two washers [7] that hold the switch [3] to the fuel filter housing.
- (c) Remove the switch [3].
- (d) Put a protective cover on the fuel filter housing.
- (e) Remove the O-ring [1] and O-ring [2] from the switch [3].
 - 1) Discard the O-rings.
- (f) Put a protective cover on the probe of the switch.

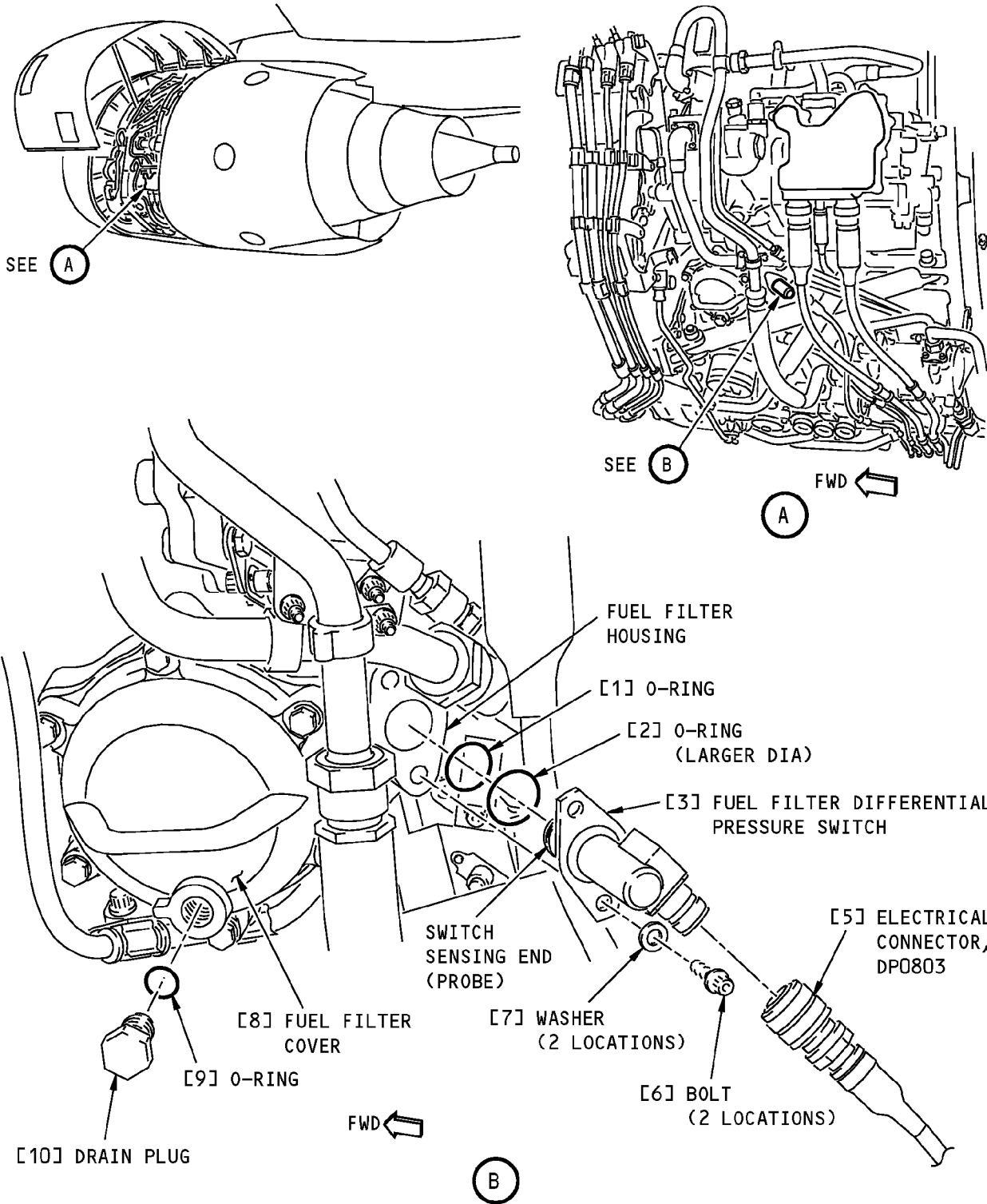
————— **END OF TASK** —————

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Fuel Filter Differential Pressure Switch Installation
Figure 401/73-34-01-990-801-F00

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TASK 73-34-01-400-801-F00

3. Fuel Filter Differential Pressure Switch Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

B. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	O-ring	73-34-01-01-025	HAP ALL
2	O-ring	73-34-01-01-020	HAP ALL
9	O-ring	73-11-01-01-065	HAP ALL
10	Plug	73-11-01-01-060	HAP ALL

D. Location Zones

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

E. Fuel Filter Differential Pressure Switch Installation

SUBTASK 73-34-01-840-003-F00

(1) Prepare for the installation:

- (a) Lubricate the threads of the two bolts [6] with grease, D00601 [CP2101].
- (b) Remove the protective cover from the probe of the fuel filter differential pressure switch [3].
- (c) Do these steps to install the O-ring [2] and the O-ring [1] on the switch [3]:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- 1) Lubricate the two O-rings with oil, D00623 [CP5066].
- 2) Install O-ring [2].

NOTE: The two O-rings do not have the same diameter. Install the larger diameter O-ring first.

- 3) Install O-ring [1].

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- (d) Remove the protective cover from the fuel filter housing.

SUBTASK 73-34-01-420-001-F00

- (2) Do these steps to install the switch [3] on the fuel filter housing:

- (a) Put the switch [3] in its correct position on the fuel filter housing.
- (b) Install the two bolts [6] and the two washers [7] that hold the switch [3] to the fuel filter housing.
- 1) Tighten the two bolts [6] to 87.5-88.5 pound-inches (9.5-10.5 Newton meters).
- (c) Remove the protective covers from the electrical connector [5] and the switch receptacle.
- (d) Connect the electrical connector DP0803 [5] to the switch receptacle.

SUBTASK 73-34-01-420-002-F00

- (3) Do these steps to install the drain plug on the fuel filter cover:

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

- (a) Lubricate a new O-ring [9] with oil, D00623 [CP5066].
- (b) Install the O-ring [9] in the groove of the drain plug [10].
- (c) Lubricate the threads of the drain plug [10] with oil, D00623 [CP5066].
- (d) Install the drain plug [10] on the fuel filter cover [8].
- 1) Tighten the drain plug to 45-55 pound-inches (5.0-6.2 Newton meters).
- (e) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] on the drain plug.

F. Fuel Filter Differential Pressure Switch Installation Test

SUBTASK 73-34-01-840-004-F00

- (1) Do these steps to prepare for the switch installation test:

- (a) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.
- 1) Remove the DO-NOT-OPERATE tag from the BAT switch on panel P5-13.
- (b) For engine 1, do this step:
- Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

- (c) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

- (d) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

SUBTASK 73-34-01-720-001-F00

- (2) Do the switch installation test:

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- (a) Put the engine Start Switch in the CON position.
- (b) Make sure that the FILTER BYPASS light does not show on the Fuel Panel, P5.
- (c) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

- (d) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

- (e) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00):

————— **END OF TASK** —————

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