CHAPTER

71

POWER PLANT

(GE90-100 SERIES ENGINES)

777-200/300
AIRCRAFT MAINTENANCE MANUAL

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POWER PLANT

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412	Sep 05/2017	
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414	May 05/2017	
415	May 05/2017	
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417	Sep 05/2017	
418	Sep 05/2017	
419	Sep 05/2017	
420	BLANK	
71-12-01		
401	Sep 05/2017	
402	Sep 05/2017	
403	Sep 05/2017	
404	Sep 05/2017	
405	Jan 05/2018	
406	Sep 05/2017	
407	Sep 05/2017	
408	BLANK	
71-12-02		
401	Jan 05/2017	
402	Sep 05/2017	
403	Sep 05/2017	
404	Sep 05/2017	
405	Sep 05/2017	
406	Sep 05/2017	
407	Sep 05/2017	
408	Sep 05/2017	
409	Sep 05/2017	
410	Sep 05/2017	
71-12-03		
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416	Sep 05/2017	
417	Sep 05/2017	
418	BLANK	
71-12-03		
601	Jan 05/2016	
602	Sep 05/2017	
603	Sep 05/2017	
604	Sep 05/2017	
605	Sep 05/2017	
606	Sep 05/2017	
607	Sep 05/2017	
608	Sep 05/2017	
609	Sep 05/2017	
610	BLANK	
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408	Sep 05/2017	
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410	BLANK	
71-12-06		
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404	Sep 05/2017	
405	Jul 25/2018	
406	Jul 25/2018	
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602	Jan 05/2018	
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606	May 05/2018	
607	Jan 05/2018	
608	Jan 05/2018	
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610	Jan 05/2018	
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411	Sep 05/2017	
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414	Sep 05/2016	
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416	Sep 05/2017	
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418	Sep 05/2016	
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Engine Automatic Start TASK 71-00-00-800-805-H01			255	ARO ALL
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Preservation of An Installed Engine for 10 Days (Engine On-Wing) TASK 71-00-03-600-802-H01			202	ARO ALL
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Preservation of An Installed Engine for not more than Three Months (Engine On-Wing) TASK 71-00-03-600-803-H01			205	ARO ALL
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Close the Fan Cowl Panel (Power Method) TASK 71-11-04-400-802-H01			209	ARO ALL
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Fan Cowl Upper Edge General Visual Inspection TASK 71-11-04-200-801-H00			601	ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4
Fan Cowl Bag Side General Visual Inspection TASK 71-11-04-200-802-H00			604	ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076
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FAN COWL PANELS - ENGINE FAN COWL UPPER EDGE AND INNER SURFACE 3M 5004 TAPE REPAIR	71-11-04		801	ARO ALL
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Fan Cowl Upper Edge Tape Application TASK 71-11-04-390-801-H00			810	ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4
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Fan Cowl Latch Keeper Installation TASK 71-11-05-400-802-H01			410	ARO ALL
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OIL TANK ACCESS DOOR - REMOVAL/INSTALLATION	71-11-10		401	ARO ALL
Oil Tank Access Door Removal TASK 71-11-10-000-801-H01			401	ARO ALL
Oil Tank Access Door Installation TASK 71-11-10-400-801-H01			403	ARO ALL
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PDOS PUMP FILTER ELEMENT - REMOVAL/INSTALLATION	71-12-05		401	ARO ALL
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POWER PLANT - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Engine ground safety precautions

(2) Engine operation limits

(3) Engine operation preparation

(4) Engine start selection

(5) Engine automatic start

(6) Engine manual start

(7) Engine start (manual override of the SAV)

(8) Engine cross bleed start

(9) Usual engine stop

(10) Emergency engine stop

(11) Engine dry motoring

(12) Engine wet motoring

(13) Nacelle/strut overheat warning.

(14) Engine isolation - deactivation

(15) Engine isolation - activation.

TASK 71-00-00-800-801-H01

2. Engine Ground Safety Precautions

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205, Figure 206 and Figure 207)

A. General

(1) You must be very careful when you operate the engine. Make sure that you follow the instructions to prevent injury to persons and damage to other airplanes, equipment or structures. The engine suction can pull a person or loose material into the air inlet. The engine exhaust is very hot and moves at high speeds. The fan air is very strong and can move persons or material a long distance. When you operate the thrust reverser, the fan air goes to the front of the engine.

B. References

Reference	Title
71-00-00-200-808-H01	Engine Exposure to Fire and Extinguishing Agents Inspection (P/B 601)

C. Tools/Equipment

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

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Reference	Description
COM-1616	Meter - Sound Level Part #: 1565-9911 Supplier: 088V6 Part #: CEL-240/K1 Supplier: 01RN5 Part #: SE-402-AC3 Supplier: 1QDV5 Opt Part #: 2100-10 Supplier: 90435 Opt Part #: 2400-10 Supplier: 90435 Opt Part #: CEL-254/K1 Supplier: 01RN5

D. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

E. The Air Inlet

SUBTASK 71-00-00-800-001-H01

WARNING STAY AWAY FROM THE ENGINE INLET, AND THE EXHAUST AREAS WHILE THE ENGINE OPERATES. INJURIES TO PERSONNEL CAN OCCUR.

(1) There is a strong air suction in the area where the air goes into the engine. This suction is very strong when the engine operates at takeoff power.

SUBTASK 71-00-00-160-001-H01

WARNING REMOVE ALL TOOLS AND OTHER OBJECTS FROM THE INLET COWL, STRUT, OR ENGINE. LOOSE OBJECTS WILL COME THROUGH THE ENGINE AT HIGH SPEED WHEN IT OPERATES. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(2) Clean the area in front of the air inlet before you operate the engine. You must remove all loose objects.

F. Engine Exhaust and Fan Discharge

SUBTASK 71-00-00-800-002-H01

WARNING STAY AWAY FROM THE ENGINE INLET, AND THE EXHAUST AREAS WHILE THE ENGINE OPERATES. INJURIES TO PERSONNEL CAN OCCUR.

(1) Jet Velocity

(a) The engine exhaust and fan air is at high speed when you operate the engine. The air blown behind the engine can move loose stones and other material a long distance. The figures in the task show the dangerous areas around the engine at three thrust levels. These levels are the minimum idle thrust, the breakaway thrust, and the takeoff thrust levels.

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SUBTASK 71-00-00-800-003-H01

WARNING KEEP ALL PERSONNEL, EQUIPMENT, AND FLAMMABLE MATERIALS AWAY FROM BEHIND THE ENGINE WHEN YOU START THE ENGINE. THERE CAN BE FUEL IN THE COMBUSTION CHAMBER. THIS FUEL CAN BURN IN THE EXHAUST NOZZLE. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT GO IN THE PATH OF THE EXHAUST WHEN THE ENGINE OPERATES AT IDLE OR HIGHER POWER. THE EXHAUST GAS IS HOT AND INJURY TO PERSONS CAN OCCUR.

(2) Jet Exhaust Temperature

(a) The engine exhaust temperature is very hot at idle and takeoff power. The high-temperature zone extends a long distance behind the engine. The exhaust temperature is sufficient to cause damage to the asphalt pavement. Concrete is the recommended material for the area behind the engines.

SUBTASK 71-00-00-800-004-H01

WARNING DO NOT GO IN THE EXHAUST AREA WHEN YOU START THE ENGINE OR WHILE THE ENGINE OPERATES. THE EXHAUST GASES ARE BAD TO BREATHE AND CAN GET IN YOUR EYES. IF YOU BREATHE THE GASES OR GET THE GASES IN YOUR EYES (IN AREAS WHERE THERE IS A HIGH CONCENTRATION), INJURY CAN OCCUR.

(3) Toxicity

(a) Tests show that there is a small concentration of carbon monoxide in the jet exhaust. The exhaust gas is dangerous to breathe and can cause injury to your eyes. Do not breathe the jet exhaust gas.

SUBTASK 71-00-00-800-005-H01

WARNING KEEP ALL PERSONNEL AND EQUIPMENT OUT OF THE FAN AIR PATH WHEN THE THRUST REVERSER OPERATES. FAN AIR COMES OUT TO THE SIDES OF THE ENGINE AND GOES TO THE FRONT. THE FAN AIR IS SUFFICIENT TO MOVE A PERSON OR EQUIPMENT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Thrust Reverser

(a) You can operate the thrust reverser without an engine start. This lets you do a maintenance check of the thrust reverser. When the thrust reverser operates, the fan air blows out to the sides and front of the engine. The hazard areas are shown in the figure for reverse minimum idle power.

G. Engine Ignition System High Voltage

SUBTASK 71-00-00-800-032-H01

WARNING DO NOT TOUCH THE ENGINE IGNITION SYSTEM WHILE THE SYSTEM OPERATES. IGNITION VOLTAGE IS HIGH WHICH MAKES IT DANGEROUS. ELECTRICAL SHOCK CAN KILL, OR CAUSE INJURIES TO PERSONNEL.

(1) The engine ignition system supplies high energy and high voltage to start the engine. An electrical shock from this system can kill or cause injury to persons.

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SUBTASK 71-00-00-800-006-H01

(2) You can operate the ignition system without an engine start. This lets you do a maintenance check of the ignition system.

H. Hot Engine Parts

SUBTASK 71-00-00-800-007-H01

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

(1) After you operate the engine, the engine parts will be very hot. Some areas of the engine can be hotter than others. These areas include the combustion module, the turbines and the exhaust areas.

I. Fuel and Oil

SUBTASK 71-00-00-800-008-H01

WARNING DO NOT GET FUEL OR OIL ON YOUR SKIN. REMOVE THE FUEL OR OIL FROM YOUR SKIN IMMEDIATELY. IF YOU LET IT STAY ON YOUR SKIN, IT CAN CAUSE INJURIES TO YOUR SKIN.

(1) Engine fuel and oil can make your skin dry if it stays on your skin for a long time. If the fuel or oil touches your skin, remove the fuel or oil from your skin quickly.

J. Pressurized Oil System

SUBTASK 71-00-00-800-009-H01

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY FIVE MINUTES AFTER AN ENGINE IS STOPPED. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

(1) There is pressure in the engine oil tank when the engine operates. The oil pressure slowly decreases after you stop the engine. Wait a minimum of five minutes after you stop the engine before you remove the cap from the oil tank.

K. Deicing Fluid

SUBTASK 71-00-00-660-001-H01

CAUTION DO NOT APPLY DEICING FLUID IN THE ENGINE INLET WHILE THE ENGINE OPERATES. CONTAMINATION OF THE AIRFOILS AND OTHER COMPONENTS WITH DEICING FLUID DECREASES ENGINE PERFORMANCE.

(1) You apply deicing fluid to the airplane to remove and prevent formation of ice on the wings, fuselage and engine nacelles. Make sure you do not apply the deicing fluid into the engine inlet or exhaust.

L. Thrust Lever Movement

SUBTASK 71-00-00-980-001-H01

(1) During normal engine operation, move the thrust levers in a slow and smooth manner.

NOTE: Thrust lever movement that is not slow and smooth will cause the engine performance to deteriorate.

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M. Wind Direction

SUBTASK 71-00-00-560-001-H01

(1) Wind direction and speed can cause stability problems for the engine.

SUBTASK 71-00-00-560-002-H01

(2) Position the airplane to limit the amount of crosswind into the engine inlet. If there is a crosswind, obey the operational limitations for the wind velocity.

N. Engine Noise

SUBTASK 71-00-00-860-002-H01

WARNING MAKE SURE ALL PERSONS USE THE APPROVED SAFETY EQUIPMENT FOR THEIR EARS WHEN THEY ARE NEAR NOISE THAT IS MORE THAN 84 DB. THIS WILL HELP PREVENT INJURY TO PERSONS.

(1) The jet engines make sufficient noise to cause damage to your ears.

(a) Figures for the noise graph are in the task.

(b) Excessive noise can damage your ears.

(c) Exposure to high quantities of noise for a short time, can cause temporary damage to your ears, and your ears can become less sensitive to hear sound.

(d) Exposure to high quantities of noise for a long time can cause permanent damage to your ears, and you can lose your hearing.

(e) Exposure to very high quantities of noise for a short time can cause permanent damage to your ears, and you can lose your hearing.

(f) When you are near an engine in operation, always use ear protection to decrease your exposure to engine noise.

1) A cup-type ear protection is recommended.

SUBTASK 71-00-00-869-001-H01

(2) There are two graphs, the noise time limits and the one engine operation noise contours.

(a) The noise contour graphs are guidelines for the amount of noise that is made by the engine at three defined power settings for the standard conditions shown on the graph.

(b) When the data from the noise contour graphs is used with the noise time limit chart, you can determine the need for hearing protection for a certain condition.

(c) The noise time limits are from the standards of the Occupational Safety and Health Administration (OSHA), the International Organization for Standardization (ISO) and the European Union (EU).

(d) For one engine operation, the noise contours are given for ground idle thrust, breakaway thrust, and takeoff thrust.

1) The figure for engine operation noise contours also gives the values for engine noise caused by dual engine operation.

(e) To find the quantity of noise energy, use a sound level meter, COM-1616.

(f) For the distance and the circumferential position from the engine, find the maximum noise from the applicable noise contour graph. Compare this value with the noise time limits graph.

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(g) Speak to a noise safety person to help you make the decision about the risk of noise damage to your ears.

NOTE: These noise contour graphs should not be used as a reliable basis for the prediction of noise in the surrounding community. These graphs are given to show the noise environment and to give guidance for hearing safety practices. Decisions about the risks of noise exposure should be made by a qualified, noise safety expert with the aid of a sound level measuring instruments.

O. Dry Chemical Fire Extinguishing Agents

SUBTASK 71-00-00-800-010-H01

CAUTION

DO NOT USE THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS ON THE ENGINE. THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS CAN CAUSE CORROSION TO THE ENGINE PARTS.

(1) The use of dry chemical fire extinguishing agents is not recommended.

SUBTASK 71-00-00-800-011-H01

(2) If you use fire extinguishing agents, do this step:

(a) Do this task: Engine Exposure to Fire and Extinguishing Agents Inspection, TASK 71-00-00-200-808-H01.

SUBTASK 71-00-00-160-002-H01

CAUTION

DO NOT USE WATER TO REMOVE THE DRY CHEMICAL POWDER FROM THE ENGINE. THE DRY AGENTS IN THE CHEMICAL POWDER AND WATER WILL MAKE A COMPOUND THAT CAN CAUSE CORROSION. DO NOT LET THE DRY CHEMICAL POWDER GO IN THE HOLES ON THE ENGINE. DRY CHEMICAL POWDER THAT STAYS IN THE ENGINE CAN CAUSE CORROSION OF THE ENGINE INTERNAL COMPONENTS.

(3) The use of water to remove dry chemical fire extinguishing agents is not recommended. Dry chemical fire extinguishing agents are not water soluble. Water can cause the agents to collect and bond to the engine parts. This can cause a decrease in engine performance and corrosion to engine parts.

——— END OF TASK ———

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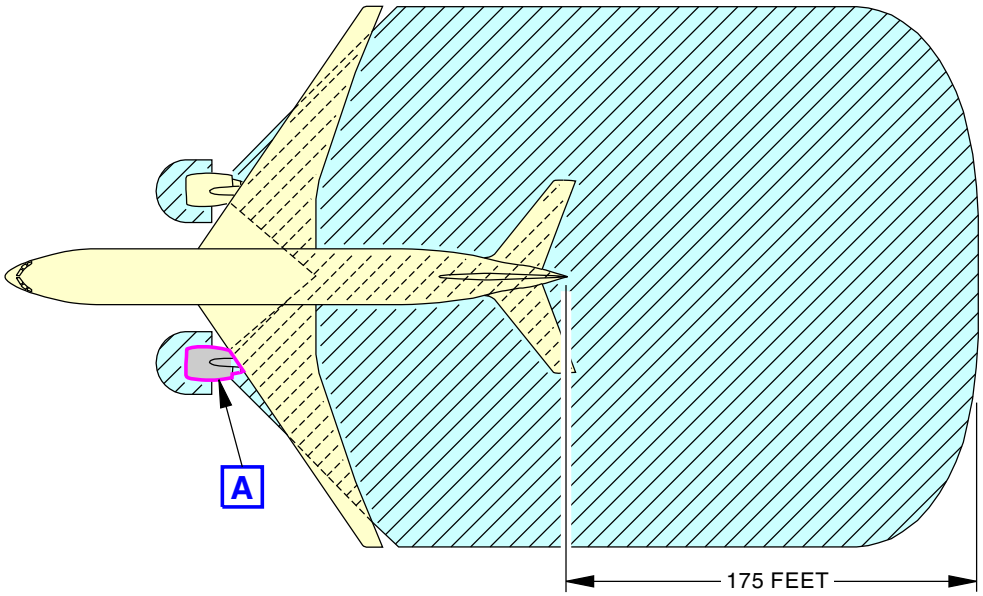

**EXHAUST HAZARD AREA
(COWLS CLOSED)**

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE
THE DANGEROUS AREA AT THE ENGINE INLET BY 20 PERCENT.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

M06344 S0004285440_V2

**Minimum Idle-Power Hazard Area
Figure 201/71-00-00-990-804-H01 (Sheet 1 of 4)**

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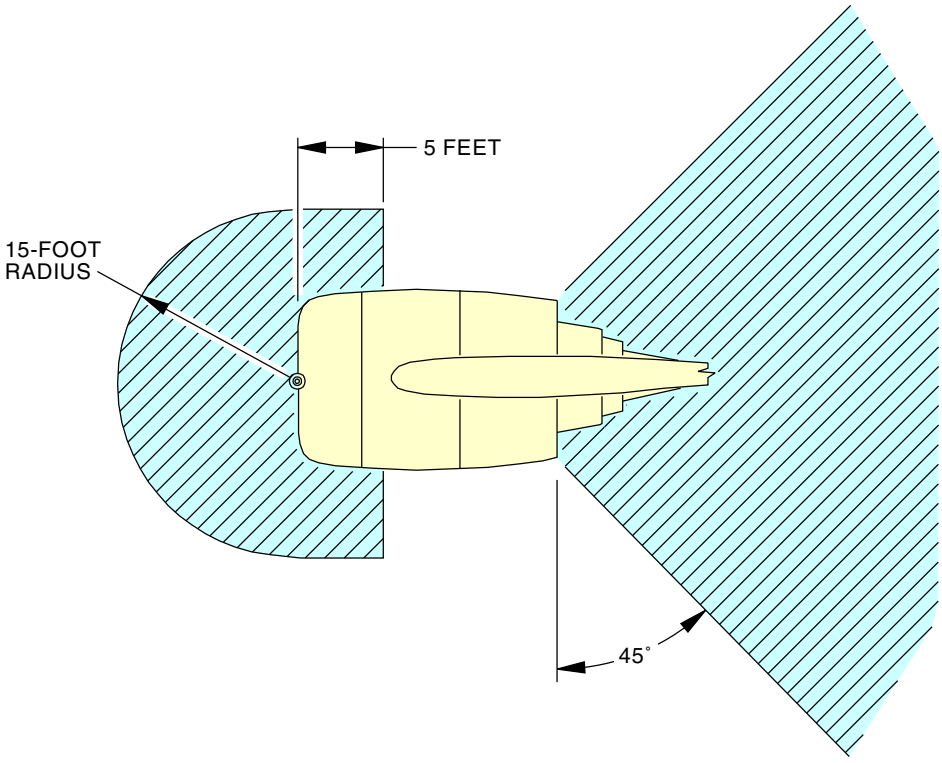

INLET HAZARD AREA
(COWLS CLOSED)

A

NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY. THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

M06345 S0004285441_V5

Minimum Idle-Power Hazard Area
Figure 201/71-00-00-990-804-H01 (Sheet 2 of 4)

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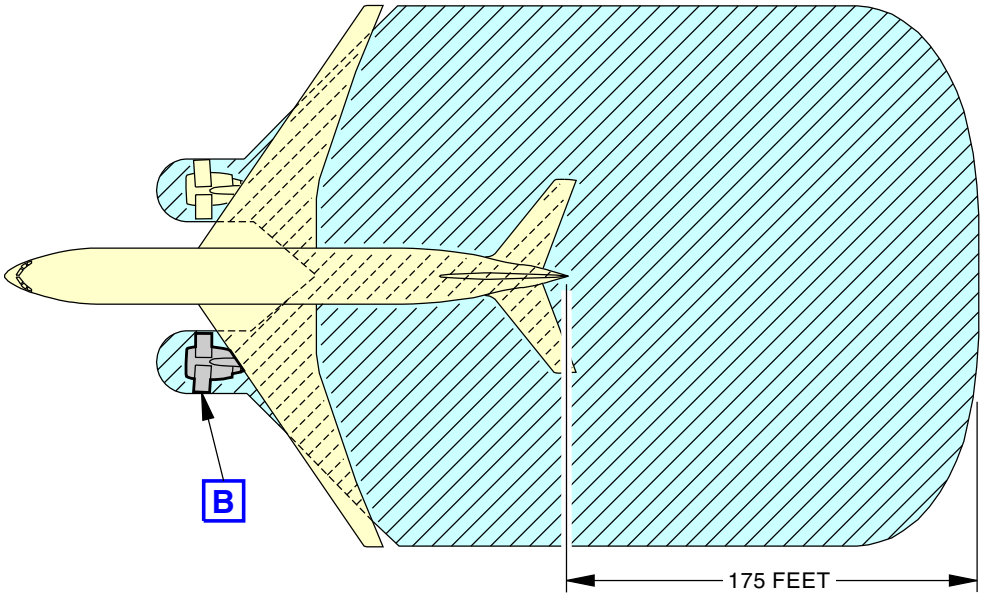

EXHAUST HAZARD AREA
(COWLS OPEN)

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20 PERCENT.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

M06346 S0004285442_V2

Minimum Idle-Power Hazard Area
Figure 201/71-00-00-990-804-H01 (Sheet 3 of 4)

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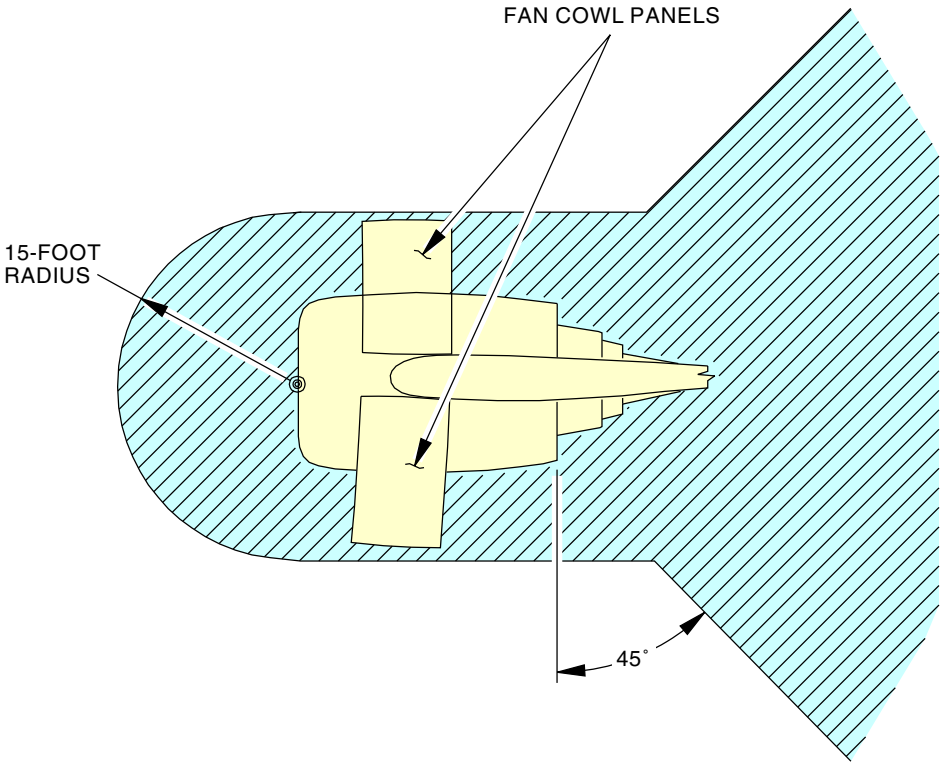

INLET HAZARD AREA
(COWLS OPEN)

B

NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY.
THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

M06347 S0004285443_V3

Minimum Idle-Power Hazard Area
Figure 201/71-00-00-990-804-H01 (Sheet 4 of 4)

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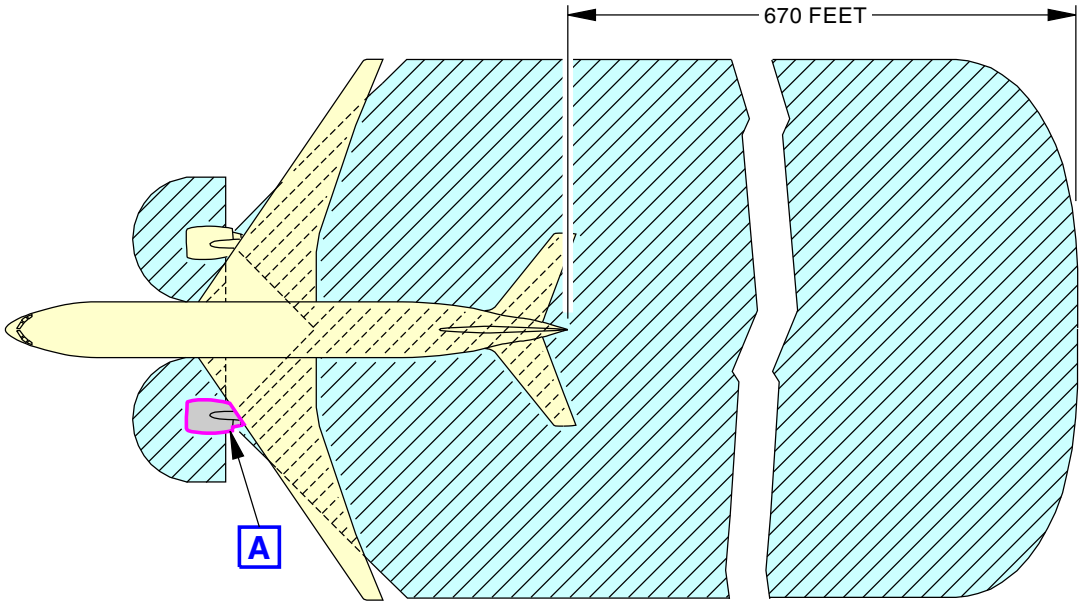

EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20 PERCENT.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

M06348 S0004285444_V3

Breakaway Thrust-Power Hazard Area
Figure 202/71-00-00-990-805-H01 (Sheet 1 of 2)

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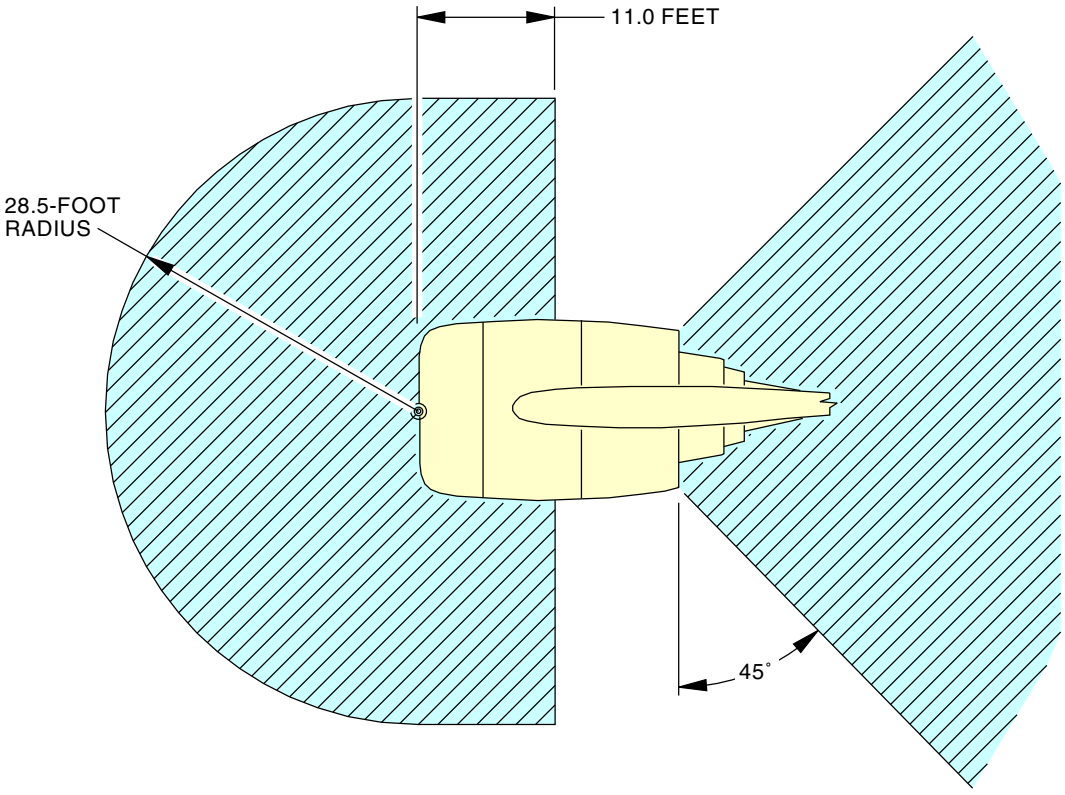

INLET HAZARD AREA

A

NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY.
THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

M06349 S0004285445_V2

Breakaway Thrust-Power Hazard Area
Figure 202/71-00-00-990-805-H01 (Sheet 2 of 2)

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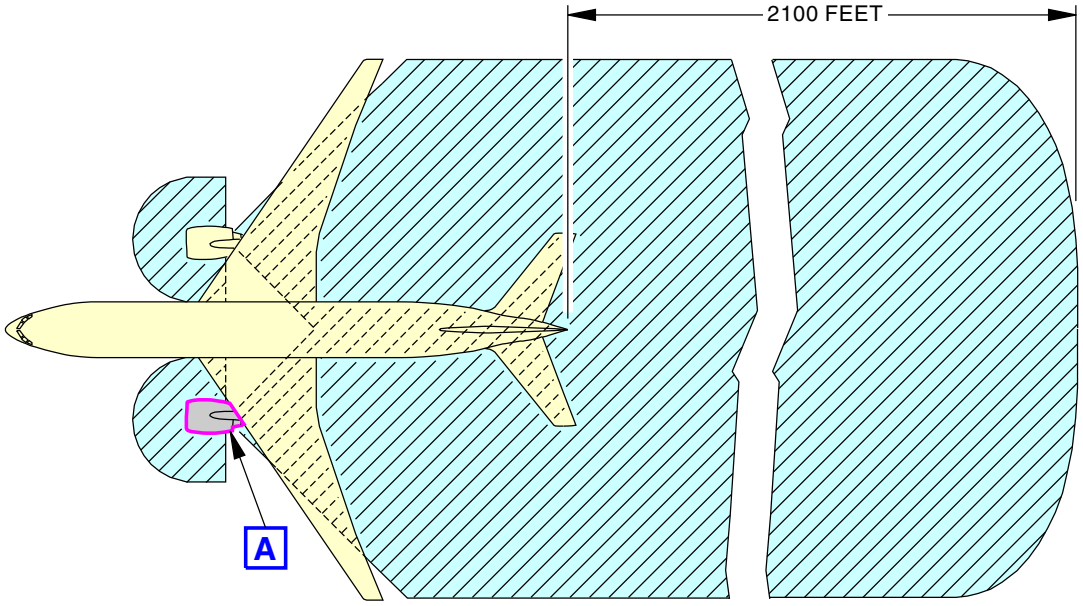

EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20 PERCENT.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

M06350 S0004285446_V2

Takeoff Thrust-Power Hazard Area
Figure 203/71-00-00-990-806-H01 (Sheet 1 of 2)

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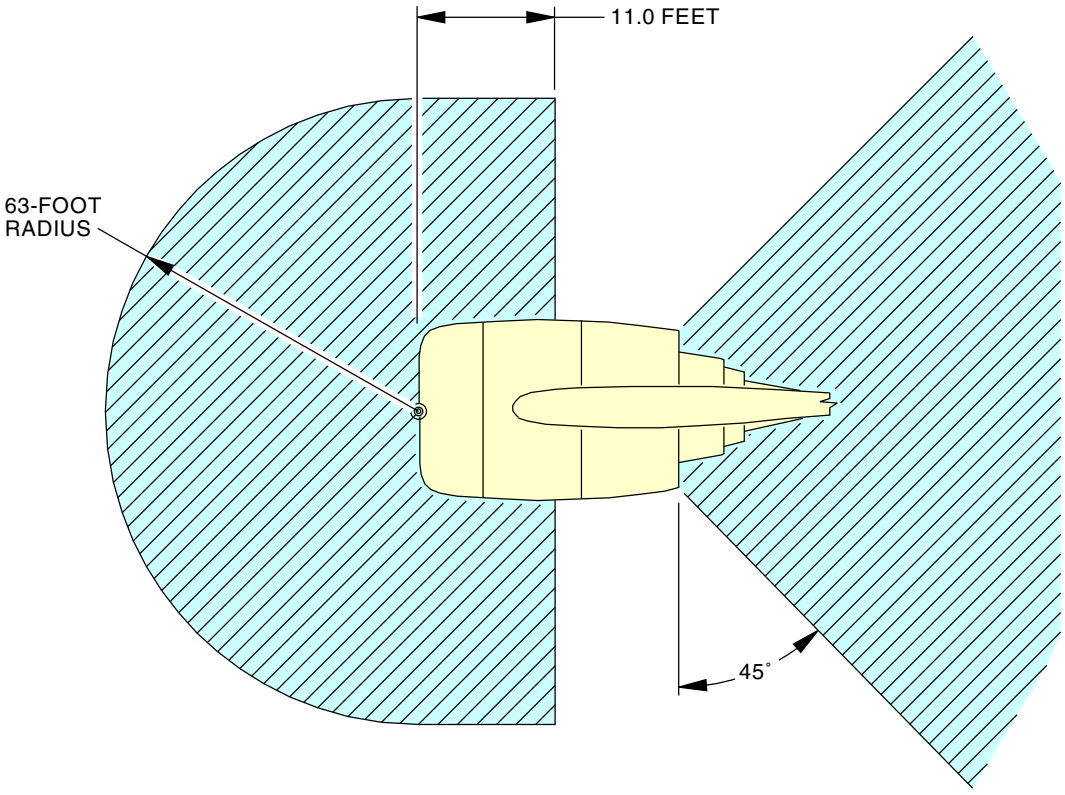

INLET HAZARD AREA

A

NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY.
THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

M06351 S0004285447_V3

Takeoff Thrust-Power Hazard Area
Figure 203/71-00-00-990-806-H01 (Sheet 2 of 2)

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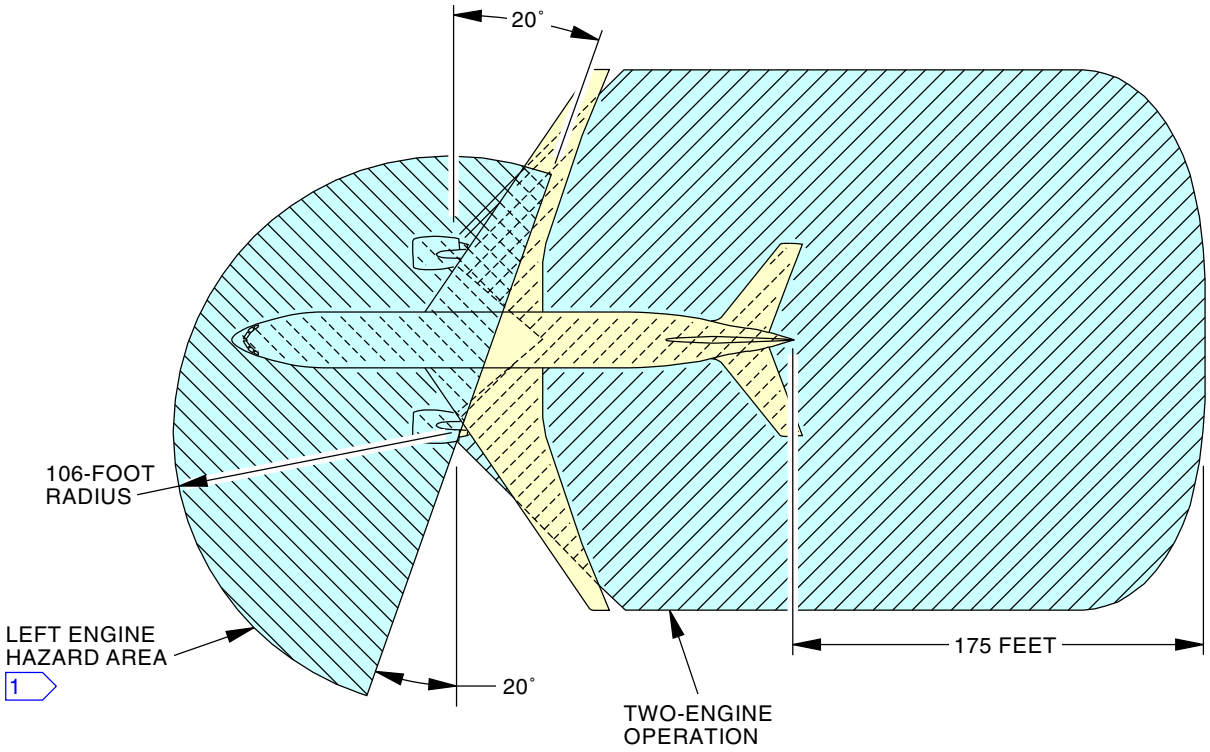

EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20 PERCENT.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.4

1 THE CONDITION FOR THE LEFT ENGINE IS SHOWN, THE RIGHT ENGINE IS EQUIVALENT

M06352 S0004285448_V2

Reverse Minimum Idle-Power Hazard Area
Figure 204/71-00-00-990-807-H01

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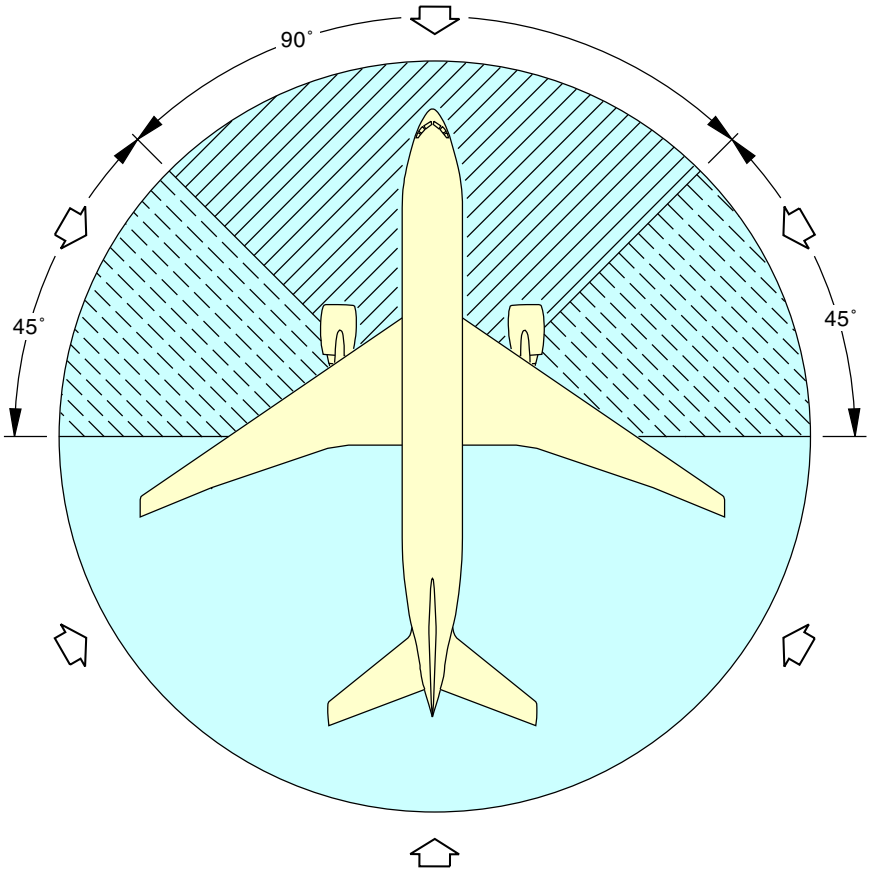

LEGEND:

RELATIVE WIND

RECOMMENDED (30 KNOTS MAXIMUM WIND VELOCITY) 1

PERMITTED (15 KNOTS MAXIMUM WIND VELOCITY) 1

LIMITED UP TO THE FLIGHT IDLE (5 KNOTS MAXIMUM WIND VELOCITY)

1 THE WIND VELOCITY IS FOR STABLE WIND CONDITIONS. DECREASE THE MAXIMUM WIND LIMIT 5 KNOTS FOR GUSTY WIND CONDITIONS.

YOU CAN OPERATE THE APU DURING THE ENGINE OPERATION ON THE GROUND.

M06353 S0004285449_V2

Preferred Relative Wind Direction During an Engine Operation
Figure 205/71-00-00-990-808-H01

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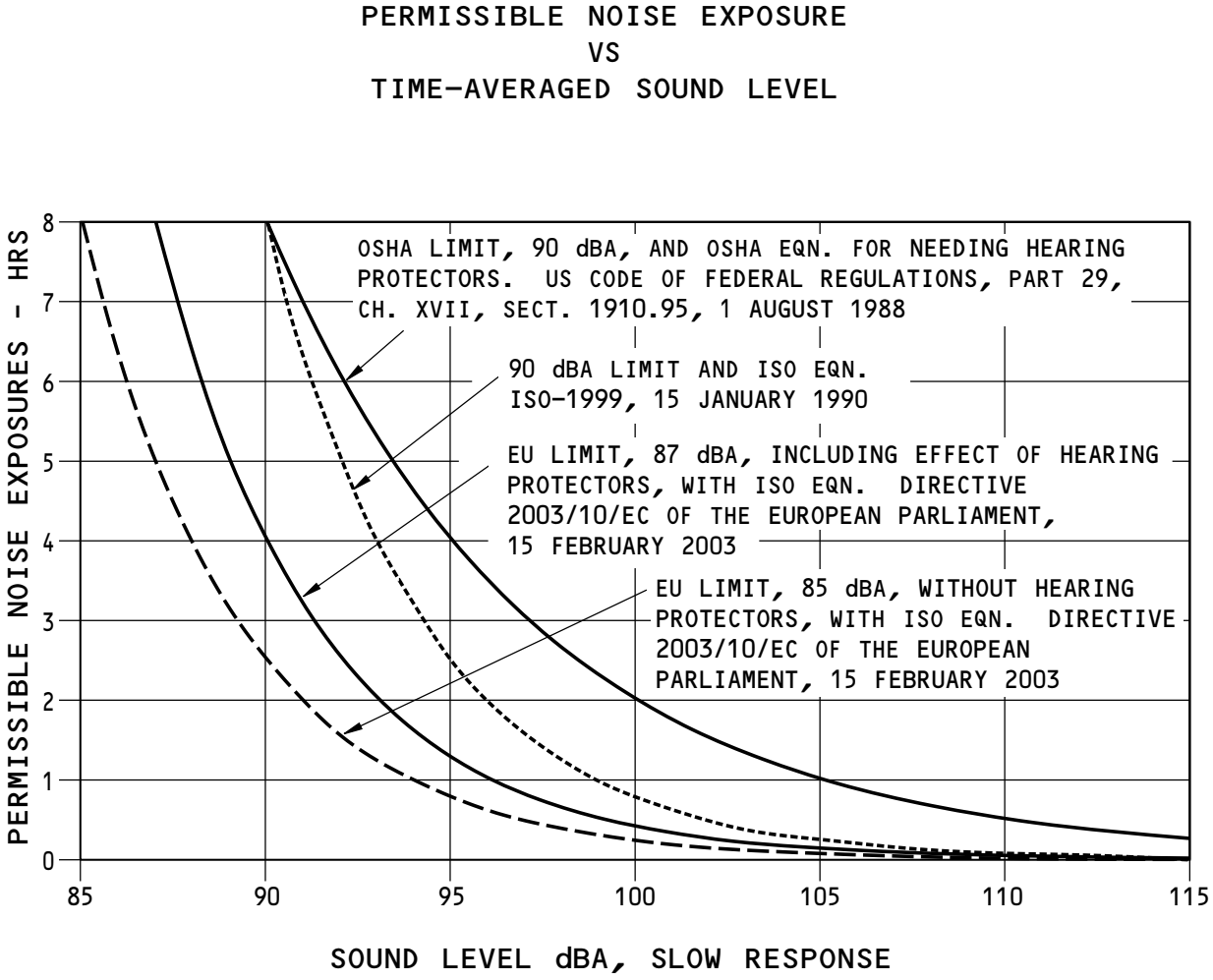

M06354 S0004285450_V2

Noise Time Limits
Figure 206/71-00-00-990-809-H01

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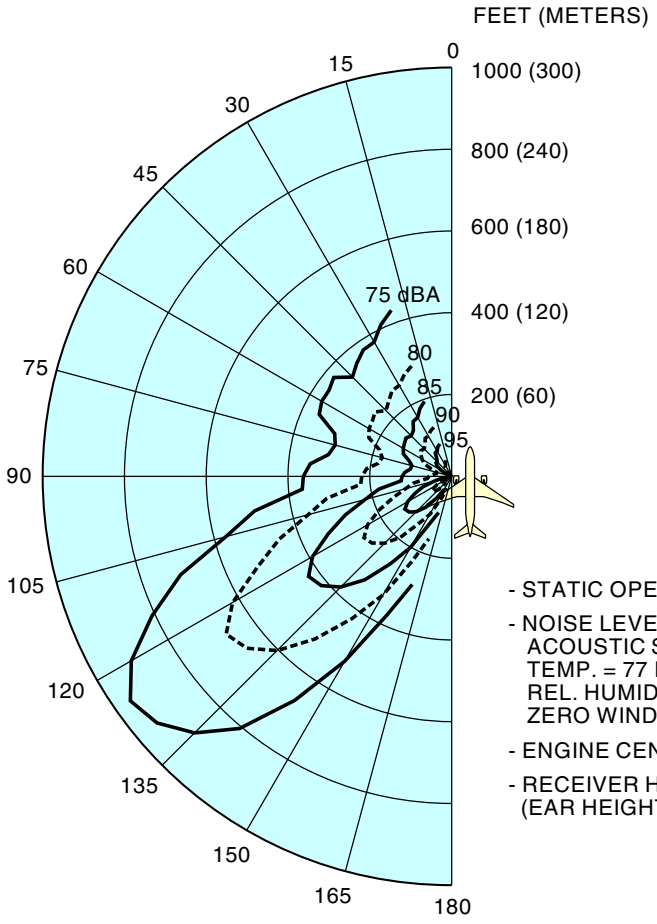
SINGLE ENGINE OPERATING AT:
(ADD 3 dBA FOR TWO ENGINES OPERATING)

GROUND IDLE THRUST
(4,740 LBS; N1C = 542 RPM)



- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE.
NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE.
BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

GE90-115B GROUND RUN-UP dBA NOISE CONTOURS

N1C542_DBA

W59555 S0000126613_V4

One Engine Operation Noise Contours
Figure 207/71-00-00-990-820-H01 (Sheet 1 of 3)

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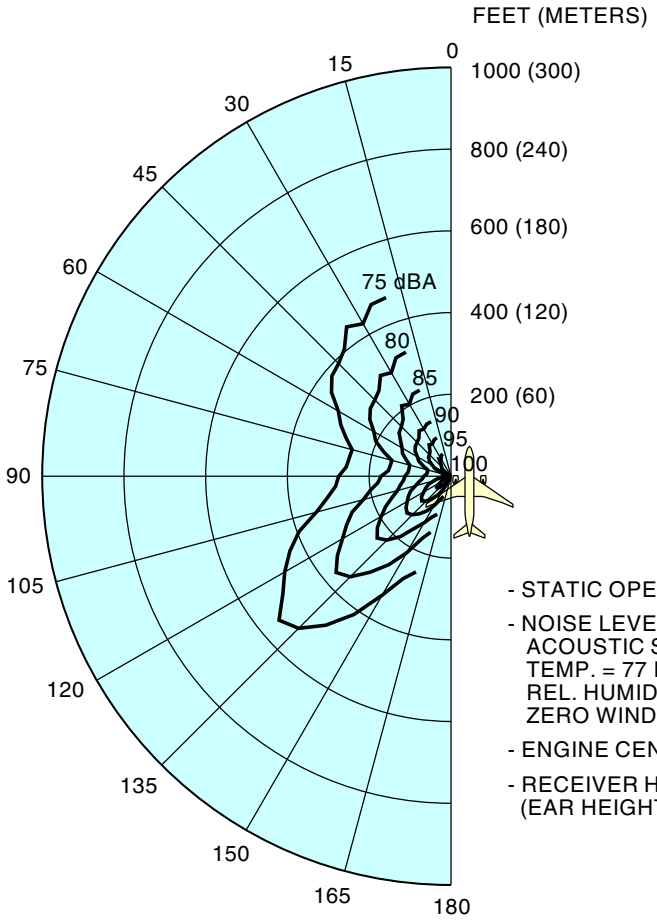
SINGLE ENGINE OPERATING AT:
(ADD 3 dBA FOR TWO ENGINES OPERATING)

BREAKAWAY THRUST
(5,100 LBS; N1C = 722 RPM)



- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE. NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE. BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

GE90-115B GROUND RUN-UP dBA NOISE CONTOURS

N1C722_DBA
W59553 S0000126614_V3

One Engine Operation Noise Contours
Figure 207/71-00-00-990-820-H01 (Sheet 2 of 3)

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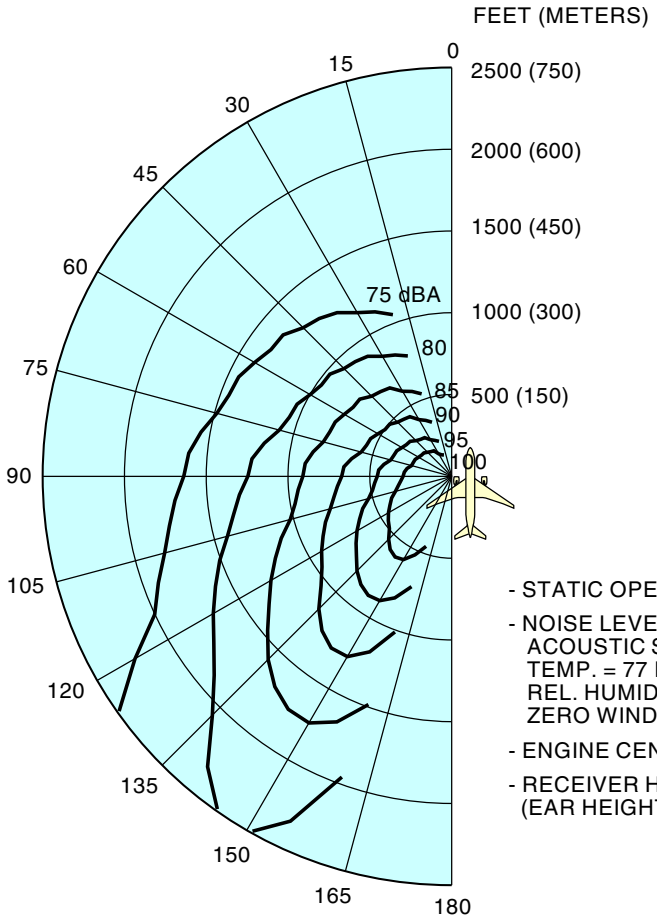
SINGLE ENGINE OPERATING AT:
(ADD 3 dBA FOR TWO ENGINES OPERATING)

TAKEOFF THRUST
(114,300 LBS; N1C = 2,421 RPM)



- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE.
NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE.
BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

GE90-115B GROUND RUN-UP dBA NOISE CONTOURS

N1C2421_DBA

W59562 S0000126620_V3

One Engine Operation Noise Contours
Figure 207/71-00-00-990-820-H01 (Sheet 3 of 3)

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TASK 71-00-00-800-802-H01

3. Engine Operation Limits

(Figure 208, Figure 209, and Figure 210)

A. General

(1) This task gives the operation limits of the engine.

(2) If an engine parameter is more than the given limits, it is necessary to do maintenance on the engine.

(a) You can find the necessary maintenance for an engine exceedance in the Power Plant Inspection procedure.

(b) If you do not know the cause of the exceedance, do the troubleshooting in the fault isolation manual.

B. References

Reference	Title
71-00-00-200-803-H01	No or Low Oil Pressure Inspection (P/B 601)
71-00-00-200-806-H01	Overtemperature Inspection (P/B 601)
73-00-00-170-801-H00	Fuel Supply System (with Hydraulic Fluid) Contamination Cleaning (P/B 201)
79-00-00-200-807-H01	Engine Oil System (Fluids and Solids Contamination) Inspection (P/B 601)
FIM 71-05 TASK 805	Engine Oil Leak or Engine Oil Consumption High or Low Oil Quantity or Oil Quantity Decreases at a Quick Rate - Fault Isolation

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Exhaust Gas Temperature (EGT) Limits

NOTE: The age, condition, and bleed air configuration of each engine can cause a difference in EGT between engines. At idle and low power operation, a difference in EGT values by itself is not an indication of a problem unless there is an EGT limit exceedance.

SUBTASK 71-00-00-800-012-H01

(1) Ground Start: 750 °C (1382 °F).

NOTE: Usual engine start EGT is below 750 °C. The engine autostart function will stop the engine start if the EGT is more than 750 °C.

NOTE: If the airplane has a pneumatic system problem, the engine start EGT will be higher. Also, the length of time that is necessary to start the engine will be longer.

SUBTASK 71-00-00-800-013-H01

(2) Operational EGT Limits:

(a) Takeoff - 1090 °C (1994 °F) for 5 minutes (10 minutes for engine out contingency)

(b) Takeoff - 1095 °C (2003 °F) for 30 seconds

(c) Maximum continuous - 1050 °C (1922 °F) for unlimited time.

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E. Oil Pressure Limits

SUBTASK 71-00-00-800-014-H01

(1) The minimum oil pressure limit is 10 psig (69 kPa).

SUBTASK 71-00-00-800-015-H01

(2) You must have a minimum of 10 psig (69 kPa) at the minimum idle speed.

(a) N2 rotor speed and oil pressure must increase together.

SUBTASK 71-00-00-860-329-H00

(3) If the engine was operated with no oil pressure or less than 10 psid (69 kPa) oil pressure, refer to No or Low Oil Pressure Inspection, TASK 71-00-00-200-803-H01.

F. Oil Temperature Limits

SUBTASK 71-00-00-800-016-H01

(1) The continuous maximum limit for the oil temperature is 132 °C (270 °F). The maximum limit for the oil temperature is 143 °C (290 °F) for 15 minutes at all power levels.

SUBTASK 71-00-00-800-017-H01

(2) The minimum oil temperature limit to operate the engine is -40 °C (-40 °F).

SUBTASK 71-00-00-800-018-H01

(3) If the oil temperature is above the permitted limit, stop the engine.

(a) Find and correct the cause of the high oil temperature.

G. Oil Specifications

SUBTASK 71-00-00-800-019-H01

CAUTION ONLY USE TYPES AND BRANDS OF ENGINE OIL THAT ARE APPROVED BY THE GE SB 79-0001. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE OIL THAT IS NOT APPROVED.

(1) See the GE SB 79-001 for the engine oil specifications.

H. Fuel Specifications

SUBTASK 71-00-00-800-020-H01

(1) See the GE Specification D50TF2 Class A, C, D or E.

SUBTASK 71-00-00-800-034-H00

(2) Fatty Acid Methyl Ester (FAME) contamination (Table 201).

Table 201/71-00-00-993-831-H00

FAME Level	Limitations	
	Engines Operated on the Ground	Aircraft on ground (engines not yet operated)
Less than 50 ppm	None	None *[1]
More than 50 ppm	Do not permit dispatch. Contact aircraft and engine manufacturer.	Do not start aircraft or permit dispatch. Contact aircraft and engine manufacturer. Make sure fuel in aircraft tanks is below 50 ppm FAME then apply requirements as given for less than 50 ppm *[2]

*[1] Level within specification criteria.

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*[2] Contact aircraft and engine manufacturer to find subsequent maintenance actions or develop a return to service maintenance program and submit for FAA approval.

SUBTASK 71-00-00-170-002-H00

CAUTION

DO NOT OPERATE THE ENGINE UNTIL YOU REMOVE THE HYDRAULIC FLUID CONTAMINATION FROM THE AIRPLANE FUEL SYSTEM. IF YOU OPERATE THE ENGINE WITH HYDRAULIC FLUID CONTAMINATION, DAMAGE TO THE ENGINE CAN OCCUR.

(3) If the engine fuel supply is contaminated with hydraulic fluid, do this task: Fuel Supply System (with Hydraulic Fluid) Contamination Cleaning, TASK 73-00-00-170-801-H00.

NOTE: Hydraulic fluid contains phosphorous. Phosphorous contact with hot section hardware can cause corrosion on hot metal surfaces such as the combustor and turbines. Phosphorous can also damage fluorosilicone elastomers such as O-rings and other seals.

I. Rotor Operation Speed Limits (Redline Speed Limits)

SUBTASK 71-00-00-800-021-H01

(1) The maximum N1 rotor speed is 2602 rpm (110.5%).

SUBTASK 71-00-00-800-022-H01

(2) The maximum N2 rotor speed is 11292 rpm (121.0%).

J. Overtemperature Limits

SUBTASK 71-00-00-800-023-H01

(1) For EGT limits during an engine start and at less than idle speed, see the engine start procedure (TASK 71-00-00-800-835-H00).

(a) If the EGT is more than the EGT limit during a start, refer to the overtemperature inspection procedure (TASK 71-00-00-200-806-H01).

SUBTASK 71-00-00-750-002-H01

(2) For EGT limits at idle and higher speeds, refer to the overtemperature inspection procedure (TASK 71-00-00-200-806-H01).

K. Oil Consumption Guidelines

SUBTASK 71-00-00-800-024-H01

(1) Compare the oil consumption guidelines to the calculated engine oil consumption.

(a) Do these steps to calculate the oil consumption of the engine.

1) Find the total quantity of oil that the engine uses during a period of 10 to 20 flights.

2) Find the total number of hours that the engine operated during this period of flights.

3) Divide the total quantity of oil by the total number of hours.

NOTE: If you calculate the oil consumption for a smaller number of flights, it may give an incorrect value.

SUBTASK 71-00-00-800-025-H01

(2) Oil consumption is not more than 0.66 quarts/hour (0.62 liters/hour).

SUBTASK 71-00-00-869-004-H00

(3) Normal oil consumption is less than 0.36 quarts/hour (0.34 liters/hour).

SUBTASK 71-00-00-869-005-H00

(4) If you find increase oil consumption that meets the conditions that follow, refer to the troubleshooting in the fault isolation manual.

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(a) Oil consumption that shows a trend of gradually increase.

(b) Oil consumption that shows a sudden step increase.

1) If there is a sudden increase in oil consumption more than 0.66 quart per hour (0.62 liter per hour) in one flight, do this task: Engine Oil Leak or Engine Oil Consumption High or Low Oil Quantity or Oil Quantity Decreases at a Quick Rate - Fault Isolation, FIM 71-05 TASK 805.

(c) Oil consumption that is more than 0.66 quarts/hour (0.62 liters/hour).

SUBTASK 71-00-00-790-001-H01

(5) If the engine has a slow or sudden increase in oil consumption, examine the engine for external oil leaks or damage to the bearing compartments.

(a) If the oil consumption is more than the oil consumption guideline limit, refer to the troubleshooting in the fault isolation manual.

NOTE: The oil quantity indicator in the flight compartment shows the amount of engine oil in the engine oil tank. The instrument does not show the quantity of engine oil in the engine. When you operate the engine, 4-6 quarts (3.8-5.7 liters) of engine oil can go from the engine oil tank to the engine. This will cause the oil indication in the flight compartment to decrease by the same quantity. After you stop the engine, the engine oil goes back into the engine oil tank. The oil quantity indication in the flight compartment will show an increase in the quantity of oil.

SUBTASK 71-00-00-790-015-H00

(6) If the engine has a sudden decrease in oil consumption, examine the engine for fuel in the engine oil. Do this task: Engine Oil System (Fluids and Solids Contamination) Inspection, TASK 79-00-00-200-807-H01.

L. Starter Operation Guideline

SUBTASK 71-00-00-800-026-H01

(1) Starter air pressure during starter operation is approximately 30-45 psig (207-310 kPa).

SUBTASK 71-00-00-800-027-H01

(2) The starter duty cycle as follows:

(a) 5 minutes on, maximum

(b) 10 minutes off

(c) 5 minutes on, maximum.

NOTE: Let the starter cool for a minimum of 10 minutes before subsequent operation.

M. Vibration Guidelines

SUBTASK 71-00-00-800-028-H01

(1) N1 Rotor - the vibration advisory level is 4.0 UNITS (6.25 MILS SA).

NOTE: If the vibration level is more than limits, do the troubleshooting in the FIM.

SUBTASK 71-00-00-800-029-H01

(2) N2 Rotor - the vibration advisory level is 4.0 UNITS (2.0 IPS).

NOTE: If the vibration level is more than limits, do the troubleshooting in the FIM.

NOTE: High vibration during engine start of up to 5.0 units N2 or BB is usually after engine off periods of 1 - 4 hours. If the high vibration levels return to normal in less than three minutes of the idle operation, no troubleshooting is necessary.

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N. Engine Test Data Nomenclature

SUBTASK 71-00-00-800-030-H01

(1) These are the definitions of engine stations and performance parameters. (Table 202).

Table 202/71-00-00-993-801-H01 Engine Test Stations and Parameters TABLE 201

TEST DATA ABBR. ON EPCS SCREEN	TEST STATION OR PARAMETER DEFINITIONS
EGT	Exhaust Gas Temperature
N1	LP System Rotor Speed
N2	HP System Rotor Speed
TRA	Thrust Resolver Angle
T/RL	Left Thrust Reverser
T/RR	Right Thrust Reverser
P AMB	Ambient Pressure
PS3	HP Compressor Discharge Static Pressure
T25	HP Compressor Inlet Total Temperature
T3	HPC Discharge Total Temperature
VBV	Variable Bypass Valve
VSV	Variable Stator Vane
FMV	Fuel Meter Valve
LPCAI	Low Pressure Compressor Anti-Ice Valve
HPTACC	HP Turbine Active Clearance Control
LPTACC	LP Turbine Active Clearance Control
CCC	Core Compartment Cooling
OIL T	Engine Oil Temperature
OIL P	Engine Oil Pressure
OIL FLT	Oil Filter Differential Pressure
FUEL FLT	Fuel Filter Differential Pressure
OAT	Outside Air Temperature
T49	LPT Inlet Total Temperature (EGT)

END OF TASK

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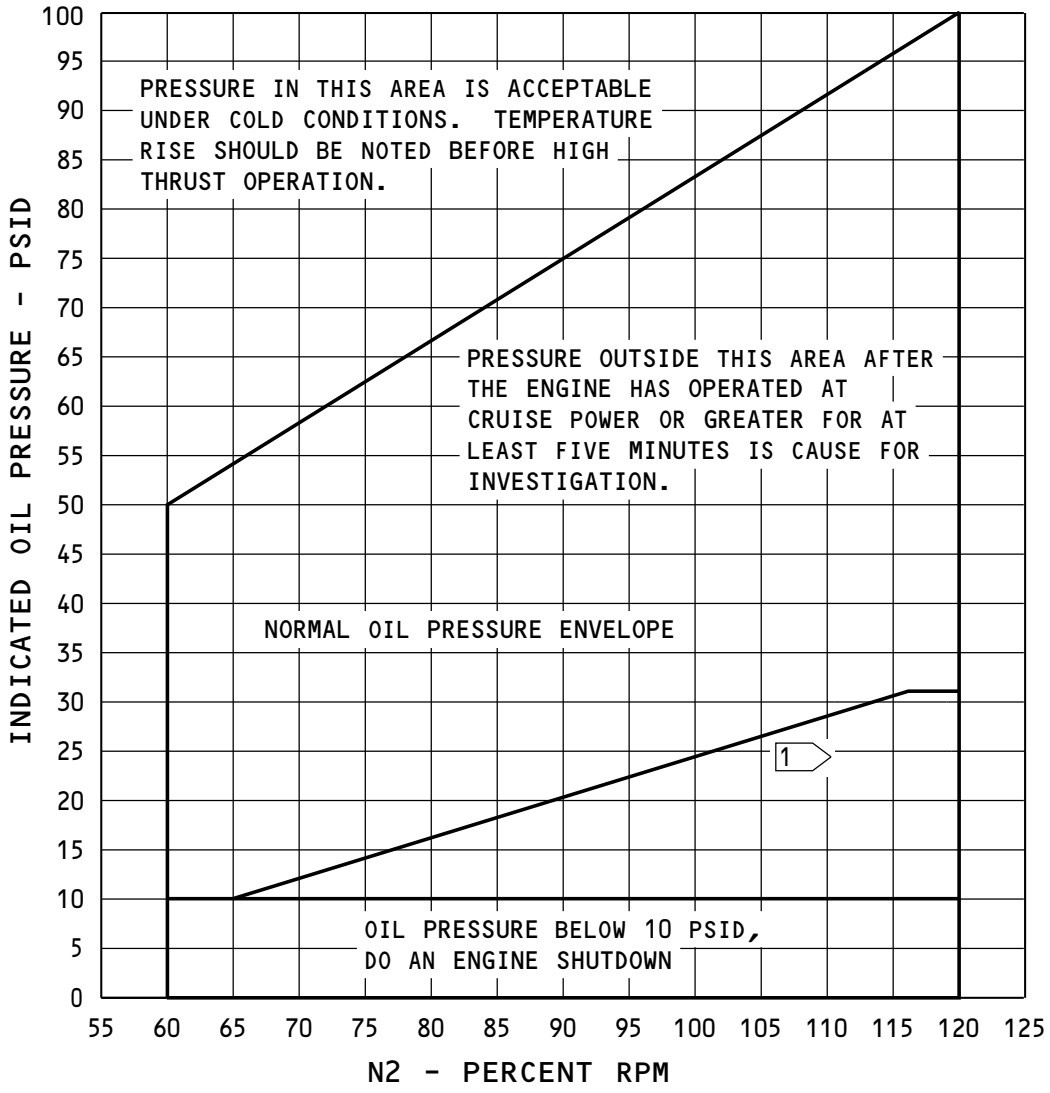

NOTE: DURING NEGATIVE G OPERATION CONDITIONS, OIL PRESSURE LESS THAN 10 PSID IS PERMITTED FOR A MAXIMUM OF 15 SECONDS.

1 GROUND: FOR PRESSURE IN THIS AREA, THE CAUSE MUST BE CORRECTED BEFORE FLIGHT.
FLIGHT: FOR PRESSURE IN THIS AREA, THE TEMPERATURE AND PRESSURE MUST BE MONITORED. SHUTDOWN ENGINE IF OIL TEMPERATURE IS MORE THAN THE LIMITS.

NOTE: OIL TEMPERATURE DO NOT STABILIZE FOR A TYPICAL TAKEOFF

1262251-00
M06356 S0004285452_V4

Oil Supply During Operation
Figure 208/71-00-00-990-810-H01

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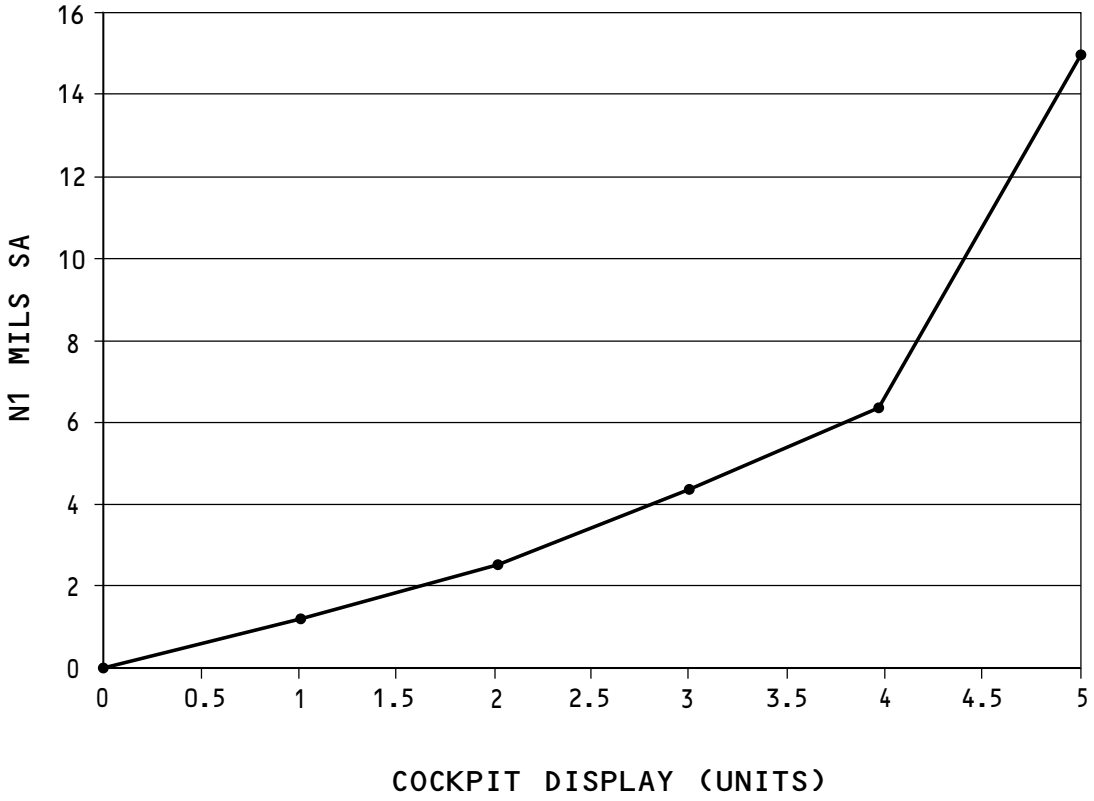

1358135 S0000244116_V1

Fan Vibration AVM Display
Figure 209/71-00-00-990-842-H01

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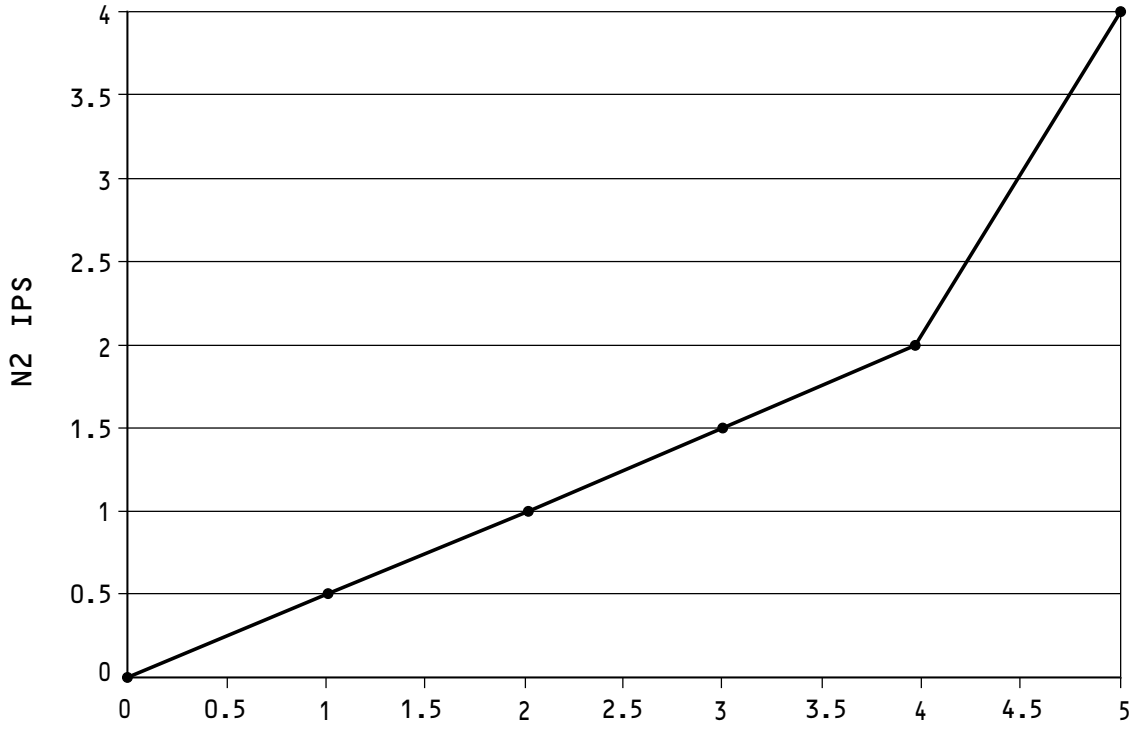

1358194 S0000244117_V1

Core Vibration AVM Vibration
Figure 210/71-00-00-990-843-H01

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TASK 71-00-00-800-834-H00

4. Engine Operation Preparation

(Figure 211 or Figure 212 or Figure 213 and Figure 214)

A. General

(1) This procedure provides instructions as follow:

(a) Engine preparation before a start in cold weather temperatures less than 37°F (3°C)

(b) Procedure for engine manual de-icing if the ground de-icing time interval between the engine run up was more than specified

(c) Engine preparation after shutdown in a cold weather

(d) Engine preparation for start in all weather conditions.

(2) Engine operation in cold weather.

(a) Engine operation in cold weather conditions can cause special problems, due to the effects of the ice, snow, slush, frost and low temperatures.

(b) During cold weather conditions, inlet, fan exhaust and turbine exhaust covers are needed to prevent snow or ice from accumulating in the engine.

(c) Ice formation in the engine inlet can be hazardous for engine operation.

1) Snow can also be blown into the engine and freeze on engine blades and casing, causing the rotor to lock, or creating potential rotor imbalance during operation.

2) Make sure that you are careful when you blow off snow from the inlet. Snow can enter the engine and refreeze to form ice.

3) Preheating is required when you find snow and icing that has blocked the rotors.

4) Preheating is also required if you find snow and ice on components such as acoustic panels of inlet cowl, fan exhaust, the LPC or LPT blades, the primary nozzle, and the thrust reverser external surfaces or joints.

(d) Engine icing also occurs during ground engine operation when visible moisture is present and the outside temperature is below 37°F (3°C).

1) Engine ice may formed on the inbound flight, and remain on the engine if the temperature stays near freezing.

2) Water droplets and snow that hit the spinner, inlet lip, fan blades, booster splitter or inlet, outlet guide vanes can build up to form ice.

NOTE: Visible moisture is defined as fog with visibility of 1.0 mile (1.6 km) or less, or when rain, snow, sleet, ice crystals and so on, or standing water is present on the ramps, taxiways or runways.

(e) The engine has a minimum starting temperature of -40.0°F (-40°C) for Type II oils. If the oil temperature is less than -40.0°F (-40°C), increase the temperature of the oil. Refer to the steps in this task to increase the temperature of the oil.

1) All engines are provided with Type II oils.

NOTE: If the air temperature is below -40°F (-40°C), you can increase the temperature of the oil.

NOTE: GE90 Service Bulletin 79-001 lists all approved lubricants.

(f) It is very important that you remove all loose objects from the air inlet and the area around the air inlet before you start the engine.

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ARO ALL POST SB 777-GE100-73-0086

(g) ENGINES WITH FLUOROCARBONS SEALS (Viton GLT-600S) ON THE HMU:

Preheating of the HMU may be necessary, if the HMU is fitted with fluorocarbon (Viton GLT-600S) seals and has been in ambient temperatures below -40.0°F (-40°C).

ARO ALL

B. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
12-11-01-650-801	Pressure Refueling (P/B 301)
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
12-13-03-600-802	IDG Oil Fill (P/B 301)
12-13-07-200-801	Backup Generator Oil Level Check (P/B 301)
12-13-07-600-801	Backup Generator Oil Fill (P/B 301)
12-22-07-200-803	IDG Oil Level Check (P/B 301)
24-22-00-860-805	Supply Electrical Power (P/B 201)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
32-00-15-480-801	Landing Gear Door Safety Pins Installation (P/B 201)
32-00-30-480-801	Landing Gear Downlock Pins Installation (P/B 201)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-290-804-H01	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection (P/B 601)
72-00-00-980-801-H01	Manual Motoring of the HPC Rotor (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-1505	Chocks - Wheel Part #: AC6820-LR Supplier: 032T9 Part #: PF10-010 Supplier: 3D5B2 Part #: W88 Supplier: 9L752
SPL-9037	Guard - Inlet, Engine Runup Safety Part #: J71039-155 Supplier: 81205 Opt Part #: J71011-1 Supplier: 81205

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(Continued)

Reference	Description
SPL-10698	Cover, Inlet, GE9X Part #: FC-GE90-11B-EIC Supplier: 7S813
SPL-10699	Plug - Thrust Reverser, GE90-115B Part #: RA70301 Supplier: 2R201
SPL-10700	Plug - Exhaust Nozzle, GE90-115B Part #: RA70302 Supplier: 2R201
STD-1125	Heater - Blower, Explosion Proof

D. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

E. Access Panels

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

F. Prepare the Engine Before a Start in Cold Weather

SUBTASK 71-00-00-860-290-H00

WARNING IF HIGH WINDS ARE POSSIBLE, OBEY THE INSTRUCTIONS IN THIS TASK. HIGH WINDS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO THE AIRPLANE

CAUTION DO NOT LET THE INLET COWL BECOME DAMAGED. MAKE SURE YOU PUT A PLASTIC DROP CLOTH ON THE INLET COWL. THIS WILL HELP PREVENT SCRATCHES AND CHEMICAL DAMAGE TO THE PAINTED SURFACES OR NOSE LIP SURFACE ON THE INLET COWL.

(1) If it is necessary, use a ladder to get an adequate access to the front of the engine before you continue with the inspection.

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SUBTASK 71-00-00-860-003-H01

WARNING DO NOT MAKE ANY ATTEMPT TO VISUALLY CHECK THE INLET COWL OR THE FAN EXHAUST DUCTS FOR THE ICE BUILDUP WHEN THE ENGINE IS IN OPERATION. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, INJURY TO PERSON CAN OCCUR.

(2) Do an inspection of the engine before a start engine in cold weather as follows:

NOTE: Before start, the engine must be free of all visible ice, and the fan must be free to turn.

(a) Do a visual inspection of the spinner, both sides of the fan blades, T12 sensor, inlet cowl highlight, inlet cowl acoustic panel, fan exhaust, outlet guide vanes (OGVs), booster or LPC splitter or inlet, the primary nozzle, the thrust reverser external surfaces or joints and external cowl surfaces for snow or ice accumulation.

(b) Use adequate light to illuminate the back side of the fan and first stage of the booster stator.

NOTE: The first stage of the booster stator can be viewed through the opening between the fan blades by standing at ground level, off to the side of the centerline of the engine.

SUBTASK 71-00-00-860-282-H00

(3) Make sure that the N1 rotor is free to rotate in a counterclockwise direction (view from front).

SUBTASK 71-00-00-860-283-H00

CAUTION DO NOT PUT THE HOT AIR DUCT INTO THE ENGINE INLET. MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE DUCT IS LESS THAN 150°F (66°C). HIGHER TEMPERATURES CAN CAUSE DAMAGE TO THE COMPOSITE MATERIALS IN THE INLET AND ENGINE.

CAUTION DO NOT ALLOW FOR THE MELTED ICE AND ICE CHUNKS DISLODGED BY HEATING TO COLLECT AT THE BOTTOM OF THE ENGINE. THEY COULD RE-FREEZE AND BECOME INGESTED WHEN THE ENGINE OPERATES. USE A SPONGE OR A CLOTH TO REMOVE ANY COLLECTED WATER, AND MANUALLY REMOVE DISLODGED ICE CHUNKS.

(4) If ice or snow has collected in the engine, and the N1 rotor does not turn freely:

(a) Install an engine inlet cover, SPL-10698, and/or turbine exhaust cover (exhaust nozzle plug, SPL-10700) on the engine primary nozzle and/or a fan exhaust cover (thrust reverser plug, SPL-10699).

(b) Use the applicable hot air duct from an explosion proof heater, STD-1125 to make the hot air blow onto the engine core exhaust.

(c) Apply heat until the N1 rotor (fan) turns freely, and/or the ice has dislodged.

(d) You may also apply heat to the front of the engine.

1) If you apply heat to the front of the engine, you need to install a fan exhaust cover (thrust reverser plug, SPL-10699) and an engine primary nozzle cover (exhaust nozzle plug, SPL-10700) first.

2) To de-ice the booster or LPC splitter or inlet, put the hot air between the fan blades toward the booster or LPC splitter or inlet.

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SUBTASK 71-00-00-860-284-H00

CAUTION

DO NOT PUT THE HOT AIR DUCT INTO THE ENGINE INLET. MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE DUCT IS LESS THAN 150°F (66°C). HIGHER TEMPERATURES CAN CAUSE DAMAGE TO THE COMPOSITE MATERIALS IN THE INLET AND ENGINE.

CAUTION

DO NOT ALLOW FOR THE MELTED ICE AND ICE CHUNKS DISLODGED BY HEATING TO COLLECT AT THE BOTTOM OF THE ENGINE. THEY COULD RE-FREEZE AND BECOME INGESTED WHEN THE ENGINE OPERATES. USE A SPONGE OR A CLOTH TO REMOVE ANY COLLECTED WATER, AND MANUALLY REMOVE DISLODGED ICE CHUNKS.

(5) If you have problems during the start procedure, make sure that the N2 rotor is free to turn.

(a) Make sure that the N2 rotor is free to rotate by cranking at the N2 rotation provision under the motor pad cover on the aft face of the accessory gearbox (TASK 72-00-00-980-801-H01).

(b) If ice or snow has collected in the engine, and the N2 rotor does not turn freely, install a turbine exhaust cover (exhaust nozzle plug, SPL-10700) on the engine primary nozzle and/or a fan exhaust cover (thrust reverser plug, SPL-10699).

(c) Attach the applicable hot air duct from an explosion proof heater, STD-1125 to the engine.

(d) Apply heat to the engine exhaust to free the N2 rotor.

(e) You may also apply heat to the engine inlet to free the N2 rotor.

1) Put the hot air between the fan blades toward the booster splitter or inlet.

SUBTASK 71-00-00-860-309-H00

CAUTION

DO NOT PUT THE HOT AIR DUCT INTO THE ENGINE INLET. MAKE SURE THAT THE TEMPERATURE OF THE AIR FROM THE DUCT IS LESS THAN 150°F (66°C). HIGHER TEMPERATURES CAN CAUSE DAMAGE TO THE COMPOSITE MATERIALS IN THE INLET AND ENGINE.

(6) ENGINES WITHOUT FLUOROCARBONS SEALS (Viton GLT-600S) ON THE HMU:

(a) If the oil temperature is less than -40.0°F (-40°C), increase the temperature of the oil as follows.

WARNING

DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO OPEN THE THRUST REVERSER(S). IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR

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

a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

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Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Use the applicable hot air duct from an explosion proof heater to make the hot air blow on the components that follow until the oil temperature is more than or equal to -40.0°F (-40°C):

1) Oil tank
2) Lube and scavenge pump
3) Main fuel/oil heat exchanger
4) Oil supply tubes.

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

a) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

2) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

3) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

4) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

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SUBTASK 71-00-00-860-310-H00

(7) ENGINES WITH FLUOROCARBONS SEALS (Viton GLT-600S) ON THE HMU:

(a) If the aircraft has been cold soaked with the engine cowling closed, at an ambient temperature below -40.0°F (-40°C) for more than 4 hours, do these steps:

NOTE: The engine has a minimum starting temperature of -40.0°F (-40°C) for Type II oils. If the oil temperature is less than -40.0°F (-40°C), increase the temperature of the oil. Refer to the steps in this task to increase the temperature of the oil.

CAUTION

LET THE AIR TEMPERATURE INCREASE SLOWLY. IF THE TEMPERATURE INCREASES QUICKLY, IT CAN CAUSE THERMAL SHOCK. DAMAGE TO THE ENGINE PARTS CAN OCCUR.

1) Use a explosion proof heater, STD-1125 or a suitable substitute, and do the steps that follow:

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.

a) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine: (TASK 78-31-00-010-816-H00).

b) Before you apply the heat, do a visual inspection and clear any fuel near the HMU.

NOTE: To prevent thermal shock on engine parts, increase the air temperature slowly to 131°F (55°C) ± 10°F (5°C).

c) Point the heater hose at the HMU housing for 5 to 10 minutes (Figure 214).

<1> Make sure that the hot air temperature is set at 131°F (55°C) ± 10°F (5°C).

NOTE: Make sure the temperature from the blower does not exceed a maximum temperature of 131°F (55°C) ± 10°F (5°C).

NOTE: The time specified in the figure is the amount of time necessary to heat the HMU to no more than 77°F (25°C) with the explosion proof heater, STD-1125 with a 1500 SCFM flow rate. Heaters with different flow rates will heat the HMU more quickly or slowly depending upon the flow rate.

d) Remove the explosion proof heater, STD-1125.

WARNING

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

e) Do these tasks in sequence to safely close the left and right thrust reverser on the applicable engine (TASK 78-31-00-410-816-H00).

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(b) After the HMU has been heated, follow the procedures to start the engine as soon as possible after the heating is completed, within 1 hour if the outside air temperature is below -40.0°F (-40°C), to prevent the HMU temperature from dropping to below -40.0°F (-40°C).

NOTE: It is recommended to run the engines at idle for no less than 5 minutes to make sure that the oil and fuel system are up to usual operating temperature.

SUBTASK 71-00-00-860-285-H00

CAUTION

IF YOU DO NOT OBEY THE INSTRUCTIONS THAT FOLLOW, DAMAGE TO THE ENGINE CAN BE THE RESULT.

(8) Do these steps for ice shedding procedures required during the cold weather operation:

(a) If the operation at minimum idle in icing conditions is more than 60 minutes, move the thrust lever forward to obtain 50% N1 for one second, then retard to minimum idle.

(b) If the operation at minimum idle is continued, move the thrust lever again at 60-minute intervals to shed accumulated ice.

NOTE: During engine operation in icing conditions, water droplets and snow ingested by the engine hit the spinner, inlet lip, fan blades, booster guide vanes, and can build up to form ice. The ice can shed periodically and discharge through the fan exhaust, or can be ingested into the engine core.

1) If the ice shedding procedure is not performed as prescribed, shut down the engine, and do the steps in the “Do an inspection of the engine before start engine in cold weather” above.

SUBTASK 71-00-00-860-286-H00

CAUTION

IF YOU DO NOT OBEY THE INSTRUCTIONS THAT FOLLOW, DAMAGE TO THE ENGINE CAN BE THE RESULT.

(9) Do these steps for the use of anti-icing during cold weather operation:

(a) When ground icing conditions are suspected, reduce the power setting and turn ON the nacelle anti-ice system.

NOTE: The nacelle anti-ice is used to remove ice build-up from the inlet cowl.

(b) Use a low thrust setting while the anti-ice system in ON, until all ice has melted away.

(c) After all ice has melted away, the thrust setting can be increased.

SUBTASK 71-00-00-860-287-H00

CAUTION

DO NOT OPERATE THE ENGINE WHICH HAS LOW TEMPERATURES FOR A LONG TIME IF THE FUEL AND OIL PRESSURE ARE LOWER THAN NORMAL OPERATING LIMITS. IF THE INDICATION IS LOWER THAN THE NORMAL OPERATING LIMITS, IMMEDIATELY SHUTDOWN THE ENGINE AND LOOKS FOR ICE ON THE ENGINE. IF THE ICE IS PRESENT, REMOVE THE ICE BEFORE YOU DO ANOTHER ATTEMPTED START. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

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(CAUTION PRECEDES)

CAUTION

IF THE AIRPLANE IS PARKED ON ICE OR PACKED SNOW, START THE ENGINES WITH THE AUXILIARY POWER UNIT (APU) OR SUPPLY AIR FROM THE GROUND CARTS. ENGINE THRUST IS NOT SYMMETRIC DURING CROSS BLEED STARTS AND CAN CAUSE THE AIRPLANE TO MOVE IN A CIRCLE. ICE CHOCKS AND A HIGH GROSS WEIGHT CAN MINIMIZE AIRPLANE MOVEMENT. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE AIRPLANE CAN OCCUR.

CAUTION

IF YOU DO NOT OBEY THE INSTRUCTIONS THAT FOLLOW, DAMAGE TO THE ENGINE CAN BE THE RESULT.

(10) If the engine is slow to start, hangs up, or will not accelerate out of idle, shut down the engine and do the troubleshooting.

SUBTASK 71-00-00-210-078-H00

CAUTION

DO NOT OPERATE THE ENGINE IF THERE IS NO INDICATION OF OIL PRESSURE BY THE TIME THE ENGINE HAS ACCELERATED TO THE MINIMUM IDLE. DO NOT OPERATE THE ENGINE IF THE PRESSURE IS DROPPED TO ZERO AFTER A FEW MINUTES OF THE GROUND RUN. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

(11) Do a check on the engine oil pressure:

NOTE: During the engine start under the extreme cold conditions, oil pressure peaks to full pressure indication scale may occur due to high oil viscosity. The pressure should subside as the oil temperature increases. If the oil pressure remains above the normal range after the oil temperature stabilizes, shut down the engine and do an investigation.

NOTE: Lubrication unit shaft failures have been reported during or immediately after engine start in cold conditions. This has caused no oil pressure. Monitor the engine oil pressure during and immediately after engine start.

SUBTASK 71-00-00-868-002-H00

(12) Let the IDG frequency stabilize before you apply the large electrical loads.

NOTE: Preheating the IDG is not necessary, but cold oil in the IDG will make the generator slow to develop steady power. One minute of operation is usually sufficient to warm up the IDG.

SUBTASK 71-00-00-868-003-H00

CAUTION

DO NOT OPERATE THE ENGINE AT A HIGH POWER SETTING WHEN ICE BUILDUP OCCURS ON THE INLET COWL OR NACELLE. USE A LOW POWER SETTING WITH THE NACELLE ANTI-ICING SYSTEM SET TO ON UNTIL ALL ICE IS MELTED. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE ENGINE.

(13) Use the nacelle anti-icing system to remove the ice buildup from the inlet cowl.

NOTE: Use a low power setting with the nacelle anti-ice system on until all ice is melted.

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SUBTASK 71-00-00-868-004-H00

CAUTION

DO NOT OPERATE THE ENGINE AT A HIGH POWER SETTING WHEN ICE BUILDUP OCCURS ON THE INLET COWL OR NACELLE. USE A LOW POWER SETTING WITH THE NACELLE ANTI-ICING SYSTEM SET TO ON UNTIL ALL ICE IS MELTED. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE ENGINE.

(14) When icing conditions are suspected, reduce the power setting and turn on the nacelle anti-icing system, then increase the power setting only after the ice has been eliminated.

NOTE: Use a low power setting with the nacelle anti-ice system on until all ice is melted.

SUBTASK 71-00-00-980-004-H00

(15) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

G. Do the Engine Manual De-Icing if the Ground De-Icing Time Interval Between the Engine Run-Up Was More Than Specified

SUBTASK 71-00-00-860-289-H00

(1) This procedure must be used if the available ice shedding procedures are not used, or the 60 minute limitation is exceeded.

(a) Do the steps in the “Do an inspection of the engine before start engine in cold weather” above.

H. Prepare the Engine After Shutdown in Cold Weather

SUBTASK 71-00-00-480-001-H01

(1) When snow or rain can turn into ice in the engine, install protective covers on the inlet and primary nozzle. Make sure that you install the covers as quickly as possible after the shutdown of the engine.

(a) Install the protective cover on the primary nozzle when the engine temperature decreases sufficiently (usually two to four hours).

NOTE: Snow and rain can go into the engine and become ice when the engine is not in operation. Ice can lock the rotors to the stators. Ice can also cause vibration in the rotor system.

I. Prepare the Engine for the Start Procedure

SUBTASK 71-00-00-080-002-H01

WARNING

MAKE SURE THAT ALL ENGINE OPERATION AREAS ARE AS CLEAN AS POSSIBLE. IF ALL RAMPS, TAXIWAYS, RUNWAYS, AND OTHER OPERATIONS AREAS ARE NOT CLEAN, DAMAGE TO THE ENGINE, AIRPLANE AND INJURY TO PERSONS CAN OCCUR.

(1) Remove the protective covers on the inlet and exhaust if they are installed.

SUBTASK 71-00-00-980-003-H01

(2) Point the airplane into the wind, when necessary.

SUBTASK 71-00-00-860-005-H01

(3) Make sure that the nose landing gear is in the forward direction.

SUBTASK 71-00-00-860-006-H01

(4) Install the lock pins in the landing gear (TASK 32-00-30-480-801).

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SUBTASK 71-00-00-860-007-H01

(5) If the landing gear doors are open, then install the safety pins in the landing gear doors (TASK 32-00-15-480-801).

SUBTASK 71-00-00-480-002-H01

WARNING MAKE SURE THAT THE LANDING GEAR GROUND SAFETIES AND THE WHEEL CHOCKS ARE IN POSITION. INJURIES TO PERSONNEL AND DAMAGE TO THE AIRCRAFT CAN OCCUR

(6) Install the wheel chocks, COM-1505 on each of the main gears, do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.

(a) Make sure that the forward wheel chocks are in front of wheel positions 1, 2, 3 and 4. Make sure that the wheel chocks are six to twelve inches in front of the tires.

(b) Make sure that the aft wheel chocks are aft of wheel positions 9, 10, 11 and 12. Make sure that the wheel chocks are near but do not touch the tires.

SUBTASK 71-00-00-210-018-H01

WARNING REMOVE ALL TOOLS AND OTHER OBJECTS FROM THE INLET COWL, STRUT, OR ENGINE. LOOSE OBJECTS WILL COME THROUGH THE ENGINE AT HIGH SPEED WHEN IT OPERATES. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(7) Make sure that you remove all loose objects from the air inlet and the ground area around the air inlet.

(a) Examples of loose objects are:

1) Parts, lockwire and safety cable

2) Tools and equipment

3) Rags

4) Interphone equipment and cables.

SUBTASK 71-00-00-210-019-H01

(8) Do a visual check for damage or ice on these parts:

(a) The inlet cowl

(b) The fan blades

(c) The fan spinner

(d) The LPC stator

(e) The T12 sensor

(f) The external cowl surfaces

(g) If you find ice on engine parts, you must remove the ice from the engine with hot air. See the paragraph: Prepare the Engine Before a Start in Cold Weather.

SUBTASK 71-00-00-210-075-H00

(9) Make sure that the thrust reverser is stowed.

SUBTASK 71-00-00-210-076-H00

(10) Make sure that the latches for the fan cowls and thrust reverser are correctly engaged.

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SUBTASK 71-00-00-210-020-H01

(11) Do a visual check of the core exhaust (LPT), exhaust plug and the primary nozzle for damage and unwanted material.

(a) Wire particles are permitted in the primary nozzle if they have a diameter less than 0.003 inch (0.076 mm) and a length less than 0.80 inch (20.32 mm).

(b) Sheet metal particles are permitted in the primary nozzle if they have a thickness less than 0.004-0.006 inch (0.102-0.152 mm) and a longest dimension less than 0.6 inch (15.2 mm).

(c) If you find other materials, do this step before the subsequent start.

1) Do this task: Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection, TASK 72-00-00-290-804-H01.

SUBTASK 71-00-00-860-008-H01

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

SUBTASK 71-00-00-860-009-H01

CAUTION DO NOT OPERATE THE HYDRAULIC SYSTEMS UNLESS THE FUEL LEVEL IS HIGHER THAN THE HEAT EXCHANGERS. WITHOUT SUFFICIENT FUEL, THE HEAT EXCHANGER WILL BECOME TOO HOT. DAMAGE TO THE HYDRAULIC SYSTEM WILL OCCUR.

(13) Make sure that there is sufficient fuel in each of the left and right main fuel tanks to cool the left, center, and right hydraulic system heat exchangers.

(a) A minimum of 4794 pound (2174 kilograms) of fuel in each of the left and right main fuel tanks is necessary to cool the left and right hydraulic system heat exchangers.

(b) A minimum of 7303 pounds (3312 kilograms) of fuel in the right main fuel tank is necessary to cool the center hydraulic system heat exchanger.

(c) If it is necessary, add sufficient fuel to the fuel tanks to maintain the minimum when you operate the engine (TASK 12-11-01-650-801).

SUBTASK 71-00-00-860-281-H00

(14) Make sure that all brakes are activated and fully applied during engine operation to prevent airplane movement.

SUBTASK 71-00-00-860-010-H01

WARNING MAKE SURE THERE IS SUFFICIENT FUEL ON THE AIRPLANE TO WEIGH IT DOWN FOR TRACTION. ENGINE OPERATION AT THRUST LEVELS ABOVE IDLE WITH LIGHT FUEL LOADS, CAN RESULT IN SUDDEN AIRPLANE MOVEMENT (SKIDDING) FORWARD. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(15) Make sure that you have the correct minimum gross weight to operate the engine at high power (use charts in Figure 211 or Figure 212 or Figure 213, or refer to Table 203 or Table 204 or Table 205).

(a) If the minimum gross weight charts are used, make sure that you follow the steps below that show how to use the charts:

1) You must first make a selection of the “test thrust” level. This is the thrust level you will have on the engine that will do the test.

2) Then, you must make a selection of the “balance thrust” level. This is the thrust level you will have on the opposite side engine.

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3) Use the plots in Figure 211 or Figure 212 or Figure 213. Find the curve that has a label with the test and balance thrust levels.

4) Find the point on the plot that has the gross weight and the center of gravity of the airplane. The location of the center of gravity is defined in “% mean aerodynamic chord” (MAC). A 0% MAC is a forward center of gravity and a 100% MAC is an aft center of gravity.

5) Make sure that the point on the plot is above the curve for the test and balance thrust levels.

Table 203/71-00-00-993-802-H01 Minimum Gross Weight for Engine Operation

Minimum Gross Weight for Engine Operation (High Power) (FOR 777-300ER with 115K Pounds Thrust Base Line)*[1]			
Power Level*[2]	Minimum Airplane Gross Weight*[3]	Power Level For Opposite Engine*[4] %N1	MAX CG (% MAC)*[5]
Minimum Idle	369,500 (167,602 Kgs)	0.0	44
Approach Idle	395,000 (179,200 Kgs)	0.0	44
60% N1	450,000 (204,170 Kgs)	0.0	44
80% N1	466,000 (211,400 Kgs)	0.0	30
85% N1	539,000 (244,500 Kgs)	0.0	30
80% N1	395,000 (179,200 Kgs)	60.0	44
85% N1	395,000 (179,200 Kgs)	60.0	44
Takeoff	493,000 (223,700 Kgs)	60.0	36

*[1] This table is valid for ambient temperatures of 0 degree F or greater.

*[2] Make sure both RIGHT and CENTER hydraulic systems are fully pressurized and operational. Make sure both brake meter pressures indicate approximately 3000 psig on the LANDING GEAR BRKS/STRNG maintenance page.

*[3] These values are the minimum gross weight that is necessary to operate the engine at the specified power level and must be maintained for the duration of the engine run. The operating empty weight (OEW) values that follow should be used to calculate the minimum gross weight requirement: Airplanes OEW (approximately) 777-300ER 369,500 pounds (167,602 Kgs). Minimum fuel quantity and distribution must be maintained during the engine run to cool the hydraulic system heat exchangers.

*[4] It is necessary to operate the opposite engine at this power level with the brakes applied, the parking set, and the wheel chocks installed (6-12 inches away from the front wheel positions 1, 2, 3 and 4 of the front tires, and behind but do not touch the rear wheel positions 9, 10, 11 and 12 of the rear tires). Make sure the nose gear is pointed straight ahead.

*[5] Max CG calculation is not necessary if the airplane is in the OEW configuration with only fuel added to satisfy the minimum airplane gross weight requirement.

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Table 204/71-00-00-993-829-H00

Minimum Gross Weight for Engine Operation (High Power) (For 777-200LR and 777-200F with 115K Pounds Thrust Base Line) *[1]			
Power Level*[2]	Minimum Airplane Gross Weight*[3]	Power Level For Opposite Engine %N1*[4]	MAX CG (% MAC)*[5]
Minimum Idle	339,700 *[6] (154,085 Kgs)	0.0	44
Minimum Idle	307,100 *[7] (139,298 Kgs)	0.0	44
Approach Idle	420,000 (190,500 Kgs)	0.0	44
60% N1	420,000 (190,500 Kgs)	0.0	44
80% N1	435,000 (197,300 Kgs)	0.0	32
85% N1	500,000 (226,800 Kgs)	0.0	32
80% N1	420,000 (190,500 Kgs)	60.0	44
85% N1	420,000 (190,500 Kgs)	60.0	44
Takeoff	527,000 (239,100 Kgs)	60.0	41

*[1] This table is valid for ambient temperatures of 0 degree F or greater.

*[2] Make sure both RIGHT and CENTER hydraulic systems are fully pressurized and operational. Make sure both brake meter pressures indicate approximately 3000 psig on the LANDING GEAR BRKS/STRNG maintenance page.

*[3] These values are the minimum gross weight that is necessary to operate the engine at the specified power level and must be maintained for the duration of the engine run. The operating empty weight (OEW) values that follow should be used to calculate the minimum gross weight requirement: Airplanes OEW (approximately) 777-200LR 339,700 pounds (154,085 Kgs) and 777-200F 307,100 pounds (139,298 kgs). Minimum fuel quantity and distribution must be maintained during the engine run to cool the hydraulic system heat exchangers.

*[4] It is necessary to operate the opposite engine at this power level with the brakes applied, the parking set, and the wheel chocks installed (6-12 inches away from the front wheel positions 1, 2, 3 and 4 of the front tires, and behind but do not touch the rear wheel positions 9, 10, 11 and 12 of the rear tires). Make sure the nose gear is pointed straight ahead.

*[5] Max CG calculation is not necessary if the airplane is in the OEW configuration with only fuel added to satisfy the minimum airplane gross weight requirement.

*[6] Minimum idle weight for 777-200LR.

*[7] Minimum idle weight for 777-200F.

Table 205/71-00-00-993-830-H00

Minimum Gross Weight for Engine Operation (High Power) (For 777-200LR and 777-200F with 110K Pounds Thrust Base Line)*[1]			
Power Level*[2]	Minimum Airplane Gross Weight*[3]	Power Level For Opposite Engine %N1*[4]	MAX CG (% MAC)*[5]

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Table 205/71-00-00-993-830-H00 (Continued)

Minimum Gross Weight for Engine Operation (High Power) (For 777-200LR and 777-200F with 110K Pounds Thrust Base Line)*[1]			
Minimum Idle	339,700 *[6] (154,085 Kgs)	0.0	44
Minimum Idle	307,100 *[7] (139,298 Kgs)	0.0	44
Approach Idle	420,000 (190,500 Kgs)	0.0	44
60% N1	420,000 (190,500 Kgs)	0.0	44
80% N1	440,000 (199,600 Kgs)	0.0	32
85% N1	503,100 (228,200 Kgs)	0.0	32
80% N1	420,000 (190,500 Kgs)	60.0	44
85% N1	420,000 (190,500 Kgs)	60.0	44
Takeoff	510,000 (231,400 Kgs)	60.0	42

*[1] This table is valid for ambient temperatures of 0 degree F or greater.

*[2] Make sure both RIGHT and CENTER hydraulic systems are fully pressurized and operational. Make sure both brake meter pressures indicate approximately 3000 psig on the LANDING GEAR BRKS/STRNG maintenance page.

*[3] These values are the minimum gross weight that is necessary to operate the engine at the specified power level and must be maintained for the duration of the engine run. The operating empty weight (OEW) values that follow should be used to calculate the minimum gross weight requirement: Airplanes OEW (approximately) 777-200LR 339,700 pounds (154,085 Kgs) and 777-200F 307,100 pounds (139,298 kgs). Minimum fuel quantity and distribution must be maintained during the engine run to cool the hydraulic system heat exchangers.

*[4] It is necessary to operate the opposite engine at this power level with the brakes applied, the parking set, and the wheel chocks installed (6-12 inches away from the front wheel positions 1, 2, 3 and 4 of the front tires, and behind but do not touch the rear wheel positions 9, 10, 11 and 12 of the rear tires). Make sure the nose gear is pointed straight ahead.

*[5] Max CG calculation is not necessary if the airplane is in the OEW configuration with only fuel added to satisfy the minimum airplane gross weight requirement.

*[6] Minimum idle weight for 777-200LR.

*[7] Minimum idle weight for 777-200F.

SUBTASK 71-00-00-860-011-H01

(16) Put these control switches for the hydraulic system, on the P5 panel, to the ON position:

(a) L ENG - PRIMARY

(b) C1 ELEC - PRIMARY

(c) C2 ELEC - PRIMARY

(d) R ENG - PRIMARY.

SUBTASK 71-00-00-860-264-H00

(17) Put these control switches for the hydraulic system, on the P5 panel, to the AUTO position:

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(a) L ELEC - DEMAND

(b) C1 AIR - DEMAND

(c) C2 AIR - DEMAND

(d) R ELEC - DEMAND.

SUBTASK 71-00-00-210-077-H00

(18) Make sure that the hydraulic systems are fully pressurized and operate correctly.

SUBTASK 71-00-00-210-021-H01

(19) Make sure that the two brake pressure indicators show approximately 3000 psig on the LANDING GEAR BRKS/STRNG maintenance page.

SUBTASK 71-00-00-210-022-H01

(20) Examine the engine oil level in the engine oil tank.

(a) If necessary, do this task: Engine Oil Replenishing, TASK 12-13-01-130-803-002.

SUBTASK 71-00-00-210-023-H01

(21) Do this task: IDG Oil Level Check, TASK 12-22-07-200-803.

(a) If necessary, do this task: IDG Oil Fill, TASK 12-13-03-600-802.

SUBTASK 71-00-00-210-024-H01

(22) Get access to the EICAS electrical maintenance page.

(a) Make sure that the oil level for the backup generator shows NORM (TASK 12-13-07-200-801).

(b) If it is necessary, do this task: Backup Generator Oil Fill, TASK 12-13-07-600-801.

SUBTASK 71-00-00-210-025-H01

(23) Do a check of the engine drain ports for fuel, oil and hydraulic leaks.

(a) Make sure that if fuel drained from the engine, it cannot cause a fire.

SUBTASK 71-00-00-860-012-H01

(24) Make sure that the forward thrust levers are in the idle thrust position.

SUBTASK 71-00-00-860-013-H01

(25) Make sure that all circuit breakers on these panels are closed.

NOTE: Do not close the circuit breakers which have a DO-NOT-CLOSE tag or an INOP collar.

(a) Overhead Circuit Breaker Panel, P11

(b) APU Auxiliary Panel, P49

(c) Power Panel - Left, P100

(d) Power Management Panel - Left, P110

(e) Power Panel - Right, P200

(f) Power Management Panel - Right, P210

(g) Power Panel - Auxiliary, P300

(h) Power Management Panel - Standby, P310

(i) Power Panel - Ground Service/Handling, P320.

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SUBTASK 71-00-00-860-014-H01

(26) Make sure that the applicable engine fire switch handle (DISCH LEFT or DISCH RIGHT) is in its usual (pushed in and locked) position.

NOTE: The engine fire switch handle (DISCH LEFT or DISCH RIGHT) is on the P8 panel of the control stand.

(a) When the fan and thrust reverser cowls are open, the fire extinguishing systems for the engine are not effective.

1) Make sure that you have sufficient fire extinguisher equipment available when it is necessary.

SUBTASK 71-00-00-860-015-H01

(27) Make sure that the parking brake lever, on the P10 panel, is in the ON (pulled up) position.

SUBTASK 71-00-00-860-016-H01

WARNING

MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKER FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF A THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND DAMAGE TO THE EQUIPMENT IN THE AREA OF THE NOSE RADOME.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	6	C34439	WXR L R/T
E	16	C34438	WXR R R/T

SUBTASK 71-00-00-860-262-H01

WARNING

MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE SEMI-LEVER GEAR CONTROL. ENGINE OPERATION CAN CAUSE THE SEMI-LEVER GEAR TO GO INTO LOCK UP MODE. THIS WILL CAUSE THE AIRPLANE TO SQUAT SLIGHTLY AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD RESULT.

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-00-860-017-H01

(30) If you do not want the warning speakers to sound during an engine operation, open these circuit breakers and attach DO-NOT-CLOSE tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

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NOTE: An aural warning will occur when engine speed is more than 60% N1 and the parking brake is set. It will also occur when engine speed is more than 60% N1 and flaps are at 20 units or more.

(a) If you operate the engine at 60% N1 or less, remove the DO-NOT-CLOSE tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-210-026-H01

(31) Do a check on EICAS display for previous fault messages.

(a) If it is necessary, press the CANCEL/RECALL button to remove EICAS messages on the display before you start the engine.

SUBTASK 71-00-00-860-018-H01

(32) If it is necessary, put the BEACON LIGHTS to ON.

SUBTASK 71-00-00-860-019-H01

WARNING MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR WHEN THE ENGINE IS POWERED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE CAN OCCUR.

(33) Make sure that the airplane is clear and that there are no persons in the dangerous areas (TASK 71-00-00-800-801-H01).

SUBTASK 71-00-00-860-020-H01

WARNING IF YOU MUST RETRACT THE FLAPS, MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE, THE TRAILING EDGE FLAPS AND FLAP DRIVE MECHANISMS. SERIOUS INJURY AND DAMAGE TO EQUIPMENT COULD OCCUR.

CAUTION IF THE FLAPS ARE EXTENDED FOR A LONG PERIOD OF TIME DURING HIGH POWERED OPERATION, THE ENGINE AIR FLOW CAN CAUSE DAMAGE TO THE FLAPS.

(34) If you operate the engine at high power, make sure that the flaps are fully retracted.

NOTE: For the safety concern, Boeing recommends that the inlet guard, SPL-9037 or equivalent inlet guard is used to prevent personnel injury and foreign object damage (FOD) to the engine.

(a) If the flaps are not retracted, do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

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SUBTASK 71-00-00-780-001-H01

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIR CONDITIONING SYSTEM CAN OCCUR.

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

END OF TASK

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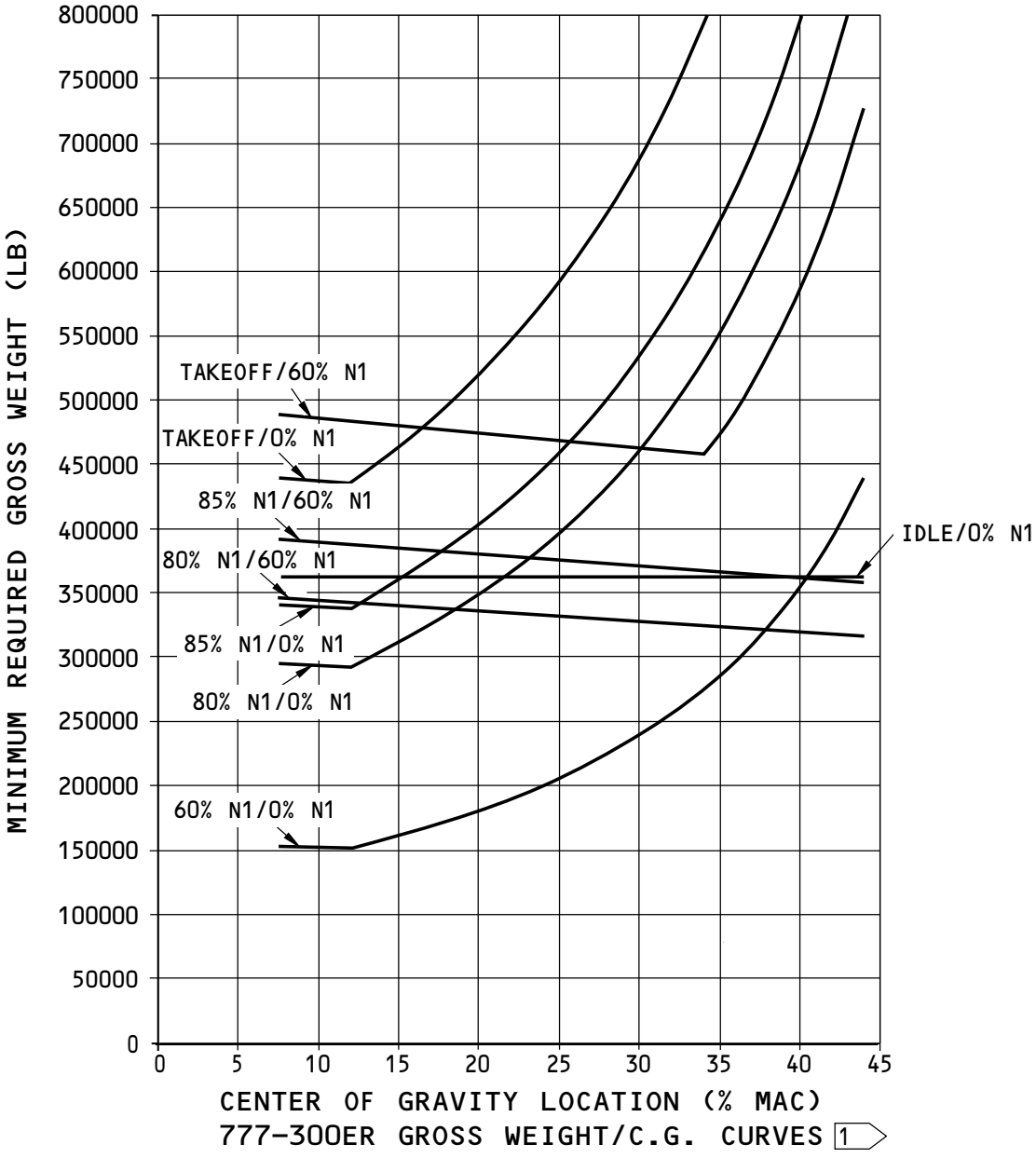

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.
GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

M06363 S0004285456_V3

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-300ER with 115K Pounds Thrust Base Line)
Figure 211/71-00-00-990-811-H01 (Sheet 1 of 2)

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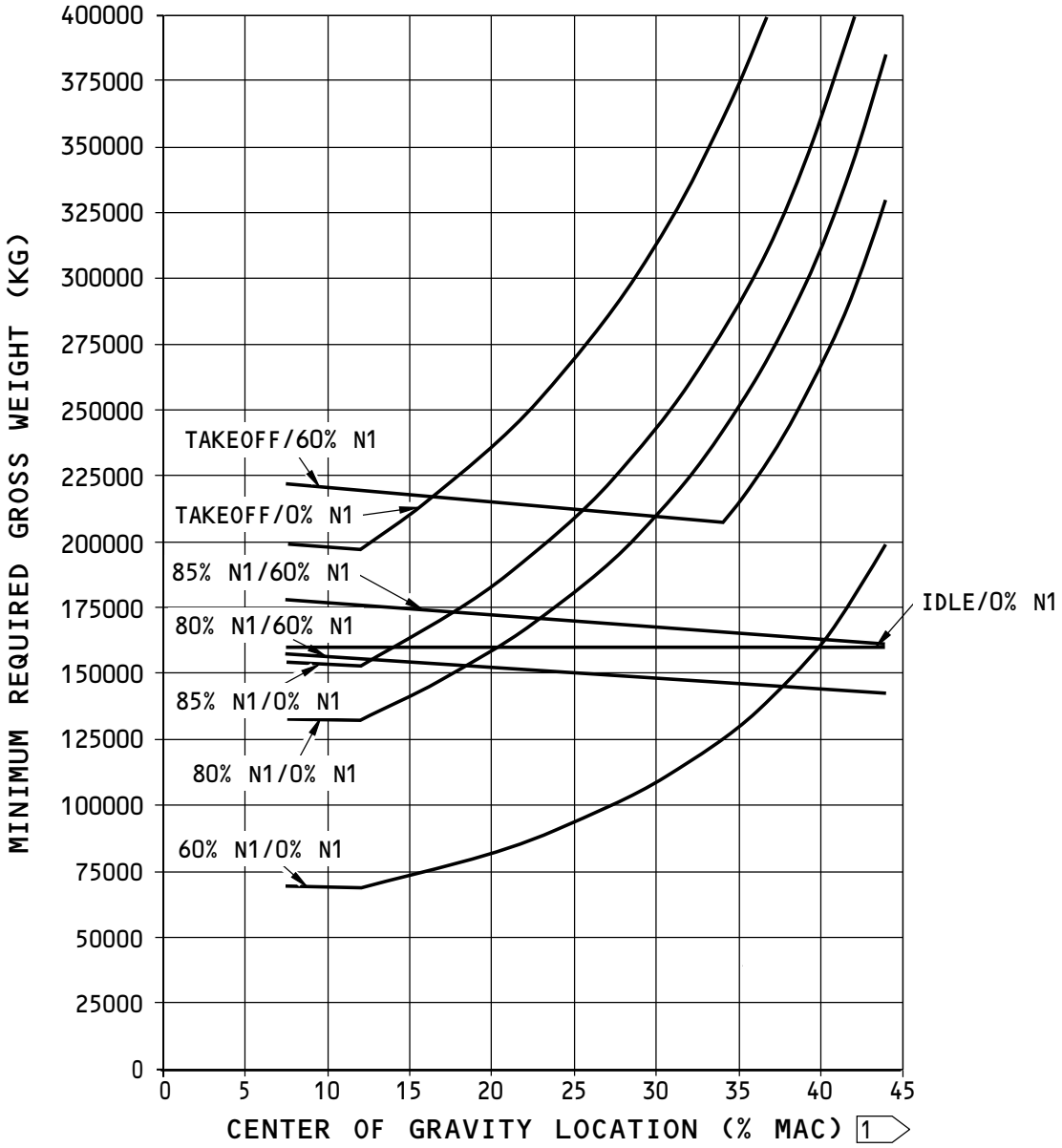

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.

GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

1989801 S0000386146_V2

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-300ER with 115K Pounds Thrust Base Line)
Figure 211/71-00-00-990-811-H01 (Sheet 2 of 2)

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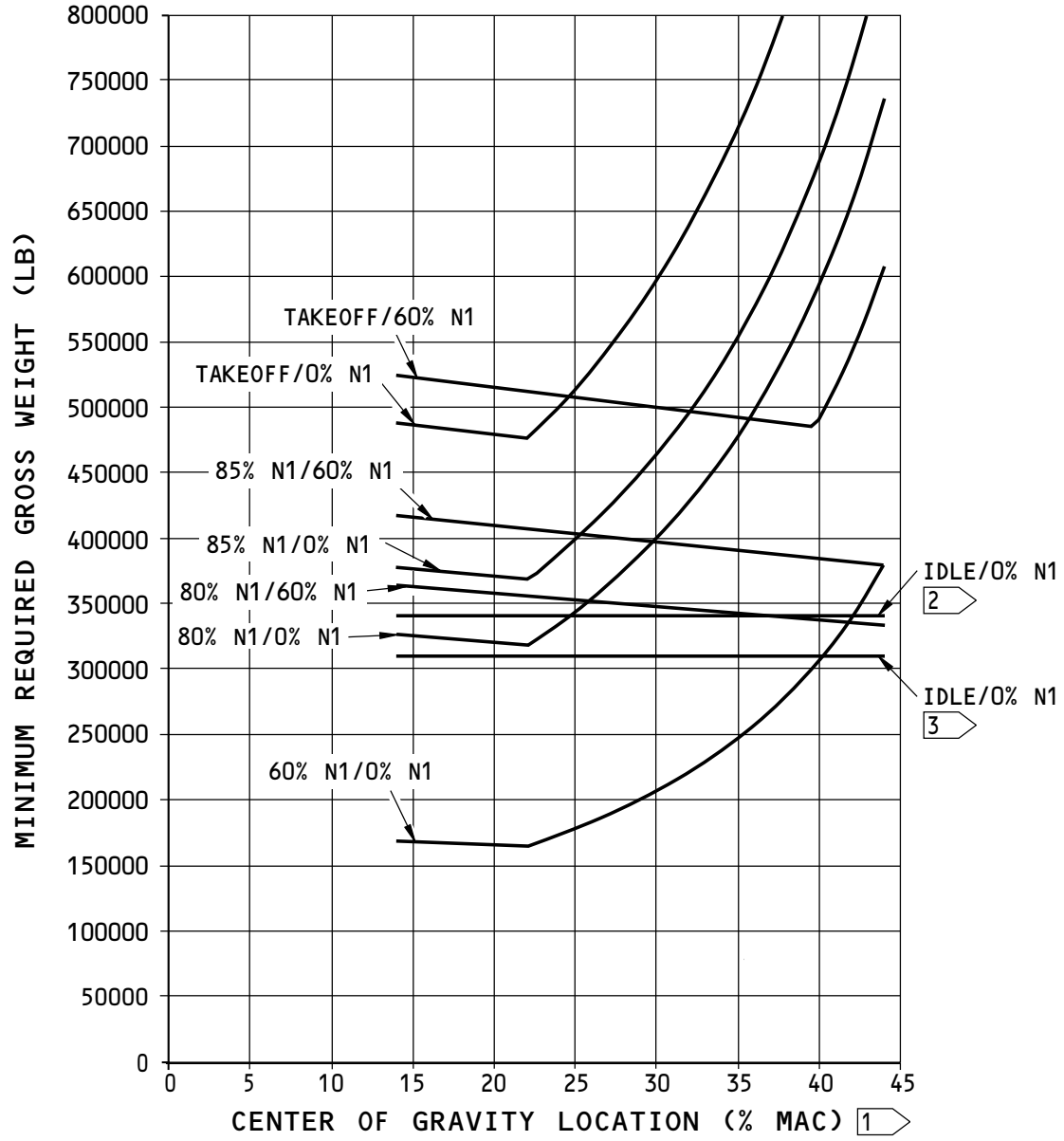

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.

GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

2 MINIMUM IDLE FOR 777-200LR

3 MINIMUM IDLE FOR 777-200F

1989821 S0000386143_V2

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-200LR and 777-200F with 115K Pounds Thrust Base Line)
Figure 212/71-00-00-990-851-H00 (Sheet 1 of 2)

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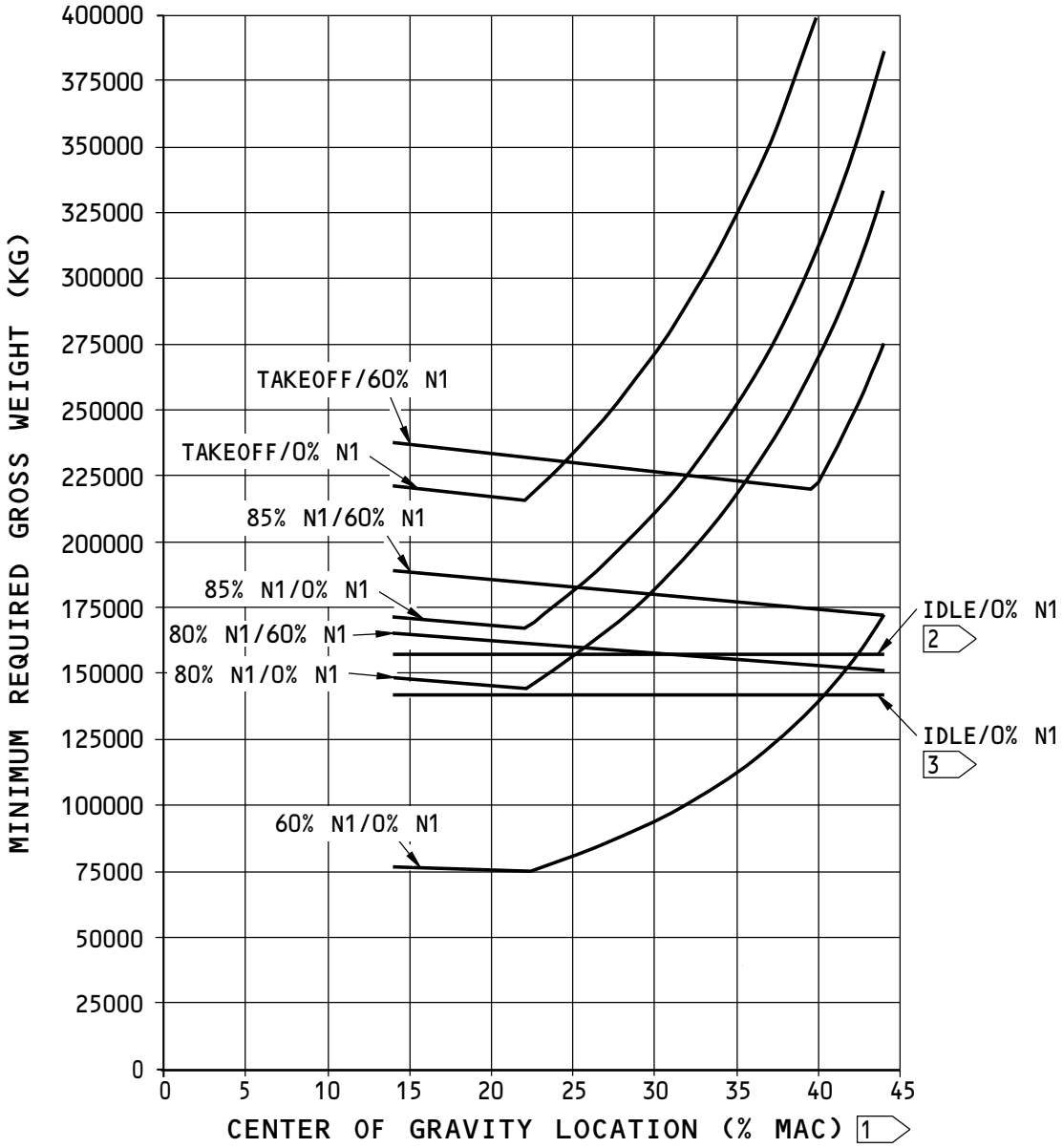

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.

GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

2 MINIMUM IDLE FOR 777-200LR

3 MINIMUM IDLE FOR 777-200F

1989827 S0000386147_V2

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-200LR and 777-200F with 115K Pounds Thrust Base Line)
Figure 212/71-00-00-990-851-H00 (Sheet 2 of 2)

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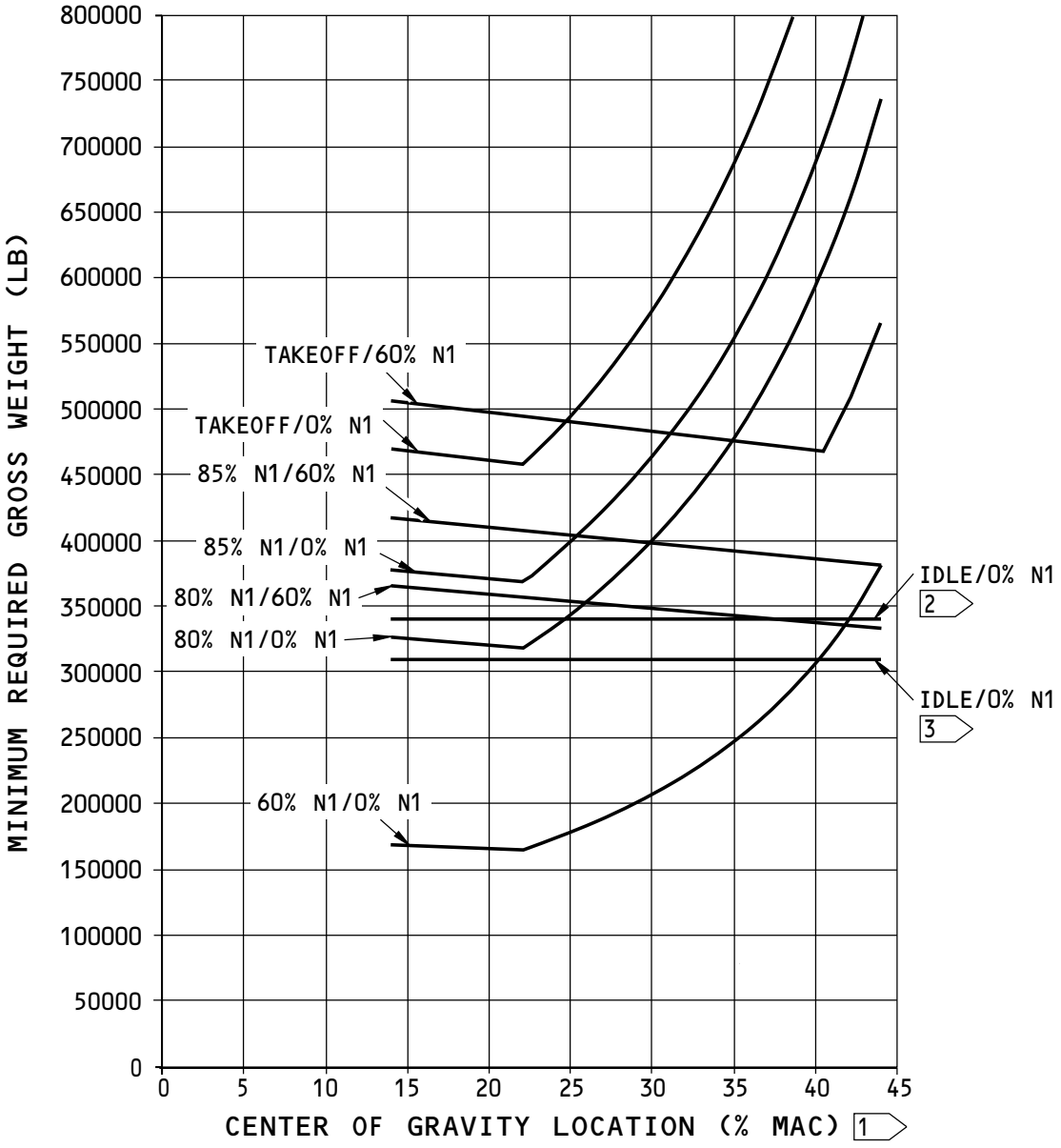

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.

GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

2 MINIMUM IDLE FOR 777-200LR

3 MINIMUM IDLE FOR 777-200F

1989829 S0000386144_V2

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-200LR and 777-200F with 110K Pounds Thrust Base Line)
Figure 213/71-00-00-990-852-H00 (Sheet 1 of 2)

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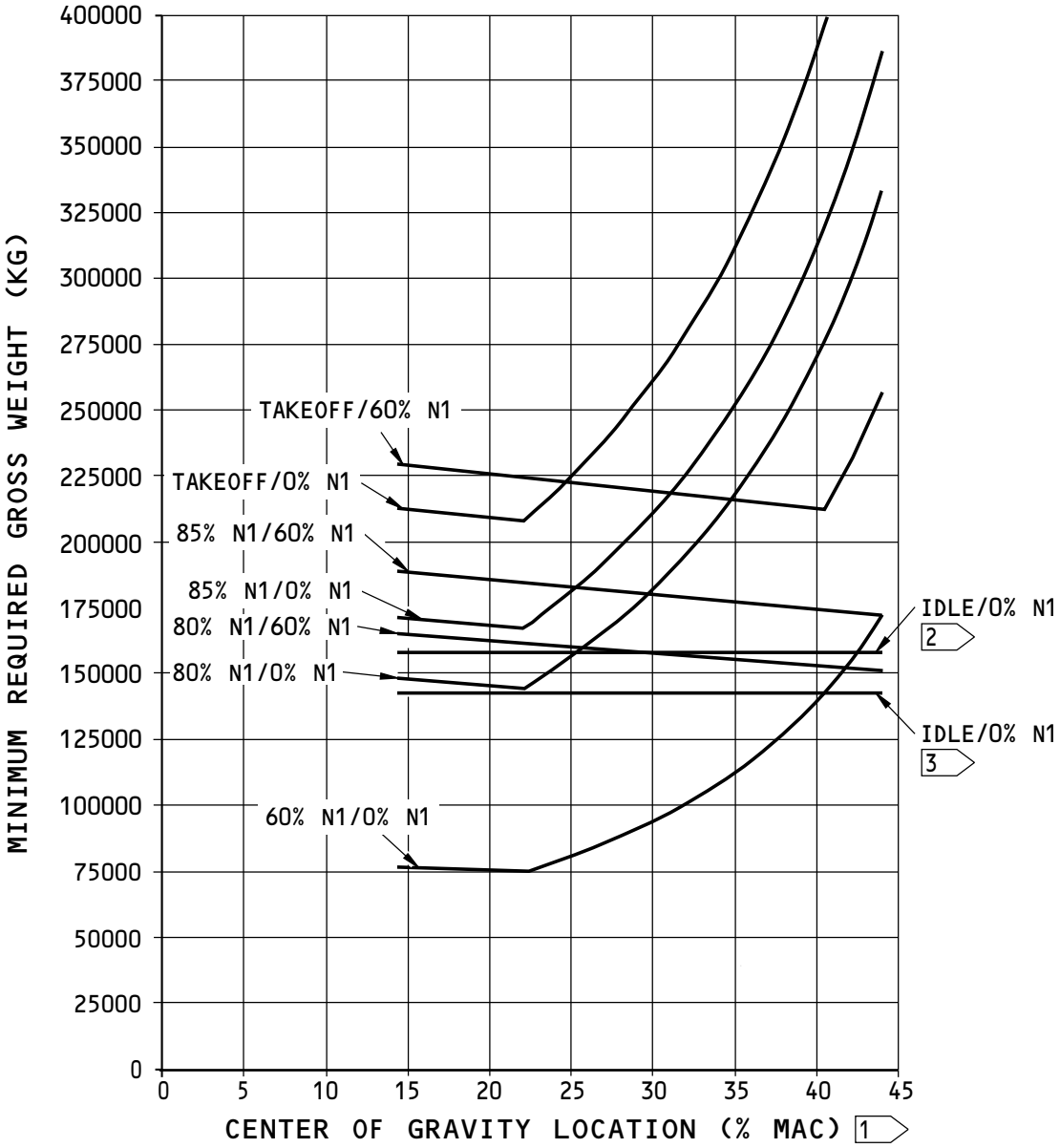

NOTE: REQUIRED GROSS WEIGHT VS CENTER OF GRAVITY FOR UNRESTRAINED ENGINE RUN WITH ALL BRAKES ACTIVE.

GROSS WEIGHT/CENTER OF GRAVITY (C.G.) OPERATING POINT MUST BE ABOVE THE CURVE FOR THE THRUST COMBINATION BEING TESTED.

1 TEST THRUST/BALANCE THRUST

2 MINIMUM IDLE FOR 777-200LR

3 MINIMUM IDLE FOR 777-200F

1989831 S0000386148_V2

Minimum Gross Weighted/Center of Gravity Curves for Engine Operation (777-200LR and 777-200F with 110K Pounds Thrust Base Line)
Figure 213/71-00-00-990-852-H00 (Sheet 2 of 2)

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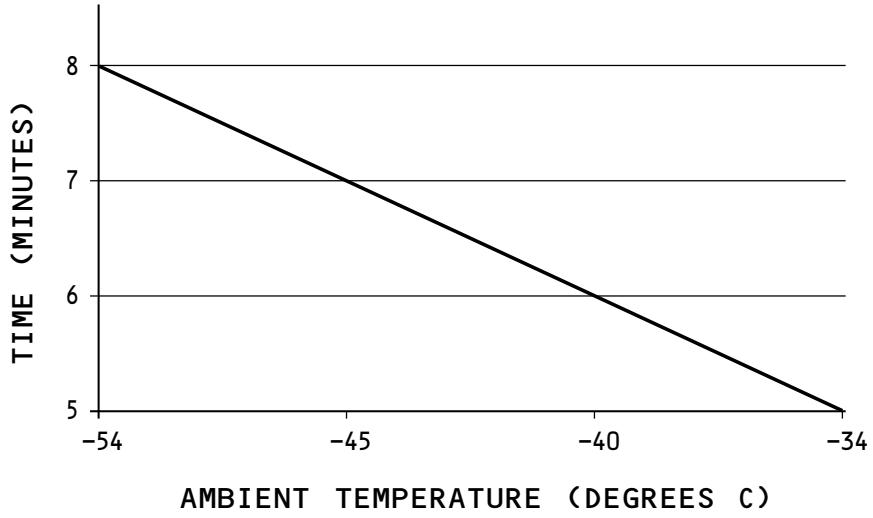

NOTE: THIS HEATING TIME IS FROM USING A HOT AIR BLOWER (1500 CFM) AT 131 DEGREES FAHRENHEIT (55 DEGREES CELSIUS) +/-10 DEGREES FAHRENHEIT (5 DEGREES CELSIUS).

5005286-00

2280394 S0000515021_V2

Heating Time for HMU Housing
Figure 214/71-00-00-990-850-H00

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TASK 71-00-00-800-835-H00

5. Engine Start (Selection)

A. General

(1) The purpose of this task is to permit the mechanics to select the applicable method to start the engine.

(2) The procedure can be used for the left engine or the right engine.

B. Procedure

SUBTASK 71-00-00-860-021-H01

CAUTION

THE AUTOMATIC PROTECTIVE FEATURES AND FUNCTIONS OF THE ENGINE ARE NOT FULLY AVAILABLE DURING ENGINE MANUAL START. YOU MUST MONITOR THE ENGINE DATA DURING THE ENGINE MANUAL START TO MAKE SURE THAT THEY ARE IN THE LIMITS OR ENGINE DAMAGE CAN OCCUR.

(1) Do one of these tasks to start the engine.

NOTE: For ground maintenance or troubleshooting, use Engine Automatic Start, TASK 71-00-00-800-805-H01 unless you are troubleshooting an Engine Manual Start fault, a Manual Override of the Starter Air Valve fault or a Cross-bleed start fault.

NOTE: The ADIRU and SAARU must both be powered in order for the engine controls to operate in normal mode. If either ADIRU or SAARU are inoperative, the EECs will operate in an alternate mode.

(a) Engine Automatic Start, TASK 71-00-00-800-805-H01.

(b) Engine Manual Start, TASK 71-00-00-800-806-H01.

(c) Engine Start (Manual Override of Starter Air Valve), TASK 71-00-00-800-807-H01.

(d) Engine Cross Bleed Start, TASK 71-00-00-800-808-H01.

——— END OF TASK ———

TASK 71-00-00-800-805-H01

6. Engine Automatic Start

(Figure 215)

A. General

(1) This procedure has the steps that are necessary to start the engine with the automatic start procedure.

(2) This task provides the instructions on how to start the engine automatically.

(3) You must monitor engine data during the start to make sure that they are in the limits. Monitor the EGT, engine oil pressure, N1 and N2 rotor speeds and the vibration during the start.

(4) The EEC (FADEC) will automatically stop the automatic start procedure if the EGT, low oil pressure, N1, or N2 rpm and acceleration are not satisfactory.

(5) You can manually stop the start procedure at all times during the automatic start procedure.

(6) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(7) During the start, keep the service air bleed inputs and accessory loads to a minimum.

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B. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
49-11-00-860-804	APU Starting and Operation (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Automatic Start Procedure

SUBTASK 71-00-00-860-022-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-300-H00

(2) Make sure that you pressurize the pneumatic system.

SUBTASK 71-00-00-860-029-H01

(3) If necessary, operate the APU (TASK 49-11-00-860-804).

SUBTASK 71-00-00-860-023-H01

(4) For the left engine start, set the L FUEL PUMPS FWD and AFT switches, on the P5 panel, to ON.

SUBTASK 71-00-00-860-292-H00

(5) For the right engine start, set the R FUEL PUMPS FWD and AFT switches, on the P5 panel, to ON.

SUBTASK 71-00-00-860-024-H01

(6) Set the forward thrust lever to the minimum idle position.

SUBTASK 71-00-00-860-025-H01

(7) Set the reverse thrust lever to the forward (down) position.

SUBTASK 71-00-00-860-026-H01

(8) Set the ENGINE AUTOSTART switch, on the P5 panel, to ON.

SUBTASK 71-00-00-860-027-H01

(9) Set the BLEED AIR L, C, and R ISLN, and APU switches, on the P5 panel, to AUTO.

SUBTASK 71-00-00-860-030-H01

(10) Set the applicable ENGINE L(R) START/IGNITION switch, on the P5 panel, to START.

SUBTASK 71-00-00-860-031-H01

(11) Set the applicable L(R) FUEL CONTROL switch, on the P10 panel, to RUN.

SUBTASK 71-00-00-860-323-H00

CAUTION

IF AN ENGINE IS RESTARTED IN A 2 HOUR TO 4 HOUR SHUTDOWN PERIOD AFTER HIGH POWER OPERATION, A BOWED ROTOR START CAN OCCUR. BOWED ROTOR STARTS CAN CAUSE HIGH N2 VIBRATIONS.

(12) Monitor the vibration on the EICAS display.

(a) If the N2 vibration values are more than 4.0 units, set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

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(b) Do this task: Dry Motor, TASK 71-00-00-800-836-H00. Continue to dry motor for 60 seconds.

(c) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(d) Wait 5 minutes before you start the engine.

SUBTASK 71-00-00-210-027-H01

(13) Make sure that the manifold duct pressure is between 30 - 45 psig (207 - 310 kPa).

NOTE: The engine start time will be longer and engine start EGT will be higher for low starter air pressure.

SUBTASK 71-00-00-210-028-H01

CAUTION

DO NOT OPERATE THE ENGINE IF THERE IS NO INDICATION OF OIL PRESSURE BY THE TIME THE ENGINE HAS ACCELERATED TO MINIMUM IDLE. DO NOT OPERATE THE ENGINE IF THE OIL PRESSURE HAS DROPPED TO LESS THAN 10. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

(14) Monitor N1, N2, oil pressure, fuel flow, EGT and vibration to make sure that the automatic start procedure is satisfactory.

NOTE: During the engine start under the cold conditions, oil pressure increases due to high oil viscosity. Then oil pressure decreases as the oil temperature increases. If the oil pressure remains above the normal range after the oil temperature stabilizes, shut down the engine and do an investigation.

NOTE: Lubrication unit shaft failures have been reported during or immediately after engine start in cold conditions. This has caused no oil pressure. Monitor the engine oil pressure during and immediately after engine start.

SUBTASK 71-00-00-860-032-H01

(15) During the automatic start, the EEC will automatically energize the ignition and start the fuel flow.

(a) Ignition is energized and fuel flow will start when the N2 rotor speed is approximately 22% (+ 15 seconds).

SUBTASK 71-00-00-860-033-H01

(16) Monitor the EGT for engine ignition.

(a) The EGT must start to increase in less than 15 seconds from the time that the fuel flow starts.

(b) If the EGT does not increase in 15 seconds after the fuel and ignition are ON, the EEC (FADEC) will automatically signal to turn off the fuel and ignition. EEC will motor the engine for 30 seconds to remove the fuel and vapors, and try to start the engine again with the two ignition systems.

SUBTASK 71-00-00-210-029-H01

(17) Monitor the N1, N2, fuel flow, and the EGT carefully during the start procedure for unusual indications.

NOTE: If the starter air pressure is low, the engine starting time will be slower and EGT will be higher. If the N1 does not turn by the time that the engine is at idle, stop the engine immediately.

(a) The N1 and N2 rpm must continuously increase to idle.

(b) The EGT must increase within the ground start limit.

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(c) Make sure that the fuel flow is approximately 800 pounds/hour (363 kilograms/hour) before the engine lights.

SUBTASK 71-00-00-860-034-H01

(18) During the automatic start, if the EGT increases too quickly or is more than the limit, the EEC will stop the automatic start. If the EEC does not stop the automatic start, do these steps:

(a) Monitor the starter air valve indication on the EICAS AIR synoptic display.

1) If the starter air valve indication is not shown on the EICAS AIR synoptic display, EEC (FADEC) has stopped the engine start.

2) Immediately set the applicable L(R) FUEL CONTROL switch, on the P10 panel, to CUTOFF.

(b) Make a record of the length of time and the highest temperature of the engine during a temperature exceedance condition.

SUBTASK 71-00-00-860-035-H01

(19) During the automatic start, the EEC will close the starter air valve and de-energize the ignition when the engine is stable at idle.

NOTE: The ENGINE L(R) START/IGNITION switch on the overhead panel, P5, returns to NORM at approximately 68-70% N2. The igniter will de-energize at approximately 56-67% N2.

SUBTASK 71-00-00-860-036-H01

(20) The EEC (FADEC) will automatically signal to stop the start if one of these failure conditions occurs:

(a) If the EGT does not increase in less than 15 seconds after fuel flow is started

(b) If the N1 rotor does not start to turn by 60% N2 (locked N1 rotor)

(c) If the EGT is more than the automatic start limits

(d) If there is an engine surge indication.

NOTE: When the EEC aborts an automatic start of the engine, that will cause a maintenance message. Refer to the fault isolation manual for the applicable troubleshooting steps.

(e) If the engine reaches an initial motoring N2 (52.7%) and oil pressure is low (less than 10 psi).

NOTE: EEC will initiate the Failed Start Sequence.

NOTE: Does not affect inflight starts.

SUBTASK 71-00-00-860-037-H01

(21) During a stop in the automatic start procedure, the EEC (FADEC) will automatically signal to engage the starter at the maximum starter speed for 30 seconds to dry motor the engine.

SUBTASK 71-00-00-860-038-H01

(22) When the engine reaches the idle speed, make sure the ENGINE L(R) START/IGNITION switch on the overhead panel, P5, is automatically set to NORM.

NOTE: An EICAS message will show if the ENGINE L(R) START/IGNITION switch is not in the correct position.

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SUBTASK 71-00-00-860-294-H00

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

END OF TASK

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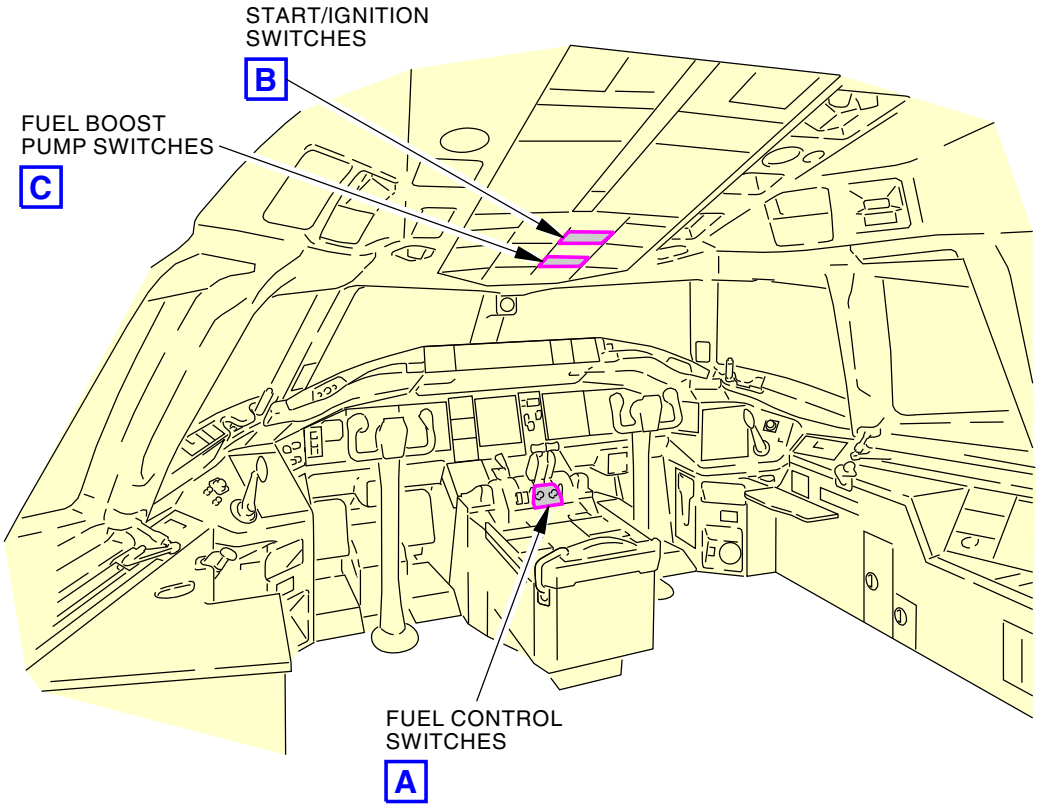
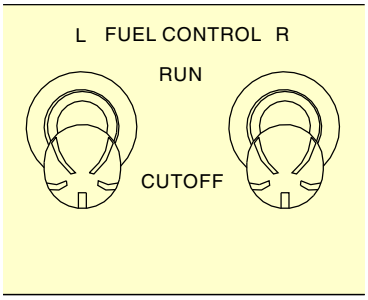


FLIGHT COMPARTMENT



FUEL CONTROL SWITCHES

A

M06357 S0004285459_V2

Engine Start Switches
Figure 215/71-00-00-990-812-H01 (Sheet 1 of 2)

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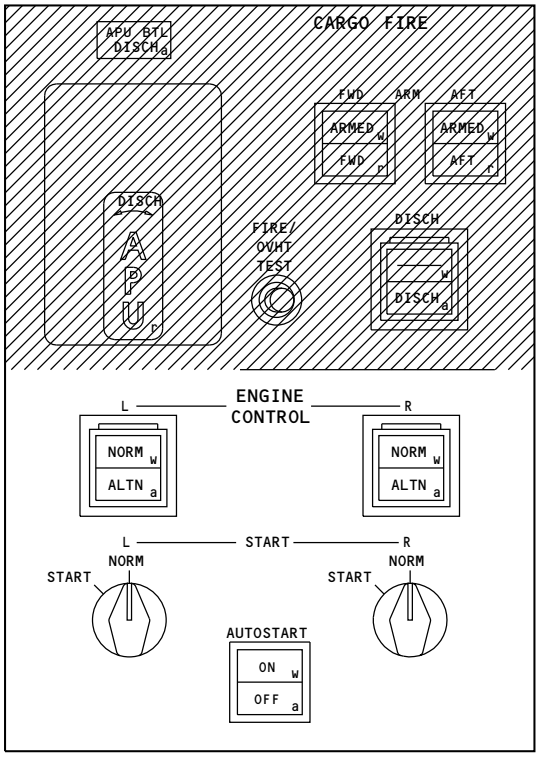
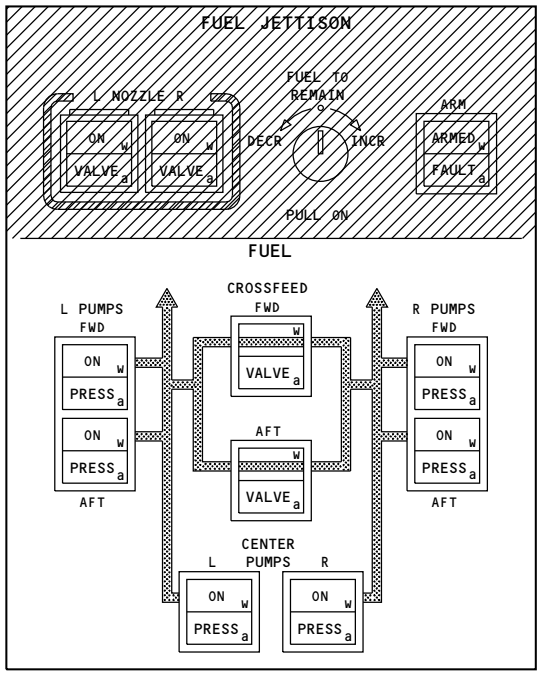


START SWITCHES

B



FUEL BOOST PUMP SWITCHES

C

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Engine Start Switches
Figure 215/71-00-00-990-812-H01 (Sheet 2 of 2)

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TASK 71-00-00-800-806-H01

7. Engine Manual Start

A. General

(1) This procedure has the steps that are necessary to start the engine manually.

(2) You must monitor the exhaust gas temperature (EGT) very carefully during the start. You must make sure that the engine does not go more than the EGT limits.

(3) You must monitor the other engine data during the start to make sure that they are in the limits. Monitor the engine oil pressure, N1 and N2 rotor speeds and vibration during the start.

(4) You must manually stop the start during the manual start procedure when the engine data is not satisfactory.

(5) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(6) During the start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
49-11-00-860-804	APU Starting and Operation (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Manual Start

SUBTASK 71-00-00-860-040-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-299-H00

(2) Make sure that you pressurize the pneumatic system.

SUBTASK 71-00-00-860-047-H01

(3) If necessary, operate the APU (TASK 49-11-00-860-804).

SUBTASK 71-00-00-860-041-H01

(4) Set the FUEL L(R) PUMPS FWD and AFT switches on the P5 panel to ON for the fuel tank on the same side as the engine that will be started.

SUBTASK 71-00-00-860-042-H01

(5) Set the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-043-H01

(6) Set the reverser thrust lever to the forward (down) position.

SUBTASK 71-00-00-860-044-H01

(7) Set the ENGINE AUTOSTART switch on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-045-H01

(8) Set the BLEED AIR L, R, and C ISLN, and APU switches on the overhead panel, P5, to AUTO.

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SUBTASK 71-00-00-860-048-H01

(9) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

SUBTASK 71-00-00-210-030-H01

(10) Make sure the manifold duct pressure is approximately between 30-45 psig (207-310 kPa).

NOTE: The engine start time will be longer and engine start EGT will be higher for low starter air pressure.

SUBTASK 71-00-00-860-049-H01

(11) Make sure the N2 increases.

SUBTASK 71-00-00-860-050-H01

CAUTION

DO NOT OPERATE THE ENGINE IF THERE IS NO INDICATION OF OIL PRESSURE BY THE TIME THE ENGINE HAS ACCELERATED TO MINIMUM IDLE. DO NOT OPERATE THE ENGINE IF THE OIL PRESSURE HAS DROPPED TO LESS THAN 10. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

(12) Make sure the engine oil pressure increases.

NOTE: During the engine start under the cold conditions, oil pressure increases due to high oil viscosity. Then oil pressure decreases as the oil temperature increases. If the oil pressure remains above the normal range after the oil temperature stabilizes, shut down the engine and do an investigation.

NOTE: Lubrication unit shaft failures have been reported during or immediately after engine start in cold conditions. This has caused no oil pressure. Monitor the engine oil pressure during and immediately after engine start.

SUBTASK 71-00-00-860-052-H01

(13) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to RUN when N2 is at maximum motoring speed (22-31% N2).

NOTE: Do not set the fuel control switch to run if the maximum motoring speed is less than 22%. The starter is not serviceable.

SUBTASK 71-00-00-860-327-H00

(14) Make sure the N1 increases.

(a) If N1 does not increase by the time N2 reaches the 60%, stop the start.

SUBTASK 71-00-00-860-324-H00

CAUTION

IF AN ENGINE IS RESTARTED IN A 2 HOUR TO 4 HOUR SHUTDOWN PERIOD AFTER HIGH POWER OPERATION, A BOWED ROTOR START CAN OCCUR. BOWED ROTOR STARTS CAN CAUSE HIGH N2 VIBRATIONS.

(15) Monitor the vibration on the EICAS display.

(a) If the N2 vibration are more than 4.0 units, set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

(b) Do this task: Dry Motor, TASK 71-00-00-800-836-H00. Continue to dry motor for 60 seconds.

(c) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(d) Wait 5 minutes before you start the engine.

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SUBTASK 71-00-00-210-031-H01

(16) Monitor the N1, N2, fuel flow, EGT and vibration carefully during the start procedure for all unusual indications.

(a) The N1 and N2 rpm must continuously increase to idle speed.

(b) The EGT must continuously increase to idle EGT.

(c) If N2 slowly accelerates with a fast increase in EGT to the limits of 750 ° C (1382 ° F), you must stop the start and the fuel immediately.

(d) Make sure the fuel flow shows (approximately 800 PPH or 363 KPH) before engine light off.

SUBTASK 71-00-00-860-053-H01

(17) During the start procedure, if the EGT increases too fast or is more than the start temperature limit (750 ° C or 1382 ° F), do these steps.

(a) Monitor the SAV indication on the EICAS AIR synoptic display.

1) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

(b) Do the task: Dry Motor, TASK 71-00-00-800-836-H00.

1) Continue to dry motor for 30 seconds.

(c) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(d) Make a record of the time and the highest temperature that occurs during an overtemperature.

SUBTASK 71-00-00-860-054-H01

(18) Monitor the start carefully for one of the conditions that follow:

(a) If the N2 rotor does not start to turn (locked N2 rotor)

(b) If the N2 rotor does not turn at the usual motor speed

(c) If the N1 rotor does not start to turn when the N2 approaches idle (locked N1)

(d) If the oil pressure does not increase after the FUEL CONTROL switch is set to RUN.

1) If one or more of the above conditions occur during start, do these steps:

a) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

b) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-055-H01

(19) Monitor the start carefully for one of the conditions that follow:

(a) If the fuel flow or ignition is accidentally stopped.

(b) If the EGT does not start to increase in less than 15 seconds after the FUEL CONTROL switch on the control stand panel, P10, is set to RUN.

1) If one or more of the above conditions occur during start, do these steps:

a) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

b) Do the task: Dry Motor, TASK 71-00-00-800-836-H00.

c) Continue to dry motor the engine for 30 seconds.

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2) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-056-H01

(20) Make sure the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, goes to the NORM position at approximately 68-70% of N2. The igniter will de-energize at approximately 56-67% N2.

SUBTASK 71-00-00-860-295-H00

CAUTION MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

——— END OF TASK ———

TASK 71-00-00-800-807-H01

8. Engine Start (Manual Override of Starter Air Valve)

(Figure 216)

A. General

(1) This procedure has the steps that are necessary to manually override the starter air valve to start the engine. A SAV manual control handle will permit you to open and close the starter air valve.

(2) Start procedures that use the SAV manual control are very similar to the normal start procedures.

(3) Make sure to have communication between the ground personnel and the person in the flight compartment.

(4) You must monitor the exhaust gas temperature (EGT) very carefully during the start. You must make sure that the engine does not go more than the EGT limits.

(5) You must monitor the other engine data during the start to make sure that they are in the limits. Monitor the oil pressure, N1 and N2 rotor speeds and vibration during the start.

(6) You must manually stop the start during the manual override start procedure when the engine data is not satisfactory.

(7) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(8) During the start, keep the service air bleed inputs and accessory loads to a minimum.

(9) The manual override start is done when the fan cowl panels and the thrust reversers are closed.

B. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
49-11-00-860-804	APU Starting and Operation (P/B 201)

C. Tools/Equipment

Reference	Description
STD-421	Goggles - Eye Protection

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(Continued)

Reference	Description
STD-1181	Gloves - Heat Protective

D. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

E. Access Panels

Number	Name/Location
415JB	Thrust Reverser Latch Panel, Left Engine
425JB	Thrust Reverser Latch Panel, Right Engine

F. Manual Override Start

SUBTASK 71-00-00-860-058-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-298-H00

(2) Make sure that you pressurize the pneumatic system.

SUBTASK 71-00-00-860-065-H01

(3) If necessary, operate the APU (TASK 49-11-00-860-804).

SUBTASK 71-00-00-010-007-H01

(4) For the person on the ground, do these steps:

(a) Open the applicable latch access door on the thrust reverser to get access to the SAV manual control handle for the starter air valve.

1) For the left engine;

Number	Name/Location
415JB	Thrust Reverser Latch Panel, Left Engine

2) For the right engine;

Number	Name/Location
425JB	Thrust Reverser Latch Panel, Right Engine

SUBTASK 71-00-00-860-059-H01

(5) Set the FUEL L(R) PUMPS FWD and AFT switches on the P5 panel to ON for the fuel tank on the same side as the engine that will be started.

SUBTASK 71-00-00-860-060-H01

(6) Set the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-061-H01

(7) Set the reverser thrust lever to the forward (down) position.

SUBTASK 71-00-00-860-062-H01

(8) Set the ENGINE AUTOSTART switch on the overhead panel, P5, to ON.

SUBTASK 71-00-00-860-063-H01

(9) Set the BLEED AIR L, R, and C ISLN, and APU switches on the overhead panel, P5, to AUTO.

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SUBTASK 71-00-00-860-066-H01

(10) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

SUBTASK 71-00-00-860-067-H01

WARNING THE PERSON ON THE GROUND MUST WEAR GOGGLES, GLOVES, AND PROTECTIVE CLOTHING ON THE ARMS. THE HOT AIRFLOW OR THE HIGH AIRFLOW FROM THE STARTER CAN CAUSE INJURY TO PERSONS.

CAUTION MAKE SURE THAT THERE IS AIR PRESSURE IN THE STARTER AIR DUCT. IF THERE IS NO AIR PRESSURE, DAMAGE TO THE STARTER AIR VALVE CAN OCCUR.

(11) Open the starter air valve as follows:

(a) Make sure the person on the ground wears eye protection goggles, STD-421, heat protective gloves, STD-1181 and the protective clothing.

(b) Tell the person to ensure that the SAV manual control handle is engaged.

(c) Turn the SAV manual control handle clockwise (1 and 1/4 turns) to fully open the starter air valve.

(d) Tell the person to hold the starter air valve in the OPEN position.

SUBTASK 71-00-00-860-068-H01

(12) Make sure the N2 increases.

SUBTASK 71-00-00-860-069-H01

CAUTION DO NOT OPERATE THE ENGINE IF THERE IS NO INDICATION OF OIL PRESSURE BY THE TIME THE ENGINE HAS ACCELERATED TO MINIMUM IDLE. DO NOT OPERATE THE ENGINE IF THE OIL PRESSURE HAS DROPPED TO LESS THAN 10. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

(13) Make sure the engine oil pressure increases.

NOTE: During the engine start under the cold conditions, oil pressure increases due to high oil viscosity. Then oil pressure decreases as the oil temperature increases. If the oil pressure remains above the normal range after the oil temperature stabilizes, shut down the engine and do an investigation.

NOTE: Lubrication unit shaft failures have been reported during or immediately after engine start in cold conditions. This has caused no oil pressure. Monitor the engine oil pressure during and immediately after engine start.

SUBTASK 71-00-00-860-071-H01

(14) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to RUN when N2 is at maximum motoring speed.

NOTE: Do not set the fuel control switch to run if the maximum motoring speed is less than 22%. The starter is not serviceable.

SUBTASK 71-00-00-860-328-H00

(15) Make sure the N1 increases.

(a) If N1 does not increase by the time N2 reaches the 60%, stop the start.

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SUBTASK 71-00-00-860-326-H00

CAUTION

IF AN ENGINE IS RESTARTED IN A 2 HOUR TO 4 HOUR SHUTDOWN PERIOD AFTER HIGH POWER OPERATION, A BOWED ROTOR START CAN OCCUR. BOWED ROTOR STARTS CAN CAUSE HIGH N2 VIBRATIONS.

(16) Monitor the vibration on the EICAS display.

(a) If the N2 vibration values are more than 4.0 units, set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

(b) Do this task: Dry Motor, TASK 71-00-00-800-836-H00. Continue to dry motor for 60 seconds.

(c) Set the applicable ENGINE L(R) START/ IGNITION switch on the overhead panel, P5, to NORM.

(d) Wait 5 minutes before you start the engine.

SUBTASK 71-00-00-210-032-H01

(17) Monitor the N1, N2, fuel flow, EGT and vibration carefully during the start procedure for all unusual indications.

(a) The N1 and N2 rpm must continuously increase to idle speed.

(b) The EGT must continuously increase to the idle EGT limits.

(c) If N2 slowly accelerate with a fast increase in EGT to limits of 750 ° C (1382 ° F), you must stop the start immediately.

(d) Make sure the fuel flow shows (approximately 800 PPH or 363 KPH) before engine light off.

SUBTASK 71-00-00-860-072-H01

(18) During the start procedure, if the EGT increases too fast or is more than the start temperature limit (750 °C or 1382 ° F), stop the engine start immediately.

(a) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

(b) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(c) Make a record of the time and the highest temperature that occurs during an overtemperature.

SUBTASK 71-00-00-860-073-H01

(19) During the start if one of the conditions that follow occurs, stop the engine: (TASK 71-00-00-800-837-H00).

(a) If the N2 rotor does not start to turn (locked N2 rotor)

(b) If the N2 rotor does not turn at the usual motor speed

(c) EGT increase is too fast and could go above the EGT start limits

(d) If the N1 rotor does not start to turn when the N2 approaches idle (locked N1)

(e) If the fuel flow or ignition is accidentally stopped

(f) If the EGT does not start to increase in less than 15 seconds after the FUEL CONTROL switch is set to RUN

(g) If the oil pressure does not increase after the L(R) FUEL CONTROL switch is set to RUN.

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SUBTASK 71-00-00-860-074-H01

CAUTION

KEEP ENGINE MOTORING TO A MINIMUM. ENGINE MOTORING FOR A LONG TIME CAN CAUSE DAMAGE TO THE ENGINE STARTER.

(20) If you stop the start, dry motor the engine during shutdown (TASK 71-00-00-800-836-H00).

(a) Do the dry motor procedure for 30 seconds minimum to cool the engine and remove the fuel that has not burn from the engine.

SUBTASK 71-00-00-210-033-H01

CAUTION

AT 62% N2, TURN THE SAV MANUAL CONTROL HANDLE TO CLOSE THE STARTER AIR VALVE. SPEEDS THAT ARE HIGHER THAN 62% N2 WITH THE STARTER AIR VALVE OPEN CAN CAUSE DAMAGE TO THE ENGINE STARTER.

(21) At 62% N2, close the valve as follows:

(a) Tell the person on the ground to turn the SAV manual control handle counterclockwise (1 and 1/4 turns) back to its initial position.

SUBTASK 71-00-00-860-075-H01

(22) Make sure the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, goes to the NORM position at approximately 68-70% of N2. The igniter will de-energize at approximately 56-67% N2.

SUBTASK 71-00-00-860-076-H01

(23) Tell the person on the ground to put the SAV manual control handle to the stowed position.

SUBTASK 71-00-00-010-008-H01

(24) For the person on the ground, do these steps:

(a) Close the latch access door on the applicable thrust reverser.

1) For the left engine;

Number	Name/Location
415JB	Thrust Reverser Latch Panel, Left Engine

2) For the right engine;

Number	Name/Location
425JB	Thrust Reverser Latch Panel, Right Engine

SUBTASK 71-00-00-860-296-H00

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

END OF TASK

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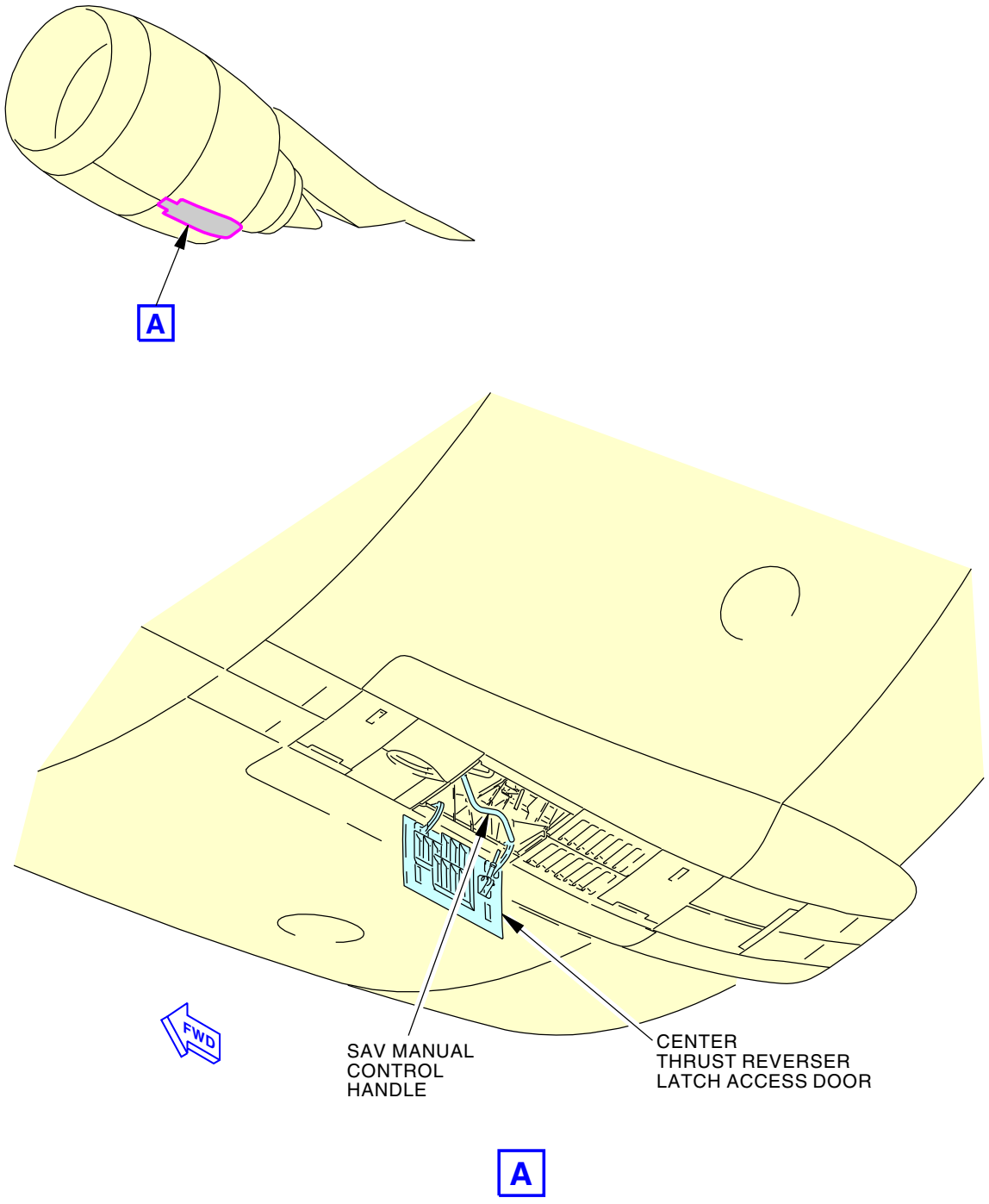

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Manual Override Start
Figure 216/71-00-00-990-813-H01

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TASK 71-00-00-800-808-H01

9. Engine Cross Bleed Start

(Figure 215)

A. General

(1) This procedure has the steps that are necessary to do the engine cross bleed start.

(2) You must monitor engine data during the start to make sure that they are in the limits. Monitor the EGT, engine oil pressure, N1 and N2 rotor speeds and the vibration during the start.

(3) The EEC (FADEC) will automatically stop the automatic start procedure if the EGT, N1, or N2 rpm and acceleration are not satisfactory.

(4) You can manually stop the start procedure at all times during the start cross bleed start procedure.

(5) Do each step of the procedure in sequence. If you stop the cross bleed start, you must do each step of the sequence again.

(6) During the cross bleed start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Engine Cross Bleed Start

SUBTASK 71-00-00-860-078-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-079-H01

(2) Start the opposite engine (TASK 71-00-00-800-835-H00).

(a) Let the engine become stable at the idle.

SUBTASK 71-00-00-860-080-H01

(3) Set the BLEED AIR L, R, and C ISLN, and APU switches on the overhead panel, P5, to AUTO.

SUBTASK 71-00-00-860-081-H01

(4) Set the AIR CONDITIONING L and R PACK switches on the overhead panel, P5, to AUTO.

(a) Make sure that the flow control valves in the Cabin Air Conditioning and Temperature Control System (CACTCS) are OPEN and there is stable flow to the packs.

SUBTASK 71-00-00-860-082-H01

(5) Get access to the 36 Air Supply Maintenance Page or synoptic display (TASK 31-61-00-800-804).

(a) Make sure that the L and R MANIFOLD DUCT PRESSURE is more than 20 psig.

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SUBTASK 71-00-00-860-083-H01

(6) Set the applicable BLEED AIR L(R) ENG switch (for opposite engine) on the overhead panel, P5, to ON.

SUBTASK 71-00-00-860-084-H01

(7) Set the BLEED AIR APU switch on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-085-H01

(8) Set the BLEED AIR L(R) ENG switch (for start engine) on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-086-H01

(9) Set the FUEL L(R) PUMPS FWD and AFT switches on the P5 panel to ON for the fuel tank on the same side as the engine that will be started.

SUBTASK 71-00-00-860-087-H01

(10) Set the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-088-H01

(11) Set the reverser thrust lever to the forward (down) position.

SUBTASK 71-00-00-860-089-H01

(12) Set the ENGINE AUTOSTART switch on the overhead panel, P5, to ON.

SUBTASK 71-00-00-860-090-H01

(13) Increase the opposite engine speed to 77-79 % N2.

SUBTASK 71-00-00-200-002-H00

(14) Make sure that L and R MANIFOLD DUCT PRESSURE is more than 30 psig.

SUBTASK 71-00-00-860-091-H01

(15) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

SUBTASK 71-00-00-860-092-H01

(16) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to RUN.

SUBTASK 71-00-00-860-325-H00

CAUTION

IF AN ENGINE IS RESTARTED IN A 2 HOUR TO 4 HOUR SHUTDOWN PERIOD AFTER HIGH POWER OPERATION, A BOWED ROTOR START CAN OCCUR. BOWED ROTOR STARTS CAN CAUSE HIGH N2 VIBRATIONS.

(17) Monitor the vibration on the EICAS display.

(a) If the N2 vibration values are more than 4.0 units, set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

(b) Do this task: Dry Motor, TASK 71-00-00-800-836-H00. Continue to dry motor for 60 seconds.

(c) Set the applicable ENGINE L(R) START/ IGNITION SWITCH on the overhead panel, P5, to NORM.

(d) Wait 5 minutes before you start the engine.

SUBTASK 71-00-00-210-034-H01

(18) Make sure that the manifold duct pressure is approximately between 30 psig (207 kPa) - 45 psig (310 kPa).

NOTE: The engine start time will be longer and engine start EGT will be higher for low starter air pressure.

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SUBTASK 71-00-00-210-035-H01

CAUTION

DO NOT OPERATE THE ENGINE IF THERE IS NO INDICATION OF OIL PRESSURE BY THE TIME THE ENGINE HAS ACCELERATED TO MINIMUM IDLE. DO NOT OPERATE THE ENGINE IF THE OIL PRESSURE HAS DROPPED TO LESS THAN 10. IF YOU DO NOT FOLLOW THE INSTRUCTIONS, DAMAGE TO THE ENGINE CAN OCCUR.

(19) Monitor N1, N2, oil pressure, fuel flow, EGT and vibration to make sure that the engine starts satisfactorily.

NOTE: During the engine start under the cold conditions, oil pressure increases due to high oil viscosity. Then oil pressure decreases as the oil temperature increases. If the oil pressure remains above the normal range after the oil temperature stabilizes, shut down the engine and do an investigation.

NOTE: Lubrication unit shaft failures have been reported during or immediately after engine start in cold conditions. This has caused no oil pressure. Monitor the engine oil pressure during and immediately after engine start.

SUBTASK 71-00-00-860-093-H01

(20) During the start, the EEC (FADEC) automatically signals the ignition and fuel flow:

(a) Ignition is ON at approximately 22% of N2 speed + 15 seconds.

(b) Fuel Flow is ON at approximately 22% of N2 speed + 18 seconds.

SUBTASK 71-00-00-860-094-H01

(21) Monitor the EGT for engine ignition:

(a) The EGT must start to increase in less than 15 seconds from the time the fuel is ON.

NOTE: If the EGT does not increase in 15 seconds after the fuel and ignition are ON, the EEC (FADEC) will automatically signal to turn off the fuel and ignition. EEC will motor the engine for 30 seconds to remove the fuel and vapors, and try to start the engine again with the two ignition systems.

SUBTASK 71-00-00-210-036-H01

(22) Monitor the N1, N2, fuel flow and the EGT carefully during the start procedure for all unusual indications:

NOTE: If the starter air pressure is low, the engine starting time will be slower and peak EGT will be higher. If the N1 does not turn by the time the engine reaches idle, stop the engine immediately.

(a) The N1 and N2 rpm must continuously increase to idle speed.

(b) The EGT must increase to the idle EGT limits.

(c) Make sure that the fuel flow is approximately 800 PPH or 363 KPH before engine light off.

SUBTASK 71-00-00-860-095-H01

(23) During the start, if the EGT increases too fast or is more than the start temperature limit, the EEC (FADEC) should stop the start attempt. If not, do these steps:

(a) Monitor the SAV indication on the EICAS AIR synoptic display.

1) If the SAV indication is closed on EICAS AIR synoptic display, EEC (FADEC) stopped the engine start.

2) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF immediately.

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(b) Make a record of the length of time and the highest temperature of the engine during an overtemperature condition.

SUBTASK 71-00-00-860-096-H01

(24) During the start, the EEC (FADEC) automatically signals to turn the starter air valve and ignition off as the engine becomes stable at idle.

NOTE: The ENGINE L(R) START/IGNITION switch on the overhead panel, P5, returns to NORM at approximately 68-70% N2. The igniter will de-energize at approximately 56-67% N2.

SUBTASK 71-00-00-860-097-H01

(25) The EEC (FADEC) will automatically signal to stop the start if one of these failure conditions occurs:

(a) If EGT does not increase in 15 seconds after fuel is introduced in the engine

(b) If the N1 rotor does not start to turn by 60% N2 (locked N1 rotor)

(c) If the EGT is more than the automatic start limits

(d) If there is an engine surge indication.

NOTE: When the EEC aborts an automatic start of the engine, that will cause a maintenance message. Refer to the fault isolation manual for the applicable troubleshooting steps.

(e) If the engine touches an initial motoring N2 (52.7%) and oil pressure is low (less than 10 psi).

NOTE: EEC will initiate the Failed Start Sequence.

NOTE: Does not affect inflight starts.

SUBTASK 71-00-00-860-098-H01

(26) During a stop in the cross bleed Autostart procedure, the EEC (FADEC) will automatically signal to engage the starter at the maximum starter speed for 30 seconds to dry motor the engine.

SUBTASK 71-00-00-860-099-H01

(27) When the engine reaches the idle speed, make sure the ENGINE L(R) START/IGNITION switch on the overhead panel, P5, is automatically reset to NORM.

NOTE: An EICAS message will be shown if the ENGINE L(R) START/IGNITION switch is not in the correct position.

SUBTASK 71-00-00-860-100-H01

(28) Decrease the opposite engine speed to idle and permit the two engines to stabilize at minimum idle.

SUBTASK 71-00-00-860-297-H00

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

END OF TASK

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TASK 71-00-00-800-837-H00

10. Usual Engine Stop

A. General

(1) This task contains the procedures to stop the engine (usual engine stop).

B. References

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

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Usual Engine Stop

SUBTASK 71-00-00-860-102-H01

(1) Move the thrust lever to the minimum idle.

SUBTASK 71-00-00-860-103-H01

(2) If you operated the engine at more than minimum idle, decrease the engine speed to idle and operate at idle as follows:

NOTE: Operation at idle will permit the engine rotors and cases to decrease in temperature. This will prevent locked turbine rotors and damaged turbine air seals. This will also permit temperatures below the cowling to decrease and not overheat the core-mounted components. This will also reduce the severity of bowed rotor HPC vibrations and protect the engine against blade tip damage.

(a) If the engine was operated at idle only, operate the engine at minimum idle for 3 minutes before you stop the engine.

(b) If the engine was operated above idle for less than 5 minutes, operate the engine at minimum idle for 5 minutes before you stop the engine.

(c) If the engine was operated for more than 5 minutes above idle, operate the engine at minimum idle for 10 minutes before you stop the engine.

SUBTASK 71-00-00-860-104-H01

(3) Make sure the BLEED AIR L, R, and C ISLN, and APU switches on the overhead panel, P5, are in the AUTO positions.

NOTE: The Pneumatic system must be in AUTO so the operator can motor the engine in the event of an internal engine fire.

SUBTASK 71-00-00-860-105-H01

(4) Make sure the external power or APU power is available before you shutdown the engine (TASK 24-22-00-860-805).

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SUBTASK 71-00-00-860-106-H01

CAUTION

MAKE SURE THAT ENGINE SHUTDOWN OCCURS IMMEDIATELY AFTER YOU SET THE FUEL CONTROL SWITCH TO CUTOFF. IF THE ENGINE CONTINUES TO OPERATE WHEN YOU SET THE FUEL CONTROL SWITCH TO CUTOFF, A SYSTEM MALFUNCTION OCCURRED. MAINTENANCE IS NECESSARY BEFORE YOU START THE ENGINE AGAIN.

(5) Set the L(R) FUEL CONTROL switches on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-210-037-H01

(6) Monitor the EGT, N1, N2, and fuel flow indication on engine shutdown.

NOTE: When the engine temperature and rotor speed decrease, you know that the fuel flow to the engine has stopped.

SUBTASK 71-00-00-210-038-H01

(7) Look for indication of engine fire during shutdown.

SUBTASK 71-00-00-210-039-H01

(8) If you see signs of a fire, immediately do the emergency stop procedure and motor the engine (TASK 71-00-00-800-810-H01).

NOTE: When the engine shutdown is complete and all rotation stops, the EGT may indicate an increase due to temperature soak back.

SUBTASK 71-00-00-860-107-H01

(9) Set the AIR CONDITIONING L and R PACK switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-108-H01

(10) Set the FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-109-H01

(11) Set these hydraulic demand pumps switches on the overhead panel, P5:

(a) HYDRAULIC DEMAND L and R ELEC switches to OFF

(b) HYDRAULIC DEMAND C1 and C2 AIR switches to OFF.

SUBTASK 71-00-00-860-110-H01

(12) If the circuit breakers were pulled to prevent operation of the warning speakers, remove the DO-NOT-CLOSE tags and close these circuit breakers.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-860-111-H01

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	6	C34439	WXR L R/T
E	16	C34438	WXR R R/T

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Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-00-860-112-H01

(14) Turn the APU SELECTOR on the overhead panel, P5, from ON to the OFF.

——— END OF TASK ———

TASK 71-00-00-800-810-H01

11. Emergency Engine Stop

A. General

(1) This procedure has the steps that are necessary to stop the engine in an emergency.

(2) An emergency can be an internal engine fire, external engine fire or an engine failure or stall.

(3) In an emergency the engine is to be immediately isolated from the airplane fuel supply.

(4) If an internal fire can not be extinguished by motoring the engine or if motoring is not possible, extinguish the fire with a portable fire extinguisher.

(5) The use of fire extinguishing agents to put out a fire must be reported for maintenance actions.

B. References

Reference	Title
71-00-00-200-808-H01	Engine Exposure to Fire and Extinguishing Agents Inspection (P/B 601)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Emergency Engine Stop

SUBTASK 71-00-00-860-113-H01

CAUTION

DO NOT USE A FIRE EXTINGUISHING AGENT UNLESS THE ENGINE DRY-MOTOR PROCEDURE DOES NOT STOP THE FIRE. IF YOU USE FIRE EXTINGUISHING AGENTS, ENGINE REMOVAL IS MANDATORY.

(1) If an engine has an internal engine fire, do these steps:

NOTE: An internal engine fire during a start or shutdown can be heard and seen by ground personnel as smoke or fire from the primary nozzle.

NOTE: The EGT indication may or may not be above the redline limit. The indication is dependent on power to the EEC. The EGT indication will not be available if the N2 speed is below 7-8%. N2 speed above 7-8% is needed to maintain electrical power to the EEC (FADEC).

(a) Move the thrust lever to the minimum idle.

(b) Set the applicable L(R) FUEL CONTROL switch to CUTOFF.

(c) Monitor the EGT, N1, N2, and fuel flow for indication of an engine shutdown.

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(d) When the N2 speed decreases below 30% on the EICAS display, do these steps:

1) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

NOTE: Make sure that pneumatic air pressure is available to motor the engine.

2) Motor the engine for 30 seconds, or until the fire goes out.

NOTE: Do not obey the starter time limits if you have an internal engine fire.

3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(e) If the internal fire continues, use a fire extinguishing agent to put out the fire.

1) Do this task: Engine Exposure to Fire and Extinguishing Agents Inspection, TASK 71-00-00-200-808-H01.

SUBTASK 71-00-00-860-114-H01

(2) If engine has an external engine fire, do these steps:

(a) Move the thrust lever to the minimum idle.

(b) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

(c) Pull the applicable engine fire switch handle (DISCH LEFT or RIGHT) on the P8 panel of the control stand.

NOTE: This will put the engine fire switch handle (DISCH LEFT or RIGHT) in the ready position and command the fuel spar valve to close.

(d) If a FIRE ENG message remains displayed on the EICAS display or you see smoke and flame, do this step.

1) Turn the engine fire switch handle (DISCH LEFT or RIGHT) to the left or right and hold for 1 second.

NOTE: If you turn it to the left, you discharge the left fire extinguishing bottle. If you turn it to the right, you discharge the right fire extinguishing bottle.

(e) If after 30 seconds, FIRE ENG message remains displayed on the EICAS display, do this step:

1) Turn the engine fire switch handle (DISCH LEFT or RIGHT) to the opposite position (left or right) and hold for 1 second.

(f) Report the use of fire extinguishing agents to identify the necessary corrective maintenance actions.

SUBTASK 71-00-00-860-115-H01

(3) If the engine has a failure or stall, do these steps:

(a) Move the thrust lever to the minimum idle.

NOTE: An increase in vibration levels with sudden changes in engine parameters, could indicate an engine failure. The engine is to be stopped and the cause of the vibration or parameters change corrected. Do not try to re-start an engine until the cause of the vibration and parameter changes is identified and corrected.

(b) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

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(c) Determine the type of failure.

NOTE: If loud noises, such as bangs, bumps, etc., are heard, do not start the engine.

NOTE: An engine flameout will show an immediate decrease in EGT and N2 followed closely by a decrease in N1. Low oil pressure and abnormal electrical indications will also occur.

(d) If the flameout was not caused by an engine failure, do these steps:

NOTE: During a rapid engine shutdown, cooling air through the engine decreases quickly and stops as soon as the engine rotors stop. The sudden loss of cooling air can cause a turbine blade-to-shroud rub and the seizure of low pressure turbine (LPT).

1) Dry motor the engine for 30 seconds or more to make sure the N1 and N2 rotors operate satisfactorily (TASK 71-00-00-800-836-H00).

NOTE: Do not dry motor more than the starter time limits.

2) Start the engine to make sure the N1, N2, and main oil pressure are satisfactory (TASK 71-00-00-800-835-H00).

(e) If the flameout was caused by an engine failure, do this step.

1) Correct the cause of the failure before you dry motor or start the engine.

SUBTASK 71-00-00-860-258-H01

(4) Set the AIR CONDITIONING L and R PACK switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-259-H01

(5) Set the FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-260-H01

(6) Set these hydraulic demand pumps switches on the overhead panel, P5:

(a) HYDRAULIC DEMAND L and R ELEC switches to OFF

(b) HYDRAULIC DEMAND C1 and C2 AIR switches to OFF.

SUBTASK 71-00-00-865-001-H01

(7) If the circuit breakers were pulled to prevent operation of the warning speakers, remove the DO-NOT-CLOSE tags and close these circuit breakers.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-865-002-H01

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	6	C34439	WXR L R/T
E	16	C34438	WXR R R/T

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Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-00-860-261-H01

(9) Turn the APU SELECTOR on the overhead panel, P5, from ON to the OFF.

——— END OF TASK ———

TASK 71-00-00-800-836-H00

12. Dry Motor

A. General

(1) This procedure motors the engine with the starter without fuel to the combustion chamber.

(2) Use this procedure to remove the fuel that is not burned or from the engine after wet motoring.

(3) Use this procedure to decrease the EGT to a safe temperature.

(4) Use this procedure to extinguish a tailpipe fire.

(5) Use this procedure for all maintenance operation where it is necessary to motor the engine unless the wet motor procedure is specified.

B. References

Reference	Title
31-61-00-800-802	Erasing a EICAS Status Message Latched by AIMS (P/B 201)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Dry Motor Procedure

SUBTASK 71-00-00-860-116-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-122-H01

CAUTION MAKE SURE YOU OPEN ALL EIGHT CIRCUIT BREAKERS BEFORE YOU DO THE DRY MOTOR PROCEDURE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, THE FUEL COULD IGNITE AND AN ENGINE OVERTEMPERATURE COULD OCCUR.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-640-001-H01

(3) If fuel was drained from the engine fuel system, do these steps:

(a) For the left engine; open this circuit breaker and install safety tag.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	4	C76601	L ENG FUEL VALVE

(b) For the right engine; open this circuit breaker and install safety tag.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	19	C76600	R ENG FUEL VALVE

(c) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to RUN.

(d) Make sure the applicable ENG FUEL SPAR VALVE is open.

1) Open this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE

2) Open this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	19	C28002	R ENGINE FUEL SPAR VALVE

(e) Set the applicable FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

(f) Set the applicable FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to ON.

(g) For the left engine; remove the safety tag and close this circuit breaker.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	4	C76601	L ENG FUEL VALVE

(h) For the right engine; remove the safety tag and close this circuit breaker.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-00-860-117-H01

(4) Move the forward thrust lever to minimum idle.

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SUBTASK 71-00-00-860-118-H01

(5) Make sure the ENGINE AUTOSTART switch on the overhead panel, P5, is set the OFF position.

SUBTASK 71-00-00-860-119-H01

(6) Move the reverse thrust lever to the stowed position.

SUBTASK 71-00-00-860-120-H01

(7) Make sure the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, is in the CUTOFF position.

SUBTASK 71-00-00-860-121-H01

(8) Make sure the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, is in the NORM position.

SUBTASK 71-00-00-860-123-H01

(9) Make sure that you pressurize the pneumatic system (TASK 36-00-00-860-802).

SUBTASK 71-00-00-860-125-H01

(10) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

SUBTASK 71-00-00-210-040-H01

(11) Do a check of the SAV and N2 speeds.

(a) Make sure the N2 rotor turns.

(b) Make sure the SAV is open.

SUBTASK 71-00-00-210-041-H01

(12) Do a check of the main oil pressure.

(a) The main oil pressure must be positive and continuous.

SUBTASK 71-00-00-860-126-H01

CAUTION

KEEP ENGINE MOTORING TO A MINIMUM. ENGINE MOTORING FOR A LONG TIME CAN CAUSE DAMAGE TO THE ENGINE STARTER.

(13) Continue to dry motor the engine.

(a) Do the maintenance checks that made it necessary to dry motor the engine.

(b) Do not go more than the time limits of the starter duty cycle.

SUBTASK 71-00-00-860-127-H01

(14) If the engine has a tailpipe fire, continue to dry motor the engine until the fire is extinguished.

NOTE: Do not obey the starter time limits if you have a tailpipe fire.

SUBTASK 71-00-00-860-128-H01

(15) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-129-H01

(16) Set the FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-130-H01

(17) If the circuit breakers for the fuel spar valve was opened, do the applicable step:

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(a) For the left engine; remove the safety tag and close this circuit breaker.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE

(b) For the right engine; remove the safety tag and close this circuit breaker.

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	19	C28002	R ENGINE FUEL SPAR VALVE

SUBTASK 71-00-00-860-131-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-275-H00

(19) If it is necessary, erase any EICAS status messages which where set (TASK 31-61-00-800-802).

(a) For the left engine:

1) ENG IGNITOR L1
2) ENG IGNITOR L2
3) ENG FUEL VALVE L.

(b) For the right engine:

1) ENG IGNITOR R1
2) ENG IGNITOR R2
3) ENG FUEL VALVE R.

SUBTASK 71-00-00-860-276-H00

(20) If it is necessary, erase the Non-normal Checklist (NNC) events from the Electronic Checklist (ECL) as follows:

(a) Push the checklist display switch (CHKL) on the Display Select Panel.

(b) Push the LWR CTR switch on the Display Select Panel (this will pop-up the ECL page on the lower EICAS display).

(c) From the ECL page on the lower EICAS display, use the Cursor Control Device (CCD) to select the RESETS function.

(d) Select RESET NNC to clear the ECL latches generated by the EICAS messages “FUEL PRESS ENG L” and “FUEL PRESS ENG R”.

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SUBTASK 71-00-00-860-293-H00

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

END OF TASK

TASK 71-00-00-800-812-H01

13. Wet Motor

A. General

(1) This procedure motors the engine with the starter with fuel to the combustion chamber but without ignition.

(2) Only use this procedure for all maintenance operation that tells you to motor (wet motor procedure) the engine with fuel to the combustion chamber. Use the Dry Motor Procedure for all other motor procedures.

(3) This procedure can be used with the standard wet motor leak check (TASK 71-00-00-700-803-H01).

B. References

Reference	Title
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
71-00-00-700-803-H01	Test No. 3 - Standard Wet Motor Leak Check (P/B 501)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Wet Motor Procedure

SUBTASK 71-00-00-860-133-H01

(1) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

SUBTASK 71-00-00-860-134-H01

(2) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-135-H01

(3) Make sure that the ENGINE AUTOSTART switch on the overhead panel, P5, is set to OFF.

SUBTASK 71-00-00-860-136-H01

(4) Make sure that the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, is in the NORM position.

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SUBTASK 71-00-00-860-137-H01

CAUTION

MAKE SURE YOU OPEN ALL EIGHT CIRCUIT BREAKERS BEFORE YOU DO THE WET MOTOR PROCEDURE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, THE FUEL COULD IGNITE AND AN ENGINE OVERTEMPERATURE COULD OCCUR.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-138-H01

(6) Make sure you pressurize the pneumatic system.

SUBTASK 71-00-00-860-139-H01

(7) Set the applicable FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to ON.

SUBTASK 71-00-00-860-140-H01

(8) Make sure the EGT is less than 100 ° C. If the EGT is more than 100 ° C, do the steps below to dry motor the engine.

NOTE: The temperature of the EGT is available in the propulsion data limits maintenance pages.

(a) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

(b) Make sure the SAV is OPEN.

(c) Monitor the N2 speed and the main oil pressure.

(d) Make sure the rotor turns.

(e) Make sure that the oil pressure increases and positive.

(f) If the engine has a tailpipe fire, continue to dry motor the engine until the fire is extinguished.

NOTE: Do not obey the starter time limits if you have a tailpipe fire.

CAUTION

KEEP ENGINE MOTORING TO A MINIMUM. ENGINE MOTORING FOR A LONG TIME CAN CAUSE DAMAGE TO THE ENGINE STARTER.

(g) Dry motor the engine until the EGT is less than 100 ° C.

SUBTASK 71-00-00-860-141-H01

(9) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to START.

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SUBTASK 71-00-00-860-142-H01

(10) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to RUN when N2 is at maximum motoring speed (22-31% N2).

SUBTASK 71-00-00-860-143-H01

(11) Make sure the SAV is OPEN.

SUBTASK 71-00-00-210-042-H01

(12) Monitor the N2 speed.

(a) Make sure the rotor turns.

SUBTASK 71-00-00-210-043-H01

(13) Make sure that the oil pressure increases and positive.

SUBTASK 71-00-00-210-083-H00

(14) Look for fuel flow indication on EICAS.

SUBTASK 71-00-00-800-036-H00

CAUTION

KEEP ENGINE MOTORING TO A MINIMUM. ENGINE MOTORING FOR A LONG TIME CAN CAUSE DAMAGE TO THE ENGINE STARTER.

CAUTION

OBEY THE DUTY CYCLES FOR THE STARTER MOTOR. IF YOU DO NOT OBEY THE DUTY CYCLES, DAMAGE TO THE STARTER MOTOR CAN OCCUR.

(15) Do the maintenance checks that required the wet motoring of the engine.

SUBTASK 71-00-00-860-144-H01

(16) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-145-H01

CAUTION

AFTER YOU DO THE WET MOTOR, DRY MOTOR THE ENGINE FOR A MINIMUM OF 60 SECONDS TO CLEAR THE COMBUSTION CHAMBER OF FUEL. IF YOU DO NOT, HOT START OR TAILPIPE FIRE CAN OCCUR ON THE SUBSEQUENT START.

CAUTION

MAKE SURE THAT THE FUEL FOG STOP QUICKLY AFTER YOU SET THE FUEL CONTROL SWITCH TO CUTOFF. IF THE FUEL FOG DOES NOT STOP, MAINTENANCE IS NECESSARY BEFORE A SUBSEQUENT ENGINE START. IF YOU DO NOT CORRECT THE CONDITION, AN ENGINE OVERTEMPERATURE CAN OCCUR DURING A SUBSEQUENT START.

CAUTION

KEEP ENGINE MOTORING TO A MINIMUM. ENGINE MOTORING FOR A LONG TIME CAN CAUSE DAMAGE TO THE ENGINE STARTER.

(17) Continue to dry motor the engine until all signs of the fuel fog stops.

NOTE: You must dry motor the engine for a minimum of 60 seconds after the FUEL CONTROL switch is set to CUTOFF.

(a) Have a ground observer look at the engine and make sure the fuel fog stops.

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CAUTION OBEY THE DUTY CYCLES FOR THE STARTER MOTOR. IF YOU DO NOT OBEY THE DUTY CYCLES, DAMAGE TO THE STARTER MOTOR CAN OCCUR.

(b) Make sure that the starter time is in the limits.

SUBTASK 71-00-00-860-146-H01

(18) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

(a) Make sure the SAV is closed.

SUBTASK 71-00-00-860-147-H01

(19) Set the FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to OFF.

SUBTASK 71-00-00-860-148-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-301-H00

CAUTION MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

——— END OF TASK ———

TASK 71-00-00-800-813-H01

14. Nacelle/Strut Overheat Warning

A. General

(1) This task contains the procedure for a nacelle/strut overheat warning.

(2) These indications will show if you have a nacelle/strut overheat warning.

(a) The Master Caution light, on the glareshield, goes on.

(b) The aural warning goes on.

(c) The amber EICAS CAUTION message will display.

B. References

Reference	Title
FIM 26-11 TASK 816	EICAS Messages OVERHEAT ENG L (R) - Fault Isolation

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C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Nacelle/Strut Overheat Warning

SUBTASK 71-00-00-860-150-H01

(1) If you get one of these messages, OVERHEAT ENG L(R) or BLEED LEAK STRUT L(R), on the EICAS display during an engine operation, do these steps:

(a) Move the thrust lever to the idle position.

(b) If the strut overheat indication stops, stop the engine as usual and do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(c) If the strut overheat indication continues, stop the engine immediately as follows:

NOTE: You can have a strut fire. Stop the engine without the usual idle operation for engine cool down.

1) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

(d) Find and correct the cause of the warning (FIM 26-11 TASK 816).

(e) Make sure that you do the unscheduled maintenance check on the strut for damage.

——— END OF TASK ———

TASK 71-00-00-040-801-H00

15. Engine Isolation - Deactivation

A. General

(1) This task opens the fan cowl panels and thrust reverser.

(2) This task isolates hazardous energy in the engines.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
410	PowerPlant, Left
420	PowerPlant, Right

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D. Procedure

SUBTASK 71-00-00-020-002-H00

(1) For the left engine:

Open these circuit breakers and install safety tags:

Left Power Management Panel, P110

Row	Col	Number	Name
J	25	C24603	L IDG DISC

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW

SUBTASK 71-00-00-020-003-H00

(2) For the right engine:

Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	16	C80600	R ENG START VALVE
B	18	C80606	R ENG START SW

Right Power Management Panel, P210

Row	Col	Number	Name
J	2	C24602	R IDG DISC

SUBTASK 71-00-00-860-312-H00

(3) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-00-00-860-313-H00

(4) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-00-00-860-314-H00

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.

(5) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

SUBTASK 71-00-00-860-315-H00

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(6) Open the left and right fan cowl panels: Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

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SUBTASK 71-00-00-860-316-H00

WARNING OPEN THE FAN COWL PANELS BEFORE YOU OPEN THE THRUST REVERSERS. IF YOU TRY TO OPEN THE THRUST REVERSERS FIRST, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO THE ENGINE COWLS.

(7) Open the left and right thrust reversers: Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00.

E. Fan Cowl Panels - Tryout

NOTE: This tryout is to make sure that the fan cowl panels and the thrust reversers are in the fully open position.

SUBTASK 71-00-00-210-088-H00

(1) For the left engine:

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

Left Power Management Panel, P110

Row	Col	Number	Name
J	25	C24603	L IDG DISC

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW

SUBTASK 71-00-00-210-089-H00

(2) For the right engine:

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	16	C80600	R ENG START VALVE
B	18	C80606	R ENG START SW

Right Power Management Panel, P210

Row	Col	Number	Name
J	2	C24602	R IDG DISC

SUBTASK 71-00-00-210-090-H00

(3) Make sure that the yellow safety stripe on the lower side of the lock collar is seen.

SUBTASK 71-00-00-210-091-H00

(4) Make sure that the red safety stripe on the lower side of the lock collar is not seen.

END OF TASK

TASK 71-00-00-440-801-H00

16. Engine Isolation - Activation

A. General

(1) This task closes the fan cowl panels and thrust reverser.

(2) This task restores the engine back to its usual condition.

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B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
410	PowerPlant, Left
420	PowerPlant, Right

D. Procedure

SUBTASK 71-00-00-860-317-H00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the left and right thrust reversers: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

SUBTASK 71-00-00-860-318-H00

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION MAKE SURE THAT THE THRUST REVERSERS ARE FULLY CLOSED BEFORE YOU CLOSE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FAN COWL PANELS AND THE THRUST REVERSER CAN OCCUR.

(2) Close the left and right fan cowl panels: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

SUBTASK 71-00-00-860-319-H00

(3) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

SUBTASK 71-00-00-860-320-H00

(4) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-420-006-H00

(5) For the left engine:

Remove the safety tags and close these circuit breakers:

Left Power Management Panel, P110

Row	Col	Number	Name
J	25	C24603	L IDG DISC

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Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW

SUBTASK 71-00-00-420-007-H00

(6) For the right engine:

Remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	16	C80600	R ENG START VALVE
B	18	C80606	R ENG START SW

Right Power Management Panel, P210

Row	Col	Number	Name
J	2	C24602	R IDG DISC

——— END OF TASK ———

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POWER PLANT - ADJUSTMENT/TEST

1. General

A. This procedure gives the necessary tests to make sure the engine operates correctly after components are repaired or replaced. The test are given a number for positive identification. The steps that follows show the test numbers and the titles:

(1) Test Number 1 - Pneumatic Leak Test

(2) Test Number 2 - Dry Motor Leak Check

(3) Test Number 3 - Standard Wet Motor Leak Check

(4) Test Number 5 - Idle Leak Check

(5) Test Number 6 - Part-Power Leak Check

(6) Test Number 7 - Power Assurance Test

(7) Test Number 8 - Replacement Engine (Pretested Engine) Test

(8) Test Number 9 - Replacement Engine (Untested Engine) Test

(9) Test Number 10 - Low Pressure System (Fan/LPT) Vibration Survey

(10) Test Number 11 - High Pressure System (HPC/HPT) Vibration Survey

(11) Test Number 12A - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401-200)

(12) Test Number 12B - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N 241-32-007-021)

(13) Test Number 13 - Engine Reverse Thrust Lever Interlock Test (MAT Initiated Test)

(14) Test Number 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test)

(15) Test Number 15 - Engine Air Driven Actuator Test (MAT Initiated Test)

(16) Test Number 16 - Engine Electronic Engine Control (EEC) Test (MAT Initiated Test)

(17) Test Number 17 - Engine Ignition System Test (MAT Initiated Test)

(18) Test Number 18 - Debris Monitoring System (DMS) Test (MAT Initiated Test)

(19) Test Number 19 - Variable Stator Vane Operational Test (MAT Initiated Test)

(20) Test Number 20 - CCC and LPTACC Functional Test

(21) Test Number 21 - High-Power Leak Check

(22) Test Number 22 - Seal Break-In Run Test.

B. To make this procedure easy to use, symbols are given to some engine data at internal and external locations on the engine. These symbols are shown in the table below:

ABBR.	NOMENCLATURE
ACC	Active Clearance Control
AGB	Accessory Gearbox
AVM	Airborne Vibration Monitoring
CCC	Core Compartment Cooling
DAC	Dual Annular Combustor
DMS	Debris Monitoring System
EEC	Electronic Engine Control

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(Continued)

ABBR.	NOMENCLATURE
EGT	Exhaust Gas Temperature
EICAS	Engine Indication and Crew Alert System
EPCS	Electronic Propulsion Control System
FADEC	Full Authority Digital Engine Control
HPT	High Pressure Turbine
IDG	Integrated Drive Generator
LPT	Low Pressure Turbine
MCD	Magnetic Chip Detector
MAT	Maintenance Access Terminal
MFD	Multi-Functional Display
MFP	Main Fuel Pump
N1	Low Pressure Rotor Speed
N2	High Pressure Rotor Speed
OAT	Outside Air Temperature
OMS	Onboard Maintenance System
VBV	Variable Bleed Valve
VSCF	Variable Speed Constant Frequency
VSV	Variable Stator Vane

TASK 71-00-00-800-833-H00

2. Power Plant Test Reference Table

A. General

(1) This task gives the necessary tests that are to be done after the component is repaired or replaced.

B. References

Reference	Title
73-00-00-200-801-H01	Fuel Leakage Examination (at the AGB Fuel Adapters (Wet Motor)) (P/B 601)
79-21-12-400-801-H01	Debris Monitoring System (DMS) Sensor Installation (P/B 401)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Procedure

SUBTASK 71-00-00-800-033-H01

(1) Refer to the table that follows for a list of Power Plant Tests.

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(a) If you get this data digitally, (i.e., PMA), use the referenced task links below to go to the applicable test.

Table 501/71-00-00-993-840-H01 GE90–100 List of Power Plant Tests

Task	Description	Task Reference
Test No. 1	Pneumatic Leak Test	Test No. 1 - Pneumatic Leak Test, TASK 71-00-00-700-801-H01
Test No. 2	Dry Motor Leak Check	Test No. 2 - Dry Motor leak Check, TASK 71-00-00-700-802-H01
Test No. 3	Standard Wet Motor Leak Check	Test No. 3 - Standard Wet Motor Leak Check, TASK 71-00-00-700-803-H01
Test No. 5	Idle Leak Check	Test No. 5 - Idle Leak Check, TASK 71-00-00-700-804-H01
Test No. 6	Part-Power Leak Check	Test No. 6 - Part-Power Leak Check, TASK 71-00-00-700-805-H01
Test No. 7	Power Assurance Test	Test No. 7 - Power Assurance Test, TASK 71-00-00-700-806-H01
Test No. 8	Replacement Engine (Pretested Engine) Test	Test No. 8 - Replacement Engine (Pretested Engine) Test, TASK 71-00-00-700-807-H01
Test No. 9	Replacement Engine (Untested Engine) Test	Test No. 9 - Replacement Engine (Untested Engine) Test, TASK 71-00-00-700-808-H01
Test No. 10	Low Pressure System (Fan/LPT) Vibration Survey	Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01
Test No. 11	High Pressure System (HPC/HPT) Vibration Survey	Test No. 11 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-700-810-H01
Test No. 12A	Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401–200)	Test No. 12A - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401-200), TASK 71-00-00-700-811-H01
Test No. 13	Engine Reverse Thrust Lever Interlock Test (MAT Initiated Test)	Test No. 13 - Engine Reverse Thrust Lever Interlock Test (MAT Initiated Test), TASK 71-00-00-700-812-H01
Test No. 14	Engine Fuel Driven Actuator Test (MAT Initiated Test)	Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-813-H01
Test No. 15	Engine Air Driven Actuator Test (MAT Initiated Test)	Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-814-H01
Test No. 16	Engine Electronic Control (EEC) Test (MAT Initiated Test)	Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01

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Table 501/71-00-00-993-840-H01 GE90–100 List of Power Plant Tests (Continued)

Task	Description	Task Reference
Test No. 17	Engine Ignition System Test (MAT Initiated Test)	Test No. 17 - Engine Ignition System Test (MAT Initiated Test), TASK 71-00-00-700-816-H01
Test No. 18	Debris Monitoring System Test (MAT Initiated Test)	Test No. 18 - Debris Monitoring System Test (MAT Initiated Test), TASK 71-00-00-700-817-H01
Test No. 19	Variable Stator Vane Operational Test (MAT Initiated test)	Test No. 19 - Variable Stator Vane Operational Test (MAT Initiated test), TASK 71-00-00-700-818-H01
Test No. 20	CCC and LPTACC Functional Test	Test No. 20 - CCC and LPTACC Functional Test, TASK 71-00-00-700-819-H01
Test No. 21	High-Power Leak Check	Test No. 21 - High-Power Leak Check, TASK 71-00-00-700-822-H00
Test No. 22	Seal Break-In Run Test	Test No. 22 - Seal Break-In Run Test, TASK 71-00-00-700-823-H00

(2) The table that follows shows the necessary tests that are to be done after the applicable component is repaired or replaced. The power plant tests are written to keep engine ground run to a minimum.

Table 502/71-00-00-993-841-H00

Component Repaired or Replaced	Test*[1]
AGB	2, 6, and 21
AGB Carbon Seals	21
Air Ducts (Non LRU Items)	*[2] and 5
Air Tubes (Non LRU Items)	*[2] and 5
Backup Generator	2, 5, and 6 *[3] *[13]
Backup Generator Oil Filter	2
Backup Generator Oil Level Sightglass	2
Bleed Bias Flow Sensor (P3B)	1
Configuration Type Box	16
Control Alternator Stator and Rotor	5
Core Compartment Cooling Valve	15 or 20
Core Compartment Cooling Valve Feedback Switch	15 or 20
DMS Conditioner	16 *[4]
DMS Air/Oil Separator	5
DMS Sensor	18, 5 *[5]
Eductor Valve	5
EEC (FADEC)	16

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Table 502/71-00-00-993-841-H00 (Continued)

Component Repaired or Replaced	Test*[1]
EEC (FADEC) Electrical Harnesses	16
Engine (Pretested Engine)	8
Engine (Untested)	9
Engine Depreservation	14 and 15
Hydraulic Engine Driven Pump	2, 5, and 6 *[13]
Engine Rating Plug	16, *[6]
Engine Starter	2 and 5
Fan Blades	10, *[7]
Fan Blade Platforms	10, *[7]
Fan Stator Module	8 or 9
Fuel Filter Assembly	2 and 5
Fuel Filter DP Sensor	16, 2 and 5
Fuel Filter Element	2
Fuel Flow Transmitter	3,*[8] and 6
Fuel Manifold Pressure Sensor	2, 5 and 16
Fuel Nozzles	21
HPT ACC Valve	14, 15 and 5
Hydromechanical Unit (HMU)	3, 14, 5 and 6, *[9]
IDG	2, 5, and 6 *[10] *[13]
IDG Oil Level Sightglass	2
IDG Fuel/Oil Heat Exchanger	2, 5 and 6,*[9]
IDG Oil Filter	2
IDG Oil (IN) Temperature Sensor	16
IDG Oil (OUT) Temperature Sensor	16
IDG/VSCF Air/Oil Heat Exchanger	2
Igniter	17
Ignition Exciter	17
Ignition Lead	17
Inlet Cowl	16
LPC AI Valve	14, 3 and 5
LPT ACC Valve	15 or 20
LPT ACC Valve Feedback Switch	15 or 20
Lube and Scavenge Pump	2 and 21
Oil Filter Element	2 and 5

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Table 502/71-00-00-993-841-H00 (Continued)

Component Repaired or Replaced	Test*[1]
Magnetic Chip Detector (MCD of Starter)	2
Main Fuel/Oil Heat Exchanger	2, 5, and 6,*[9]
Main Fuel Pump (MFP)	16, 2, 5 and 6,*[9]
MFP Interstage Fuel Strainer	2
Main Fuel Supply Hose	5
Manual Gravity Filling Cap Assembly	5
N1 Speed Sensor	2,*[8]
N2 Speed Sensor	5,*[8]
Oil Filter Differential Pressure Sensor	16 and 5
Oil Pressure Sensor	16 and 5
Oil Level Sensor	5,*[11]
Oil System Drain or Flush	5
Oil Tank	5
Oil Temperature Sensor	16
Oil Tubes (External)	5
PT25 Sensor	16
Scavenge Oil Inlet Screens	5
Spinner	10 *[12]
Starter Air Pressure Sensor	2
Starter Air Valve	2
T3 Sensor	16
T12 Sensor	16
T49 EGT Harness	16
T49 EGT Probes	16
TGB	2, 6, and 16
VBV Actuator	14 and 5
VSCF Oil (IN) Temperature Sensor	16
VSCF Oil (OUT) Temperature Sensor	16
VSCF Oil/Oil Heat Exchanger	5
VSV Actuator	14 and 5

*[1] Do the test in the sequence that they are listed for each component.

*[2] Do a visual check on all non LRU air tubes or ducts that were disconnected or removed for engine maintenance (AMM 75-00-00/201).

*[3] Do the installation test of the backup generator (AMM 24-25-01/401).

*[4] Do a check for the maintenance messages.

*[5] Test 5 is not required if an independent second mechanic did a check to make sure the DMS sensor is installed correctly by the first mechanic (TASK 79-21-12-400-801-H01).

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*[6] Do the engine rating identification procedure (AMM 73-21-19/201) to make sure the rating is correct.

*[7] Test No. 10 is required if you replace 1 or more fan blades or fan blade platforms with different blades or platforms. If you remove up to 3 blades or platforms, and re-install the same blades or platforms in their original positions, Test No. 10 is not required. If you remove 4 or more blades or platforms, and re-install the same blades or platforms in their original positions, it is recommended to perform Test No. 10 to verify that the engine balance is satisfactory. In this case, operators may elect not to do the vibration survey, but there is additional risk of an operational event if maintenance errors occur.

*[8] Do a check for the presence of channel A and B parameters on the EPCS while the engine is at idle.

*[9] (a) Do a visual check for static fuel leakage (TASK 73-00-00-200-801-H01).

NOTE: If the engine has been checked for static fuel leak during the previous engine test, then it is not necessary to run the engine again only for a static fuel leak check. You must continue with other remaining engine tests as given in the Table 502 as they are necessary to find other fluid leakages.

(b) If you think or suspect of fuel leak, then you must run engine again and perform static fuel leakage again.

*[10] Do the operational test procedure (AMM 24-11-00/501).

*[11] Do an indication check on MFD.

*[12] If the spinner balance weight bolt has been replaced with a different weight bolt, then it is necessary to perform Test No. 10 LPT (FAN/LPT) vibration survey. If the replaced spinner used the same balance weight bolts at the same locations, then it is not require performing Test No. 10 LPT (FAN/LPT) vibration survey.

*[13] Test 6 is optional if an independent second mechanic can see the correct installation of the O-ring and/or pre-formed packing. After installation, make sure the O-ring is seated in the groove correctly and is free of damage.

——— END OF TASK ———

TASK 71-00-00-700-801-H01

3. Test No. 1 - Pneumatic Leak Test

(Figure 501, Figure 502, Figure 503, and Figure 504)

A. General

(1) This test motors the engine to do a check for air leaks in the pneumatic system ducts and joints.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
49-11-00-860-804	APU Starting and Operation (P/B 201)
49-11-00-860-805	APU Usual Shutdown (P/B 201)
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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C. Tools/Equipment

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

Reference	Description
COM-1538	Cart - Nitrogen Bottle Part #: 7046-011 Supplier: 00994 Part #: 8377 Supplier: 94861 Part #: 8932 Supplier: 94861 Part #: NBNT Supplier: D2029
COM-3843	Air Start Unit - Stored Air Type (Trailer or Truck Mounted, 300 to 600 lbs. air storage at 500 PSIG)
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

Reference	Description	Specification
D00010	Compound - Thread Antiseize, High Temperature	MIL-PRF-907

E. Location Zones

Zone	Area
135	Environmental Control Systems Bay, Left
136	Environmental Control Systems Bay, Right
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

Number	Name/Location
195BL	ECS High Pressure Connection Door
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

G. Prepare for the Pneumatic Leak Test

SUBTASK 71-00-00-860-151-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW
B	16	C80600	R ENG START VALVE

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	18	C80606	R ENG START SW

SUBTASK 71-00-00-210-044-H01

(2) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

SUBTASK 71-00-00-210-045-H01

(3) Make sure that the L or R MANIFOLD DUCT PRESSURE indication shows zero.

(a) If the duct pressure is more than zero, do this task: Depressurize the Pneumatic System, TASK 36-00-00-860-801.

SUBTASK 71-00-00-860-152-H01

(4) Make sure that these switches on the overhead panel, P5, are in the OFF position (Figure 501).

(a) AIR CONDITIONING L or R PACK switch.

(b) ANTI-ICE WING switch.

(c) ANTI-ICE L and R ENGINE switches.

(d) HYDRAULIC DEMAND AIR C1 switch.

(e) HYDRAULIC DEMAND AIR C2 switch.

(f) ENGINE AUTOSTART switch.

SUBTASK 71-00-00-860-153-H01

(5) Make sure that these switches on the overhead panel, P5, are in the AUTO position.

(a) BLEED AIR C ISLN valve switch.

(b) BLEED AIR L ISLN valve switch.

(c) BLEED AIR R ISLN valve switch.

(d) BLEED AIR APU switch.

SUBTASK 71-00-00-860-154-H01

(6) Make sure that the applicable BLEED AIR L(R) ENG switch on the overhead panel, P5, is in the ON position.

SUBTASK 71-00-00-860-155-H01

(7) Make sure that the ENGINE L and R START/IGNITION switches on the overhead panel, P5, are in the NORM position.

SUBTASK 71-00-00-010-009-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

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(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

H. Pneumatic Leak Test

SUBTASK 71-00-00-040-001-H01

(1) Manually lock the high pressure shutoff valve (HPSOV) in the LOCKED CLOSED position (Figure 504).

SUBTASK 71-00-00-020-001-H01

(2) Disconnect the supply pressure sense line from the supply pressure fitting (Figure 502).

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(a) Use the teflon-jawed pliers, STD-664 to disconnect the electrical connector DM36116 from the PRSOVC.

(b) Disconnect the supply pressure sense line from the supply pressure fitting.

(c) Put the protective cap on the supply pressure fitting.

(d) Install a nitrogen cart, COM-1538 or air start unit, COM-3843 to the supply pressure sense line.

(e) Supply 30-50 psig pressure to the PRSOVC.

SUBTASK 71-00-00-860-156-H01

CAUTION MAKE SURE THAT ELECTRICAL POWER IS ON THE AIRPLANE BEFORE YOU APPLY PNEUMATIC POWER AND REMOVE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO AIR CONDITIONING SYSTEM COMPONENTS COULD OCCUR.

(3) Do one of the steps that follow to pressurize the pneumatic system:

(a) If you use a ground pneumatic source to pressurize the pneumatic system of the engine, do these steps (Figure 503):

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1) Open this access panel:

Number	Name/Location
195BL	ECS High Pressure Connection Door

2) Connect the ground pneumatic source to the HP ground connector.

3) For a test on the left engine, set the BLEED AIR L ISLN switch on the overhead panel, P5, to the CLOSED position.

4) For a test on the right engine, set the BLEED AIR R ISLN switch on the overhead panel, P5, to the AUTO position.

WARNING DO NOT SUPPLY AIR THAT IS GREATER THAN 50 PSIG OR 232 °C (450 °F) TO THE PNEUMATIC SYSTEM. IF YOU SUPPLY AIR WITH TOO MUCH PRESSURE OR TOO HIGH TEMPERATURE, DAMAGE TO THE EQUIPMENT AND INJURY TO PERSONS CAN OCCUR.

CAUTION MAKE SURE THE APU AND ENGINES ARE NOT IN OPERATION BEFORE YOU INSTALL THE GROUND AIR SOURCE. THIS CAN CAUSE DAMAGE TO THE GROUND AIR SOURCE EQUIPMENT.

5) Start the ground pneumatic source.

NOTE: Do not supply more than 50 psig.

6) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

7) Make sure that the L and R MANIFOLD DUCT PRESSURE is more than 20 psig.

(b) If you use the APU to pressurize the pneumatic system, do these steps:

1) For a test on the left engine, set the BLEED AIR R ISLN switch on the overhead panel, P5, to the CLOSED position.

2) For a test on the right engine, set the BLEED AIR L ISLN switch on the overhead panel, P5, to the CLOSED position.

3) Start the APU and let it become stable at the governed speed.

a) Do this task: APU Starting and Operation, TASK 49-11-00-860-804.

4) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

5) Make sure that the L and R MANIFOLD DUCT PRESSURE is more than 20 psig.

(c) If you use the opposite engine to pressurize the pneumatic system, do these steps:

1) Set the BLEED AIR L, C, and R ISLN switches on the overhead panel, P5, to AUTO.

2) Set the AIR CONDITIONING L and R PACK switches on the overhead panel, P5, to AUTO.

a) Make sure that the flow control valves in the Cabin Air Conditioning and Temperature Control System (CACTCS) are OPEN and there is stable flow to the packs.

3) Remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	16	C80600	R ENG START VALVE
B	18	C80606	R ENG START SW

4) Start the opposite engine and let it become stable (TASK 71-00-00-800-835-H00).

5) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

6) Make sure that the L and R MANIFOLD DUCT PRESSURE is more than 20 psig.

SUBTASK 71-00-00-790-002-H01

(4) Examine the joints and connections for leaks in the part of the pneumatic system that is isolated.

(a) Small air leakage around the full circumference of a coupling is permitted.

(b) Put an anemometer, 8384, 2.0 to 3.0 inches from the outer side of the joints and connections to examine for leaks.

1) Air leaks from one location around a duct joints and connections must not be more than 100 feet/min.

(c) Make a note of the locations where the leaks are more than 100 feet/min.

SUBTASK 71-00-00-860-157-H01

CAUTION MAKE SURE THAT ELECTRICAL POWER IS ON THE AIRPLANE BEFORE YOU APPLY PNEUMATIC POWER AND REMOVE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO AIR CONDITIONING SYSTEM COMPONENTS COULD OCCUR.

(5) Depressurize the pneumatic system from the APU, engine, or ground pneumatic power:

(a) If the APU pneumatic source was used, do this task: APU Usual Shutdown, TASK 49-11-00-860-805.

WARNING MAKE SURE THAT ALL PERSONS ARE AWAY FROM THE WING LEADING EDGES. THE RELEASE OF HIGH TEMPERATURE WING ANTI-ICE AIR WILL CAUSE INJURY TO PERSONS.

1) Set the applicable AIR CONDITIONING L(R) PACK switch on the overhead panel, P5, to AUTO.

2) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

3) Make sure that the L and R MANIFOLD DUCT PRESSURE is zero psig.

(b) If the engine pneumatic source was used, stop the engine.

1) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

2) Put the applicable BLEED AIR L(R) ENG switch on the overhead panel, P5, to the OFF position.

WARNING MAKE SURE THAT ALL PERSONS ARE AWAY FROM THE WING LEADING EDGES. THE RELEASE OF HIGH TEMPERATURE WING ANTI-ICE AIR WILL CAUSE INJURY TO PERSONS.

3) Set the applicable AIR CONDITIONING L(R) PACK switch on the overhead panel, P5, to AUTO.

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4) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

5) Make sure that the applicable L(R) ENG High Stage Press and Interim Duct Press are zero psig.

(c) If the ground pneumatic source was used, do these steps:

WARNING MAKE SURE THAT ALL PERSONS ARE AWAY FROM THE WING LEADING EDGES. THE RELEASE OF HIGH TEMPERATURE WING ANTI-ICE AIR WILL CAUSE INJURY TO PERSONS.

1) Set the applicable AIR CONDITIONING L(R) PACK switch on the overhead panel, P5, to AUTO.

2) Get access to the 36 Air Supply Maintenance Page (TASK 31-61-00-800-804).

3) Make sure that the L and R MANIFOLD DUCT PRESSURE is zero psig.

4) Remove the ground pneumatic source from the HP connector.

5) Close this access panel (AMM TASK 06-41-00-800-801)

Number	Name/Location
195BL	ECS High Pressure Connection Door

SUBTASK 71-00-00-360-001-H01

(6) Repair each joint or coupling (by adjustment or replacement of the duct or coupling) that has a leak of more than 100 feet/min.

SUBTASK 71-00-00-420-001-H01

(7) Connect the supply pressure sense line to the supply pressure fitting.

(a) Decrease the nitrogen or air supply pressure to zero psig.

(b) Remove the nitrogen cart, COM-1538 or air start unit, COM-3843 from the supply pressure sense line.

(c) Remove the cap from the supply pressure fitting.

(d) Apply compound, D00010 to the fitting on the supply pressure sense line.

(e) Connect the supply pressure sense line to the supply pressure fitting.

1) Tighten the tube nut on the supply pressure sense line (TASK 70-51-00-910-801-H01).

SUBTASK 71-00-00-440-001-H01

(8) Manually unlock the high pressure shutoff valve (HPSOV) (Figure 504).

SUBTASK 71-00-00-420-002-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(9) Use the teflon-jawed pliers, STD-664 to connect the electrical connector DM36116 to the PRSOVC.

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SUBTASK 71-00-00-860-158-H01

(10) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-001-H01

(11) Use a maintenance access terminal (MAT) to do the system test of the applicable air supply control system.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 36 Air Supply Control System
5) SYSTEM TEST
6) Left Air Supply Control System Test or
7) Right Air Supply Control System Test
8) CONTINUE.

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START TEST.

(c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(d) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

SUBTASK 71-00-00-860-159-H01

(12) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

I. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-006-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

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1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-160-H01

(2) If you use a ground pneumatic source or the APU to pressurize the pneumatic system of the engine, do this step.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	1	C80601	L ENG START VALVE
B	3	C80605	L ENG START SW
B	16	C80600	R ENG START VALVE
B	18	C80606	R ENG START SW

END OF TASK

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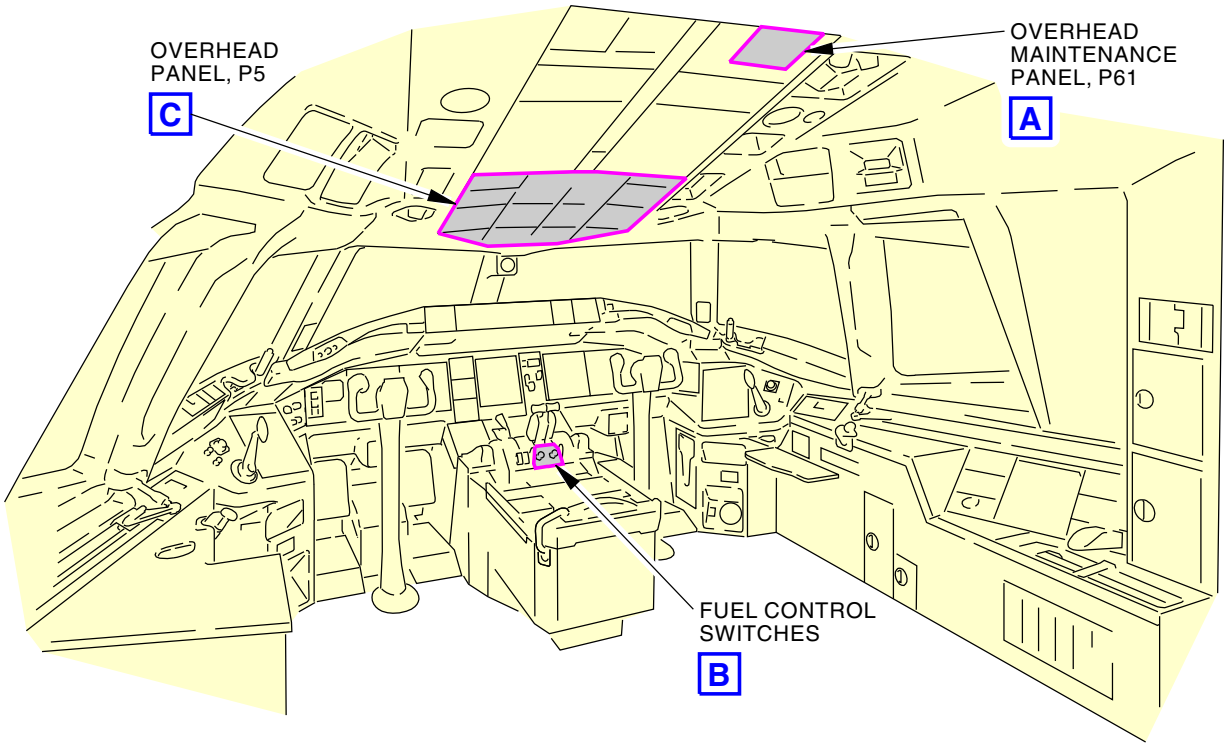
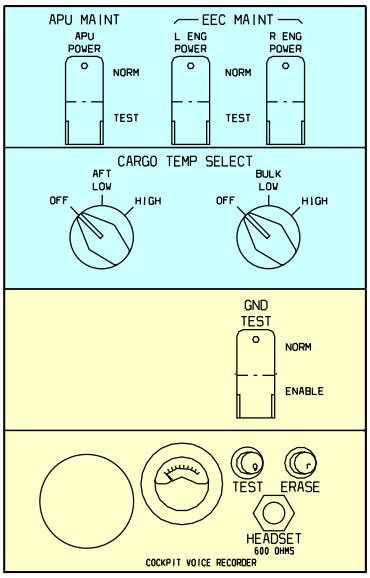
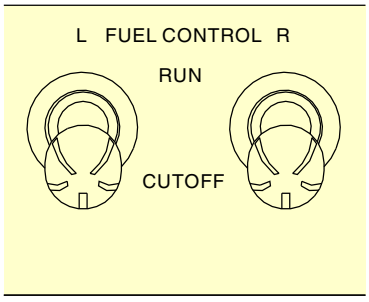


FLIGHT COMPARTMENT



OVERHEAD MAINTENANCE PANEL, P61

A



FUEL CONTROL SWITCHES

B

M06364 S0004285470_V2

Switch Locations
Figure 501/71-00-00-990-814-H01 (Sheet 1 of 2)

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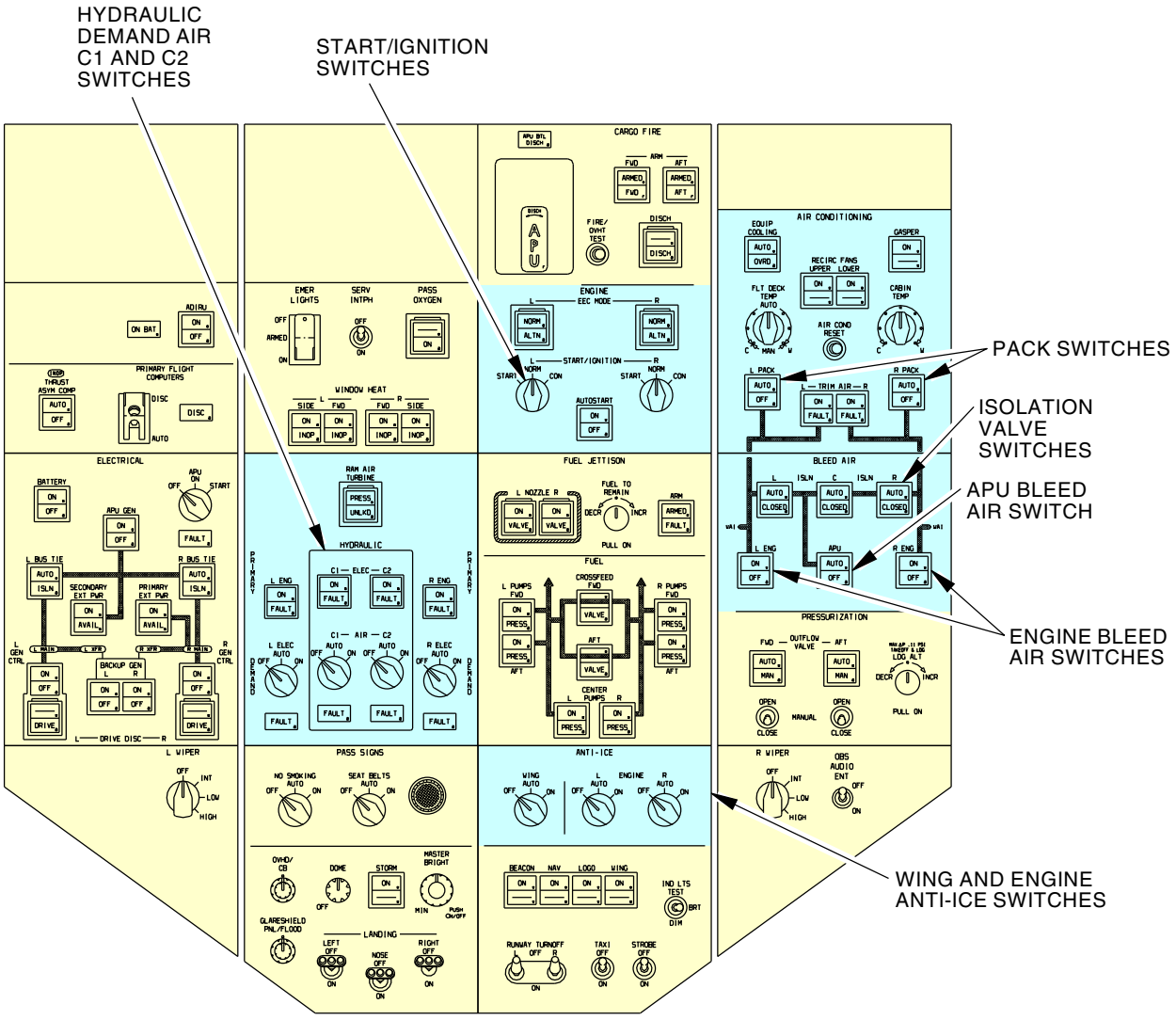

C

M06365 S0004285471_V2

Switch Locations
Figure 501/71-00-00-990-814-H01 (Sheet 2 of 2)

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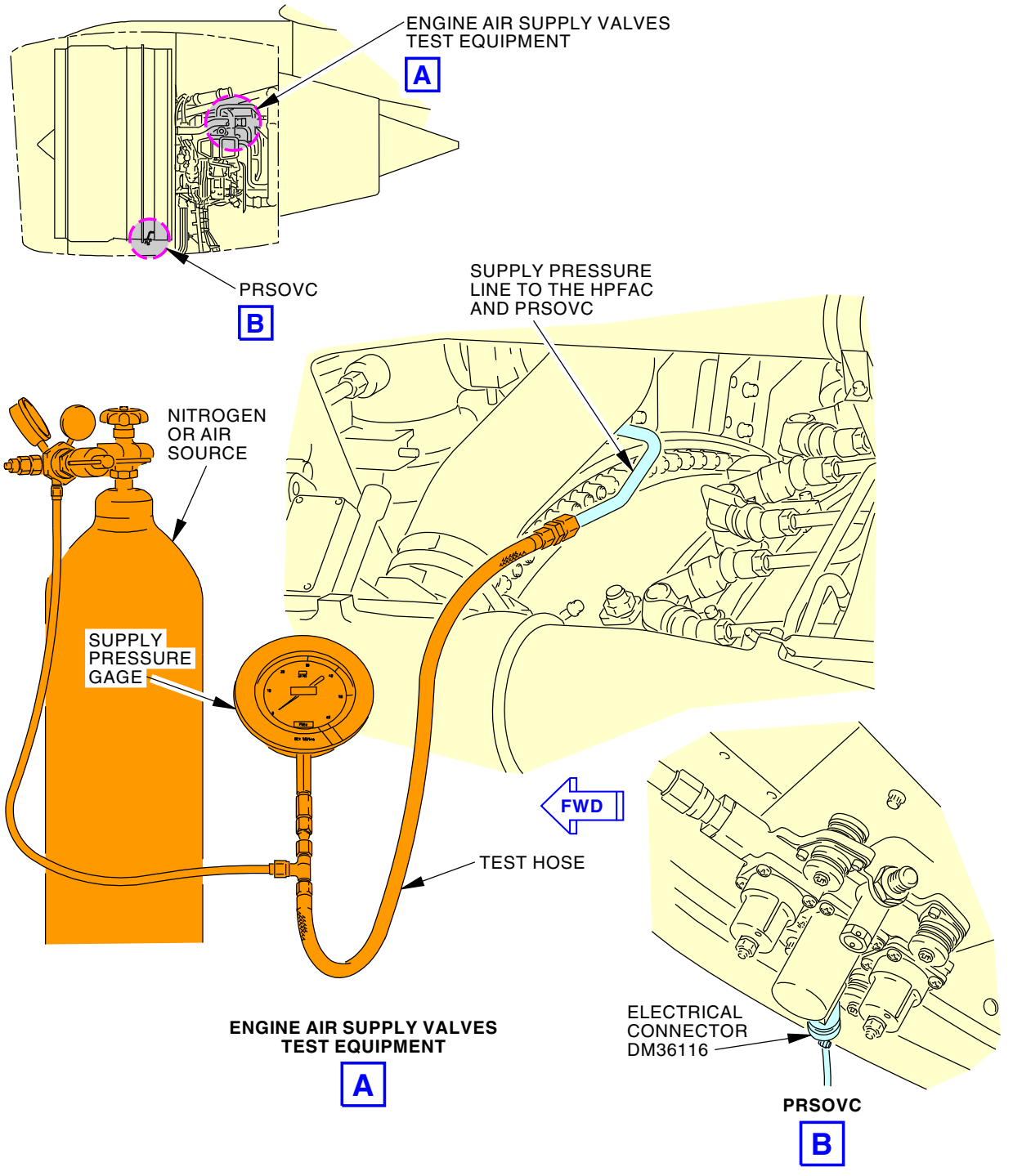

M06366 S0004285472_V3

Engine Air Supply Valve Operational Test
Figure 502/71-00-00-990-815-H01

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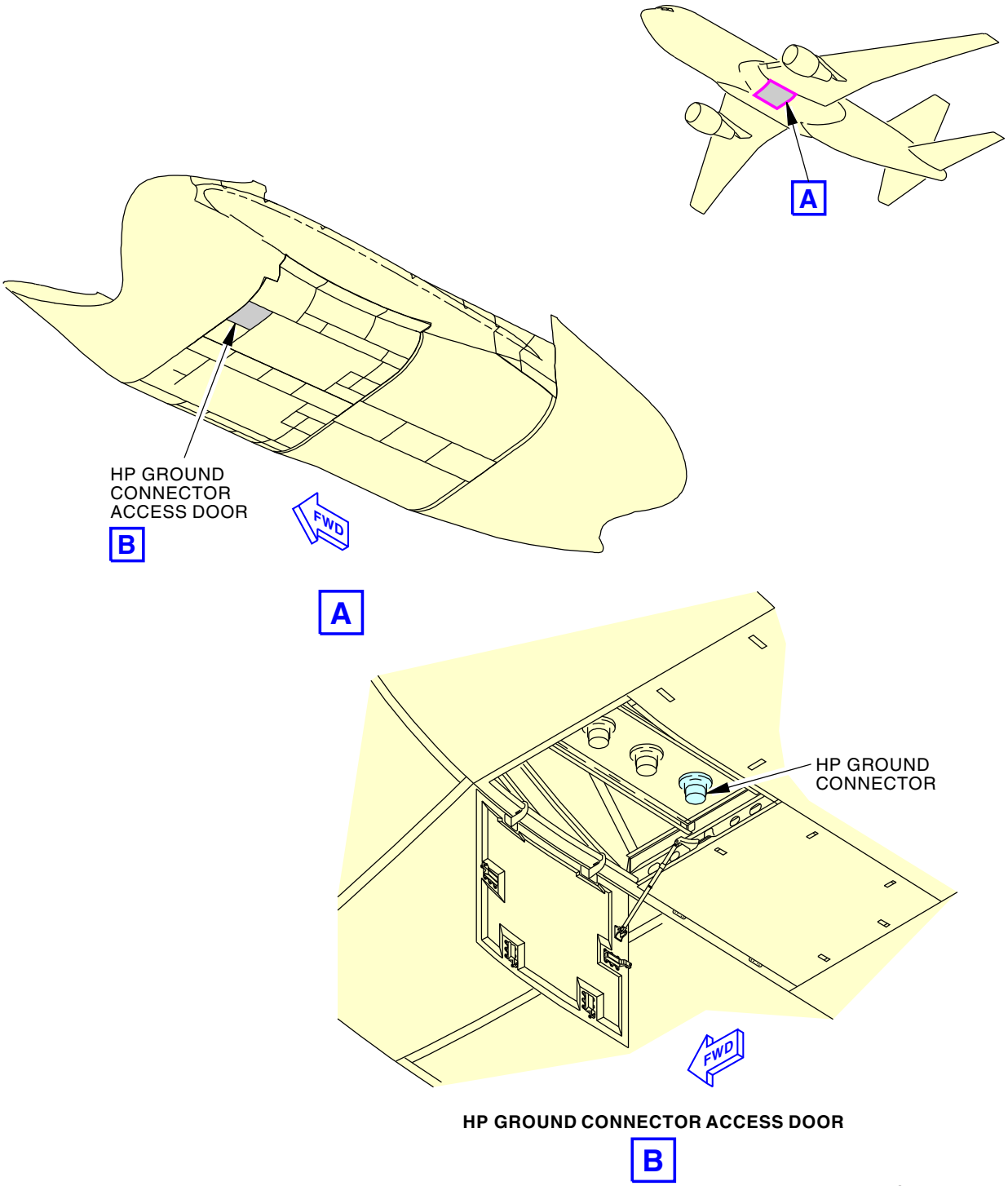

HP Ground Connector Access
Figure 503/71-00-00-990-816-H01

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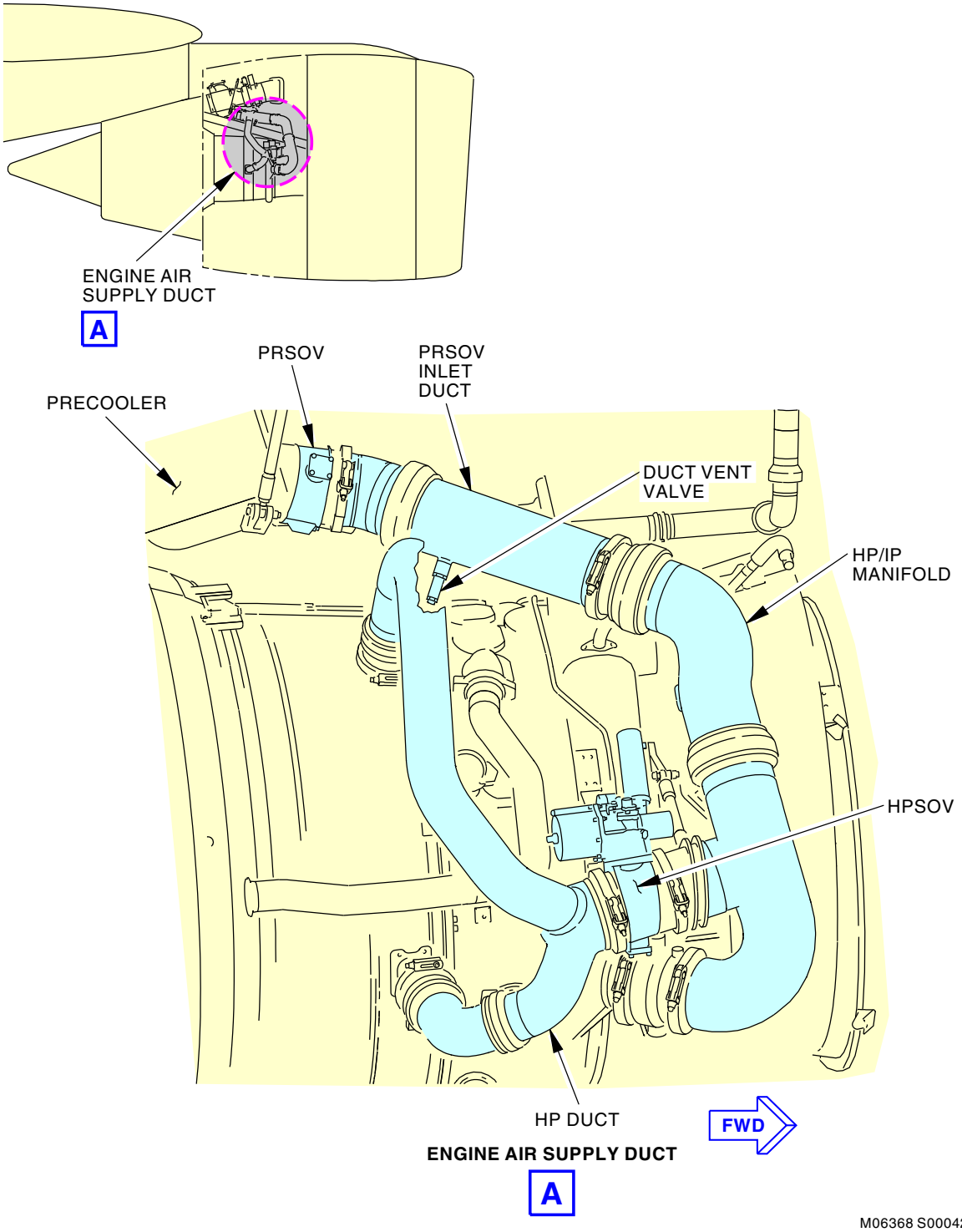

M06368 S0004285474_V2

Engine Air Supply Pneumatic Duct Leak Test
Figure 504/71-00-00-990-817-H01

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TASK 71-00-00-700-802-H01

4. Test No. 2 - Dry Motor leak Check

A. General

(1) This check is to find leaks in some areas of the oil, the fuel system, and verify the operation of the starter and the starter air valve.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-71-00-700-801-H01	Engine Vents and Drains Examination (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-15976	Fixture - Leak Check Part #: 9C3184 Supplier: 06083
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

G. Dry Motor Leak Check Procedure

SUBTASK 71-00-00-010-010-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-160-003-H01

(2) Clean the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-480-004-H00

(3) Put the individual 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to each line at the drain mast below the power plant.

SUBTASK 71-00-00-480-005-H00

(4) Attach a plastic bag, STD-92 on the drain mast lines and tighten it with a plastic tie, or install the leak check fixture, SPL-15976 on the drain mast below the power plant.

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SUBTASK 71-00-00-860-161-H01

CAUTION

DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. IF YOU OPERATED THE STARTER MORE THAN THE LIMITS, DAMAGE TO THE STARTER WILL OCCUR.

(5) Do this task: Dry Motor, TASK 71-00-00-800-836-H00.

SUBTASK 71-00-00-790-003-H01

(6) Examine the applicable component or system while you motor the engine and after you stop the engine.

(a) If you find leakage, repair or replace the tubes, tube flanges, the fittings or components as it is necessary.

(b) Pay attention to the drain mast lines for leakage.

1) Remove the plastic bag, STD-92 from the drain mast lines.

2) Put the collected fluid from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194. Refer to Engine Vents and Drains Examination, TASK 71-71-00-700-801-H01 for Drain Mast - Leakage Limits and the Corrective Action.

3) If necessary, remove and empty the fluid from the leak check fixture, SPL-15976.

(c) If you do the leak check after AGB LRU replacement, make sure you do an inspection of the AGB LRU interface area for any sign of fresh leakage.

(d) Look at the cases for oil and fuel stains.

(e) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

H. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-007-H01

WARNING

DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine

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(Continued)

Number	Name/Location
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-700-803-H01

5. Test No. 3 - Standard Wet Motor Leak Check

A. General

(1) This test is used for a check of the fuel leaks on all the fuel system components.

NOTE: The fuel will flow to an inner area of the HMU and some of the fuel nozzles.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-812-H01	Wet Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-71-00-700-801-H01	Engine Vents and Drains Examination (P/B 601)
73-11-05-400-801-H01	Fuel Nozzle Installation (P/B 401)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-15976	Fixture - Leak Check Part #: 9C3184 Supplier: 06083
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

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E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

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

G. Standard Wet Motor Leak Check Procedure

SUBTASK 71-00-00-010-011-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-160-004-H01

(2) Clean the areas to be examined with a cotton wiper, G00034.

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SUBTASK 71-00-00-160-007-H00

(3) Put the individual 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to each line at the drain mast below the power plant.

SUBTASK 71-00-00-480-006-H00

(4) Attach a plastic bag, STD-92 on the drain mast lines and tighten it with a plastic tie, or install the leak check fixture, SPL-15976 on the drain mast below the power plant.

SUBTASK 71-00-00-860-162-H01

CAUTION

AFTER THE WET MOTOR, DRY MOTOR THE ENGINE FOR 60 SECONDS TO CLEAR THE COMBUSTION CHAMBER OF FUEL. ENGINE OVERTEMPERATURE OR A TAILPIPE FIRE CAN OCCUR ON THE SUBSEQUENT START.

(5) Do this task: Wet Motor, TASK 71-00-00-800-812-H01.

SUBTASK 71-00-00-790-004-H01

(6) Examine the applicable component or system while you motor the engine and after you stop the engine.

(a) If you find leakage, repair or replace the tubes, tube flanges, the fittings or components as it is necessary.

(b) Pay attention to the drain mast lines for leakage.

1) Remove the plastic bag, STD-92 from the drain mast lines.

2) Put the collected fluid from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194. Refer to Engine Vents and Drains Examination, TASK 71-71-00-700-801-H01 for Drain Mast - Leakage Limits and the Corrective Action.

3) If necessary, remove and empty the fluid from the leak check fixture, SPL-15976.

(c) If you do the leak check after AGB LRU replacement, make sure you do an inspection of the AGB LRU interface area for any sign of fresh leakage.

(d) If you have a fuel leak at the fuel manifold B-nut:

1) Check the B-nut surfaces for high metal.

a) If necessary, polish to remove the high metal.

NOTE: Fuel nozzle preformed packing is a secondary seal surface and does not prevent fuel leakage. Replace the fuel nozzle preformed packing only if there are nicks or cuts.

2) Tighten the fuel manifold B-nut Fuel Nozzle Installation, TASK 73-11-05-400-801-H01.

(e) Look at the cases for oil and fuel stains.

(f) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

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H. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-008-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-00-00-700-804-H01

6. Test No. 5 - Idle Leak Check

A. General

(1) This check is to examine the engine component or system for leakage.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-802-H01	Engine Operation Limits (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-71-00-700-801-H01	Engine Vents and Drains Examination (P/B 601)
73-11-05-400-801-H01	Fuel Nozzle Installation (P/B 401)

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(Continued)

Reference	Title
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-15976	Fixture - Leak Check Part #: 9C3184 Supplier: 06083
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

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

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G. Idle Leak Check

SUBTASK 71-00-00-010-012-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-160-005-H01

(2) Clean the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-170-003-H00

(3) Put the individual 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to each line at the drain mast below the power plant.

SUBTASK 71-00-00-480-007-H00

(4) Attach a plastic bag, STD-92 on the drain mast lines and tighten it with a plastic tie, or install the leak check fixture, SPL-15976 on the drain mast below the power plant.

SUBTASK 71-00-00-410-009-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

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1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-163-H01

(6) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(a) Access the MFD engine maintenance page format display.

1) Do this task: Showing a Maintenance Page (AMM TASK 31-61-00-800-804).

(b) Let the engine become stable at the minimum idle for five minutes.

(c) Make sure the engine operates in the operation limits Engine Operation Limits, TASK 71-00-00-800-802-H01.

SUBTASK 71-00-00-860-164-H01

(7) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-010-013-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-790-005-H01

(9) Examine the applicable component or system for sign of fluid leakage.

(a) If you find leakage, repair or replace the tubes, tube flanges, fittings or components as it is necessary.

(b) Pay attention to the drain mast lines for leakage.

1) Remove the plastic bag, STD-92 from the drain mast lines.

2) Put the collected fluid from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194. Refer to Engine Vents and Drains Examination, TASK 71-71-00-700-801-H01 for Drain Mast - Leakage Limits and the Corrective Action.

3) If necessary, remove and empty the fluid from the leak check fixture, SPL-15976.

(c) If you do the leak check after AGB LRU replacement, make sure you do an inspection of the AGB LRU interface area for any sign of fresh leakage.

(d) If you have a fuel leak at the fuel manifold B-nut:

1) Check the B-nut surfaces for high metal.

a) If necessary, polish to remove the high metal.

NOTE: Fuel nozzle preformed packing is a secondary seal surface and does not prevent fuel leakage. Replace the fuel nozzle preformed packing only if three are nicks or cuts.

2) Tighten the fuel manifold B-nut Fuel Nozzle Installation, TASK 73-11-05-400-801-H01.

(e) Look at the cases and the areas for oil and fuel stains.

(f) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

SUBTASK 71-00-00-420-003-H01

CAUTION

MAKE SURE THAT THE PNEUMATIC SEAL IS IN THE GROOVE AT THE AFT OUTER FAN CASE. THE SEAL DOES NOT FULLY INFLATE DURING THE IDLE LEAK CHECK. IF THE PNEUMATIC SEAL IS NOT IN THE GROOVE, DAMAGE TO THE SEAL CAN OCCUR WHEN YOU CLOSE THE THRUST REVERSERS.

(10) Make sure the pneumatic seal is not disengaged from the groove on the aft outer fan case.

(a) If the pneumatic seal is out of the groove, put the pneumatic seal back in the groove with your hand at the aft outer fan case.

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H. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-010-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-700-805-H01

7. Test No. 6 - Part-Power Leak Check

A. General

(1) This test is find carbon seal leakage and leaks in some areas of the oil and fuel system.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-71-00-700-801-H01	Engine Vents and Drains Examination (P/B 601)
73-11-05-400-801-H01	Fuel Nozzle Installation (P/B 401)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)

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(Continued)

Reference	Title
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-15976	Fixture - Leak Check Part #: 9C3184 Supplier: 06083
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

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

G. Part-Power Leak Check

SUBTASK 71-00-00-010-014-H01

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

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

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(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-160-006-H01

(2) Clean the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-480-003-H01

(3) Put the individual 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to each line at the drain mast below the power plant.

SUBTASK 71-00-00-480-008-H00

(4) Attach a plastic bag, STD-92 on the drain mast lines and tighten it with a plastic tie, or install the leak check fixture, SPL-15976 on the drain mast below the power plant.

SUBTASK 71-00-00-410-011-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

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1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-165-H01

WARNING MAKE SURE THE BRAKING SYSTEM IS LOCKED. IF THE BRAKING SYSTEM IS NOT LOCKED, ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURY TO PERSONNEL ON THE GROUND.

(6) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

SUBTASK 71-00-00-860-166-H01

CAUTION MAKE SURE THAT YOU CAN APPLY FULL BRAKING TO THE AIRPLANE. IF THE BRAKE IS NOT ON, DAMAGE TO THE AIRPLANE, ENGINE NACELLE OR THE ENGINE COULD OCCUR.

(7) Maintain the hydraulic, the pneumatic, and the electrical power to the airplane.

SUBTASK 71-00-00-860-167-H01

(8) Let the engine become stable at idle for 5 minutes.

SUBTASK 71-00-00-860-168-H01

(9) Move the thrust lever to 50% N1.

SUBTASK 71-00-00-860-169-H01

(10) Let the engine become stable at 50% N1 for 3 minutes.

SUBTASK 71-00-00-860-170-H01

(11) Move the thrust lever slowly to idle.

SUBTASK 71-00-00-860-171-H01

(12) Let the engine stay at idle for 5 minutes.

SUBTASK 71-00-00-860-172-H01

(13) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-010-015-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

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(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-790-006-H01

(15) Examine the applicable component or system for sign of fluid leakage.

(a) If you find leakage, repair or replace the tubes, tube flanges, fittings or components as it is necessary.

(b) Pay attention to the drain mast lines for leakage.

1) Remove the plastic bag, STD-92 from the drain mast lines.

2) Put the collected fluid from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194. Refer to Engine Vents and Drains Examination, TASK 71-71-00-700-801-H01 for Drain Mast - Leakage Limits and the Corrective Action.

3) If necessary, remove and empty the fluid from the leak check fixture, SPL-15976.

(c) If you do the leak check after AGB LRU replacement, make sure you do an inspection of the AGB LRU interface area for any sign of fresh leakage.

(d) If you have a fuel leak at the fuel manifold B-nut:

1) Check the B-nut surfaces for high metal.

a) If necessary, polish to remove the high metal.

NOTE: Fuel nozzle preformed packing is a secondary seal surface and does not prevent fuel leakage. Replace the fuel nozzle preformed packing only if three are nicks or cuts.

2) Tighten the fuel manifold B-nut Fuel Nozzle Installation, TASK 73-11-05-400-801-H01.

(e) Look at the cases for oil and fuel stains.

(f) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

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H. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-012-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-00-00-700-806-H01

8. Test No. 7 - Power Assurance Test

(Figure 505 or Figure 506 and Figure 507)

A. General

(1) Do this test to make sure that the engine will get takeoff power and not be limited by EGT or N2.

(2) Calculate the %N1, maximum EGT, %N2, and the fuel flow target values.

(3) When you operate the airplane at an airport above sea level, adjust (altitude correction) the EGT limit (maximum EGT). The correct EGT margin is based on the airplane route structure.

NOTE: The Power Assurance Test is one method to make sure that the engine will get takeoff power and not be limited by EGT or N2. Other methods include test cell run data as given in the Engine Shop Manual or the review of flight data by engine condition monitoring. These other methods can provide a more accurate estimate of the engine condition.

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B. References

Reference	Title
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
FIM 73-22 TASK 852	N2 Redline Exceedance - Fault Isolation
FIM 73-22 TASK 853	EGT Redline Exceedance - Fault Isolation
FIM 73-34 TASK 811	Fuel Flow Indication High or Low with All Other Engine Parameters Normal - Fault Isolation

C. Tools/Equipment

Reference	Description
STD-1116	Thermometer - Alcohol (Mercury),-40 to +125 Degrees F (-40 to +49 Degrees C)

D. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

E. Power Assurance Test

SUBTASK 71-00-00-970-001-H01

(1) Find and write the targets from the power assurance data.

(a) Write the barometric pressure on the data sheet.

CAUTION KEEP MERCURY THERMOMETERS AWAY FROM THE AIRPLANE. IF THE THERMOMETER BREAKS, MERCURY CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(b) Get the outside air temperature (OAT) with a thermometer, STD-1116.

NOTE: Do not use the airplane total air temperature indication to get the OAT. If you do, the power assurance target will be incorrect.

1) Take the temperature reading in the shade area of the airplane.

2) Write the OAT on the data sheet.

(c) Find and write the targets from the power assurance limits for: %N1, Maximum EGT, Maximum %N2, Maximum fuel flow for the current OAT.

1) Find and write the required adjustments for each 0.1% actual N1 deviated from the target N1.

a) For the GE90-115B, GE90-115B1, GE90-110B1 or GE90-110B1L engine ratings, refer to (Figure 505 or Figure 506).

SUBTASK 71-00-00-860-173-H01

WARNING FOLLOW THE INSTRUCTIONS IN THE REFERENCE TO MAKE SURE THAT THE AIRPLANE DOES NOT MOVE DURING HIGH-POWER OPERATION. ENGINE THRUST CAN MOVE THE AIRPLANE AND CAUSE INJURY TO PERSONNEL ON THE GROUND AND DAMAGE TO EQUIPMENT.

(2) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

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(a) Make sure that you pull the warning speakers circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

1) Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-860-174-H01

WARNING MAKE SURE THAT YOU CAN APPLY FULL BRAKING TO THE AIRPLANE. IF THE BRAKE IS NOT ON, ENGINE THRUST CAN MOVE THE AIRPLANE AND CAUSE INJURY TO PERSONNEL ON THE GROUND AND DAMAGE TO EQUIPMENT.

(3) Maintain the hydraulic, the pneumatic, and the electrical power to the engine from the airplane.

SUBTASK 71-00-00-860-175-H01

(4) Let the engine become stable at idle for three minutes with no bleed air or airplane electrical generator loads.

NOTE: The EGT data is compensated specifically for three minutes stabilization.

SUBTASK 71-00-00-860-176-H01

(5) Make sure that the applicable systems on the overhead panel, P5, are OFF:

NOTE: These systems must be OFF during this test procedure because the power assurance tables are calculated for a no load and no bleed conditions.

(a) BLEED AIR L or R ENG switch

(b) ANTI-ICE WING switch

(c) ANTI-ICE L or R ENGINE switch

(d) ELECTRICAL L or R GEN CTRL switch.

SUBTASK 71-00-00-970-002-H01

(6) Monitor all the engine parameters.

(a) Make sure that you carefully monitor EGT and N2.

SUBTASK 71-00-00-860-177-H01

(7) Slowly move the thrust lever to the power assurance target %N1.

SUBTASK 71-00-00-860-178-H01

(8) Let the engine become stable at the power assurance target for a minimum of three minutes.

SUBTASK 71-00-00-970-003-H01

(9) Write the indicated parameters on the data sheet for: %N1, %N2, EGT, and the Fuel flow.

SUBTASK 71-00-00-860-179-H01

(10) Slowly move the thrust lever to idle.

SUBTASK 71-00-00-860-180-H01

(11) When the Test 7 is satisfactorily completed, continue with a subsequent test or stop the engine:

(a) After engine operation, operate the engine at minimum idle for 10 minutes.

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(b) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-860-181-H01

(12) If the circuit breakers were pulled to prevent operation of the warning speakers, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-710-001-H01

(13) Compare the indicated parameters and the target parameters of %N1, %N2, EGT, and the fuel flow:

(a) Indicated %N1.

1) For each 0.1% indicated N1 deviates from power assurance target %N1, increase or decrease the maximum values by the following amount:

a) Increase the maximum %N2, EGT, and fuel flow values if indicated %N1 is more than power assurance target %N1.

b) Decrease the maximum %N2, EGT, and fuel flow values if indicated %N1 is less than power assurance target %N1.

(b) Indicated %N2.

1) If the indicated %N2 and EGT is below the maximum values, you can get takeoff power and not be limited by the EGT or N2.

2) If the indicated %N2 is above the maximum %N2, do the fault isolation procedure to correct the problem (FIM 73-22 TASK 852).

(c) Indicated EGT.

1) If the indicated %N2 and EGT is below the maximum values, you can get takeoff power and not be limited by the EGT or N2.

2) If the indicated EGT is above the maximum EGT, do the fault isolation procedure to correct the problem (FIM 73-22 TASK 853).

NOTE: The Power Assurance Test maximum EGT values include an allowance for the normal loss of EGT margin that occurs shortly after installation of a new or fully overhauled engine. If the engine is being tested after installation and has completed a Quick Turn Engine Shop Visit or has been installed for more than 1,000 hours, the maximum EGT can be increased by 7 degrees C.

(d) Indicated Fuel flow.

1) If the indicated fuel flow is above the maximum fuel flow, do the fault isolation to correct the problem (FIM 73-34 TASK 811).

NOTE: The maximum fuel flow is not a limit, but troubleshooting is recommended to prevent indicated fuel quantity, fuel quantity used and fuel imbalance indication issues.

——— END OF TASK ———

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
-40.0	-40	71.96	96.53	590	16766	7605
-38.2	-39	72.12	96.74	594	16805	7623
-36.4	-38	72.27	96.94	597	16844	7640
-34.6	-37	72.42	97.15	600	16883	7658
-32.8	-36	72.58	97.36	603	16923	7676
-31.0	-35	72.73	97.56	606	16961	7693
-29.2	-34	72.88	97.77	610	16999	7711
-27.4	-33	73.03	97.97	613	17038	7728
-25.6	-32	73.19	98.17	616	17076	7746
-23.8	-31	73.34	98.38	619	17114	7763
-22.0	-30	73.49	98.58	622	17153	7780
-20.2	-29	73.64	98.79	626	17191	7798
-18.4	-28	73.79	98.99	629	17229	7815
-16.6	-27	73.94	99.19	632	17268	7833
-14.8	-26	74.09	99.39	635	17305	7850
-13.0	-25	74.24	99.59	638	17344	7867
-11.2	-24	74.39	99.80	641	17382	7884
-9.4	-23	74.54	100.00	645	17419	7901
-7.6	-22	74.69	100.20	648	17459	7919
-5.8	-21	74.84	100.40	651	17496	7936
-4.0	-20	74.98	100.60	654	17534	7953
-2.2	-19	75.13	100.80	657	17572	7971
-0.4	-18	75.28	101.00	660	17609	7987
1.4	-17	75.43	101.20	664	17647	8004
3.2	-16	75.57	101.40	667	17684	8021
5.0	-15	75.72	101.59	670	17721	8038
6.8	-14	75.87	101.79	673	17760	8056
8.6	-13	76.01	101.99	676	17796	8072
10.4	-12	76.16	102.19	679	17835	8090
12.2	-11	76.31	102.39	682	17871	8106
14.0	-10	76.45	102.59	685	17908	8123
15.8	-9	76.60	102.78	688	17945	8140
17.6	-8	76.74	102.98	692	17982	8157
19.4	-7	76.89	103.18	695	18019	8173
21.2	-6	77.03	103.37	698	18056	8190
23.0	-5	77.17	103.57	701	18092	8206
24.8	-4	77.32	103.77	704	18130	8223
26.6	-3	77.46	103.96	707	18166	8240
28.4	-2	77.60	104.16	710	18202	8256
30.2	-1	77.75	104.36	713	18241	8274
32.0	0	77.89	104.55	716	18279	8291
33.8	1	78.03	104.75	720	18317	8309
35.6	2	78.17	104.94	723	18356	8326

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Power Assurance Limits 50% Thrust GE90-115B/-115B1
Figure 505/71-00-00-990-818-H01 (Sheet 1 of 3)

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
37.4	3	78.32	105.13	726	18395	8344
39.2	4	78.46	105.32	729	18434	8361
41.0	5	78.60	105.51	733	18472	8379
42.8	6	78.74	105.71	736	18509	8396
44.6	7	78.88	105.90	739	18546	8412
46.4	8	79.02	106.09	742	18583	8429
48.2	9	79.16	106.28	745	18621	8447
50.0	10	79.30	106.48	748	18657	8463
51.8	11	79.44	106.67	752	18695	8480
53.6	12	79.58	106.86	755	18732	8497
55.4	13	79.72	107.05	758	18768	8513
57.2	14	79.86	107.25	761	18804	8529
59.0	15	80.00	107.44	764	18840	8545
60.8	16	80.14	107.63	767	18878	8563
62.6	17	80.28	107.81	771	18918	8581
64.4	18	80.42	108.00	774	18959	8600
66.2	19	80.55	108.18	777	18997	8617
68.0	20	80.69	108.37	780	19036	8635
69.8	21	80.83	108.55	784	19076	8653
71.6	22	80.97	108.74	787	19120	8673
73.4	23	81.10	108.92	791	19164	8693
75.2	24	81.24	109.10	794	19206	8712
77.0	25	81.38	109.28	798	19246	8730
78.8	26	81.51	109.47	801	19282	8746
80.6	27	81.65	109.65	804	19319	8763
82.4	28	81.78	109.84	807	19357	8780
84.2	29	81.92	110.02	810	19394	8797
86.0	30	82.06	110.21	813	19430	8813
87.8	31	82.19	110.39	816	19468	8830
89.6	32	82.33	110.58	819	19505	8847
91.4	33	82.46	110.76	822	19541	8864
93.2	34	82.60	110.95	825	19576	8879
95.0	35	82.73	111.14	828	19609	8895
96.8	36	82.86	111.32	831	19641	8909
98.6	37	83.00	111.51	834	19675	8924
100.4	38	83.13	111.69	837	19707	8939
102.2	39	83.26	111.88	839	19741	8955
104.0	40	83.40	112.06	842	19774	8969
105.8	41	83.53	112.25	845	19807	8984
107.6	42	83.66	112.43	848	19840	8999
109.4	43	83.80	112.61	851	19874	9015
111.2	44	83.93	112.81	853	19901	9027
113.0	45	84.06	113.01	856	19930	9040

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Power Assurance Limits 50% Thrust GE90-115B/-115B1
Figure 505/71-00-00-990-818-H01 (Sheet 2 of 3)

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
114.8	46	84.19	113.22	858	19958	9053
116.6	47	84.33	113.42	861	19981	9063
118.4	48	84.46	113.62	863	20002	9073
120.2	49	84.59	113.82	865	20030	9086
122.0	50	84.72	114.03	868	20059	9098

NOTES:

1. The stabilization time required for the Max power assurance check is three minutes. Longer times are required to make sure of full stabilization. A 8°C added has been included in the Table EGT value to compensate for the shorter stabilization time.
2. Figures assume no bleed or horsepower extraction and are therefore valid only when generator and pneumatic switches are off.
3. For each 1000ft pressure altitude above sea level, the Table Wf value should be decreased by 659 lb/hr (298.5 kg/hr).
4. For each +0.1% actual N1 deviates from target N1, adjust the Table values as follows:

EGT	°C	1.1
N2	%	0.04
Fuel Flow	lb/hr(kg/hr)	65 (29.5)

5. For operations at airports with elevations higher than sea level, the following adjustments should be made to the Table EGT value:

EGT Limit Adjustment for Operation Above Sea Level

Airport Altitude ft	EGT Adjustment °C	Airport Altitude ft	EGT Adjustment °C
1000	0	8000	0
2000	0	9000	0
3000	0	10000	0
4000	0	11000	0
5000	0	12000	0
6000	0	13000	0
7000	0	14000	0

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Power Assurance Limits 50% Thrust GE90-115B/-115B1
Figure 505/71-00-00-990-818-H01 (Sheet 3 of 3)

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
-40.0	-40	71.96	96.80	603	16963	7694
-38.2	-39	72.12	97.01	607	17002	7712
-36.4	-38	72.27	97.21	610	17042	7730
-34.6	-37	72.42	97.42	613	17080	7747
-32.8	-36	72.58	97.63	616	17120	7765
-31.0	-35	72.73	97.83	620	17158	7783
-29.2	-34	72.88	98.04	623	17197	7801
-27.4	-33	73.03	98.24	626	17236	7818
-25.6	-32	73.19	98.45	629	17275	7836
-23.8	-31	73.34	98.65	633	17314	7854
-22.0	-30	73.49	98.85	636	17352	7871
-20.2	-29	73.64	99.06	639	17390	7888
-18.4	-28	73.79	99.26	642	17430	7906
-16.6	-27	73.94	99.46	645	17468	7923
-14.8	-26	74.09	99.66	649	17506	7941
-13.0	-25	74.24	99.86	652	17544	7958
-11.2	-24	74.39	100.07	655	17583	7976
-9.4	-23	74.54	100.27	658	17620	7993
-7.6	-22	74.69	100.47	661	17659	8010
-5.8	-21	74.84	100.67	665	17696	8027
-4.0	-20	74.98	100.87	668	17735	8044
-2.2	-19	75.13	101.07	671	17773	8062
-0.4	-18	75.28	101.27	674	17810	8079
1.4	-17	75.43	101.47	677	17849	8096
3.2	-16	75.57	101.66	681	17887	8113
5.0	-15	75.72	101.86	684	17924	8130
6.8	-14	75.87	102.06	687	17963	8148
8.6	-13	76.01	102.26	690	18001	8165
10.4	-12	76.16	102.46	693	18039	8182
12.2	-11	76.31	102.66	696	18076	8199
14.0	-10	76.45	102.86	700	18114	8217
15.8	-9	76.60	103.05	703	18151	8233
17.6	-8	76.74	103.25	706	18188	8250
19.4	-7	76.89	103.45	709	18225	8267
21.2	-6	77.03	103.64	712	18263	8284
23.0	-5	77.17	103.84	715	18299	8300
24.8	-4	77.32	104.04	718	18339	8318
26.6	-3	77.46	104.23	722	18378	8336
28.4	-2	77.60	104.43	725	18417	8354
30.2	-1	77.75	104.63	728	18457	8372
32.0	0	77.89	104.79	731	18496	8390
33.8	1	78.03	104.99	735	18536	8408
35.6	2	78.17	105.21	738	18574	8425

1257044-00-B D85433 S0000164738_V3

Power Assurance limits 50% Thrust GE90-110B1/-110B1L
Figure 506/71-00-00-990-844-H01 (Sheet 1 of 3)

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
37.4	3	78.32	105.37	741	18613	8443
39.2	4	78.46	105.56	744	18652	8460
41.0	5	78.60	105.75	748	18690	8478
42.8	6	78.74	105.94	751	18729	8496
44.6	7	78.88	106.13	754	18769	8513
46.4	8	79.02	106.32	757	18807	8531
48.2	9	79.16	106.51	761	18846	8548
50.0	10	79.30	106.71	764	18884	8566
51.8	11	79.44	106.90	767	18921	8583
53.6	12	79.58	107.09	770	18959	8600
55.4	13	79.72	107.28	773	18995	8616
57.2	14	79.86	107.47	777	19031	8633
59.0	15	80.00	107.66	780	19069	8649
60.8	16	80.14	107.85	783	19107	8667
62.6	17	80.28	108.04	786	19148	8685
64.4	18	80.42	108.22	790	19187	8703
66.2	19	80.55	108.40	793	19226	8721
68.0	20	80.69	108.59	796	19269	8740
69.8	21	80.83	108.77	800	19312	8760
71.6	22	80.97	108.96	803	19357	8780
73.4	23	81.10	109.14	807	19399	8799
75.2	24	81.24	109.32	810	19441	8819
77.0	25	81.38	109.51	814	19479	8835
78.8	26	81.51	109.69	817	19516	8852
80.6	27	81.65	109.88	820	19555	8870
82.4	28	81.78	110.07	823	19592	8887
84.2	29	81.92	110.25	826	19629	8904
86.0	30	82.06	110.44	829	19667	8921
87.8	31	82.19	110.62	832	19703	8937
89.6	32	82.33	110.80	835	19740	8954
91.4	33	82.46	110.98	838	19778	8971
93.2	34	82.60	111.17	841	19812	8987
95.0	35	82.73	111.35	844	19847	9002
96.8	36	82.86	111.54	847	19880	9017
98.6	37	83.00	111.72	850	19914	9033
100.4	38	83.13	111.90	853	19948	9048
102.2	39	83.26	112.08	856	19981	9063
104.0	40	83.40	112.26	859	20016	9079
105.8	41	83.53	112.45	861	20051	9095
107.6	42	83.66	112.62	864	20085	9110
109.4	43	83.80	112.80	867	20120	9126
111.2	44	83.93	112.99	870	20148	9139
113.0	45	84.06	113.19	873	20179	9153

1257045-00-B D86045 S0000164739_V3

Power Assurance limits 50% Thrust GE90-110B1/-110B1L
Figure 506/71-00-00-990-844-H01 (Sheet 2 of 3)

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Tamb °F	Tamb °C	N1 %	N2 %	EGT °C	Wf LBS/HR	Wf KGS/HR
114.8	46	84.19	113.39	875	20209	9167
116.6	47	84.33	113.59	878	20239	9180
118.4	48	84.46	113.79	881	20269	9194
120.2	49	84.59	113.99	883	20294	9205
122.0	50	84.72	114.19	885	20317	9216

NOTES:

1. The stabilization time required for the Max Power Assurance check is three minutes. Longer times are required to make sure of full stabilization. A 8°C added has been included in the Table EGT value to compensate for the shorter stabilization time.
2. Figures assume no bleed or horsepower extraction and are therefore valid only when generator and pneumatic switches are off.
3. For each 1000ft pressure altitude above sea level, the Table Wf value should be decreased by 659 lb/hr (298.9 kg/hr).
4. For each +0.1% actual N1 deviates from target N1, adjust the Table values as follows:

EGT	°C	1.1
N2	%	0.04
Fuel Flow	lb/hr(kg/hr)	65 (29.5)

5. For operations at airports with elevations higher than sea level, the following adjustments should be made to the table EGT value:

EGT Limit Adjustment for Operation Above Sea Level			
Airport Altitude ft	EGT Adjustment °C	Airport Altitude ft	EGT Adjustment °C
1000	0	8000	0
2000	-1	9000	0
3000	0	10000	0
4000	0	11000	0
5000	-3	12000	0
5600	-2	13000	0
6000	0	14000	0
7000	0		

1257046-00-B
D86203 S0000164740_V3

Power Assurance limits 50% Thrust GE90-110B1/-110B1L
Figure 506/71-00-00-990-844-H01 (Sheet 3 of 3)

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ENG NO.	TARGET %N1	ADJUSTED %N1	INDICATED %N1	TARGET MAX. EGT	INDICATED MAX. EGT	TARGET MAX. %N2	INDICATED MAX. %N2	TARGET MAX. FUEL FLOW	INDICATED MAX. FUEL FLOW
1									
2									

NOTE: OAT (OUTSIDE AIR TEMPERATURE): BAROMETRIC PRESSURE

1835243 S0000324313_V2

Power Assurance Test Engine Data Sheet
Figure 507/71-00-00-990-847-H00

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TASK 71-00-00-700-807-H01

9. Test No. 8 - Replacement Engine (Pretested Engine) Test

A. General

(1) Do this test on the newly installed engine (pretested) for leak check at the engine and strut interface connections.

(2) A pretested engine is a complete engine or propulsor which was operated satisfactorily in an approved test cell before it was installed on the airplane or a serviceable engine that was removed from an aircraft and the maintenance that follows has not been done on the engine or propulsor:

(a) Separation of a major module-to-major module flange (Booster to HPC, HPC to CDN, CDN to HPT, HPT to LPT) unless the maintenance was done according to an AMM task, or a Service Bulletin which is defined as a Quick Turn procedure or in the Service Bulletin, post maintenance test procedures are defined.

(b) Fan stator to propulsor mating or demating does not affect the pretested or tested determination of an engine or propulsor.

(c) LRU removal and replacements does not affect the pretested or tested determination of an engine or propulsor.

(3) If a replacement engine is not pretested, you must do Test No. 9 - Replacement Engine Test (Untested Engine) to do a check of the engine installation and operation.

(4) Test 10 - Low Pressure System (Fan/LPT) vibration survey is not required if maintenance was not performed to the fan (e.g. Fan Blade or Spinner removed/installed)

B. References

Reference	Title
24-11-01-200-805	IDG Disconnect Check (P/B 601)
26-11-00-710-801	Engine Fire Detection Operational Test (P/B 501)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
30-21-00-730-804-001	Engine Anti-Ice (engine running) - System Test (P/B 501)
31-61-00-800-803	Erasing a Scheduled Maintenance Task (P/B 201)
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
31-61-00-800-815	Showing Scheduled Maintenance Tasks (P/B 201)
36-10-00-700-801	Engine Air Supply Operational Test (P/B 501)
71-00-03-600-806-H01	Depreservation of An Installed Engine (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
73-21-20-800-801-H00	Engine Identification (Serial Number) Installation (ESN Special Function) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
79-00-00-200-804-H01	Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection (P/B 601)

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C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Replacement Engine Test

SUBTASK 71-00-00-630-001-H01

(1) If the engine is preserved, do a engine depreservation (TASK 71-00-03-600-806-H01).

SUBTASK 71-00-00-740-002-H01

(2) Do this task: Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01.

SUBTASK 71-00-00-710-002-H01

(3) Do this task: Engine Fire Detection Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-790-007-H01

(4) Do this task: Test No. 1 - Pneumatic Leak Test, TASK 71-00-00-700-801-H01.

SUBTASK 71-00-00-790-008-H01

(5) Do this task: Test No. 2 - Dry Motor leak Check, TASK 71-00-00-700-802-H01.

SUBTASK 71-00-00-790-009-H01

(6) Do a standard wet motor leak check if it is not done during engine depreservation (TASK 71-00-00-700-803-H01).

SUBTASK 71-00-00-790-010-H01

(7) Do this task: Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-813-H01.

SUBTASK 71-00-00-710-003-H01

(8) Do this task: Test No. 5 - Idle Leak Check, TASK 71-00-00-700-804-H01.

SUBTASK 71-00-00-790-011-H01

(9) Do this task: Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-814-H01.

SUBTASK 71-00-00-710-004-H01

(10) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

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SUBTASK 71-00-00-710-006-H01

(11) If it is necessary, do this task: Engine Air Supply Operational Test, TASK 36-10-00-700-801.

NOTE: If the HPSOV/HPFAC, PRSOV/PRSOVC and FAMV/HPFAC are working correctly, then the Engine Air Supply Operational Test is not necessary.

SUBTASK 71-00-00-710-023-H00

(12) Do this task: IDG Disconnect Check, TASK 24-11-01-200-805.

SUBTASK 71-00-00-710-024-H00

(13) Do this task: Engine Anti-Ice (engine running) - System Test, TASK 30-21-00-730-804-001.

SUBTASK 71-00-00-710-007-H01

(14) Do a check for engine maintenance status messages on EICAS.

(a) Do this task: Showing a Maintenance Page, TASK 31-61-00-800-804.

(b) Make sure there is no maintenance status messages.

SUBTASK 71-00-00-860-182-H01

(15) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the function.

SUBTASK 71-00-00-210-046-H01

(16) Use a maintenance access terminal (MAT) to do the system configuration check for the correct engine serial number and FADEC software version for the applicable engine:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE

2) LINE MAINTENANCE

3) SYSTEM CONFIGURATION

4) Select the ATA system 71-80 for L or R engine.

5) CONTINUE

6) Read the engine serial number for the applicable engine (Use the scroll bar to see all data).

7) Make sure the engine serial number and the FADEC software in the MAT are correct.

8) If the engine serial number is different, do this task:Engine Identification (Serial Number) Installation (ESN Special Function), TASK 73-21-20-800-801-H00.

SUBTASK 71-00-00-210-079-H01

(17) Get access to the Maintenance Task page on the EICAS Multi-Function Display (TASK 31-61-00-800-815), and look for the ENG EEC C2 Scheduled Maintenance Task (SMT) messages.

(a) If you do not see an ENG EEC C2 Scheduled Maintenance Task (SMT) messages, then no more action is necessary.

(b) If you see an ENG EEC C2 Scheduled Maintenance Task (SMT) message, then continue.

(c) Use a maintenance access terminal (MAT) to find the engine control C2 scheduled maintenance task.

1) Make these selections on the MAT:

a) ONBOARD MAINTENANCE

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b) EXTENDED MAINTENANCE

c) MAINTENANCE PLANNING

d) INBOUND SCHEDULED MAINTENANCE TASKS

e) CONTINUE.

2) Look for one or more of these scheduled maintenance tasks (SMTs) and their related maintenance messages (Table 503).

NOTE: The Maintenance messages that show in the table below the SMT on the screen are related to the SMT.

Table 503/71-00-00-993-823-H01 Scheduled Maintenance Tasks

Scheduled Maintenance Tasks	
731 452 51	ENG EEC C2 (L)
731 452 52	ENG EEC C2 (R)

3) If you see the SMTs and their related maintenance messages, do the corrective action in the Fault Isolation Manual (FIM) for the maintenance messages.

4) After you correct the maintenance messages, do the steps to erase the EICAS ENG EEC C2 Scheduled Maintenance Task (SMT) (TASK 31-61-00-800-803).

5) Select EXIT MAINTENANCE from the Extended Maintenance menu.

SUBTASK 71-00-00-860-183-H01

(18) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-00-010-016-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

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Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-210-047-H01

(20) Make sure all the pneumatic duct components are not loose.

NOTE: Only newly added or changed components need to be inspected.

(a) Retighten each pneumatic duct clamps if you find looseness.

SUBTASK 71-00-00-210-087-H01

(21) Do this task: Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection, TASK 79-00-00-200-804-H01.

SUBTASK 71-00-00-410-013-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-700-808-H01

10. Test No. 9 - Replacement Engine (Untested Engine) Test

A. General

(1) This test is to do a check of a newly installed engine or propulsor which was not operated satisfactorily in an approved test cell.

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B. References

Reference	Title
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
12-22-01-610-805-002	Engine Oil Change (P/B 301)
24-11-01-200-805	IDG Disconnect Check (P/B 601)
26-11-00-710-801	Engine Fire Detection Operational Test (P/B 501)
30-21-00-730-804-001	Engine Anti-Ice (engine running) - System Test (P/B 501)
31-61-00-800-803	Erasing a Scheduled Maintenance Task (P/B 201)
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
31-61-00-800-815	Showing Scheduled Maintenance Tasks (P/B 201)
36-10-00-700-801	Engine Air Supply Operational Test (P/B 501)
71-00-03-600-806-H01	Depreservation of An Installed Engine (P/B 201)
73-21-15-000-802-H01	EEC (FADEC) Software Installation (with a Portable Data Loader (PDL)) (P/B 201)
73-21-15-400-802-H01	EEC (FADEC) Software Installation (on the MAT) (P/B 201)
79-00-00-200-804-H01	Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection (P/B 601)
79-21-04-210-801-H01	Scavenge Oil Inlet Screens Inspection (P/B 201)
79-21-07-000-801-H01	Oil Filter Element Removal (P/B 401)
79-21-07-400-801-H01	Oil Filter Element Installation (P/B 401)
80-11-01-200-801-H01	Engine Starter Inspection (P/B 601)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Replacement Engine Test

SUBTASK 71-00-00-630-002-H01

(1) If an engine is preserved, do an engine depreservation (TASK 71-00-03-600-806-H01).

SUBTASK 71-00-00-710-008-H01

(2) Do this task: Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01.

SUBTASK 71-00-00-710-009-H01

(3) Do this task: Engine Fire Detection Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-790-012-H01

(4) Do this task: Test No. 1 - Pneumatic Leak Test, TASK 71-00-00-700-801-H01.

SUBTASK 71-00-00-790-013-H01

(5) Do this task: Test No. 2 - Dry Motor leak Check, TASK 71-00-00-700-802-H01.

SUBTASK 71-00-00-790-014-H01

(6) Do a standard wet motor leak check if it is not done during engine depreservation, do this task: Test No. 3 - Standard Wet Motor Leak Check, TASK 71-00-00-700-803-H01.

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SUBTASK 71-00-00-710-010-H01

(7) Do this task: Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-813-H01.

SUBTASK 71-00-00-710-011-H01

(8) Do this task: Test No. 5 - Idle Leak Check, TASK 71-00-00-700-804-H01.

(a) During this test, do this task: Engine Anti-Ice (engine running) - System Test, TASK 30-21-00-730-804-001.

SUBTASK 71-00-00-710-012-H01

(9) Do this task: Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-814-H01.

SUBTASK 71-00-00-710-016-H01

(10) While the engine operates during the subsequent tests, look at the MAT; Extended Maintenance - Existing Faults for maintenance messages related to these items:

(a) Fuel filter bypass

(b) Oil filter bypass

(c) Debris Monitoring System (DMS).

SUBTASK 71-00-00-710-025-H00

(11) Do this task: Test No. 22 - Seal Break-In Run Test, TASK 71-00-00-700-823-H00.

SUBTASK 71-00-00-710-013-H01

(12) Do this task: Test No. 7 - Power Assurance Test, TASK 71-00-00-700-806-H01.

(a) While the engine is at idle during this test, do this task: Engine Anti-Ice (engine running) - System Test, TASK 30-21-00-730-804-001.

SUBTASK 71-00-00-710-014-H01

(13) Do this task: Test No. 11 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-700-810-H01.

NOTE: If you did not do maintenance on the HPC or HPT during the time before installation and the last operation of the engine, the vibration survey is not necessary.

SUBTASK 71-00-00-710-015-H01

(14) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

(a) While the engine is at idle during this test, do this task: IDG Disconnect Check, TASK 24-11-01-200-805.

SUBTASK 71-00-00-710-017-H01

(15) Do this task: Engine Air Supply Operational Test, TASK 36-10-00-700-801.

(a) While the engine is at idle during this test, do this task: IDG Disconnect Check, TASK 24-11-01-200-805.

SUBTASK 71-00-00-860-184-H01

(16) If the installed engine completed a full performance restoration shop visit without test cell or other operation before it was installed on an aircraft, do the steps that follow:

NOTE: Do this task as soon as possible after the engine shutdown.

(a) Drain the engine oil.

1) Do this task: Engine Oil Change, TASK 12-22-01-610-805-002.

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(b) Replace the oil filter element. These are the tasks: Oil Filter Element Removal, TASK 79-21-07-000-801-H01 and Oil Filter Element Installation, TASK 79-21-07-400-801-H01.

(c) Do this task: Engine Oil Replenishing, TASK 12-13-01-130-803-002.

SUBTASK 71-00-00-710-026-H00

(17) Do a check for engine maintenance status messages on EICAS.

(a) Do this task: Showing a Maintenance Page, TASK 31-61-00-800-804.

(b) Make sure there is no maintenance status message.

SUBTASK 71-00-00-420-008-H00

(18) Make sure all the pneumatic duct components are not loose.

(a) Retighten each pneumatic duct clamps if you find looseness.

SUBTASK 71-00-00-210-086-H00

(19) Do this task: Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection, TASK 79-00-00-200-804-H01.

SUBTASK 71-00-00-210-049-H01

(20) Do this task: Scavenge Oil Inlet Screens Inspection, TASK 79-21-04-210-801-H01.

SUBTASK 71-00-00-220-001-H01

(21) Do this task: Engine Starter Inspection, TASK 80-11-01-200-801-H01.

SUBTASK 71-00-00-210-050-H01

(22) Use a maintenance access terminal (MAT) to do the system configuration check for the correct engine serial number, FADEC software version, and thrust rating for the applicable engine:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) SYSTEM CONFIGURATION
4) Select the ATA system 71-80 for L and R engine
5) CONTINUE
6) Read the engine serial number for the applicable engine (Use the scroll bar to see all data)
7) Make sure they are correct engine serial number and FADEC software version on the MAT
8) If the FADEC software versions for both engines do not match, install the latest FADEC software version (TASK 73-21-15-400-802-H01 or TASK 73-21-15-000-802-H01).
9) If the engine thrust rating for both engines do not match the airplane thrust rating, refer to GE90-100 Service Bulletin 72-0001 latest revision to change the thrust rating.

SUBTASK 71-00-00-210-080-H01

(23) Get access to the Maintenance Task page on the EICAS Multi-Function Display (TASK 31-61-00-800-815), and look for the ENG EEC C2 Scheduled Maintenance Task (SMT) messages.

(a) If you do not see an ENG EEC C2 Scheduled Maintenance Task (SMT) messages, then no more action is necessary.

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(b) If you see an ENG EEC C2 Scheduled Maintenance Task (SMT) message, then continue.

(c) Use a maintenance access terminal (MAT) to find the engine control C2 scheduled maintenance task.

1) Make these selections on the MAT:

a) ONBOARD MAINTENANCE

b) EXTENDED MAINTENANCE

c) MAINTENANCE PLANNING

d) INBOUND SCHEDULED MAINTENANCE TASKS

e) CONTINUE.

2) Look for one or more of these scheduled maintenance tasks (SMTs) and their related maintenance messages (Table 504).

NOTE: The Maintenance messages that show in the table below the SMT on the screen are related to the SMT.

Table 504/71-00-00-993-824-H01 Scheduled Maintenance Tasks

Scheduled Maintenance Tasks	
731 452 51	ENG EEC C2 (L)
731 452 52	ENG EEC C2 (R)

3) If you see the SMTs and their related maintenance messages, do the corrective action in the Fault Isolation Manual (FIM) for the maintenance messages.

4) After you correct the maintenance messages, do the steps to erase the EICAS ENG EEC C2 Scheduled Maintenance Task (SMT) (TASK 31-61-00-800-803).

5) Select EXIT MAINTENANCE from the Extended Maintenance menu.

——— END OF TASK ———

TASK 71-00-00-700-809-H01

11. Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey

A. General

(1) This test is to make sure the engine vibration is satisfactory after the replacement of certain components.

(2) If the vibration is satisfactory, the airplane can be dispatched, with subsequent trim balance from In-flight data.

(3) If the indicated vibration is above the vibration guidelines (0.8 unit):

(a) Trim balance the engine.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left

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(Continued)

Zone	Area
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Low Pressure System (Fan/LPT) Vibration Survey

SUBTASK 71-00-00-860-185-H01

(1) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(a) Make sure you pull the warning speakers circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

1) Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-860-186-H01

(2) Let the engine become stable at idle for five minutes.

(a) Make sure the engine is sufficiently warm to prevent unusual vibration characteristics.

SUBTASK 71-00-00-860-187-H01

(3) Access the EICAS Engine Performance Page on the MFD (Multi-function Display) (TASK 31-61-00-800-804).

SUBTASK 71-00-00-710-019-H01

(4) Find the vibration peaks as follows:

WARNING MAKE SURE THE BRAKING SYSTEM IS LOCKED. IF THE BRAKING SYSTEM IS NOT LOCKED, ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURY TO PERSONNEL ON THE GROUND.

(a) Slowly move the thrust lever forward at a constant rate of two minutes, from a stable idle to 80% N1.

NOTE: Engine operation to 100 percent N1 is necessary for the alternative procedure below. Special precautions can be necessary.

NOTE: The rate of acceleration must be sufficiently slow (approximately two minutes) to let you find the vibration peaks.

1) Make sure that you do not operate the engine above the vibration guideline limit of 4.0 units.

a) If the engine will go above the limit, stop the test and do the applicable fault isolation in the FIM.

2) When you move the thrust lever forward, make sure to observe the VIB data (of the Fan and LPT) on the EICAS Engine Performance Page display.

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(b) As you accelerate the engine to 80% N1, write the %N1 speed indication of the one or several vibration peak(s) on the data sheet.

NOTE: Engine vibration can have one or several peak conditions at speeds between idle and 80% N1.

(c) Slowly move the thrust lever backward and stop at the %N1 RPM for each vibration peak.

(d) Let the engine become stable at the vibration peak for 30 seconds.

(e) After 30 seconds, find the vibration indication of the vibration peak and write it on the data sheet.

(f) Repeat this procedure for each vibration peak and write the data on the data sheet.

1) Make sure all of the vibration levels recorded at each of the engine speeds are less than 0.8 units.

(g) If the Engine Performance Page on the MFD (Multi-function display) indicates vibration is not above 0.8 units for an engine speed between idle and 80 percent N1, continue with a subsequent test or do the steps that follow:

1) Move the thrust lever to idle and operate the engine at minimum idle for 10 minutes.
2) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.
3) No other action is necessary.

(h) If the indicated vibration is above 0.8 units for an engine speed between idle and 80 percent N1, do the procedure that follows or the alternative procedure:

1) Move the thrust lever to idle and operate the engine at minimum idle for 10 minutes.
2) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.
3) Do this task: Test No. 12A - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401-200), TASK 71-00-00-700-811-H01 or Test No. 12B - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N 241-322-008-022 or 241-322-007-021, Media P/N 241-322-915-001), TASK 71-00-00-700-821-H02.

NOTE: Engine operation to 100 percent N1 is necessary for the alternative procedure that follows. Special precautions can be necessary.

4) Alternative procedure: Continue survey up to 100 percent N1. If you do not see peaks above 2.3 units between idle and 100 percent, do the steps that follow:

a) Move the thrust lever to idle and operate the engine at minimum idle for 10 minutes.
b) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.
c) No other action is necessary.

5) If you get peaks above 2.3 units, do this task: Test No. 12A - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401-200), TASK 71-00-00-700-811-H01 or Test No. 12B - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N 241-322-008-022 or 241-322-007-021, Media P/N 241-322-915-001), TASK 71-00-00-700-821-H02.

NOTE: Fan blades can seat themselves again in flight. Additional trim balancing can be necessary.

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SUBTASK 71-00-00-860-188-H01

(5) If the circuit breakers were pulled to prevent operation of the warning speakers, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

——— END OF TASK ———

TASK 71-00-00-700-810-H01

12. Test No. 11 - High Pressure System (HPC/HPT) Vibration Survey

A. General

(1) This test is to make sure the high pressure rotor vibration is satisfactory.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. High Pressure System (HPC/HPT) Vibration Survey

SUBTASK 71-00-00-860-189-H01

(1) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(a) Make sure you pull the warning speakers circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

1) Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-860-190-H01

(2) Let the engine become stable at idle for five minutes.

(a) Make sure the engine is sufficiently warm to prevent unusual vibration characteristics.

SUBTASK 71-00-00-860-191-H01

(3) Access the MFD Engine Performance Page on the MFD (Multi-function Display) (TASK 31-61-00-800-804).

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SUBTASK 71-00-00-710-020-H01

(4) Find the vibration peaks as follows:

WARNING MAKE SURE YOU PUT THE AIRPLANE BRAKES ON. IF THE BRAKING SYSTEM IS NOT LOCKED, ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURY TO PERSONNEL ON GROUND.

(a) Slowly move the thrust lever forward at a constant rate of two minutes, from a stable idle to 95% N2.

NOTE: The rate of acceleration must be sufficient (approximately two minutes) to let you find the vibration peaks.

1) Make sure that you do not operate the engine above the vibration guideline limit of 4.0 units.

a) If the engine will go above the limit, stop the test and do the applicable fault isolation in the FIM.

2) When you move the thrust lever forward, make sure to observe the N2 VIB data on the Engine Secondary Format of the MFD (Multi-function display).

NOTE: Engine vibration can have one or several peak conditions at speeds between idle and 95% N2.

(b) As you accelerate the engine to 95% N2, write the %N2 speed indication of the one or several vibration peak(s) on the data sheet.

NOTE: Engine vibration can have one or several peak conditions at speeds between idle and 95% N2.

(c) Slowly move the thrust lever backward and stop at the %N2 RPM for each vibration peak.

(d) Let the engine become stable at the vibration peak for 30 seconds.

(e) After 30 seconds, find the average vibration indication of the vibration peak and write it on the data sheet.

(f) Repeat this procedure for each vibration peak and write the data on the data sheet.

NOTE: The average of each vibration peak must not be above the guideline limit of 4.0 units.

(g) Move the thrust lever to idle.

(h) If the Engine Performance Page on the MFD (Multi-function display) indicated vibration is above the average of 4.0 units, do these steps:

1) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

2) Correct the cause of high vibration (see FIM).

(i) If the indicated vibration is not above the average of 4.0 units, continue with a subsequent test or stop the engine:

1) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-860-192-H01

(5) If the circuit breakers were pulled to prevent operation of the warning speakers, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	14	C31606	WARNING SPEAKER-R

——— END OF TASK ———

TASK 71-00-00-700-811-H01

13. Test No. 12A - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N S332W401-200)

A. General

(1) This task contains five independent paragraphs. You must follow the steps closely as instructed when you do the trim balancing:

(a) Low Pressure System (Fan/LPT) Preparation and Check (Paragraph F)

(b) Low Pressure System (Fan/LPT) Trim Balance Procedures (Paragraph G)

(c) Tests Run After Trim Balance Procedures (Paragraph H)

(d) Collect Ground Run Data Procedures (Paragraph I)

(e) Specific Balance Coefficient Calculation Procedures (Paragraph J).

(2) This task is used to balance the N1 rotor of the engine. This procedure is used when the AVM data load has valid balance coefficients.

(3) The recommended vibration guidelines for the N1 and N2 limits are listed below Table 505. The N1 vibration in mils S.A unit is shown on the engine balancing system of the MAT. Vibration in scalar unit is shown on EICAS display.

NOTE: The recommended vibration levels given in the table below are guideline levels only. It is not necessary that you must do the trim balance to correct the vibration on the engine immediately if the vibration is over the recommended vibration levels. A trim balance is necessary If the Airlines determine that the engine needs to reduce its vibration levels to satisfy the ride comfort of the Airplane. You must do the trim balance immediately when the engine is absolutely over 3.0 (N1 front or rear) scalar units on the EICAS display.

Table 505/71-00-00-993-806-H01 Recommended Vibration Guidelines - TABLE 504

N1 (Front)	N1 (Rear)	N2
3.0 mil S.A (2.1 scalar units)	3.0 mil S.A (2.1 scalar units)	4.0 scalar units

(4) For information on how to get help on the MAT during the engine balance procedure or on how to start the Engine Balancing System on the MAT, do this task: How to Start the Engine Balancing Function, TASK 45-10-00-820-801.

(5) Engine balance related data stored in the AVM is erased when the engine serial number is changed. The data include: the balance weight, the vibration history, and the specific balance coefficients.

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CAUTION MAKE SURE THAT YOU KNOW THE PART NUMBERS OF THE SCU AND THE DATA LOAD THAT ARE INSTALLED ON THE MAT. IF YOU ARE INCORRECTLY INSTALLED THE DATA LOAD OR PART NUMBER ON THE MAT, YOU WILL NOT BE ABLE TO DO THE TRIM BALANCE ON THE ENGINE.

(6) There are two different sets of AVM data loads for the SCU (P/N S332W401-200). Make sure you know the part numbers of the SCU and data load installed on the airplane before you use this procedure.

(a) Data load software 777F-AEK-GE2-00 (P/N S332W401-5200) is the primary and is the default data load when the No. 1 bearing accelerometer is operative.

(b) Data load software 777E-AEK-GE3-00 (P/N S332W401-5300) is an alternate which is used for the TCF accelerometer when the No. 1 bearing accelerometer is no longer operative.

(7) The AVM has six target speeds. The AVM will collect data only when the engine is in ±1% of one of these six target N1 speeds.

(a) Both data load softwares 777F-AEK-GE2-00 (P/N S332W401-5200) and 777E-AEK-GE3-00 (P/N S332W401-5300) have these target N1 Speed: 76%, 80%, 86%, 90%, 94% and 104%.

1) Make sure to put the airplane in a position that will limit the amount of crosswind into the engine inlet.

NOTE: Wind direction and speed can cause stability problems during engine operation. Under some conditions, engine will not get to the speed above.

(8) The balance weights on the spinner are referred to as the fan balance weights. The balance weights on the LPT blades are referred to as the LPT balance weights or LPT balance clips.

NOTE: One plane method is sufficient for the engine trim balancing. Two plane method is not applicable and is not recommended by the engine manufacturer.

(a) You will use the Engine Balancing System on the MAT to find the quantity and size of the weights to install on the engine to balance the N1 rotor or LPT.

(9) You can do a ground run to collect vibration data if the MAT does not have enough flight leg data or a repaired (Low Pressure components) or a replaced engine indicated high N1 vibration during a vibration survey, or you prefer to use ground run data for trim balance. If the MAT does have enough flight leg data, use the flight leg data for the trim balance.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
45-10-00-820-801	How to Start the Engine Balancing Function (P/B 201)
71-00-00-800-802-H01	Engine Operation Limits (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Tools/Equipment

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

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Reference	Description
SPL-2239	Tool - Balance Weight Clip, GE90 Low Pressure Turbine
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00004	Compound - Antiseize, Graphite-Petrolatum	SAE AMS 2518
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Low Pressure System (Fan/LPT) Trim Balance Preparation and Check

SUBTASK 71-00-00-710-021-H01

(1) If you want to know the engine vibration, do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

NOTE: This step is to do a vibration check of an engine and to see if the vibration of the engine is more than vibration guidelines (TASK 71-00-00-800-802-H01).

SUBTASK 71-00-00-970-004-H01

(2) If you need to collect the engine ground run data, go to the Collect the Ground Run Data Procedure section in this task (paragraph I).

NOTE: Do the paragraph (I) if you decide to collect the vibration data by ground run. Ground run the engine can collect vibration data for one of these conditions:

1) If the MAT does not have enough flight leg data.

2) If you prefer to use ground run data for trim balance.

3) If you want a test run after you had repaired a low pressure components or replaced engine indicated a high N1 vibration during a vibration survey.

4) If you need to calculate the specific coefficients when the system default specific balance coefficient did not provide the acceptable resulted solution for the trim balance.

NOTE: The No. 1 bearing accelerometer gives indications of Fan Vibration. It does not give indications for Core or LPT Vibrations. For LPT and Core Vibration, use the turbine accelerometer indication.

SUBTASK 71-00-00-860-193-H01

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-194-H01

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

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SUBTASK 71-00-00-860-195-H01

(5) Set the applicable thrust lever to minimum idle.

SUBTASK 71-00-00-860-196-H01

(6) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait for 30 seconds before you start the test.

SUBTASK 71-00-00-970-005-H01

(7) Do a vibration data check as follows:

(a) Do the steps that follow if there was a report of high engine vibration.

1) Get information on the type of vibration (N1, N2 or broadband) and flight conditions.

2) Get the EICAS/CMC data snapshot of the engine at the time of the report (TASK 45-10-00-740-808), if available.

(b) Make sure the AVM system operates correctly.

1) Look at the MAT for AVM faults.

a) Continue with the Vibration Data Check if there are no AVM faults.

b) If there are AVM faults, do the applicable fault isolation procedure in the FIM.

(c) Use a maintenance access terminal (MAT) to do a check of the vibration data saved in the AVM.

1) Make these selections on the MAT main menu:

a) ONBOARD MAINTENANCE

b) OTHER FUNCTIONS

c) ENGINE BALANCING

d) ENGINE 1 or ENGINE 2

NOTE: Select the engine that has high vibration.

e) PERFORM BALANCE

f) CONTINUE

2) Find the N1 and N2 vibration data that shows on the FLIGHT HISTORY displays.

a) On the EXISTING BALANCE WEIGHTS display, make these selections:

b) FLIGHT HISTORY

c) Look for conditions with high N1 vibration data.

NOTE: Vibration data will be highlighted if N1 vibration is equal or above 3.0 mils S.A (front or rear).

NOTE: The recommended vibration guidelines of N1 (front and rear) are 3.0 mils S.A.

d) N2 FLIGHT HISTORY

e) Look for conditions with high N2 vibration data.

NOTE: Vibration data will be highlighted if N2 vibration is equal or above 4.0 scalar units.

NOTE: The recommended vibration guideline of N2 is 4.0 scalar units.

3) If the N2 vibration data are not satisfactory, troubleshoot and find the cause (See FIM).

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4) If the flight crew made a report of high vibration as broadband with N1 and N2 vibration low during the event, and there is no highlighted N1 or N2 vibration data from the flight history page, troubleshoot and find the cause (See FIM).

5) If the N1 vibration data are not satisfactory, continue with the engine balance procedure.

6) If the N1 and N2 vibration data are satisfactory, EXIT the Engine Balancing.

SUBTASK 71-00-00-210-051-H01

(8) Do a balance weights list check for the fan as follows:

(a) Make these selections to go back to the EXISTING BALANCE WEIGHTS display menu.

1) GO BACK (N1 VIBRATION FLIGHT HISTORY display will appear)

2) GO BACK (EXISTING BALANCE WEIGHTS display will appear).

(b) Print a report (or make a record by hand) of the EXISTING BALANCE WEIGHTS display.

1) Select REPORT from the MAT main menu.

2) REPORT PAGE DATA

a) Left or Right CMCF

b) SEND (Printer, Diskdrive, or Data Link)

c) GO BACK

(c) Compare the balance weights currently on the engine fan against the fan balance weights shown on the EXISTING BALANCE WEIGHTS display of the MAT.

NOTE: You need to identify the fan balance weights on the engine and compare the weights currently on the EXISTING BALANCE WEIGHTS display of the MAT. If the fan balance weights are not the same, you can get incorrect instructions for the removal and installation of fan balance weights when you do an engine balancing. The fan balance weight holes are numbered on every four holes counterclockwise (viewed in the aft direction) which start at the hole 1 mark (dimple mark) on the spinner.

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585 in the lower half of the inlet cowl.

(d) If the fan balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the fan balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the fan balance weights on the engine (Table 506).

1) Select the part number column or hole/blade column.

2) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

a) If you need to add a new part and hole/blade numbers, add the new balance weight (bolt) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.

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b) If you need to change a part and hole/blade numbers, put the correct balance weight (bolt) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

c) If you need to erase a part and hole/blade numbers, erase the balance weight (bolt) part number or hole/blade number in the system. Select ERASE PART AND/OR HOLE/BLADE NUMBERS.

d) CONTINUE

e) Do the above steps again for each balance weight that needs to be corrected.

3) Select FLIGHT HISTORY to update the balance weights list.

4) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.

a) Select GO BACK, find the error, and correct the balance weights list.

b) Select FLIGHT HISTORY again to update the balance weights list.

G. Low Pressure System (Fan/LPT) Trim Balance Procedures

SUBTASK 71-00-00-280-012-H01

(1) Do the preparation and balance weights check as necessary before you do the trim balance (Paragraph above).

SUBTASK 71-00-00-740-003-H01

(2) Do the trim balance procedure as follows:

(a) Make sure the N1 VIBRATION FLIGHT HISTORY display shows.

(b) Do the instructions that show on the N1 VIBRATION FLIGHT HISTORY display and then make these selections:

1) AIRPLANE WITH THE AVM SCU P/N S332W401-200; Select the AVERAGE (preferred) or the flight leg that has the most data or the last ground run data (if you decide to use the ground run data. If it is necessary to collect the ground run data, go to the Collect the Ground Run Data Procedure - Paragraph (I)).

NOTE: The AVERAGE is the default for the ENGINE BALANCING. The AVERAGE is recommended unless you will use the ground run data. If none of the flight legs or the AVERAGE have data for at least two speeds, there is not enough data to balance the engine. You will need to do a ground run to collect data or wait until the AVM saves more flight legs for this engine.

NOTE: If you decide to go to a different display and then decide to get back to the N1 VIBRATION FLIGHT HISTORY display, make sure you select the AVERAGE or the flight leg that has the most data or the last ground run data (that you selected before) again.

2) Continue to select GO BACK until you see the EXISTING BALANCE WEIGHTS display.

3) CONTINUE.

(c) Do the instructions that show on the PERFORM BALANCE SOLUTION SUMMARY display and then make these selections:

1) ONE PLANE

NOTE: The one plane method is recommended because it takes less time and is usually satisfactory. Two plane method is not recommended by the engine manufacturer.

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2) SOLUTION PREDICTION.

(d) If the predicted vibration data are satisfactory, do this step.

1) Select GO BACK.

(e) Print a report (or make a record by hand) of the PERFORM BALANCE SOLUTION SUMMARY.

1) Select REPORT on the MAT main menu.

2) REPORT PAGE DATA

a) Left or Right CMCF

b) SEND (Printer, Diskdrive, or Data Link)

c) GO BACK

3) CONTINUE.

(f) Do the instructions that show on the PERFORM BALANCE NEW BALANCE WEIGHT if you decided to install the new balance weights.

NOTE: This step permits you to save the new balance weights in the AVM signal conditioner unit.

1) KEEP WEIGHTS

(g) Do the instructions that show on the ENGINE BALANCING EXIT APPROVAL.

1) KEEP WEIGHTS

(h) Make a different selection from the MAT main menu to exit.

(i) Make sure the NOTICE dialog box shows.

(j) Select STOP to exit Engine Balancing.

(k) If the predicted vibration data are not satisfactory or if you do not want to use the balance solution at this time, make these selections to exit the engine balancing.

1) OTHER FUNCTIONS or select a different selection from MAT main menu

2) Make sure the NOTICE dialog box displays.

3) STOP.

(l) If you decide to do the TWO PLANE method, make these selections to get back to the PERFORM BALANCE SOLUTION SUMMARY display.

NOTE: Two plane method is used when the one plane solution is not satisfactory. Two plane method is not recommended by the engine manufacturer. Please consult with the engine manufacture representative if you decide to do the two plane method.

1) OTHER FUNCTIONS

2) ENGINE BALANCING

3) ENGINE 1 or ENGINE 2

NOTE: Select the engine that has high vibration.

4) PERFORM BALANCE

5) CONTINUE

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6) Do a balance weights list check for the LPT and compare the balance weights currently on the LPT against the LPT balance weights shown on the EXISTING BALANCE WEIGHTS display.

   NOTE: You need to identify the balance weights on the engine LPT and compare the LPT balance weights currently on the EXISTING BALANCE WEIGHTS display. If the LPT balance weights are incorrect, you can get incorrect instructions for the removal and installation of balance weights when you do an engine balancing.

   NOTE: The turbine blades are counted clockwise (viewed in the forward direction). The number 1 turbine blade is at the same angular location as the number 1 fan blade. To find the turbine blade 1, go to the front of the engine and turn the fan until fan hole 1 (dimple mark on the aft spinner) is at the bottom. This places the turbine blade 1 at the bottom of the engine.

7) If the LPT balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the LPT balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the LPT balance weights on the engine Table 507.

   a) Select the part number column or hole/blade column.

   b) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

      NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

   c) If you need to add a new part and hole/blade numbers, add the new LPT balance weight (clip) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.

   d) If you need to change a part and hole/blade numbers, put the correct LPT balance weight (clip) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

   e) If you need to erase a part and hole/blade numbers, erase the LPT balance weight (clip) part number or hole/blade number in the system. Select ERASE PART AND/OR HOLE/BLADE NUMBERS.

   f) CONTINUE

   g) Do the above steps again for each LPT balance weight that needs to be corrected.

   h) Select FLIGHT HISTORY to update the LPT balance weights list.

   i) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.

   j) Select GO BACK, find the error, and correct the LPT balance weights list.

   k) Select FLIGHT HISTORY again to update the LPT balance weights list.

8) Make sure the N1 VIBRATION FLIGHT HISTORY display shows.

9) Do the instructions that show on the N1 VIBRATION FLIGHT HISTORY display and then make these selections:

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10) AIRPLANE WITH THE AVM SCU P/N S332W401-200; Select the same AVERAGE or the flight leg that has the most data or the last ground run data (if you decide to use the ground run data. If it is necessary to collect more ground run data, go to Collect the Ground Run Data Procedures - Paragraph I).

NOTE: The AVERAGE is the default for the ENGINE BALANCING. The AVERAGE is recommended unless you will use the ground run data. If none of the flight legs or the AVERAGE have data for at least two speeds, there is not enough data to balance the engine. You will need to do a ground run to collect data or wait until the AVM saves more flight legs for this engine.

NOTE: If you decide to go to a different display and then decide to get back to the N1 VIBRATION FLIGHT HISTORY display, make sure you select the AVERAGE or the flight leg that has the most data or the last ground run data (that you selected before) again.

11) Continue to select GO BACK until you see the EXISTING BALANCE WEIGHTS display.

12) CONTINUE

13) Do the instructions that show on the PERFORM BALANCE SOLUTION SUMMARY display and then make these selections:

a) TWO PLANE

b) SOLUTION PREDICTION.

(m) If the predicted vibration data are satisfactory, do this step.

1) Select GO BACK.

(n) Print a report (or make a record by hand) of the PERFORM BALANCE SOLUTION SUMMARY.

1) Select REPORT on the MAT main menu.

2) REPORT PAGE DATA

a) Left or Right CMCF

b) SEND (Printer, Diskdrive, or Data Link)

c) GO BACK

3) CONTINUE.

(o) Do the instructions that show on the PERFORM BALANCE NEW BALANCE WEIGHT if you decided to install the new balance weights.

NOTE: This step permits you to save the new balance weights in the AVM signal conditioner unit.

1) KEEP WEIGHTS

(p) Do the instructions that show on the ENGINE BALANCING EXIT APPROVAL.

1) KEEP WEIGHTS

(q) Make a different selection from the MAT main menu to exit.

(r) Make sure the NOTICE dialog box shows.

(s) Select STOP to exit Engine Balancing.

(t) If the predicted vibration data are not satisfactory again, troubleshoot and find the cause (See FIM).

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SUBTASK 71-00-00-420-004-H01

(3) Use the report and make the necessary changes on the fan or LPT balance weights on the engine.

(a) If it is necessary, install the applicable balance weight bolt(s) on the spinner at the locations indicated in the report.

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585 in the lower half of the inlet cowl.

2) Find the fan balance weight bolts to be installed or replaced.

NOTE: The dimple is the location of the number 1 fan blade and fan balance weight bolt. The spinner is marked with numbers (every four holes) in a counterclockwise direction, as you look aft on the spinner.

3) See the report for the part numbers and locations (listed on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY record) to give the new position(s) for the fan balance weight bolt(s) on the spinner.

a) There are six different types (except the standard bolt) of the fan balance weight bolts that you can use to balance the N1 vibration Table 506.

NOTE: Most of the bolts installed on the spinner are the standard reference bolts (Part number 2013M80P01 or P01). It will be necessary to remove the standard bolts in the locations that the balance weights are to be installed. It will also be necessary to install the standard bolts in the hole balance weights that are removed.

Table 506/71-00-00-993-807-H01 Fan Balance Weights - TABLE 505

PART NUMBER ON MAT (EBS)	LENGTH (INCHES)	WEIGHT (GRAMS)	MOMENT WEIGHT (GRAM-INCHES)
P01 *[1]	1.1	15	100
P02	1.9	21	200
P04	1.5	33	400
P06	2.4	46	600
P08	3.3	59	800
P10	4.3	74	1000
P12	5.4	89	1200

*[1] P01 standard bolts do not show in the EBS fan balance weight list.

4) Use the information on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY display, and remove the applicable fan balance weight bolts that are to be replaced on the spinner.

5) Apply a thin coat of compound, D00004 to the threads of the new bolt(s).

6) Install the new fan balance weight bolt(s) into the spinner.

a) Tighten the new fan balance weight bolt(s) to 150-170 pound-inches (16.9-19.2 Newton-meters).

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7) Make sure that all forty four fan balance weight bolts (44 locations) are installed on the spinner.

(b) If it is necessary, install the applicable LPT balance weight clips on the LPT blades.

1) Turn the LPC fan rotor until the fan hole 1 is at the bottom of the engine.

NOTE: The turbine blades are counted clockwise (viewed in the forward direction). The number 1 turbine blade is at the same angular location as the number 1 fan blade. To find the turbine blade 1, go to the front of the engine and turn the fan until fan hole 1 (dimple mark on the spinner) is at the bottom. This places the turbine blade 1 at the bottom of the engine.

2) See the report for the part numbers and locations (listed on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY record) to give the new position(s) for the LPT balance weight clip(s) on the LPT.

a) There is one type of the LPT balance weight clip that you can use to balance the LPT vibration Table 507.

NOTE: Use new LPT balance weight clips for each installations. Do not re-use old balance weight clips.

Table 507/71-00-00-993-808-H01 LPT Balance Weights - TABLE 506

PART NUMBER ON MAT (EBS)	WEIGHT (GRAMS)	MOMENT WEIGHT (GRAM-INCHES)
P01	5.70	200

3) Use the information on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY display, and remove the applicable balance weight clips on the LPT blade.

CAUTION MAKE SURE YOU PUT A CLOTH OVER THE BALANCE WEIGHT CLIP OR BLOCK THE FRONT OF THE LPT BLADE AT THE LOCATION OF THE CLIP. IF YOU DO NOT, THE BALANCE WEIGHT COULD FLY FORWARD INTO THE ENGINE AND CAN CAUSE DAMAGE DURING THE SUBSEQUENT ENGINE OPERATION.

a) Put a cotton wiper, G00034 over the LPT balance weight clip or block the front side of the blade.

b) Place an CP3A, extractor under the shroud.

c) Engage the CP3A, extractor in the hole of the LPT balance weight clip tab.

d) Pull on the tab of the LPT balance weight clip and remove the LPT balance weight clip from the blade shroud. Discard the LPT balance weight clip.

e) Remove the cotton wiper, G00034 or blockage in front of the blade.

4) Install the new LPT balance weight clip(s) on the LPT blades.

a) Put the LPT balance weight clip in your hand with the hook away from you.

b) Place the hook of the LPT balance weight clip to the forward side of the blade shroud.

c) Put the LPT balance weight clip on the blade shroud and pull it toward you to engage the hook over the forward side of the blade shroud.

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d) Push the aft end of the LPT balance weight clip down over the aft edge of the blade shroud.

e) Open the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239 so the LPT balance weight clip will fit into the claw area of the GE90 low pressure turbine balance weight clip, SPL-2239.

NOTE: The claw area is in the shape of the LPT balance weight clip.

f) Put the GE90 low pressure turbine balance weight clip, SPL-2239 between the LPT blades at the location for the LPT balance weight clip.

g) Put the hook of the LPT balance weight clip into the forward side of the GE90 low pressure turbine balance weight clip, SPL-2239.

h) Turn the GE90 low pressure turbine balance weight clip, SPL-2239 down to engage the claw against the aft side of the tab on the LPT balance weight clip.

i) Make sure the GE90 low pressure turbine balance weight clip, SPL-2239 is aligned with the LPT balance weight clip.

j) Close the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239 and crimp the tab down against the blade shroud.

k) Open the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239.

l) Lift the aft end of the GE90 low pressure turbine balance weight clip, SPL-2239 and push the GE90 low pressure turbine balance weight clip, SPL-2239 forward to free the hook from the forward side of the balance weight clip.

m) Remove the GE90 low pressure turbine balance weight clip, SPL-2239 from between the blades.

SUBTASK 71-00-00-840-001-H01

(4) This will conclude the Low Pressure System (Fan/LPT) Trim Balance Procedures.

SUBTASK 71-00-00-868-001-H01

(5) Do the Tests Run After Trim Balance Procedures in the paragraph (H) below.

H. Tests Run After Trim Balance Procedures

SUBTASK 71-00-00-080-003-H01

(1) Remove all tools, parts, and unwanted material from the inlet and turbine exhaust areas.

SUBTASK 71-00-00-860-197-H01

(2) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-00-860-198-H01

(3) If the record of the PERFORM BALANCE SOLUTION SUMMARY display shows that a post-balance engine run is necessary, do one of these steps:

NOTE: It is possible to do a balance calculation with data at only 2 speeds. However, it is recommended that the run have the data at 4 speeds or more. A second balance is recommended if the vibration is not satisfactory.

(a) Do a low power run (less than 80% N1) or high power (greater than 80% N1) engine run to see if the vibrations are in the limits (TASK 71-00-00-800-835-H00).

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1) For a high power run, make sure you pull the warning speakers circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

a) Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

2) After engine operation, operate the engine at minimum idle for 10 minutes.

3) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(b) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

SUBTASK 71-00-00-860-199-H01

(4) If you will not operate the engine at high power again, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-869-002-H01

(5) This will conclude the Tests Run After Trim Balance Procedures.

I. Collect the Ground Run Data Procedures

NOTE: Do this paragraph if you decide to collect the vibration data for one of these conditions:

1) If the MAT does not have enough flight leg data.

2) If you prefer to use ground run data for trim balance.

3) If you want a test run check the vibration level after you have repaired a low pressure components or replaced engine indicated a high N1 vibration during a vibration survey.

4) If you need to calculate the specific coefficients when the system default specific balance coefficient did not provide the acceptable resulted solution for the trim balance.

NOTE: The No. 1 bearing accelerometer gives indications of Fan Vibration. It does not give indications for Core or LPT Vibrations. For LPT and Core Vibration, use the turbine accelerometer indication.

SUBTASK 71-00-00-970-006-H01

(1) Use the maintenance access terminal (MAT) to prepare the ground run.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE

2) OTHER FUNCTIONS

3) ENGINE BALANCING

4) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to collect ground run data.

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5) CALCULATE SPECIFIC BALANCE COEFFICIENTS/GROUND RUN

6) CONTINUE.

(b) Make sure the N1 VIBRATION FLIGHT HISTORY displays.

(c) On the N1 VIBRATION FLIGHT HISTORY display, make this selection.

1) GROUND RUN

SUBTASK 71-00-00-210-052-H01

(2) If it is necessary, do a balance weights list check for the fan as follows:

(a) Make sure the EXISTING BALANCE WEIGHTS display.

(b) Print a report (or make a record by hand) of the EXISTING BALANCE WEIGHTS display.

1) Select REPORT from the MAT main menu.

2) REPORT PAGE DATA

a) Left or Right CMCF

b) SEND (Printer, Diskdrive, or Data Link)

c) GO BACK

(c) Compare the balance weights currently on the engine fan against the fan balance weights shown on the EXISTING BALANCE WEIGHTS display.

NOTE: You need to identify the fan balance weights on the engine and compare the weights currently on the EXISTING BALANCE WEIGHTS display. If the fan balance weights are incorrect, you can get incorrect instructions for the removal and installation of fan balance weights when you do an engine balancing.

NOTE: The fan balance weight holes are numbered on every four holes counterclockwise (viewed in the aft direction) which start at the hole 1 mark (dimple mark) on the spinner.

(d) If the fan balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the fan balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the fan balance weights on the engine (Table 506).

1) Select the part number column or hole/blade column.

2) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

a) If you need to add a new part and hole/blade numbers, add the new balance weight (bolt) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.

b) If you need to change a part and hole/blade numbers, put the correct balance weight (bolt) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

c) If you need to erase a part and hole/blade numbers, erase the balance weight (bolt) part number or hole/blade number in the system. Select ERASE PART AND/OR HOLE/BLADE NUMBERS.

d) CONTINUE

e) Do the above steps again for each balance weight that needs to be corrected.

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SUBTASK 71-00-00-970-007-H01

(3) To collect the ground run data, do these steps:

(a) Make sure you pull the warning speaker circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

1) Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

CAUTION

DO NOT USE THE ALTERNATE MODE FOR ENGINE CONTROL DURING THE GROUND RUN TO GET HIGHER N1 SPEEDS. THERE IS NO LIMIT PROTECTION IN THE ALTERNATE MODE. THE ENGINE SPEED CAN GO HIGHER THAN THE LIMIT. DAMAGE TO THE ENGINE CAN OCCUR.

(b) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

1) Let the engine become stable at idle for five minutes.

2) Access the EICAS Engine Performance Page on the MFD (Multi-function Display) (TASK 31-61-00-800-804).

3) Do a two-minute acceleration of the engine (up to 80-85% of N1) and a two-minute deceleration of the engine.

4) Permit the engine to become stable at idle.

(c) On the EXISTING BALANCE WEIGHTS, make these selections:

1) START GROUND RUN.

2) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.

a) Select GO BACK, find the error, and correct the balance weights list.

b) Select START GROUND RUN again to update the balance weights list.

(d) Make sure the GROUND RUN IN OPERATION dialog box displays.

(e) Prepare to run the engine at the speeds that follow: 76%, 80%, 86%, 90%, 94%, and 104% N1.

NOTE: Under some conditions, the engine will not get to the speeds above. The EEC will limit engine speed to Max Static N1 for the day (Command N1 bug as shown on the Engine Primary Display). It is not recommended to do ground run at 104% N1.

1) The Engine Balancing System must record data at a minimum of two speeds to have data to do the trim balance.

(f) Make sure the N1 is in the limits.

(g) Set the engine to the lowest speed of the six N1 speeds.

(h) Keep the engine at this speed for a minimum of 40 seconds.

(i) Operate the engine at the other speed for a minimum of 40 seconds at each speed.

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(j) CONTINUE

(k) If the warning dialog box shows one of these messages - CANNOT CONNECT TO SIGNAL CONDITIONER UNIT (LEFT OR RIGHT), SIGNAL CONDITIONER UNIT (LEFT OR RIGHT) CANNOT RECEIVE A REQUEST FROM THE CMCF.

1) Select GO BACK on the dialog box or wait for 90 seconds; then do the steps on the MAT main menu to go back to the N1 VIBRATION FLIGHT HISTORY display.

a) ONBOARD MAINTENANCE

b) OTHER FUNCTIONS

c) ENGINE BALANCING

d) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to collect ground run data.

e) CALCULATE SPECIFIC BALANCE COEFFICIENTS/GROUND RUN

f) CONTINUE.

(l) Make sure the N1 VIBRATION FLIGHT HISTORY displays.

(m) Make sure the Engine Balancing System made a record of the vibration data from the ground run to do a balance.

NOTE: Look at the bottom of the N1 VIBRATION FLIGHT HISTORY display for the new data. It will have the word GROUND to the left and no date or time information at this point in the procedure.

NOTE: It is possible to do a balance calculation with data at only 2 speeds.

(n) If there is not sufficient vibration data to do a balance, there were possibly wind gusts or the N1 speed was not in the permitted range (or engine vibration is low).

1) Do a check on the CMC for the AVM faults, if no faults, continue steps below.

2) Point the nose of the airplane in the direction of wind.

3) Select the applicable ENGINE L(R) EEC MODE switch on the overhead panel, P5, to the ALTN position.

4) Select the START GROUND RUN button and operate the engine again at each of the five speeds.

5) Operate the engine at other speed again for a minimum of one minute this time.

(o) If there are vibration data for four or more speeds, make these selections to keep the ground run data.

1) KEEP GROUND RUN DATA

2) MAKE SURE WEIGHTS.

(p) Make sure the EXISTING BALANCE WEIGHTS displays and make this selection.

1) KEEP WEIGHTS.

(q) Make sure the EXIT APPROVAL dialog box displays and make this selection.

1) KEEP WEIGHTS.

(r) Make a different selection from the MAT main menu.

(s) Make sure the NOTICE dialog box displays and make this selection.

1) STOP to exit Engine Balancing.

(t) Move the thrust lever to the idle position.

(u) Set the applicable ENGINE L(R) EEC MODE on the overhead panel, P5, to NORM.

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(v) After engine operation, operate the engine at minimum idle for 10 minutes.

(w) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(x) Stop the Collect the Ground Run Data Procedure if this is a check run or an engine run to collect data for an engine balance.

(y) Continue the Collect the Ground Run Data Procedure again if you want the GROUND RUN DATA for the specific balance coefficients calculation.

SUBTASK 71-00-00-860-200-H01

(4) If you will not operate the engine at high power again, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-840-002-H01

(5) This will conclude the Collect the Ground Run Data Procedures.

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J. Specific Balance Coefficients Calculation Procedures

SUBTASK 71-00-00-970-008-H01

CAUTION

IF THE SPECIFIC BALANCE COEFFICIENTS WERE ACCIDENTALLY KEPT, OR YOU WANT TO DELETE THE SPECIFIC BALANCE COEFFICIENTS, DO A DATALOAD OF THE AVM DATALOAD DISKETTE. THIS WILL CHANGE THE AVM BACK TO ITS INITIAL CONFIGURATION. MAKE SURE YOU ARE TRAINED TO DO THIS PROCEDURE. IF YOU ARE NOT TRAINED, YOU CAN CAUSE DAMAGE TO THE AVM DATA LOAD SOFTWARE.

(1) Use the maintenance access terminal (MAT) to calculate the specific balance coefficients.

NOTE: The generic (default) balance coefficients data loaded in the AVM are for the No. 1 bearing accelerometer and the TCF accelerometer. Specific balance coefficients are calculated when you decide to replace the generic (default) balance coefficients.

NOTE: If you want to calculate one plane specific balance coefficients for the fan, then you need vibration data from two flight legs or two ground runs or one flight leg and one ground run where the configurations of the fan balance weights are different from each flight leg(s) or ground run(s), but the LPT weights are the same.

NOTE: If you want to calculate one plane specific balance coefficients for the LPT, then you can use vibration data from two flight legs or two ground runs or one flight leg and one ground run where the configurations of the LPT weights are different from each flight leg(s) or ground run(s), but the fan weights are the same.

NOTE: If you want to calculate two plane specific balance coefficients, then you need vibration data from three flight legs or three ground runs where the configurations of the fan and the LPT balance weights are different from each flight leg(s) or ground run(s). Use the flight data because it is better than ground data.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) ENGINE BALANCING
4) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to calculate the specific balance coefficients.

5) CALCULATE SPECIFIC BALANCE COEFFICIENTS/GROUND RUN
6) CONTINUE
7) FLIGHT HISTORY.

(b) When the N1 VIBRATION FLIGHT HISTORY displays, do one of these steps:

1) FOR ONE PLANE METHOD, make these selections on the displayed flight legs:

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a) Select the first flight leg or GROUND run data.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data.

b) Select the second flight leg or GROUND run data with different fan (or LPT) balance weights.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data. When the flight leg was not shown the hightlite (brighter) during you selection, meaning the flight legs have the same weight configuration as the one previously selected. To correct this problem, recommend to abort the procedure. Go to the ENGINE BALANCING first screen and follow the steps through to the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. Re-edit the new balance weights in this screen and do the ground run or flight to collect the data again.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

c) If you cannot select the second flight leg or ground run data, exit the Engine Balancing.

NOTE: You cannot calculate specific balance coefficients because the AVM considers the weights to be the same for all of the legs.

<1> Make a different selection from the MAT main menu.

<2> Make sure the NOTICE dialog box shows.

<3> Select STOP to exit Engine Balancing.

2) FOR TWO PLANE METHOD, make these selections on the displayed flight legs:

a) Select the first flight leg or GROUND run data.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data.

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b) Select two flight legs or GROUND run data with different fan and LPT balance weights.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data. When the flight leg was not shown the hightlite (brighter) during you selection, meaning the flight legs have the same weight configuration as the one previously selected. To correct this problem, recommend to abort the procedure. Go to the ENGINE BALANCING first screen and follow the steps through to the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. Re-edit the new balance weights in this screen and do the ground run or flight to collect the data again.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

c) If you cannot select two flight legs or ground runs, exit the Engine Balancing.

NOTE: You cannot calculate specific balance coefficients because the AVM considers the weights to be the same for all of the legs.

<1> Make a different selection from the MAT main menu.

<2> Make sure the NOTICE dialog box shows.

<3> Select STOP to exit Engine Balancing.

(c) Select the CALCULATE COEFFICIENTS button if it became brighter (hightlite).

NOTE: If the CALCULATE COEFFICIENTS button does not become brighter, it is because you did not select enough flight legs, or the configurations of the fan balance weights and the LPT balance weights are not different.

1) If the CALCULATE COEFFICIENTS button does not became brighter (hightlite), go back to the previous step and select a different flight legs again.

(d) You will see The CALCULATE CONDITION dialog box briefly show and then go away.

(e) When the KEEP COEFFICIENTS dialog box displays, if you decide not to keep this new specific balance coefficient, make a different selection from the MAT main menu to exit The Specific Balance Coefficients Calculation Procedure.

(f) When the KEEP COEFFICIENTS dialog box displays, do these steps if you decide to keep this new specific balance coefficient.

1) KEEP

2) When the N1 VIBRATION FLIGHT HISTORY displays, make this selection.

a) MAKE SURE WEIGHTS.

3) When the EXISTING BALANCE WEIGHTS displays, make this selection.

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a) KEEP WEIGHTS.

4) When the EXIT APPROVAL dialog box displays, make these selections.

a) KEEP WEIGHTS

b) STOP to exit Engine Balancing.

SUBTASK 71-00-00-840-003-H01

(2) This will conclude the Specific Balance Coefficients Calculation Procedures.

(a) Go back to the Low Pressure System (Fan/LPT) Trim Balance Procedure if it is necessary to balance the engine.

——— END OF TASK ———

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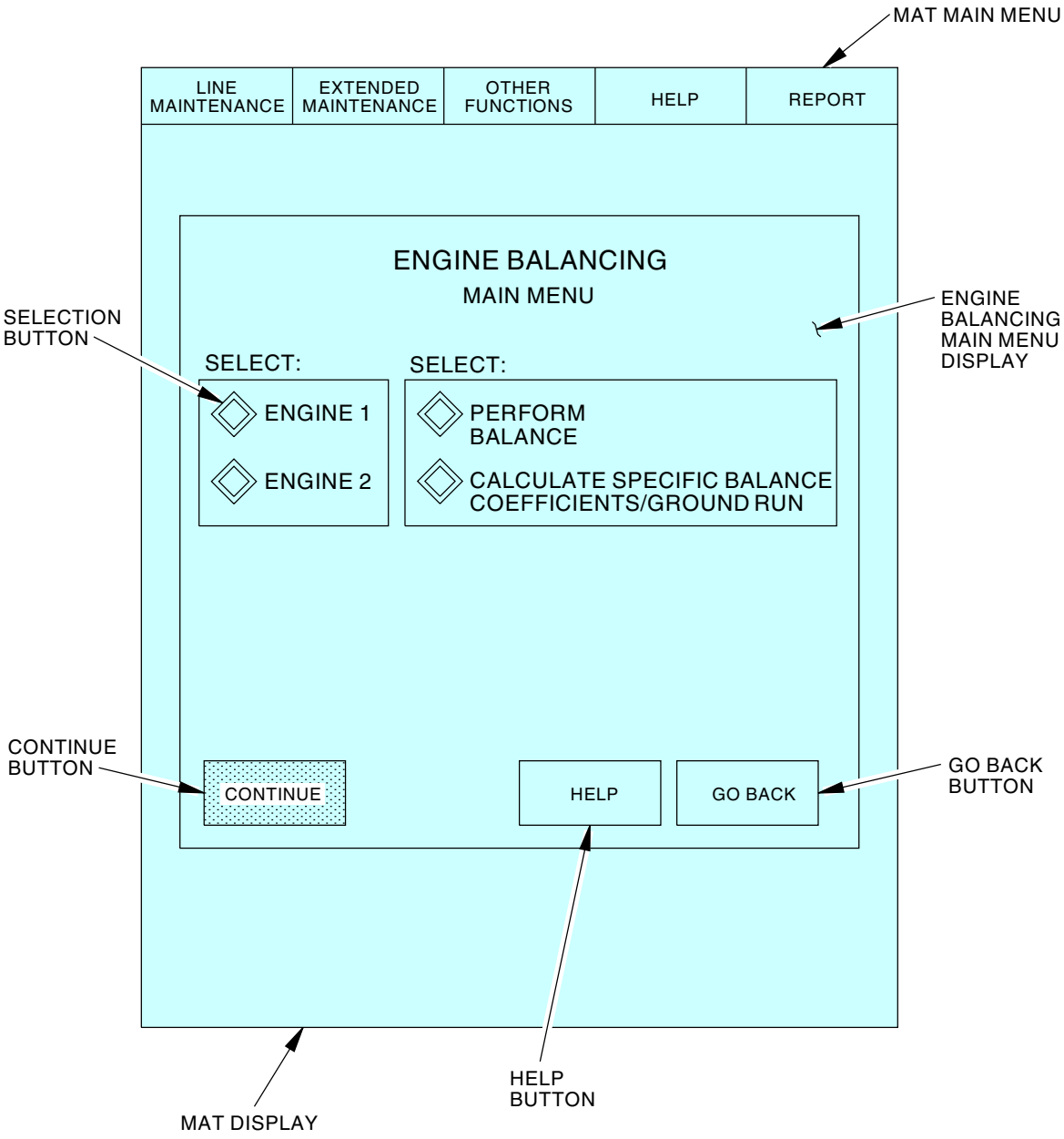

M06372 S0004285528_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 1 of 8)

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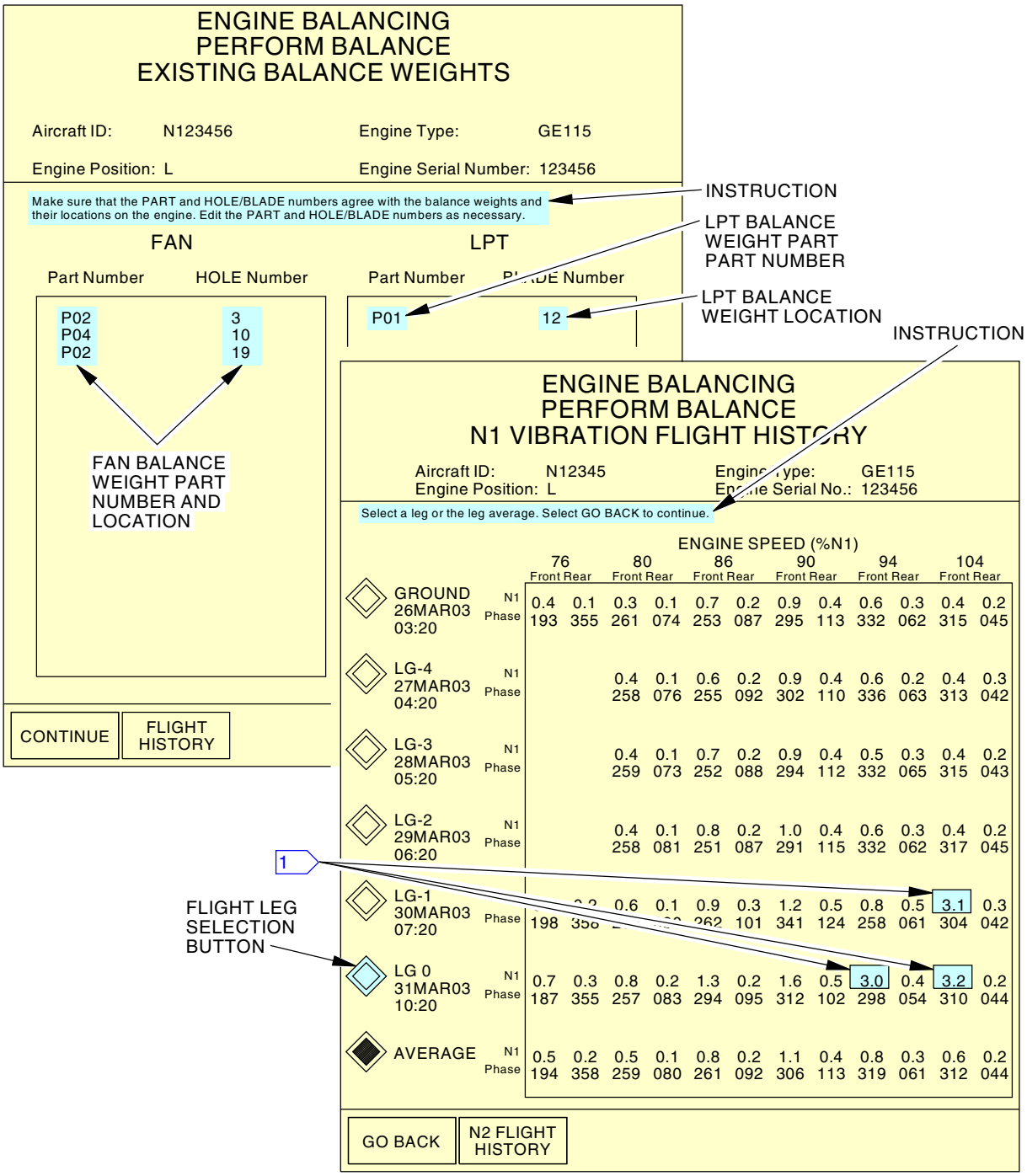

M06373 S0004285529_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 2 of 8)

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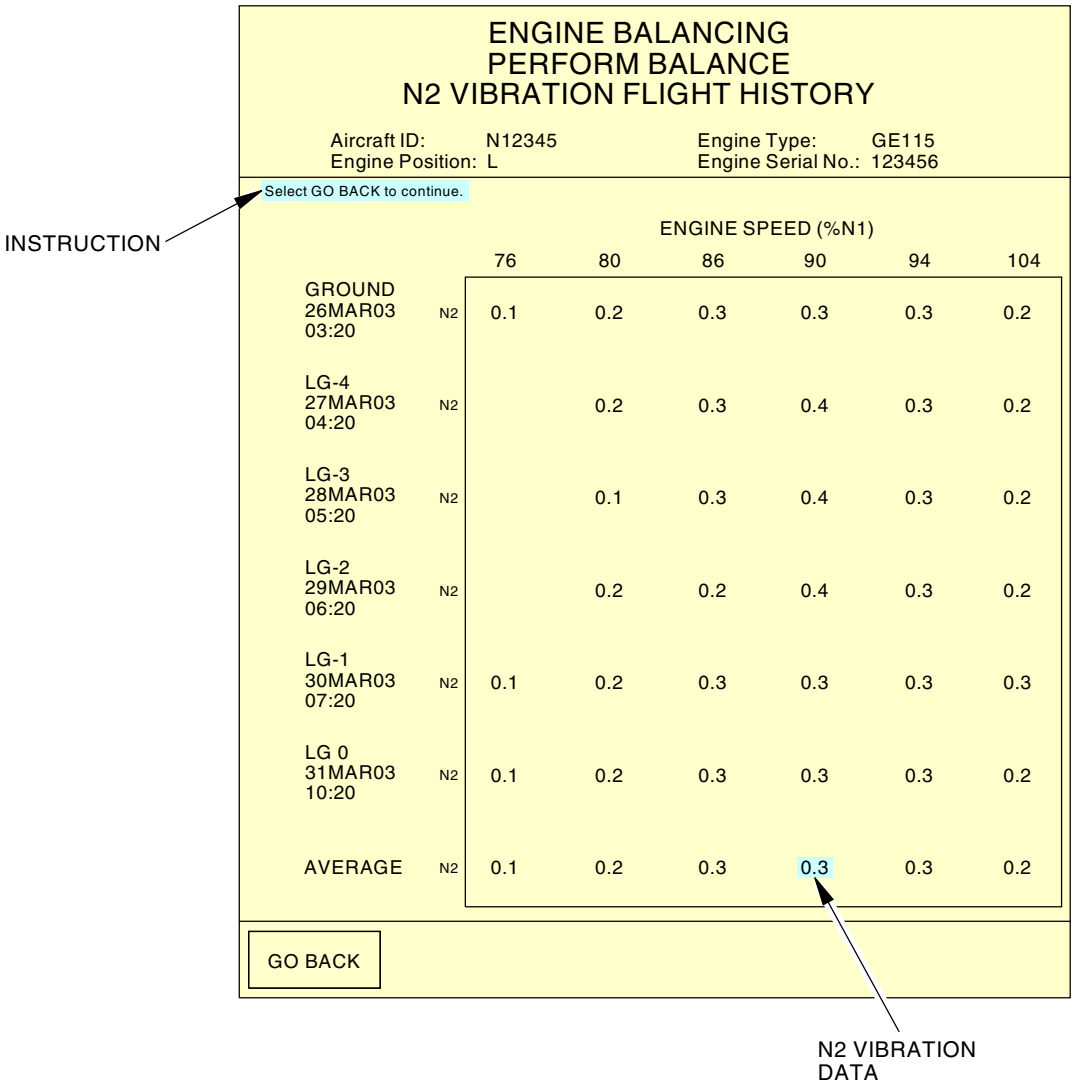

N80768 S0004285530_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 3 of 8)

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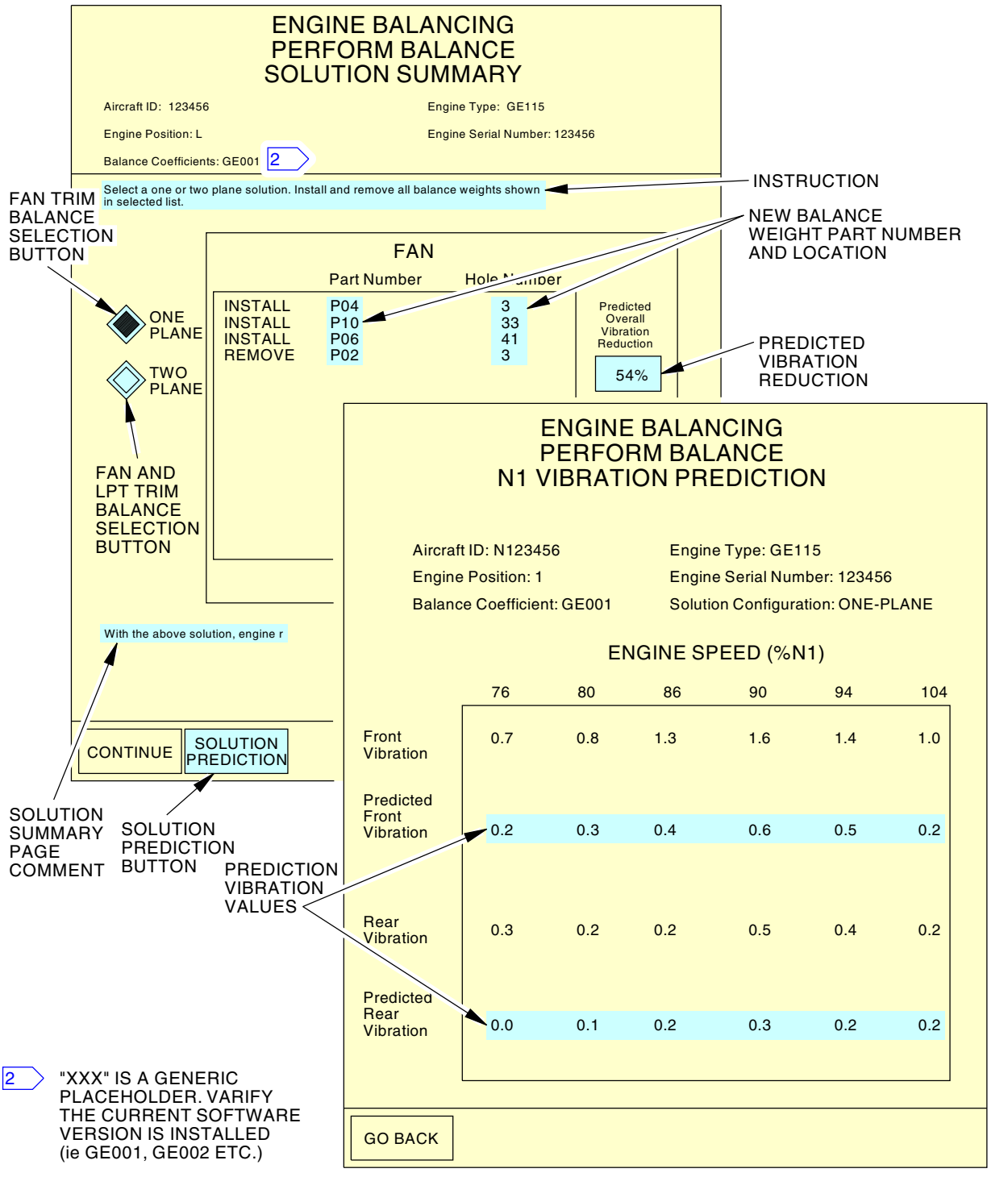

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 4 of 8)

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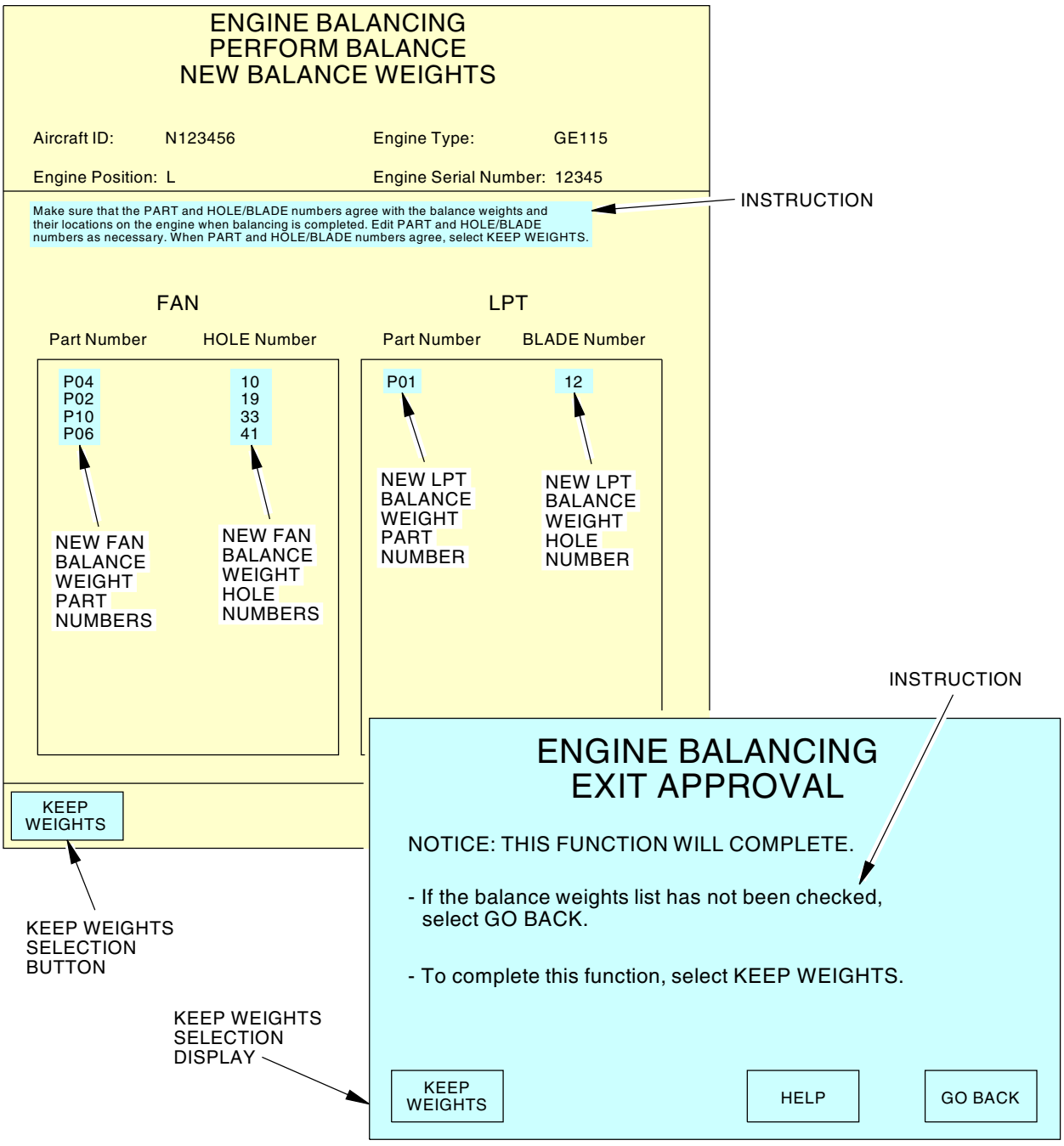

M06376 S0004285532_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 5 of 8)

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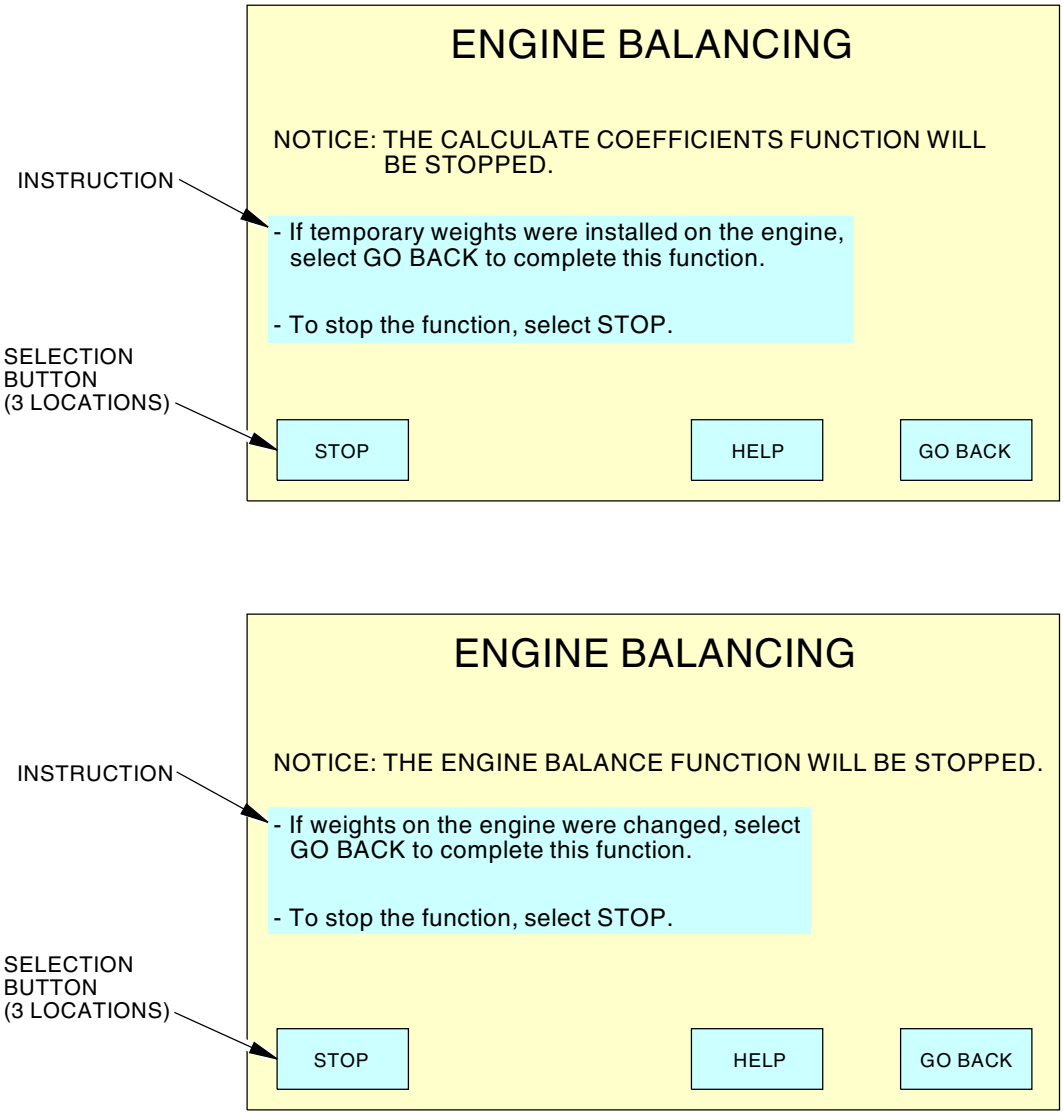

NOTICE DIALOG BOXES

M06377 S0004285533_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 6 of 8)

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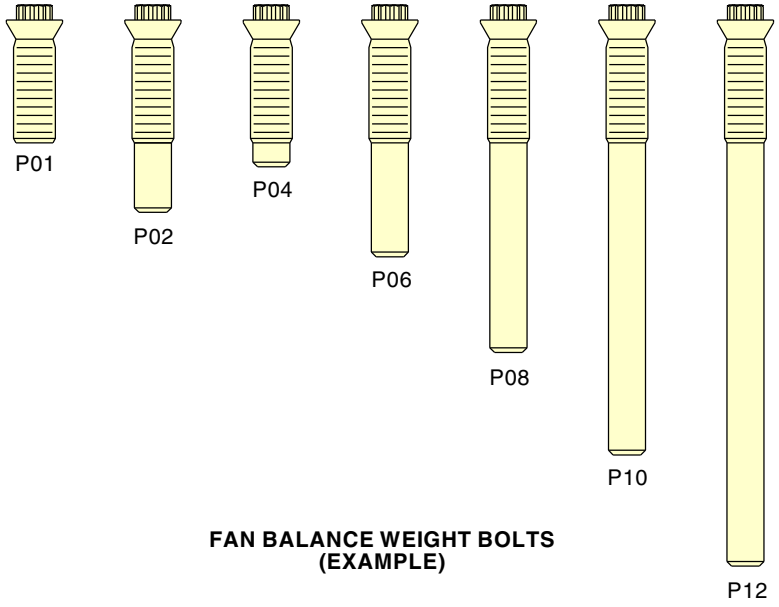
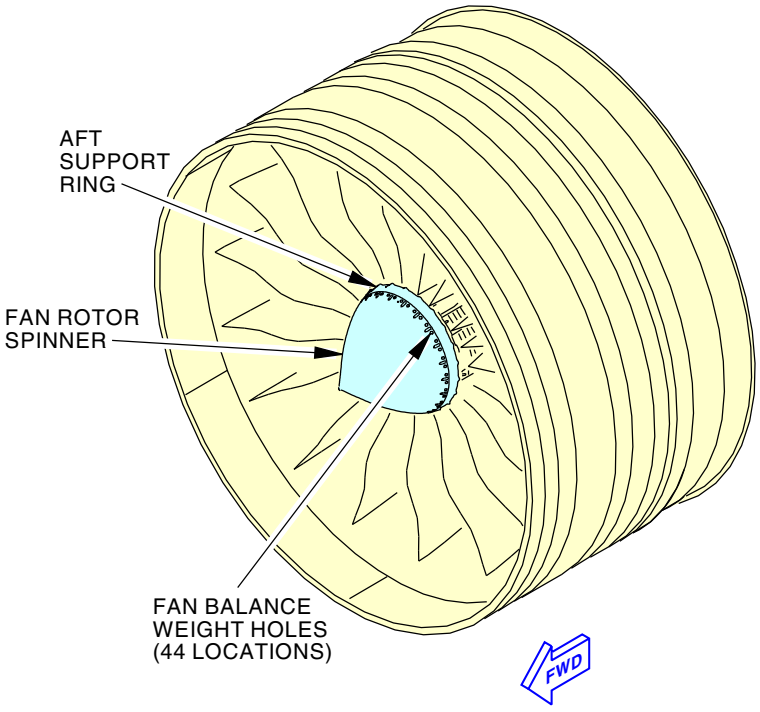


FAN BALANCE WEIGHT BOLTS (EXAMPLE)



NOTE:

FAN BALANCE WEIGHT HOLES ARE NUMBERED ON EVERY FOUR HOLES COUNTER CLOCKWISE WHICH START AT HOLE 1 MARK (DIMPLE MARK) ON THE AFT SPINNER.

1198925-00-A

M06378 S0004285534_V3

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 7 of 8)

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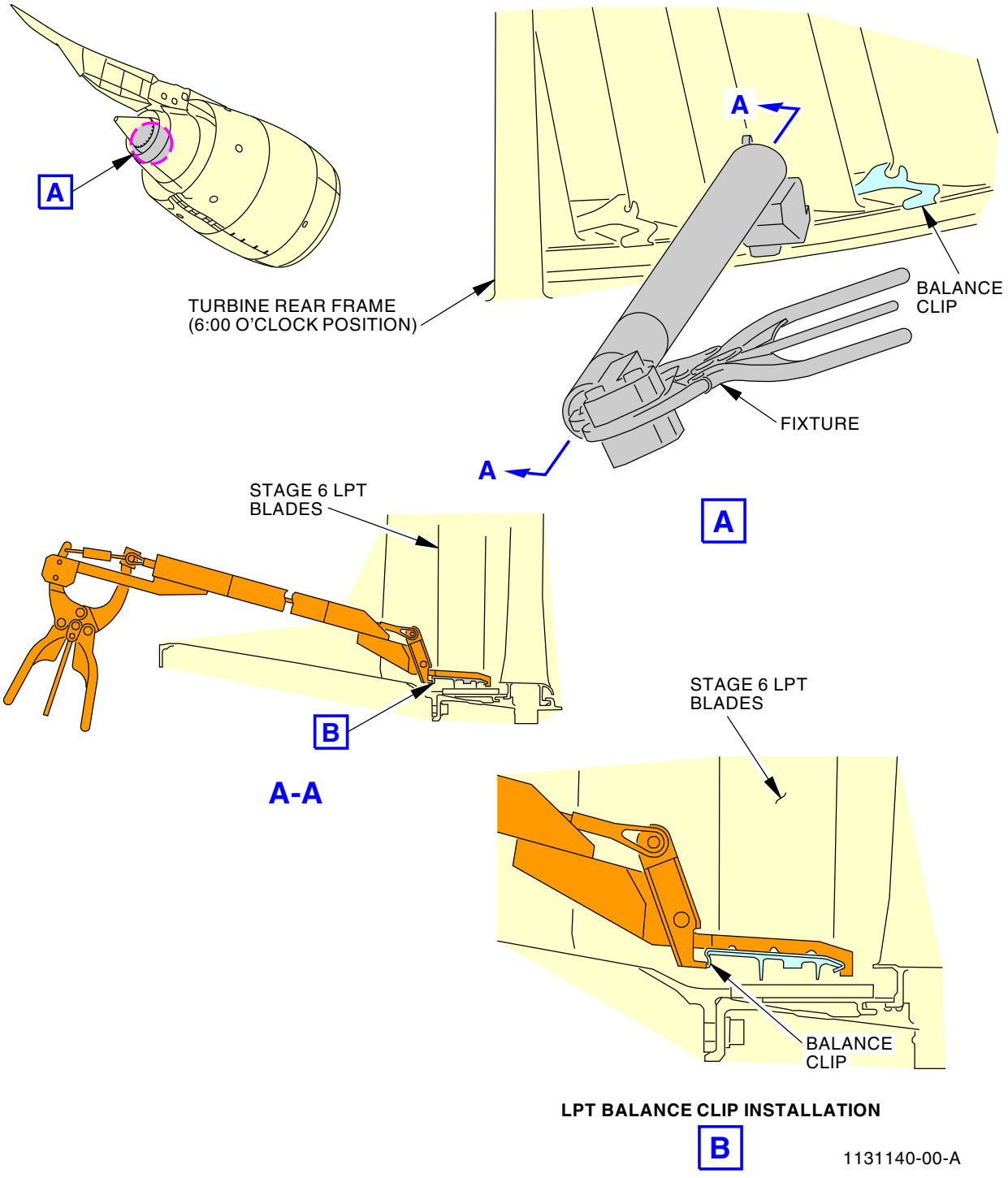

Engine Balancing System (EBS)
Figure 508/71-00-00-990-819-H01 (Sheet 8 of 8)

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TASK 71-00-00-700-821-H02

14. Test No. 12B - Low Pressure System (Fan/LPT) Trim Balance (For SCU P/N 241-322-008-022 or 241-322-007-021, Media P/N 241-322-915-001)

(Figure 509)

A. General

(1) This task contains five independent paragraphs. You must follow the steps closely as instructed when you do the trim balancing:

(a) Low Pressure System (Fan/LPT) Preparation and Check

(b) Low Pressure System (Fan/LPT) Trim Balance Procedures

(c) Tests Run After Trim Balance Procedures

(d) Collect Ground Run Data Procedures

(e) Specific Balance Coefficient Calculation Procedures.

(2) This task is used to balance the N1 rotor of the engine. This procedure is used when the AVM data load has valid balance coefficients.

(3) The recommended vibration guidelines for the N1 and N2 limits are listed below Table 508. The N1 vibration in mils S.A unit is shown on the engine balancing system of the MAT. Vibration in scalar unit is shown on EICAS display.

NOTE: The recommended vibration levels given in the table below are guideline levels only. It is not necessary that you must do the trim balance to correct the vibration on the engine immediately if the vibration is over the recommended vibration levels. A trim balance is necessary If the Airlines determine that the engine needs to reduce its vibration levels to satisfy the ride comfort of the Airplane. You must do the trim balance immediately when the engine is absolutely over 3.0 (N1 front or rear) scalar units on the EICAS display.

Table 508/71-00-00-993-825-H02 Recommended Vibration Guidelines

N1 (Front)	N1 (Rear)	N2
3.0 mil S.A (2.1 scalar units)	3.0 mil S.A (2.1 scalar units)	4.0 scalar units

(4) For information on how to get help on the MAT during the engine balance procedure or on how to start the Engine Balancing System on the MAT, do this task: How to Start the Engine Balancing Function, TASK 45-10-00-820-801.

(5) Engine balance related data stored in the AVM is erased when the engine serial number is changed. The data include: the balance weight, the vibration history, and the specific balance coefficients.

(6) For the SCU (P/N 241-322-008-022 or P/N 241-322-007-021), make sure you know the part numbers of the SCU and data load installed on the airplane before you use this procedure.

(a) Data load software 7713-VIB-G80-01 with media P/N 241-322-915-001 (SCU P/N 241-322-008-022 or P/N 241-322-007-021) is the primary and is the default data load when the No. 1 bearing accelerometer is operative, or not.

NOTE: Make sure that you know the part numbers of the SCU and the data load that are installed on the MAT. If the SCU or data load part numbers are incorrect, it could cause the engine vibration to increase.

(7) The AVM has six target speeds. The AVM will collect data only when the engine is in ±1% of one of these six target N1 speeds.

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(a) The data load software 7713-VIB-G80-01 with media P/N 241-322-915-001 (SCU P/N 241-322-008-022 or P/N 241-322-007-021) have these target N1 Speed: 76%, 80%, 86%, 90%, 94% and 104%.

1) Make sure to put the airplane in a position that will limit the amount of crosswind into the engine inlet.

NOTE: Wind direction and speed can cause stability problems during engine operation. Under some conditions, engine will not get to the speed above.

(8) The balance weights on the spinner are referred to as the fan balance weights. The balance weights on the LPT blades are referred to as the LPT balance weights or LPT balance clips.

NOTE: One plane method is sufficient for the engine trim balancing. Two plane method is not applicable and is not recommended by the engine manufacturer.

(a) You will use the Engine Balancing System on the MAT to find the quantity and size of the weights to install on the engine to balance the N1 rotor or LPT.

(9) You can do a ground run to collect vibration data if the MAT does not have enough flight leg data or a repaired (Low Pressure components) or a replaced engine indicated high N1 vibration during a vibration survey, or you prefer to use ground run data for trim balance. If the MAT does have enough flight leg data, use the flight leg data for the trim balance.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
45-10-00-820-801	How to Start the Engine Balancing Function (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (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-2239	Tool - Balance Weight Clip, GE90 Low Pressure Turbine
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00004	Compound - Antiseize, Graphite-Petrolatum	SAE AMS 2518
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left

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(Continued)

Zone	Area
421	Engine, Right

F. Low Pressure System (Fan/LPT) Trim Balance Preparation and Check

SUBTASK 71-00-00-710-022-H02

(1) If you want to know the engine vibration, do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

NOTE: This step is to do a vibration check of an engine and to see if the vibration of the engine is more than vibration guidelines (TASK 71-00-00-800-802-H01).

SUBTASK 71-00-00-970-009-H02

(2) If you need to collect the engine ground run data, go to the Collect the Ground Run Data Procedure section in this task.

NOTE: Do the paragraph (I) if you decide to collect the vibration data by ground run. Ground run the engine can collect vibration data for one of these conditions:

1) If the MAT does not have enough flight leg data.

2) If you prefer to use ground run data for trim balance.

3) If you want a test run after you had repaired a low pressure components or replaced engine indicated a high N1 vibration during a vibration survey.

4) If you need to calculate the specific coefficients when the system default specific balance coefficient did not provide the acceptable resulted solution for the trim balance.

NOTE: The No. 1 bearing accelerometer gives indications of Fan Vibration. It does not give indications for Core or LPT Vibrations. For LPT and Core Vibration, use the turbine accelerometer indication.

SUBTASK 71-00-00-860-266-H02

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-267-H02

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-268-H02

(5) Set the applicable thrust lever to minimum idle.

SUBTASK 71-00-00-860-269-H02

(6) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait for 30 seconds before you start the test.

SUBTASK 71-00-00-970-010-H02

(7) Do a vibration data check as follows:

(a) Do the steps that follow if there was a report of high engine vibration.

1) Get information on the type of vibration (N1, N2 or broadband) and flight conditions.

2) Get the EICAS/CMC data snapshot of the engine at the time of the report (TASK 45-10-00-740-808), if available.

(b) Make sure the AVM system operates correctly.

1) Look at the MAT for AVM faults.

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a) Continue with the Vibration Data Check if there are no AVM faults.

b) If there are AVM faults, do the applicable fault isolation procedure in the FIM.

(c) Use a maintenance access terminal (MAT) to do a check of the vibration data saved in the AVM.

1) Make these selections on the MAT main menu:

a) ONBOARD MAINTENANCE

b) OTHER FUNCTIONS

c) ENGINE BALANCING

d) ENGINE 1 or ENGINE 2

NOTE: Select the engine that has high vibration.

e) PERFORM BALANCE

f) CONTINUE.

2) Find the N1 and N2 vibration data that shows on the FLIGHT HISTORY displays.

a) On the EXISTING BALANCE WEIGHTS display, make these selections:

<1> FLIGHT HISTORY

<2> FLIGHT HISTORY

NOTE: Vibration data will be highlighted if N1 vibration is equal or above 3.0 mils S.A (front or rear).

NOTE: The recommended vibration guidelines of N1 (front and rear) are 3.0 mils S.A.

<3> N2 FLIGHT HISTORY

<4> Look for conditions with high N2 vibration data.

NOTE: Vibration data will be highlighted if N2 vibration is equal or above 4.0 scalar units.

NOTE: The recommended vibration guideline of N2 is 4.0 scalar units.

3) If the N2 vibration data are not satisfactory, troubleshoot and find the cause (See FIM).

4) If the flight crew made a report of high vibration as broadband with N1 and N2 vibration low during the event, and there is no highlighted N1 or N2 vibration data from the flight history page, troubleshoot and find the cause (See FIM).

5) If the N1 vibration data are not satisfactory, continue with the engine balance procedure.

6) If the N1 and N2 vibration data are satisfactory, EXIT the Engine Balancing.

SUBTASK 71-00-00-210-081-H02

(8) Do a balance weights list check for the fan as follows:

(a) Make these selections to go back to the EXISTING BALANCE WEIGHTS display menu.

1) GO BACK (N1 VIBRATION FLIGHT HISTORY display will appear)

2) GO BACK (EXISTING BALANCE WEIGHTS display will appear).

(b) Print a report (or make a record by hand) of the EXISTING BALANCE WEIGHTS display.

1) Select REPORT from the MAT main menu.

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2) REPORT PAGE DATA.
   a) Left or Right CMCF.
   b) SEND (Printer, Diskdrive, or Data Link).
   c) GO BACK.

(c) Compare the balance weights currently on the engine fan against the fan balance weights shown on the EXISTING BALANCE WEIGHTS display of the MAT.

NOTE: You need to identify the fan balance weights on the engine and compare the weights currently on the EXISTING BALANCE WEIGHTS display of the MAT. If the fan balance weights are not the same, you can get incorrect instructions for the removal and installation of fan balance weights when you do an engine balancing. The fan balance weight holes are numbered on every four holes counterclockwise (viewed in the aft direction) which start at the hole 1 mark (dimple mark) on the spinner.

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585 in the lower half of the inlet cowl.

(d) If the fan balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the fan balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the fan balance weights on the engine (Table 509).

1) Select the part number column or hole/blade column.
2) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

   NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

   a) If you need to add a new part and hole/blade numbers, add the new balance weight (bolt) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.
   b) If you need to change a part and hole/blade numbers, put the correct balance weight (bolt) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.
   c) If you need to erase a part and hole/blade numbers, erase the balance weight (bolt) part number or hole/blade number in the system. Select ERASE PART AND/OR HOLE/BLADE NUMBERS.
   d) CONTINUE
   e) Do the above steps again for each balance weight that needs to be corrected.

3) Select FLIGHT HISTORY to update the balance weights list.
4) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.
   a) Select GO BACK, find the error, and correct the balance weights list.

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b) Select FLIGHT HISTORY again to update the balance weights list.

G. Low Pressure System (Fan/LPT) Trim Balance Procedures

SUBTASK 71-00-00-280-013-H02

(1) Do the preparation and balance weights check as necessary before you do the trim balance (Paragraph above).

SUBTASK 71-00-00-740-010-H02

(2) Do the trim balance procedure as follows:

(a) Make sure the N1 VIBRATION FLIGHT HISTORY display shows.

(b) Do the instructions that show on the N1 VIBRATION FLIGHT HISTORY display and then make these selections:

1) AIRPLANE WITH THE AVM SCU P/N 241-322-008-022 or P/N 241-322-007-021; Select the AVERAGE (preferred) or the flight leg that has the most data or the last ground run data (if you decide to use the ground run data. If it is necessary to collect the ground run data, go to the Collect the Ground Run Data Procedure).

NOTE: The AVERAGE is the default for the ENGINE BALANCING. The AVERAGE is recommended unless you will use the ground run data. If none of the flight legs or the AVERAGE have data for at least two speeds, there is not enough data to balance the engine. You will need to do a ground run to collect data or wait until the AVM saves more flight legs for this engine.

NOTE: If you decide to go to a different display and then decide to get back to the N1 VIBRATION FLIGHT HISTORY display, make sure you select the AVERAGE or the flight leg that has the most data or the last ground run data (that you selected before) again.

2) Continue to select GO BACK until you see the EXISTING BALANCE WEIGHTS display.

3) CONTINUE.

(c) Do the instructions that show on the PERFORM BALANCE SOLUTION SUMMARY display and then make these selections:

1) ONE PLANE

NOTE: The one plane method is recommended because it takes less time and is usually satisfactory. Two plane method is not recommended by the engine manufacturer.

2) SOLUTION PREDICTION.

(d) If the predicted vibration data are satisfactory, do this step.

1) Select GO BACK.

(e) Print a report (or make a record by hand) of the PERFORM BALANCE SOLUTION SUMMARY.

1) Select REPORT on the MAT main menu.

2) REPORT PAGE DATA

a) Left or Right CMCF

b) SEND (Printer, Diskdrive, or Data Link)

c) GO BACK

d) CONTINUE.

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(f) Do the instructions that show on the PERFORM BALANCE NEW BALANCE WEIGHT if you decided to install the new balance weights.

NOTE: This step permits you to save the new balance weights in the AVM signal conditioner unit.

1) KEEP WEIGHTS

(g) Do the instructions that show on the ENGINE BALANCING EXIT APPROVAL.

1) KEEP WEIGHTS

(h) Make a different selection from the MAT main menu to exit.

(i) Make sure the NOTICE dialog box shows.

(j) Select STOP to exit Engine Balancing.

(k) If the predicted vibration data are not satisfactory or if you do not want to use the balance solution at this time, make these selections to exit the engine balancing.

1) OTHER FUNCTIONS or select a different selection from MAT main menu.

2) Make sure the NOTICE dialog box displays.

3) STOP.

(l) If you decide to do the TWO PLANES method, make these selections to get back to the PERFORM BALANCE SOLUTION SUMMARY display.

NOTE: Two plane method is used when the one plane solution is not satisfactory. Two plane method is not recommended by the engine manufacturer. Please consult with the engine manufacture representative if you decide to do the two plane method.

1) OTHER FUNCTIONS

2) ENGINE BALANCING

3) ENGINE 1 or ENGINE 2

NOTE: Select the engine that has high vibration.

4) PERFORM BALANCE

5) CONTINUE

6) Do a balance weights list check for the LPT and compare the balance weights currently on the LPT against the LPT balance weights shown on the EXISTING BALANCE WEIGHTS display.

NOTE: You need to identify the balance weights on the engine LPT and compare the LPT balance weights currently on the EXISTING BALANCE WEIGHTS display. If the LPT balance weights are incorrect, you can get incorrect instructions for the removal and installation of balance weights when you do an engine balancing.

NOTE: The turbine blades are counted clockwise (viewed in the forward direction). The number 1 turbine blade is at the same angular location as the number 1 fan blade. To find the turbine blade 1, go to the front of the engine and turn the fan until fan hole 1 (dimple mark on the aft spinner) is at the bottom. This places the turbine blade 1 at the bottom of the engine.

7) If the LPT balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the LPT balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the LPT balance weights on the engine (Table 510).

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a) Select the part number column or hole/blade column.

b) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

c) If you need to add a new part and hole/blade numbers, add the new LPT balance weight (clip) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.

d) If you need to change a part and hole/blade numbers, put the correct LPT balance weight (clip) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

e) If you need to erase a part and hole/blade numbers, erase the LPT balance weight (clip) part number or hole/blade number in the system. Select ERASE PART AND/OR HOLE/BLADE NUMBERS.

f) CONTINUE

g) Do the above steps again for each LPT balance weight that needs to be corrected.

h) Select FLIGHT HISTORY to update the LPT balance weights list.

i) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.

j) Select GO BACK, find the error, and correct the LPT balance weights list.

k) Select GO BACK, find the error, and correct the LPT balance weights list.

8) Make sure the N1 VIBRATION FLIGHT HISTORY display shows.

9) Do the instructions that show on the N1 VIBRATION FLIGHT HISTORY display and then make these selections:

a) AIRPLANE WITH THE AVM SCU P/N 241-322-008-022 or P/N 241-322-007-021; Select the same AVERAGE or the flight leg that has the most data or the last ground run data (if you decide to use the ground run data. If it is necessary to collect more ground run data, go to Collect the Ground Run Data Procedures).

NOTE: The AVERAGE is the default for the ENGINE BALANCING. The AVERAGE is recommended unless you will use the ground run data. If none of the flight legs or the AVERAGE have data for at least two speeds, there is not enough data to balance the engine. You will need to do a ground run to collect data or wait until the AVM saves more flight legs for this engine.

NOTE: If you decide to go to a different display and then decide to get back to the N1 VIBRATION FLIGHT HISTORY display, make sure you select the AVERAGE or the flight leg that has the most data or the last ground run data (that you selected before) again.

b) Continue to select GO BACK until you see the EXISTING BALANCE WEIGHTS display.

c) CONTINUE.

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10) Do the instructions that show on the PERFORM BALANCE SOLUTION SUMMARY display and then make these selections:
    a) TWO PLANES
    b) SOLUTION PREDICTION.

(m) If the predicted vibration data are satisfactory, do this step.
    1) Select GO BACK.

(n) Print a report (or make a record by hand) of the PERFORM BALANCE SOLUTION SUMMARY.
    1) Select REPORT on the MAT main menu.
    2) REPORT PAGE DATA:
        a) Left or Right CMCF
        b) SEND (Printer, Diskdrive, or Data Link).
    3) GO BACK.

(o) Do the instructions that show on the PERFORM BALANCE NEW BALANCE WEIGHT if you decided to install the new balance weights.

NOTE: This step permits you to save the new balance weights in the AVM signal conditioner unit.

    1) KEEP WEIGHTS

(p) Do the instructions that show on the ENGINE BALANCING EXIT APPROVAL.
    1) KEEP WEIGHTS

(q) Make a different selection from the MAT main menu to exit.

(r) Make sure the NOTICE dialog box shows.

(s) Select STOP to exit Engine Balancing.

(t) If the predicted vibration data are not satisfactory again, troubleshoot and find the cause (See FIM).

SUBTASK 71-00-00-420-005-H02

(3) Use the report and make the necessary changes on the fan or LPT balance weights on the engine.

(a) If it is necessary, install the applicable balance weight bolt(s) on the spinner at the locations indicated in the report.

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585 in the lower half of the inlet cowl.
2) Find the fan balance weight bolts to be installed or replaced.

NOTE: The dimple is the location of the number 1 fan blade and fan balance weight bolt. The spinner is marked with numbers (every four holes) in a counterclockwise direction, as you look aft on the spinner.

3) See the report for the part numbers and locations (listed on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY record) to give the new position(s) for the fan balance weight bolt(s) on the spinner.

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a) There are six different types (except the standard bolt) of the fan balance weight bolts that you can use to balance the N1 vibration (Table 509).

NOTE: Most of the bolts installed on the spinner are the standard reference bolts (Part number 2013M80P01 or P01). It will be necessary to remove the standard bolts in the locations that the balance weights are to be installed. It will also be necessary to install the standard bolts in the hole balance weights that are removed.

Table 509/71-00-00-993-826-H02 Fan Balance Weights

PART NUMBER ON MAT (EBS)	LENGTH (INCHES)	WEIGHT (GRAMS)	MOMENT WEIGHT (GRAM-INCHES)
P01*[1]	1.1	15	100
P02	1.9	21	200
P04	1.5	33	400
P06	2.4	46	600
P08	3.3	59	800
P10	4.3	74	1000
P12	5.4	89	1200

*[1] Standard bolts do not show in the EBS fan balance weight list.

4) Use the information on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY display, and remove the applicable fan balance weight bolts that are to be replaced on the spinner.

5) Apply a thin coat of compound, D00004 to the threads of the new bolt(s).

6) Install the new fan balance weight bolt(s) into the spinner.

a) Tighten the new fan balance weight bolt(s) to 150.0-170.0 Pound-inches (16.9-19.2 Newton-meters).

7) Make sure that all forty four fan balance weight bolts (44 locations) are installed on the spinner.

(b) If it is necessary, install the applicable LPT balance weight clips on the LPT blades.

1) Turn the LPC fan rotor until the fan hole 1 is at the bottom of the engine.

NOTE: The turbine blades are counted clockwise (viewed in the forward direction). The number 1 turbine blade is at the same angular location as the number 1 fan blade. To find the turbine blade 1, go to the front of the engine and turn the fan until fan hole 1 (dimple mark on the spinner) is at the bottom. This places the turbine blade 1 at the bottom of the engine.

2) See the report for the part numbers and locations (listed on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY record) to give the new position(s) for the LPT balance weight clip(s) on the LPT.

a) There is one type of the LPT balance weight clip that you can use to balance the LPT vibration (Table 510).

NOTE: Use new LPT balance weight clips for each installations. Do not re-use old balance weight clips.

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Table 510/71-00-00-993-827-H02 LPT Balance Weights

PART NUMBER ON MAT (EBS)	WEIGHT (GRAMS)	MOMENT WEIGHT (GRAM-INCHES)
P01	5.7	200

3) Use the information on the ENGINE BALANCING PERFORM BALANCE SOLUTION SUMMARY display, and remove the applicable balance weight clips on the LPT blade.

CAUTION MAKE SURE YOU PUT A CLOTH OVER THE BALANCE WEIGHT CLIP OR BLOCK THE FRONT OF THE LPT BLADE AT THE LOCATION OF THE CLIP. IF YOU DO NOT, THE BALANCE WEIGHT COULD FLY FORWARD INTO THE ENGINE AND CAN CAUSE DAMAGE DURING THE SUBSEQUENT ENGINE OPERATION.

a) Put a cotton wiper, G00034 over the LPT balance weight clip or block the front side of the blade.

b) Place an CP3A, extractor under the shroud.

c) Engage the CP3A, extractor in the hole of the LPT balance weight clip tab.

d) Pull on the tab of the LPT balance weight clip and remove the LPT balance weight clip from the blade shroud. Discard the LPT balance weight clip.

e) Remove the cotton wiper, G00034 or blockage in front of the blade.

4) Install the new LPT balance weight clip(s) on the LPT blades.

a) Put the LPT balance weight clip in your hand with the hook away from you.

b) Place the hook of the LPT balance weight clip to the forward side of the blade shroud.

c) Put the LPT balance weight clip on the blade shroud and pull it toward you to engage the hook over the forward side of the blade shroud.

d) Push the aft end of the LPT balance weight clip down over the aft edge of the blade shroud.

e) Open the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239 so the LPT balance weight clip will fit into the claw area of the GE90 low pressure turbine balance weight clip, SPL-2239.

NOTE: The claw area is in the shape of the LPT balance weight clip.

f) Put the GE90 low pressure turbine balance weight clip, SPL-2239 between the LPT blades at the location for the LPT balance weight clip.

g) Put the hook of the LPT balance weight clip into the forward side of the GE90 low pressure turbine balance weight clip, SPL-2239.

h) Turn the GE90 low pressure turbine balance weight clip, SPL-2239 down to engage the claw against the aft side of the tab on the LPT balance weight clip.

i) Make sure the GE90 low pressure turbine balance weight clip, SPL-2239 is aligned with the LPT balance weight clip.

j) Close the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239 and crimp the tab down against the blade shroud.

k) Open the toggle pliers of the GE90 low pressure turbine balance weight clip, SPL-2239.

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l) Lift the aft end of the GE90 low pressure turbine balance weight clip, SPL-2239 and push the GE90 low pressure turbine balance weight clip, SPL-2239 forward to free the hook from the forward side of the balance weight clip.

m) Remove the GE90 low pressure turbine balance weight clip, SPL-2239 from between the blades.

SUBTASK 71-00-00-840-004-H02

(4) This will conclude the Low Pressure System (Fan/LPT) Trim Balance Procedures.

SUBTASK 71-00-00-860-270-H02

(5) Do the Tests Run After Trim Balance Procedures below.

H. Tests Run After Trim Balance Procedures

SUBTASK 71-00-00-080-004-H02

(1) Remove all tools, parts, and unwanted material from the inlet and turbine exhaust areas.

SUBTASK 71-00-00-840-005-H02

(2) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-00-860-271-H02

(3) If the record of the PERFORM BALANCE SOLUTION SUMMARY display shows that a post-balance engine run is necessary, do one of these steps:

NOTE: It is possible to do a balance calculation with data at only 2 speeds. However, it is recommended that the run have the data at 4 speeds or more. A second balance is recommended if the vibration is not satisfactory.

(a) Do a low power run (less than 80% N1) or high power (greater than 80% N1) engine run to see if the vibrations are in the limits (TASK 71-00-00-800-835-H00).

1) For a high power run, make sure you pull the warning speakers circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

2) After engine operation, operate the engine at minimum idle for 10 minutes.

3) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(b) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

SUBTASK 71-00-00-860-272-H02

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-860-273-H02

(5) This will conclude the Tests Run After Trim Balance Procedures.

I. Collect the Ground Run Data Procedures

NOTE: Do this paragraph if you decide to collect the vibration data for one of these conditions:

1) If the MAT does not have enough flight leg data.

2) If you prefer to use ground run data for trim balance.

3) If you want a test run check the vibration level after you have repaired a low pressure components or replaced engine indicated a high N1 vibration during a vibration survey.

4) If you need to calculate the specific coefficients when the system default specific balance coefficient did not provide the acceptable resulted solution for the trim balance.

NOTE: The No. 1 bearing accelerometer gives indications of Fan Vibration. It does not give indications for Core or LPT Vibrations. For LPT and Core Vibration, use the turbine accelerometer indication.

SUBTASK 71-00-00-970-011-H02

(1) Use the maintenance access terminal (MAT) to prepare the ground run.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) ENGINE BALANCING
4) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to collect ground run data.

5) Calculate specific balance coefficients/ground run.
6) CONTINUE.

(b) Make sure the N1 VIBRATION FLIGHT HISTORY displays.

(c) On the N1 VIBRATION FLIGHT HISTORY display, make this selection.

1) GROUND RUN.

SUBTASK 71-00-00-210-082-H02

(2) If it is necessary, do a balance weights list check for the fan as follows:

(a) Make sure the EXISTING BALANCE WEIGHTS display.

(b) Print a report (or make a record by hand) of the EXISTING BALANCE WEIGHTS display.

1) Select REPORT from the MAT main menu.
2) REPORT PAGE DATA.

a) Left or Right CMCF.
b) SEND (Printer, Diskdrive, or Data Link).
c) GO BACK.

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(c) Compare the balance weights currently on the engine fan against the fan balance weights shown on the EXISTING BALANCE WEIGHTS display.

NOTE: You need to identify the fan balance weights on the engine and compare the weights currently on the EXISTING BALANCE WEIGHTS display. If the fan balance weights are incorrect, you can get incorrect instructions for the removal and installation of fan balance weights when you do an engine balancing.

NOTE: The fan balance weight holes are numbered on every four holes counterclockwise (viewed in the aft direction) which start at the hole 1 mark (dimple mark) on the spinner.

(d) If the fan balance weights on the engine are different than those listed on the EXISTING BALANCE WEIGHTS display, change the fan balance weights shown on the EXISTING BALANCE WEIGHTS display so they are the same as the fan balance weights on the engine (Table 509).

1) Select the part number column or hole/blade column.

2) When the ENGINE BALANCING EDIT WEIGHT DATA dialog box shows, make one of the three selections below.

NOTE: You must put the cursor on the correct position when you add, change, or erase a part number. Use the BACK SPACE or DELETE key to change or erase part number.

a) If you need to add a new part and hole/blade numbers, add the new balance weight (bolt) part number or hole/blade number into the system. Select ADD NEW PART AND HOLE/BLADE NUMBERS.

b) If you need to change a part and hole/blade numbers, put the correct balance weight (bolt) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

c) If you need to change a part and hole/blade numbers, put the correct balance weight (bolt) part number or hole/blade number into the system. Select CHANGE PART AND/OR HOLE/BLADE NUMBERS.

d) CONTINUE

e) Do the above steps again for each balance weight that needs to be corrected.

SUBTASK 71-00-00-970-012-H02

(3) To collect the ground run data, do these steps:

(a) Make sure you pull the warning speaker circuit breakers during an engine operation.

NOTE: The alarm will sound if the engine is to be operated at more than 60% N1 and, if the flaps are extended to more than the 20-Unit position or the parking brake is pulled up (on).

Open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

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CAUTION

DO NOT USE THE ALTERNATE MODE FOR ENGINE CONTROL DURING THE GROUND RUN TO GET HIGHER N1 SPEEDS. THERE IS NO LIMIT PROTECTION IN THE ALTERNATE MODE. THE ENGINE SPEED CAN GO HIGHER THAN THE LIMIT. DAMAGE TO THE ENGINE CAN OCCUR.

(b) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

1) Let the engine become stable at idle for five minutes.

2) Access the EICAS Engine Performance Page on the MFD (Multi-function Display) (TASK 31-61-00-800-804).

3) Do a two-minute acceleration of the engine (up to 80-85% of N1) and a two-minute deceleration of the engine.

4) Permit the engine to become stable at idle.

(c) On the EXISTING BALANCE WEIGHTS, make these selections:

1) START GROUND RUN.

2) If the ENGINE BALANCING EDIT ERROR dialog box shows, Engine Balancing does not know one of the part or hole/blade numbers that you put in the balance weights list.

a) Select GO BACK, find the error, and correct the balance weights list.

b) Select START GROUND RUN again to update the balance weights list.

(d) Make sure the GROUND RUN IN OPERATION dialog box displays.

(e) Prepare to run the engine at the speeds that follow: 76%, 80%, 86%, 90%, 94%, and 104% N1.

NOTE: Under some conditions, the engine will not get to the speeds above. The EEC will limit engine speed to Max Static N1 for the day (Command N1 bug as shown on the Engine Primary Display). It is not recommended to do ground run at 104% N1.

1) The Engine Balancing System must record data at a minimum of two speeds to have data to do the trim balance.

(f) Make sure the N1 is in the limits.

(g) Set the engine to the lowest speed of the six N1 speeds.

(h) Keep the engine at this speed for a minimum of 60 seconds.

(i) Operate the engine at the other speed for a minimum of 60 seconds at each speed.

(j) CONTINUE

(k) If the warning dialog box shows one of these messages - CANNOT CONNECT TO SIGNAL CONDITIONER UNIT (LEFT OR RIGHT), SIGNAL CONDITIONER UNIT (LEFT OR RIGHT) CANNOT RECEIVE A REQUEST FROM THE CMCF.

1) Select GO BACK on the dialog box or wait for 90 seconds; then do the steps on the MAT main menu to go back to the N1 VIBRATION FLIGHT HISTORY display.

a) ONBOARD MAINTENANCE

b) OTHER FUNCTIONS

c) ENGINE BALANCING

d) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to collect ground run data.

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e) CALCULATE SPECIFIC BALANCE COEFFICIENTS/GROUND RUN

f) CONTINUE.

(l) Make sure the N1 VIBRATION FLIGHT HISTORY displays.

(m) Make sure the Engine Balancing System made a record of the vibration data from the ground run to do a balance.

NOTE: Look at the bottom of the N1 VIBRATION FLIGHT HISTORY display for the new data. It will have the word GROUND to the left and no date or time information at this point in the procedure.

NOTE: It is possible to do a balance calculation with data at only 2 speeds.

(n) If there is not sufficient vibration data to do a balance, there were possibly wind gusts or the N1 speed was not in the permitted range (or engine vibration is low).

1) Do a check on the CMC for the AVM faults, if no faults, continue steps below.

2) Point the nose of the airplane in the direction of wind.

3) Select the applicable ENGINE L(R) EEC MODE switch on the overhead panel, P5, to the ALTN position.

4) Select the START GROUND RUN button and operate the engine again at each of the five speeds.

5) Operate the engine at other speed again for a minimum of one minute this time.

(o) If there are vibration data for four or more speeds, make these selections to keep the ground run data.

1) KEEP GROUND RUN DATA

2) MAKE SURE WEIGHTS.

(p) Make sure the EXISTING BALANCE WEIGHTS displays and make this selection.

1) KEEP WEIGHTS.

(q) Make sure the EXIT APPROVAL dialog box displays and make this selection.

1) KEEP WEIGHTS.

(r) Make a different selection from the MAT main menu.

(s) Make sure the NOTICE dialog box displays and make this selection.

1) STOP to exit Engine Balancing.

(t) Move the thrust lever to the idle position.

(u) Set the applicable ENGINE L(R) EEC MODE on the overhead panel, P5, to NORM.

(v) After engine operation, operate the engine at minimum idle for 10 minutes.

(w) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(x) Stop the Collect the Ground Run Data Procedure if this is a check run or an engine run to collect data for an engine balance.

(y) Continue the Collect the Ground Run Data Procedure again if you want the GROUND RUN DATA for the specific balance coefficients calculation.

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SUBTASK 71-00-00-860-274-H02

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
C	1	C31001	WARNING SPEAKER-L
C	14	C31606	WARNING SPEAKER-R

SUBTASK 71-00-00-840-006-H02

(5) This will conclude the Collect the Ground Run Data Procedures.

J. Specific Balance Coefficients Calculation Procedures

SUBTASK 71-00-00-970-013-H02

CAUTION

IF THE SPECIFIC BALANCE COEFFICIENTS WERE ACCIDENTALLY KEPT, OR YOU WANT TO DELETE THE SPECIFIC BALANCE COEFFICIENTS, DO A DATALOAD OF THE AVM DATALOAD DISKETTE. THIS WILL CHANGE THE AVM BACK TO ITS INITIAL CONFIGURATION. MAKE SURE YOU ARE TRAINED TO DO THIS PROCEDURE. IF YOU ARE NOT TRAINED, YOU CAN CAUSE DAMAGE TO THE AVM DATA LOAD SOFTWARE.

(1) Use the maintenance access terminal (MAT) to calculate the specific balance coefficients.

NOTE: The generic (default) balance coefficients data loaded in the AVM are for the No. 1 bearing accelerometer and the TCF accelerometer. Specific balance coefficients are calculated when you decide to replace the generic (default) balance coefficients.

NOTE: If you want to calculate one plane specific balance coefficients for the fan, then you need vibration data from two flight legs or two ground runs or one flight leg and one ground run where the configurations of the fan balance weights are different from each flight leg(s) or ground run(s), but the LPT weights are the same.

NOTE: If you want to calculate one plane specific balance coefficients for the LPT, then you can use vibration data from two flight legs or two ground runs or one flight leg and one ground run where the configurations of the LPT weights are different from each flight leg(s) or ground run(s), but the fan weights are the same.

NOTE: If you want to calculate two plane specific balance coefficients, then you need vibration data from three flight legs or three ground runs where the configurations of the fan and the LPT balance weights are different from each flight leg(s) or ground run(s). Use the flight data because it is better than ground data.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) ENGINE BALANCING

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4) ENGINE 1 or ENGINE 2

NOTE: Select the engine that you want to calculate the specific balance coefficients.

5) CALCULATE SPECIFIC BALANCE COEFFICIENTS/GROUND RUN

6) CONTINUE

7) FLIGHT HISTORY.

(b) When the N1 VIBRATION FLIGHT HISTORY displays, do one of these steps:

1) FOR ONE PLANE METHOD, make these selections on the displayed flight legs:

a) Select the first flight leg or GROUND run data.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data.

b) If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data. When the flight leg was not shown the hightlite (brighter) during you selection, meaning the flight legs have the same weight configuration as the one previously selected. To correct this problem, recommend to abort the procedure. Go to the ENGINE BALANCING first screen and follow the steps through to the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. Re-edit the new balance weights in this screen and do the ground run or flight to collect the data again.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

c) If you cannot select the second flight leg or ground run data, exit the Engine Balancing.

NOTE: You cannot calculate specific balance coefficients because the AVM considers the weights to be the same for all of the legs.

<1> Make a different selection from the MAT main menu.

<2> Make sure the NOTICE dialog box shows.

<3> Select STOP to exit Engine Balancing.

2) FOR TWO PLANE METHOD, make these selections on the displayed flight legs:

a) Select the first flight leg or GROUND run data.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data.

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b) Select two flight legs or GROUND run data with different fan and LPT balance weights.

NOTE: If you cannot select a flight leg (not shown hightlite or brighter), try to select the subsequent flight leg or ground run data. When the flight leg was not shown the hightlite (brighter) during you selection, meaning the flight legs have the same weight configuration as the one previously selected. To correct this problem, recommend to abort the procedure. Go to the ENGINE BALANCING first screen and follow the steps through to the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. Re-edit the new balance weights in this screen and do the ground run or flight to collect the data again.

NOTE: There are two screens to edit the balance weights: ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen and ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen. When you change the weight configuration, make sure that you edit the new balance weights in the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS screen. If you are edited the new weights in the ENGINE BALANCING PERFORM BALANCE NEW BALANCE WEIGHTS screen, you will not be able to select the flight leg for the calculation, because the system is still considered the exiting balance weights as the current weight configuration, not the new balance weights that you just edited.

c) If you cannot select two flight legs or ground runs, exit the Engine Balancing.

NOTE: You cannot calculate specific balance coefficients because the AVM considers the weights to be the same for all of the legs.

<1> Make a different selection from the MAT main menu.

<2> Make sure the NOTICE dialog box shows.

<3> Select STOP to exit Engine Balancing.

(c) Select the CALCULATE COEFFICIENTS button if it became brighter (hightlite).

NOTE: If the CALCULATE COEFFICIENTS button does not become brighter, it is because you did not select enough flight legs, or the configurations of the fan balance weights and the LPT balance weights are not different.

1) If the CALCULATE COEFFICIENTS button does not became brighter (hightlite), go back to the previous step and select a different flight legs again.

(d) You will see The CALCULATE CONDITION dialog box briefly show and then go away.

(e) When the KEEP COEFFICIENTS dialog box displays, if you decide not to keep this new specific balance coefficient, make a different selection from the MAT main menu to exit The Specific Balance Coefficients Calculation Procedure.

(f) When the KEEP COEFFICIENTS dialog box displays, do these steps if you decide to keep this new specific balance coefficient.

1) KEEP.

2) When the N1 VIBRATION FLIGHT HISTORY displays, make this selection.

a) KEEP WEIGHTS.

3) When the EXISTING BALANCE WEIGHTS displays, make this selection.

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a) KEEP WEIGHTS.

4) When the EXIT APPROVAL dialog box displays, make these selections.

a) KEEP WEIGHTS.

b) STOP to exit Engine Balancing.

SUBTASK 71-00-00-840-007-H02

(2) This will conclude the Specific Balance Coefficients Calculation Procedures.

(a) Go back to the Low Pressure System (Fan/LPT) Trim Balance Procedure if it is necessary to balance the engine.

——— END OF TASK ———

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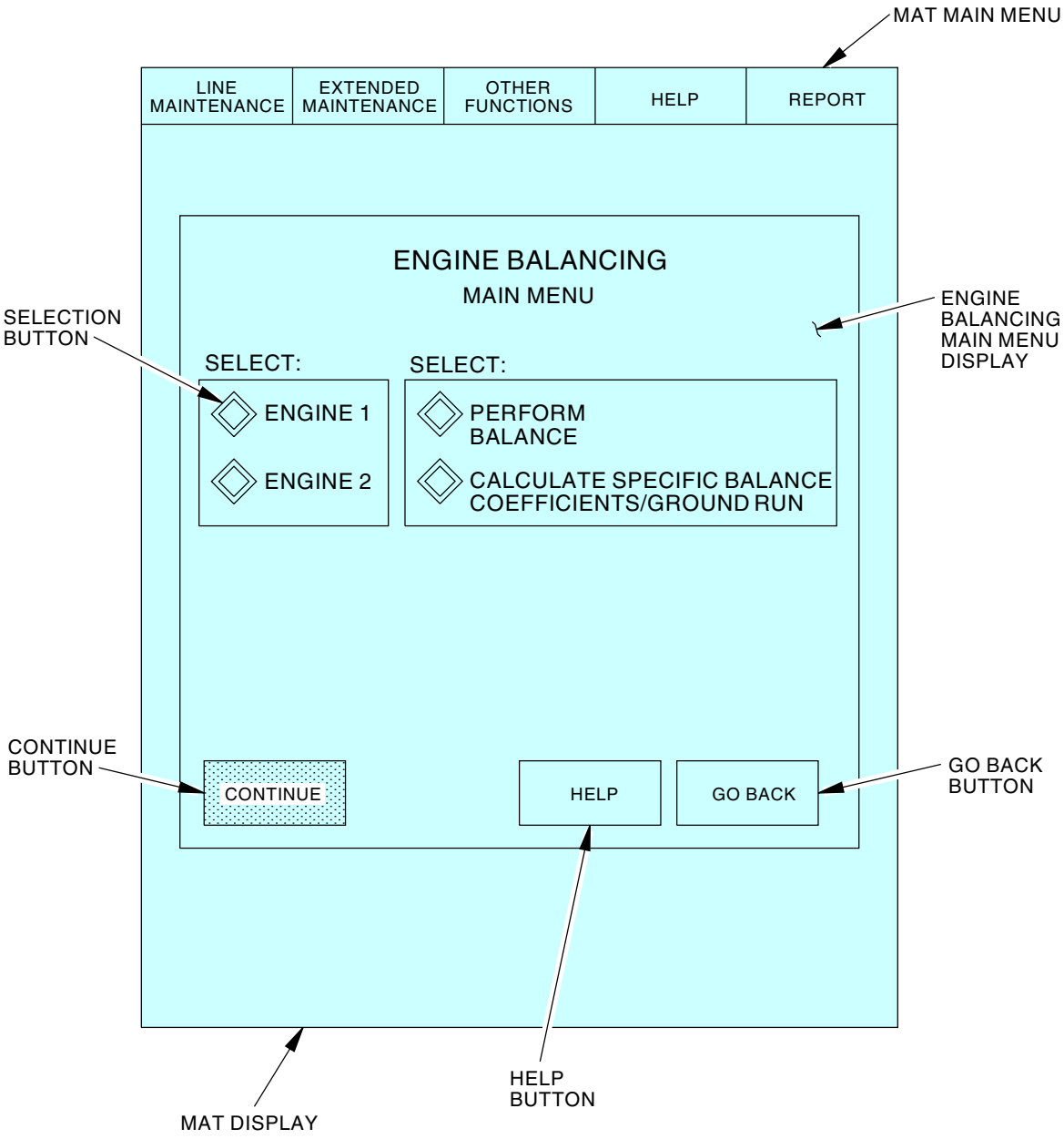

M06372 S0004285528_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 1 of 8)

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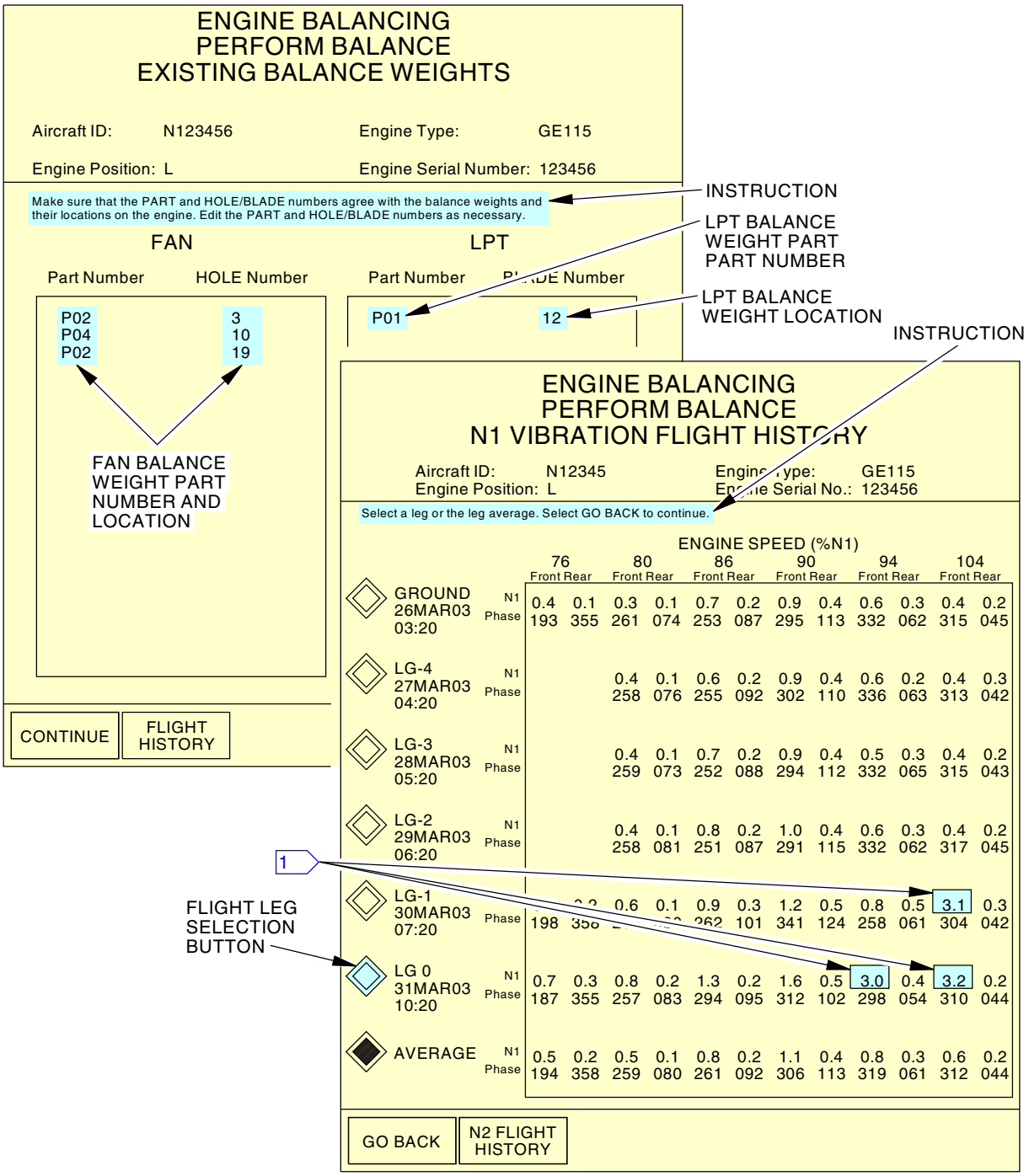

M06373 S0004285529_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 2 of 8)

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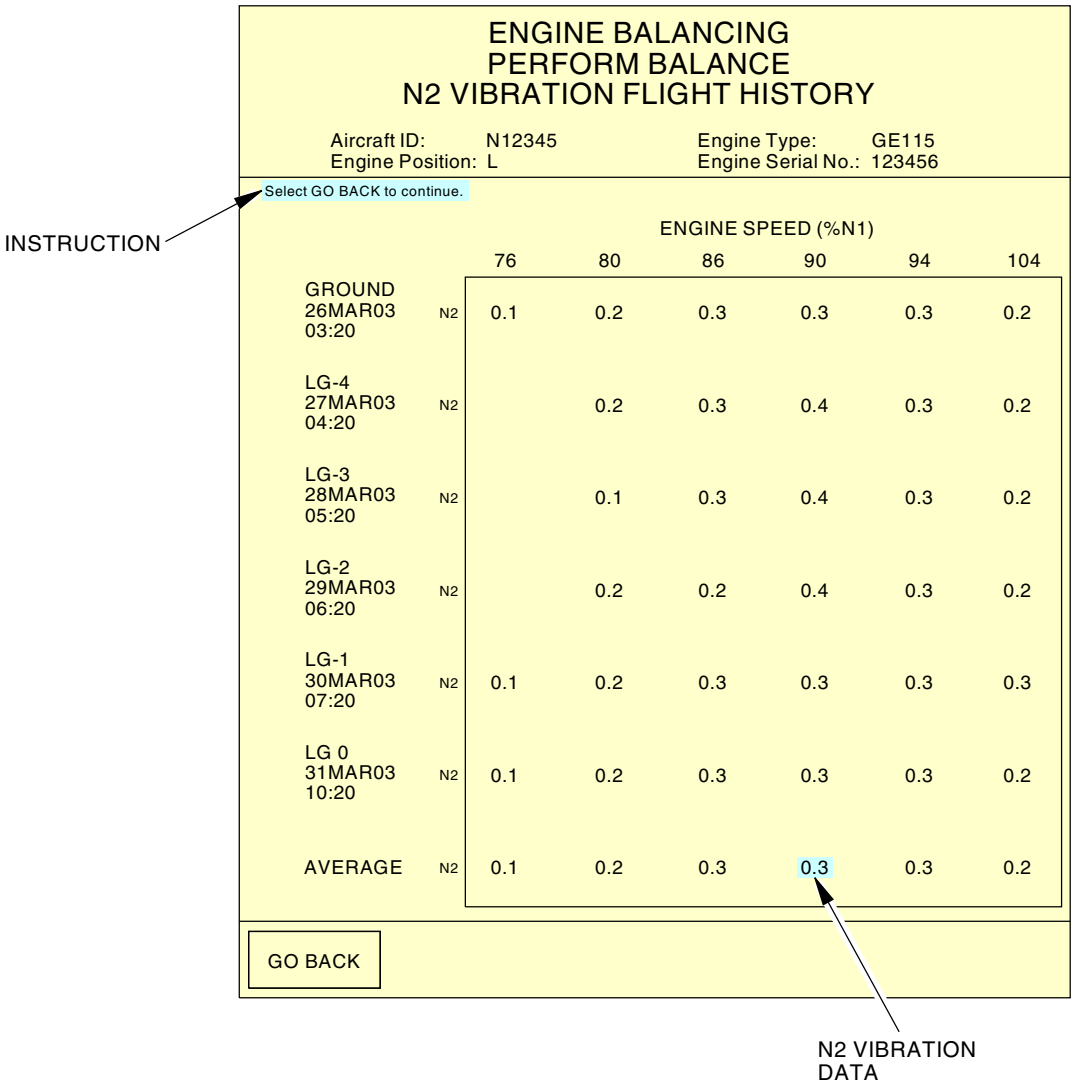

N80768 S0004285530_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 3 of 8)

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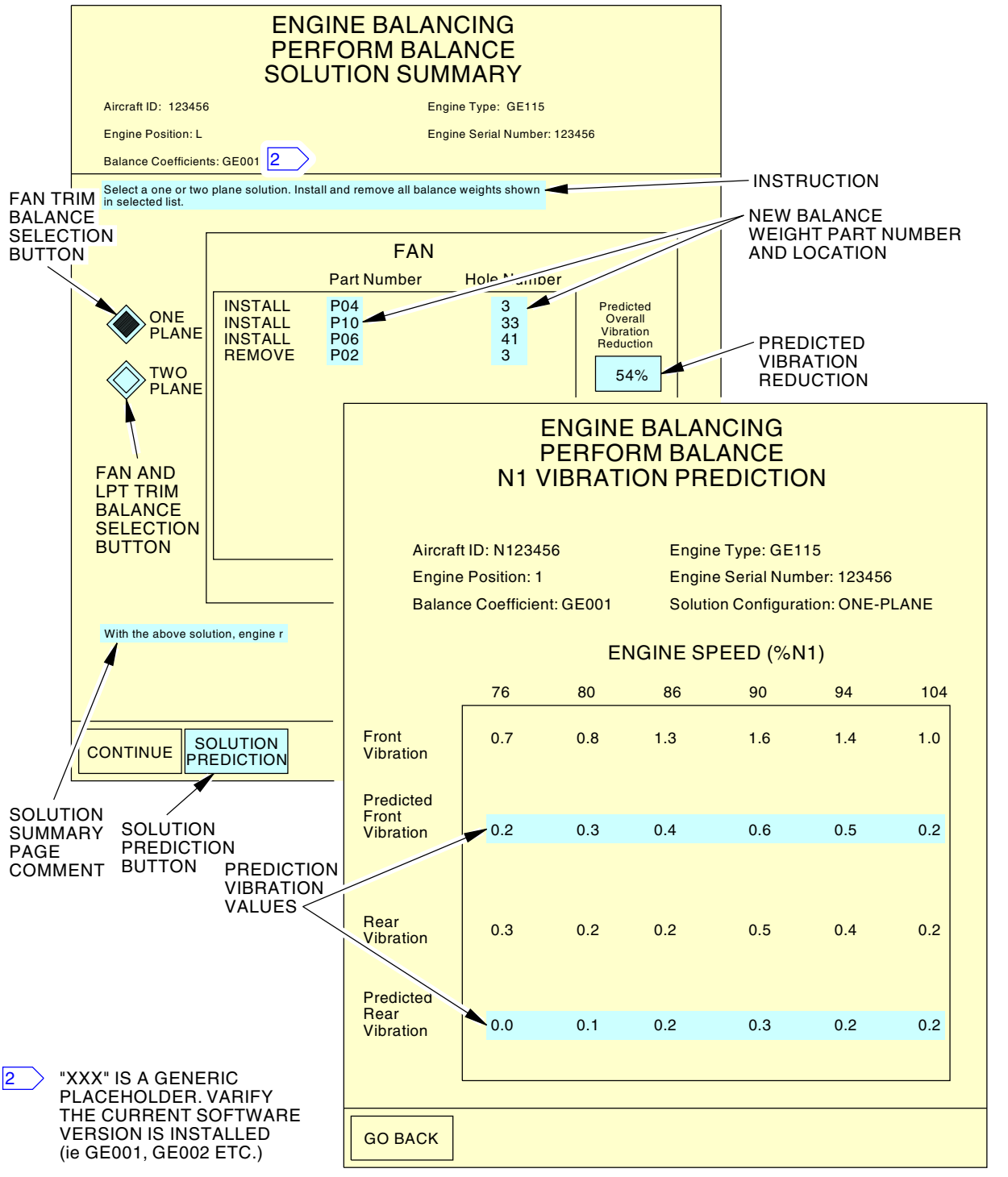

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 4 of 8)

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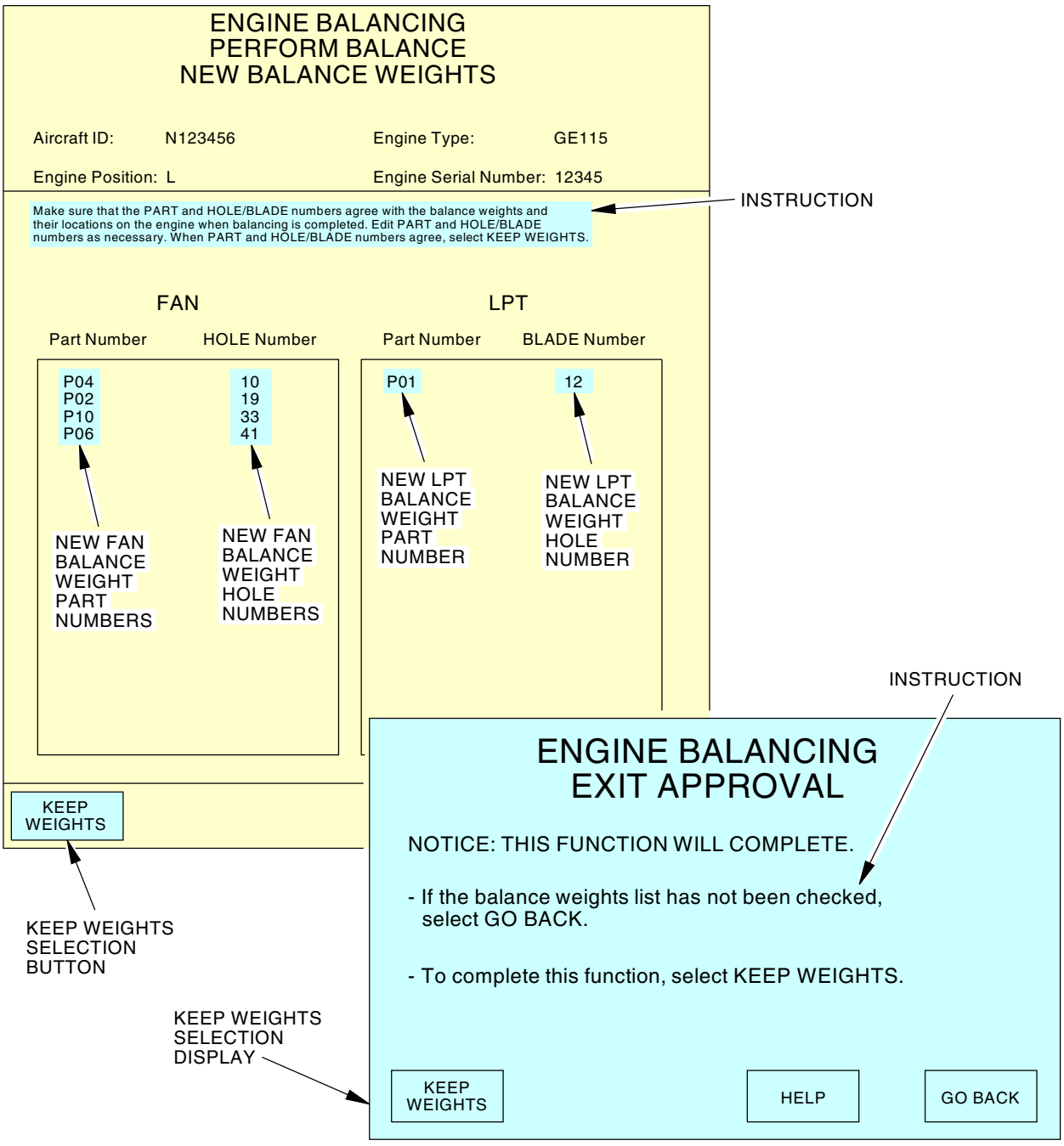

M06376 S0004285532_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 5 of 8)

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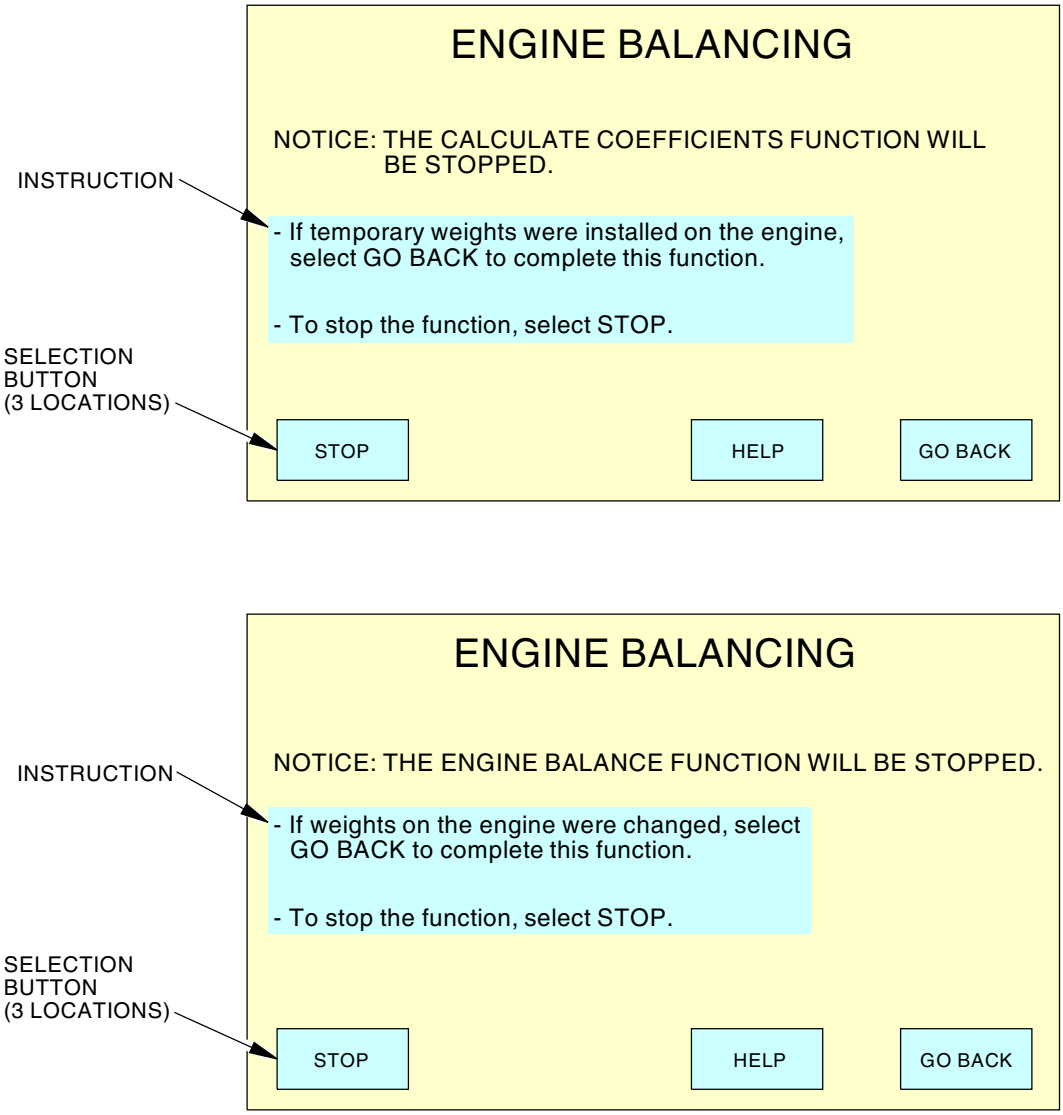

NOTICE DIALOG BOXES

M06377 S0004285533_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 6 of 8)

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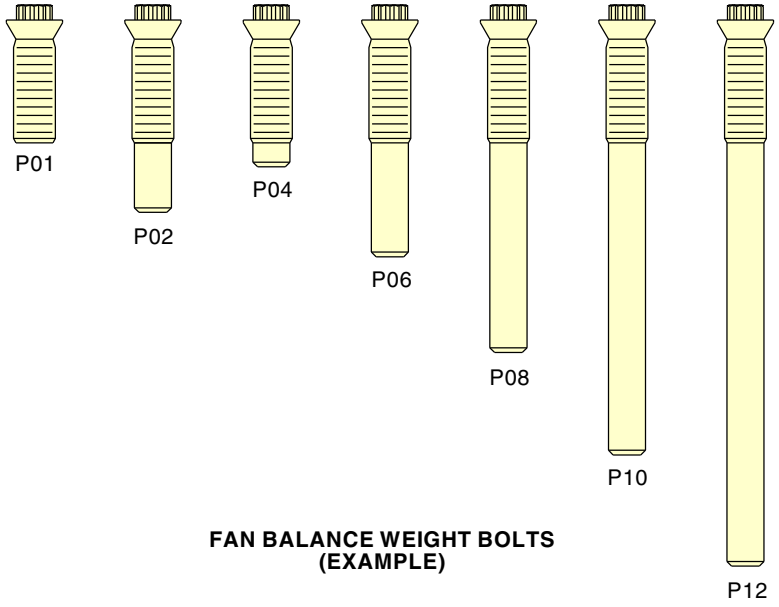
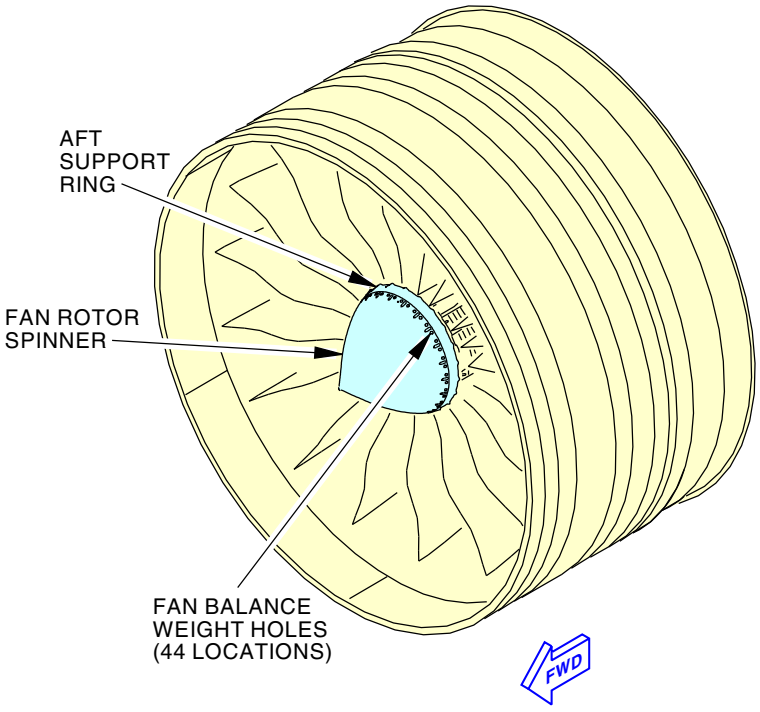


FAN BALANCE WEIGHT BOLTS (EXAMPLE)



NOTE:

FAN BALANCE WEIGHT HOLES ARE NUMBERED ON EVERY FOUR HOLES COUNTER CLOCKWISE WHICH START AT HOLE 1 MARK (DIMPLE MARK) ON THE AFT SPINNER.

1198925-00-A

M06378 S0004285534_V3

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 7 of 8)

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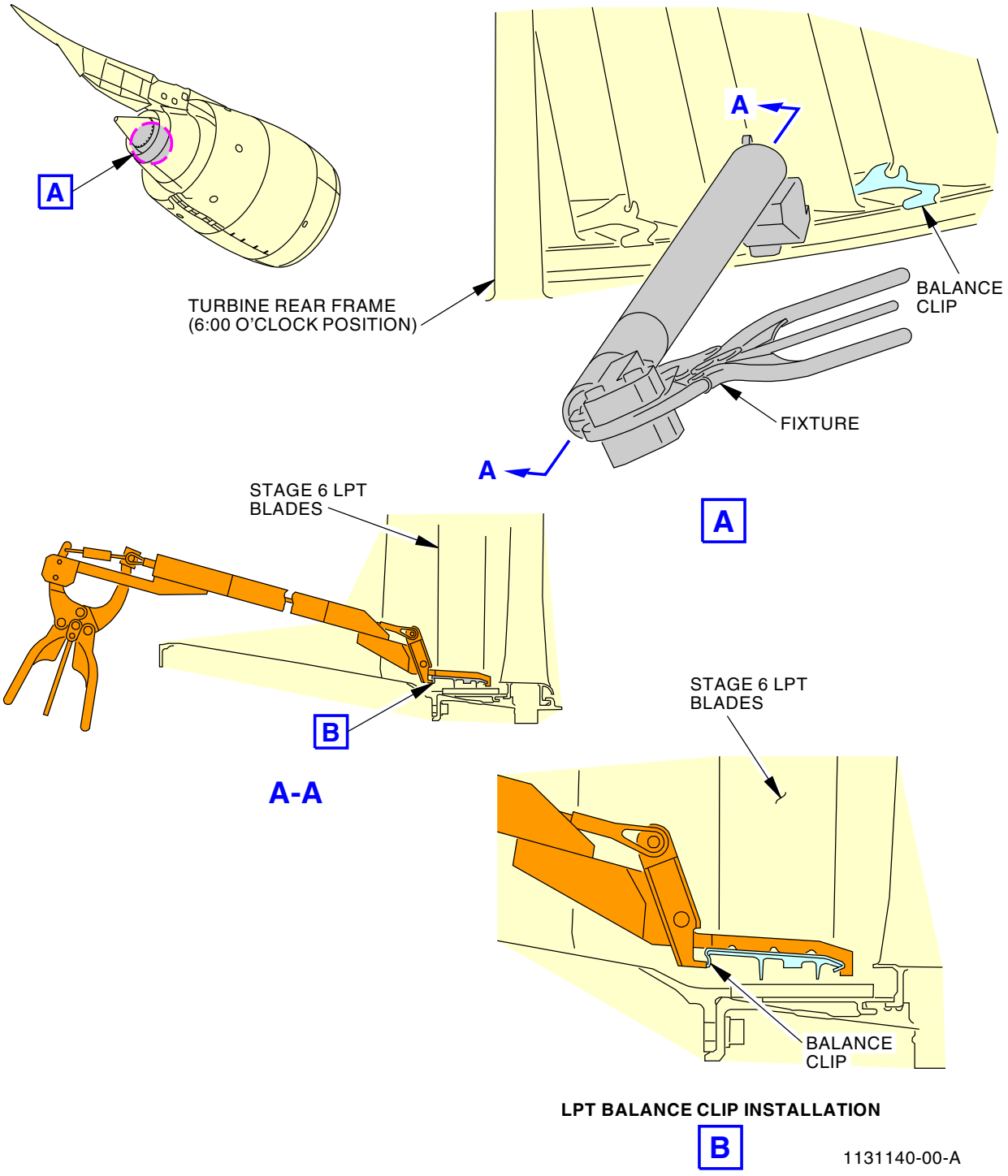

Engine Balancing System (EBS)
Figure 509/71-00-00-990-845-H02 (Sheet 8 of 8)

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TASK 71-00-00-700-812-H01

15. Test No. 13 - Engine Reverse Thrust Lever Interlock Test (MAT Initiated Test)

A. General

(1) This test makes sure that the interlock actuator for the reverse thrust lever operates correctly. This test also makes sure the interlock relay drive circuit and feedback are satisfactory for the two EEC (FADEC) channels.

(2) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

B. References

Reference	Title
27-61-00-740-801	Spoilers System Test (P/B 501)
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Engine Reverse Thrust Lever Interlock Test (MAT initiated Test)

SUBTASK 71-00-00-860-201-H01

(1) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-202-H01

(2) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

SUBTASK 71-00-00-860-203-H01

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-204-H01

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-205-H01

(5) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-206-H01

(6) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-004-H01

(7) Use a maintenance access terminal (MAT) to do the system test of the applicable reverse thrust lever interlock actuator:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE

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2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left or Right Engine
5) SYSTEM TEST
6) Left Engine Reverse Thrust Lever Interlock Test or
7) Right Engine Reverse Thrust Lever Interlock Test
8) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:
1) CONTINUE
2) START TEST

(c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(d) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.
1) If you see an AUTO SPEEDBRAKE EICAS message, do this task: Spoilers System Test, TASK 27-61-00-740-801 and clear the EICAS message.

NOTE: This message can be shown if the speedbrake circuit breakers are opened for the thrust reverser interlock actuator test and then all three hydraulic systems are powered.

SUBTASK 71-00-00-860-207-H01

(8) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-014-H01

(1) Make sure you close all the circuit breakers that you opened.

——— END OF TASK ———

TASK 71-00-00-700-813-H01

16. Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test)

A. General

(1) This test is used to find problems quickly and with less maintenance work than if you ran the engine.

(2) This test is to make sure the EEC (FADEC) can control the fuel driven actuators correctly and they can move through their full range of operation. This test will start automatically during dry motoring. During the test if the FUEL CONTROL switch is moved to RUN, N2 drops below 20%, or the HPSOV opens, the test will stop. This test checks the FMV, VBV, VSV, and the HPTACC.

(3) During this test, you will dry motor the engine.

(4) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

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B. References

Reference	Title
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Engine Fuel Driven Actuator Test (MAT Initiated Test)

SUBTASK 71-00-00-860-208-H01

(1) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-209-H01

(2) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

SUBTASK 71-00-00-860-210-H01

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-211-H01

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-212-H01

(5) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-005-H01

(6) Use a maintenance access terminal (MAT) to do the system test of the applicable engine fuel driven actuator test.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left or Right Engine
5) SYSTEM TEST
6) Left Engine Fuel Driven Actuator Test or
7) Right Engine Fuel Driven Actuator Test
8) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START TEST

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CAUTION

DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. IF YOU OPERATE THE STARTER MORE THAN THE LIMITS, DAMAGE TO THE STARTER WILL OCCUR.

(c) When you are instructed to motor the engine, do a dry motor procedure for two minutes.

1) Do this task: Dry Motor, TASK 71-00-00-800-836-H00.

(d) When the test is completed, make sure you get one of the indications that follow:

1) Make sure PASSED shows adjacent to TEST CONDITION on the MAT.

2) If L ENG EEC CH-A STOPPED TEST, L ENG EEC CH-B STOPPED TEST, R ENG EEC CH-A STOPPED TEST, or R ENG EEC CH-B STOPPED TEST is shown, repeat the test. If the STOPPED TEST message repeats, do this task: Test No. 5 - Idle Leak Check, TASK 71-00-00-700-804-H01.

NOTE: The idle leak check will do a less rigorous but an equivalent check to the Engine Fuel Driven Actuators Test to make sure the replaced LRUs will function correctly.

(e) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-015-H01

(1) Make sure you close all the circuit breakers that you opened.

SUBTASK 71-00-00-860-213-H01

(2) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

——— END OF TASK ———

TASK 71-00-00-700-814-H01

17. Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test)

A. General

(1) This test is to make sure the EEC (FADEC) can control the air driven actuators correctly and they can move through their full range of operation. This test will start automatically after engine is at idle. During the test if the FUEL CONTROL switch is moved to CUTOFF or N2 is not at idle, the test will stop. This test is to make sure the core compartment cooling valve (CCC), the LPT active clearance control valve (LPTACC) and the HPT active clearance control valve (HPTACC) correctly operate.

(2) During this test, you will operate the engine at flight idle power.

(3) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: How to Use the Central Maintenance Computing System (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

B. References

Reference	Title
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)

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(Continued)

Reference	Title
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Engine Air Driven Actuator Test (MAT Initiated Test)

SUBTASK 71-00-00-860-214-H01

(1) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

SUBTASK 71-00-00-860-215-H01

(2) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-216-H01

(3) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-217-H01

(4) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-218-H01

(5) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-006-H01

(6) Use a maintenance access terminal (MAT) to do the system test of the applicable engine air driven actuator Test:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left or Right Engine
5) SYSTEM TEST
6) Left Engine Air Driven Actuator Test or
7) Right Engine Air Driven Actuator Test
8) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START TEST

(c) When you are instructed to start the engine, start the engine.

1) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

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(d) Let the engine become stable at idle for five minutes.

NOTE: Make sure the engine is in a stable condition.

(e) When the MAT instructs you to stop the engine, do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

NOTE: You can shut down the engine from approach idle, if the engine was operated for five minutes at idle.

(f) Make the selection that follows on the MAT to continue the test:

1) CONTINUE

(g) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(h) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

SUBTASK 71-00-00-860-219-H01

(7) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

——— END OF TASK ———

TASK 71-00-00-700-815-H01

18. Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test)

A. General

(1) This test makes sure the engine electrical control circuits operate satisfactorily.

(2) This test makes sure the EEC (FADEC) electrical control circuits operate correctly for the two channels A and B.

(3) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

B. References

Reference	Title
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. EEC Test (MAT Initiated Test)

SUBTASK 71-00-00-860-220-H01

(1) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

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SUBTASK 71-00-00-860-221-H01

(2) Make sure the ADIRU and the SAARU operate.

NOTE: Alignment is not necessary.

SUBTASK 71-00-00-860-222-H01

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-223-H01

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-224-H01

(5) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-225-H01

(6) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-007-H01

(7) Use a maintenance access terminal (MAT) to do the EEC test on the applicable engine.

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left Engine or Right Engine
5) SYSTEM TEST
6) Left Engine Electronic Engine Control Test or
7) Right Engine Electronic Engine Control Test
8) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START TEST

(c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(d) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-016-H01

(1) Make sure you close all the circuit breakers that you opened.

SUBTASK 71-00-00-860-226-H01

(2) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

END OF TASK

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TASK 71-00-00-700-816-H01

19. Test No. 17 - Engine Ignition System Test (MAT Initiated Test)

A. General

(1) This task gives you a visual check and an system (audible) test of the ignition system.

(2) The test lets you command the EEC to energize each ignition circuit. The test makes sure that the igniter, exciter, and the EEC channels operate correctly to supply the electrical power to the ignition system. During the test, if the FUEL CONTROL switch is moved to CUTOFF or the engine HMU HPSOV opens, the test will stop.

(3) You can do the test for the left or the right engine ignition system. To do this test, it is necessary to have another person at the engine to listen for the sound of the igniter fire.

(4) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine

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E. Do the Visual Check

SUBTASK 71-00-00-010-017-H01

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

(1) Do these tasks in sequence to safely open the left thrust reverser on the applicable engine:

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left fan cowl panel, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

(e) For the left thrust reverser, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine

SUBTASK 71-00-00-210-053-H01

(2) Do a visual check of the ignition system components.

(a) Make sure that there is no fraying condition in the wire braid of the ignition system.

(b) Make sure that the cooling air tubes of the ignition leads are serviceable.

F. Prepare for the Engine Ignition System (Audible) Test (MAT Initiated Test)

SUBTASK 71-00-00-860-227-H01

CAUTION DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. IF YOU OPERATE THE STARTER MORE THAN THE LIMITS, DAMAGE TO THE STARTER WILL OCCUR.

(1) If you did not dry-motor the engine before the test, do a dry-motor procedure to remove the remaining fuel in the engine (TASK 71-00-00-800-836-H00).

(a) Stop the engine.

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SUBTASK 71-00-00-940-001-H01

WARNING

DO NOT DO THIS TEST DURING AIRPLANE FUELING, WHEN BUILDINGS OR OTHER AIRPLANES ARE IN THE JET EXHAUST HAZARD AREAS. AVOID HAZARDS SUCH AS FLAMMABLE VAPORS, FUEL OR OIL LEAKAGE ENVIRONMENT DURING IGNITION TESTING. MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET EXHAUST HAZARD AREA FOR GROUND IDLE OF THE APPLICABLE ENGINE. IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER, EXCITERS, AND THE IGNITION LEADS DURING OPERATION. IF YOU DO NOT OBEY THIS INSTRUCTION, YOU CAN BE KILLED.

(2) Make sure that the airplane and adjacent areas are safe, if an accidental tailpipe fire should occur.

SUBTASK 71-00-00-860-228-H01

(3) Make sure that the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

SUBTASK 71-00-00-860-229-H01

(4) For the left engine, make sure that these circuit breakers are closed:

Left Power Management Panel, P110

Row	Col	Number	Name
C	24	C73401	L ENG EEC ALTN PWR CHAN A
E	19	C73403	L ENG EEC ALTN PWR CHAN B

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	2	C73609	L ENG START CTRL
B	3	C80605	L ENG START SW
E	1	C74403	L ENG IGN 1
E	14	C74405	L ENG IGN 2

Standby Power Management Panel, P310

Row	Col	Number	Name
G	3	C76603	L ENG EEC RST/FUEL SPAR
G	5	C76605	L ENG IGN CTRL
G	7	C76607	L ENG FUEL/IGN CTRL

SUBTASK 71-00-00-860-277-H01

(5) For the left engine, make sure that these circuit breakers are open and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2

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SUBTASK 71-00-00-860-230-H01

(6) For the right engine, make sure that these circuit breakers are closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	17	C73610	R ENG START CTRL
B	18	C80606	R ENG START SW
E	2	C74404	R ENG IGN 2
E	15	C74402	R ENG IGN 1

Right Power Management Panel, P210

Row	Col	Number	Name
E	1	C73400	R ENG EEC ALTN PWR CHAN A
E	11	C73402	R ENG EEC ALTN PWR CHAN B

Standby Power Management Panel, P310

Row	Col	Number	Name
G	4	C76602	R ENG EEC RST/FUEL SPAR
G	6	C76604	R ENG IGN CTRL
G	8	C76606	R ENG FUEL/IGN CTRL

SUBTASK 71-00-00-860-278-H01

(7) For the right engine, make sure that these circuit breakers are open and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2

SUBTASK 71-00-00-860-231-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	4	C76601	L ENG FUEL VALVE

SUBTASK 71-00-00-860-232-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-00-860-233-H01

(10) Set these switches on the overhead panel, P5, to the positions that follow (Figure 501):

(a) The ENGINE AUTOSTART switch to the ON position.

(b) The ENGINE L or R START/IGNITION switch to the NORM position.

SUBTASK 71-00-00-860-234-H01

(11) Set the applicable thrust lever to the idle position.

SUBTASK 71-00-00-860-235-H01

(12) Make sure that the L(R) FUEL CONTROL switches on the control stand panel, P10, are in the CUTOFF position.

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SUBTASK 71-00-00-860-236-H01

(13) Make sure that the applicable EEC MAINT L(R) ENG POWER switch on the aft overhead maintenance panel, P61, is in the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-860-237-H01

(14) Use the interphone to speak between persons on the ground and on the flight compartment.

NOTE: One person must stand near the left side of the L(R) engine to listen for the igniter(s) to fire.

G. Do the Engine Ignition System (Audible) Test (MAT Initiated Test)

SUBTASK 71-00-00-860-279-H01

(1) Do the circuit check for the AC bus power and the standby power of the igniter circuit.

NOTE: It is recommended that the audible test to test each igniter twice with the Main AC breaker push IN and the standby breaker pull OUT, and with the Main AC breaker pull OUT and the standby breaker push IN.

(a) Do the steps that follow for the left and right engine igniters:

1) For the left engine igniter 1:

a) First, do the check of the Main AC breaker push IN and standby breaker pull OUT.

<1> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	1	C74403	L ENG IGN 1

<2> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1

b) Second, do the check of the Main AC breaker pull OUT and standby breaker push IN.

<1> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	1	C74403	L ENG IGN 1

<2> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1

2) For the left engine igniter 2:

a) First, do the check of the Main AC breaker push IN and standby breaker pull OUT.

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<1> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	14	C74405	L ENG IGN 2

<2> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	2	C74407	L ENG STBY IGN 2

b) Second, do the check of the Main AC breaker pull OUT and standby breaker push IN.

<1> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	14	C74405	L ENG IGN 2

<2> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	2	C74407	L ENG STBY IGN 2

3) For the right engine igniter 1:

a) First, do the check of the Main AC breaker push IN and standby breaker pull OUT.

<1> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	15	C74402	R ENG IGN 1

<2> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	14	C74400	R ENG STBY IGN 1

b) Second, do the check of the Main AC breaker pull OUT and standby breaker push IN.

<1> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	15	C74402	R ENG IGN 1

<2> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	14	C74400	R ENG STBY IGN 1

4) For the right engine igniter 2:

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a) First, do the check of the Main AC breaker push IN and standby breaker pull OUT.

<1> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	2	C74404	R ENG IGN 2

<2> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	15	C74406	R ENG STBY IGN 2

b) Second, do the check of the Main AC breaker pull OUT and standby breaker push IN.

<1> Open (pull-out) this circuit breaker and install safety tag:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
E	2	C74404	R ENG IGN 2

<2> Remove the safety tag and close (push-in) this circuit breaker:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	15	C74406	R ENG STBY IGN 2

SUBTASK 71-00-00-860-322-H00

(2) For the left engine:

Make sure that these circuit breakers are closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	14	C74405	L ENG IGN 2

SUBTASK 71-00-00-860-321-H00

(3) For the right engine:

Make sure that these circuit breakers are closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	2	C74404	R ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-238-H01

(4) Use a maintenance access terminal (MAT) to do the system test for the applicable No. 1 and No. 2 ignition system.

(a) Make these selections on the MAT main menu:

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1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left Engine or Right Engine
5) SYSTEM TEST
6) Left Engine Ignition System Test or
7) Right Engine Ignition System Test
8) CONTINUE.

(b) Do the instructions that show on the MAT and then make these selections:
1) CONTINUE
2) START TEST.

(c) Put the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to the RUN position.

(d) Continue with the instructions that show on the MAT until the screen requests for EEC channel selection.

(e) Select one of the fourth channels:
1) UPPER CH A
2) LOWER CH A
3) UPPER CH B
4) LOWER CH B

NOTE: The upper or lower CH A or CH B is referred to ignition system 1 or ignition system 2.

5) CONTINUE to start the test.

(f) Use the interphone to speak to the persons on the ground near the engine.

(g) Did the igniter fire?
1) Select YES or NO
2) CONTINUE.

(h) Continue with the instructions that show on the MAT until the screen requests for another ignition circuit and EEC channel test selection.

(i) Do you want to test another ignition circuit and EEC channel?
1) Select YES or NO
2) CONTINUE or STOP TEST.

(j) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(k) If FAILED shows, make sure that there is no maintenance message for the ignition system.
1) If there is a maintenance message for the ignition system, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

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SUBTASK 71-00-00-860-239-H01

(5) After the test results are shown, put the L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-291-H00

(6) For the left engine, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	14	C74405	L ENG IGN 2

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	2	C74404	R ENG IGN 2
E	15	C74402	R ENG IGN 1

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-240-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	4	C76601	L ENG FUEL VALVE

SUBTASK 71-00-00-860-241-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-00-410-017-H01

(3) Make sure that you close all the circuit breakers that you opened.

SUBTASK 71-00-00-860-242-H01

(4) Set the EEC MAINT L(R) ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-00-410-018-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Do these tasks in sequence to safely close the left thrust reverser on the applicable engine:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

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1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-700-817-H01

20. Test No. 18 - Debris Monitoring System Test (MAT Initiated Test)

A. General

(1) Test No. 18 is for airplanes that use the Debris Monitoring System (DMS) to detect the debris in the oil system. To use this test, the EEC (FADEC) software of the Debris Monitoring System (DMS) must be activated.

(2) This test is to make sure the Debris Monitoring System (DMS) is healthy and checks to see if debris was detected.

(3) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: (How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808).

B. References

Reference	Title
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Debris Monitoring System Test (MAT Initiated Test)

SUBTASK 71-00-00-860-243-H01

(1) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-244-H01

(2) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

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SUBTASK 71-00-00-860-245-H01

(3) Set the applicable ENGINE L(R) START/IGNITION switch on the overhead panel, P5, to NORM.

SUBTASK 71-00-00-860-246-H01

(4) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

SUBTASK 71-00-00-860-247-H01

(5) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the test.

SUBTASK 71-00-00-740-008-H01

(6) Use a maintenance access terminal (MAT) to do the system test of the applicable Debris Monitoring System (DMS) test:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Left or Right Engine
5) SYSTEM TEST
6) Left Debris Monitoring System (DMS) Test or
7) Right Debris Monitoring System (DMS) Test
8) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START TEST

(c) When the test is completed, make sure that PASSED shows adjacent to TEST CONDITION on the MAT.

(d) If FAILED shows, refer to the applicable Maintenance Message Index in the FIM or select the maintenance message and select MAINTENANCE MESSAGE DATA.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-248-H01

(1) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

——— END OF TASK ———

TASK 71-00-00-700-818-H01

21. Test No. 19 - Variable Stator Vane Operational Test (MAT Initiated test)

A. General

(1) This procedure is used to move the HPC Variable Stator Vanes (VSV) to a more open position and the Variable Bypass Valves (VBV) to a more closed position. This allows you to do the borescope of the HPC stages 1-5 easier or to position the VSVs and VBVs for engine gas path cleaning.

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(2) This function has a set of conditions for the airplane which you must do to make this function operate. Instructions on the display tell you what those conditions are. The engine must be dry motored to move the VSVs and VBVs.

(3) If you use this procedure to do an engine gas path cleaning, it is not necessary to open the thrust reversers.

(4) A maintenance access terminal is necessary for this procedure. For instructions on how to use a maintenance access terminal, do this task: How to Use the Central Maintenance Computing System, TASK 45-10-00-740-808.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
34-33-00-710-801	Radio Altimeter System - Operational Test (P/B 501)
45-10-00-740-808	How to Use the Central Maintenance Computing System (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. Access Panels

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

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E. Prepare for the Variable Stator Vanes Operational Test

SUBTASK 71-00-00-010-018-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-860-249-H01

(2) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-00-860-250-H01

(3) Make sure the three low range radio altimeters operate, (Radio Altimeter System - Operational Test, TASK 34-33-00-710-801).

SUBTASK 71-00-00-860-251-H01

(4) Make sure the ENGINE AUTOSTART switch on the overhead panel, P5, is set to the ON position.

SUBTASK 71-00-00-860-252-H01

CAUTION MAKE SURE YOU OPEN ALL EIGHT CIRCUIT BREAKERS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, THE FUEL COULD IGNITE AND AN ENGINE OVERTEMPERATURE COULD OCCUR.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-253-H01

(6) Set the applicable FUEL L(R) PUMPS FWD and AFT switches on the overhead panel, P5, to the OFF position.

SUBTASK 71-00-00-860-254-H01

(7) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the special function.

SUBTASK 71-00-00-860-255-H01

(8) Set the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

F. Variable Stator Vanes (VSV) Operational Test Procedure

SUBTASK 71-00-00-740-009-H01

(1) Use a maintenance access terminal (MAT) to do the special functions for the applicable engine:

(a) Make these selections on the MAT main menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Left or Right Engine
5) Left Engine VSV Opening for Maintenance Special Function or
6) Right Engine VSV Opening for Maintenance Special Function
7) CONTINUE

(b) Do the instructions that show on the MAT and then make these selections:

1) CONTINUE
2) START FUNCTION
3) CONTINUE

CAUTION

DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. IF YOU OPERATE THE STARTER MORE THAN THE LIMITS, DAMAGE TO THE STARTER WILL OCCUR.

(c) When you are instructed to motor the engine, do a dry motor procedure for thirty seconds.

1) Do this task: Dry Motor, TASK 71-00-00-800-836-H00.

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(d) If STOPPED shows adjacent to the FUNCTION CONDITION, look at the CAUSE.

1) If a member system stopped the function, select TO START FUNCTION.

NOTE: The MAT shows instructions to let the function operate.

(e) Do the instructions that show on the MAT display.

(f) Select CONTINUE.

(g) Make a different selection on the MAT main menu to exit the special function.

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-860-256-H01

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-00-860-257-H01

(2) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-00-410-019-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-700-819-H01

22. Test No. 20 - CCC and LPTACC Functional Test

A. General

(1) This test is to make sure that the CCC and LPTACC valves are functioning normally.

NOTE: Test No. 15 - Engine Air Driven Actuator TEST (MAT Initiated Test) is the preferred test procedure. This test is an alternate.

(2) During the test you will operate the engine at idle power.

B. References

Reference	Title
31-61-00-800-804	Showing a Maintenance Page (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

D. CCC and LPTACC Functional Test

SUBTASK 71-00-00-010-019-H01

(1) Set the applicable EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

(a) Wait 30 seconds before you start the special function.

SUBTASK 71-00-00-010-020-H01

(2) Go to the engine indicating and crew alerting system (EICAS) electronic propulsion control system (EPCS) page 2 display (TASK 31-61-00-800-804).

SUBTASK 71-00-00-010-021-H01

(3) For the core compartment cooling valve feedback switch or core compartment cooling valve repair or replaced, verify the parameter CCC is “OPEN”.

SUBTASK 71-00-00-010-022-H01

(4) For the LPTACC valve feedback switch or LPTACC Valve repair or replaced, verify the parameter LPTACC is “CLOSED”.

SUBTASK 71-00-00-010-023-H01

(5) For the core compartment cooling valve repair or replaced, start the engine and let the engine stabilize at idle for 5 minutes.

(a) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(b) Go to the EICAS page 2 display and verify the parameter CCC is “OPEN”.

(c) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

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SUBTASK 71-00-00-010-024-H01

(6) For the LPTACC valve repair or replaced, start the engine and let the engine stabilize at idle for 5 minutes.

(a) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(b) Go to the EICAS EPCS page 2 display and verify the parameter LPT ACC is “CLOSED”.

(c) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-263-H01

(1) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

——— END OF TASK ———

TASK 71-00-00-700-822-H00

23. Test No. 21 - High-Power Leak Check

A. General

(1) This task provides the instructions on how to do a high-power leak check.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-71-00-700-801-H01	Engine Vents and Drains Examination (P/B 601)
73-11-05-400-801-H01	Fuel Nozzle Installation (P/B 401)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-15976	Fixture - Leak Check Part #: 9C3184 Supplier: 06083
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

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D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
411	Engine, Left
421	Engine, Right

F. Access Panels

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

G. Prepare for the Test

SUBTASK 71-00-00-010-026-H00

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-110-001-H00

(2) Clean the main and aft skirt panels of the heat shield and the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-840-008-H00

(3) Put the individual 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to each line at the drain mast below the power plant.

SUBTASK 71-00-00-480-009-H00

(4) Attach a plastic bag, STD-92 on the drain mast lines and tighten it with a plastic tie, or install the leak check fixture, SPL-15976 on the drain mast below the power plant.

H. High Power Leak Check

SUBTASK 71-00-00-860-302-H00

WARNING MAKE SURE THAT YOU CAN APPLY FULL BRAKE FORCE TO THE AIRPLANE. IF THE BRAKE IS NOT ON, ENGINE THRUST CAN MOVE THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(a) Maintain the hydraulic, pneumatic, and electrical power to the airplane.

SUBTASK 71-00-00-860-303-H00

(2) Let the engine become stable at idle for five minutes.

SUBTASK 71-00-00-860-304-H00

(3) Move the thrust lever to 70% N1.

SUBTASK 71-00-00-860-305-H00

(4) Let the engine become stable at 70% N1 for three minutes.

SUBTASK 71-00-00-860-306-H00

(5) Move the thrust lever slowly to idle.

SUBTASK 71-00-00-860-307-H00

(6) Let the engine stay at idle for ten minutes.

SUBTASK 71-00-00-860-308-H00

(7) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-010-027-H00

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

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(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-210-085-H00

(9) Examine the applicable component or system for sign of fluid leakage.

(a) If you find leakage, repair or replace the tubes, tube flanges, fittings or components as it is necessary.

(b) Examine the drain mast lines for leakage.

1) Remove the plastic bag, STD-92 from the drain mast lines.

2) Put the collected fluid from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194. Refer to Engine Vents and Drains Examination, TASK 71-71-00-700-801-H01 for Drain Mast - Leakage Limits and the Corrective Action.

3) If necessary, remove and empty the fluid from the leak check fixture, SPL-15976.

(c) If you do the leak check after AGB LRU replacement, make sure you do an inspection of the AGB LRU interface area for any sign of fresh leakage.

(d) If you have a fuel leak at the fuel manifold B-nut:

1) Check the B-nut surfaces for high metal.

a) If necessary, polish to remove the high metal.

NOTE: Fuel nozzle preformed packing is a secondary seal surface and does not prevent fuel leakage. Replace the fuel nozzle preformed packing only if there are nicks or cuts.

2) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-H01).

(e) Look at the cases for oil and fuel stains.

(f) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

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I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-022-H00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-00-00-700-823-H00

24. Test No. 22 - Seal Break-In Run Test

A. General

(1) This procedure gives instructions for run-in of new engine seals.

(2) This test is necessary only if the replacement engine has not been tested before (untested engine).

(3) It is not necessary for engine to be tested by this procedure if new seals have not been installed even if other minor repairs have been done. Engines that have new LPT shrouds or interstage seals, HPT interstage seal, or HPC interstage seals, or internal compressor discharge pressure (CDP) seal installed should do this procedure.

(4) This procedure will correctly run-in the seals without damage to the seal teeth of the stationary seal surfaces.

(a) If you stop the break-in run, you must do the complete break-in run again.

(b) If high vibration is occurs, do a trim balance as necessary to decrease the vibration.

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B. References

Reference	Title
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1116	Thermometer - Alcohol (Mercury),-40 to +125 Degrees F (-40 to +49 Degrees C)

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Seal Break-In Run Test

SUBTASK 71-00-00-700-001-H00

(1) Get the outside air temperature (OAT) with a thermometer, STD-1116 as follows:

(a) Take the temperature reading in the shade area of the airplane.

(b) Use the thermometer reading to find the necessary power settings given in the step(s) below.

(c) Adjust the N1% value as follows:

NOTE: The N1% value needs to be adjusted in below step(s) because of the outside air temperature (OAT) effect.

1) Follow the OAT reading line until it intersects the N1% column of the value necessary in the procedure, which is shown at the top of Table 511.

NOTE: For example, for an OAT of 0 Celsius (32 Fahrenheit), 95% N1 adjusted value is 92.5 %.

SUBTASK 71-00-00-700-002-H00

(2) FOR THE GE90-110B1 ENGINES; To complete the break-in, do the steps that follow:

NOTE: This step is used for the airplanes with GE90-110B1 engines rating.

NOTE: Accelerate only to the highest rating for which the engine is to be tested and used.

(a) Accelerate to 95% N1, and hold for five seconds, then decelerate to 89.2% N1.

1) Hold stable for 105 seconds and take a reading.

(b) Accelerate to 95.0 % N1, and hold for five seconds, then decelerate to 92.0 % N1.

1) Hold stable for 105 seconds and take a reading.

(c) Accelerate to 97.1 % N1, and hold for five seconds, then decelerate to 95.0 % N1.

1) Hold stable for 105 seconds and take a reading.

(d) Accelerate to 98.6 % N1, and hold for five seconds, then decelerate to 97.1 % N1.

1) Hold stable for 105 seconds and take a reading.

(e) Accelerate to 99.7 % N1, and hold for five seconds, then decelerate to 98.6 % N1.

1) Hold stable for 105 seconds and take a reading.

(f) Accelerate to 99.7 % N1, and hold stable for 105 seconds and take a reading.

(g) Do a two minute deceleration to 81.4 % N2 and hold for 15 minutes.

(h) Do a 30 second acceleration to 105.0 % N2 and hold for two minutes.

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1) Do a fast deceleration to 81.4 % N2 and hold for 15 minutes.

(i) Do a 30 second acceleration to 111.4 % N2 and hold for two minutes.

1) Do a fast deceleration to 81.4 % N2 and hold for 15 minutes.

NOTE: If the engine does not reach 111.4 % N2 before reaching 99.7 % N1, the 111.4 % N2 point is not necessary.

(j) Do a 30 second acceleration to 99.7 % N1 and hold for two minutes.

1) Do a fast deceleration to 81.4 % N2 and hold for 20 minutes.

(k) Do a two minute acceleration to 99.7 % N1 and hold for 30 seconds

(l) Do a two minute deceleration to idle and hold stable at idle for five minutes, then accelerate to 81.4 % and hold it for five minutes.

(m) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-00-700-003-H00

(3) FOR THE GE90-115B ENGINES; To complete the break-in, do the steps that follow:

NOTE: This step is used for the airplanes with GE90-115B engine rating.

NOTE: Accelerate only to the highest rating for which the engine is to be tested and used.

(a) Accelerate to 95% N1, and hold for five seconds, then decelerate to 89.2 % N1.

1) Hold stable for 105 seconds and take a reading.

(b) Accelerate to 95.0 % N1, and hold for five seconds, then decelerate to 92.0 % N1.

1) Hold stable for 105 seconds and take a reading.

(c) Accelerate to 97.1 % N1, and hold for five seconds, then decelerate to 95.0 % N1.

1) Hold stable for 105 seconds and take a reading.

(d) Accelerate to 98.6 % N1, and hold for five seconds, then decelerate to 97.1 % N1.

1) Hold stable for 105 seconds and take a reading.

(e) Accelerate to 99.7 % N1, and hold for five seconds, then decelerate to 98.5 % N1.

1) Hold stable for 105 seconds and take a reading.

(f) Accelerate to 101.0 % N1, and hold for five seconds, then decelerate to 99.7 % N1.

1) Hold stable for 105 seconds and take a reading.

(g) Accelerate to 102.5 % N1, and hold for five seconds, then decelerate to 101.0 % N1.

1) Hold stable for 105 seconds and take a reading.

(h) Accelerate to 103.9 % N1, and hold for five seconds, then decelerate to 102.5 % N1.

1) Hold stable for 105 seconds and take a reading.

(i) Accelerate to 103.9 % N1, and hold stable for 105 seconds and take a reading.

(j) Do a two minute deceleration to 81.4 % N2 and hold for 15 minutes.

(k) Do a 30 second acceleration to 105.0 % N2 and hold for two minutes.

1) Do a fast deceleration to 81.4 % N2 and hold for 15 minutes.

(l) Do a 30 second acceleration to 111.4 % N2 and hold for two minutes.

1) Do a fast deceleration to 81.4 % N2 and hold for 15 minutes.

NOTE: If the engine does not go to 111.4 % N2 before it goes to 103.9 % N1, the 111.4 % N2 point is not necessary.

(m) Do a 30 second acceleration to 103.9 % N1 and hold for two minutes.

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1) Do a fast deceleration to 81.4 % N2 and hold for 20 minutes.

(n) Do a two minute acceleration to 103.9 % N1 and hold for 30 seconds.

(o) Do a two minute deceleration to idle and hold stable at idle for five minutes, then accelerate to 81.4 % and hold it for five minutes.

(p) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

Table 511/71-00-00-993-839-H00

Temp (Deg C)	Temp (Deg F)	55.2%	67.9%	76.25%	84.1%	89.2%	92.0%	95.0%	97.1%	97.7%	98.6%	99.7%	101.0%	102.5%	103.9%
-30	-22	50.7	62.4	70.0	77.3	81.9	84.5	87.3	89.2	89.7	90.6	91.6	92.8	94.2	95.4
-29	-20.2	50.8	62.5	70.1	77.4	82.1	84.7	87.5	89.4	89.9	90.8	91.8	93.0	94.4	95.6
-28	-18.4	50.9	62.7	70.3	77.6	82.2	84.9	87.7	89.5	90.1	90.9	92.0	93.2	94.6	95.8
-27	-16.6	51.0	62.8	70.4	77.7	82.4	85.0	87.8	89.7	90.3	91.1	92.2	93.4	94.8	96.0
-26	-14.8	51.1	62.9	70.6	77.9	82.6	85.2	88.0	89.9	90.4	91.3	92.3	93.6	95.0	96.2
-25	-13	51.2	63.0	70.7	78.1	82.8	85.4	88.2	90.1	90.6	91.5	92.5	93.7	95.2	96.4
-24	-11.2	51.3	63.2	70.8	78.2	82.9	85.6	88.4	90.3	90.8	91.7	92.7	93.9	95.4	96.6
-23	-9.4	51.4	63.3	71.0	78.4	83.1	85.7	88.5	90.4	91.0	91.9	92.9	94.1	95.5	96.8
-22	-7.6	51.5	63.4	71.1	78.5	83.3	85.9	88.7	90.6	91.2	92.1	93.1	94.3	95.7	97.0
-21	-5.8	51.6	63.6	71.3	78.7	83.4	86.1	88.9	90.8	91.4	92.2	93.3	94.5	95.9	97.2
-20	-4	51.7	63.7	71.4	78.8	83.6	86.2	89.1	91.0	91.5	92.4	93.5	94.7	96.1	97.4
-19	-2.2	51.8	63.8	71.5	79.0	83.7	86.4	89.2	91.2	91.7	92.6	93.6	94.9	96.3	97.6
-18	-0.4	51.9	63.9	71.7	79.2	83.9	86.6	89.4	91.3	91.9	92.8	93.8	95.1	96.5	97.8
-17	1.4	52.0	64.1	71.8	79.3	84.1	86.8	89.6	91.5	92.1	93.0	94.0	95.2	96.7	98.0
-16	3.2	52.1	64.2	72.0	79.5	84.2	86.9	89.8	91.7	92.3	93.1	94.2	95.4	96.9	98.2
-15	5	52.2	64.3	72.1	79.6	84.4	87.1	89.9	91.9	92.4	93.3	94.4	95.6	97.1	98.3
-14	6.8	52.4	64.4	72.2	79.8	84.6	87.3	90.1	92.1	92.6	93.5	94.6	95.8	97.3	98.5
-13	8.6	52.5	64.6	72.4	79.9	84.7	87.4	90.3	92.2	92.8	93.7	94.7	96.0	97.4	98.7
-12	10.4	52.6	64.7	72.5	80.1	84.9	87.6	90.5	92.4	93.0	93.9	94.9	96.2	97.6	98.9
-11	12.2	52.7	64.8	72.7	80.2	85.1	87.8	90.6	92.6	93.2	94.0	95.1	96.4	97.8	99.1
-10	14	52.8	64.9	72.8	80.4	85.2	87.9	90.8	92.8	93.3	94.2	95.3	96.5	98.0	99.3
-9	15.8	52.9	65.0	72.9	80.5	85.4	88.1	91.0	92.9	93.5	94.4	95.5	96.7	98.2	99.5
-8	17.6	53.0	65.2	73.1	80.7	85.5	88.3	91.2	93.1	93.7	94.6	95.6	96.9	98.4	99.7
-7	19.4	53.1	65.3	73.2	80.8	85.7	88.4	91.3	93.3	93.9	94.8	95.8	97.1	98.6	99.9
-6	21.2	53.2	65.4	73.3	81.0	85.9	88.6	91.5	93.5	94.0	94.9	96.0	97.3	98.7	100.0
-5	23	53.3	65.5	73.5	81.1	86.0	88.8	91.7	93.6	94.2	95.1	96.2	97.5	98.9	100.2
-4	24.8	53.4	65.7	73.6	81.3	86.2	88.9	91.8	93.8	94.4	95.3	96.4	97.6	99.1	100.4
-3	26.6	53.4	65.8	73.8	81.4	86.3	89.1	92.0	94.0	94.6	95.5	96.5	97.8	99.3	100.6

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Table 511/71-00-00-993-839-H00 (Continued)

Temp (Deg C)	Temp (Deg F)	55.2%	67.9%	76.25%	84.1%	89.2%	92.0%	95.0%	97.1%	97.7%	98.6%	99.7%	101.0%	102.5%	103.9%
-2	28.4	53.5	65.9	73.9	81.6	86.5	89.3	92.2	94.2	94.7	95.6	96.7	98.0	99.5	100.8
-1	30.2	53.6	66.0	74.0	81.8	86.7	89.4	92.4	94.3	94.9	95.8	96.9	98.2	99.7	101.0
0	32	53.7	66.1	74.2	81.9	86.8	89.6	92.5	94.5	95.1	96.0	97.1	98.4	99.8	101.2
1	33.8	53.8	66.3	74.3	82.0	87.0	89.8	92.7	94.7	95.3	96.2	97.3	98.5	100.0	101.4
2	35.6	53.9	66.4	74.4	82.2	87.1	89.9	92.9	94.9	95.4	96.3	97.4	98.7	100.2	101.5
3	37.4	54.0	66.5	74.6	82.3	87.3	90.1	93.0	95.0	95.6	96.5	97.6	98.9	100.4	101.7
4	39.2	54.1	66.6	74.7	82.5	87.5	90.2	93.2	95.2	95.8	96.7	97.8	99.1	100.6	101.9
5	41	54.2	66.8	74.8	82.6	87.6	90.4	93.4	95.4	96.0	96.9	98.0	99.3	100.8	102.1
6	42.8	54.3	66.9	75.0	82.8	87.8	90.6	93.5	95.5	96.1	97.0	98.1	99.4	100.9	102.3
7	44.6	54.4	67.0	75.1	82.9	87.9	90.7	93.7	95.7	96.3	97.2	98.3	99.6	101.1	102.5
8	46.4	54.5	67.1	75.2	83.1	88.1	90.9	93.9	95.9	96.5	97.4	98.5	99.8	101.3	102.6
9	48.2	54.6	67.2	75.4	83.2	88.2	91.1	94.0	96.1	96.6	97.6	98.7	100.0	101.5	102.8
10	50	54.7	67.3	75.5	83.4	88.4	91.2	94.2	96.2	96.8	97.7	98.8	100.1	101.7	103.0
11	51.8	54.8	67.5	75.6	83.5	88.6	91.4	94.4	96.4	97.0	97.9	99.0	100.3	101.8	103.2
12	53.6	54.9	67.6	75.8	83.7	88.7	91.5	94.5	96.6	97.2	98.1	99.2	100.5	102.0	103.4
13	55.4	55.0	67.7	75.9	83.8	88.9	91.7	94.7	96.7	97.3	98.3	99.4	100.7	102.2	103.5
14	57.2	55.1	67.8	76.0	84.0	89.0	91.9	94.9	96.9	97.5	98.4	99.5	100.8	102.4	103.7
15	59	55.2	67.9	76.2	84.1	89.2	92.0	95.0	97.1	97.7	98.6	99.7	101.0	102.5	103.9
16	60.8	55.3	68.1	76.3	84.3	89.3	92.2	95.2	97.2	97.8	98.8	99.9	101.2	102.7	104.1
17	62.6	55.4	68.2	76.4	84.4	89.5	92.3	95.4	97.4	98.0	98.9	100.0	101.4	102.9	104.3
18	64.4	55.5	68.3	76.6	84.6	89.6	92.5	95.5	97.6	98.2	99.1	100.2	101.5	103.1	104.4
19	66.2	55.6	68.4	76.7	84.7	89.8	92.7	95.7	97.7	98.3	99.3	100.4	101.7	103.3	104.6
20	68	55.7	68.5	76.8	84.8	89.9	92.8	95.9	97.9	98.5	99.5	100.6	101.9	103.4	104.8
21	69.8	55.8	68.6	77.0	85.0	90.1	93.0	96.0	98.1	98.7	99.6	100.7	102.1	103.6	105.0
22	71.6	55.9	68.8	77.1	85.1	90.2	93.1	96.2	98.2	98.8	99.8	100.9	102.2	103.8	105.2
23	73.4	56.0	68.9	77.2	85.3	90.4	93.3	96.3	98.4	99.0	100.0	101.1	102.4	104.0	105.3
24	75.2	56.1	69.0	77.4	85.4	90.6	93.4	96.5	98.6	99.2	100.1	101.2	102.6	104.1	105.5
25	77	56.2	69.1	77.5	85.6	90.7	93.6	96.7	98.7	99.3	100.3	101.4	102.8	104.3	105.7
26	78.8	56.2	69.2	77.6	85.7	90.9	93.8	96.8	98.9	99.5	100.5	101.6	102.9	104.5	105.9
27	80.6	56.3	69.3	77.7	85.9	91.0	93.9	97.0	99.1	99.7	100.6	101.8	103.1	104.7	106.0
28	82.4	56.4	69.5	77.9	86.0	91.2	94.1	97.2	99.2	99.8	100.8	101.9	103.3	104.8	106.2
29	84.2	56.5	69.6	78.0	86.1	91.3	94.2	97.3	99.4	100.0	101.0	102.1	103.4	105.0	106.4
30	86	56.6	69.7	78.1	86.3	91.5	94.4	97.5	99.6	100.2	101.1	102.3	103.6	105.2	106.6

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Table 511/71-00-00-993-839-H00 (Continued)

Temp (Deg C)	Temp (Deg F)	55.2%	67.9%	76.25%	84.1%	89.2%	92.0%	95.0%	97.1%	97.7%	98.6%	99.7%	101.0%	102.5%	103.9%
31	87.8	56.7	69.8	78.3	86.4	91.6	94.5	97.6	99.7	100.3	101.3	102.4	103.8	105.4	106.2
32	89.6	56.8	69.9	78.4	86.6	91.8	94.7	97.8	99.9	100.5	101.5	102.6	104.0	105.5	105.8
33	91.4	56.9	70.0	78.5	86.7	91.9	94.8	98.0	100.1	100.7	101.6	102.8	104.1	105.5	105.5
34	93.2	57.0	70.1	78.6	86.8	92.1	95.0	98.1	100.2	100.8	101.8	102.9	104.3	105.0	105.0
35	95	57.1	70.3	78.8	87.0	92.2	95.2	98.3	100.4	101.0	102.0	103.1	104.5	104.5	104.5
36	96.8	57.2	70.4	78.9	87.1	92.4	95.3	98.4	100.5	101.2	102.1	103.3	103.9	103.9	103.9
37	98.6	57.3	70.5	79.0	87.3	92.5	95.5	98.6	100.7	101.3	102.3	103.4	103.4	103.4	103.4
38	100.4	57.4	70.6	79.2	87.4	92.7	95.6	98.8	100.9	101.5	102.5	102.8	102.8	102.8	102.8
39	102.2	57.5	70.7	79.3	87.6	92.8	95.8	98.9	101.0	101.7	102.2	102.2	102.2	102.2	102.2
40	104	57.5	70.8	79.4	87.7	93.0	95.9	99.1	101.2	101.6	101.6	101.6	101.6	101.6	101.6
41	105.8	57.6	70.9	79.5	87.8	93.1	96.1	99.2	101.1	101.1	101.1	101.1	101.1	101.1	101.1
42	107.6	57.7	71.1	79.7	88.0	93.3	96.2	99.4	100.8	100.8	100.8	100.8	100.8	100.8	100.8
43	109.4	57.8	71.2	79.8	88.1	93.4	96.4	99.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5
44	111.2	57.9	71.3	79.9	88.3	93.6	96.5	99.7	100.2	100.2	100.2	100.2	100.2	100.2	100.2
45	113	58.0	71.4	80.0	88.4	93.7	96.7	99.9	99.8	99.8	99.8	99.8	99.8	99.8	99.8
46	114.8	58.1	71.5	80.2	88.5	93.8	96.8	99.5	99.5	99.5	99.5	99.5	99.5	99.5	99.5
47	116.6	58.2	71.6	80.3	88.7	94.0	97.0	99.2	99.2	99.2	99.2	99.2	99.2	99.2	99.2
48	118.4	58.3	71.7	80.4	88.8	94.1	97.1	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9
49	120.2	58.4	71.8	80.5	88.9	94.3	97.3	98.6	98.6	98.6	98.6	98.6	98.6	98.6	98.6
50	122	58.5	71.9	80.7	89.1	94.4	97.4	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3

END OF TASK

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POWER PLANT - INSPECTION/CHECK

1. General

A. This procedure has eleven tasks:

(1) An inspection of the engine if a stall or possible stall occurred

(2) An inspection of the engine if a birdstrike occurred.

(3) An inspection of the engine for Foreign Object Damage (FOD)

(4) A no or low oil pressure inspection

(5) An in-flight windmilling inspection

(6) An overspeed inspection

(7) An overtemperature inspection

(8) An inspection of the engine for volcanic ash ingestion

(9) An inspection of the engine for heavy sand ingestion

(10) An inspection of the engine for exposure to fire and extinguishing agents

(11) An over maximum vibration inspection

TASK 71-00-00-200-801-H01

2. Engine Stall Inspection

A. General

(1) This task is an internal engine inspection for stall or possible stall damage.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
45-10-00-740-817	How to Find Maintenance Messages from the Present Leg that are not Correlated (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-290-803-H01	High Pressure Compressor Section Rotor Inspection (P/B 601)
72-00-00-290-806-H01	High Pressure Turbine Section Rotor (Stage 1 and 2 blades), Stage 2 Nozzle and Stage 2 Shroud Inspection (P/B 601)
72-00-00-290-807-H01	Low Pressure Turbine Section Rotor Inspection (P/B 601)
72-21-00-200-803-H01	Fan Blade (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-02-020-803-H01	One Fan Blade Removal (P/B 401)
72-21-02-400-803-H01	One Fan Blade Installation (P/B 401)
72-23-00-200-802-H00	Fan Hub Frame IGV Guide Pads Inspection (P/B 601)
72-24-00-200-802-H01	Fan Abradable Shroud Inspection (P/B 601)
72-30-00-200-801-H01	High Pressure Compressor Section (HPC) Inspection (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)

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(Continued)

Reference	Title
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
79-21-04-210-801-H01	Scavenge Oil Inlet Screens Inspection (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Prepare for the Inspection

SUBTASK 71-00-00-010-001-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine

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(Continued)

Number	Name/Location
426AR	Right Thrust Reverser, Right Engine

F. Engine Stall Inspection

SUBTASK 71-00-00-210-055-H01

(1) Examine the fan abradable paint stripe (TASK 72-24-00-200-802-H01).

(a) Examine the fan abradable paint stripe forward of the fan blades for rub indications (TASK 72-24-00-200-802-H01)(Figure 601).

(b) If there is an indication of fan blade rub, examine the fan blade tip for delamination (TASK 72-21-00-200-803-H01).

(c) The Continue-In-Service (CIS) limit for the fan abradable with indication of a fan blade rub is 10 cycles with these conditions:

1) The fan blade rub is not 360 degrees.

2) The fan blade rub does not extend into the backing plate.

3) The fan blade rub does not extend beyond the paint stripe leading edge.

SUBTASK 71-00-00-210-056-H01

(2) Examine the fan blade tip for delamination (TASK 72-21-00-200-803-H01).

(a) No fan blade tip delamination is permitted.

1) If fan blade tip delamination is found, replace the fan blade. These are the tasks: (TASK 72-21-02-020-803-H01 and TASK 72-21-02-400-803-H01).

(b) The Continue-In-Service (CIS) limit for a fan blade with tip delamination is 10 cycles with these conditions:

1) The delamination length is not more than 17.0 inches (431.8 mm).

2) There are no delamination of the fan blades on the other aircraft engine.

NOTE: The CIS limit is for one engine in a dual engine event.

SUBTASK 71-00-00-290-001-H01

(3) Examine the stage 1, 5, and 8 of the high pressure compressor (HPC) blades with a borescope (TASK 72-00-00-290-803-H01) Figure 602.

(a) Carefully examine the stage 5 blade tips. If the stage 5 blade tips have burrs (rough edge or a sharp protrusion on the edge or surface of the parent material) or curled metal on the concave and convex sides, do the step that follows:

1) Do a borescope in Area "L" (the lower 25% of airfoil) of the stage 5 and 6 blades for cracks. Carefully examine the trailing edge area.

2) No cracks are permitted. If cracks are not seen, do the borescope again after 500 cycles. If cracks are not seen after 500 cycles, stall inspection of the stage 5 and 6 blades are not necessary unless another stall occurs.

SUBTASK 71-00-00-290-002-H01

(4) Examine the high pressure turbine (HPT) stage one blades with a borescope (TASK 72-00-00-290-806-H01).

SUBTASK 71-00-00-290-003-H01

(5) Examine the aft side of the stage one low pressure turbine (LPT) stage one blades with a borescope (TASK 72-00-00-290-807-H01).

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SUBTASK 71-00-00-210-001-H01

(6) Use the Maintenance Access Terminal (MAT) to do a check for a debris monitoring system (DMS) maintenance messages (TASK 45-10-00-740-817).

SUBTASK 71-00-00-280-001-H01

(7) Examine the magnetic plug in the scavenge inlet screen for metal flakes (Scavenge Oil Inlet Screens Inspection, TASK 79-21-04-210-801-H01).

NOTE: Abnormal material collected by the magnetic plug should be evaluated for distress of oil wetted parts.

SUBTASK 71-00-00-200-005-H00

(8) Do an inspection of the Variable Stator Vane (VSV) system hardware (TASK 72-30-00-200-801-H01) in or less than 10 cycles. Give special attention to the VSV guide pads:

(a) Inlet Guide Vane (IGV) and VSV actuation rings.

(b) VSV guide pads.

(c) Lever arms and bushings.

(d) Connector links.

(e) VSV actuation shaft.

SUBTASK 71-00-00-200-006-H00

(9) Do an inspection of the fan hub frame IGV guide pads (TASK 72-23-00-200-802-H00) in or less than 10 cycles.

SUBTASK 71-00-00-210-002-H01

(10) To find the cause of the engine stall, refer to the FIM Observed Faults section.

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-001-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

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(Continued)

Number	Name/Location
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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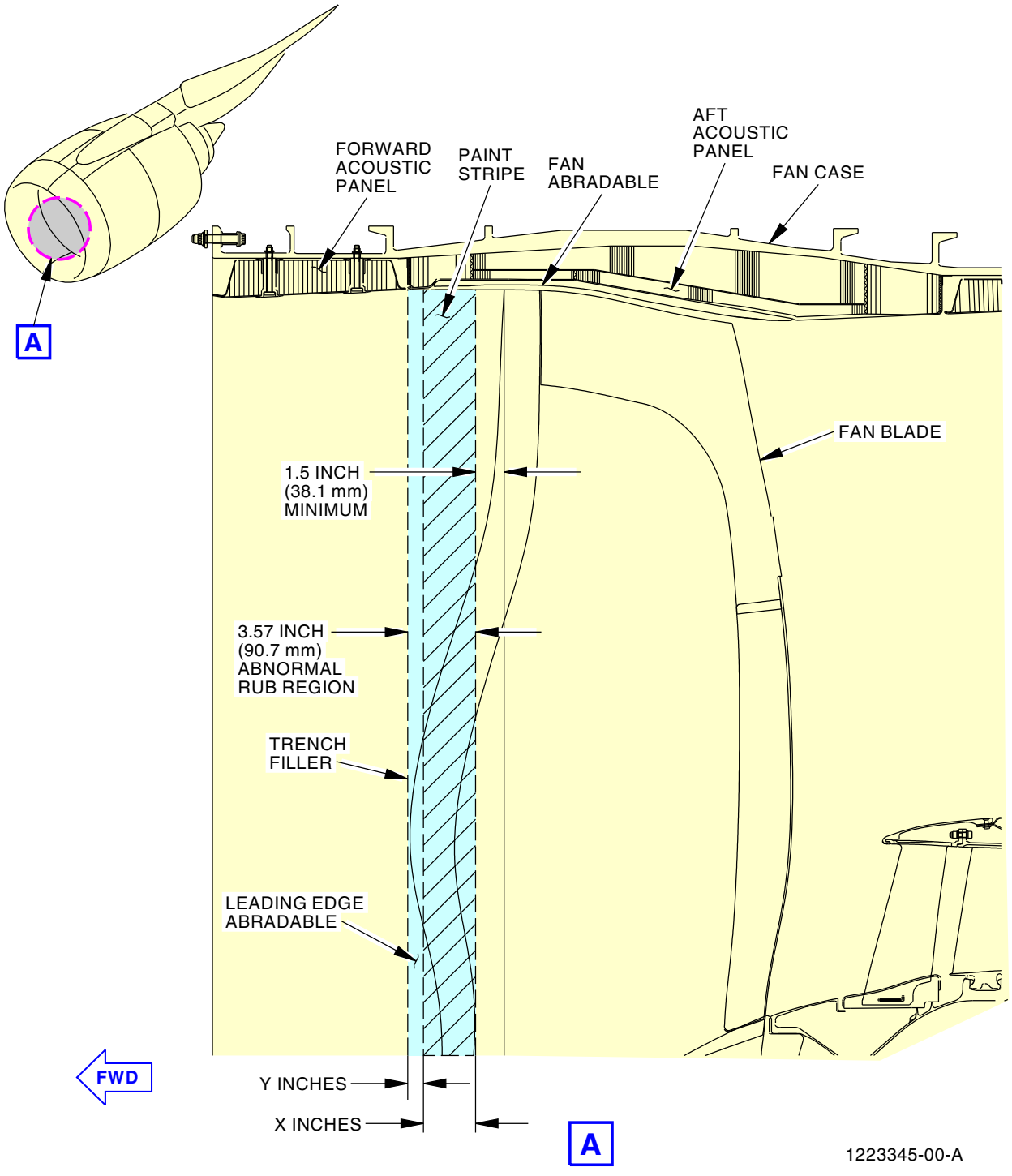

Fan Abradable Paint Stripe Inspection
Figure 601/71-00-00-990-823-H01 (Sheet 1 of 3)

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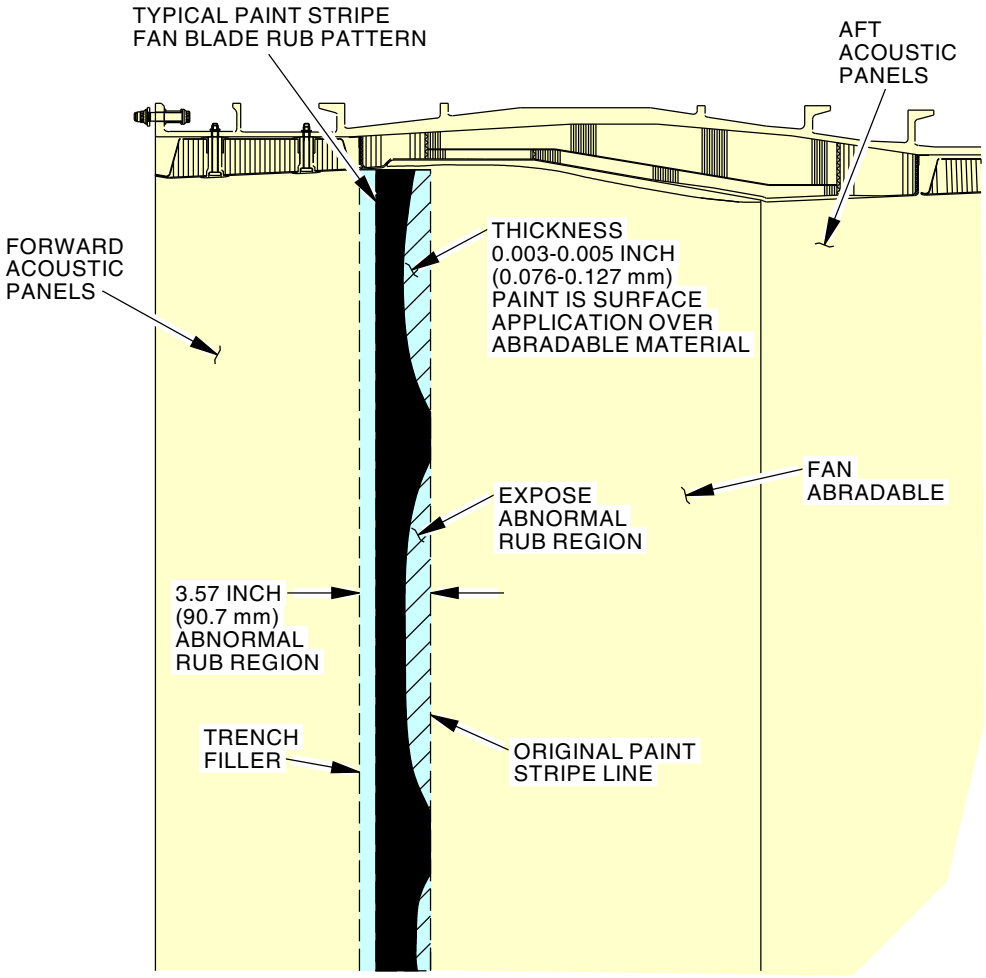

NOTE:

RUB PATTERN MAY NOT REPEAT
OR EXTEND 360 DEGREES.

1223346-00-A

422142 S0000137888_V2

Fan Abradable Paint Stripe Inspection
Figure 601/71-00-00-990-823-H01 (Sheet 2 of 3)

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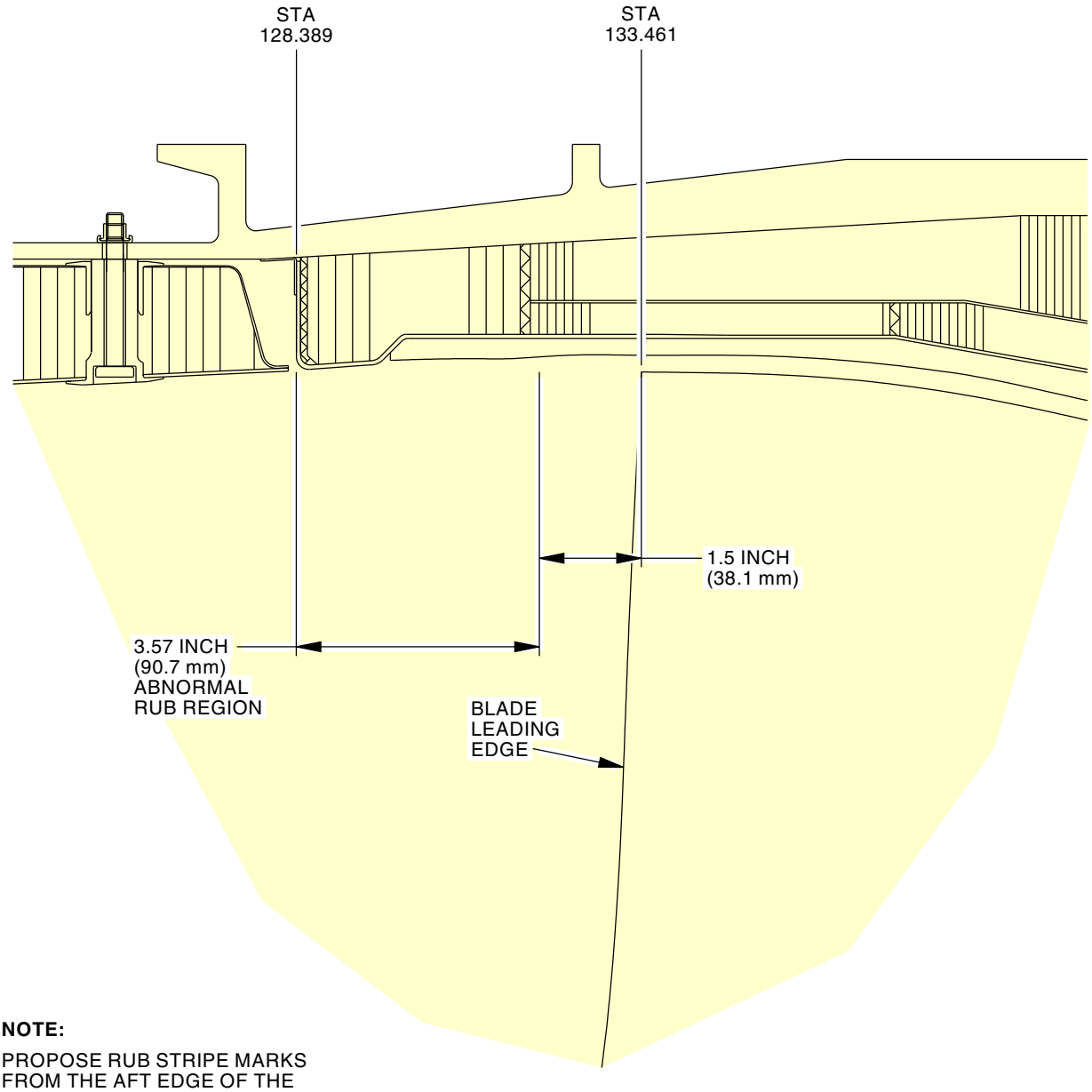

NOTE:

PROPOSE RUB STRIPE MARKS FROM THE AFT EDGE OF THE ACOUSTIC PANEL 3.57 INCHES (90.7 mm) LONG AROUND THE CIRCUMFERENCE.

1223347-00-A

422074 S0000137889_V2

Fan Abradable Paint Stripe Inspection
Figure 601/71-00-00-990-823-H01 (Sheet 3 of 3)

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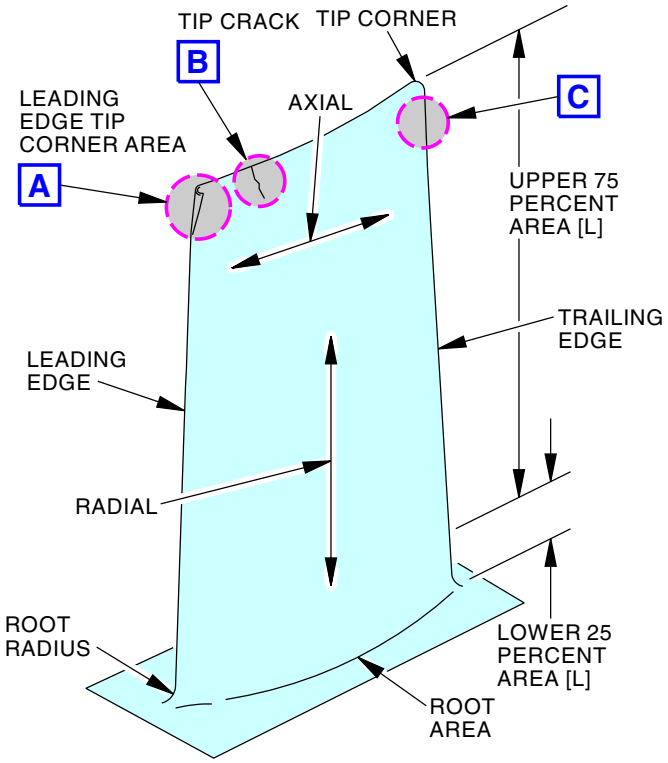
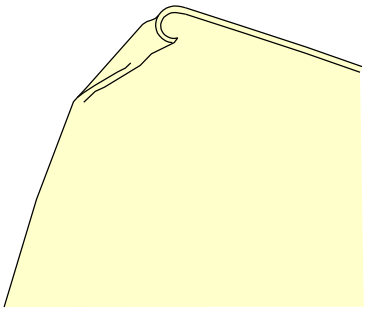
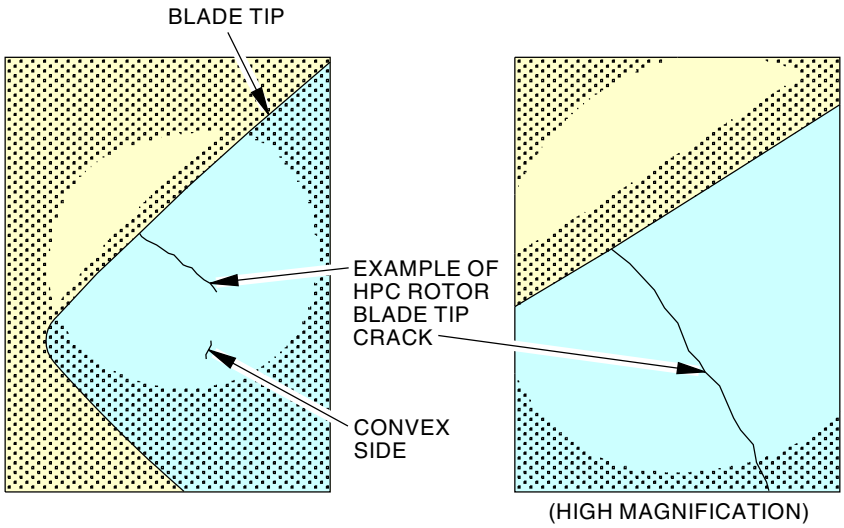


(EXAMPLE OF 5TH- AND 6TH-STAGE)



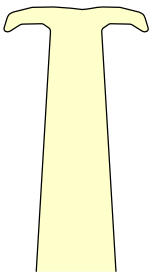
(EXAMPLE OF TIP CURL)

A



(EXAMPLE OF BLADE TIP CRACKS)

B



(EXAMPLE OF CURLED METAL ON BOTH CONVEX AND CONCAVE SIDES)

C

M06422 S0004285543_V2

HPC 5th and 6th Stages Blades Inspection
Figure 602/71-00-00-990-801-H01

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TASK 71-00-00-200-812-H01

3. Engine Birdstrike Inspection

(Figure 603)

A. General

(1) This task provides the instructions on how to examine the engine after a birdstrike.

(2) If the ultrasonic inspection is used, you must use one of the approved kits and one of the approved instruments listed in the Tables in the procedure. An ultrasonic instrument with an alarm that you can hear is necessary.

B. References

Reference	Title
24-11-00-200-801	Generator Drive System Inspection/Check (P/B 601)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-290-803-H01	High Pressure Compressor Section Rotor Inspection (P/B 601)
72-00-00-290-804-H01	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection (P/B 601)
72-21-00-200-801-H01	Fan Rotor Spinner and Support Ring (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-200-802-H01	Fan Booster Stage 1 Vane Outer Shroud Inspection (P/B 601)
72-21-00-200-803-H01	Fan Blade (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-220-801-H01	Fan Booster Flowpath Spacer (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-220-803-H01	Fan Blade Platforms (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-02-020-803-H01	One Fan Blade Removal (P/B 401)
72-21-02-400-803-H01	One Fan Blade Installation (P/B 401)
72-21-04-200-801-H01	Fan Booster Acoustic Panel Inspection (P/B 601)
72-24-00-200-802-H01	Fan Abradable Shroud Inspection (P/B 601)
72-24-00-200-804-H01	Fan Outlet Guide Vane (OGV) Inspection (P/B 601)
72-24-00-200-807-H01	Fan Stator Case Outlet Guide Vane (OGV) Fairing Inspection (P/B 601)
72-24-01-200-801-H01	Fan Stator Case Forward Outer Acoustic Liner Inspection (P/B 601)
72-24-01-200-802-H01	Fan Stator Case Aft Outer Acoustic Liner Inspection (P/B 601)
73-21-00-200-801-H01	Fuel Control System Inspection (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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C. Tools/Equipment

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

Reference	Description
COM-4330	Instrument - Ultrasonic Inspection Kit Part #: EPOCH XT Supplier: 32212 Part #: MASTERSCAN 380M Supplier: K6003 Part #: SONIC 1200M Supplier: 32212 Part #: USD 15B Supplier: 52039 Part #: USM 35X Supplier: 52039 Part #: USM GO Supplier: 52039 Part #: USN 58L Supplier: 52039 Part #: USN 60 Supplier: 52039 Opt Part #: EPOCH 4 Supplier: 32212 Opt Part #: EPOCH 4 PLUS Supplier: 32212 Opt Part #: EPOCH 4B Supplier: 32212 Opt Part #: EPOCH III Supplier: 32212 Opt Part #: SONATEST 330 Supplier: K6003 Opt Part #: SONATEST 340 Supplier: K6003 Opt Part #: SONIC 1000 SERIES Supplier: 32212 Opt Part #: SONIC 136 Supplier: 29192 Opt Part #: SONIC 137 Supplier: 29192 Opt Part #: USD 10 Supplier: 52039 Opt Part #: USD 15 Supplier: 52039 Opt Part #: USN 52L Supplier: 52039
SPL-4329	Kit - Ultrasonic test Part #: GE-FQAP-638 Supplier: 06083 Opt Part #: GE-FQAP-544 Supplier: 06083
STD-569	Light - Black, Ultraviolet
STD-1136	Facepiece (Mask) - Particulate Filtering, Disposable (NIOSH N95 approved)
STD-3904	Goggles - Safety

D. Consumable Materials

Reference	Description	Specification
B00679 [C04-035]	Alcohol - Isopropyl	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G00624	Bag - Plastic, General Purpose	
G01043	Cloth - Lint-free	
G02448 [C05-003]	Marker - Pens	
G50030 [C10-040]	Tape -Teflon, Scotch Brand 5490, Teflon 1 x 0.002 in. thick	
G50140	Gloves - Protective, Latex or Nitrile	
G50230	Glove - Vinyl	

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

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F. Access Panels

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

G. Prepare for the Inspection

SUBTASK 71-00-00-010-025-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-00-200-001-H00

WARNING PUT ON EQUIPMENT FOR PROTECTION BEFORE YOU TOUCH THE BIRD CARCASS, BLOOD, GUTS, AND RESIDUE. THIS CAN CONTAIN BACTERIA AND VIRUSES THAT CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

(2) Do these steps before you continue:

(a) Before you touch any of the bird remains, put on the protective equipment.

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1) Wear the vinyl glove, G50230 or protective gloves, G50140 below the usual cut-resistant gloves.

2) It is recommended to use a protective mask (FSP2 type) or filtering facepiece, STD-1136 and safety goggles, STD-3904 during the inspection.

3) Use a disposable coverall if there is risk of body contact with the bird remains.

(b) If it is necessary, examine and make sure that the fan blades are cleaned before you examine the fan blade for delamination by ultrasonic inspection".

(c) Remove the bird pieces and put them in a plastic bag, G00624 or a hermetically sealed plastic bag.

WARNING DO NOT USE AIR OR WATER PRESSURE TO CLEAN THE BIRD PIECES FROM THE ENGINE. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIAL (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

1) Clean the area with a lint-free cloth, G01043 moistened with alcohol, B00679 [C04-035].

2) If you used tools to remove the organic debris, clean the tools with alcohol, B00679 [C04-035].

WARNING DO NOT LET THE BIRD CARCASS OR OTHER PIECES OF THE BIRD TOUCH YOUR SKIN. DISCARD THE BIRD PIECES IN A PLASTIC DISPOSAL BAG. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIALS (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

3) Remove the gloves and disposable coveralls and put them in the same plastic bag, G00624 or a hermetically sealed plastic bag.

4) Carefully clean your hands with soap and water.

SUBTASK 71-00-00-940-002-H00

(3) If you do the ultrasonic inspection, you must use the ultrasonic test kit, SPL-4329 and an approved ultrasonic instrument, COM-4330.

NOTE: An ultrasonic instrument with an alarm you can hear is necessary.

NOTE: As of March, 2011, GE-FQAP-544 Kit will no longer be available. However, you may continue to use the kit if you have it.

Table 601/71-00-00-993-836-H00

Item	Qty	Part Number	Part Description
1	4	RP52HS-3	Dry Coupled UT Roller Probe
2	1	J055067G01	Inspection Fixture
3	2	J061051	Wear Plate/ Spacer for the Fan Blade Fixture PN: J055067G01
4	2	J061202	Standoff Rod for the J055067G01 Fixture
5	1	UT-2138	Calibration Standard
6	4	C-012	6' Coaxial
7 *[1]	2	02062	Sandford Peel-Off Marker

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Table 601/71-00-00-993-836-H00 (Continued)

Item	Qty	Part Number	Part Description
8 *[1]	1	6C290	12” Steel Scale
9 *[1]	1	3A594	Hex T Set with ball end, 13 piece
10 *[1]	1	03-438-12A	16 oz. Dynalon* Quick Mist* HDPE Sprayer Bottle
11	1	1560	Pelican Case with wheels and pluckable foam
12	1	5490	3” X 36” Teflon Tape
13	1	J061007	Blade holding fixture - Not Required for the GE90-115B Engine Line
14	1		Label
15	1		Conformance Package

*[1] Equivalent items may be substituted for items # 7, 8, 9, 10,

Table 602/71-00-00-993-837-H00

Item	Qty	Part Number	Part Description
1	4	RP25HS-3	Dry Coupled UT Roller Probe
2	1	J055067	Scanning Fixture
3	1	UT-1381	Calibration Standard
4	4	C-012	6' Coaxial Cable
5 *[1]	4	NT-580	1/4 Wide Transparent Red Tape
6 *[1]	1	6C290	12” Steel Scale
7 *[1]	1	1600	Pelican Case, Blk , Inside Dimension 22 X 17 X 8 Inches
8	1		Label
9	1		Conformance Package
10	1	5490	3”’ X 36” Teflon Tape

*[1] Equivalent items may be substituted for items # 5, 6, 7.

H. Engine Birdstrike Inspection

SUBTASK 71-00-00-210-074-H01

(1) Examine the fan abradable paint stripe (TASK 72-24-00-200-802-H01).

(a) Examine the fan abradable paint stripe forward of the fan blades for rub indications (TASK 72-24-00-200-802-H01).

(b) If there is an indication of fan blade rub, examine the fan blade tip for delamination (TASK 72-21-00-200-803-H01).

(c) The Continue-In-Service (CIS) limit for the fan abradable with indication of a fan blade rub is 10 cycles with these conditions:

1) The fan blade rub is not 360 degrees.

2) The fan blade rub does not extend into the facing sheet.

3) The fan blade rub does not extend more than the leading edge of the fan abradable.

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SUBTASK 71-00-00-210-058-H01

(2) Examine the primary nozzle for damage:

(a) Wire particles that are permitted in the primary nozzle if the maximum particle diameter is 0.003 inch (0.076 mm) and the maximum length is 0.80 inch (20.32 mm).

(b) Sheet metal particles are permitted in the primary nozzle if the particles are 0.004-0.006 inch (0.100-0.150 mm) thick with a maximum dimension of 0.6 inch (15.2 mm).

(c) Before the subsequent start of the engine, If you find other materials, do the step that follows.

1) Do this task: Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection, TASK 72-00-00-290-804-H01.

SUBTASK 71-00-00-210-059-H01

(3) Examine the forward spinner, aft spinners, and aft support ring for damage (TASK 72-21-00-200-801-H01).

SUBTASK 71-00-00-210-060-H01

(4) Examine the fan blade platforms for damage (TASK 72-21-00-220-803-H01).

SUBTASK 71-00-00-210-061-H01

(5) Examine the flow path spacer for damage (TASK 72-21-00-220-801-H01).

SUBTASK 71-00-00-210-062-H01

(6) Examine the fan blade leading edge tip and metal strip, and trailing edge tip caps for damage (TASK 72-21-00-220-803-H01).

SUBTASK 71-00-00-210-063-H01

(7) Examine the fan blade tip for the delamination (TASK 72-21-00-200-803-H01).

(a) No fan blade tip delamination is permitted.

1) If the fan blade tip delamination is found, replace the fan blade (TASK 72-21-02-020-803-H01 and TASK 72-21-02-400-803-H01).

(b) The Continue-In-Service (CIS) limit for a fan blade with tip delamination is 10 cycles with these conditions:

1) The delamination length is not more than 17.0 inches (431.8 mm).

2) There are no delamination of any fan blades on the other aircraft engine.

NOTE: The C-I-S limit is for one engine in a dual engine event.

SUBTASK 71-00-00-220-002-H01

(8) Examine the engine for signs of secondary damage caused by the birdstrike.

NOTE: Secondary damage is a sign of distress due to the birdstrike on the fan OGV fairing, fan forward acoustic panel, and/or the fan aft acoustic panel.

(a) If there is a sign of secondary damage caused by the birdstrike, examine the fan blade(s) for delamination by ultrasonic inspection.

NOTE: A birdstrike event that causes secondary damage will require an ultrasonic inspection of the affected fan blades.

NOTE: Personnel who do ultrasonic inspection must be certified in accordance with one of the following: NAS 410, ASNT-TC-1A, ATA 105, COSAC, or locally approved certification program. Personnel who do this inspection must receive practical training in the use of this procedure. They must demonstrate proficiency in calibration, inspection, and evaluation routine before they are authorized to accept or reject findings.

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(b) You may defer the ultrasonic inspection as follows:

1) For a single engine birdstrike event with secondary damage, ultrasonic inspection for the affected engine can be deferred for up to 10 cycles.

2) For a dual engine birdstrike, with secondary damage on one engine, ultrasonic inspection for the affected engine can be deferred for up to 10 cycles.

3) For a dual engine birdstrike, with secondary damage on both engines, do these steps:

a) You must do an ultrasonic inspection on one affected engine before the next flight.

b) You can defer the ultrasonic inspection on the other affected engine for up to 10 cycles.

(c) Determine which blade(s) in the set requires the ultrasonic inspection.

1) If the blades were cleaned before you can examine them, you must do an ultrasonic inspection of all 22 blades in the set.

2) Use a ultraviolet black light, STD-569 or white light to examine the set of 22 blades to find evidence of a bird strike.

NOTE: White light inspection is an acceptable method. However, black light inspection is a more reliable method to find signs of bird protein stains or contamination.

a) If a blade or group of blades shows evidence of bird protein stains or contamination , you must do an ultrasonic inspection on that blade or group of blades.

NOTE: It is not necessary to do an ultrasonic inspection on the blades in the set that do not show signs of bird protein stains or contamination.

3) If all 22 blades show no visual indication of bird material, do an ultrasonic inspection of all blades in the set.

NOTE: If you see secondary damage, there has been contact between the blade(s) and the bird(s) regardless of the lack evidence of organic material on the blades.

(d) Do a visual inspection of the fan blades.

1) Use a water damped cotton wiper, G00034 to remove any surface debris from the fan blades.

a) Use Form 1381 and write down of any visual nicks, scratches, delamination, or other defects.

(e) Prepare for the ultrasonic Inspection:

1) Select the number 1 fan blade.

NOTE: The number 1 fan blade is the one directly behind the fan spinner dimple.

2) Identify the number 1 fan blade with a piece of red tape (P/N-580) or with a marker, G02448 [C05-003].

3) Identify the remaining fan blades 2-22 counterclockwise.

NOTE: View from forward looking aft.

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4) Identify the two zones, zone 1 and zone 2 on the 22 fan blades with red tape (P/N-580) or with a marker, G02448 [C05-003].

NOTE: Use the tape (P/N NT-580) and the ruler supplied with the ultrasonic kit to identify the zones.

NOTE: Make sure that the blade surface is clean before you apply tape. When the tape is in its position on the blade, apply the pressure to make sure that there are no trapped air or bubbles.

NOTE: Tape (P/N NT-580) will not decrease the ultrasound while the tape is attached tightly to a clean surface and there are no air bubbles. It is not necessary to remove the tape to do the inspection.

NOTE: After you finish the inspection, you can remove the grease pencil marks with water and paper towels.

5) Select and connect the power source for the ultrasonic instrument.

NOTE: Refer to the ultrasonic instrument manual for the operating instructions.

6) Turn the ultrasonic instrument switch to ON or PWR and let it to warm up.

NOTE: Refer to the manufacturers operating instructions.

7) Use the applicable ultrasonic instrument controls to the initial control settings specified in the tables below.

Table 603/71-00-00-993-809-H01 Ultrasonic Instrument - Sonic 1000 series

CONTROL DESCRIPTION	INITIAL SETTING
PULSER:	
GAIN	60.0 dB
PULSE	350 Ns
DAMPING	50 Ohms
MODE	DUAL
VOLTAGE	300 V
RECEIVER:	
DISPLAY	HALFWAVE NEG
FREQUENCY	1 MHz
REJECT	OFF
RANGE:	
RANGE	3.26 INCH
DELAY	0.659
VELOCITY	0.110
MAX REP	3000 HZ
THICK:	
T-GAUGE	OFF
ANGLE:	
TRIG	OFF

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Table 603/71-00-00-993-809-H01 Ultrasonic Instrument - Sonic 1000 series (Continued)

CONTROL DESCRIPTION	INITIAL SETTING
GATE 1	-(NEG)
POSN	1.04 INCH
WIDTH	1.84 INCH
LEVEL	10%

Table 604/71-00-00-993-810-H01 Ultrasonic Instrument - USN 60

CONTROL DESCRIPTION	INITIAL SETTING
PULSER:	
ENERGY	HIGH
DAMPING	150 Ohm
PRF MODE	AUTO HIGH
RECEIVER:	
FREQUENCY	1 MHz
RECTIFY	HALF PS
DUAL	ON
REJECT	0%
GAIN	50.0
AMP	% SCREEN HT
RANGE	6.766 INCH
PROBE DELAY	1.0794 US
DISPLAY DELAY	4.910 US
VELOCITY	0.240 IN/US
MATERIAL	CUSTOM
READING 1	A%A
GATE:	
GATE	A
ALARMS	NEGATIVE
TRIGGER	N/A
AUTO CAL	N/A

Table 605/71-00-00-993-811-H01 Ultrasonic Instrument - USN 58L

CONTROL DESCRIPTION	INITIAL SETTING
PULSER:	
ENERGY	HIGH
DAMPING	1500 Ohm
PRF MODE	AUTO HIGH

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Table 605/71-00-00-993-811-H01 Ultrasonic Instrument - USN 58L (Continued)

CONTROL DESCRIPTION	INITIAL SETTING
RECEIVER:	
FREQUENCY	1 MHz
RECTIFY	POS HALFWAVE
DUAL	ON
REJECT	0%
GAIN	50.0
RANGE	3.4
PROBE DELAY	7.25 US
DISPLAY DELAY	-1.775 US
GATE	A
TTL GATE #1	GATE A
ALARMS	INSTANTANEOUS
HORN	ON
GATE LOGIC	NEGATIVE
VELOCITY	0.24 IN/US

Table 606/71-00-00-993-812-H01 Ultrasonic Instrument - USN 52L/USN 52R

CONTROL DESCRIPTION	INITIAL SETTING
PULSER:	
DAMPING	150 Ohm
RECEIVER:	
FREQUENCY	0.3-4 MHz
RECTIFY	HALF POS
DUAL	ON
REJECT	OFF
GAIN	50.0
RANGE	1.5 IN
DELAY	6.0 US
REP RATE	HIGH
MATERIAL LEVEL	0.110 IN/US
GATE	A
ALARMS	NEGATIVE
START	0.365
WIDTH	1.65
THRESHOLD	10%

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Table 607/71-00-00-993-813-H01 Ultrasonic Instrument - Sonatest 330

CONTROL DESCRIPTION	INITIAL SETTING
VEL	240 IN/US
RANGE	3.5
DELAY	0.720
REF GAIN	60
GAIN	55
FREQ	1 MHz HWT
REJECT	0
DAMP	180
TX MODE	DOUBLE
PRF MAX	1000 HZ
TX WIDTH	400
GATE LEVEL	10%
GATE START	1.0
GATE WIDTH	3.4

Table 608/71-00-00-993-814-H01 Ultrasonic Instrument - Sonic 137

CONTROL DESCRIPTION	INITIAL SETTING
POWER	ON
PULSE	350 NS
DAMPING	100 Ohms
MODE	DUAL
REP RATE	2750 HZ
PULSER	300 V
GAIN	50 dB
REF GAIN	40 dB
DISPLAY	HALF POS
FREQUENCY	1 MHz
REJECT	OFF
RANGE	3.4 IN
DELAY	0.64 IN
VELOCITY	0.240 IN/US
SYNC	IP
UNITS	INCHES
GATE	1
LEVEL	10%

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Table 608/71-00-00-993-814-H01 Ultrasonic Instrument - Sonic 137 (Continued)

CONTROL DESCRIPTION	INITIAL SETTING
POSN	0.725 IN
WIDTH	3.24 IN

Table 609/71-00-00-993-815-H01 Ultrasonic Instrument - Sonic 136

CONTROL DESCRIPTION	INITIAL SETTING
POWER	ON
PULSE	350 NS
DAMPING	200 Ohms
MODE	DUAL
REP RATE	4 KHZ
PULSER	300 V
GAIN	55 dB
DISPLAY	HALF POS
FREQUENCY	1 MHz
REJECT	OFF
RANGE	3.5 IN
DELAY	0.635 IN
VELOCITY	0.240 IN/US
UNITS	INCHES
GATE LEVEL	10%
POLARITY	--
POSITION	0.826 IN
WIDTH	3.1 IN

Table 610/71-00-00-993-816-H01 Ultrasonic Instrument - Epoch III

CONTROL DESCRIPTION	INITIAL SETTING
ZERO	5.250 US
GAIN	40 dB
FREQUENCY	1 MHz
REJECT	0
RANGE	3.25
VEL	0.240 IN/US
RECTIFY	H WAVE+
PULSER	HIGH
DAMP	400 Ohms
MODE	DUAL

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Table 610/71-00-00-993-816-H01 Ultrasonic Instrument - Epoch III (Continued)

CONTROL DESCRIPTION	INITIAL SETTING
GATE LEVEL	10%
GATE START	0.36
GATE WIDTH	2.8
ALARM	F1

Table 611/71-00-00-993-817-H01 Ultrasonic Instrument - Epoch 4, 4+, 4B

CONTROL DESCRIPTION	INITIAL SETTING
ZERO	3.800 US
GAIN	45.0 Db
FREQUENCY	0.8-3.0 (0.8-1.2 for Epoch 4)
REJECT	0.0
RANGE	3.30
VEL	0.24 IN/US
RECTIFY	HALF WAVE+
PULSER	HIGH (MAX FOR Epoch 4+)
DAMP	400.0 OHMS
MODE	DUAL
GATE LEVEL	10%
GATE START	0.65
GATE WIDTH	2.0
ALARM	NEG
PULSER TYPE	SPIKE

Table 612/71-00-00-993-818-H01 Ultrasonic Instrument - USD 15

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
BASICS		**PULSER**	
GAIN	58	POWER	2000
RANGE	3.400 in	DAMPING	200 Ω
MTL VEL	240.0 in/ms	ASCAN	NORMAL
D-DELAY	0.400 in	PRF-MOD	AUTO OFF
P-DELAY	0.000	PRE-VAL	4000 Hz
RECEIVER		GATE-SL	GATE A
FREQUENCY	1 MHz	GATE-OUT	AMP
REJECT	0%	GATE LOGIC	NEG
RECTIFY	1/2 POSITIVE	GATE HORN	ON

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Table 612/71-00-00-993-818-H01 Ultrasonic Instrument - USD 15 (Continued)

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
BASICS		**PULSER**	
MOD	DUAL	GATE START	1.070”
		GATE WIDTH	2.100”
		GATE THRSH	10%

Table 613/71-00-00-993-819-H01 Ultrasonic Instrument - USD 15S

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
BASICS		**PULSER**	
GAIN	40	POWER	2000
RANGE	3.42 in	DAMPING	500 Ω
MTL VEL	240.0 in/ms	ASCAN	NORMAL
D-DELAY	0.418 in	PRF-MOD	AUTOHIG
P-DELAY	0.000	PRE-VAL	4000 Hz
RECEIVER		GATE-SL	GATE A
FREQUENCY	1 MHz	GATE-OUT	AMP
REJECT	0%	GATE LOGIC	NEG
RECTIFY	1/2 POSITIVE	GATE HORN	ON
DUAL	ON	GATE START	1.074”
		GATE WIDTH	2.103”
		GATE THRSH	10%

Table 614/71-00-00-993-820-H01 Ultrasonic Instrument - USD 10

CONTROL DESCRIPTION	INITIAL SETTING
GAIN	45.0 Db
DISP. DEL	0.430”
DISP. WIDTH	3.371”
SOUND VEL	240.0 in/ms
FREQUENCY	1 MHz
RECTIFY	HALF +
P-POWER	4
DAMPING	500 Ω
DUAL	ON
REJECT	0%
GATE A MODE	ANTICOI
GATE TRSH	10%

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Table 614/71-00-00-993-820-H01 Ultrasonic Instrument - USD 10 (Continued)

CONTROL DESCRIPTION	INITIAL SETTING
GATE DELAY	1.200”
GATE WIDTH	1.900”
HORN	ON
ANALOG-V	AMPLITUDE

Table 615/71-00-00-993-821-H01 Ultrasonic Instrument - USM 35/USM 35X

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
GAIN	**51**		
BASE		**PULSE**	
RANGE	3.26 in	DAMPING	LOW
MTL VEL	240.0 in/us	POWER	HIGH
D-DELAY	0.252 in	DUAL	ON
P-DELAY	0.00 us	PRF-MOD	10
RECEIVER		GATE	
FINE G	0	ALOGIC	NEGATIVE
REJECT	0%	ASTART	0.900 in
FREQUENCY	0.5–4	AWIDTH	2.000 in
RECTIFY	POS HALF WAVE	HORN	ALARM
		UNIT	INCH
		THRESHOLD	10%

Table 616/71-00-00-993-822-H01 Ultrasonic Instrument - USM 25

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
GAIN	**47**		
BASE		**PULSE**	
RANGE	4.0 in	DAMPING	LOW
MTL VEL	240.0 in/ms	POWER	HIGH
D-DELAY	0.400 in	DUAL	ON
P-DELAY	0.00 us	PRF-MOD	10
RECEIVER		GATE	
FINE G	0	ALOGIC	NEGATIVE
REJECT	0%	ASTART	0.900 in
FREQUENCY	0.5–4	AWIDTH	2.000 in
RECTIFY	POS HALF WAVE	HORN	ALARM

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Table 616/71-00-00-993-822-H01 Ultrasonic Instrument - USM 25 (Continued)

CONTROL DESCRIPTION	INITIAL SETTING	CONTROL DESCRIPTION	INITIAL SETTING
GAIN	**47**		
BASE		**PULSE**	
		UNIT	INCH
		THRESHOLD	10%

Table 617/71-00-00-993-834-H00

CONTROL DESCRIPTION	INITIAL SETTING
GAIN	47
BASE	
RANGE	6.66 IN
MTL DELAY	240.0 IN/US
D-DELAY	1.218 IN
P-DELAY	0.00 US
RECV	
FINE G	N/A
REJECT	0 %
FREQU	.5 - 4
RECTIFY	POS HALF WAVE
PULSE	
DAMPING	LOW
POWER	HIGH
DUAL	ON
PRF-MOD	N/A
GATE A	
A LOGIC	NEGATIVE
A START	2.00 IN
A WIDTH	4.50 IN
HORN	ALAR
UNIT	INCH
THRESHOLD	10%

8) Make sure that the ultrasonic instrument does not display noise or the other signal.

NOTE: If the ultrasonic instrument display electrical noise or other signals that could interfere with this inspection, do not use the unit.

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9) Make sure that you test the fan blades at the ambient temperature.

NOTE: Do not do the inspection at extreme temperatures. It could result in an unsatisfactory inspection.

NOTE: If for any reason, you cannot do a satisfactory inspection of the part, make a note of the problem area and reason of the problem on the inspection data sheet, Form 1381. Forward this information to the local GE or airline representative.

10) Calibrate the ultrasonic instrument as follows:

NOTE: It is possible that calibration standards may be assigned amplitude correction factors (or equivalent responses), because of the differences in notch response, caused by variations in the fabrication process. The GE laboratory will establish these equivalent responses, by comparison with a master standard. Correction factors are used to establish calibration sensitivity only and do not alter the amplitude specified for indication evaluation. This factor will be engraved on the calibration standard where applicable.

a) Set the instrument control settings to the initial settings found in the applicable table if not already done.

b) Remove the thumb screws and remove the two probe holders from the scanning fixture.

c) Remove the inspection bar from the scanning fixture.

d) Put the two ultrasonic roller probes (P/N RP2HS-3) into the probe holders.

NOTE: Ultrasonic roller probes (P/N RP2HS-3) are in the ultrasonic test kit, SPL-4329.

e) Position the probe holders onto the scanning fixture (P/N J055067 or J055067G01) for the vertical inspection of zone 1.

NOTE: Make sure that the probe elements are facing each other and that the probes are facing inside the inspection fixture.

f) Attach the two cables to the two probes.

g) Feed the cables through the inspections fixture clips or fixture cavity.

h) Attach the cables to the ultrasonic instrument.

i) Spray clean water on both sides of the calibration stand.

NOTE: This will help in coupling the probes to the standard and decrease probe wear.

j) Place the 0.15 inch (3.81 mm) of the calibration standard between the roller probes.

NOTE: Calibration standard and the roller probes are in the ultrasonic test kit, SPL-4329.

k) Move the calibration standard to position the roller probes normal to the surface for maximum signal on the CRT.

l) While positioned on the 0.15 inch (3.81 mm), adjust the delay control to position the calibration standard through signal at 2.0 on the CRT baseline.

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m) Put the 2.0 inches (50.8 mm) of the calibration standard between the roller probes away from the artificial delamination.

NOTE: To prevent probe damage, be careful when you remove the standard from in between the probes to not allow the probes to snap together.

n) Use the range control, position the standard through signal at 8.0 on the CRT baseline.

o) Do the two previous steps above again until the screen is set.

p) Position the probes on the 0.9 inch (22.9 mm) away from the artificial delamination.

q) Move the calibration standard to position the roller probes normal to the surface for a maximum signal on the CRT.

r) Adjust the gain to obtain an 80% full screen height (FSH) signal.

s) Write this setting on Form 1381.

NOTE: Form 1381 is in the ultrasonic test kit, SPL-4329.

NOTE: This is the calibration gain setting.

t) Increase the gain by 24 dB.

u) Write the inspection sensitivity (inspection gain) on Form 1381.

NOTE: This is the inspection sensitivity.

v) At the inspection sensitivity (inspection gain).

<1> Position the probe on the 0.90 inch (22.9 mm).

<2> Slowly roll over the artificial delamination on the calibration standard.

<3> Observe the signal being reduced as less sound energy is transmitted to the receiving probe.

w) Adjust the gate alarm threshold for 10% FSH, from 2.0 -8.0 along the CRT horizontal baseline.

x) Set the instrument audible alarm to trigger when any signal is below 10% FSH.

y) Do a check on the gate setting again by rolling the probes onto the artificial delamination.

<1> Monitor the audible alarm that is triggered once the through signal goes 10% FSH.

(f) Do an ultrasonic inspection of the fan blade.

1) Position the first fan blade to be inspected at the 6:00 o'clock position.

2) Spray clean water on both sides of the calibration stand.

NOTE: This will help in coupling the probes to the standard and decrease probe wear.

3) Make sure that the gain is set to the inspection sensitivity (calibration gain +24 dB).

4) Make sure that a loss of signal on the calibration standard artificial delamination will trigger the gate alarm.

NOTE: Zone 1 will be scanned vertically (radial) and zone 2 will be scanned horizontally (axial).

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5) Put the probe holders onto the scanning fixture to position the probes for vertical scanning of zone 1.

NOTE: Make sure that the probe elements are facing each other and that the probes are facing inside the inspection fixture.

NOTE: If you use fixture (P/N J055067G01) from kit GE-FQAP-638, make sure that the index wear plate (P/N J061051) is put in position for the inspection of GE90 Blade (screws located in holes identified GE90).

6) Spray clean water on both sides of the calibration stand.

NOTE: This will help in coupling the probes to the standard and decrease probe wear.

7) Put the inspection bar into #1 of the scanning fixture.

8) Hold the fixture so that the probes are positioned towards the center of the engine.

NOTE: This will allow the probes to get close to the fan platform.

9) Roll the probes onto the blade and move the fixture until the probes make contact with the fan blade platform.

NOTE: The probe centerline should be approximately 1.00-1.50 inches (25.4-38.1 mm) from the leading edge of the blade for the first scan. If it is not, the probes may have been installed incorrectly on the probe holders.

10) Move the fixture to position the roller probes normal to the surface for a maximum signal on the CRT.

NOTE: Be sure to hold the fixture level throughout each scan. This will make sure that the probe will be placed at a correct distance from the leading edge of the blade while scanning at each index position.

NOTE: Do not slide or pull the probes against their normal rolling plane. If you do, it could damage or misalign the probes.

11) Scan zone 1 of the fan blade (vertical scan) as follows:

a) Scan toward the tip of the blade, while you apply the pressure to the fixture so that the leading edge of the blade is riding on the inspection bar.

NOTE: This along with keeping the fixture level will be the guide for positioning the probe at the correct distance from the leading edge.

b) Scan the fan blade at less than 3.00 inches (76.2 mm) per second.

c) Keep the fan blade centered in between the fixture.

<1> Make sure that the inspection bar stays in contact with the leading edge of the blade.

d) Monitor the probes to make sure that they remain normal to the surface.

NOTE: The audible alarm will identify whether the signal is below the threshold on the CRT screen. If the audible alarm is triggered, make sure that the probes are coupled to the part and perpendicular to the surface.

e) If you get an audible alarm do to monitor the probe above again to make sure that the indication occurs again.

NOTE: It is normal for the amplitude for the through signal to change while scanning. These amplitudes may vary from below 10-100% or greater. This generally occurs as the thickness changes or when the material composition changes (i.e. metal, metal/composite, composite).

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f) If a complete loss of signal occurs between 2.0-8.0 along the CRT horizontal baseline, refer to the step indication evaluation for the fan blades below.

NOTE: 10% is used as the evaluation level. A complete loss of signal is used to determine serviceability.

NOTE: Average noise levels from the probe/instrument should not be confused with a good through transmission signal. To find the average noise level, take note of the screen display when the probes are not in contact with each other.

g) If complete loss of signal does not occur, continue the scan until there is a 1.0 inch (25.4 mm) overlap into zone 2.

NOTE: It is not necessary to remove the tape (P/N NT-580) to do the inspection at the divide line of zone 1 and zone 2. The tape will not decrease the ultrasound while the tape is attached tightly to a clean surface and there are no air bubbles.

h) Re-scan over the same path until the probe makes contact with the fan platform to complete the scan.

i) Reposition the inspection bar into the next inspection slot and do the scanning above until zone 1 has been fully inspected.

12) Scan zone 2 of the fan blade (horizontal scan) as follows:

NOTE: Make sure that the calibration signal amplitude has not changed and is 80% on the 0.90 inch. Set the gain back to the proper inspection sensitivity (calibration gain +24 dB).

a) Insert the probe holders onto the scanning fixture to position the probes for the horizontal scanning of zone 2.

b) Hold the fixture so that the probes are positioned towards the tip of the blade.

c) Put the inspection bar in the index hole on the right side of the fixture.

NOTE: The inspection bar will position and guide the fixture for evenly spaced horizontal scan of scans of zone 2. The tip of the inspection bar will guide on the fan abradable surface while scanning horizontally from the leading edge of the blade towards the trailing edge of the fan blade.

NOTE: Apply only light pressure to prevent the inspection bar from bending and skipping across the abradable surface.

NOTE: Apply Scotch 5490 tape, G50030 [C10-040] to the fan abradable surface for protection against the inspection bar making repeated contact. The Scotch 5490 tape, G50030 [C10-040] is in the ultrasonic test kit, SPL-4329.

d) Optional, instead of using the inspection bar as a guide for the zone 2, do the step that follows.

<1> Remove the inspection bar and apply the tape (P/N NT-580) as a guide with horizontal lines every 0.50 inch (12.7 mm) and scan along the lines.

e) Spray clean water on both sides of the calibration stand.

NOTE: This will help in coupling the probes to the standard and decrease probe wear.

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f) Roll the probes onto the leading edge of the fan blade near the tip of the fan blade.

g) Move the inspection bar in the index hole to position the scanning fixture at the correct distance for placing the probes as close as possible to the blade tip.

h) Move the fixture to position the roller probes normal to the surface for a maximum signal on the CRT.

i) Scan the fan blade from the leading edge towards the trailing edge until the back of the fixture makes contact with the leading edge of the fan blade.

j) Scan the fan blade at less than 3.00 inches (76.2 mm) per second.

k) Do the scan on the same path again.

l) Pull the fixture back toward the leading edge.

m) Keep the fan blade centered in between the fixture.

n) Monitor the probe to make sure that they remain normal to the surface.

o) If you get audible alarm, do the step to scan zone 2 of the fan blade again to make sure that the indication occurs again.

NOTE: The audible alarm will identify whether the signal is below the threshold on the CRT screen. If the audible alarm is triggered, make sure the probes are coupled to the part and perpendicular to the surface.

NOTE: It is normal for the amplitude for the through signal to change while scanning. These amplitudes may vary from below 10-100% or greater. This generally occurs as the thickness changes or when the material composition changes (i.e. metal, metal/composite, composite).

p) If a complete loss of signal occurs between 2.0-8.0 along the CRT horizontal baseline, refer to the step indication evaluation for the fan blades below.

NOTE: 10% is used as the evaluation level. A complete loss of signal is used to determine serviceability.

NOTE: Average noise levels from the probe/instrument should not be confused with a good through transmission signal. To find the average noise level, take note of the screen display when the probes are not in contact with each other.

q) If complete loss of signal does not occur, continue the scan.

r) Re-scan over the same path until the probe goes off the leading edge of the fan blade.

s) Position the inspection bar into the next index position and do the scanning steps above until there is a 1.0 inch (25.4 mm) overlap into zone 1.

NOTE: It is not necessary to remove the tape (P/N NT-580) to do the inspection at the divide line of zone 1 and zone 2. The tape will not lessen the ultrasound while the tape is attached tightly to a clean surface and there are no air bubbles.

13) Do a post inspection calibration check.

NOTE: A calibration check should be done at least every hour, whenever any system component or operator is changed. It should be also be done any time the operator suspects a change may have occurred in the system. Calibration need not be done between individual scans.

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a) Reduce the ultrasonic instrument to the calibration gain.

b) Spray clean water on the calibration standard.

c) Put a 0.9 inch (22.9 mm) of the calibration standard between the roller probes and maximize the signal by moving the fixture to normalize the probes.

d) If the signal is within 75-95% FSH, the test is acceptable.

e) If the maximum response from the calibration notch is less than 75%. re-calibrate the system.

<1> Do the check again only on rejected areas since the last acceptable calibration.

f) If the maximum response is more than 95%, re-calibrate the system.

<1> Do an inspection again of all the blades examined since the last calibration.

14) Do a indication evaluation for the fan blades that show a complete loss of signal within the inspection zones as follows:

a) Remove the scanning fixture/probe from the blade.

b) Use the water damp cotton wiper, G00034 and wipe the fan blade surface clean.

c) Visually examine the area and make a note of any findings on Form 1381.

d) Change the gain back to the calibration setting and make sure that the signal amplitude is 80% on the 0.9 inch (22.9 mm).

e) Set the gain back to the proper inspection sensitivity (calibration gain +24 dB).

f) Replace the scanning fixture/probe onto the suspect area and do a check if the loss of signal can be repeated.

g) If a complete loss of signal is not found, continue the scan.

h) If a complete loss of signal is repeated between 2.0-8.0 along the CRT horizontal baseline, do the step of mapping/recording of indications below.

15) Do the steps of mapping/recording of indications as follows:

a) Use Form 1381-1 for mapping each blades possible reject areas.

b) Identify the area where there is a complete loss of signal to do the mapping.

c) Identify the edge of the suspect area where the through signal reduces to half its amplitude.

<1> This applies to areas where the through signal amplitude immediately outside the suspect area is 100% FSH or less.

d) For locations outside the suspect area where the signal amplitude is more than 100%.

<1> Mark the edge of the suspect area where the signal reduces to 100% FSH.

e) Apply the tape (P/N NT-580 (red color)) to identify the approximate shape of the indication.

NOTE: You can use a grease pencil marker to map and make a record of indications.

<1> Apply as much tape if it is necessary to the specified area.

16) Disposition the fan blades with the criteria that follows:

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a) If the fan blade contains indications that are equal or more than 2.0 inches (50.8 mm) in any direction in zone 2, it is considered rejected.

<1> This also applies to indications that overlap zone 1 and 2.

b) If the fan blade contains indications that are equal or more than 4.0 inches (101.6 mm) in any direction in zone 1, it is considered rejected.

c) Record any clearly defined area in the inspection zone 1 or 2 with a complete loss of signal that was rejected on Form 1381.

17) The inspection data sheet must be forwarded to the local GE representative for evaluation and engineering disposition.

18) Keep the records that follow:

a) At a minimum, keep the information specified on Form 1381 for each inspection conducted.

(g) The Continue-In-Service (CIS) limit for fan blade delamination is 10 cycles with this condition:

1) There are no delamination of any fan blades on the other aircraft engine.

NOTE: The C-I-S limit is provided for one engine in a dual engine event.

SUBTASK 71-00-00-210-064-H01

(9) Examine the forward outer and aft outer acoustic panels for damage.

(a) Do this task: Fan Stator Case Forward Outer Acoustic Liner Inspection, TASK 72-24-01-200-801-H01.

(b) Do this task: Fan Stator Case Aft Outer Acoustic Liner Inspection, TASK 72-24-01-200-802-H01.

SUBTASK 71-00-00-210-065-H01

(10) Examine the fan OGV fairings for damage (TASK 72-24-00-200-807-H01).

SUBTASK 71-00-00-210-066-H01

(11) Examine the booster acoustic panels for damage (TASK 72-21-04-200-801-H01).

(a) If damage to the booster acoustic panels or booster inlet guide vanes is identified, do an inspection of the High Pressure Compressor (HPC) by borescope.

(b) Examine the HPC stage one, two, four, and eight blades with a borescope for damage. Refer to High Pressure Compressor Section Rotor Inspection, TASK 72-00-00-290-803-H01.

SUBTASK 71-00-00-210-067-H01

(12) Examine the booster inlet guide vanes for damage (TASK 72-21-00-200-802-H01).

(a) If damage to the booster acoustic panels or booster inlet guide vanes is identified, do an inspection of the HPC by borescope.

(b) Examine the HPC stage one, two, four, and eight blades with a borescope for damage. Refer to High Pressure Compressor Section Rotor Inspection, TASK 72-00-00-290-803-H01.

SUBTASK 71-00-00-210-068-H01

(13) Examine the T12 sensor for damage (TASK 73-21-00-200-801-H01).

SUBTASK 71-00-00-210-069-H01

(14) Examine the fan abradable shroud for damage (TASK 72-24-00-200-802-H01).

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SUBTASK 71-00-00-210-070-H01

(15) Examine the fan outlet guide vanes for damage.

(a) Do this task: Fan Outlet Guide Vane (OGV) Inspection, TASK 72-24-00-200-804-H01.

SUBTASK 71-00-00-210-071-H01

(16) Examine the Integrated Drive Generator (IDG) and variable-speed constant-frequency exchanger for damage (TASK 24-11-00-200-801).

SUBTASK 71-00-00-290-007-H01

(17) For a dual engine event, do an inspection of one of the two engines by borescope. Examine the HPC stage one, two, four, and eight blades with a borescope for damage (TASK 72-00-00-290-803-H01):

NOTE: For a single engine event, with no damage to the booster acoustic panels or booster inlet guide vanes, no borescope inspection is required.

(a) If you find damage on the HPC stage one, two, four, and/or eight blades, examine all other HPC blade stages (if you can get access to) for damage.

(b) If you find damage on one of the two engines that had a borescope inspection, do an inspection of the other engine in or less than 10 cycles.

SUBTASK 71-00-00-210-072-H01

(18) Examine the PT25 sensor when an engine stall or engine fluctuation was the result of a birdstrike (TASK 73-21-00-200-801-H01).

I. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-020-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

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(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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ENGINE SN		INSPECTOR	
INSPECTION SITE		CAL STD S/N	
DATE		SCAN FIXTURE S/N	
UT PROBE S/N'S		UT INSTRUMENT S/N	
UT INSTRUMENT			

CALIBRATION	FREQUENCY		DELAY	
	GAIN @80%		RANGE	

INSPECTION GAIN (CALIBRATION GAIN + 24 Db)	_____dB + 24 dB = _____

POST CALIBRATION	AMPLITUDE

INSPECTION FINDINGS	BLADE SN	INDICATION SIZE	COMMENTS

COMMENTS: _____

_____

_____

_____

_____

_____

ACCEPT: _____ REJECT: _____

INSPECTOR: _____ DATE: _____

FORM 1381

1227917-00-A

422104 S0000137895_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 1 of 20)

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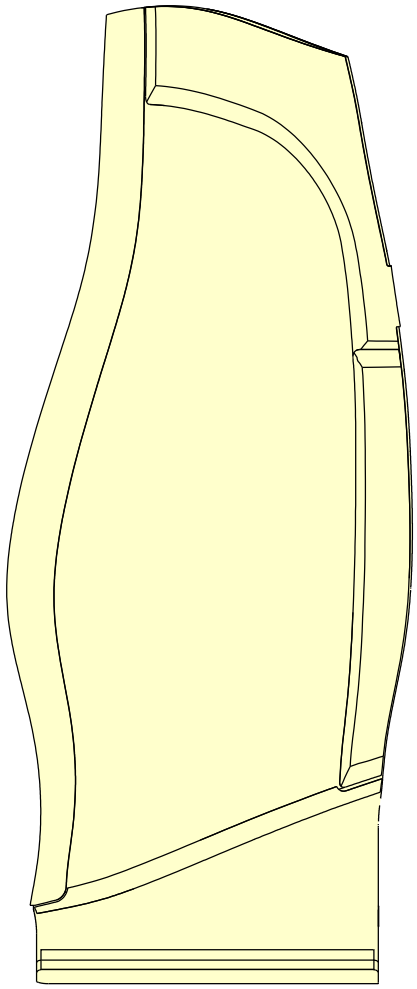

BLADE SN	INDICATION SIZE	COMMENTS

INSPECTOR: _____ DATE: _____

FORM 1381-1

1227918-00-A

430316 S0000140482_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 2 of 20)

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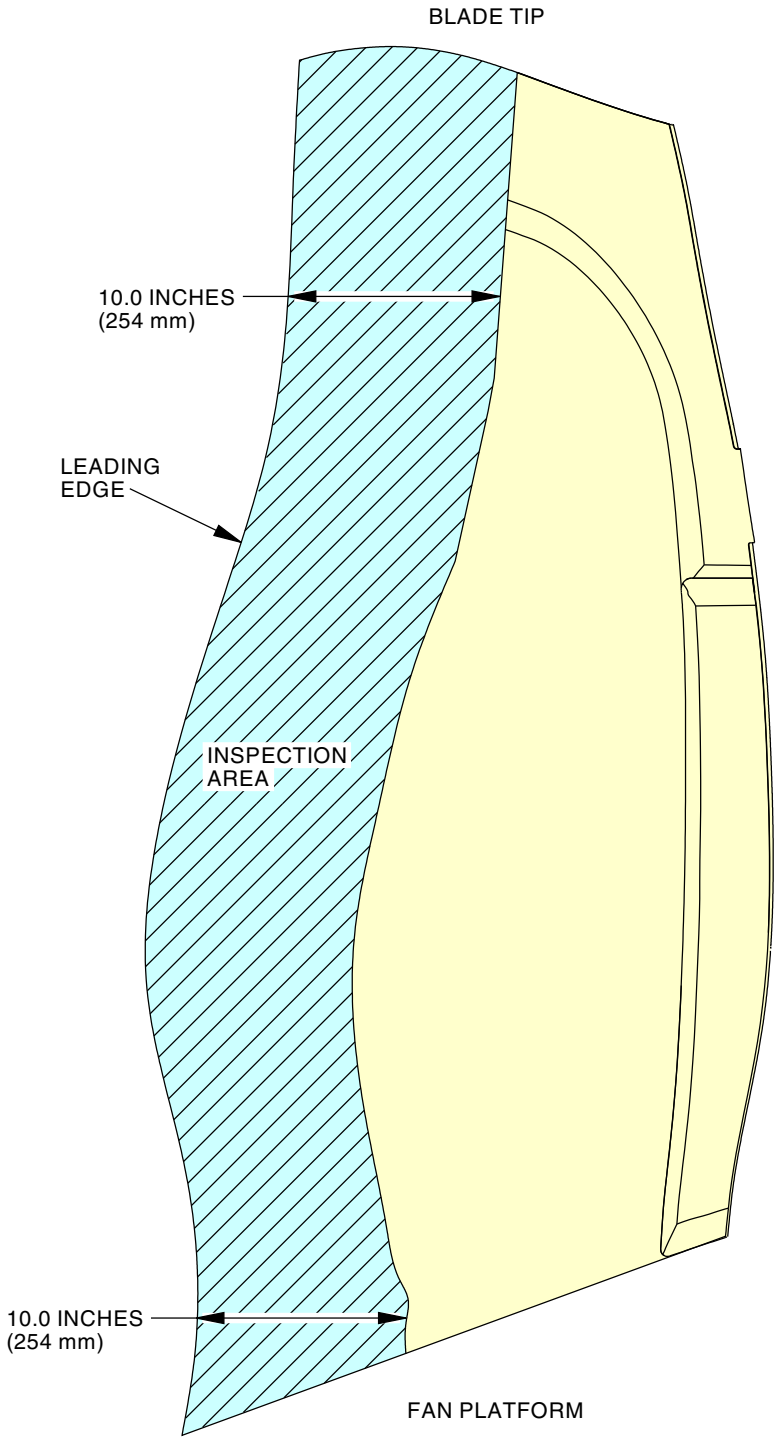

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 3 of 20)

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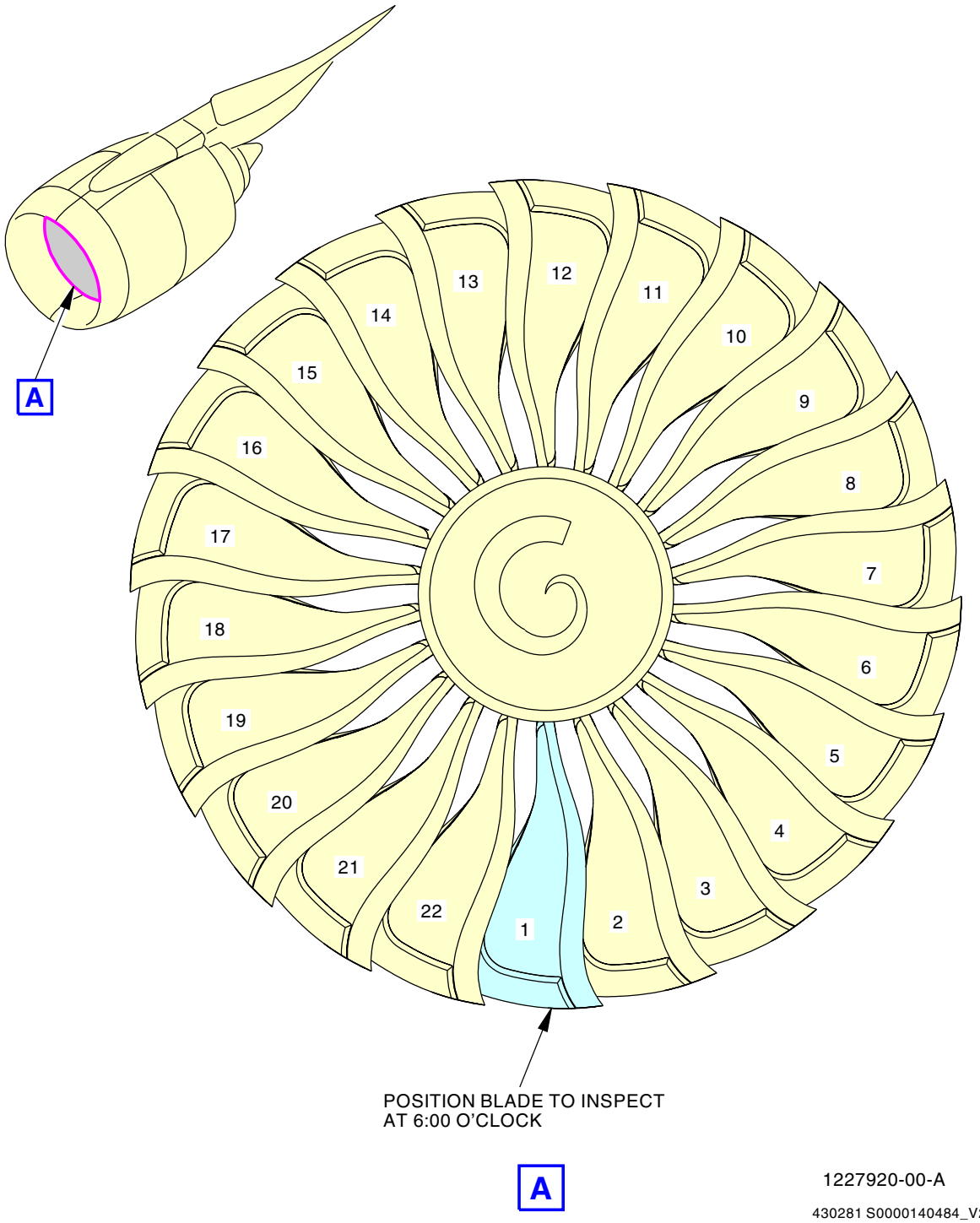

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 4 of 20)

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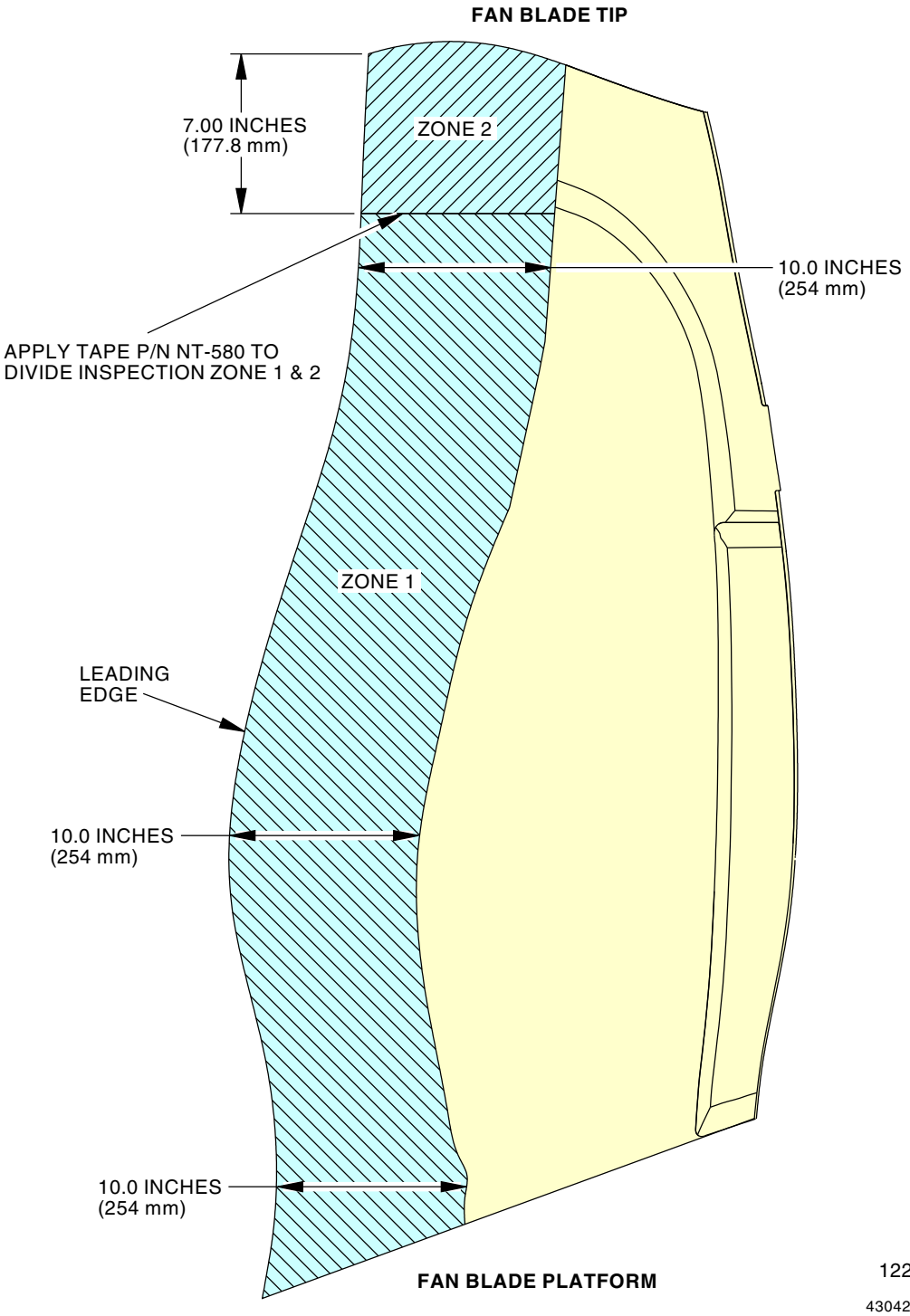

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 5 of 20)

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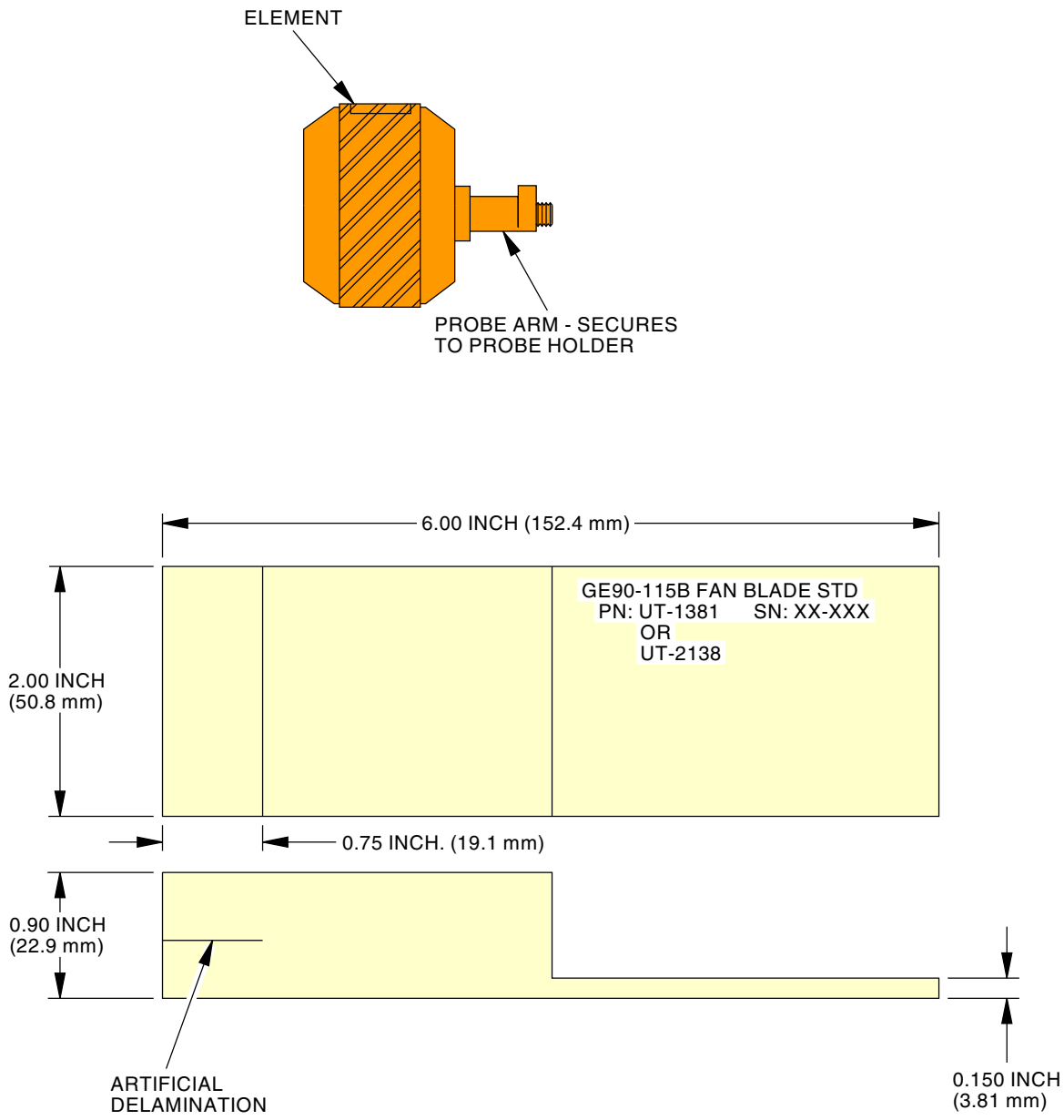

GE90-115B FAN BLADE STANDARD
PN: UT-1381 OR UT-2138

1227923-00-A

430305 S0000140486_V3

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 6 of 20)

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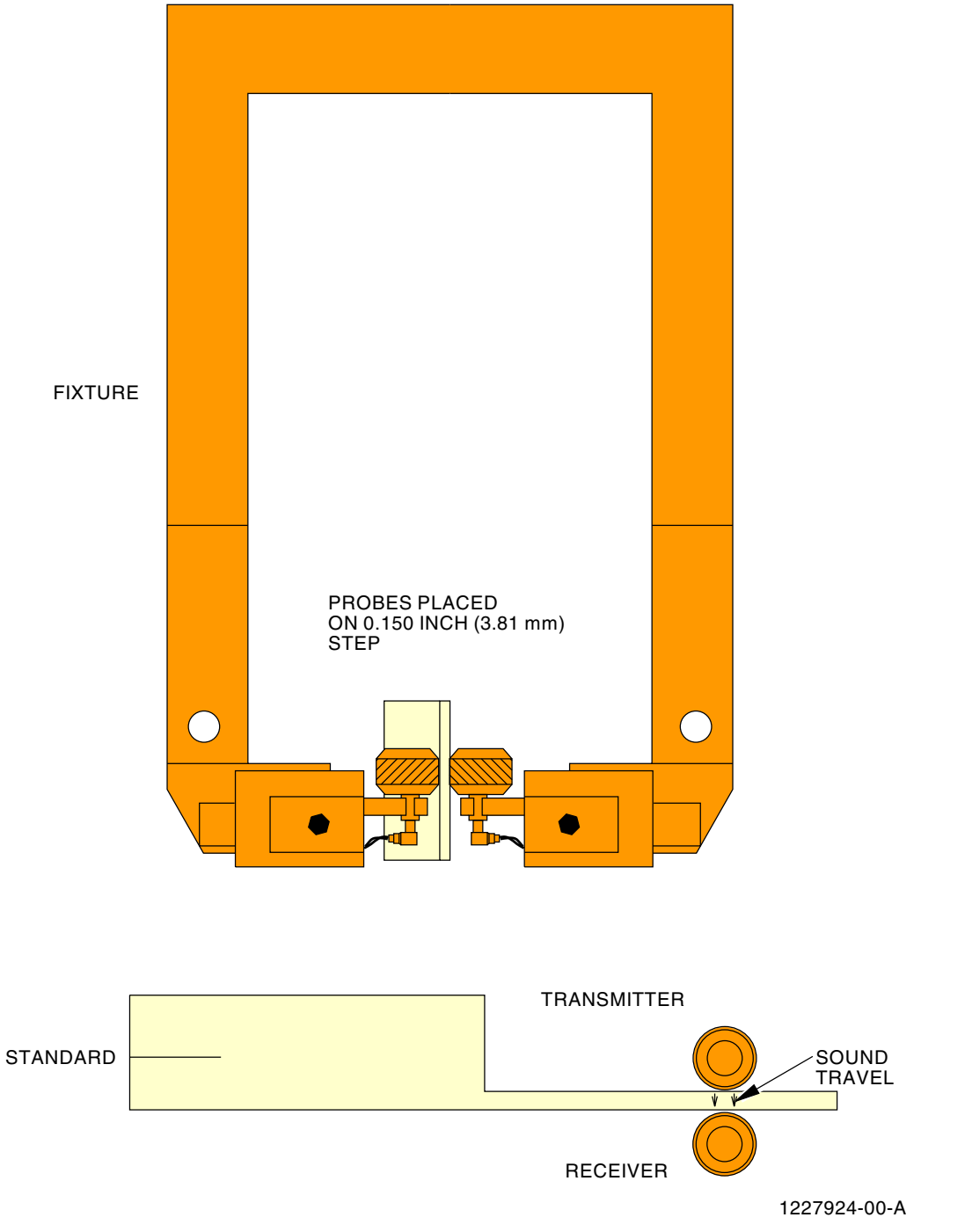

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 7 of 20)

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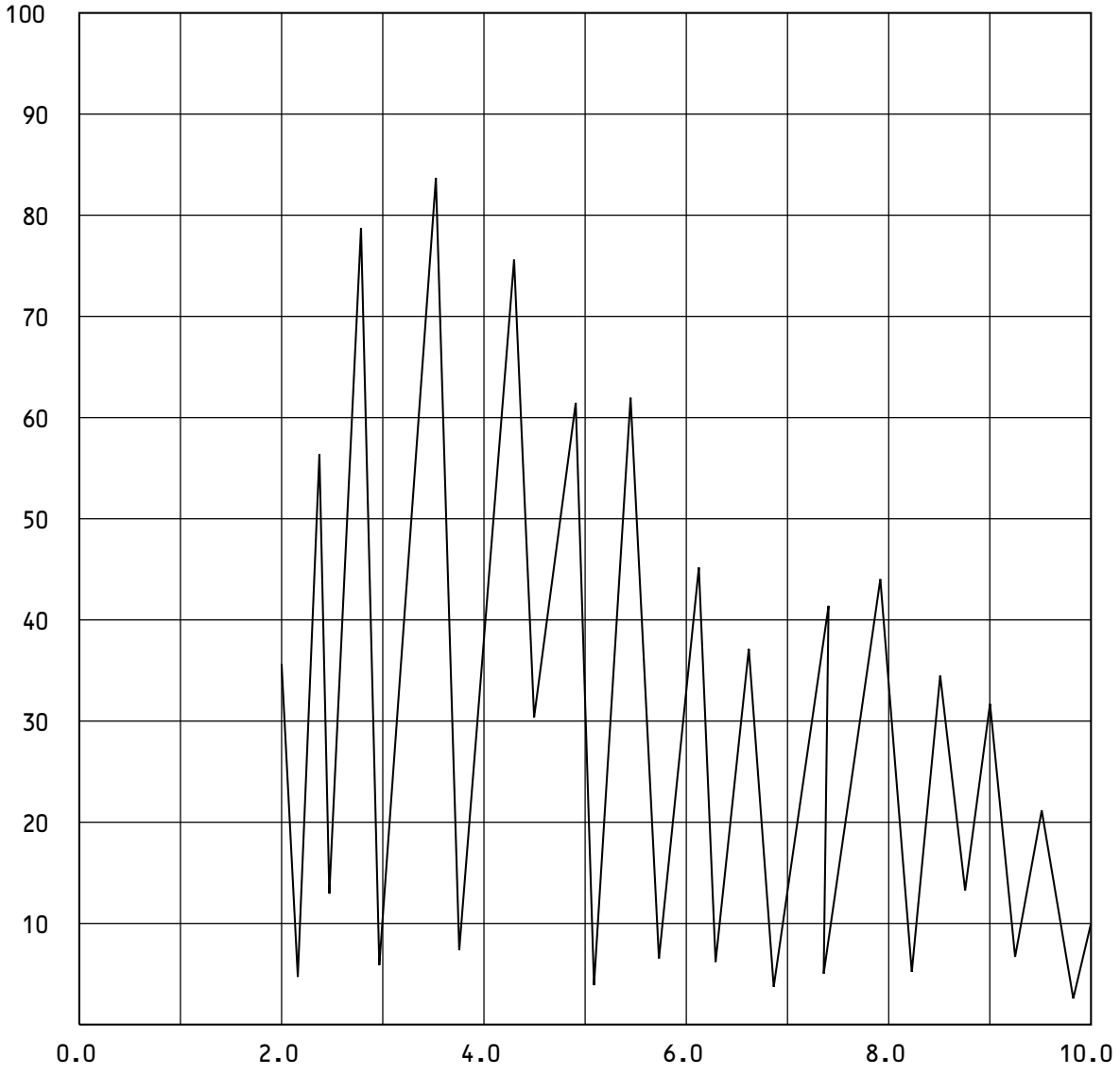

1227925-00-A
430427 S0000140488_V1

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 8 of 20)

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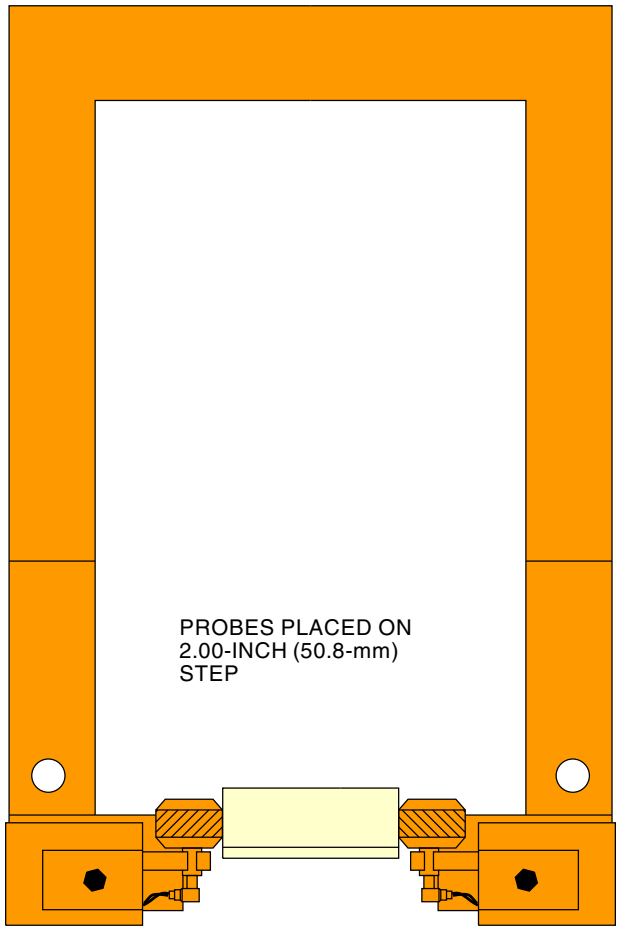

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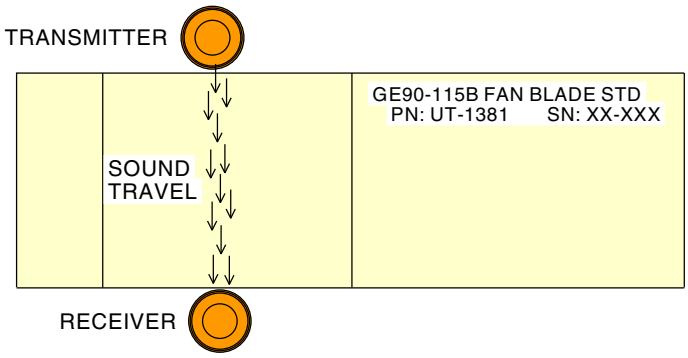

STANDARD

1227926-00-A

430419 S0000140489_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 9 of 20)

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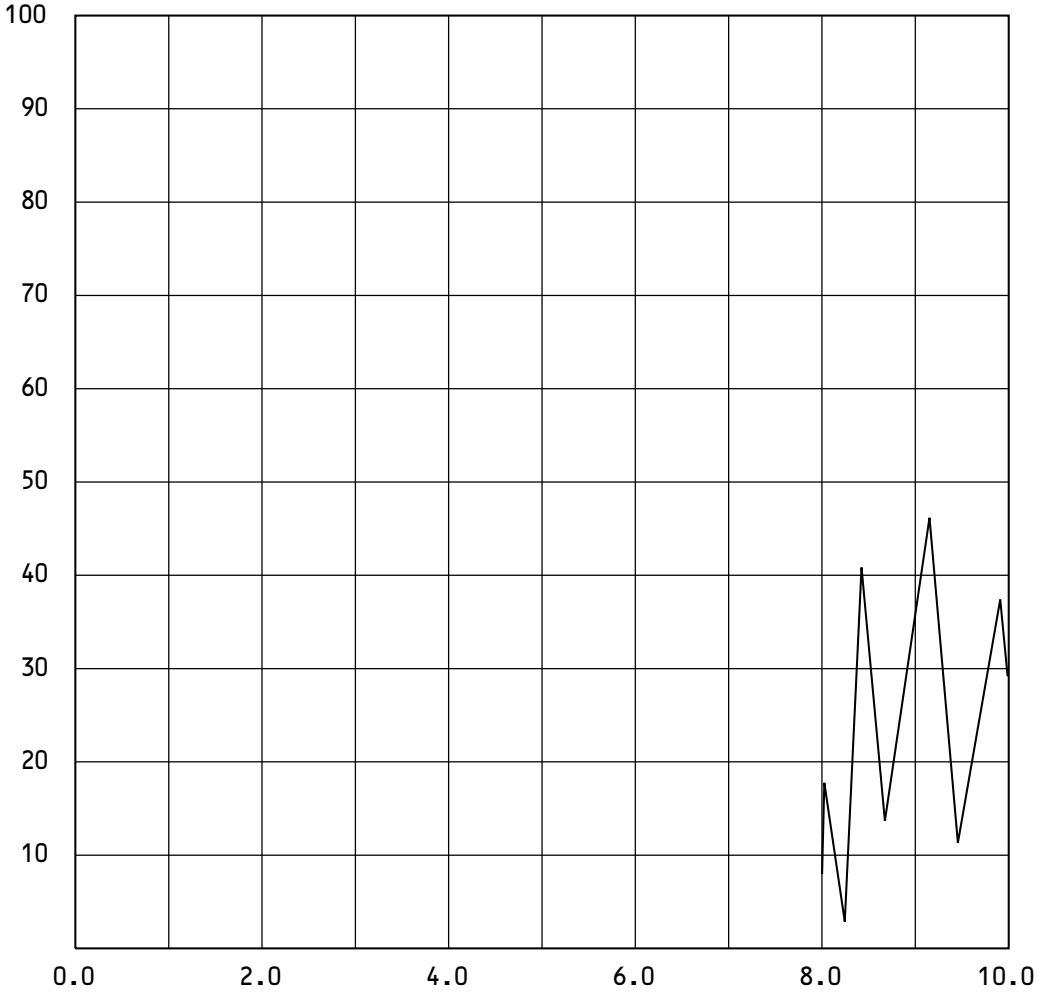

1227927-00-A
430409 S0000140490_V1

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 10 of 20)

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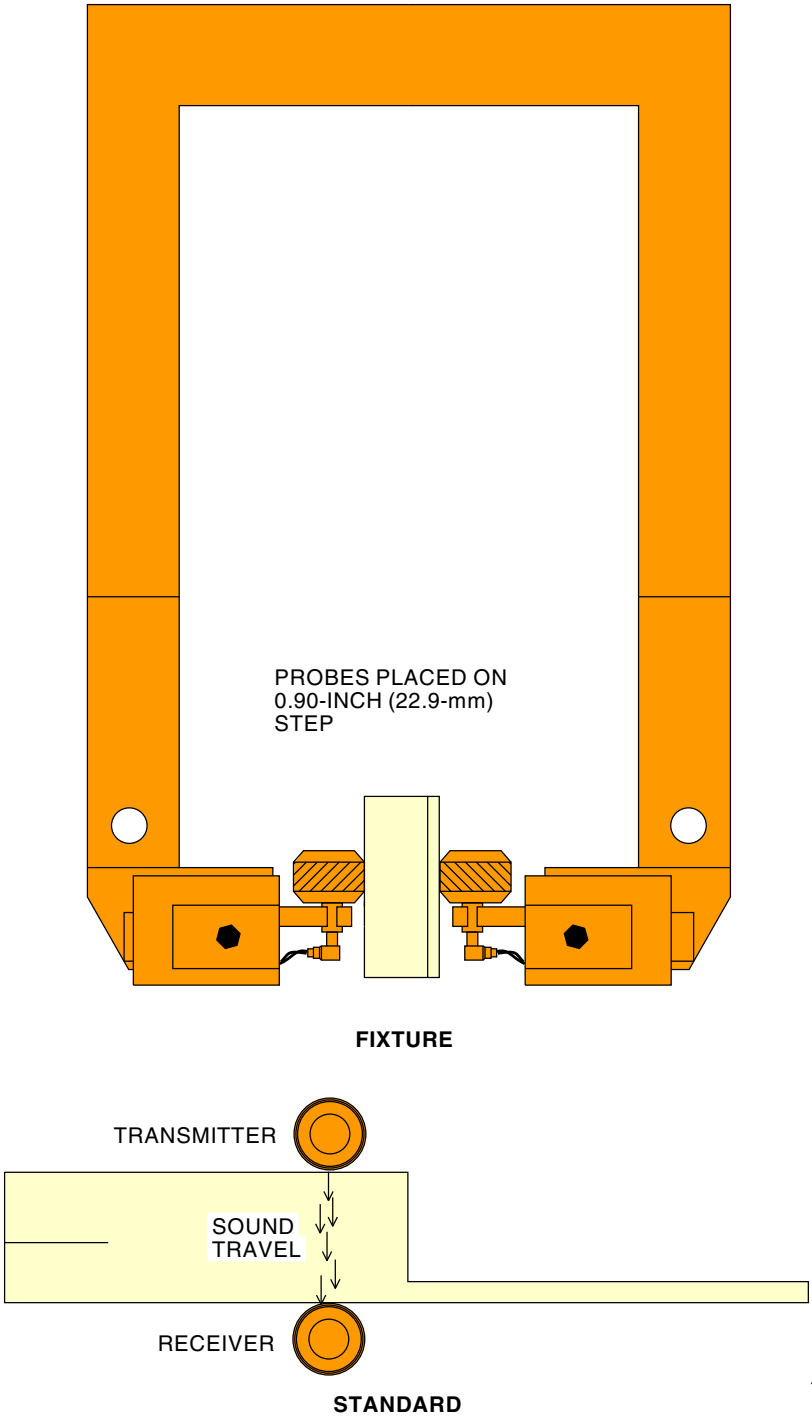

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 11 of 20)

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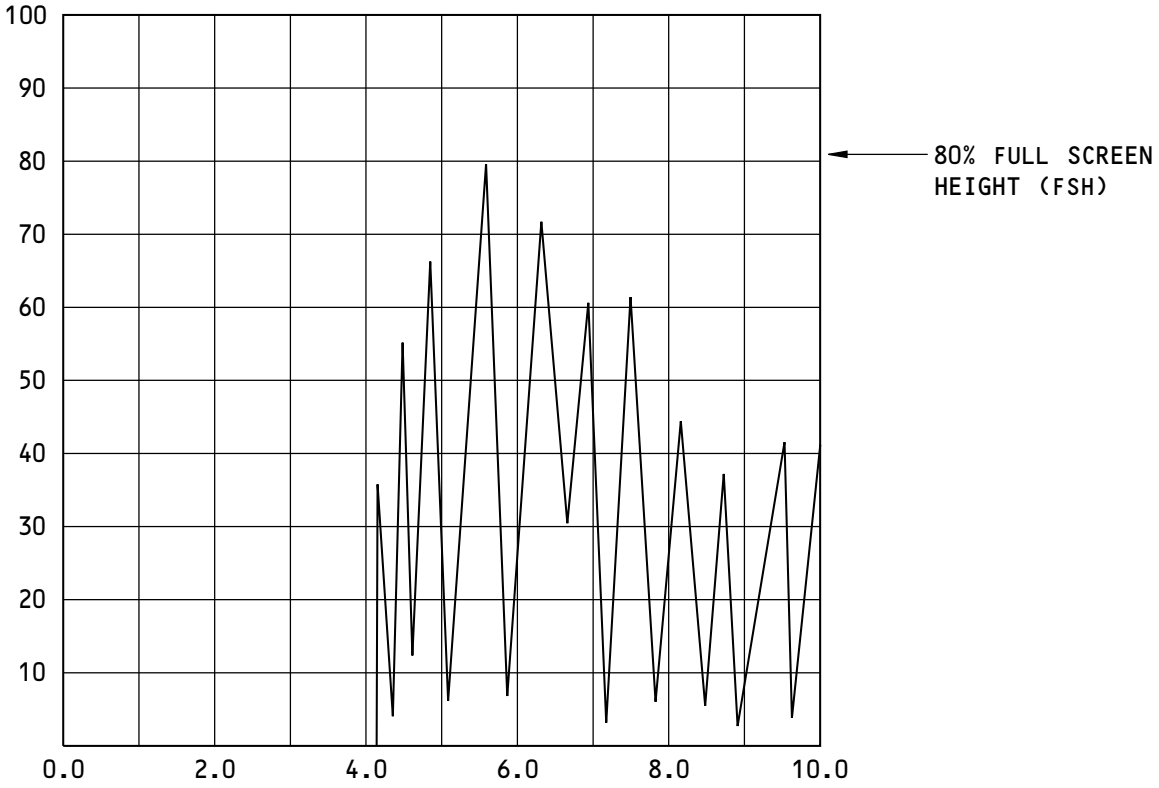

1227929-00-A
430364 S0000140493_V1

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 12 of 20)

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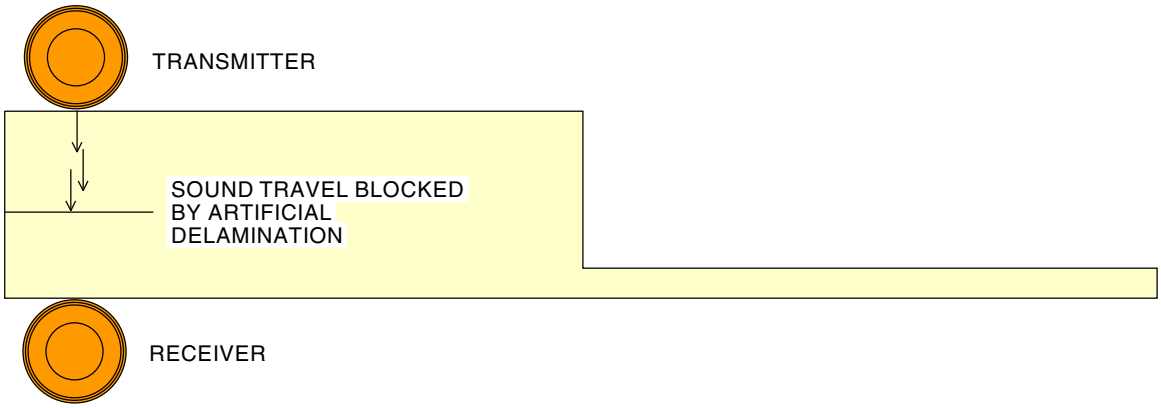

1227930-00-A

430354 S0000140494_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 13 of 20)

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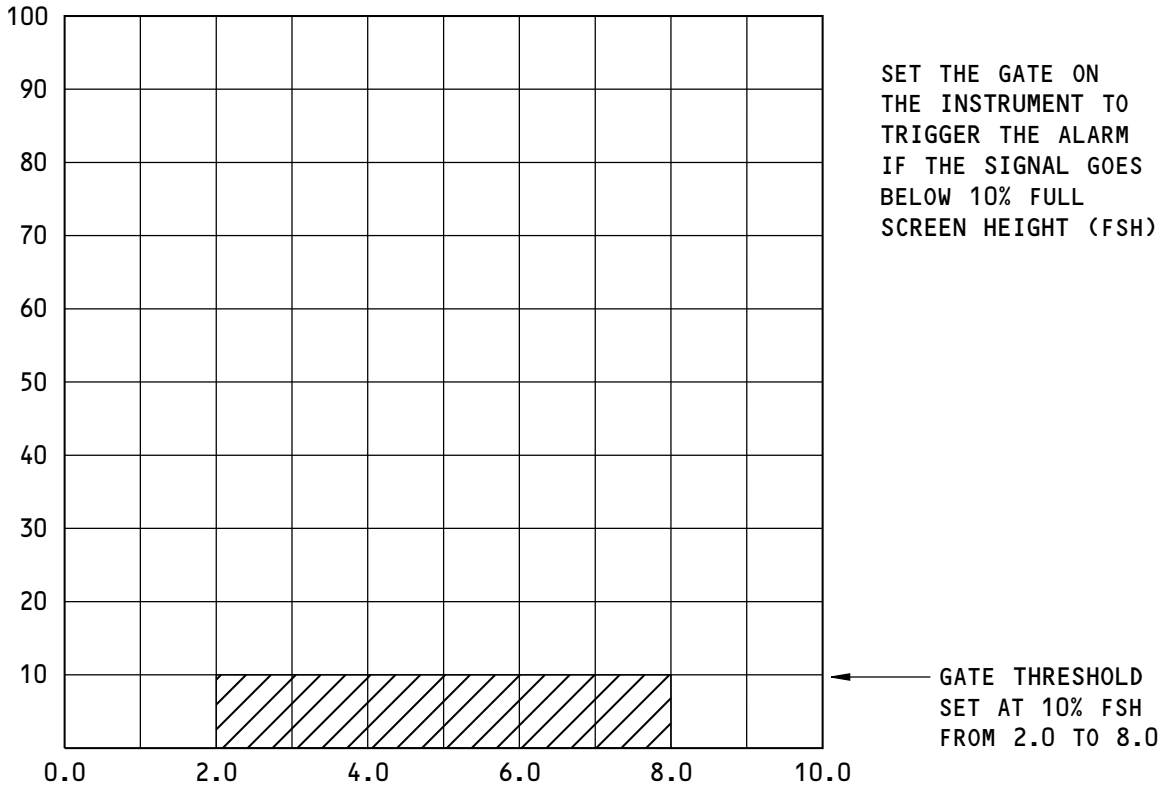

1227931-00-A
430412 S0000140495_V1

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 14 of 20)

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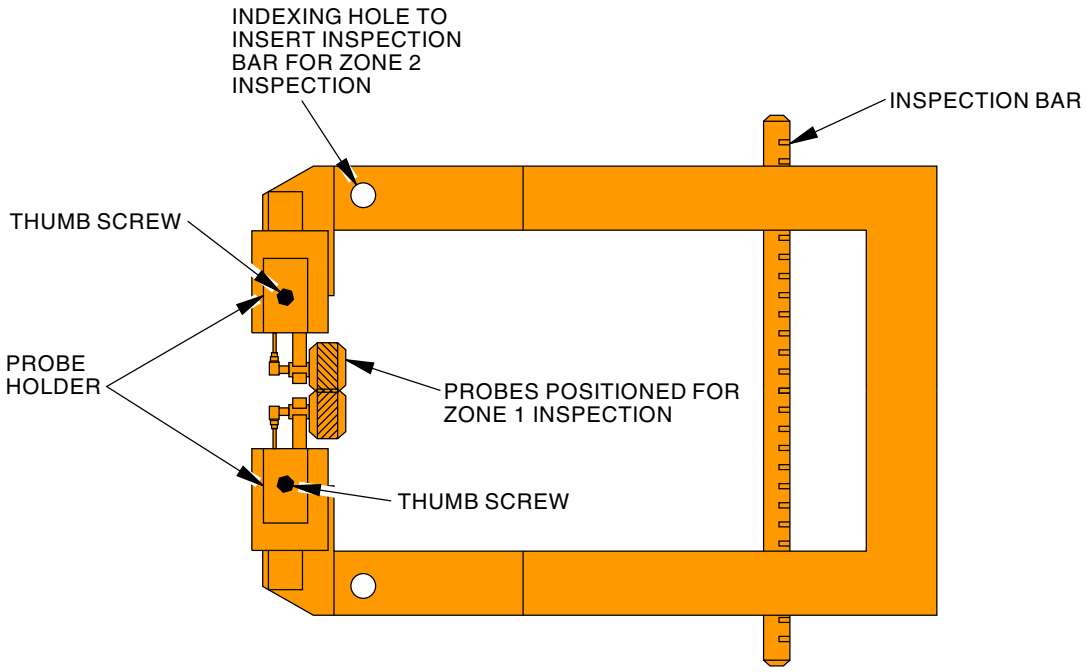

1227922-00-A

430325 S0000140496_V3

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 15 of 20)

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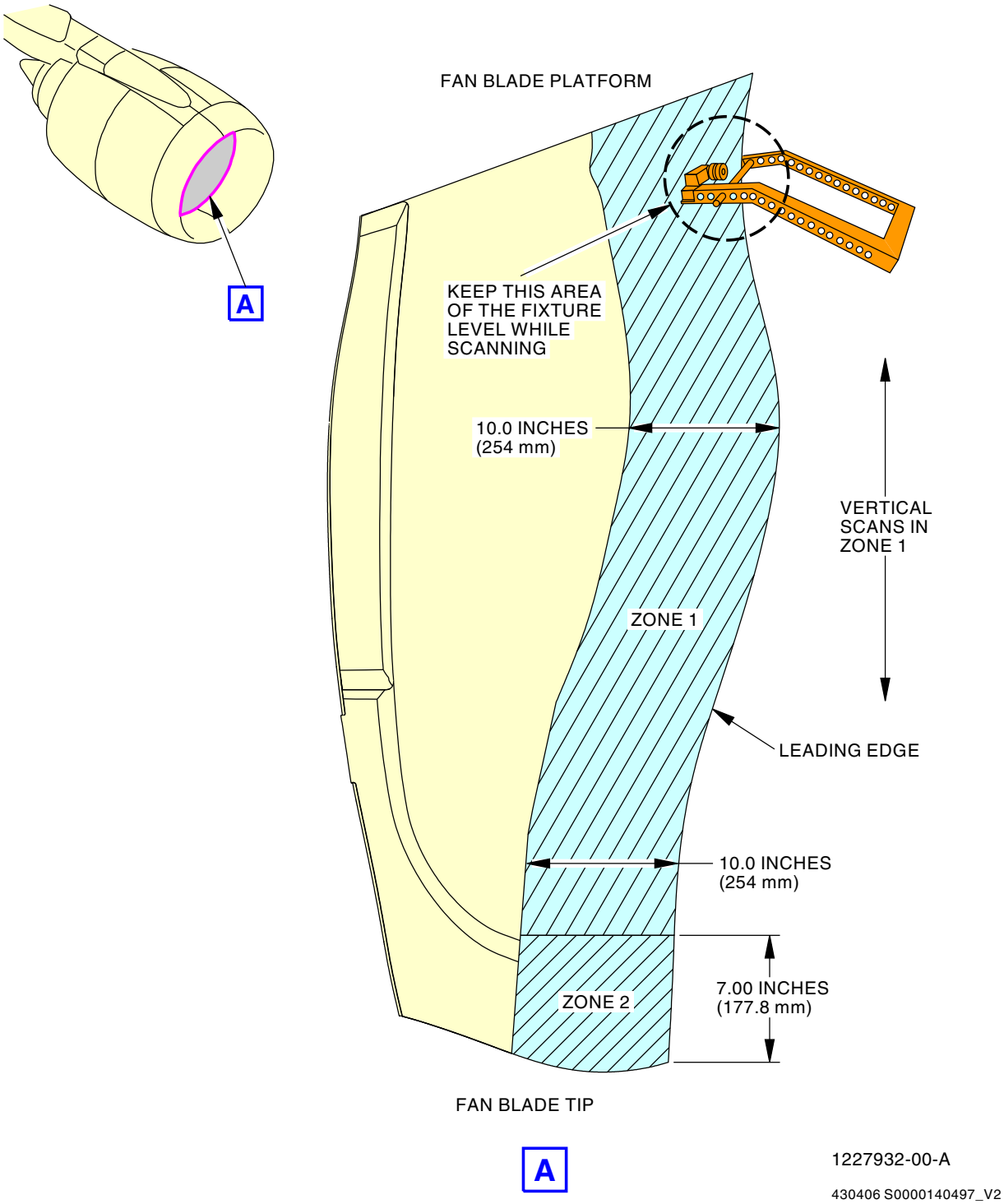

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 16 of 20)

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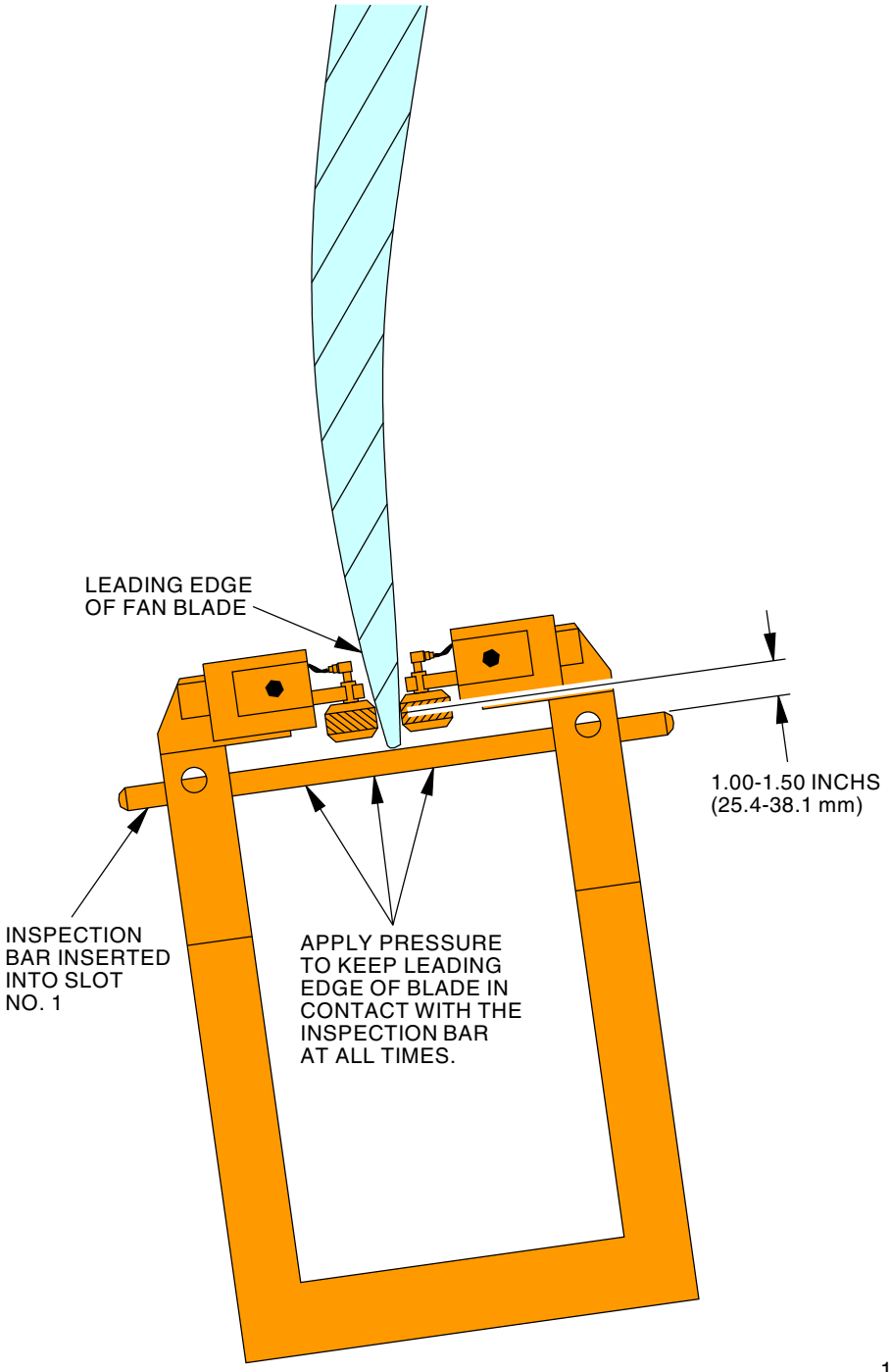

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 17 of 20)

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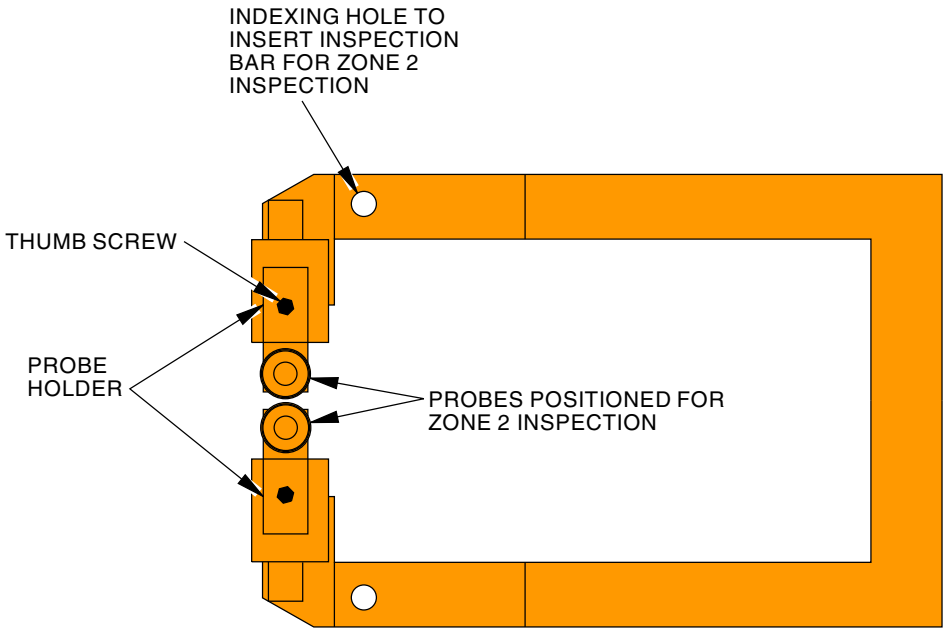
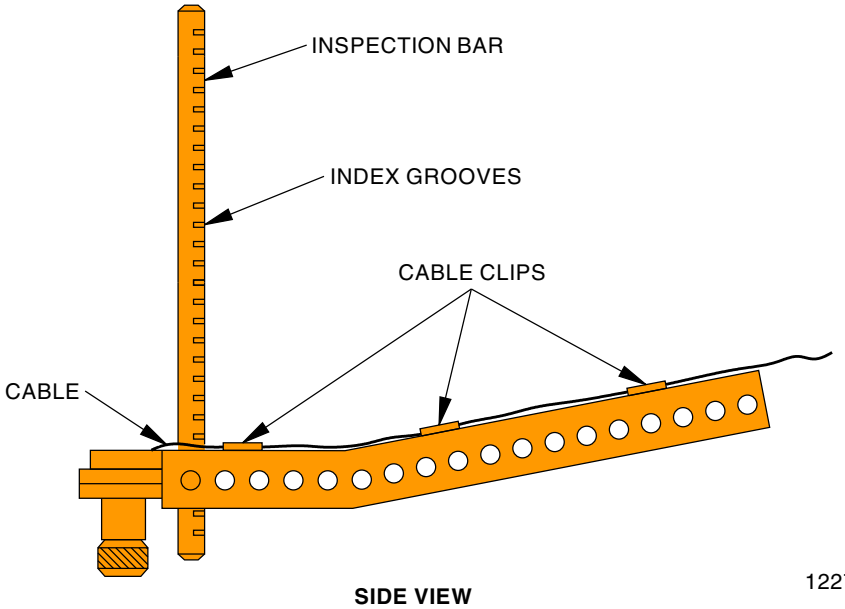


TOP VIEW



SIDE VIEW

1227934-00-A
430359 S0000140499_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 18 of 20)

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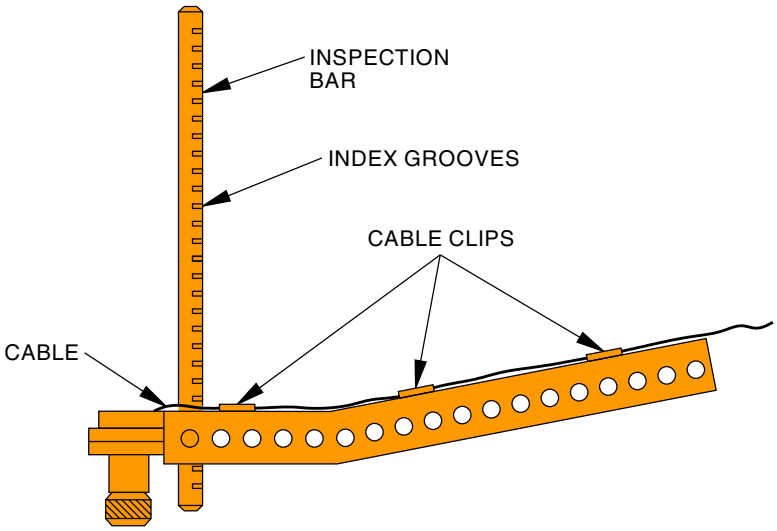
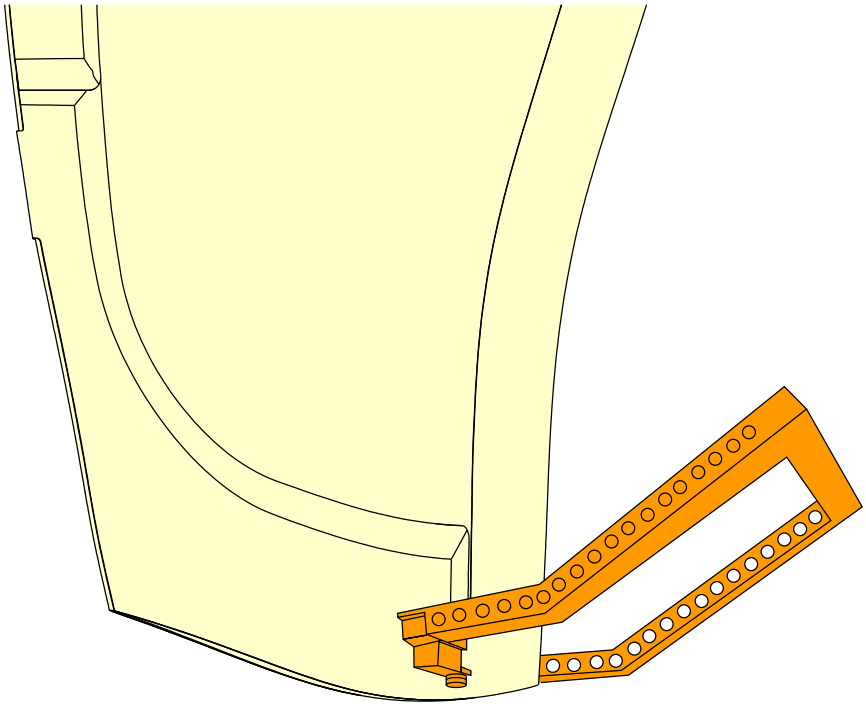


SIDE VIEW



FAN BLADE TIP

HORIZONTAL SCANS IN ZONE 2

1227935-00-A

430417 S0000140500_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 19 of 20)

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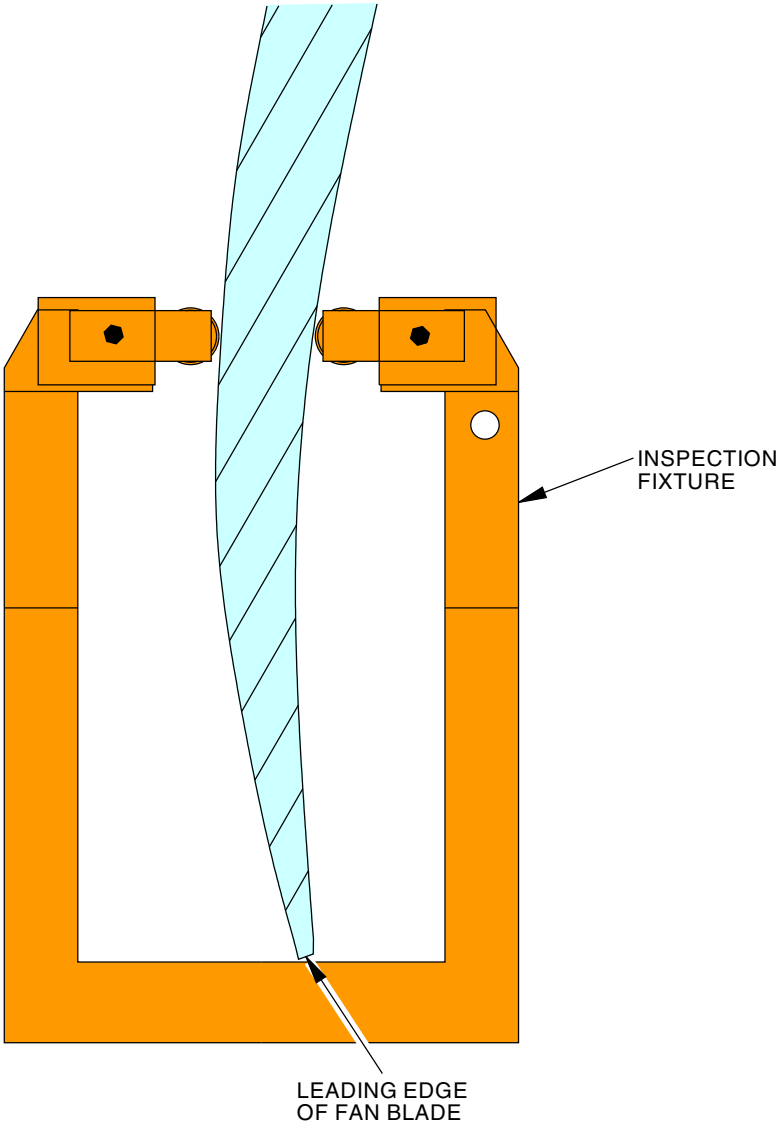

SCAN UNTIL THE LEADING EDGE OF THE FAN BLADE MAKES CONTACT WITH THE INSPECTION FIXTURE

1227936-00-A

430351 S0000140501_V2

Ultrasonic Fan Blade Inspection
Figure 603/71-00-00-990-821-H01 (Sheet 20 of 20)

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TASK 71-00-00-200-802-H01

4. Engine Foreign Object Damage Inspection

A. General

(1) This task is an inspection of the engine for damage due to suspected ingestion of foreign objects, or an icing event.

B. References

Reference	Title
24-11-00-200-801	Generator Drive System Inspection/Check (P/B 601)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-700-809-H01	Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey (P/B 501)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-290-803-H01	High Pressure Compressor Section Rotor Inspection (P/B 601)
72-00-00-290-805-H01	High Pressure Turbine Section Stage One Nozzle (Except the Leading Edge) and Stage 1 Shroud Inspection (P/B 601)
72-00-00-290-807-H01	Low Pressure Turbine Section Rotor Inspection (P/B 601)
72-21-00-200-801-H01	Fan Rotor Spinner and Support Ring (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-200-802-H01	Fan Booster Stage 1 Vane Outer Shroud Inspection (P/B 601)
72-21-00-200-803-H01	Fan Blade (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-220-801-H01	Fan Booster Flowpath Spacer (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-00-220-803-H01	Fan Blade Platforms (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-21-04-200-802-H01	Visually Examine the Fan Booster Acoustic Panels (P/B 601)
72-24-00-200-802-H01	Fan Abradable Shroud Inspection (P/B 601)
72-24-00-200-804-H01	Fan Outlet Guide Vane (OGV) Inspection (P/B 601)
72-24-00-200-807-H01	Fan Stator Case Outlet Guide Vane (OGV) Fairing Inspection (P/B 601)
72-24-01-200-801-H01	Fan Stator Case Forward Outer Acoustic Liner Inspection (P/B 601)
72-24-01-200-802-H01	Fan Stator Case Aft Outer Acoustic Liner Inspection (P/B 601)
73-21-00-200-801-H01	Fuel Control System Inspection (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left

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(Continued)

Zone	Area
421	Engine, Right

D. Access Panels

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

E. Prepare for Inspection

SUBTASK 71-00-00-010-002-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

F. Engine Foreign Object Damage Inspection

SUBTASK 71-00-00-210-003-H01

(1) Examine the engine inlet and the primary nozzle for damage:

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(a) Wire particles are permitted in the primary nozzle if the maximum particle diameter is 0.003 inch (0.076 mm) and the maximum length is 0.80 inch (20.32 mm).

(b) Sheet metal particles are permitted in the primary nozzle if the particles are 0.004 (0.100 mm) - 0.006 inch (0.150 mm) thick with a maximum dimension of 0.6 inch (15.2 mm).

(c) If you find other materials, do the step that follows before the subsequent start.

1) Do this task: High Pressure Turbine Section Stage One Nozzle (Except the Leading Edge) and Stage 1 Shroud Inspection, TASK 72-00-00-290-805-H01.

SUBTASK 71-00-00-210-004-H01

(2) Examine the fan rotor spinner, and aft support ring for damage (TASK 72-21-00-200-801-H01).

SUBTASK 71-00-00-210-005-H01

(3) Examine the fan blade platforms for damage (TASK 72-21-00-220-803-H01).

SUBTASK 71-00-00-210-006-H01

(4) Examine the flow path spacer for damage (TASK 72-21-00-220-801-H01).

SUBTASK 71-00-00-210-007-H01

(5) Examine the fan blade leading edge tip and metal strip, and trailing edge tip caps for damage (TASK 72-21-00-200-803-H01).

SUBTASK 71-00-00-210-008-H01

(6) Examine the forward outer and aft outer acoustic panels for damage (TASK 72-24-01-200-801-H01 and TASK 72-24-01-200-802-H01).

SUBTASK 71-00-00-210-009-H01

(7) Examine the booster acoustic panels for damage (TASK 72-21-04-200-802-H01).

SUBTASK 71-00-00-210-010-H01

(8) Examine the booster inlet guide vanes for damage (TASK 72-21-00-200-802-H01).

SUBTASK 71-00-00-210-011-H01

(9) Examine the T12 sensor for damage (TASK 73-21-00-200-801-H01).

SUBTASK 71-00-00-210-012-H01

(10) Examine the fan abradable shroud for damage (TASK 72-24-00-200-802-H01).

SUBTASK 71-00-00-210-013-H01

(11) Examine the fan outlet guide vanes for damage (TASK 72-24-00-200-804-H01).

SUBTASK 71-00-00-210-073-H01

(12) Examine the fan OGV fairings for damage (TASK 72-24-00-200-807-H01).

SUBTASK 71-00-00-210-014-H01

(13) Examine the integrated drive generator (IDG) and variable-speed constant-frequency (VSCF) air/oil heat exchanger for damage (TASK 24-11-00-200-801).

SUBTASK 71-00-00-200-004-H00

(14) Monitor later flights for one of the conditions that follows:

(a) One or both engines experienced high N1 vibration and the conditions that follow:

1) There is no engine stalls and no report of N1, N2 or EGT exceedances or other reported engine problems.

2) The high fan vibration cleared before landing.

NOTE: High fan vibration can occur from icing or high altitude ice crystal icing conditions.

3) If you see changes in vibration, do these tasks in or less than 10 flight cycles:

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a) Do this task: Low Pressure Turbine Section Rotor Inspection, TASK 72-00-00-290-807-H01.

b) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

(b) One or both engines experienced high LPT vibration and the conditions that follow:

1) High LPT vibration with no engine stalls.

2) No report of N1, N2 or EGT exceedances or other reported engine problems.

3) If you see changes in vibration, do these tasks in or less than 10 flight cycles:

a) Do this task: Low Pressure Turbine Section Rotor Inspection, TASK 72-00-00-290-807-H01.

b) Do this task: Test No. 10 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-700-809-H01.

(c) One engine experienced high N2 vibration and the conditions that follow:

1) There is no report of N1, N2 or EGT exceedances, fluctuations or a booster ingestion report.

2) Engine stall occurred.

3) If these conditions have occurred, do this task:

a) Examine the high pressure compressor (HPC) stage one, two, four, and eight blades with a borescope for damage (TASK 72-00-00-290-803-H01).

NOTE: Signs of booster ingestion are indications on the spinners, fan blade platforms, fan blades in the area that is from spinner platform interface to 24 inches outboard of spinner platform interface, or the booster acoustic panels.

4) If you find damage on the HPC stage one, two, four, and/or eight blades, examine all other HPC blade stages you can get access to for damage (TASK 72-00-00-290-803-H01).

(d) Both engines experience high N2 vibration and the conditions that follow:

1) There is no report of N1, N2 or EGT exceedances, fluctuations or a booster ingestion report.

2) Engine stall occurred.

3) If these conditions have occurred, do this task:

a) For one engine, examine the high pressure compressor (HPC) stage one, two, four, and eight blades with a borescope for damage (TASK 72-00-00-290-803-H01).

NOTE: Signs of booster ingestion are indications on the spinners, fan blade platforms, fan blades in the area that is from spinner platform interface to 24 inches outboard of spinner platform interface, or the booster acoustic panels.

4) If you find damage on the HPC stage one, two, four, and/or eight blades, examine all other HPC blade stages you can get access to for damage (TASK 72-00-00-290-803-H01).

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5) For the other engine, in or less than 10 cycles, examine the high pressure compressor (HPC) stage one, two, four, and eight blades with a borescope for damage (TASK 72-00-00-290-803-H01).

NOTE: You must do this inspection if there is no damage on the first engine that is examined.

6) If you find damage on the HPC stage one, two, four, and/or eight blades, examine all other HPC blade stages you can get access to for damage (TASK 72-00-00-290-803-H01).

NOTE: This inspection can be deferred for 10 cycles, if the engine parameters are normal, booster inlet guide vanes are serviceable and there is no sign of booster ingestion.

SUBTASK 71-00-00-210-015-H01

(15) Examine the PT25 sensor when an engine stall or engine fluctuation was the result of foreign object ingestion (TASK 73-21-00-200-801-H01).

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-002-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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TASK 71-00-00-200-803-H01

5. No or Low Oil Pressure Inspection

A. General

(1) This task is an inspection for possible engine damage because of an operation at or below the redline oil pressure limit.

B. References

Reference	Title
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Engine Low Oil Pressure Inspection

SUBTASK 71-00-00-280-002-H01

(1) If there was oil pressure when the engine was stopped, do these steps:

(a) Find the cause of the low oil pressure.

(b) Service the oil tank after you complete the repair (TASK 12-13-01-130-803-002).

SUBTASK 71-00-00-280-003-H01

(2) If the engine ran for 60 seconds or less with no oil pressure, do these steps:

(a) Find the cause of the low oil pressure.

(b) Service the oil tank after you complete the repair (TASK 12-13-01-130-803-002).

SUBTASK 71-00-00-750-001-H01

(3) Use a maintenance access terminal (MAT) to find the DMS maintenance messages.

(a) Make these selections on the MAT:

1) ONBOARD MAINTENANCE

2) LINE MAINTENANCE

3) PRESENT LEG FAULT

4) CONTINUE

(b) Look for the applicable DMS system Debris maintenance message 79-11561 (L ENG) or 79-11562 (R ENG), in the uncorrelated message category.

1) IF you find the fault messages, do the corrective action in the FIM.

(c) Select EXIT MAINTENANCE from the line maintenance menu.

(d) Service the oil tank after you complete the repair (TASK 12-13-01-130-803-002).

SUBTASK 71-00-00-280-004-H01

(4) If the engine ran with no oil pressure for more than 60 seconds:

(a) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.

——— END OF TASK ———

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TASK 71-00-00-200-804-H01

6. In-Flight Windmilling Inspection

A. General

(1) This task is an inspection for possible damage when the rotors have windmilled in-flight because of an engine shutdown.

B. References

Reference	Title
71-00-00-800-805-H01	Engine Automatic Start (P/B 201)
71-00-03-600-807-H01	Dry-Out of An Installed Engine After An In-flight Shutdown (Engine On-Wing) (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. In-Flight Windmilling Inspection

SUBTASK 71-00-00-280-005-H01

(1) Make sure there was oil pressure at the time the engine was stopped.

(a) If there was no oil pressure when the engine was stopped:

1) Do an inspection for no or low oil pressure (TASK 71-00-00-200-803-H01).

SUBTASK 71-00-00-810-001-H01

(2) Correct the reason for the engine shutdown.

SUBTASK 71-00-00-860-001-H01

(3) Operate the engine for 5 minutes at ground idle, not more than 6 hours after landing (TASK 71-00-00-800-805-H01).

SUBTASK 71-00-00-620-001-H01

(4) Do the engine dryout procedure if the engine is not operated.

(a) Do this task: Dry-Out of An Installed Engine After An In-flight Shutdown (Engine On-Wing), TASK 71-00-03-600-807-H01.

——— END OF TASK ———

TASK 71-00-00-200-805-H01

7. Overspeed Inspection

A. General

(1) This task is an inspection for possible engine damage because of an N1 low pressure system overspeed or an N2 high pressure system overspeed.

(2) The decision to do an on-wing inspection or a disassembly inspection is dependent on the proportion of the overspeed.

B. References

Reference	Title
31-61-00	PRIMARY DISPLAY SYSTEM
31-61-00-800-806	Erasing a Snapshot with the Page Menu (P/B 201)
31-61-00-800-810	Erasing a Snapshot with the Erase Selection Menu (P/B 201)

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(Continued)

Reference	Title
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-00-02-400-811-H00	Power Plant Installation (P/B 401)
72-00-00-290-803-H01	High Pressure Compressor Section Rotor Inspection (P/B 601)
72-00-00-290-806-H01	High Pressure Turbine Section Rotor (Stage 1 and 2 blades), Stage 2 Nozzle and Stage 2 Shroud Inspection (P/B 601)
72-00-00-290-807-H01	Low Pressure Turbine Section Rotor Inspection (P/B 601)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Procedure

SUBTASK 71-00-00-280-006-H01

(1) Examine the N1 for the overspeed:

NOTE: After the cause of the N1 overspeed has been identified and the applicable repairs are completed, you can clear the exceedance indication. To erase the auto-snapshot, do one of these tasks: Erasing a Snapshot with the Erase Selection Menu, TASK 31-61-00-800-810, Erasing a Snapshot with the Page Menu, TASK 31-61-00-800-806.

(a) Access the engine indicating and crew alerting system (EICAS) Maintenance (Exceedance) Page and determine the maximum speed at the time of the N1 overspeed.

(b) If the N1 overspeed was more than 114.4%, replace the engine. These are the tasks: Power Plant Removal, TASK 71-00-02-000-811-H00 and Power Plant Installation, TASK 71-00-02-400-811-H00.

(c) If the N1 overspeed was not more than 114.4%, do these tasks:

1) Examine the inlet and exhaust for damage.

2) Use a maintenance access terminal (MAT) to find the DMS maintenance messages.

3) Make these selections on the MAT:

a) ONBOARD MAINTENANCE

b) LINE MAINTENANCE

c) PRESENT LEG FAULT

d) CONTINUE

4) Look for the applicable DMS system Debris maintenance message 79-11561 (L Eng) or 79-11562 (R Eng), in the uncorrelated message category.

a) If you find the fault messages, do the corrective action in the FIM.

5) Select EXIT MAINTENANCE from the line maintenance menu.

6) Do the borescope inspection on the booster stage four blades.

7) Do the borescope inspection on the LPT stage one blades (Low Pressure Turbine Section Rotor Inspection, TASK 72-00-00-290-807-H01).

SUBTASK 71-00-00-280-007-H01

(2) Examine the N2 for the overspeed:

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(a) Access the engine indicating and crew alerting system (EICAS) Maintenance (Exceedance) Page and determine the maximum speed at the time of the N2 overspeed.

(b) If the N2 overspeed was more than 122.8%, replace the engine. These are the tasks: Power Plant Removal, TASK 71-00-02-000-811-H00 and Power Plant Installation, TASK 71-00-02-400-811-H00.

(c) If the N2 overspeed was not more than 122.8%, do these tasks.

1) Examine the inlet and exhaust for damage.

2) Use a maintenance access terminal (MAT) to find the DMS maintenance messages.

3) Make these selections on the MAT:

a) ONBOARD MAINTENANCE

b) LINE MAINTENANCE

c) PRESENT LEG FAULT

d) CONTINUE

4) Look for the applicable DMS system Debris maintenance message 79-11561 (L Eng) or 79-11562 (R Eng), in the uncorrelated message category.

a) IF you find the fault messages, do the corrective action in the FIM.

5) Select EXIT MAINTENANCE from the line maintenance menu.

6) If the N2 overspeed was more than 122.2%, do the borescope inspection on the HPC stages one, four, and eight blades(TASK 72-00-00-290-803-H01).

7) If the N2 overspeed was more than 122.2%, do the borescope inspection on the HPT stage one blades (TASK 72-00-00-290-806-H01).

(3) After you complete all of the troubleshooting and problem resolution, do the steps that follow. PRIMARY DISPLAY SYSTEM, SUBJECT 31-61-00.

(a) Erase any applicable EICAS messages.

(b) Erase the EICAS auto snapshot data saves.

(c) Reset the EGT display box.

——— END OF TASK ———

TASK 71-00-00-200-806-H01

8. Overtemperature Inspection

A. General

(1) This task is an inspection for possible engine damage because of an operation that exceeds start, takeoff, or maximum continuous EGT limits.

(2) The decision to do an on-wing inspection or a disassembly inspection is dependent on these conditions:

(a) The maximum given (recorded) EGT

(b) The length of time the EGT was above the maximum limit.

B. References

Reference	Title
31-61-00	PRIMARY DISPLAY SYSTEM
31-61-00-800-806	Erasing a Snapshot with the Page Menu (P/B 201)
31-61-00-800-810	Erasing a Snapshot with the Erase Selection Menu (P/B 201)

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(Continued)

Reference	Title
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-00-02-400-811-H00	Power Plant Installation (P/B 401)
72-00-00-290-805-H01	High Pressure Turbine Section Stage One Nozzle (Except the Leading Edge) and Stage 1 Shroud Inspection (P/B 601)
72-00-00-290-806-H01	High Pressure Turbine Section Rotor (Stage 1 and 2 blades), Stage 2 Nozzle and Stage 2 Shroud Inspection (P/B 601)
72-00-00-290-807-H01	Low Pressure Turbine Section Rotor Inspection (P/B 601)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Procedure

SUBTASK 71-00-00-280-008-H01

(1) Examine the Start EGT for the over limits (Exceedance) condition (Figure 604) and (Figure 605):

NOTE: After the cause of the EGT exceedance has been identified and the applicable repairs are completed, you can clear the exceedance indication by erasing the maintenance page auto-snapshot generated by the EGT exceedance event. To erase the auto-snapshot, do one of these tasks: Erasing a Snapshot with the Erase Selection Menu, TASK 31-61-00-800-810, Erasing a Snapshot with the Page Menu, TASK 31-61-00-800-806.

(a) Access the engine indicating and crew alerting system (EICAS) Maintenance (Exceedance) Page and determine the maximum EGT and the length of time of the start over limits.

(b) If the EGT was in the Area A, do the correction action of the start and pneumatic system in the FIM.

(c) If the EGT was in the Area B, do these tasks within ten cycle:

1) Do the borescope inspection on the HPT stage one blades within ten cycle (TASK 72-00-00-290-806-H01).

2) Do the correction action of the start and pneumatic system in the FIM.

(d) If the EGT was in the Area C, do these tasks before the next start:

1) Do the borescope inspection on the HPT stage one blades before the next start (TASK 72-00-00-290-806-H01).

2) Do the correction action of the start and pneumatic system in the FIM.

(e) If the EGT was in the Area D, replace the engine. These are the tasks: Power Plant Removal, TASK 71-00-02-000-811-H00 and Power Plant Installation, TASK 71-00-02-400-811-H00

SUBTASK 71-00-00-280-009-H01

(2) Examine the takeoff and maximum continuous EGT for the over limits (Exceedance) condition (Figure 605):

(a) Examine the takeoff and maximum continuous EGT for the over limits (Exceedance) condition.

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1) Access the engine indicating and crew alerting system (EICAS) Maintenance (Exceedance) Page and determine the maximum EGT and the length of time of the takeoff or maximum continuous limit (exceedance).
2) If there are ten EGT excursions into the Area A and or B, remove the engine (TASK 71-00-02-000-811-H00).
3) If the EGT was in the Area D, and you do not know the cause, do these tasks:
   a) Do a visual inspection of the engine inlet for damage before next flight.
   b) Do a visual inspection of the engine exhaust for damage before the next flight.
   c) If the inspections are satisfactory, continue the engine in service.
   d) Monitor the engine EGT performance trend and make sure the engine stays in the serviceable EGT margins.
4) If the EGT was in the Area D, and you know the cause, do these tasks:
   a) Correct the cause of the overtemperature.
   b) Monitor the engine EGT performance trend and make sure the engine stays in the serviceable EGT margins.
5) If the EGT was in the Area A, and you do not know the cause, do these tasks:
   a) Do a visual inspection of the engine inlet for damage before next flight.
   b) Do a visual inspection of the engine exhaust for damage before the next flight.
   c) Do the borescope inspection on the HPT stage one blades within ten cycles(TASK 72-00-00-290-806-H01).
   d) If the inspections are satisfactory, continue the engine in service.
6) If the EGT was in the Area A, and you know the cause, do these tasks:
   a) Correct the cause of the overtemperature.
   b) Monitor the engine EGT performance trend and make sure the engine stays in the serviceable EGT margins.
7) If the EGT was in the Area B, do these tasks:
   a) Do a visual inspection of the engine inlet for damage before next flight.
   b) Do a visual inspection of the engine exhaust for damage before the next flight.
   c) Do the borescope inspection on the HPT stage one blades within ten cycle (TASK 72-00-00-290-806-H01).
   d) If the inspections are satisfactory, continue the engine in service.
   e) Monitor the engine EGT performance trend and make sure the engine stays in the serviceable EGT margins.
8) If the EGT was in the Area C, do these tasks before the next start:
   a) Do the borescope inspection on the combustion and the HPT stage one blades before the next start (TASK 72-00-00-290-805-H01).
   b) Do the borescope inspection on the LPT stage one blades before the next start (TASK 72-00-00-290-807-H01).
   c) Within the ten cycles, replace the engine. These are the tasks: Power Plant Removal, TASK 71-00-02-000-811-H00 and Power Plant Installation, TASK 71-00-02-400-811-H00
   d) After you complete all of the troubleshooting and problem resolution, do the steps that follow. PRIMARY DISPLAY SYSTEM, SUBJECT 31-61-00.

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<1> Erase any applicable EICAS messages.

<2> Erase the EICAS auto snapshot data saves.

<3> Reset the EGT display box.

——— END OF TASK ———

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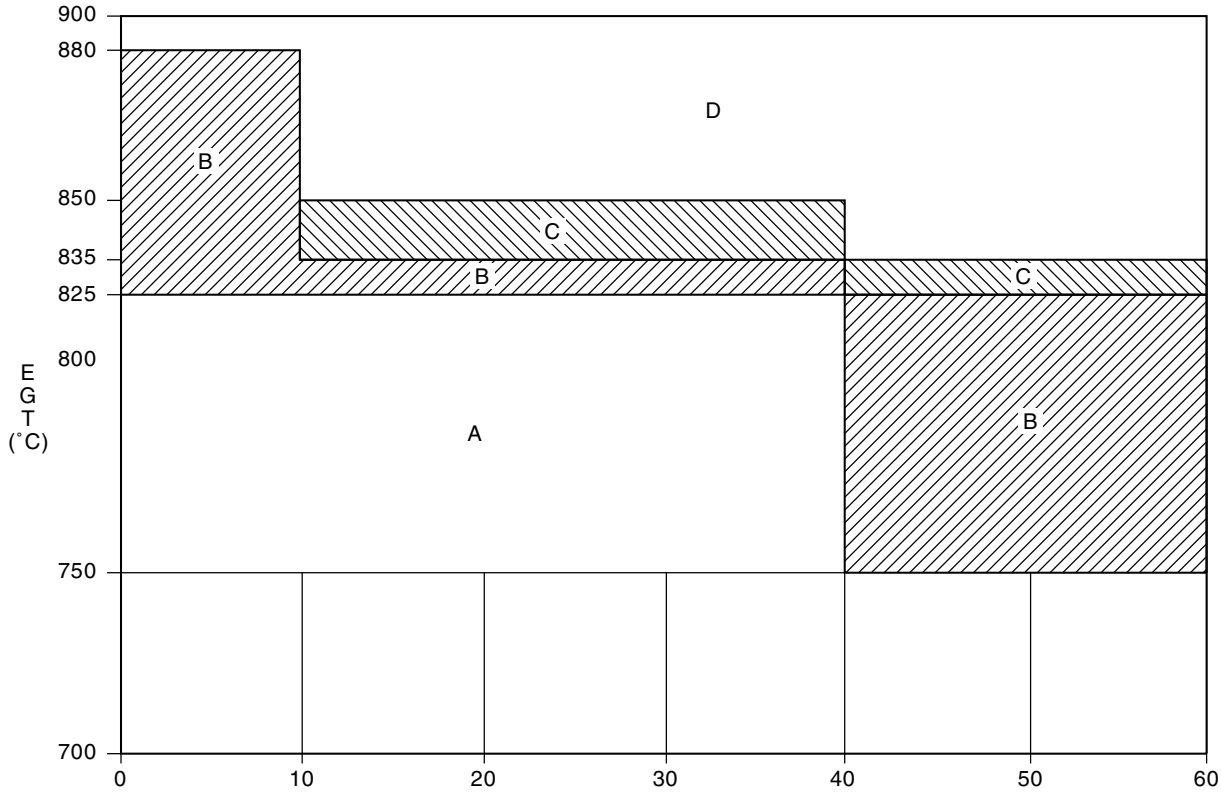

M06423 S0004285544_V2

Start EGT Exceedance Limits
Figure 604/71-00-00-990-802-H01

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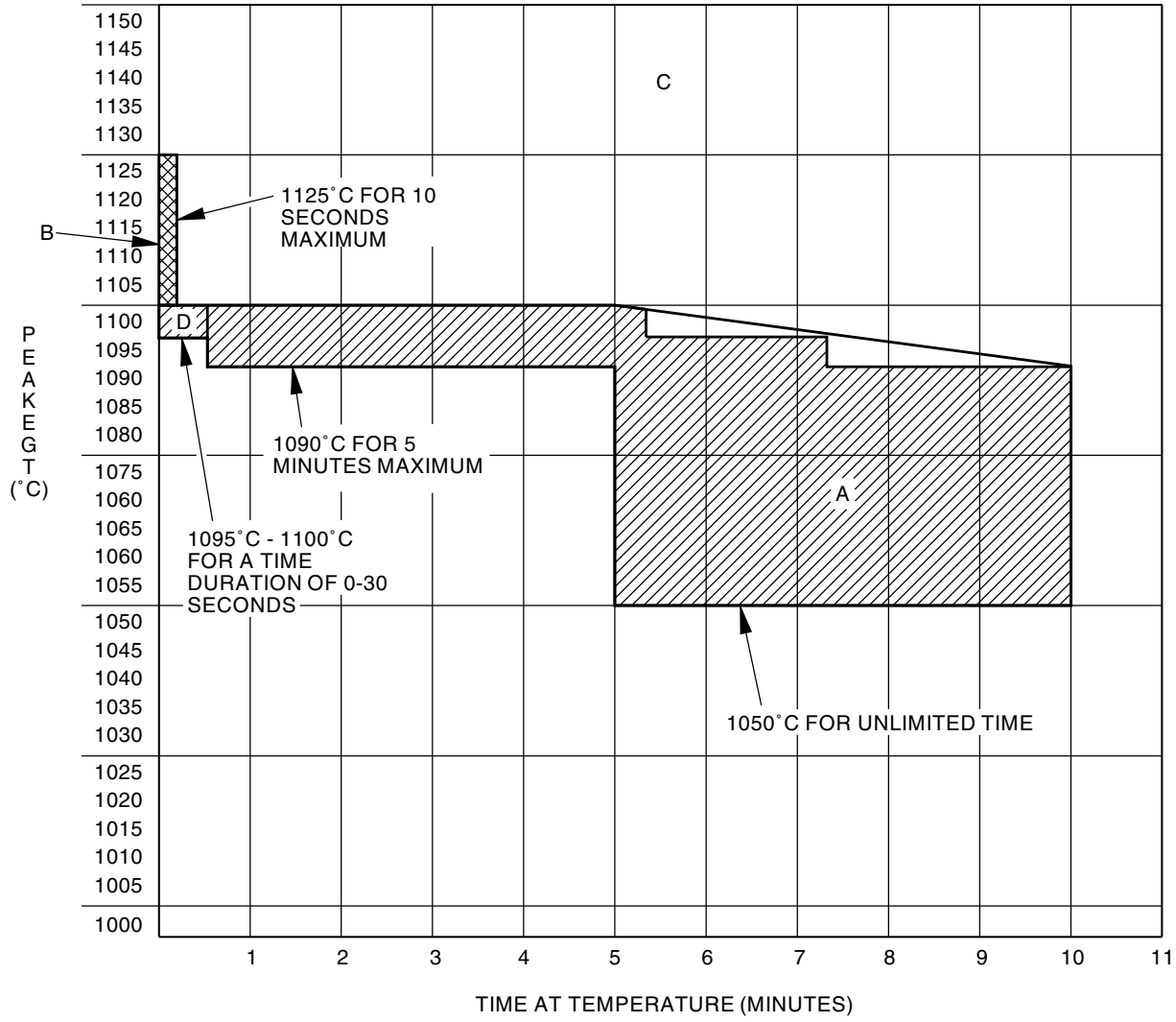

NOTE:

THIS CHART GIVES (OVERLIMIT) INSPECTION LIMITS ONLY.IT DOES NOT GIVE OPERATION LIMITS.

1200367-03-A
M06426 S0004285546_V4

EGT Exceedance Limits
Figure 605/71-00-00-990-803-H01

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TASK 71-00-00-200-807-H01

9. Volcanic Ash Ingestion Inspection

A. General

(1) This task provides the instructions on how to examine the engine for damage caused by volcanic ash ingestion.

(2) If volcanic ash ingestion of both engines has occurred, the inspection procedure for one engine must be done. If no damage is found, the volcanic ash ingestion inspection of the second engine can be deferred for up to 5 cycles. If damage is found, the volcanic ash ingestion inspection must be done on the other engine.

(3) Do not operate an engine in ash you can see or discernible ash. Discernible ash is ash that you can see or tell is there by other senses.

(4) If you operate the engine in ash you can see or discernible ash, get out of the ash immediately and follow these procedures:

(a) Do the flight planning with all available information that includes:

1) The Volcanic Ash Advisory Center (VAAC) and the meteorological (MET) office issue volcanic ash advisories and other sources of flight planning information such as FAA Flight Service Stations or other agency guidelines and/or pilot reports.

2) Operators should monitor the position of the ash you can see or discernible ash cloud and forecasted movement to permit night/IMC operations.

(b) You can do operations in an area with predicted ash concentrations of higher than 2,000 micrograms/m^3 (2.0 milligrams/m^3) at the operators' discretion, if the operations are not in ash you can see or discernible ash.

NOTE: The long-term effects of operation in low concentrations, less than 2,000 micrograms/m^3 (2.0 milligrams/m^3) are not fully understood. GE has released Service Bulletins for a leading indicator program to monitor selected engines to understand the long-term effects.

(c) Do not water wash an engine that has experienced volcanic ash ingestion until the volcanic ash has been removed from the engine and wait a minimum of 5 flights before water wash.

NOTE: Water wash can cause volcanic ash to accumulate in the HPT nozzle and blade cooling paths which can cause reduced cooling flow. It can also cause rotor imbalance from accumulation of material that stays and dries in the rotor spools.

(d) Install engine covers when aircraft is parked and position the aircraft to limit ash accumulation from wind and jet blasts from other aircraft.

(e) Clean the ramp area before you start the engine. Start both engines on a clean ramp area and avoid cross-bleed starts or single-engine taxi which may make higher thrust levels necessary. Do not taxi close to other aircraft to minimize ash ingestion. Make a selection of the cleanest taxi routes available.

(f) Minimize breakaway and taxi thrust. Do not use high thrust when ash contamination is there. Avoid static high thrust operation.

(g) Minimize reverse thrust use on ash contaminated runways, especially at lower speeds.

B. References

Reference	Title
12-22-01-170-803-002	Flush the Engine Oil System (P/B 301)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)

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(Continued)

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-290-803-H01	High Pressure Compressor Section Rotor Inspection (P/B 601)
72-00-00-290-804-H01	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection (P/B 601)
72-00-00-290-805-H01	High Pressure Turbine Section Stage One Nozzle (Except the Leading Edge) and Stage 1 Shroud Inspection (P/B 601)
72-00-00-290-806-H01	High Pressure Turbine Section Rotor (Stage 1 and 2 blades), Stage 2 Nozzle and Stage 2 Shroud Inspection (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Prepare for the Inspection

SUBTASK 71-00-00-010-003-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

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(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

F. Volcanic Ash Ingestion Inspection

SUBTASK 71-00-00-210-084-H00

(1) Do these steps if the smell or other indication of volcanic ash that you cannot see has been reported.

(a) Examine the engine inlet and exhaust for volcanic ash that collects in the engine.

1) If you do not see any volcanic ash, no further action is necessary.

2) If you see volcanic ash, you must continue the procedure.

SUBTASK 71-00-00-210-016-H01

(2) Do these steps if the engine has flown through or operated in volcanic ash.

(a) Examine the engine inlet and primary nozzle for an indication of damage, or erosion.

(b) Do a borescope inspection on the high pressure compressor (HPC) stage one and eight blades (TASK 72-00-00-290-803-H01).

(c) Do a borescope inspection on the high pressure turbine (HPT) stage one nozzle, and the HPT stages one and two blades for the damage that follows, (TASK 72-00-00-290-805-H01 and TASK 72-00-00-290-806-H01):

1) Erosion

2) Foreign Object Damage (FOD)

3) Large collected quantities of ash deposits.

(d) Do this task: Flush the Engine Oil System, TASK 12-22-01-170-803-002.

SUBTASK 71-00-00-290-008-H00

(3) Do these steps if the engines have been exposed to large amounts of volcanic ash as you can see on the ground or in the air around the engine but have not flown through or operated in it.

(a) Examine the engine inlet and exhaust for volcanic ash that collects in the engine.

1) Vacuum the volcanic ash from all areas you can access in the engine inlet and exhaust.

(b) Do the dry motor the engine for 2 minutes (TASK 71-00-00-800-836-H00).

(c) Wait for 10 minutes and then dry motor the engine for 2 minutes (TASK 71-00-00-800-836-H00)

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(d) Within 10 cycles, do a borescope inspection on the high pressure compressor (HPC) stage one and nine blades (TASK 72-00-00-290-803-H01)

(e) Within 10 cycles, do a borescope inspection on the high pressure turbine (HPT) stage one nozzle, and the HPT stages one and two blades for the damage (TASK 72-00-00-290-804-H01 and TASK 72-00-00-290-806-H01)

(f) If you find damage or there is an indication of volcanic ash in the engine, within 10 cycles, do this task: Flush the Engine Oil System, TASK 12-22-01-170-803-002.

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-003-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-200-811-H01

10. Heavy Sand Ingestion Inspection

A. General

(1) This task is a visual inspection of the engine inlet and primary nozzle for damage because of heavy sand ingestion. Heavy sand ingestion can occur with heavy runway sanding during winter operation or operation during a sandstorm.

B. Location Zones

Zone	Area
411	Engine, Left

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(Continued)

Zone	Area
421	Engine, Right

C. Heavy Sand Ingestion Inspection

SUBTASK 71-00-00-210-054-H01

(1) Examine the engine inlet for an indication of damage, or erosion.

(a) Repair or replace the inlet cowl if it is necessary.

(2) Examine the engine primary nozzle for an indication of damage, or erosion.

(a) Repair or replace the engine primary nozzle if it is necessary.

——— END OF TASK ———

TASK 71-00-00-200-808-H01

11. Engine Exposure to Fire and Extinguishing Agents Inspection

A. General

(1) This task is an internal and external engine inspection for damage due to exposure to fire and extinguishing agents.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-00-02-400-811-H00	Power Plant Installation (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00 P/B 601	ENGINE - INSPECTION/CHECK
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Consumable Materials

Reference	Description	Specification
B01023	Cleaner - Primary - Ardrox 6025	

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

F. Prepare for the Inspection

SUBTASK 71-00-00-010-004-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

G. Engine Exposure To Fire Inspection

SUBTASK 71-00-00-010-005-H01

(1) If the engine has internal or external fire damage, replace the engine.

(a) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.

(b) Do this task: Power Plant Installation, TASK 71-00-02-400-811-H00.

H. External Engine Exposure to Fire Extinguishing Agents Without Fire

SUBTASK 71-00-00-280-010-H01

(1) If the engine was exposed to the fire extinguishing agents that follow on its external surfaces but there are no signs of fire, do these steps:

(a) Carbon dioxide (C02) contamination:

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1) Fan, booster and High Pressure Compressor (HPC) sections:

a) No maintenance action is necessary for parts not exposed to heat.

2) Do the borescope inspection of Combustor, High Pressure Turbine (HPT) blades and Low Pressure Turbine (LPT) blades. Refer to ENGINE - INSPECTION/CHECK, PAGEBLOCK 72-00-00/601.

(b) Chemical foam contamination:

1) Clean chemical foam contamination from exposed areas with steam cleaning or flush with water.

(c) Dry chemical powder contamination:

1) If it is necessary, clean external areas with high capacity vacuum and 0 psig (0 kPa) - 30 psig (206.84 kPa) dry air to remove all powder. Make sure you remove all the dry chemical powder.

2) If the powder turns to a glaze, clean with Ardrox 6025 cleaner, B01023. Make sure you remove all the dry chemical powder.

(d) Halogenated hydrocarbon (Halon) contamination:

1) Clean halogenated hydrocarbon (Halon) agent contamination from exposed areas with steam cleaning or flush with water.

2) If onboard nacelle fire extinguisher systems (Halon 1301) discharged directly into the nacelle compartment and there was no contact with the turbine airfoils, no cleaning necessary for Halon 1301.

I. Internal Engine Exposure to Fire Extinguishing Agents Without Fire

SUBTASK 71-00-00-280-011-H01

(1) If the engine was exposed to fire extinguishing agents on its internal surfaces but there were no signs of fire, do these steps:

(a) Carbon dioxide (C02) contamination:

1) Do the borescope inspection of HPC blades, Combustor, HPT blades and LPT blades. Refer to ENGINE - INSPECTION/CHECK, PAGEBLOCK 72-00-00/601.

(b) Chemical foam contamination:

NOTE: When the engine gaspath is exposed to foam chemical agents do not do an internal wash (wash of the gaspath) before disassembly and cleaning of the affected parts. It is not possible to remove all remaining foam agent and chemical residue from the engine by an internal water or detergent wash.

1) Remove the engine for disassembly, overhaul and cleaning.

a) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.

b) Do this task: Power Plant Installation, TASK 71-00-02-400-811-H00.

(c) Dry chemical powder contamination:

CAUTION

DO NOT DO AN INTERNAL WASH (GASPATH WASH) OF THE ENGINE AFTER EXPOSURE TO DRY CHEMICAL POWDER FIRE EXTINGUISHING AGENTS. THESE AGENTS ARE NOT WATER SOLUBLE. AN INTERNAL WATER WASH ON DRY CHEMICAL POWDER FIRE EXTINGUISHING AGENTS CAUSES CAKING, STICKING OF THESE MATERIALS ON ENGINE PARTS, AND CLOGGING OF AIR HOLES AND CAVITIES.

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(CAUTION PRECEDES)

CAUTION DO NOT START THE ENGINE. IT IS POSSIBLE DRY CHEMICAL POWDER FIRE EXTINGUISHING AGENTS CAN ENTER AND CONTAMINATE THE ENGINE OIL SYSTEM.

1) Remove the engine for disassembly and cleaning if it was contaminated with dry chemical powder.
   a) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.
   b) Do this task: Power Plant Installation, TASK 71-00-02-400-811-H00.

(d) Halogenated hydrocarbon (Halon) contamination:

1) Remove the engine for disassembly and cleaning if it was contaminated with a halogenated hydrocarbon (Halon) agent.
   a) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.
   b) Do this task: Power Plant Installation, TASK 71-00-02-400-811-H00.

J. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-00-410-004-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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TASK 71-00-00-200-809-H01

12. Engine Over Maximum Vibration Inspection

A. General

(1) This task is an engine off-wing precautionary inspection for possible damage when the engine vibration of the high pressure system (HPC/HPT) occurs which is more than the maximum recommended vibration limit.

(2) You do not need to remove the engine immediately after an over vibration event to do this inspection. This task is only required during the first engine shop visit after the engine operated at more than the maximum recommended vibration limit. You must follow the applicable procedures in the GE100 Engine Manual for the fluorescent penetrant inspection.

B. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

C. Over Maximum Vibration Inspection

SUBTASK 71-00-00-230-001-H01

(1) If the engine high pressure system (HPC/HPT) has a vibration event above the maximum recommended vibration limit of 4.0 units, you must do a complete fluorescent penetrant inspection of the booster stator at the next shop visit (engine off wing).

NOTE: Refer to the applicable procedures in the GE100 Engine Manual.

(a) If it is necessary to do the trouble shooting, refer to the FIM.

——— END OF TASK ———

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POWER PLANT - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Power Plant Removal

(2) Power Plant Installation.

TASK 71-00-02-000-811-H00

2. Power Plant Removal

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411, Figure 412, Figure 413, Figure 414, Figure 415, and PAGEBLOCK 71-00-05/401, Figure 71-00-05-990-801-H01)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) Boeing recommends that you use the 4-points bootstrap equipment, SPL-4947 (J71043-131) bootstrap equipment for the GE100 series engines change.

(2) To do the removal and installation tasks, you can use the bootstrap equipment. The bootstrap equipment includes the forward and the aft support assemblies, cradles, chains, and engine stands. Platforms and stands are also necessary to get access to the disconnect points on the power plant. The bootstrap equipment can be operated manually or pneumatically.

(a) The manual operated bootstrap uses lever hoists to lift and lower the power plant. You can adjust the lever hoists to change the pitch and roll of the power plant (while it hangs from the strut). You can change the pitch when you lift or lower the two forward hoists or the aft hoist. You can change the roll when you adjust the aft hoist.

(b) The pneumatically operated bootstrap is an alternate equipment which uses pneumatic power to lift and lower the power plant. There are external pneumatic hoses and a control box which connect to the pneumatic hoists (4 locations). You can change the pitch and roll of the power plant with the control pendant.

(3) The power plant weighs approximately 21,000 pounds (9,525 kilograms). You must also be sure to include the weight of ground support equipment when you calculate the load.

(4) With the bootstrap equipment, dynamometers (load cells) are installed at the hoist locations to show the loads that the bootstrap equipment has on it. You must monitor the loads and keep them less than the maximum load limits.

(5) If the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) is used, and if it is necessary, use GE engine sling, SPL-4920 (9C6020G03, 9C6020G04, 9C6020G05, or 9C6020G06) to transfer the engine from the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M)] to the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) for engine transportation.

(6) You can remove an engine with the inlet cowl or without the inlet cowl installed. Without the inlet cowl installed, the aft loads will be 1000 pounds higher than the engine with the inlet cowl installed. This procedure is written for the engine removal with the inlet cowl installed.

(7) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(8) The removal task has these sections:

(a) Preparation for the Removal

(b) Remove the Power Plant with the Bootstrap Equipment (Manually Operated)

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(c) Remove the Power Plant with the Pneumatic Bootstrap Equipment (Pneumatically Operated)

(9) You must do these steps to remove the engine:

(a) Do the procedure to level the airplane.

(b) Put the thrust levers forward in the idle position.

(c) Make sure that you use the fall arrest equipment when you work up high off the ground.

(d) Close the supply shutoff valve for the engine driven pump (EDP).

(e) Remove hydraulic pressure from the applicable hydraulic system.

(f) Remove the pneumatic pressure.

(g) Remove the aft cowl forward fairings.

(h) Remove the aft mount access panels and open pressure relief door.

(i) Remove the left and right forward fairings on the thrust reverser hinges.

(j) Remove the left and right forward side fairings on the strut for bootstrap equipment installation visibility.

(k) Remove the applicable No. 1 forward fairing.

(l) Do the deactivation procedure for the leading edge slats.

(m) If it is not done so, do the deactivation procedure for the thrust reversers.

(n) Remove the fan cowl panels.

(o) Open the thrust reversers.

(p) Install the thrust reverser hold-open equipment.

(q) Install the tapes on the bleed air deflector panels.

(r) Remove the electrical power.

(s) Disconnect the electrical connectors, ducts, hoses, main fuel supply hose, and the hydraulic plumbing from the engine.

(t) Disconnect the thrust reverser V-groove latch band.

(u) Disconnect the pneumatic sense hoses from the PRSOV and the FAV sense lines.

(v) Drain the main fuel supply system.

(w) Disconnect the left and right aft tension straps from the aft deflection limiter rods.

(x) Install the aft engine mount positioning tool, if you intend to use the position fixture for the engine removal.

(y) IF THE ENGINE FAN AND CORE ARE TO BE SEPARATED; Do the steps that follow:

1) Remove the left and right QEC flange bolts at the ground handling brackets to avoid bolt removal interference with the support adapters.

2) Disconnect the starter air valve manual control shaft from the starter air valve. (Refer to Figure 71-00-05-990-801-H01.)

a) Disconnect the starter air valve manual control [9] from the starter air valve.

b) Remove the bolt [10A] and nut [10B] that attach the clamp [10] to the bracket.

c) Remove the bolt [11A] and nut [11B] that attach the clamp [11] to the bracket.

(z) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Remove the left and right blank off panels and the air bleed deflector panels from the forward inner cowl support at the fan hub frame.

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(aa) Install the forward and aft bootstrap equipment.

1) See the Paragraph of the Bootstrap Equipment (Manually Operated) Removal

2) See the Paragraph of the Pneumatic Bootstrap Equipment (Pneumatically Operated) Removal

(ab) Connect the pneumatic supply hoses (if operated by pneumatic power) to the hoists.

(ac) Lift the cradle up to the engine.

(ad) Attach the cradle to the engine.

(ae) Disengage the engine from the strut.

(af) IF THE ENGINE FAN AND CORE ARE TO BE SEPARATED; Install the separation fixture, SPL-4184 on the engine stand of the replacement engine.

(ag) Lower the engine and the cradle into the transportation stand.

(ah) Remove the bootstrap equipment (if it is necessary).

(ai) Install the forward engine mount stabilizer for engine transportation (if it is necessary).

(aj) Move the engine away from the airplane.

(ak) Remove the inlet cowl if you intend to install the inlet cowl on the replacement engine.

B. References

Reference	Title
07-11-05-580-801	Make the Airplane Stable to Prevent Tipping (P/B 201)
08-21-00-580-801	Make the Airplane Level (P/B 201)
12-15-01-610-810	Main Landing Gear Shock Strut Servicing (P/B 301)
20-41-00-910-801	Static Grounding (P/B 201)
24-22-00-860-805	Supply Electrical Power (P/B 201)
24-22-00-860-806	Remove Electrical Power (P/B 201)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
29-11-00-860-808	Main Hydraulic System Power Removal (P/B 201)
30-21-06-000-804-001	Engine Anti-Ice Duct Removal (P/B 401)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
54-52-01-000-801-001	Forward Fairings Removal (P/B 401)
54-52-01-000-802-001	Fan Cowl Support Beam Fairings Removal (P/B 401)
54-52-05-000-801	Aft Fairing Access Door Removal (P/B 401)
54-53-01-000-802-001	Strut Access Doors Removal (P/B 401)
54-53-02-000-801-001	Strut Fairings Removal (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
71-00-03-600-801-H01	Preservation of An Engine (Task Selection) (P/B 201)
71-00-04-800-801-H00	Engine and Engine Stand Preparation (P/B 201)
71-00-04-800-802-H00	Restore the Engine and Engine Stand (9C6025P02) Components to Its Usual Condition (P/B 201)
71-00-05 P/B 401	POWER PLANT (FAN STATOR MODULE TO ENGINE) - REMOVAL/INSTALLATION
71-00-05-000-801-H01	Fan Stator Module to Engine Removal (P/B 401)

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Reference	Title
71-00-05-990-801-H01	Figure: Drain and Service Module Assembly Installation (P/B 401)
71-11-01-000-802-H01	Inlet Cowl Removal (P/B 401)
71-11-04-000-805-H01	Fan Cowl Panels Removal (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-01-000-801-H01	Thrust Reverser Removal (P/B 401)
78-31-01-830-801-H01	Thrust Reverser Adjustment (P/B 501)

C. Tools/Equipment

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

Reference	Description
SPL-2073	Fixture - Stabilizer, Forward Engine Mount Part #: 9C6016G01 Supplier: 06083
SPL-2085	Equipment - Hold-Open, GE90 Engine Fan Reverser Part #: J78003-27 Supplier: 81205
SPL-2594	Equipment - Sling, GE90 Fan Thrust Reverser Part #: J78004-123 Supplier: 81205 Opt Part #: J78004-89 Supplier: 81205
SPL-4184	Fixture - Separation, Fan Case, GE90-70/80/90 and GE90-100 Series Part #: 9C6030P01 Supplier: 06083
SPL-4919	Stand - Engine Cradle and Transport, GE90-100 Series Part #: 9C6001G07 Supplier: 06083 Opt Part #: 9C6001G05 Supplier: 06083
SPL-4920	Sling - Engine Transfer, Overhead Lift Part #: 9C6020G05 Supplier: 06083 Part #: 9C6020G06 Supplier: 06083 Opt Part #: 9C6020G03 Supplier: 06083 Opt Part #: 9C6020G04 Supplier: 06083
SPL-4921	Stand - Shipping, Deluxe Air/Truck, Engine Cradle and Transport Part #: 9C6025P02 Supplier: 06083 Part #: 9C6025P03 Supplier: 06083
SPL-4947	Equipment - Bootstrap, 4-pt. Pick, GE90 Engine Part #: J71043-131 Supplier: 81205 Opt Part #: J71043-129 Supplier: 81205 Opt Part #: J71043-130 Supplier: 81205
SPL-7749	Fixture - Position, Aft Engine Mount, GE90-115B Part #: 9C1165G02 Supplier: 06083
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205

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Reference	Description
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

Reference	Description	Specification
D00139	Lubricant - Oil - WD-40	
D00552 [C02-019]	Oil - Engine Lubricating	GE Spec. D50TF1
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G50463	Pad - Fluid Absorbent (Anti-static)	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
102	Preformed packing	73-11-01-03-095	ARO ALL
105	Preformed packing	73-11-01-03-065	ARO ALL

F. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
410	PowerPlant, Left
420	PowerPlant, Right

G. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
415EL	Forward Thrust Reverser Hinge Cover, Left Engine
416AR	Right Thrust Reverser, Left Engine
416ER	Forward Thrust Reverser Hinge Cover, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
425EL	Forward Thrust Reverser Hinge Cover, Right Engine
426AR	Right Thrust Reverser, Right Engine
426ER	Forward Thrust Reverser Hinge Cover, Right Engine
431AT	Thumbnail Fairing, Left Strut

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Number	Name/Location
431BT	PDOS Pump Access Door
432AL	Left Forward Side Fairing, Left Strut
432AR	Right Forward Side Fairing, Left Strut
433CL	Left Pressure Relief Door, Left Strut
433CR	Right Aft Mount Access Panel, Left Strut
433DL	Left Aft Mount Access Panel, Left Strut
433DR	Right Pressure Relief Door, Left Strut
433EL	Left Aft Cowl Forward Fairing, Left Strut
433ER	Right Aft Cowl Forward Fairing, Left Strut
434CL	Left Forward Access Door, Left Strut Aft Fairing
441AT	Thumbnail Fairing, Right Strut
441BT	PDOS Pump Access Door
442AL	Left Forward Side Fairing, Right Strut
442AR	Right Forward Side Fairing, Right Strut
443CL	Left Pressure Relief Door, Right Strut
443CR	Right Aft Mount Access Panel, Right Strut
443DL	Left Aft Mount Access Panel, Right Strut
443DR	Right Pressure Relief Door, Right Strut
443EL	Left Aft Cowl Forward Fairing, Right Strut
443ER	Right Aft Cowl Forward Fairing, Right Strut
444CL	Left Forward Access Door, Right Strut Aft Fairing

H. Prepare for the Removal

SUBTASK 71-00-02-860-001-H01

(1) If the engine or engine core is replaced, it is recommended that you do these steps before the engine is removed.

(a) Print or record all active and inactive faults from the Existing Faults of the Extended Maintenance function on the MAT.

(b) Print or record the AVM software part number of the removed engine on the MAT.

(c) Print or record the high vibration flight legs from the N1 Vibration History page of the Engine Balancing function on the MAT.

(d) Do this task: Preservation of An Engine (Task Selection), TASK 71-00-03-600-801-H01.

SUBTASK 71-00-02-860-002-H01

(2) Do this task: Static Grounding, TASK 20-41-00-910-801.

NOTE: Use the approved ground lugs to ground the airplane.

SUBTASK 71-00-02-860-004-H01

(3) Make sure the airplane is at 3/4 ± 1/4 degree pitch (nose down) and zero ± 1/4 degree roll (TASK 08-21-00-580-801).

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SUBTASK 71-00-02-867-001-H01

CAUTION

MAKE SURE THAT THERE IS SUFFICIENT CLEARANCE BETWEEN THE BOTTOM OF THE ENGINE AND CRADLE BEFORE YOU MAKE THE AIRPLANE LEVEL. IF THERE IS NOT SUFFICIENT CLEARANCE, YOU CAN CAUSE DAMAGE TO THE ENGINE AND THE AIRPLANE.

(4) Make sure that there is a minimum of 10.0 inches (25.4 cm) (shock strut chrome) at the applicable main landing gear oleo.

(a) If for other reasons the clearance is insufficient, do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-01-610-810.

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-02-480-001-H01

(5) If it is necessary, install the tail jack (TASK 07-11-05-580-801).

NOTE: Tail jack installation is recommended to keep the airplane stable with the power plant removed.

SUBTASK 71-00-02-860-005-H01

(6) Make sure the forward thrust levers are in the idle position.

(a) Attach a DO-NOT-OPERATE tag on the thrust levers.

SUBTASK 71-00-02-922-001-H01

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

SUBTASK 71-00-02-300-001-H01

WARNING

USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(8) Use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-00-02-860-006-H01

WARNING

MAKE SURE THAT THE ENGINE AND SPAR FUEL VALVES ARE CLOSED BEFORE YOU REMOVE THE ENGINE. ACCIDENTAL FUEL LEAKAGE DURING THE ENGINE REMOVAL CAN CAUSE INJURIES TO PERSONNEL.

(9) Make sure the applicable engine and spar fuel valves are closed.

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(a) For the left engine, make sure that these circuit breakers are closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE
B	4	C76601	L ENG FUEL VALVE

(b) For the right engine, make sure that these circuit breakers are closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	19	C28002	R ENGINE FUEL SPAR VALVE
B	19	C76600	R ENG FUEL VALVE

(c) Move the applicable L(R) FUEL CONTROL switch on the control stand panel, P10, to CUTOFF.

1) Attach a DO-NOT-OPERATE tag to the L(R) FUEL CONTROL switch.

(d) Push the STAT button on the display select panel on the glareshield panel, P55.

1) Make sure you do not see the applicable ENG FUEL VALVE L(R) or FUEL SPAR VALVE L(R) status messages.

SUBTASK 71-00-02-860-007-H01

(10) Do these steps to make sure the applicable engine and spar fuel valves stay closed:

(a) For the left engine, open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE
B	4	C76601	L ENG FUEL VALVE

(b) For the right engine, open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	19	C28002	R ENGINE FUEL SPAR VALVE
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-02-860-008-H01

(11) Remove the hydraulic pressure from the applicable system (TASK 29-11-00-860-808).

(a) Bleed the applicable hydraulic reservoir pressure to zero.

SUBTASK 71-00-02-860-009-H01

(12) Do these steps to close the supply shutoff valve for the engine driven pump (EDP) (Figure 401):

(a) For the left engine, make sure that this circuit breaker is closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	5	C29603	LEFT EDP SUPPLY SHUTOFF VALVE

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(b) For the right engine, make sure that this circuit breaker is closed:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	20	C29602	RIGHT EDP SUPPLY SHUTOFF VALVE

(c) For the left engine, open these circuit breakers and install safety tags:

Standby Power Management Panel, P310

Row	Col	Number	Name
L	2	C26633	FIRE EXT L ENG BTL 1
L	4	C26635	FIRE EXT L ENG BTL 2

(d) For the right engine, open these circuit breakers and install safety tags:

Standby Power Management Panel, P310

Row	Col	Number	Name
L	1	C26632	FIRE EXT R ENG BTL 1
L	3	C26634	FIRE EXT R ENG BTL 2

(e) Make sure the applicable engine fire switch handle (DISCH LEFT or RIGHT) for the applicable engine is in its usual position.

NOTE: The engine fire switch (DISCH LEFT or RIGHT) is on the control stand panel, P8.

(f) Push the manual override switch which is below the engine fire switch handle (DISCH LEFT or RIGHT).

CAUTION

DO NOT TURN THE FIRE HANDLE AFTER YOU PULLED IT UP. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(g) Pull the applicable engine fire switch handle (DISCH LEFT or RIGHT) up, but do not turn it.

1) Attach a DO-NOT-OPERATE tag to the engine fire switch handle (DISCH LEFT or RIGHT).

(h) Open the aft strut fairing access door on the applicable engine (TASK 54-52-05-000-801).

1) Open these access panels:

Number	Name/Location
434CL	Left Forward Access Door, Left Strut Aft Fairing
444CL	Left Forward Access Door, Right Strut Aft Fairing

(i) Make sure the position indicator on the supply shutoff valve moves to the CLOSE position.

(j) If the position indication is on the CLOSE position, close the applicable aft strut fairing access door (TASK 54-52-05-000-801).

1) Close these access panels:

Number	Name/Location
434CL	Left Forward Access Door, Left Strut Aft Fairing
444CL	Left Forward Access Door, Right Strut Aft Fairing

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	5	C29603	LEFT EDP SUPPLY SHUTOFF VALVE

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	20	C29602	RIGHT EDP SUPPLY SHUTOFF VALVE

SUBTASK 71-00-02-864-001-H01

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

SUBTASK 71-00-02-010-001-H01

(14) Remove the aft cowl forward fairings on the applicable engine (TASK 54-53-02-000-801-001).

(a) Remove these access panels:

Number	Name/Location
433EL	Left Aft Cowl Forward Fairing, Left Strut
433ER	Right Aft Cowl Forward Fairing, Left Strut
443EL	Left Aft Cowl Forward Fairing, Right Strut
443ER	Right Aft Cowl Forward Fairing, Right Strut

SUBTASK 71-00-02-010-002-H01

(15) Remove the aft mount access panels and open the pressure relief door on the applicable engine (TASK 54-53-01-000-802-001).

NOTE: Some panels have thermal installation blankets installed. Make sure they are not damage when you remove them.

(a) Remove these access panels:

Number	Name/Location
433CL	Left Pressure Relief Door, Left Strut
433CR	Right Aft Mount Access Panel, Left Strut
433DL	Left Aft Mount Access Panel, Left Strut
433DR	Right Pressure Relief Door, Left Strut
443CL	Left Pressure Relief Door, Right Strut
443CR	Right Aft Mount Access Panel, Right Strut
443DL	Left Aft Mount Access Panel, Right Strut
443DR	Right Pressure Relief Door, Right Strut

SUBTASK 71-00-02-930-001-H01

(16) Remove the left and right forward fairings above the thrust reverser hinges for the applicable engine.

(a) Remove these access panels:

Number	Name/Location
415EL	Forward Thrust Reverser Hinge Cover, Left Engine

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(Continued)

Number	Name/Location
416ER	Forward Thrust Reverser Hinge Cover, Left Engine
425EL	Forward Thrust Reverser Hinge Cover, Right Engine
426ER	Forward Thrust Reverser Hinge Cover, Right Engine

SUBTASK 71-00-02-930-002-H01

(17) Remove the left and right forward side fairings from the strut on the applicable engine (TASK 54-52-01-000-801-001).

(a) Remove these access panels:

Number	Name/Location
432AL	Left Forward Side Fairing, Left Strut
432AR	Right Forward Side Fairing, Left Strut
442AL	Left Forward Side Fairing, Right Strut
442AR	Right Forward Side Fairing, Right Strut

SUBTASK 71-00-02-010-003-H01

(18) Remove the No. 1 forward fairing on the applicable engine (TASK 54-52-01-000-802-001).

(a) Remove these access panels:

Number	Name/Location
431AT	Thumbnail Fairing, Left Strut
431BT	PDOS Pump Access Door
441AT	Thumbnail Fairing, Right Strut
441BT	PDOS Pump Access Door

SUBTASK 71-00-02-010-014-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

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Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-02-010-015-H01

(20) Do this task: Fan Cowl Panels Removal, TASK 71-11-04-000-805-H01.

(a) Remove these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-00-02-480-003-H01

WARNING

DO NOT TRY TO REMOVE THE HOLD-OPEN RODS UNLESS THERE IS EQUIPMENT TO HOLD THE THRUST REVERSERS OPEN. MAKE SURE THAT YOU INSTALL THE HOLD-OPEN EQUIPMENT CORRECTLY. THE THRUST REVERSER CAN FALL QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(21) Install the hold-open equipment [12] (GE90 engine fan reverser hold open equipment, SPL-2085) on each thrust reverser PDOS actuator (Figure 402).

(a) Put the hold-open equipment [12] on each thrust reverser PDOS actuator rod which is in the open position.

(b) Remove the lockwire from the gland nuts on the thrust reverser PDOS actuator rods.

(c) Put the retainer [13] on bolt of the thrust reverser bracket.

(d) Install the upper clamp block [11] over the hold-open equipment [12].

(e) Tighten the clamp screws [14].

(f) Tighten the screw [15].

(g) Slowly lower each thrust reverser so that the extended length of the actuator rod is the same as the hold-open equipment [12].

(h) Disconnect the hold-open rod and put the hold-open rod in the stowed position on the bracket assembly on the thrust reverser.

SUBTASK 71-00-02-860-011-H01

(22) Apply Scotch Flatback Masking Tape 250, G00270 to seal the bleed air deflector panels.

SUBTASK 71-00-02-865-001-H01

WARNING

MAKE SURE YOU REMOVE ELECTRICAL POWER BEFORE YOU DISCONNECT THE FUEL, THE HYDRAULIC, AND THE ELECTRICAL LINES. IF YOU DO NOT, YOU CAN CAUSE INJURY TO PERSONNEL BY ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

(23) Do this task: Remove Electrical Power, TASK 24-22-00-860-806.

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SUBTASK 71-00-02-020-002-H01

CAUTION

MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(24) Disconnect the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52] (7 locations) from the left strut disconnect with the teflon-jawed pliers, STD-664 (Figure 403).

(a) Put the protective caps on the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52] and the receptacles.

(b) Put the tags on the wire harnesses to identify their positions for the installation.

SUBTASK 71-00-02-020-003-H01

(25) Disconnect the IDG feeder cable [41] (Figure 403).

(a) Remove the two bolts [54] and the terminal block cover [53] from the terminal block base (at the core approximately 10:00 o'clock position).

ARO 001-014 PRE SB 777-24-0143

(b) Remove the eight nuts [55] to disconnect the IDG feeder cable [41] from the terminal block base.

ARO 015-999; ARO 001-014 POST SB 777-24-0143

(c) Remove the eight nuts [55], eight lock washers [65] and eight washers [66] to disconnect the IDG feeder cable [41] from the terminal block base.

ARO ALL

CAUTION

BE CAREFUL WITH THE POWER FEEDER CABLES. DO NOT BEND OR PUT THE CABLES INTO COILS TOO TIGHTLY. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE CABLES.

(d) Carefully put the upper IDG feeder cable [41] above the left strut disconnect.

ARO 001-014 PRE SB 777-24-0143

(e) Put the eight nuts [55] with the lower IDG feeder cable [41] back on the terminal block base.

ARO 015-999; ARO 001-014 POST SB 777-24-0143

(f) Put the eight washers [66], eight lock washers [65] and eight nuts [55] with the lower IDG feeder cable [41] back on the terminal block base.

NOTE: Loosely install the nut to contain the washers and prevent FOD.

ARO ALL

(g) Put the terminal block cover [53] and the bolts [54] back on the terminal block base.

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SUBTASK 71-00-02-020-004-H01

CAUTION	BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION	USE A WRENCH AND A BACK-UP WRENCH WHEN YOU TIGHTEN OR LOOSEN THE B-NUT FOR THE HYDRAULIC LINE. GALLING DAMAGE TO THE LINE OR HYDRAULIC FITTING CAN OCCUR IF YOU DO NOT USE A BACK-UP WRENCH.

CAUTION	PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE HYDRAULIC FLUID CAN OCCUR.

CAUTION	DO NOT LET HYDRAULIC FLUID LEAKAGE COLLECT ON THE ENGINE CASE. CLEAN THE AREA IF HYDRAULIC FLUID COLLECTS ON THE ENGINE CASE. IF YOU LEAVE HYDRAULIC FLUID ON THE ENGINE CASE, ENGINE CASE DAMAGE CAN OCCUR.

(26) Disconnect the hydraulic supply hose [34], the hydraulic pressure hose [33], and the hydraulic case drain hose [31] (3 locations) from the left strut disconnect (Figure 403).

(a) If desired, put a fluid absorbent pad, G50463 below the hydraulic case drain hose, the hydraulic pressure hose, and the hydraulic supply hose on the engine case to catch any fluid which may otherwise collect on the engine.

(b) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 below the hydraulic supply hose [34], the hydraulic pressure hose [33], and the hydraulic case drain hose [31] to catch the fluid that will drain.

(c) Loosen the hydraulic spray blanket [32] from the hydraulic supply hose [34], the hydraulic pressure hose [33], and the hydraulic case drain hose [31].

1) Remove the bolts [35] and the washers [36] that attach the hydraulic spray blanket [32] to the brackets.

(d) Disconnect the hydraulic supply hose [34] from the supply fitting.

(e) Disconnect the hydraulic pressure hose [33] from the hydraulic pressure fitting.

(f) Disconnect the hydraulic case drain hose [31] from the hydraulic drain fitting.

NOTE: It is important to ensure that the hoses are removed in the correct order. If the Hoses are not disconnected in the right order, hydraulic fluid spill can occur.

(g) Put the hydraulic spray blanket [32] on the strut disconnect.

(h) Put the protective caps on the hydraulic supply hose [34], the hydraulic pressure hose [33], and the hydraulic case drain hose [31] and the fittings.

SUBTASK 71-00-02-020-005-H01

(27) Remove the upper starter duct [45] that attaches to the left side of the strut (Figure 403).

(a) Remove the couplings [43] and the seals [44] on the upper starter duct [45].

(b) Put the protective caps on the duct openings.

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SUBTASK 71-00-02-020-006-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(28) Disconnect the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60] (4 locations) from the forward side disconnect of the fan cowl support beam with the teflon-jawed pliers, STD-664 (TASK 70-00-01-400-807-H01) (Figure 403).

(a) Put the protective caps on the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60], and the receptacles.

(b) Put the tags on the wire harnesses to identify their positions for the installation.

SUBTASK 71-00-02-020-007-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION USE A WRENCH AND A BACK-UP WRENCH WHEN YOU TIGHTEN OR LOOSEN THE B-NUT FOR THE HYDRAULIC LINE. GALLING DAMAGE TO THE LINE OR HYDRAULIC FITTING CAN OCCUR IF YOU DO NOT USE A BACK-UP WRENCH.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE HYDRAULIC FLUID CAN OCCUR.

CAUTION DO NOT LET HYDRAULIC FLUID LEAKAGE COLLECT. IF YOU DO NOT MAKE THE AREA CLEAN, DAMAGE CAN OCCUR FROM THE HYDRAULIC FLUID.

(29) Disconnect the forward side hydraulic flexhoses [56] from the quick disconnects (2 locations) of the thrust reverser PDOS.

(a) Put the protective cap on the quick disconnects and the flexhose fittings.

SUBTASK 71-00-02-020-008-H01

(30) Disconnect the thrust reverser V-groove latch bands [61] from the left and right side of the fan case (Figure 403).

(a) Remove the bolts [64], the washers [63], and the nuts [62] that attach the thrust reverser V-groove latch bands [61] to the fan case brackets.

(b) Disconnect the thrust reverser V-groove latch bands [61] from the brackets.

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SUBTASK 71-00-02-030-002-H00

(31) Disconnect the pneumatic sense hose [87] from the PRSOV pneumatic sense line below the left strut disconnect (Figure 403):

(a) Install the protective caps on the pneumatic sense line and the pneumatic sense hose [87] fitting.

SUBTASK 71-00-02-030-003-H00

(32) Disconnect the pneumatic sense hose [89] from the FAV pneumatic sense line below the forward side disconnect (Figure 403):

(a) Install the protective caps on the pneumatic sense line and the pneumatic sense hose [89] fitting.

SUBTASK 71-00-02-020-009-H01

(33) Remove the LP/HP engine crossover duct [84] that is attached to the PRSOV valve (Figure 404).

(a) Remove the couplings [82] and the seals [83] that attach the LP/HP engine crossover duct [84] to the PRSOV valve and the LP/HP mix manifold duct.

(b) Remove the LP/HP engine crossover duct [84].

(c) If it is necessary, remove the pneumatic sense hose [511] from the LP/HP mix crossover manifold duct and the pneumatic sense line.

NOTE: If the replacement engine is the same engine that you had removed, you do not need to remove the pneumatic sense hose.

(d) Install protective caps on the ducts, the pneumatic sense hose, the pneumatic sense line, and the PRSOV valve.

SUBTASK 71-00-02-030-001-H00

(34) Disconnect the lower anti-ice duct assembly [320] from the upper anti-ice duct assembly at the 12:00 position (TASK 30-21-06-000-804-001):

(a) Remove the couplings [321] and seals [322] from each end of the duct assembly.

(b) Loosen the bolt [324], washer [325], bushing [326], washer [327], and nut [328] from each link assembly [323] on the engine.

NOTE: You do not need to remove the lower anti-ice duct assembly [320]. You need to loosen the link assemble so the lower anti-ice duct assembly [320] can be pushed back to provide clearance for the forward bootstrap installation.

(c) Install the protective caps on all the anti-ice duct assemblies.

(d) Make sure the duct assembly is clear from the forward bootstrap equipment.

SUBTASK 71-00-02-680-001-H01

WARNING DO NOT GET FUEL IN YOUR MOUTH, 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.

CAUTION A LARGE VOLUME OF FUEL WILL DRAIN FROM THE FUEL SUPPLY SYSTEM. TO PREVENT A FUEL SPILL, YOU MUST USE A MINIMUM OF TWO CONTAINERS TO DRAIN THE FUEL SYSTEM.

(35) Drain the main fuel pump (MFP) fuel filter [101] (Figure 406).

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(a) Put the 5 U.S.-gal (19 l) fuel resistant container, STD-201 under the MFP fuel filter [101] bowl.

(b) Remove the bleeder drain plug [104] from the fuel filter [101] bowl.

1) Let the fuel drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

(c) Remove and discard the drain plug preformed packing [105].

(d) Use a cotton wiper, G00034 to clean the bleeder drain plug [104]

(e) Lubricate a new preformed packing [105] with oil, D00552 [C02-019].

(f) Put the preformed packing [105] on the bleeder drain plug [104].

(g) Install the bleeder drain plug [104] on the fuel filter [101] bowl.

1) Tighten the bleeder drain plug [104] to 105-120 pound-inches (11.9-13.6 Newton-meters).

SUBTASK 71-00-02-680-002-H01

(36) Drain the MFP fuel supply system (Figure 406).

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201 below the main fuel pump (MFP) strainer.

WARNING MOVE TO A POSITION WHERE THE FUEL CAN NOT GET ON YOU. REMOVE THE DRAIN PLUG CAREFULLY. THE FUEL DRAINS QUICKLY. FUEL IS POISONOUS AND FLAMMABLE. FUEL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(b) Remove the locking drain plug [103] from the MFP inlet strainer.

1) Discard the locking drain plug preformed packing [102].

2) Use a cotton wiper, G00034 to clean the locking drain plug [103].

(c) Let the fuel drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

(d) Lubricate a new preformed packing [102] with clean engine oil, D00552 [C02-019].

(e) Put the new preformed packing [102] on the locking drain plug [103].

(f) Install the locking drain plug [103] with the new preformed packing [102] on the MFP inlet strainer.

1) Tighten the locking drain plug [103] to 105.0-120.0 pound-inches (11.9-13.6 Newton-meters).

SUBTASK 71-00-02-020-012-H01

(37) Disconnect the main fuel supply hose [86] from the right side disconnect (Figure 405).

(a) Loosen the fuel spray blanket [85] from the main fuel supply hose [86].

(b) Pull on the locking collar to disengage the locking teeth.

(c) Turn the coupling sleeve for the main fuel supply hose [86] counterclockwise to disconnect the hose nut.

(d) Pull the main fuel supply hose [86] free of the fitting on the strut connector.

CAUTION PUT CAPS ON THE FUEL SUPPLY HOSE AND THE FITTING ON THE STRUT. THIS PREVENTS THE CONTAMINATION OF THE FUEL SUPPLY.

(e) Install protective caps on the main fuel supply hose [86] and on the fitting in the strut.

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(f) Clean the areas where the fuel has fallen.

CAUTION

DO NOT LET THE MAIN FUEL SUPPLY HOSE TOUCH THE BOOTSTRAP EQUIPMENT. KEEP THE MAIN FUEL SUPPLY HOSE AWAY FROM THE INSTALLATION SLOT FOR THE BOOTSTRAP EQUIPMENT. THE BOOTSTRAP EQUIPMENT CAN CAUSE DAMAGE TO THE MAIN FUEL SUPPLY HOSE.

(g) Move the main fuel supply hose [86] away from the bootstrap equipment installation slot.

SUBTASK 71-00-02-020-013-H01

(38) Disconnect the aft deflection limiter rod [110] from the aft tension straps.

(a) Remove the bolts [111], the bushings [112] and the bushings [113], and the nuts [114] (Figure 407).

(b) If you intend to replace the engine or the engine core, remove the aft deflection limiter rod [110] from the engine (TASK 78-31-01-830-801-H01).

1) Remove the bolts [302] and the washers [303] the that attach the stop [301] to the turbine rear frame.

a) If necessary, remove the bracket [116] and the bracket [120] that attach on the turbine rear frame.

b) Remove the four bolts [117], the spacers [118], and the nuts [119] that attach the brackets to the turbine rear frame.

SUBTASK 71-00-02-480-004-H01

(39) Install the aft engine mount position fixture, SPL-7749 on the aft engine mount, if you intend to use the position fixture for the engine removal.

(a) Adjust the aft engine mount position fixture, SPL-7749 so that it stays in the center of the aft engine mount.

SUBTASK 71-00-02-490-007-H00

(40) Put the thrust link pads over the thrust links to prevent scratches (Figure 411).

NOTE: Aft bootstrap cable can cause scratches on the thrust links.

SUBTASK 71-00-02-010-005-H01

CAUTION

DO NOT REMOVE THE CAPTIVE SCREWS FROM THE BLANK-OFF PANEL. DAMAGE CAN OCCUR TO THE PANELS OR THE CAPTIVE SCREWS.

(41) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS (or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)); Install the forward support brackets on the forward inner cowl support at the fan hub frame (Figure 408).

(a) If the forward support brackets are not installed on the engine, do these steps.

1) Remove the eight fan hub frame mount bolts from the forward inner cowl support at the fan hub frame.

2) Remove the blank off panels [260] (left) (locations 2, 3 and 4), the blank off panels [261] (right) (locations 5, 6 and 7), the air bleed deflector panels [421] (left) (locations 3 and 4), and the air bleed deflector panels [422] (right) (locations 7 and 8) from the forward inner cowl support at the fan hub frame (TASK 71-00-04-800-801-H00).

3) Remove the flow shield brackets [450] (TASK 71-00-04-800-801-H00).

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4) Install the forward support brackets [440] and reinstall the flow shield brackets [450] (TASK 71-00-04-800-801-H00).

NOTE: The instructions on how to install the flow shield brackets and the forward support brackets can also be found in GE Engine Manual 72-00-00 Assembly 001/002.

a) Install the eight fan hub frame mount bolts on the forward inner cowl support at the fan hub frame.

<1> Lubricate the bolts [451] thread with Acheson GP460 compound, D50043 [C02-058].

<2> Install the eight bolts [451] on the forward support brackets [440].

<3> Tighten the bolts [451] to 368-432 pound-inches (41.6-48.8 Newton-meters).

SUBTASK 71-00-02-010-007-H01

(42) IF THE ENGINE FAN AND CORE ARE TO BE SEPARATED; Put the separation fixture, SPL-4184 (9C6030P01) in position on the engine stand of the replacement engine (Fan Stator Module to Engine Removal, TASK 71-00-05-000-801-H01).

NOTE: This step is used when a suitable crane is not available to remove the inlet cowl. If the inlet cowl remains installed on the fan case module while the engine is on the engine stand, interference with the inlet cowl may occur if you try to install the fan transfer carriage onto the engine stand.

SUBTASK 71-00-02-860-013-H01

(43) If the electrical power is necessary for other maintenance action, apply the electrical power to the airplane (TASK 24-22-00-860-805).

SUBTASK 71-00-02-200-001-H00

(44) Do a torque check on the TRF ground handling mount bolt (Figure 409).

(a) Make sure that the torque of the mount bolts [351] is between 375-425 pound-inches (42.4-48.0 Newton-meters).

(b) If the torque check fails, replace the bolts [351].

SUBTASK 71-00-02-030-017-H00

(45) Disconnect the brackets from the left side of the fan frame hub (Figure 410):

NOTE: The brackets may interfere with the installation of the left forward arm assembly.

(a) Remove the bolt [361] from the bracket [360].

(b) Remove the bolts [365] from the bracket [364].

SUBTASK 71-00-02-860-014-H01

(46) To remove the power plant with manually operated bootstrap equipment, go to the paragraph “Remove the Power Plant with the Bootstrap Equipment (Manually Operated)”. For pneumatically operated bootstrap equipment, go to the paragraph “Remove the Power Plant with the Bootstrap Equipment (Pneumatically Operated)”.

I. Power Plant Removal (with the Bootstrap Equipment (Manually Operated))

SUBTASK 71-00-02-860-015-H01

(1) Put the protective mats on the engine core to protect the engine components from falling objects.

SUBTASK 71-00-02-480-005-H01

(2) Install the forward bootstrap equipment, SPL-4947 (J71043-131) (Figure 412).

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(a) Install the forward upper attach fittings [126] on the left and the right sides of the strut brackets with the pins [125] and the pins [127] (two on each fitting).

(b) Attach the upper forward center beam assembly [143] to the forward upper attach fittings [126] with the pins [142].

(c) Attach the left and right forward upper arm assemblies [148] to the upper forward center beam assembly [143] with the pins [140].

NOTE: The positions of the forward upper arm assemblies are not interchangeable. They are marked as an inboard or outboard arm assembly. Make sure the center pin of the forward upper arm assemblies is not binding on other components.

1) Install the pin [141] to join the left and right forward upper arm assemblies [148] together.

(d) Attach the left and right forward lower arm assemblies [148A] to the forward upper arm assemblies [148] with the pins [141].

NOTE: The positions of the forward lower arm assemblies are interchangeable. They can be installed on either inboard or outboard sides.

(e) Attach the lever hoists [130], the dynamometers [136], and the shackles [132] to the ends of the forward lower arm assemblies [148A].

NOTE: You can use more than two shackles [132] to attach the dynamometers and the lever hoists.

SUBTASK 71-00-02-480-078-H00

(3) Install the aft bootstrap equipment, SPL-4947 (Figure 412).

(a) Attach the aft inboard arm [133] and the aft outboard arm [135] to the strut brackets with the two pins [129].

NOTE: The inboard and the outboard arm assemblies [133] and [135] are not interchangeable.

(b) Install the cable [138] through the aft inboard arm [133] and the aft outboard arm [135] so that the cable [138] rest on the pulleys [139].

1) Install pins [144] on the pulleys [139].

(c) Attach the lever hoists [130], the dynamometer [136] and the shackles [132] to the cable [138] end of the aft outboard arm [135].

NOTE: You can use more than two shackles [132] to attach the dynamometer or on the lever hoist.

(d) Attach the lever hoists [130] with the shackles [132] to the cable [138] end of the aft inboard arm [133].

SUBTASK 71-00-02-480-007-H01

(4) Carefully put the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) or shipping stand, SPL-4921 (9C6025P02 or 9C6025P03), with the cradle [124] attached, below the engine.

(a) Move the transportation stand [123] into its position from the rear of the power plant.

SUBTASK 71-00-02-420-001-H01

(5) Connect the bootstrap equipment to the cradle [124].

NOTE: There are four attach locations. Two are for the forward bootstrap and the other two are for the aft bootstrap.

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(a) Install the forward inboard cradle attach (adapter) assembly [150] on the forward inboard side of the cradle (of the engine to be changed).

1) Install the pin [154] on the cradle lug.

(b) Install the forward outboard cradle attach assembly [147] on the forward outboard side of the cradle (of the engine to be changed).

1) Install the pin [154] on the cradle lug.

(c) Install the two aft cradle attach fittings [137] on the cradle diagonal beams.

1) Install the pins [152] on the aft cradle attach fittings [137].

(d) Attach the lever hoists [130] with the shackles [132] from the cable [138] of the aft inboard arm [133] and the aft outboard arm [135] to the aft cradle attach fittings [137].

1) Make sure the chains [131] are not twisted.

(e) Attach the forward lever hoists [130] with the shackles [132] from the forward lower arm assemblies [148A] to the forward outboard cradle attach assembly [147] and to the forward inboard cradle attach (adapter) assembly [150].

1) Attach the block end of the inboard lever hoist [130] to the forward inboard cradle attach (adapter) assembly [150] with the pin [154].

2) Attach the block end of the outboard lever hoist [130] to the forward outboard cradle attach assembly [147] with the pin [154].

3) Make sure the chains [146] are not twisted.

(f) Take up the slack in the lever hoists [130].

NOTE: Make sure the cable end fittings are approximately the same distance from the ground on each sides.

SUBTASK 71-00-02-480-079-H00

WARNING

DO NOT USE THE BOOTSTRAP EQUIPMENT TO LIFT OR LOWER THE ENGINE, CRADLE AND TRANSPORTATION STAND TOGETHER TO THE ENGINE PYLON. YOU CAN USE THE BOOTSTRAP EQUIPMENT TO LIFT THE ENGINE, CRADLE AND STAND 1.5 ±0.5 IN. (38.1 ±12.7 MM) TO LET THEM HANG FREELY. THE BOOTSTRAP FUNCTION IS TO LIFT OR LOWER ONLY THE ENGINE AND CRADLE TO THE ENGINE PYLON. INCORRECT OPERATION OF THE BOOTSTRAP EQUIPMENT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION

DO NOT PUT MORE THAN 3000 POUNDS (1363 KG) ON AN AFT OUTBOARD BOOTSTRAP HOIST. MAKE SURE THAT ALL OF THE WHEELS OF THE TRANSPORTATION STAND TOUCH THE GROUND AT THE SAME TIME. IF ONLY THE FRONT WHEELS TOUCH THE GROUND, THE POSITION OF THE CENTER OF GRAVITY ON THE AFT LOAD WILL CHANGE. THIS WILL CAUSE THE LOADS TO BE MORE THAN THE LOAD LIMITS FOR THE AFT BOOTSTRAP HOISTS. IF THE LOADS ARE TOO LARGE, THIS CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION

MAKE SURE THAT THE LOAD DIFFERENCE BETWEEN THE INBOARD AND THE OUTBOARD FORWARD BOOTSTRAP EQUIPMENT IS LESS THAN THE LIMIT. THIS LIMIT APPLIES WHEN YOU LIFT THE ENGINE IN ALL OF THE OPERATION. IF THE LOAD DIFFERENCE IS MORE THAN THE LIMIT, DAMAGE TO THE ENGINE AND EQUIPMENT CAN OCCUR.

(6) Attach the cradle [124] to the engine [1].

WARNING

LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(a) Slightly lift the cradle [124] and the transportation stand [123] to permit them to align below the engine [1].

NOTE: Make sure you lift it slowly. The cradle and the transportation stand will move to the aligned position before you lift them free from the ground. It is not necessary for the transportation stand to come off the ground fully (or hang freely).

(b) Lower the cradle [124] and the transportation stand [123] to the ground.

(c) CRADLE THAT USES THE FORWARD ADAPTERS; Remove the forward (engine to cradle interface) adapters [157] from the cradle [124].

1) Attach the adapters [157] to each forward side of the engine with the pin [155] and the pin [156].

(d) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Remove the fan frame mount support adapter [263] (engine to cradle interface) from the cradle [124].

1) Attach the fan frame mount support adapter [263] to each forward side of the engine with the pin [264] and the pin [265].

(e) Remove the aft (engine to cradle interface) adapters [158] from the cradle [124].

(f) Attach the adapters [158] to each aft side of the engine with the pins [159].

(g) Disconnect the cradle [124] from the transportation stand [123].

1) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, remove the bolts, lock washers and hex nuts (10 locations) that attach the cradle [124] to the transportation stand [123].

2) Remove the pins [153] (4 locations) that attach the cradle [124] to the transportation stand [123].

WARNING

LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

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(WARNING PRECEDES)

CAUTION

MAKE SURE THAT WHEN YOU LIFT THE CRADLE, IT DOES NOT TOUCH THE FAN STATOR COMPONENTS. THE CRADLE IS VERY NEAR THE FAN STATOR COMPONENTS. DAMAGE CAN OCCUR.

(h) Operate the lever hoists [130] to lift the cradle [124] to the engine.

NOTE: Make sure you lift the cradle slowly. Align the cradle with the engine, use the aft hoists to change the roll of the cradle. Use the forward hoists or the aft hoists to change the pitch of the cradle.

NOTE: If it is necessary, move the transportation base aft to gain clearance for cradle lifting. Make sure you keep the wheels alignment in place.

1) CRADLE THAT USES THE FORWARD ADAPTERS; Make sure you align the adapter [157] and the adapter [158] (forward and aft) with the cradle [124].

2) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Make sure you align the fan frame mount support adapter [263] and the aft adapters [158] with the cradle [124].

(i) CRADLE THAT USES THE FORWARD ADAPTERS; Attach the adapter [157] and the adapter [158] (forward and aft) to the cradle [124].

(j) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Attach the fan frame mount support adapter [263] and the aft adapters [158] to the cradle [124].

1) Adjust the adjustment bolt [266] if necessary.

SUBTASK 71-00-02-480-009-H01

WARNING

MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOISTS. MAKE SURE THE LOADS ARE LESS THAN THESE LOAD LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DYNAMOMETER,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DYNAMOMETER,

4000 POUNDS (1818 KILOGRAMS) ON AN AFT DYNAMOMETER.

IF THE LOADS ARE MORE THAN THE LOAD LIMITS GIVEN, THE ENGINE CAN FALL AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(7) Increase the loads on the forward and the aft lever hoists [130] equally until the dynamometers [136] show approximately to these preloads:

(a) The forward outboard dynamometer [136] shows 14000 pounds (6364 kilograms).

(b) The forward inboard dynamometer [136] shows 10000 pounds (4545 kilograms).

(c) The aft dynamometer [136] shows 3000 pounds (1364 kilograms).

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SUBTASK 71-00-02-020-014-H01

WARNING REMOVE THE ENGINE CAREFULLY. THE ENGINE WEIGHS APPROXIMATELY 21,000 LB (9525 KG). THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(8) Disconnect the aft engine mount [121] and the forward engine mount [122] (Figure 413).

NOTE: Make sure that the anti-backlash ratchet switch of the torque wrench tool is properly set so that the socket turns in the correct direction for tightening and or loosening the bolts. False torque reading can occur if the ratchet switch is not set in the correct position.

CAUTION DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

(a) Loosen the bolts [191] and the bolts [197] for the forward mount and the aft mount one-haft of a turn.

NOTE: The torque adapter wrenches will be necessary when you remove the engine mount bolts for the engine mounts.

1) Look at the forward and the aft mounts for the clearance between the upper and the lower mounts.

a) If there is a clearance between the mounts, operate the forward and the aft lever hoists [130] to remove the clearance.

b) Make sure you do not have more than the maximum permitted loads shown on the dynamometers [136].

CAUTION DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

(b) Loosen the bolts [191] and the bolts [197] for the forward mount and the aft mount one-half of a turn.

1) Make sure that the dynamometers [136] do not exceed the load limits and make sure there is no clearance between the engine mounts again.

NOTE: The entire weight of the engine is now supported by the bootstrap hoists.

(c) Remove the bolts [191], the washers [192], the washers [210], and the washers [211] from the nuts [193].

NOTE: If you must remove the nuts [193], remove the bolts [195], the washers [202], the nuts [203], and the nut retainers [194].

(d) Remove the bolts [197], the washers [198] from the nuts [200].

NOTE: For the nuts [200], remove the nut retainers [199], and the retainer plates [201].

SUBTASK 71-00-02-020-033-H00

(9) Lower the engine and attach the cradle [124] to the transportation stand [123].

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WARNING MAKE SURE THAT WORKSTANDS AND PERSONNEL ARE AWAY FROM THE ENGINE BEFORE YOU LOWER IT. THE ENGINE CAN MOVE RELATIVE TO THE STRUT WHEN THE SHEAR PINS ARE NOT IN THE UPPER ENGINE MOUNTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT THE ENGINE CAN MOVE FREELY. IF A PART OF THE ENGINE IS CAUGHT, IT CAN MOVE QUICKLY AFTER IT IS FREE. THIS CAN CAUSE DAMAGE TO OTHER ENGINE COMPONENTS.

(a) Slowly lower the forward and the aft lever hoists [130] equally until the shear pins are clear of the upper engine mounts.

NOTE: Binding of the aft engine mount can occur if the forward hoists are lowered too far ahead than the aft hoists.

CAUTION MAKE SURE YOU LOWER THE FORWARD END OF THE ENGINE BEFORE YOU LOWER THE AFT END. THE UPPER FAN CASE CAN HIT THE THRUST REVERVERS IF THE AFT END OF THE ENGINE IS LOWERED BEFORE THE FORWARD END. DAMAGE TO THE ENGINE AND THE THRUST REVERSERS CAN OCCUR.

(b) Slowly lower the forward lever hoists [130] equally two more inches, but do not lower the aft lever hoists [130] at this time.

NOTE: This will move the upper fan case forward and down, away from the thrust reversers.

CAUTION MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

1) Make sure that the engine is clear from the thrust links, the precooler, and the forward thrust reverser hinge beam flanges.

NOTE: Do not move or turn the engine too quickly.

CAUTION MONITOR THE THRUST LINKS WHEN YOU LOWER AND TURN THE ENGINE. MAKE SURE IT DOES NOT INTERFERE WITH THE PRECOOLER OR DAMAGE TO THE PRECOOLER CAN OCCUR.

(c) Lower the forward and the aft lever hoists [130] equally until the engine is approximately six to eight inches above the transportation stand [123].

1) Make sure you keep the correct pitch and roll of the engine and the cradle [124].

(d) Adjust the lever hoists [130] to align the cradle [124] with the transportation stand [123].

(e) Lower the cradle [124] to the transportation stand [123].

(f) Attach the cradle [124] to the transportation stand [123] with the pins [153] (4 locations).

(g) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, install the bolts, lock washers and hex nuts (10 locations) that attach the cradle [124] to the transportation stand [123].

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(h) Remove the lever hoists [130], the dynamometers [136], and the shackles [132] from the cradle [124] and from the bootstrap equipment.

1) Disconnect the block ends of the lever hoists [130] from the forward inboard cradle attach (adapter) assembly [150] and from the forward outboard cradle attach assembly [147].

2) Remove the lever hoists [130] from the (inboard and outboard) forward lower arm assemblies [148A].

3) Remove the forward inboard cradle attach (adapter) assembly [150] from the cradle [124].

4) Remove the forward outboard cradle attach assembly [147] from the cradle [124].

5) Disconnect the block ends of the lever hoists [130] from the aft cradle attach fittings [137].

6) Remove the lever hoist [130] with the dynamometers [136] and the shackles [132] from the aft outboard arm [135].

7) Remove the lever hoist [130] with the shackles [132] from the aft inboard arm [133].

8) Remove the aft cradle attach fittings [137] from the cradle diagonal beams.

(i) Carefully pull the transportation stand [123] with the cradle [124] and the engine attached, forward until it is clear of the strut.

SUBTASK 71-00-02-480-010-H01

(10) Install the forward engine mount stabilizer fixture, SPL-2073 on the forward engine mount, if it is necessary.

NOTE: This tool is used for engine transportation.

SUBTASK 71-00-02-480-011-H01

(11) Put the covers on the open ends of the ducts on the engine and the strut.

SUBTASK 71-00-02-010-010-H01

(12) Remove the bootstrap equipment, if it is necessary.

NOTE: Remove the bootstrap equipment off the strut if the engine will not be installed for more than one day. Remove the bootstrap equipment if the winds will be more than 40 knots.

(a) Remove the forward bootstrap equipment.

1) Remove the forward lower arm assemblies [148A] from the forward upper arm assemblies [148].

2) Remove the forward upper arm assemblies [148] (inboard and the outboard) from the upper forward center beam assembly [143].

3) Remove the upper forward center beam assembly [143] from the forward upper attach fittings [126].

4) Remove the forward upper attach fittings [126] from the strut.

(b) Remove the aft bootstrap equipment.

1) Remove the cable [138] from the pulley [139] of the aft inboard arm [133] and the aft outboard arm [135].

2) Remove the aft inboard arm [133] and the aft outboard arm [135] from the aft strut brackets.

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SUBTASK 71-00-02-410-006-H01

(13) Close the applicable thrust reversers if it is necessary.

NOTE: Close the thrust reversers if the engine is not installed on the strut for more than one day. Close the thrust reversers if the winds will be more than 40 knots.

WARNING

DO NOT TRY TO REMOVE THE HOLD-OPEN RODS UNLESS THERE IS EQUIPMENT TO HOLD THE THRUST REVERSERS OPEN. MAKE SURE THAT YOU INSTALL THE HOLD-OPEN EQUIPMENT CORRECTLY. THE THRUST REVERSER CAN FALL QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(a) Remove the hold-open equipment [12] (GE90 engine fan reverser hold open equipment, SPL-2085).

1) Install the GE90 fan thrust reverser sling equipment, SPL-2594 on the thrust reverser (TASK 78-31-01-000-801-H01).
2) Slowly open the thrust reverser so that the extended length of the actuator rods are longer than the length of the hold-open equipment [12].
3) Loosen the clamp screws [14] on the hold-open equipment [12].
4) Remove the upper clamp blocks [11] that attach the hold-open equipment [12] to the thrust reverser actuator rods.
5) Loosen the screw [15] on the hold-open equipment [12].
6) Disengage the retainers [13] from the bolts of the thrust reverser brackets.
7) Remove the hold-open equipment [12] from the thrust reverser PDOS actuator rods.
8) Install the lockwire on the gland nuts of the thrust reverser PDOS actuator rods (TASK 70-41-00-910-803-H00).

(b) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-02-080-002-H01

(14) If you must move the airplane, do these steps:

(a) Remove the tail jack if it is installed (TASK 07-11-05-580-801).

(b) Do the shock strut deflation, if it is necessary (TASK 12-15-01-610-810).

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

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SUBTASK 71-00-02-490-002-H00

(15) If the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) is used, and if it is necessary, use engine sling, SPL-4920 (9C6020G03, 9C6020G04, 9C6020G05, or 9C6020G06) to transfer the engine from the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) to the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) for engine transportation.

NOTE: Refer to the GE Engine representative for the GE Engine Sling equipment usage.

SUBTASK 71-00-02-860-016-H01

(16) This concludes the removal procedure of the power plant with manually operated bootstrap equipment.

J. Power Plant Removal (with the Pneumatic Bootstrap Equipment (Pneumatically Operated))

SUBTASK 71-00-02-480-012-H01

CAUTION

MAKE SURE YOU ARE CERTIFIED AND TRAINED TO USE THE EQUIPMENT. IF YOU ARE NOT CERTIFIED OR TRAINED TO USE THE EQUIPMENT, YOU CAN DAMAGE THE AIRPLANE STRUT OR THE ENGINE.

(1) Use the approved pneumatic hoist equipment installation instructions to connect the supply air lines, the hoist air supply lines, and the load cell assemblies.

(a) Make sure you read the operation manual of the pneumatic hoist system before you operate the bootstrap equipment.

CAUTION

LUBRICATE THE PNEUMATIC HOISTS BEFORE EACH CYCLE OF THE HOISTS. YOU MUST LUBRICATE THE PNEUMATIC HOISTS FREQUENTLY TO PREVENT DAMAGE.

(b) Make sure you lubricate the gears inside the pneumatic hoists [130A] with WD-40 lubricant, D00139 through the hose fittings before you connect the pneumatic lines to the pneumatic hoists. Repeat the lubrication after each cycle of the hoists up and down.

(c) Make sure you install the hoist bracket [160] and the pneumatic line (red) [161] and the pneumatic line (green) [162] to the pneumatic hoists [130A] correctly.

SUBTASK 71-00-02-860-017-H01

(2) Put the protective mat, STD-585 on the engine core to protect the engine components from falling objects.

SUBTASK 71-00-02-480-013-H01

(3) Install the forward bootstrap equipment, SPL-4947 (Figure 414).

(a) Install the forward upper attach fittings [126] on the left and the right sides of the strut brackets with the pins [125] and the pins [127] (two on each fitting).

(b) Attach the upper forward center beam assembly [143] to the forward upper attach fittings [126] with the pins [142].

(c) Attach the left and right forward upper arm assemblies [148] to the upper forward center beam assembly [143] with the pins [140].

NOTE: The positions of the forward upper arm assemblies are not interchangeable. They are marked as an inboard or outboard arm assembly. Make sure the center pin of the forward upper arm assemblies is not binding on other components.

1) Install the pin [141] to join the left and right forward upper arm assemblies [148] together.

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(d) Attach the left and right forward lower arm assemblies [148A] to the forward upper arm assemblies [148] with the pin [141].

NOTE: The positions of the forward lower arm assemblies are interchangeable. They can be installed on either inboard or outboard sides.

(e) Attach the pneumatic hoists [130A], the shackles (load cell) [136A], and the shackles [132] to the ends of the forward lower arm assemblies [148A].

NOTE: You can use more than two shackles [132] to attach the dynamometers and the lever hoists.

SUBTASK 71-00-02-480-083-H00

(4) Install the aft bootstrap equipment, SPL-4947 (Figure 414).

(a) Attach the aft inboard arm [133] and the aft outboard arm [135] to the strut brackets with the two pins [129].

NOTE: The inboard and the outboard arm assemblies [133] and [135] are not interchangeable.

(b) Install the cable [138] through the aft inboard arm [133] and the aft outboard arm [135] so that the cable [138] rest on the pulleys [139].

1) Install pins [144] on the pulleys [139].

(c) Attach the pneumatic hoist [130A], the shackle (load cell) [136A], and the shackles [132] to the cable [138] end of the aft outboard arm [135].

NOTE: You can use more than two shackles [132] to attach the shackle (loadcell) to the lever hoist.

(d) Attach the pneumatic hoist [130A] with the shackles [132] to the cable [138] end of the aft inboard arm [133].

SUBTASK 71-00-02-480-015-H01

(5) Carefully put the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03), with the cradle [124] attached, below the engine.

(a) Move the transportation stand [123] into its position from the rear of the power plant.

SUBTASK 71-00-02-420-002-H01

(6) Connect the bootstrap equipment to the cradle [124].

NOTE: There are four attach locations. Two are for the forward bootstrap and the other two are for the aft bootstrap.

(a) Install the forward inboard cradle attach (adapter) assembly [150] on the forward inboard side of the cradle (of the engine to be changed).

1) Install the pin [154] on the cradle lug.

(b) Install the forward outboard cradle attach assembly [147] on the forward outboard side of the cradle (of the engine to be changed).

1) Install the pin [154] on the cradle lug.

(c) Install the aft cradle attach fittings [137] on the cradle diagonal beams.

1) Install the pins [152] on the aft cradle attach fittings [137].

(d) Attach the pneumatic hoists [130A], the shackle (load cell) [136A], and the shackles [132] from the cable [138] of the aft inboard arm [133] and the aft outboard arm [135] to the aft cradle attach fittings [137].

1) Make sure the chains [131] are not twisted.

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(e) Attach the forward pneumatic hoists [130A], the shackle (load cell) [136A], and the shackles [132] from the forward lower arm assemblies [148A] to the forward outboard cradle attach assembly [147] and to the forward inboard cradle attach (adapter) assembly [150].

1) Attach the block end of the inboard pneumatic hoist [130A] with the shackle (load cell) [136A] to the forward inboard cradle attach (adapter) assembly [150] with the pin [154].

2) Attach the block end of the outboard pneumatic hoist [130A] with the shackle (load cell) [136A] to the forward outboard cradle attach assembly [147] with the pin [154].

3) Make sure the chains [146] are not twisted.

(f) Take up the slack in the pneumatic hoists [130A].

NOTE: Make sure the cable end fittings are approximately the same distance from the ground on each sides.

SUBTASK 71-00-02-480-082-H00

CAUTION

DO NOT PUT MORE THAN 3000 POUNDS (1363 KG) ON AN AFT OUTBOARD BOOTSTRAP HOIST. MAKE SURE THAT ALL OF THE WHEELS OF THE TRANSPORTATION STAND TOUCH THE GROUND AT THE SAME TIME. IF ONLY THE FRONT WHEELS TOUCH THE GROUND, THE POSITION OF THE CENTER OF GRAVITY ON THE AFT LOAD WILL CHANGE. THIS WILL CAUSE THE LOADS TO BE MORE THAN THE LOAD LIMITS FOR THE AFT BOOTSTRAP HOISTS. IF THE LOADS ARE TOO LARGE, THIS CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION

MAKE SURE THAT THE LOAD DIFFERENCE BETWEEN THE INBOARD AND THE OUTBOARD FORWARD BOOTSTRAP EQUIPMENT IS LESS THAN THE LIMIT. THIS LIMIT APPLIES WHEN YOU LIFT THE ENGINE IN ALL OF THE OPERATION. IF THE LOAD DIFFERENCE IS MORE THAN THE LIMIT, DAMAGE TO THE ENGINE AND EQUIPMENT CAN OCCUR.

(7) Attach the cradle [124] to the engine [1].

WARNING

LET ONLY APPROVED PERSONNEL OPERATE THE PNEUMATIC HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Slightly lift the cradle [124] and the transportation stand [123] to permit them to align below the engine [1].

NOTE: Make sure you lift it slowly. The cradle and the transportation stand will move to the aligned position before you lift them free from the ground. It is not necessary for the transportation stand to come off the ground fully (or hang freely).

(b) Lower the cradle [124] and the transportation stand [123] to the ground.

(c) CRADLE THAT USES THE FORWARD ADAPTERS; Remove the forward (engine to cradle interface) adapters [157] from the cradle [124].

1) Attach the adapters [157] to each forward side of the engine with the pin [155] and the pin [156].

(d) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Remove the fan frame mount support adapters [263] (engine to cradle interface) from the cradle [124].

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1) Attach the fan frame mount support adapters [263] to each forward side of the engine with the pin [264] and the pin [265].

(e) Remove the aft (engine to cradle interface) adapters [158] from the cradle [124].

(f) Attach the adapters [158] to each aft side of the engine with the pins [159].

(g) Disconnect the cradle [124] from the transportation stand [123].

1) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, remove the bolts, lock washers and hex nuts (10 locations) that attach the cradle [124] to the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03).

2) Remove the pins [153] (4 locations) that attach the cradle [124] to the transportation stand [123].

WARNING LET ONLY APPROVED PERSONNEL OPERATE THE PNEUMATIC HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT WHEN YOU LIFT THE CRADLE, IT DOES NOT TOUCH THE FAN STATOR COMPONENTS. THE CRADLE IS VERY NEAR THE FAN STATOR COMPONENTS. DAMAGE CAN OCCUR.

(h) Operate the pneumatic hoists [130A] to lift the cradle [124] to the engine.

NOTE: Make sure you lift the cradle slowly. To align the cradle with the engine, use the aft pneumatic hoists to change the roll of the cradle. Use the forward pneumatic hoists or the aft pneumatic hoists to change the pitch of the cradle.

NOTE: If it is necessary, move the transportation base aft to gain clearance for cradle lifting. Make sure you keep the wheels alignment in place.

1) CRADLE THAT USES THE FORWARD ADAPTERS; Make sure you align the adapters [157] and the adapters [158] (forward and aft) with the cradle [124].

2) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Make sure you align the fan frame mount support adapters [263] and the aft adapters [158] with the cradle [124].

(i) CRADLE THAT USES THE FORWARD ADAPTERS; Attach the adapters [157] and the adapters [158] (forward and aft) to the cradle [124].

(j) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Attach the fan frame mount support adapters [263] and the aft adapters [158] to the cradle [124].

1) Adjust the adjustment bolt [266] if necessary.

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SUBTASK 71-00-02-480-017-H01

WARNING

MONITOR THE PENDANT DISPLAY FOR THE FORWARD AND THE AFT HOIST WEIGHTS. MAKE SURE THAT THE LOADS ARE LESS THAN THESE LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DISPLAYS,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DISPLAYS,

4000 POUNDS (1818 KILOGRAMS) ON THE AFT DISPLAY.

IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN BREAK THE HOIST AND FALL. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Increase the loads on the forward and the aft pneumatic hoists [130A] equally until the load reading show approximately these preloads:

(a) The forward outboard reading shows 14000 pounds (6364 kilograms).

(b) The forward inboard reading shows 10000 pounds (4545 kilograms).

(c) The aft reading shows 3000 pounds (1364 kilograms).

SUBTASK 71-00-02-020-016-H01

WARNING

REMOVE THE ENGINE CAREFULLY. THE ENGINE WEIGHS APPROXIMATELY 21,000 LB (9525 KG). THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(9) Disconnect the aft engine mount [121] and the forward engine mount [122] (Figure 415).

NOTE: Make sure that the anti-backlash ratchet switch of the torque wrench tool is properly set so that the socket turns in the correct direction for tightening and or loosening the bolts. False torque reading can occur if the ratchet switch is not set in the correct position.

CAUTION

DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

(a) Loosen the bolts [191] and the bolts [197] for the forward mount and the aft mount one-haft of a turn.

NOTE: The torque adapter wrenches will be necessary when you remove the engine mount bolts for the engine mounts.

1) Look at the forward and the aft mounts for the clearance between the upper and the lower mounts.

a) If there is a clearance between the mounts, operate the forward and the aft pneumatic hoists [130A] to remove the clearance.

b) Make sure you do not have more than the maximum permitted loads shown on the pendant display.

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CAUTION

DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

(b) Loosen the bolts [191] and the bolts [197] for the forward mount and the aft mount one-half of a turn.

1) Make sure that the pendant load displays do not exceed the load limits and make sure there is no clearance between the engine mounts again.

NOTE: The entire weight of the engine is now supported by the pneumatic hoists.

(c) Remove the bolts [191], the washers [192], the washers [210], and the washers [211] from the nuts [193].

NOTE: If you must remove the nuts [193], remove the bolts [195], the washers [202], the nuts [203], and the nut retainers [194].

(d) Remove the bolts [197], the washers [198] from the nuts [200].

NOTE: For the nuts [200], remove the nut retainers [199] and the retainer plates [201].

SUBTASK 71-00-02-020-034-H00

(10) Lower the engine and attach the cradle [124] to the transportation stand [123].

WARNING

MAKE SURE THAT WORKSTANDS AND PERSONNEL ARE AWAY FROM THE ENGINE BEFORE YOU LOWER IT. THE ENGINE CAN MOVE RELATIVE TO THE STRUT WHEN THE SHEAR PINS ARE NOT IN THE UPPER ENGINE MOUNTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION

MAKE SURE THAT THE ENGINE CAN MOVE FREELY. IF A PART OF THE ENGINE IS CAUGHT, IT CAN MOVE QUICKLY AFTER IT IS FREE. THIS CAN CAUSE DAMAGE TO OTHER ENGINE COMPONENTS.

(a) Slowly lower the forward and the aft pneumatic hoists [130A] equally until the shear pins are clear of the upper engine mounts.

NOTE: Binding of the aft engine mount can occur if the forward hoists are lowered too far ahead the aft hoists.

CAUTION

MAKE SURE YOU LOWER THE FORWARD END OF THE ENGINE BEFORE YOU LOWER THE AFT END. THE UPPER FAN CASE CAN HIT THE THRUST REVERVERS IF THE AFT END OF THE ENGINE IS LOWERED BEFORE THE FORWARD END. DAMAGE TO THE ENGINE AND THE THRUST REVERSERS CAN OCCUR.

(b) Slowly lower the forward pneumatic hoists [130A] equally two more inches, but do not lower the aft pneumatic hoist [130A] at this time.

NOTE: This will move the upper fan case forward and down, away from the thrust reversers.

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CAUTION MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

1) Make sure that the engine is clear from the thrust links, the precooler, and the forward thrust reverser hinge beam flanges.

NOTE: Do not move or turn the engine too quickly.

CAUTION MONITOR THE THRUST LINKS WHEN YOU LOWER AND TURN THE ENGINE. MAKE SURE IT DOES NOT INTERFERE WITH THE PRECOOLER OR DAMAGE TO THE PRECOOLER CAN OCCUR.

(c) Lower the forward and the aft pneumatic hoists [130A] equally until the engine is approximately six to eight inches above the transportation stand [123].

1) Make sure you keep the correct pitch and roll of the engine and the cradle [124].

(d) Adjust the pneumatic hoists [130A] to align the cradle [124] with the transportation stand [123].

(e) Lower the cradle [124] to the transportation stand [123].

(f) Attach the cradle [124] to the transportation stand [123] with the pins [153] (4 locations).

(g) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, install the bolts, lock washers and hex nuts (10 locations) that attach the cradle [124] to the shipping stand, SPL-4921.

(h) Remove the pneumatic hoists [130A], the shackles (load cell) [136A], and the shackles [132] from the cradle [124] and from the bootstrap equipment.

1) Disconnect the block ends of the pneumatic hoists [130A] from the forward inboard cradle attach (adapter) assembly [150] and from the forward outboard cradle attach assembly [147].

2) Remove the pneumatic hoists [130A] from the inboard and outboard forward upper arm assemblies [148].

3) Remove the forward inboard cradle attach (adapter) assembly [150] from the cradle [124].

4) Remove the forward outboard cradle attach assembly [147] from the cradle [124].

5) Disconnect the block ends of the pneumatic hoists [130A] from the aft cradle attach fittings [137].

6) Remove the pneumatic hoist [130A] with the shackle (load cell) [136A] and the shackles [132] from the aft outboard arm [135].

7) Remove the pneumatic hoist [130A] with the shackles [132] from the aft inboard arm [133].

8) Remove the aft cradle attach fittings [137] from the cradle diagonal beams.

(i) Carefully pull the transportation stand [123], with the cradle [124] and the engine attached, forward until it is clear of the strut.

SUBTASK 71-00-02-480-018-H01

(11) Install the forward engine mount stabilizer fixture, SPL-2073 on the forward engine mount, if it is necessary.

NOTE: This tool is used for engine transportation.

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SUBTASK 71-00-02-020-036-H00

(12) Remove the inlet cowl if you intend to install the same inlet cowl on the replacement engine (TASK 71-11-01-000-802-H01).

SUBTASK 71-00-02-480-019-H01

(13) Put the covers on the open ends of the ducts on the engine and the strut.

SUBTASK 71-00-02-080-003-H01

(14) Remove the bootstrap equipment, if it is necessary.

NOTE: Remove the bootstrap equipment off the strut if the engine will not be installed for more than one day. Remove the bootstrap equipment if the winds will be more than 40 knots.

(a) Remove the forward bootstrap equipment.

1) Remove the forward lower arm assemblies [148A] from the forward upper arm assemblies [148].

2) Remove the forward upper arm assemblies [148] (inboard and the outboard) from the upper forward center beam assembly [143].

3) Remove the upper forward center beam assembly [143] from the forward upper attach fittings [126].

4) Remove the forward upper attach fittings [126] from the strut.

(b) Remove the aft bootstrap equipment.

1) Remove the cable [138] assembly from the pulleys [139] of the aft arms.

2) Remove the aft inboard arm [133] and the aft outboard arm [135] from the aft strut brackets.

SUBTASK 71-00-02-410-007-H01

(15) Close the applicable thrust reversers if it is necessary.

NOTE: Close the thrust reversers if the engine is not installed on the strut for more than one day. Close the thrust reversers if the winds will be more than 40 knots.

WARNING

DO NOT TRY TO REMOVE THE HOLD-OPEN RODS UNLESS THERE IS EQUIPMENT TO HOLD THE THRUST REVERSERS OPEN. MAKE SURE THAT YOU INSTALL THE HOLD-OPEN EQUIPMENT CORRECTLY. THE THRUST REVERSER CAN FALL QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(a) Remove the hold-open equipment [12] (GE90 engine fan reverser hold open equipment, SPL-2085).

1) Install the GE90 fan thrust reverser sling equipment, SPL-2594 on the thrust reverser (TASK 78-31-01-000-801-H01).

2) Slowly open the thrust reverser so that the extended length of the actuator rods are longer than the length of the hold-open equipment [12].

3) Loosen the clamp screws [14] on the hold-open equipment [12].

4) Remove the upper clamp blocks [11] that attach the hold-open equipment [12] to the thrust reverser actuator rods.

5) Loosen the screw [15] on the hold-open equipment [12].

6) Disengage the retainers [13] from the bolts of the thrust reverser brackets.

7) Remove the hold-open equipment [12] from the thrust reverser PDOS actuator rods.

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8) Install lockwire on the gland nuts of the thrust reverser PDOS actuator rods (TASK 70-41-00-910-803-H00).

(b) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-02-080-004-H01

(16) If you must move the airplane, do these steps:

(a) Remove the tail jack if it is installed (TASK 07-11-05-580-801).

(b) Do the shock strut deflation, if it is necessary (TASK 12-15-01-610-810)

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-02-490-003-H00

(17) If the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) is used, and if it is necessary, use engine sling, SPL-4920 (9C6020G03, 9C6020G04, 9C6020G05, or 9C6020G06) to transfer the engine from the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) to the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) for engine transportation.

NOTE: Refer to the GE Engine representative for the GE Engine Sling equipment usage.

SUBTASK 71-00-02-020-031-H00

(18) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS (or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)); If it is necessary, remove the forward support brackets [440] from the forward inner cowl support at the fan hub frame.

(a) Remove the eight fan hub frame mount bolts that attach the forward support brackets [440] to the forward inner cowl support.

(b) Remove the flow shield brackets [450] (TASK 71-00-04-800-801-H00).

(c) Remove the forward support brackets [440] and reinstall the flow shield brackets [450] (TASK 71-00-04-800-802-H00).

NOTE: The instructions on how to remove these flow shield brackets and the forward support brackets can also be found in GE Engine Manual 72-00-00 Assembly 001/002.

1) Install the eight fan hub frame mount bolts on the forward inner cowl support at the fan hub frame.

a) Lubricate the bolts [451] thread with Acheson GP460 compound, D50043 [C02-058].

b) Install the eight bolts [451] on the forward support brackets [440].

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c) Tighten the bolts [451] to 368-432 pound-inches (41.6-48.8 Newton-meters).

(d) Install the blank off panels [260] (left) (locations 2, 3 and 4), the blank off panels [261] (right) (locations 5, 6 and 7), the air bleed deflector panels [421] (left) (locations 3 and 4), and the air bleed deflector panels [422] (right) (locations 7 and 8) on the forward inner cowl support at the fan hub frame (TASK 71-00-04-800-802-H00).

——— END OF TASK ———

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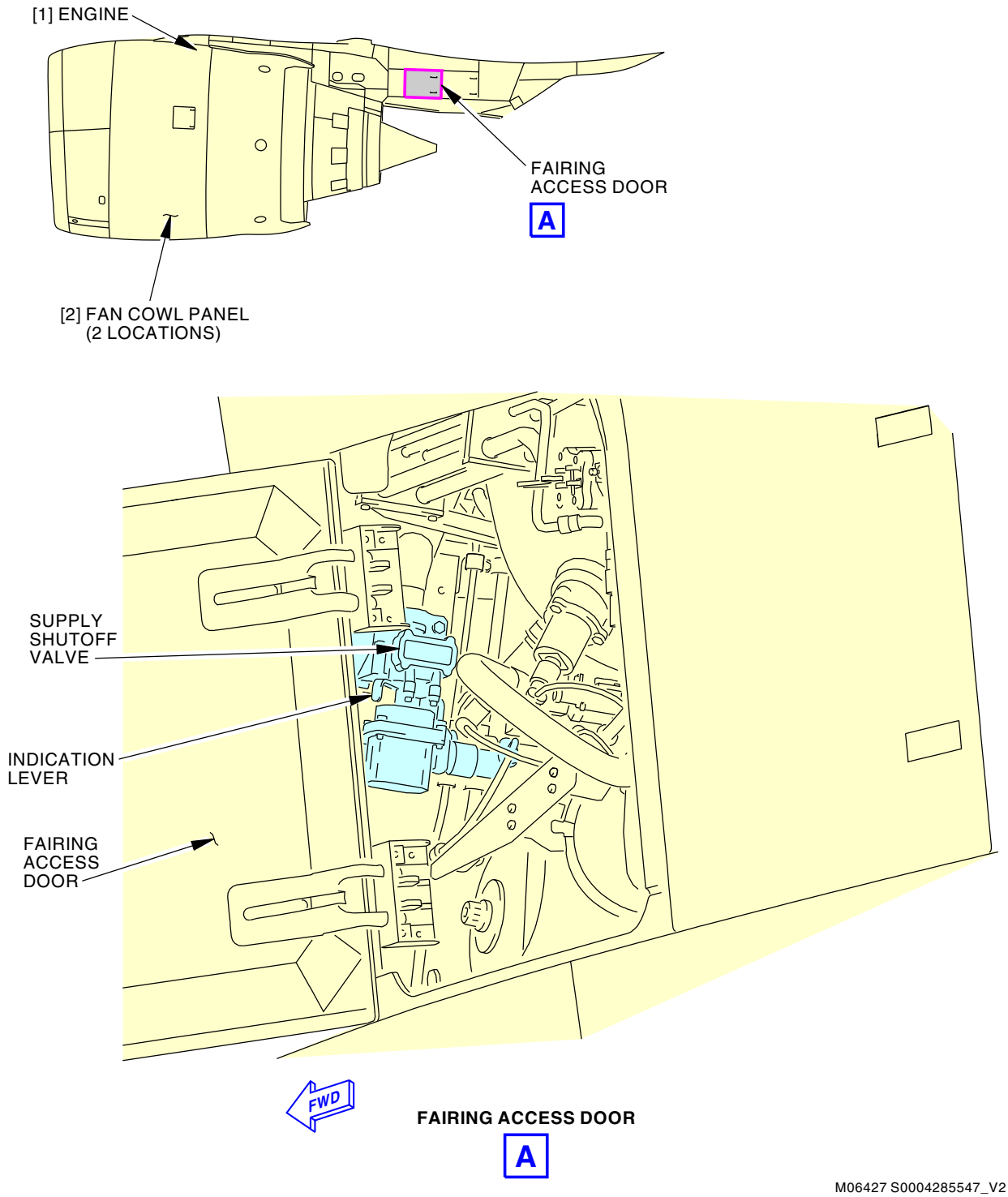

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Engine-Driven Pump (EDP) Supply Shutoff Valve Location
Figure 401/71-00-02-990-801-H01

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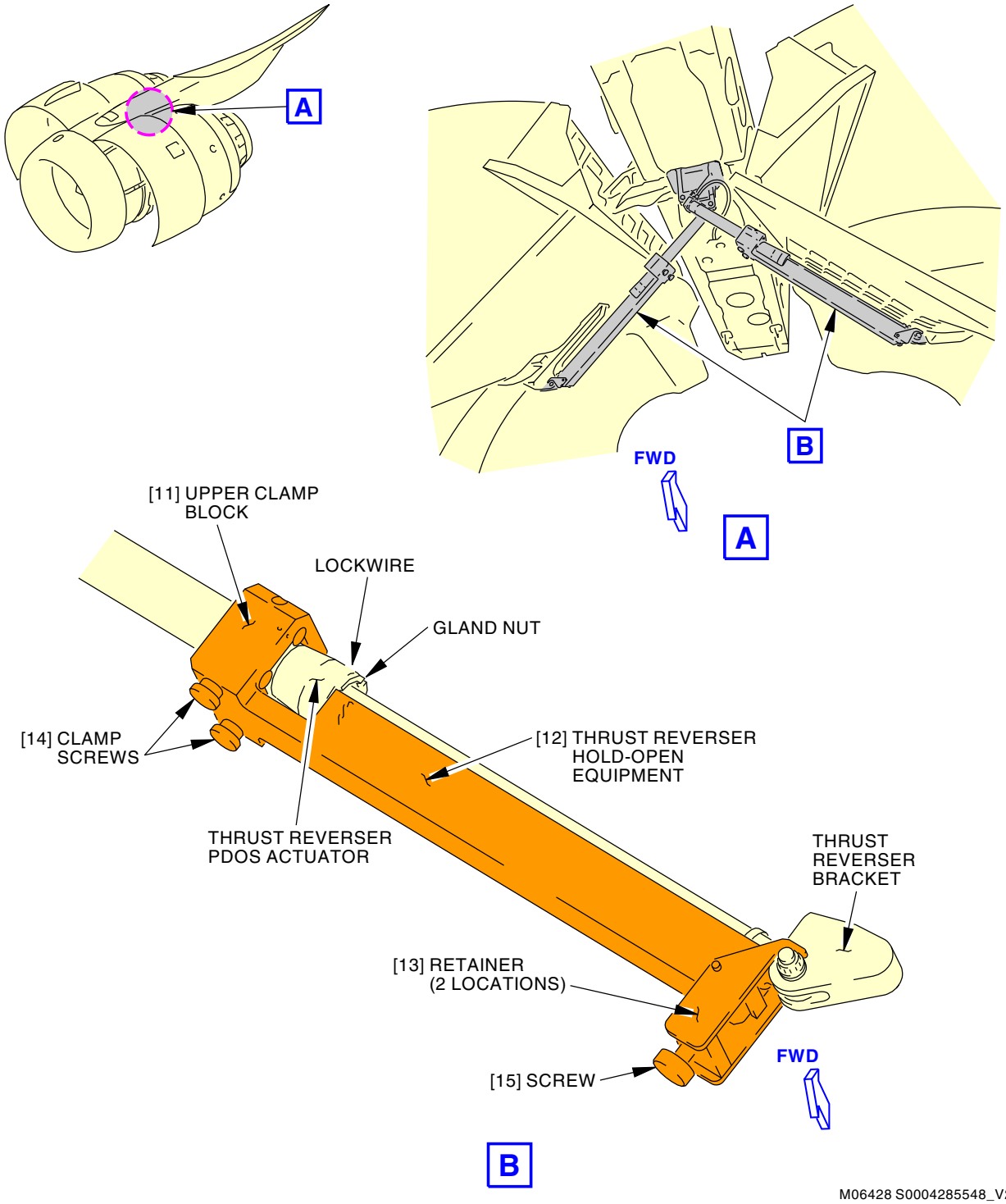

Thrust Reverser Hold-Open Equipment Installation
Figure 402/71-00-02-990-813-H01

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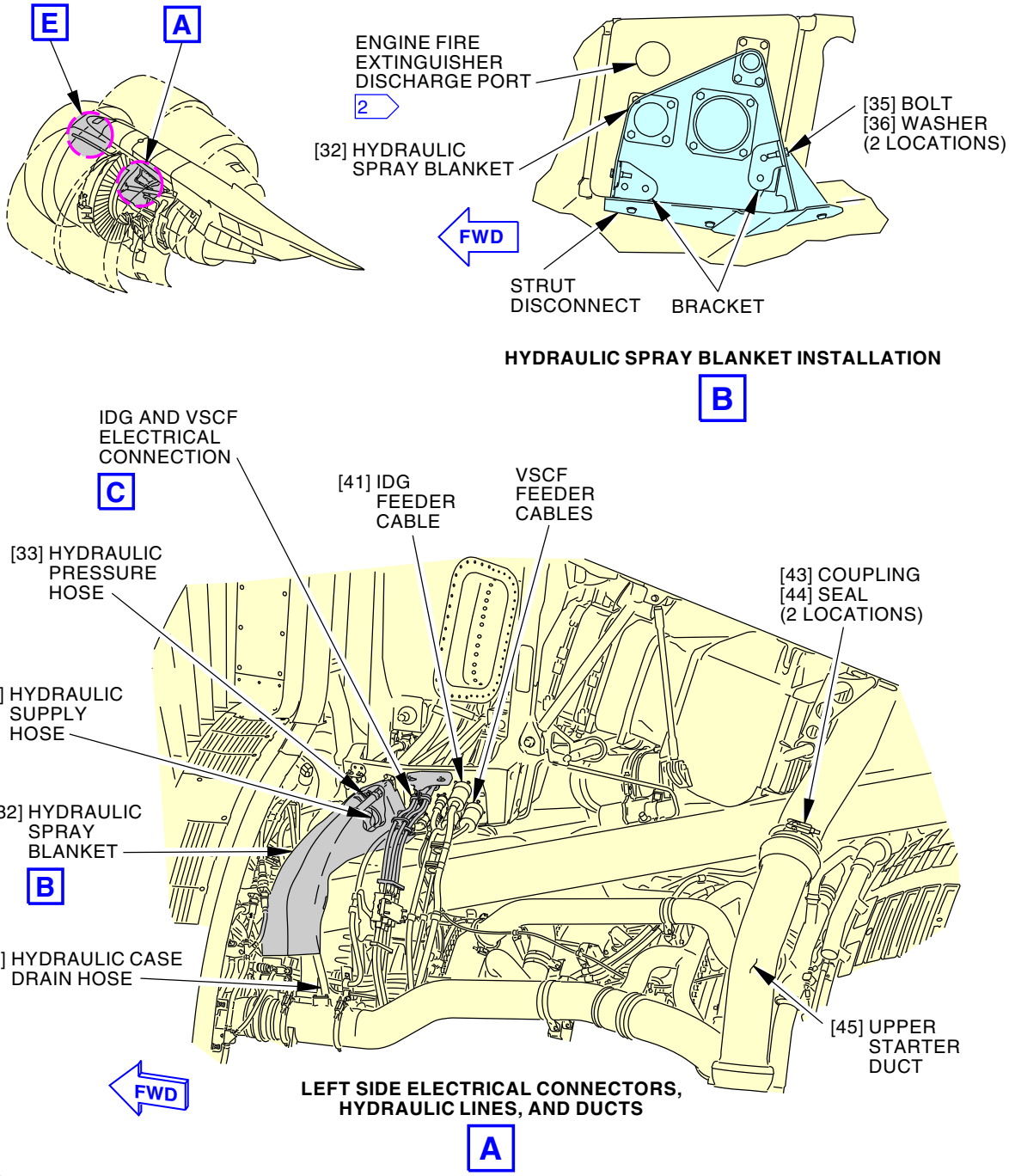

Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 1 of 6)

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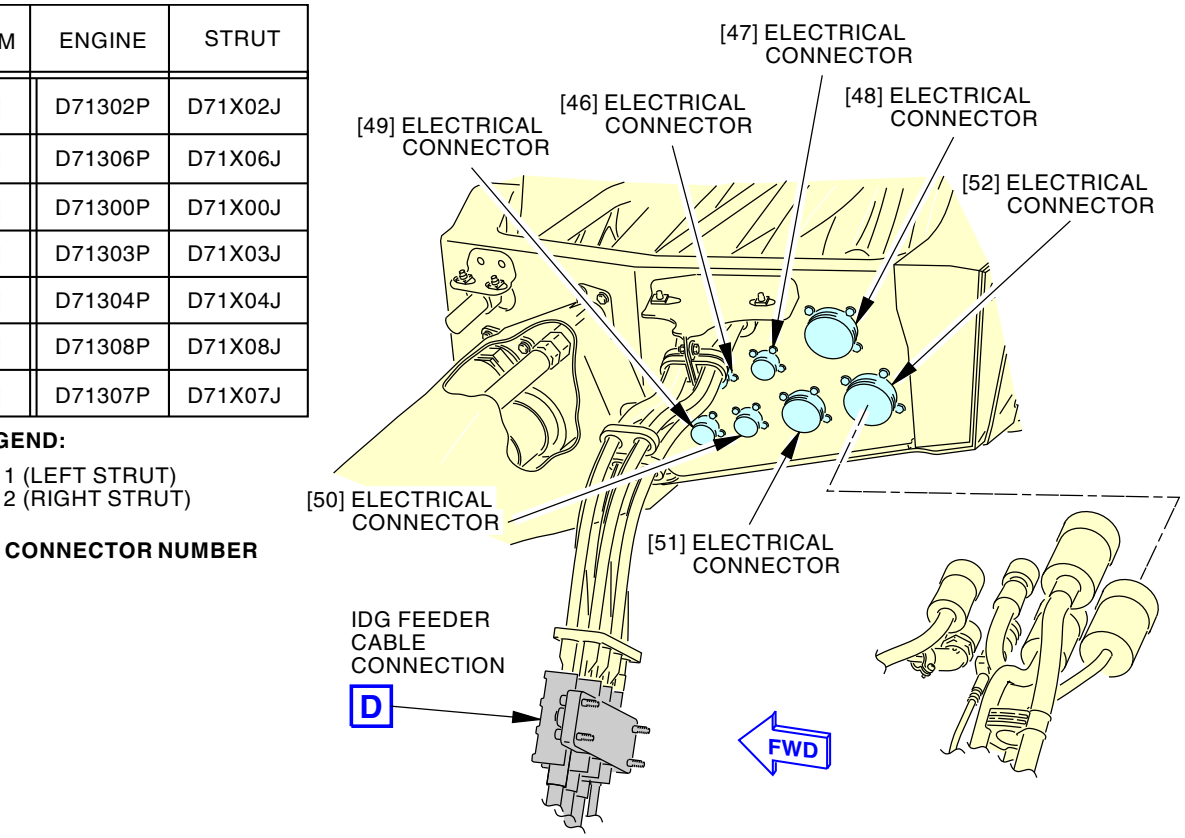
ITEM	ENGINE	STRUT
[46]	D71302P	D71X02J
[47]	D71306P	D71X06J
[48]	D71300P	D71X00J
[49]	D71303P	D71X03J
[50]	D71304P	D71X04J
[51]	D71308P	D71X08J
[52]	D71307P	D71X07J

LEGEND:

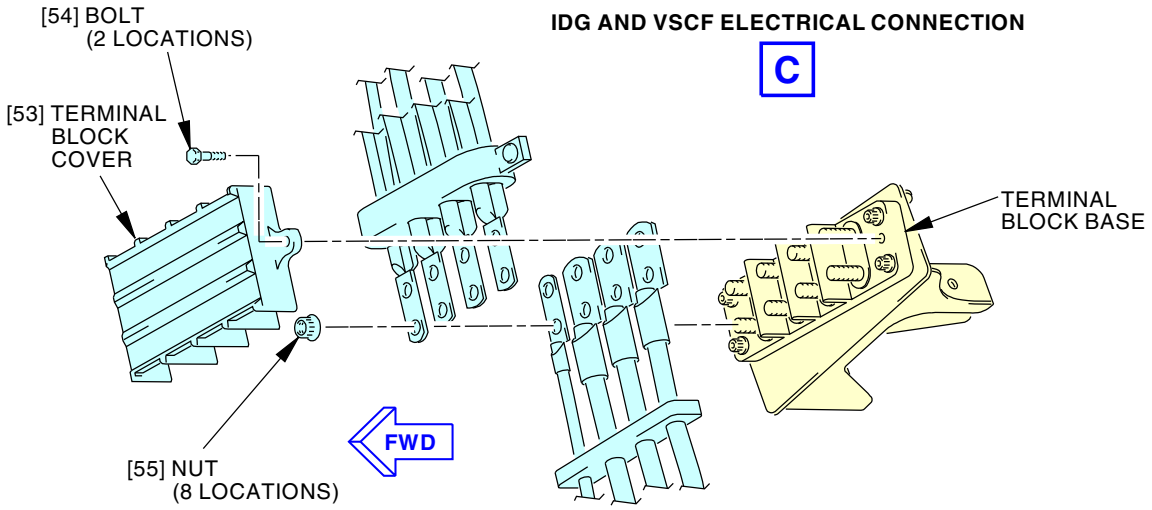
X = 1 (LEFT STRUT)
X = 2 (RIGHT STRUT)

CONNECTOR NUMBER



IDG AND VSCF ELECTRICAL CONNECTION

C



IDG FEEDER CABLE CONNECTION

D

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Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 2 of 6)

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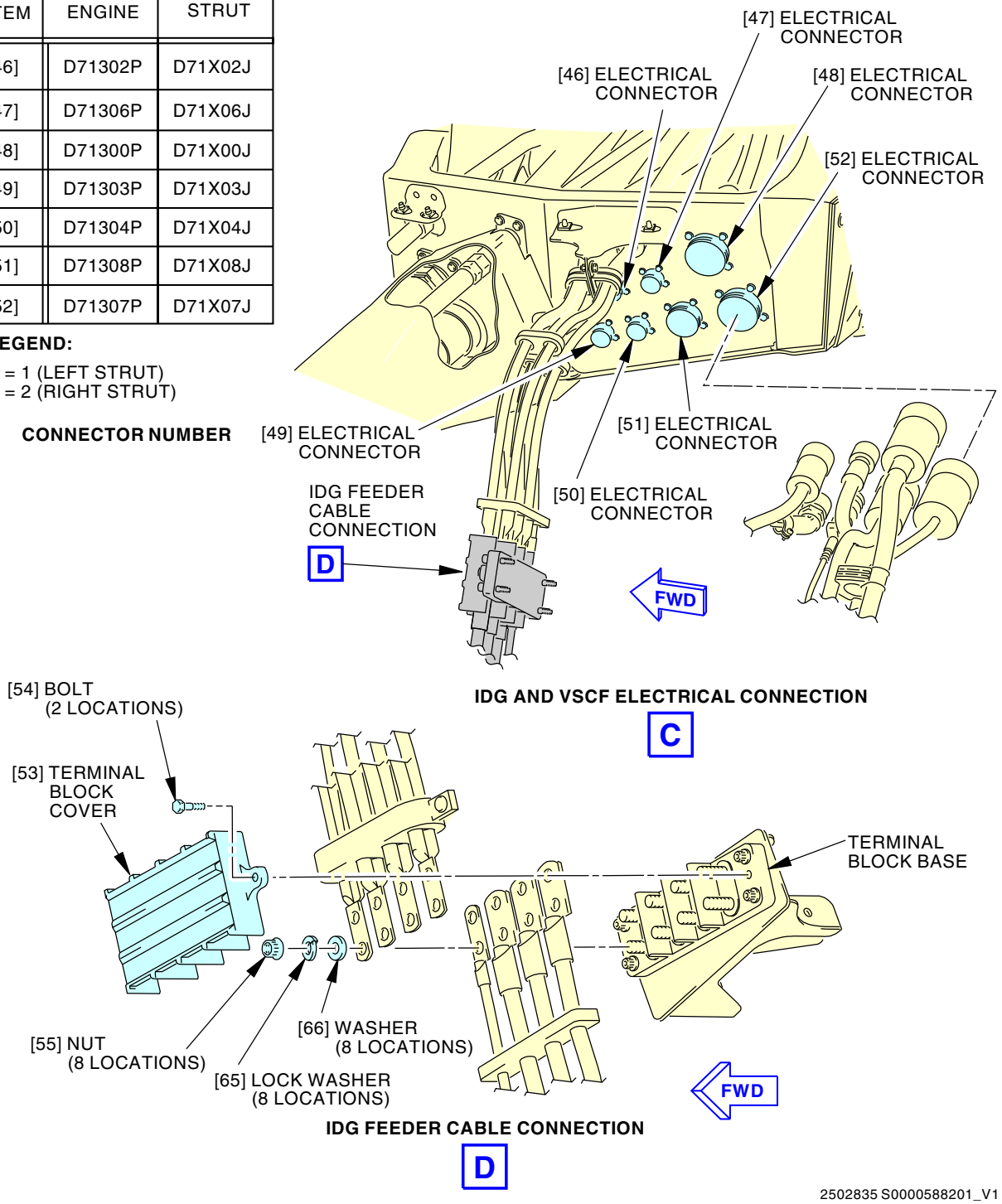
ITEM	ENGINE	STRUT
[46]	D71302P	D71X02J
[47]	D71306P	D71X06J
[48]	D71300P	D71X00J
[49]	D71303P	D71X03J
[50]	D71304P	D71X04J
[51]	D71308P	D71X08J
[52]	D71307P	D71X07J

LEGEND:

X = 1 (LEFT STRUT)
X = 2 (RIGHT STRUT)

CONNECTOR NUMBER



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Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 3 of 6)

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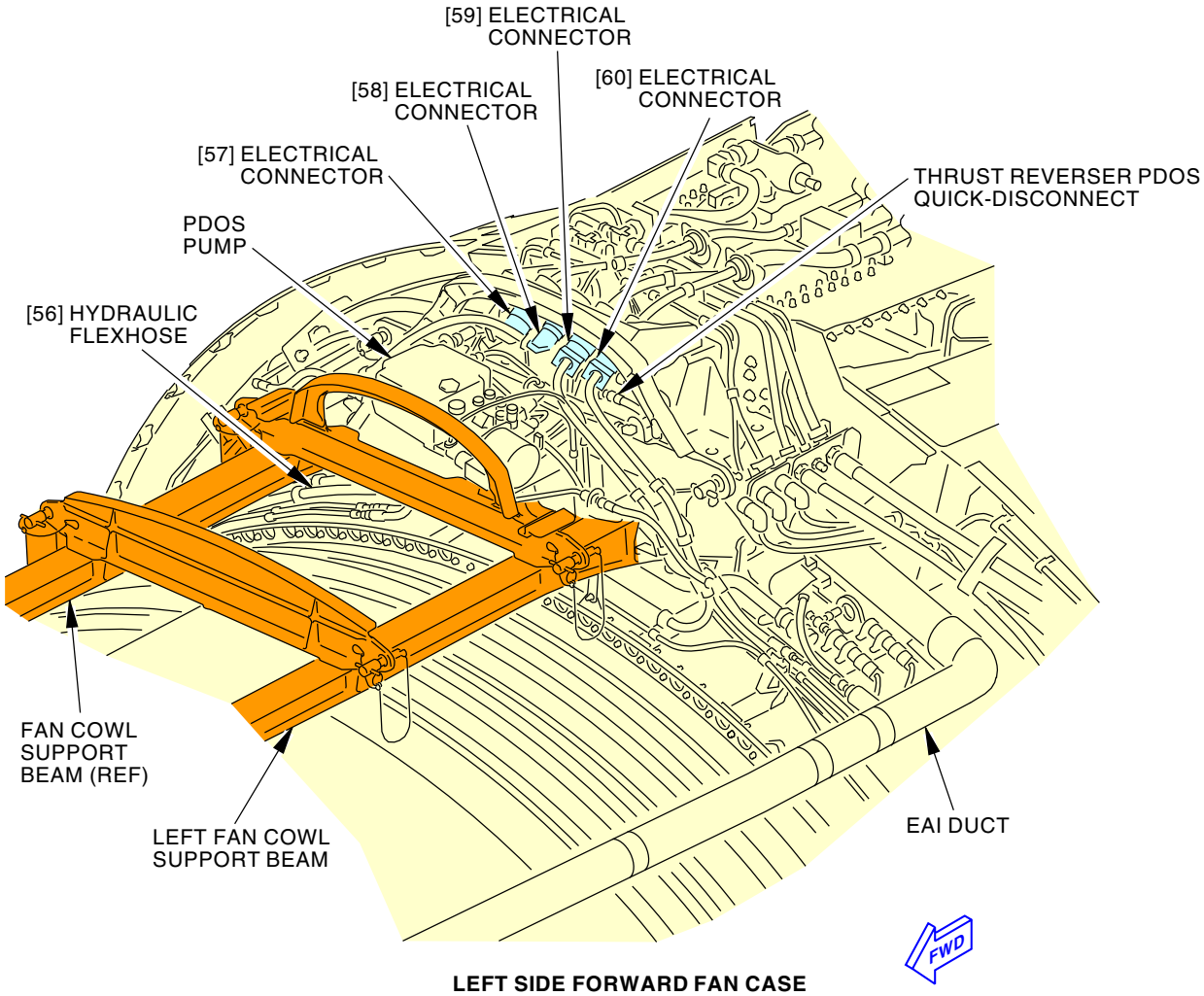

LEFT SIDE FORWARD FAN CASE

E

ITEM	ENGINE	STRUT (LEFT)	STRUT (RIGHT)
[57]	D71323P	D71123J	D71223J
[58]	D71321P	D71121J	D71221J
[59]	D71319P	D71119J	D71219J
[60]	D71317P	D71117J	D71217J

CONNECTOR NUMBER

M06431 S0004285551_V2

Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 4 of 6)

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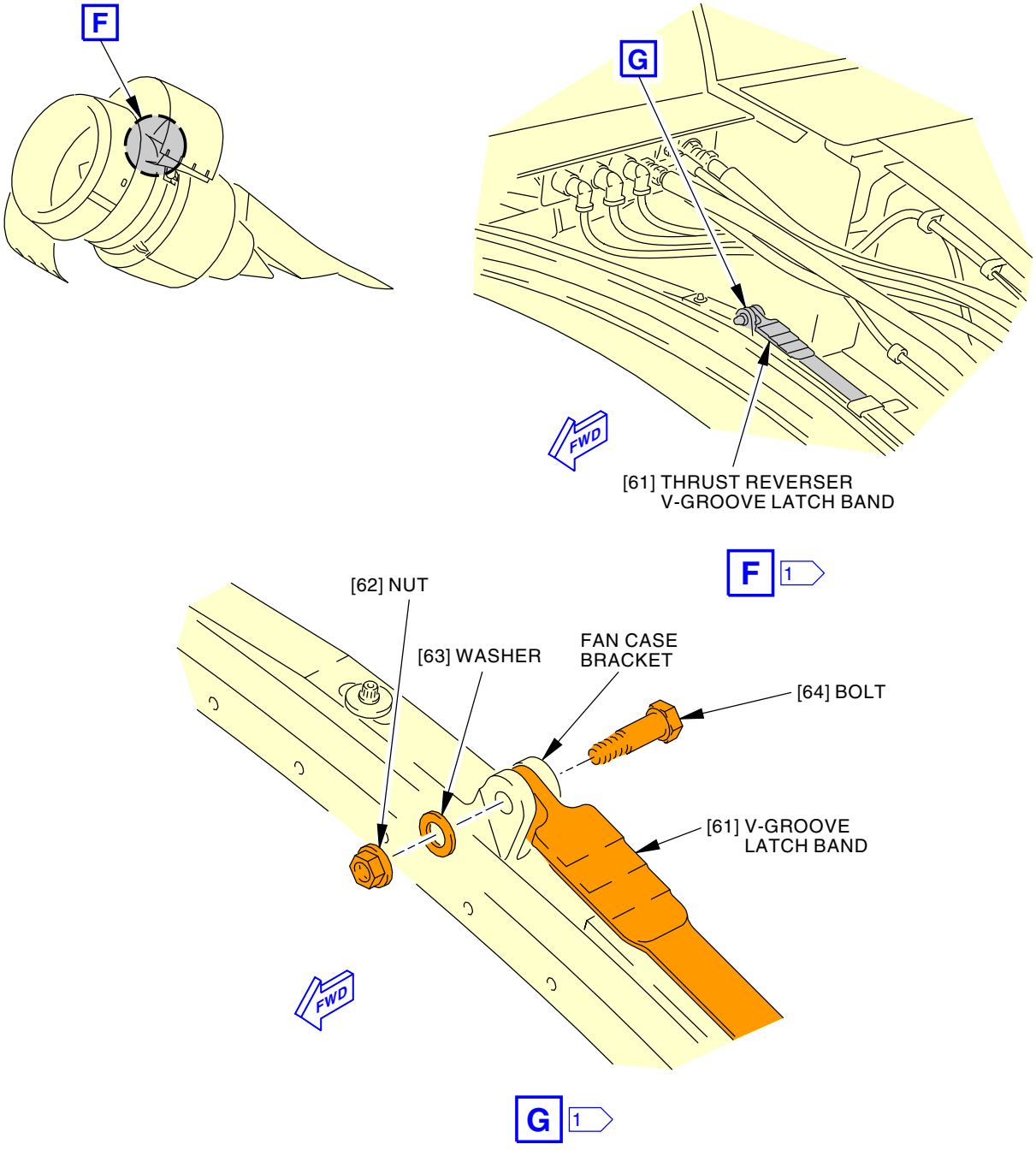

1 LEFT SIDE AND RIGHT SIDE V-GROOVE LATCH BAND INSTALLATIONS ARE THE SAME

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Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 5 of 6)

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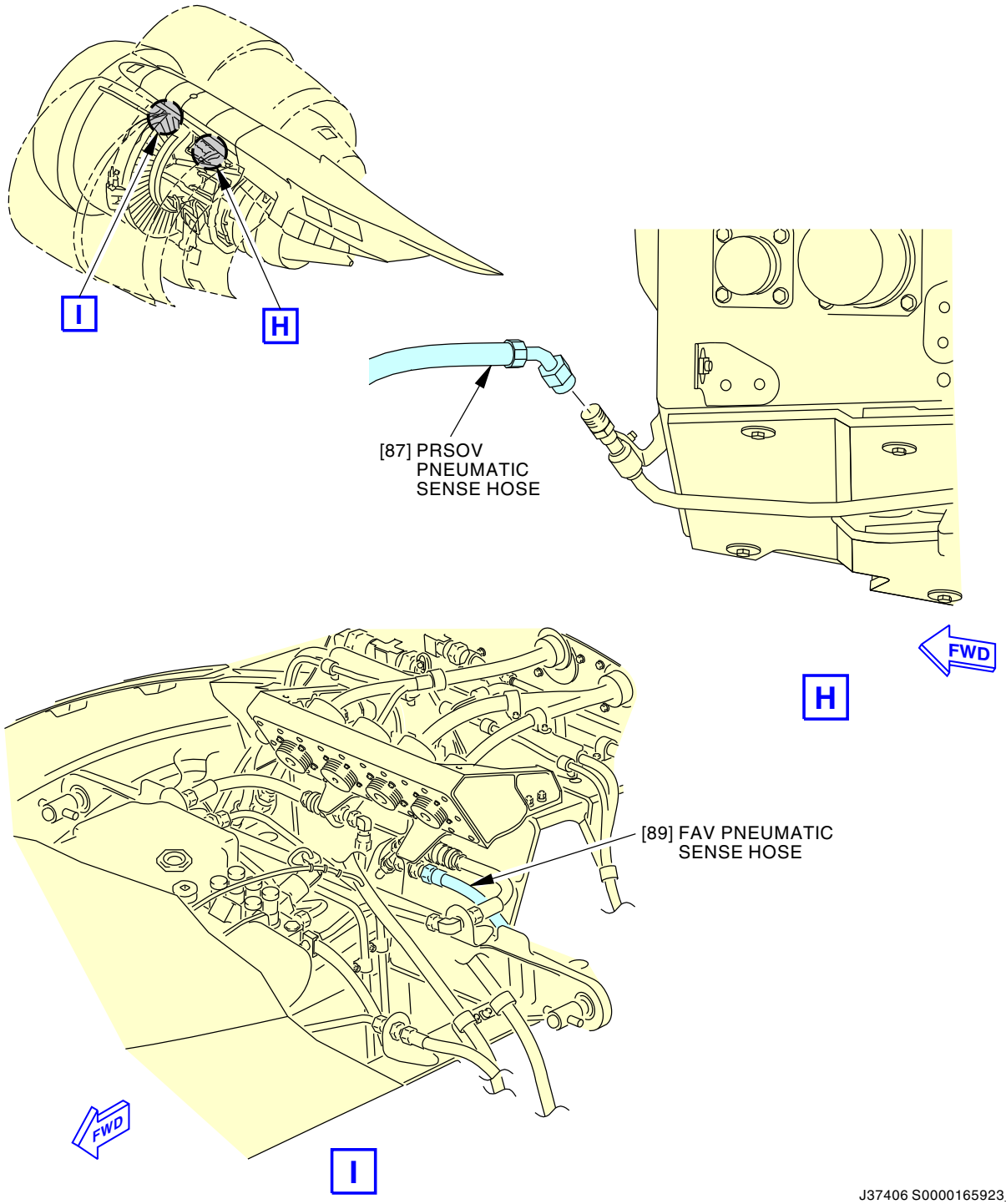

Left Side of Engine Installation
Figure 403/71-00-02-990-814-H01 (Sheet 6 of 6)

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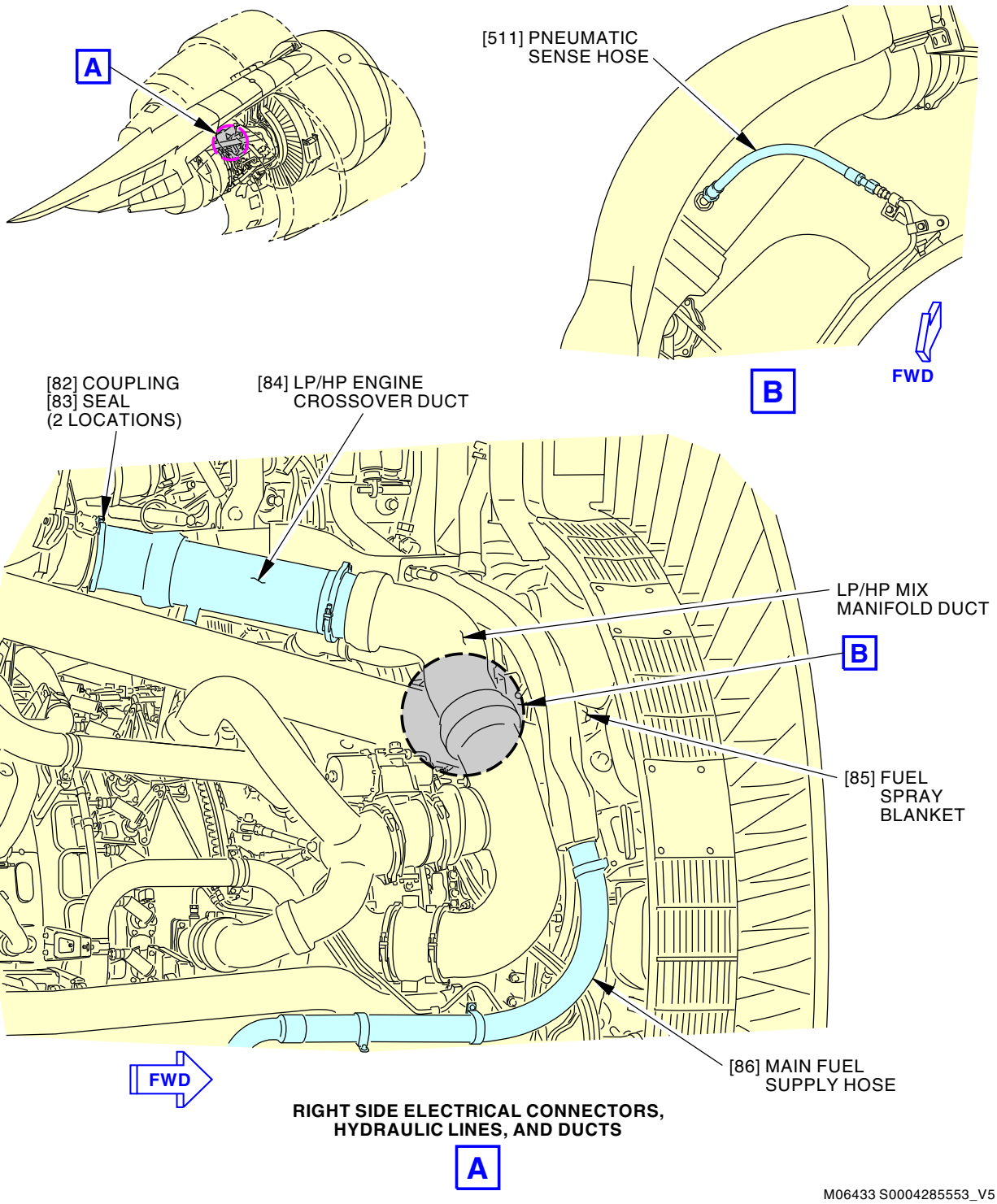

Right Side of Engine Installation
Figure 404/71-00-02-990-815-H01 (Sheet 1 of 2)

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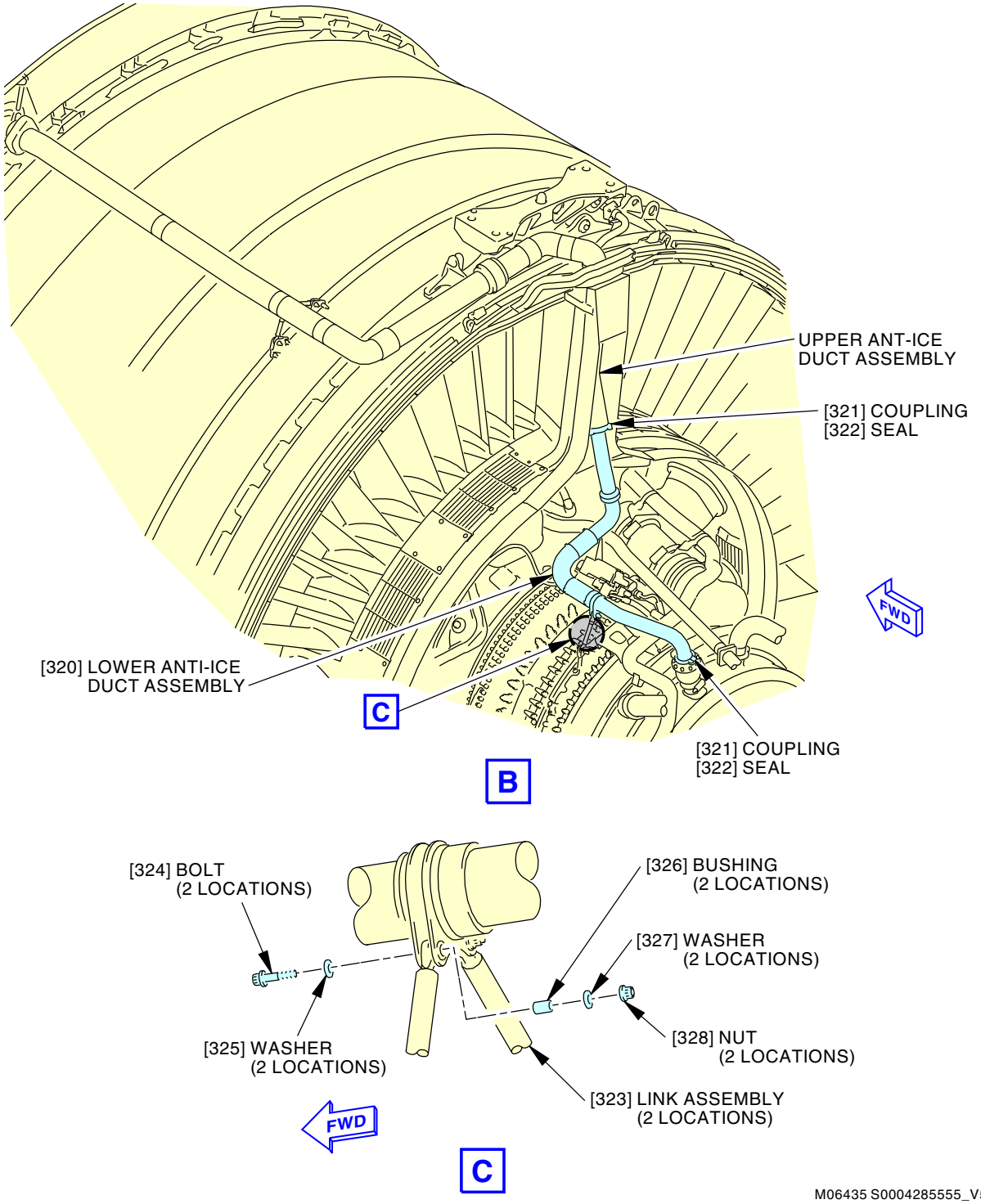

Right Side of Engine Installation
Figure 404/71-00-02-990-815-H01 (Sheet 2 of 2)

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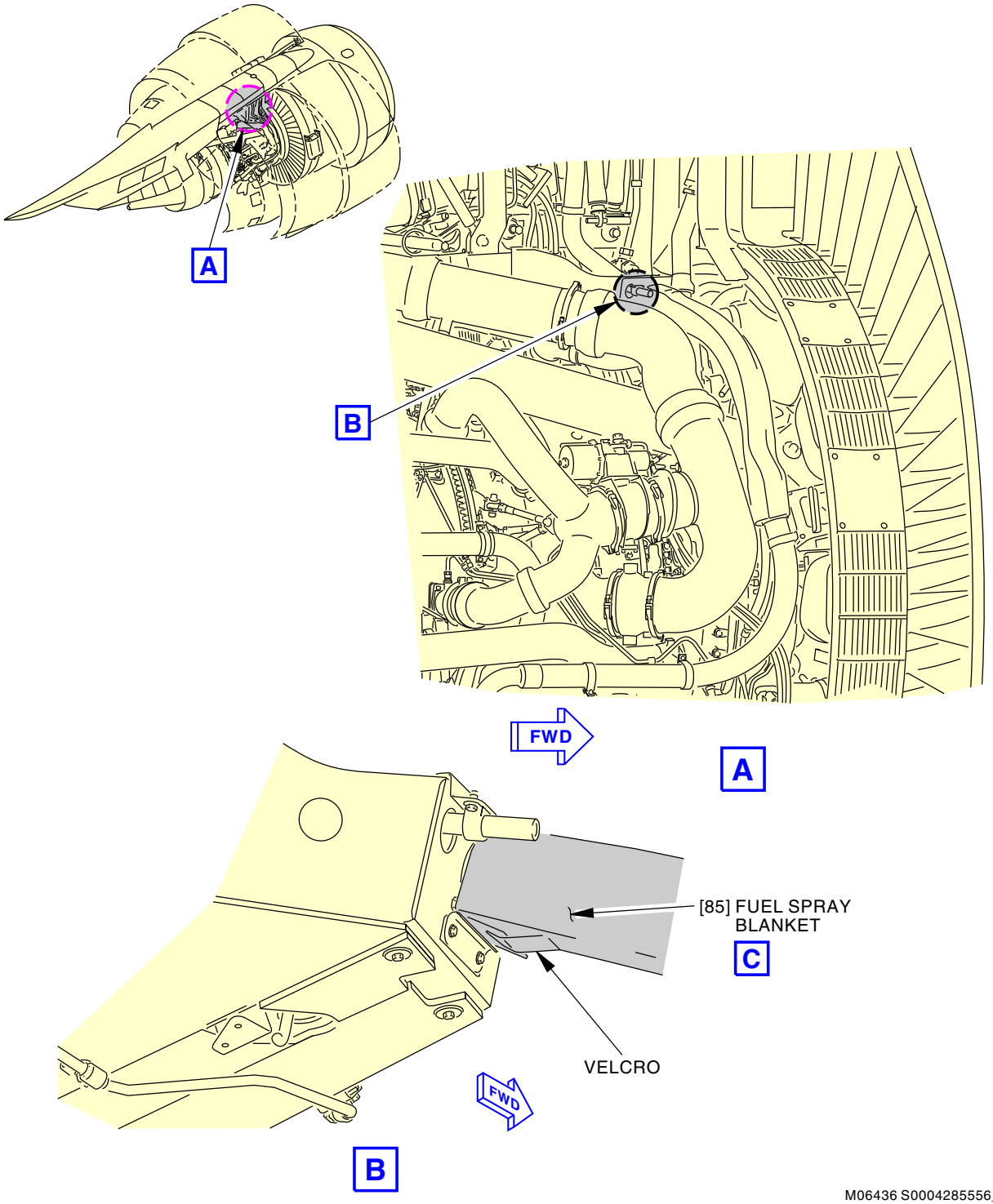

Main Fuel Supply Hose Installation
Figure 405/71-00-02-990-816-H01 (Sheet 1 of 2)

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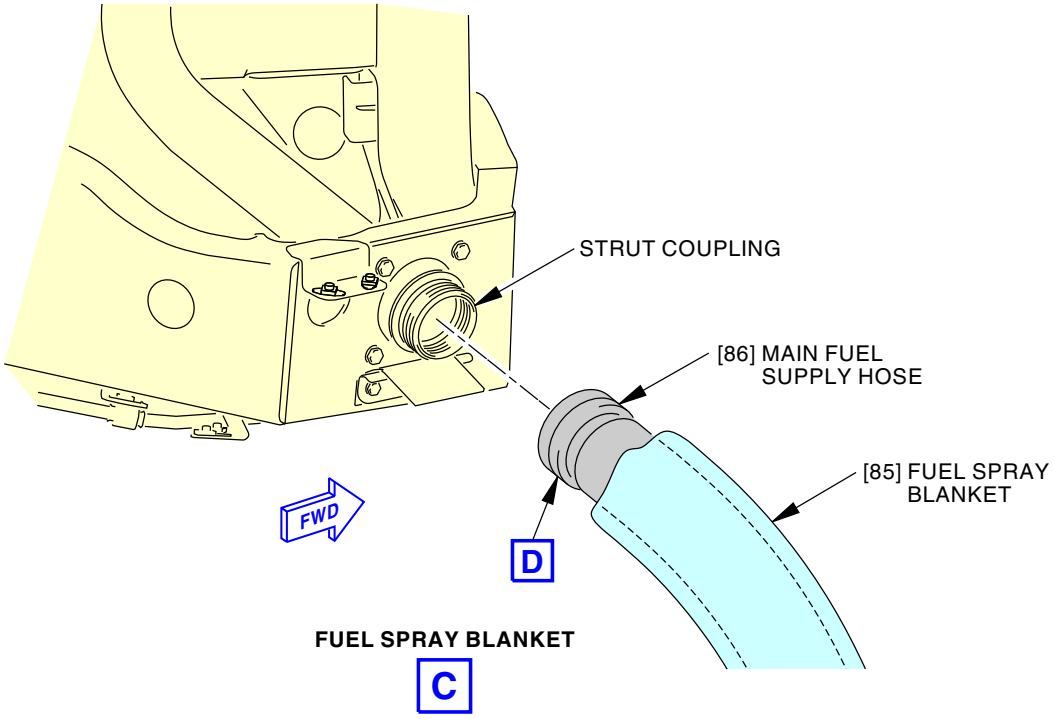
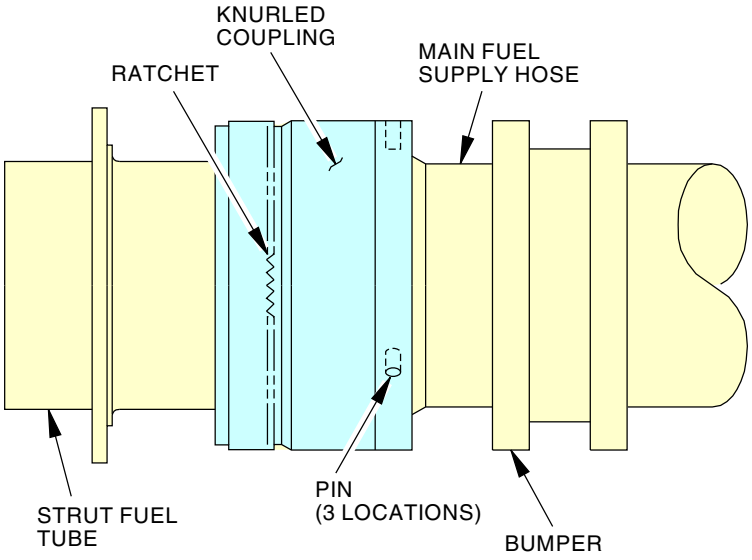


FUEL SPRAY BLANKET

C



(COUPLING IS SHOWN CONNECTED)

D

M06437 S0004285557_V4

Main Fuel Supply Hose Installation
Figure 405/71-00-02-990-816-H01 (Sheet 2 of 2)

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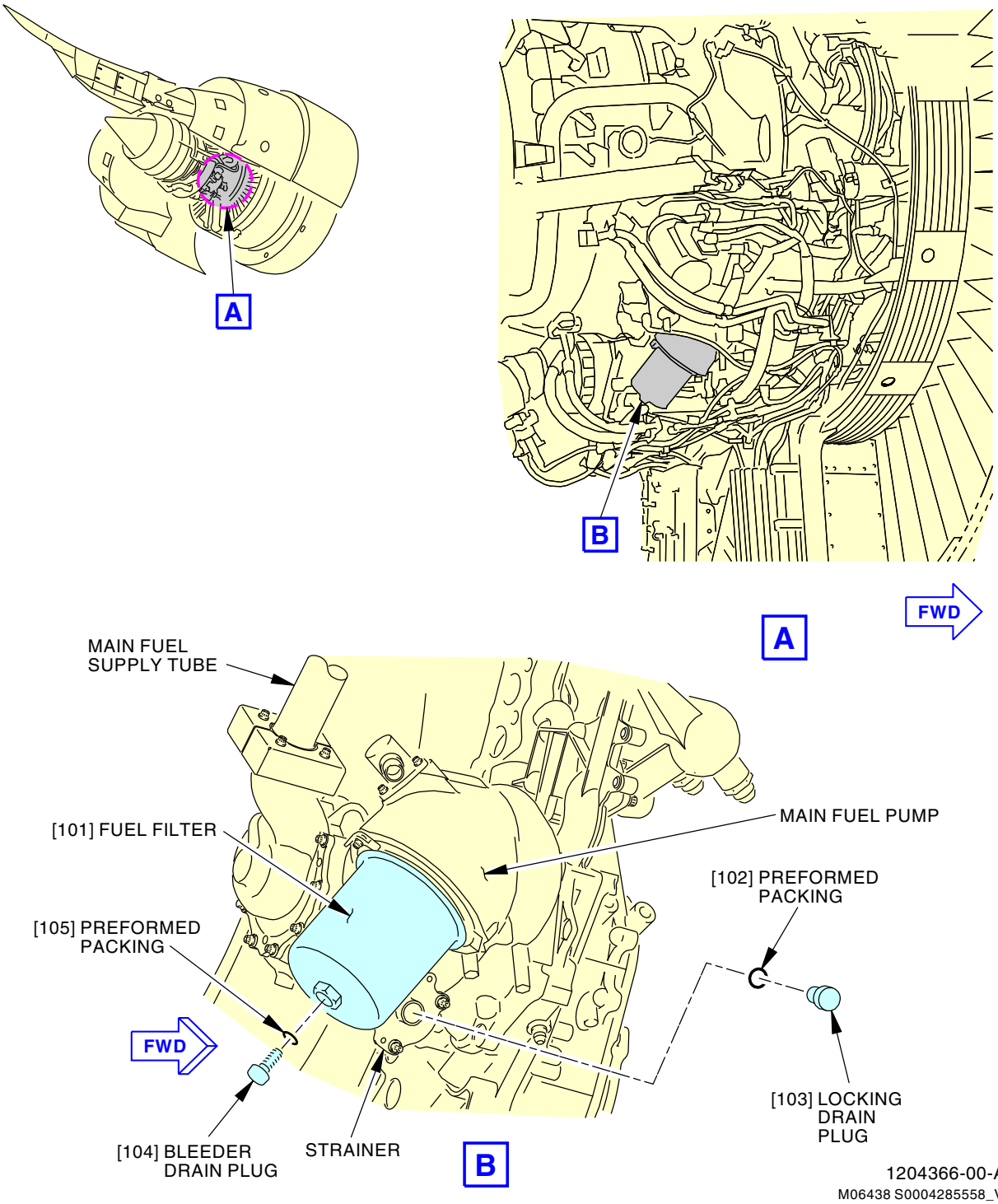

Engine Fuel Drain Plug Installation
Figure 406/71-00-02-990-817-H01

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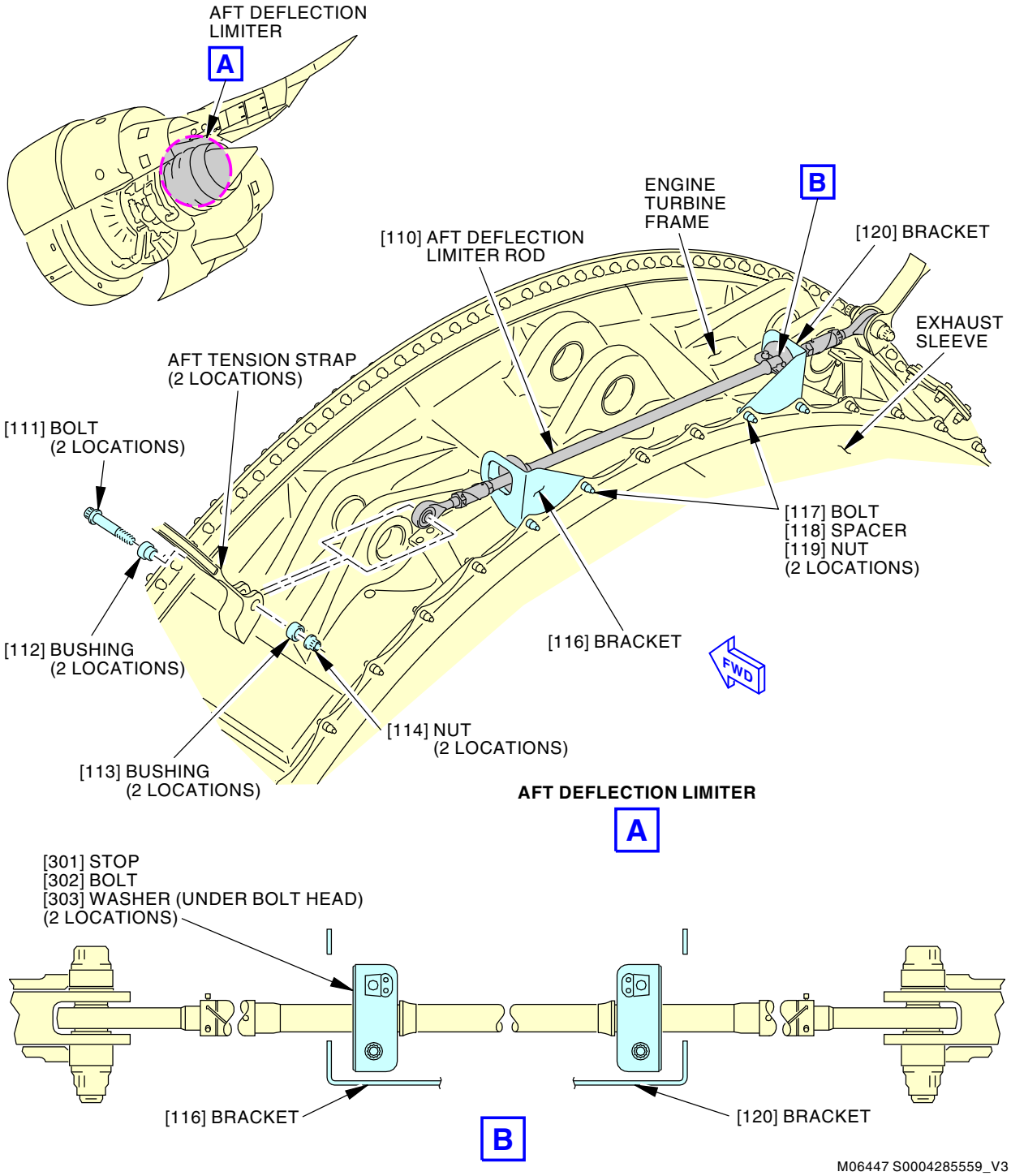

Aft Deflection Limiter Rod Installation
Figure 407/71-00-02-990-818-H01

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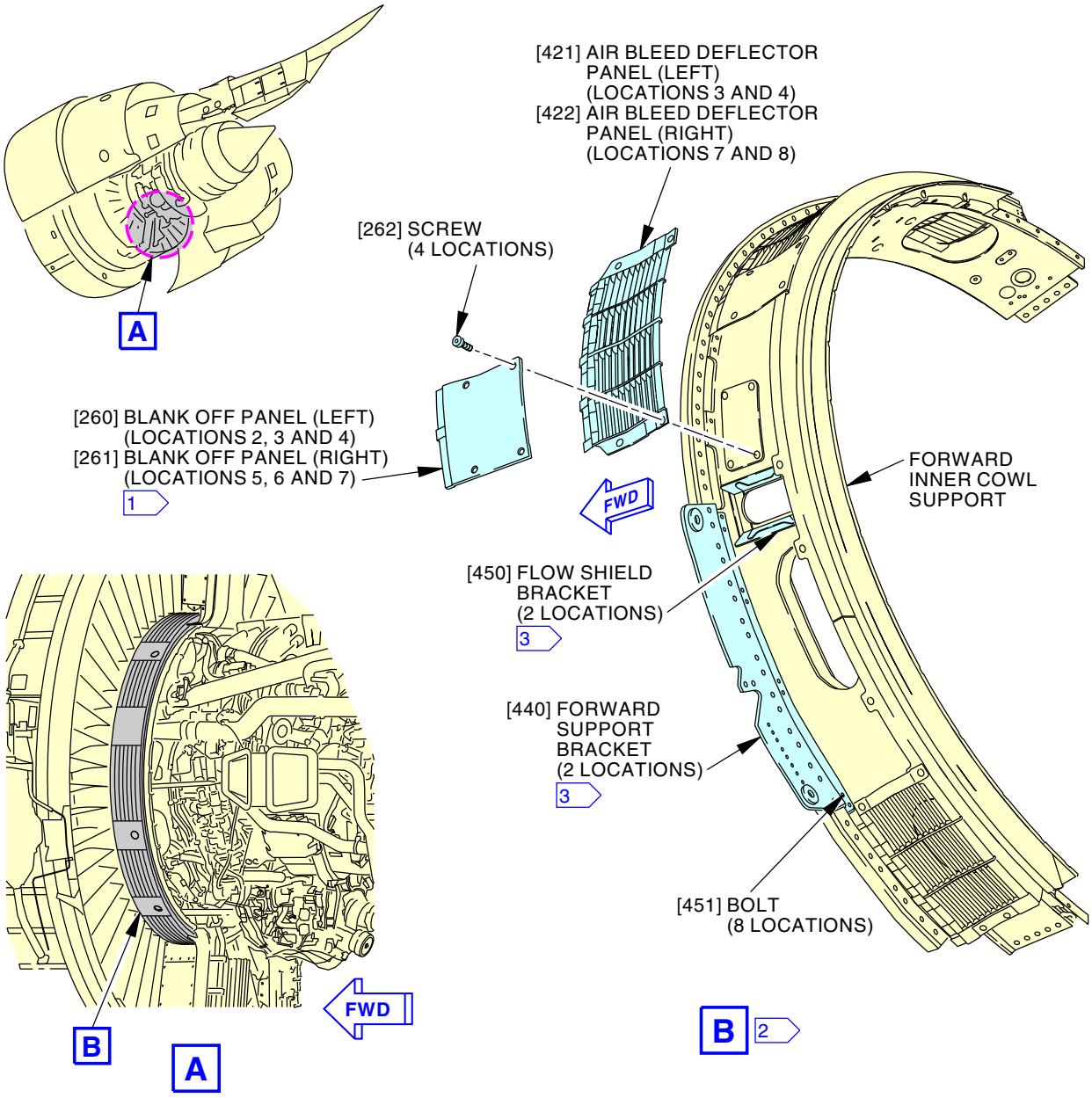

1 REMOVE ONLY WHEN YOU USE THE ENGINE CRADLE STAND THAT NEEDS TO INSTALL THE FAN FRAME MOUNT SUPPORT ADAPTER.

2 LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE.

3 FOR GE115 ENGINES; REFER TO AMM 71-00-04/201 FOR BRACKETS INSTALLATION ON THE ENGINE STAND 9C6025P02 OR 9C6025P03.

1119989-04-A
1874921 S0000341822_V2

Blank Off Panels Installation
Figure 408/71-00-02-990-819-H01

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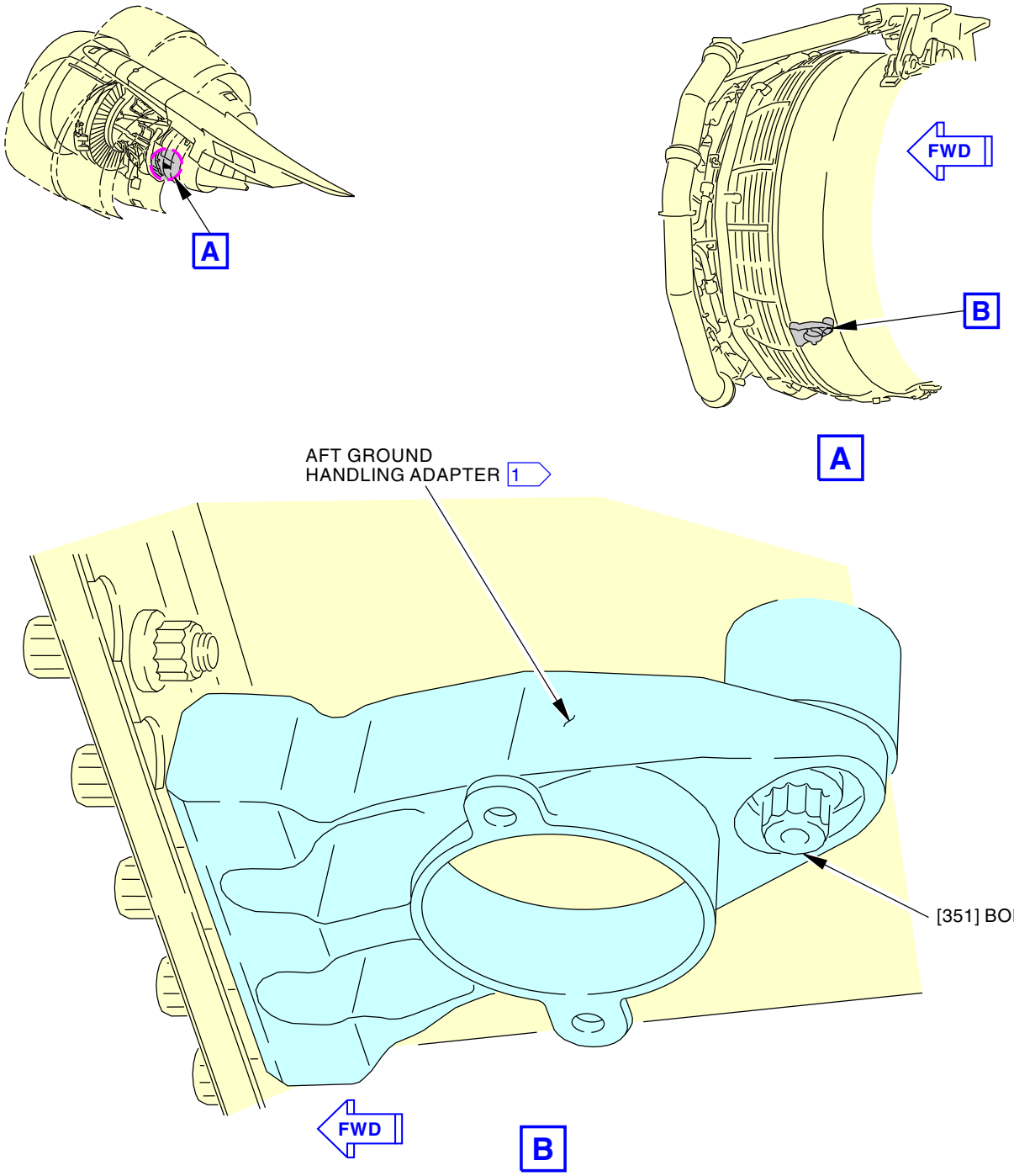

J71471 S0000175201_V2

Aft Ground Handling Mount Bolt Torque Check
Figure 409/71-00-02-990-836-H00

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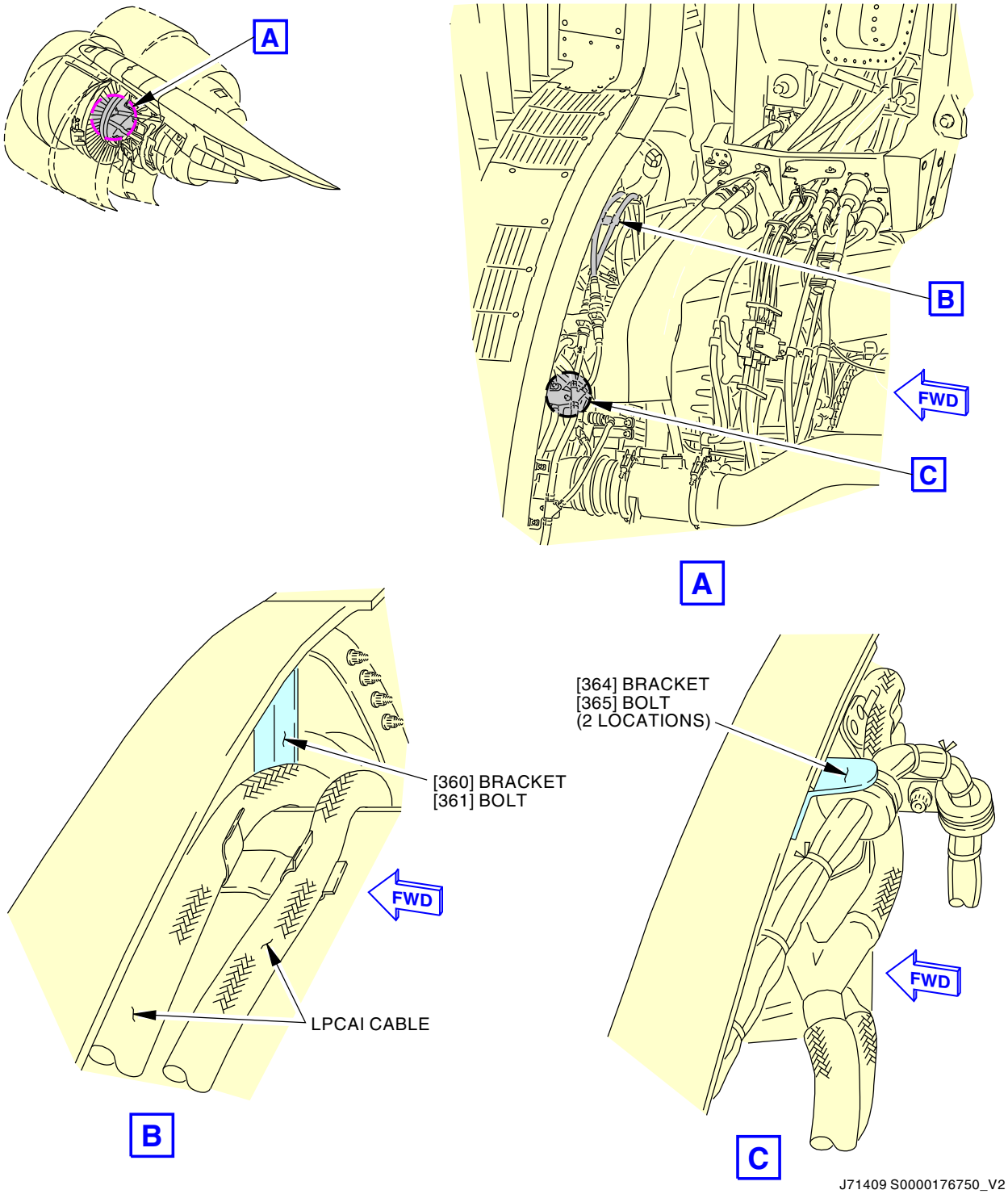

LPCAI Bracket Installation
Figure 410/71-00-02-990-837-H00

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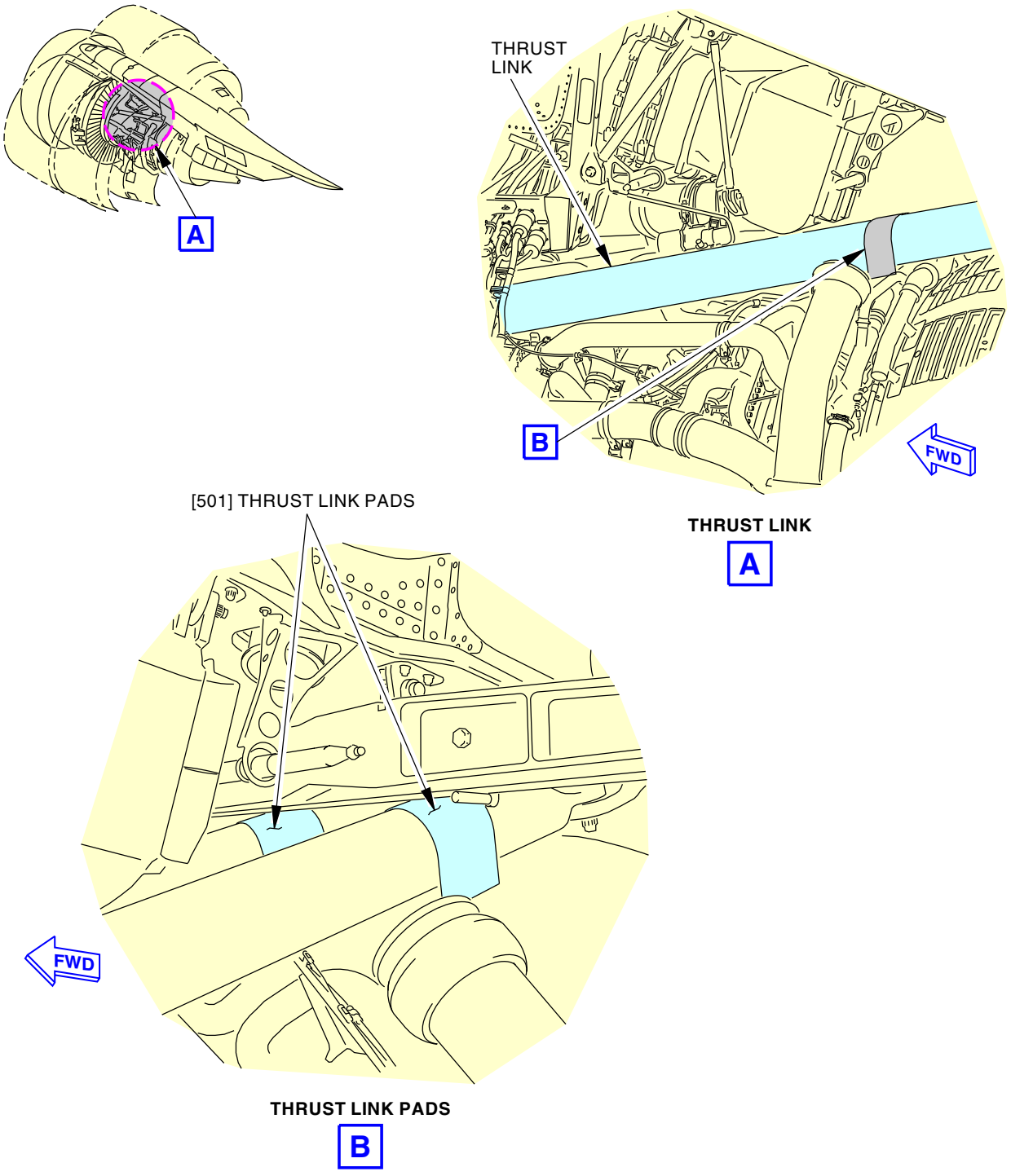

U54711 S0000207066_V2

Thrust Link Pads Installation
Figure 411/71-00-02-990-842-H00

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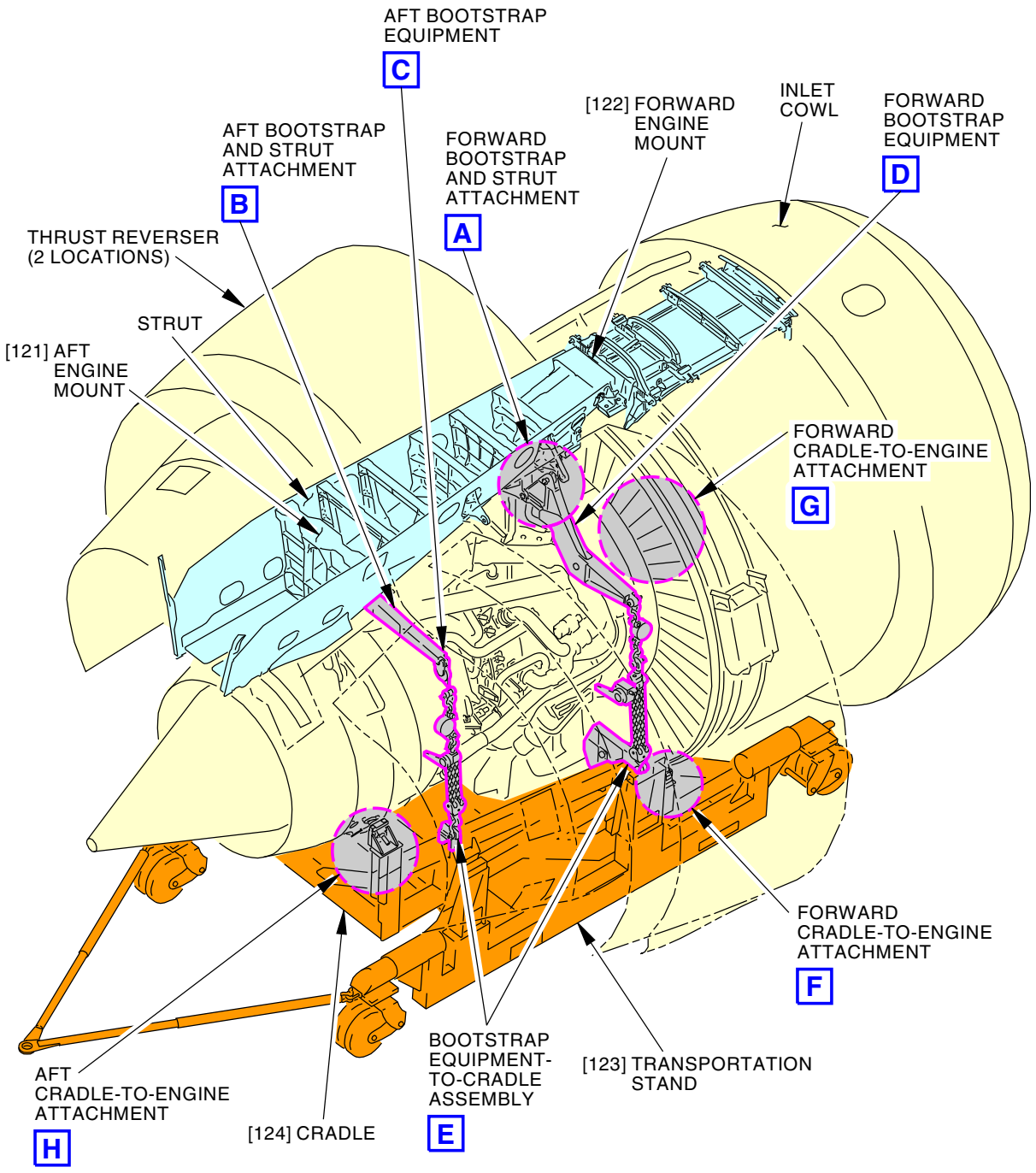

J91446 S0000185650_V2

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 1 of 6)

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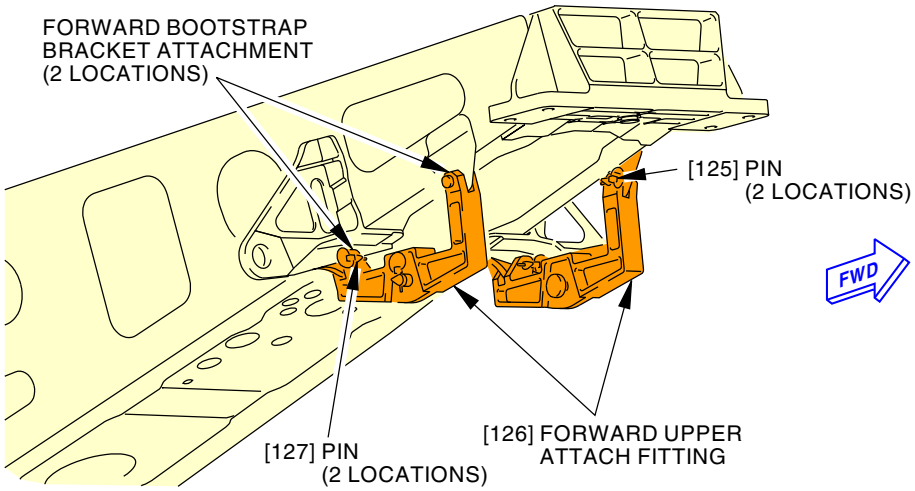
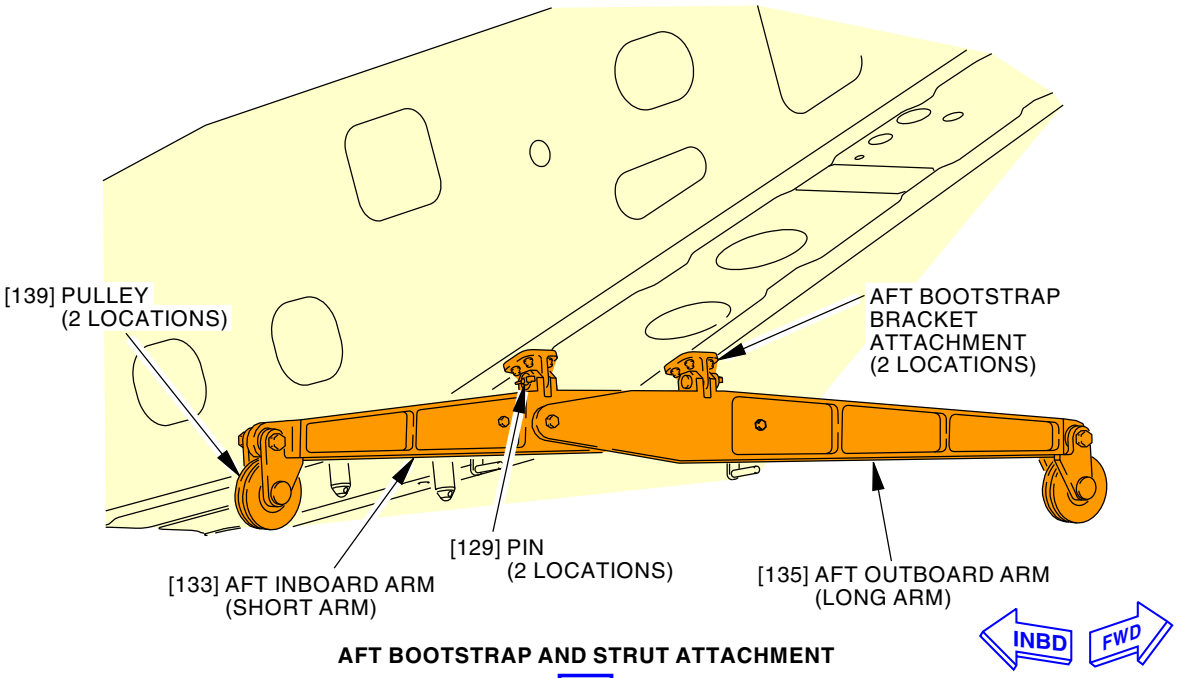


FORWARD BOOTSTRAP AND STRUT ATTACHMENT

A



AFT BOOTSTRAP AND STRUT ATTACHMENT

B

J91768 S0000185658_V3

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 2 of 6)

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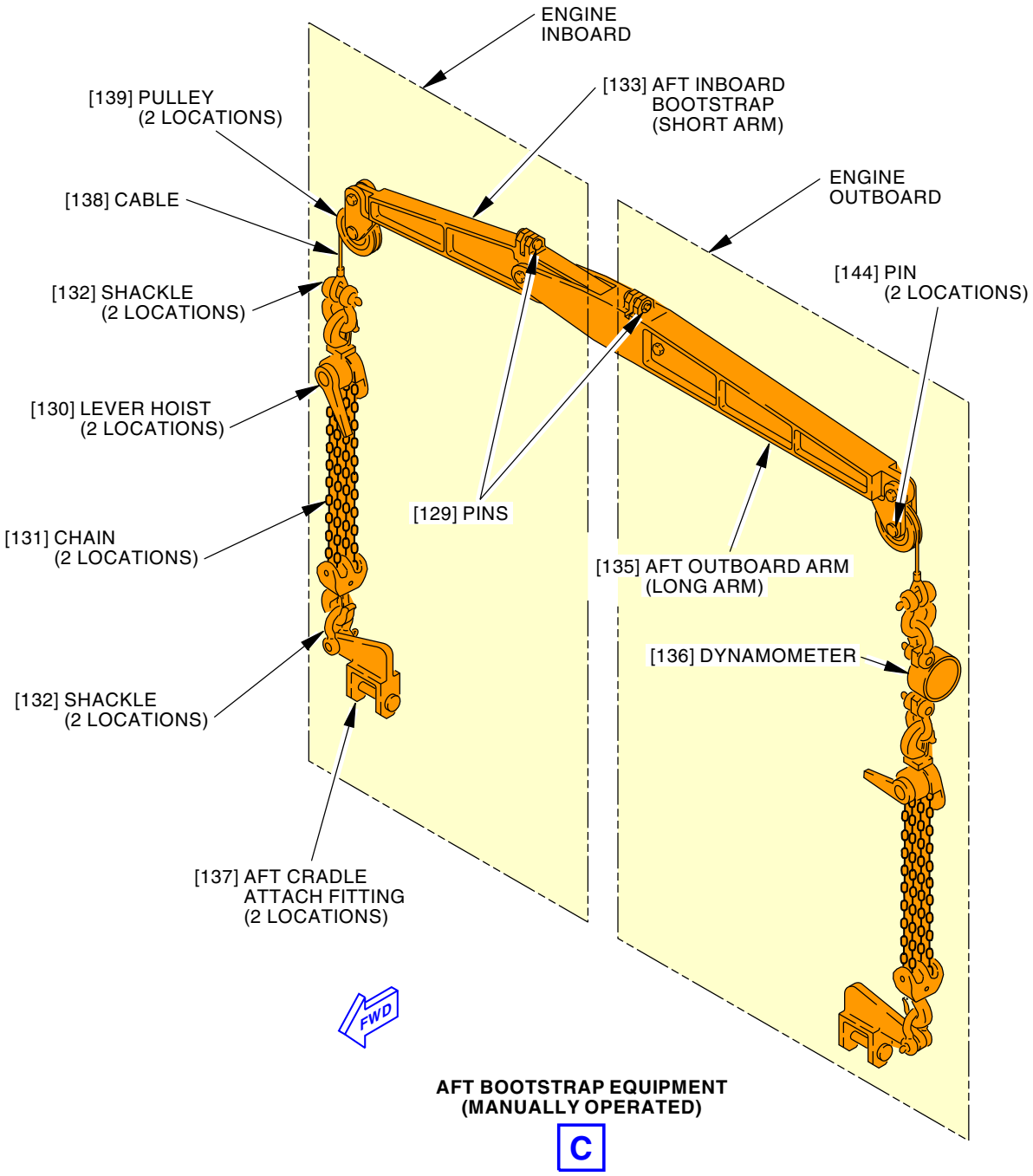

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 3 of 6)

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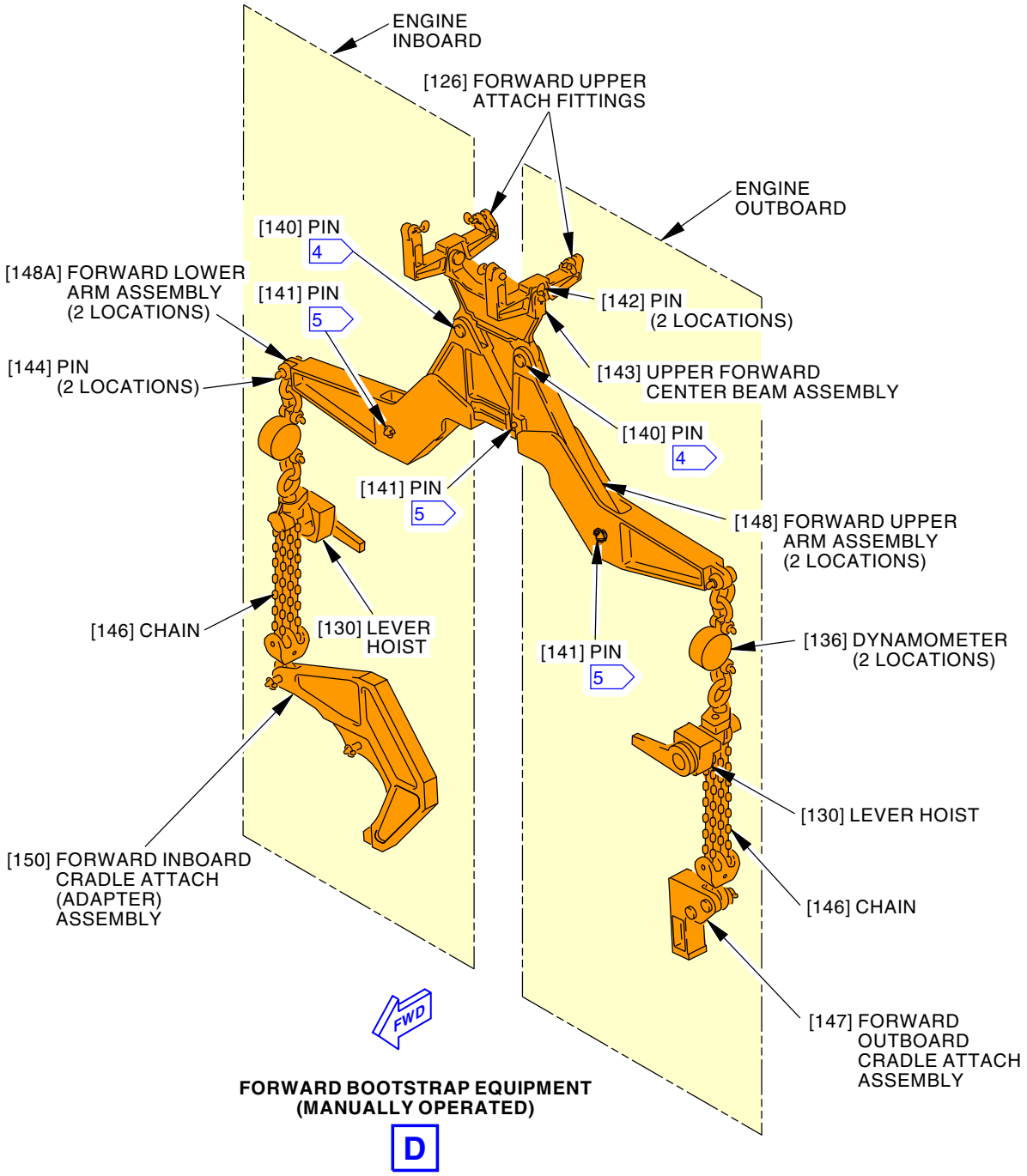

FORWARD BOOTSTRAP EQUIPMENT (MANUALLY OPERATED)

D

4 INSTALL FROM FORWARD TO AFT

5 INSTALL FROM AFT TO FORWARD

J92117 S0000185995_V5

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 4 of 6)

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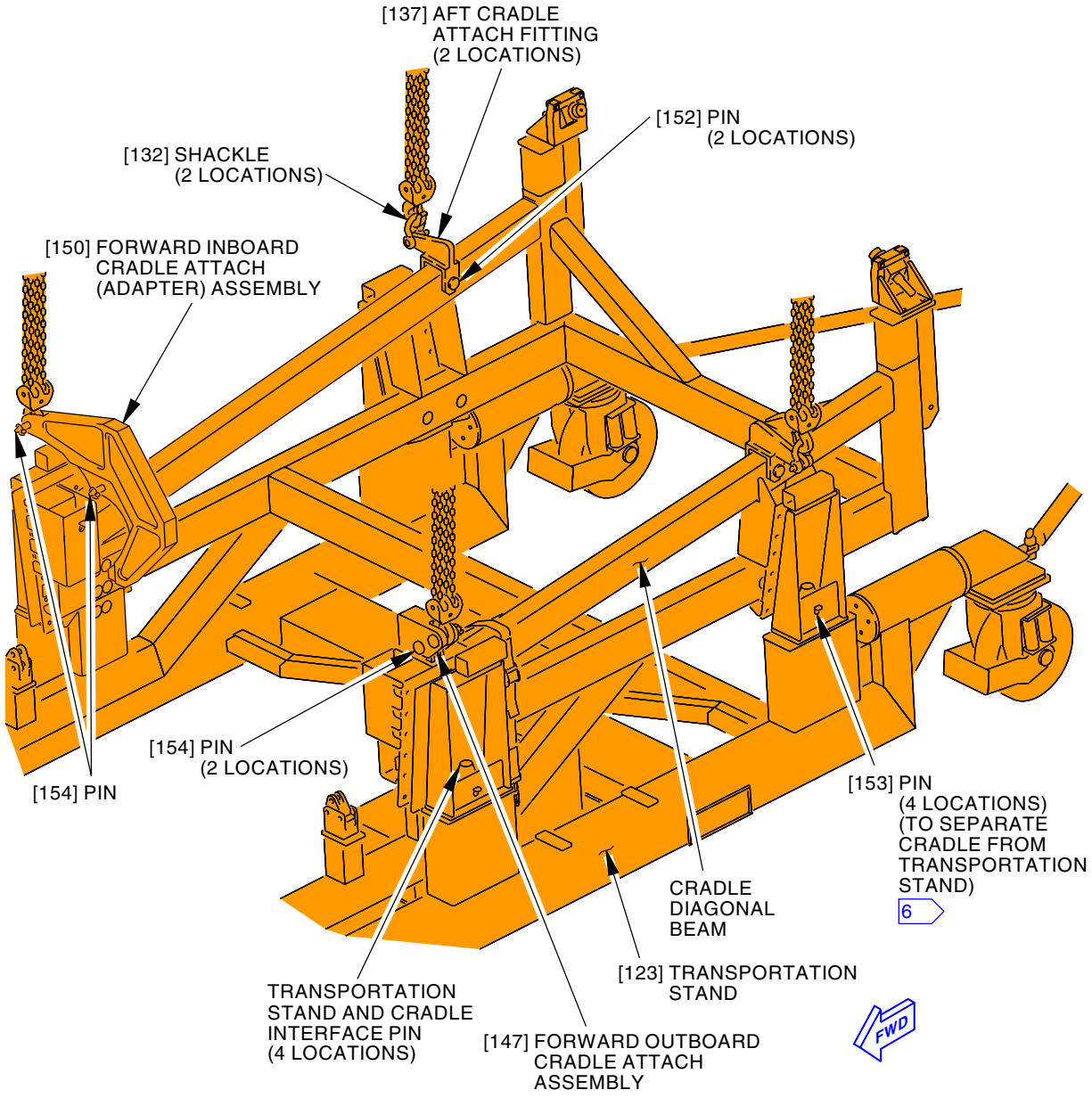

BOOTSTRAP EQUIPMENT-TO-CRADLE ASSEMBLY (MANUALLY OPERATED)

E

6 FOR 9C6025P02 STAND, THERE ARE 10 BOLTS, LOCK WASHERS AND HEX NUTS THAT ATTACH THE CRADLE TO THE STAND.

1874932 S0000341823_V4

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 5 of 6)

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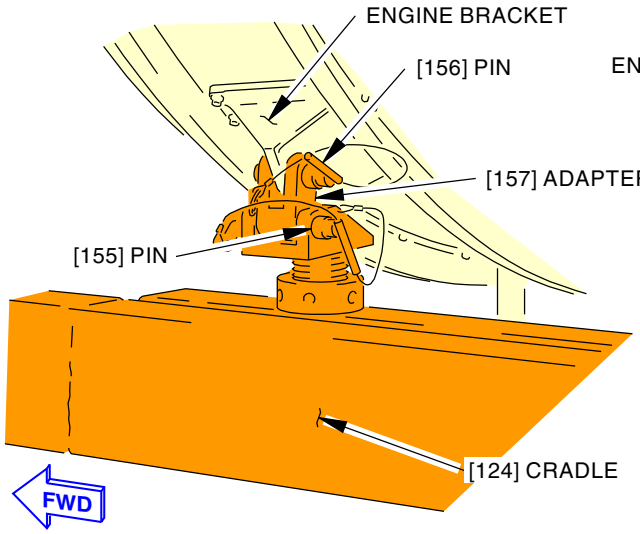
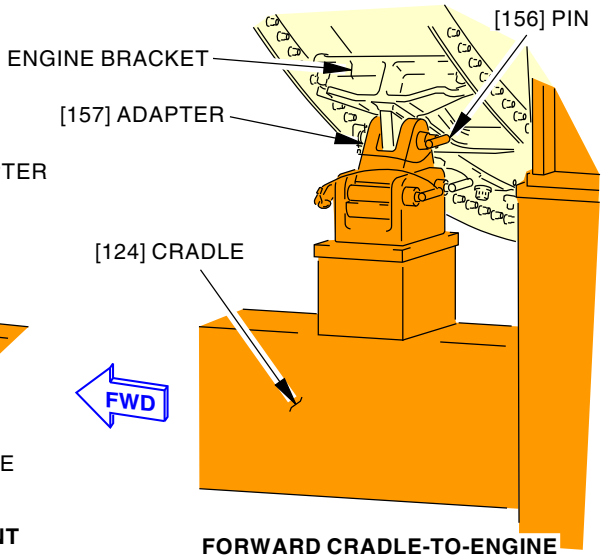


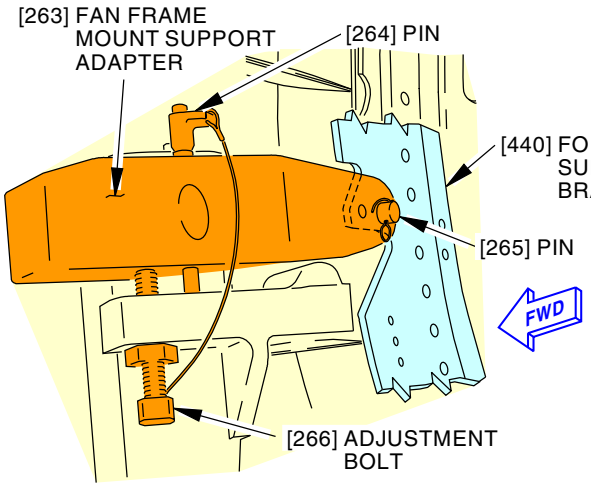
FORWARD CRADLE-TO-ENGINE ATTACHMENT

F 1 2



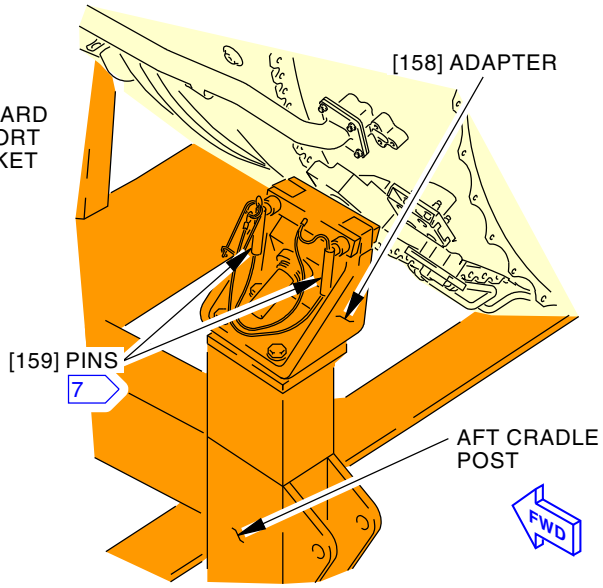
FORWARD CRADLE-TO-ENGINE ATTACHMENT

F 1 2



FORWARD CRADLE-TO-ENGINE ATTACHMENT

G 1 2



AFT CRADLE-TO-ENGINE ATTACHMENT

H 1 2

1 LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME

2 SOME ENGINE STANDS WILL HAVE A DIFFERENT ADAPTER, ATTACHMENT POINTS, OR DIFFERENT CRADLE BASE

7 SOME ADAPTERS DO NOT HAVE A LOCKED PIN

J92289 S0000185997_V5

Bootstrap Equipment Installation (Manually Operated)
Figure 412/71-00-02-990-840-H00 (Sheet 6 of 6)

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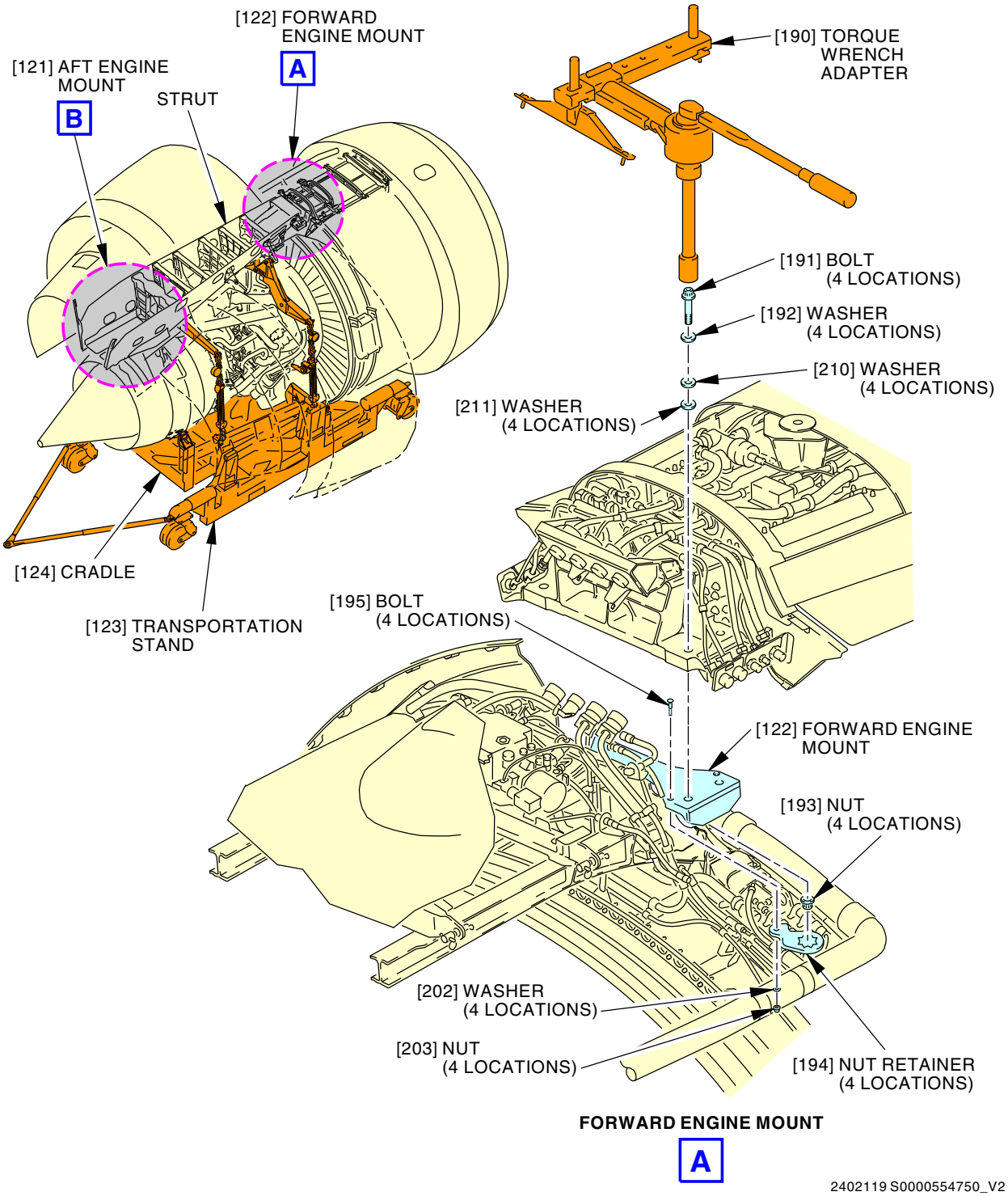

Engine Mounts Installation
Figure 413/71-00-02-990-821-H01 (Sheet 1 of 2)

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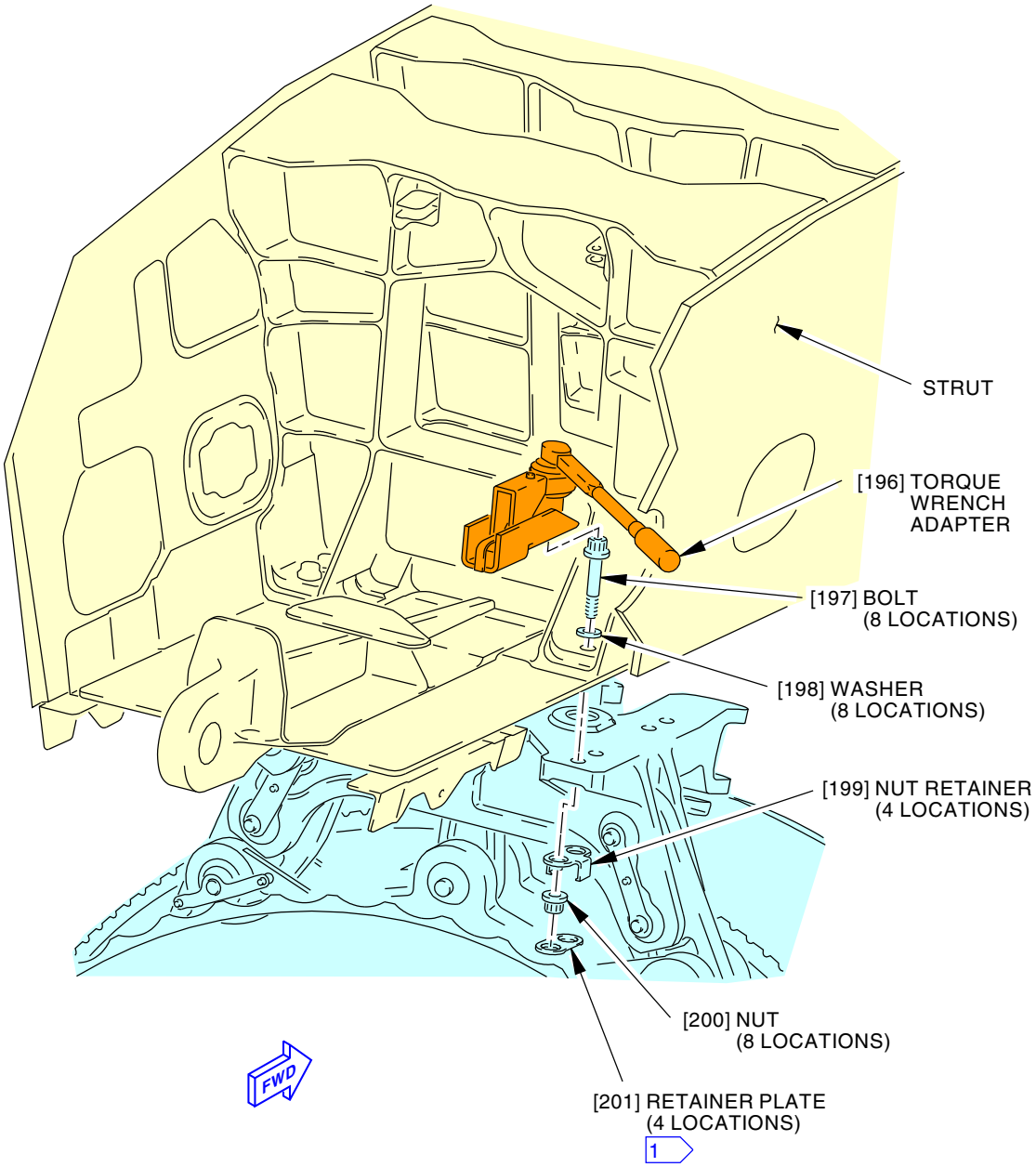

AFT ENGINE MOUNT

B

1 BEVEL SURFACE FACES DOWN.

M06446 S0004285568_V3

Engine Mounts Installation
Figure 413/71-00-02-990-821-H01 (Sheet 2 of 2)

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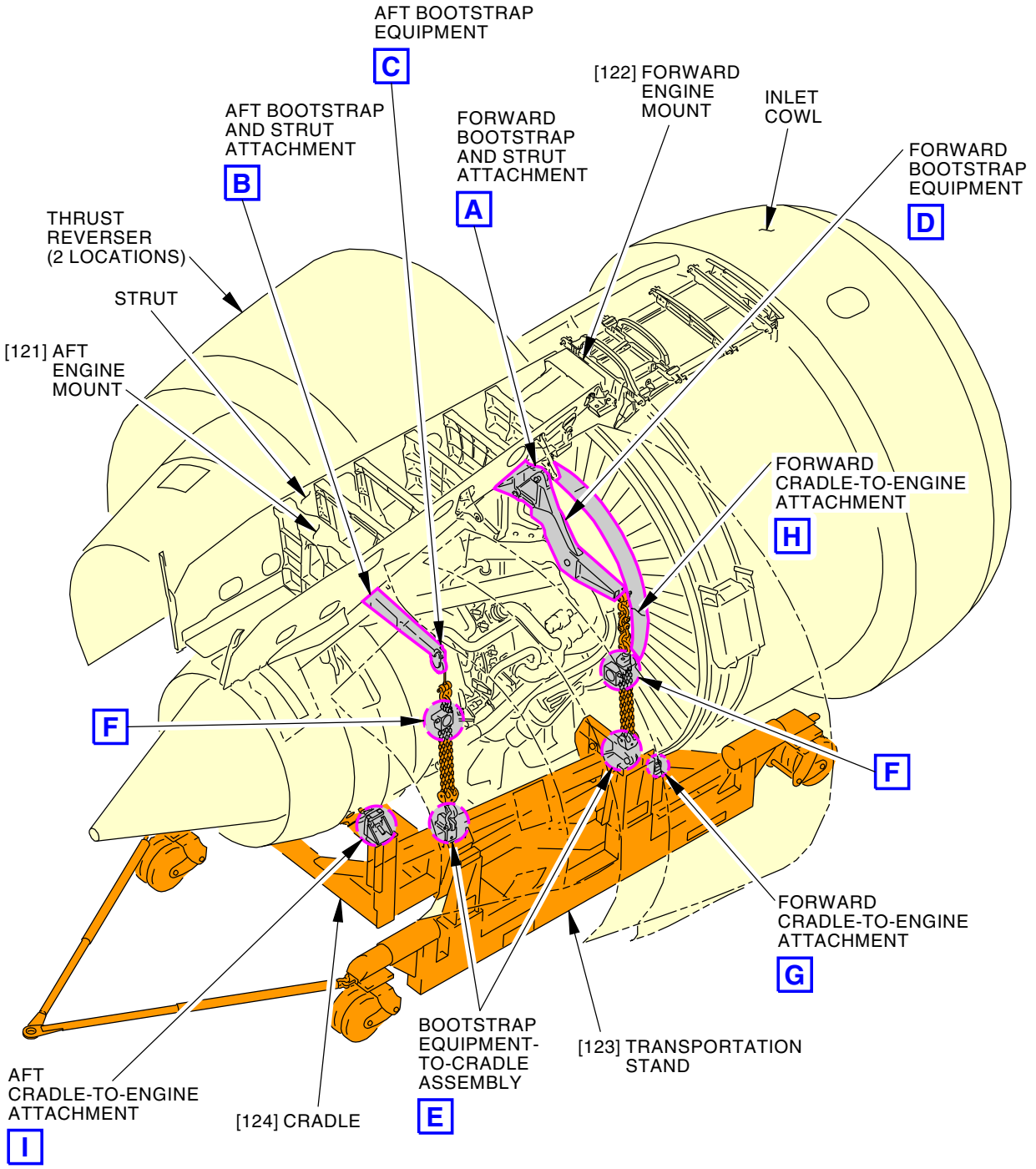

J91456 S0000185663_V3

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 1 of 6)

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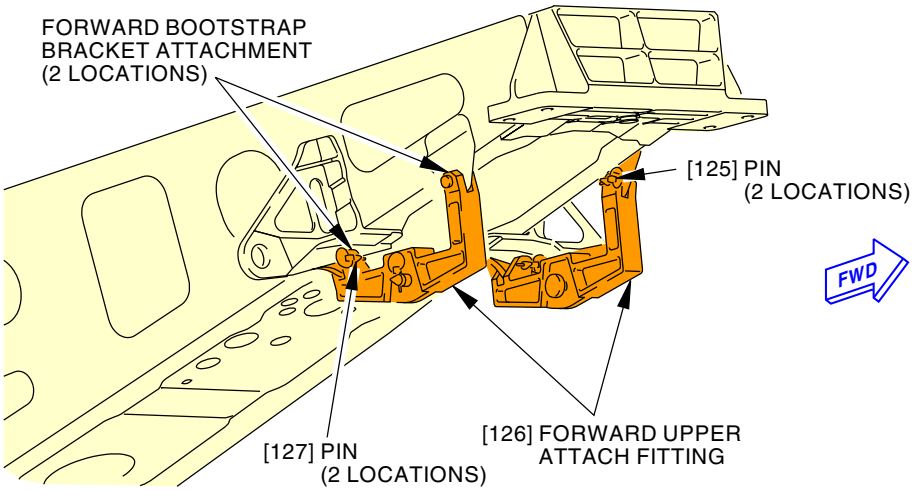
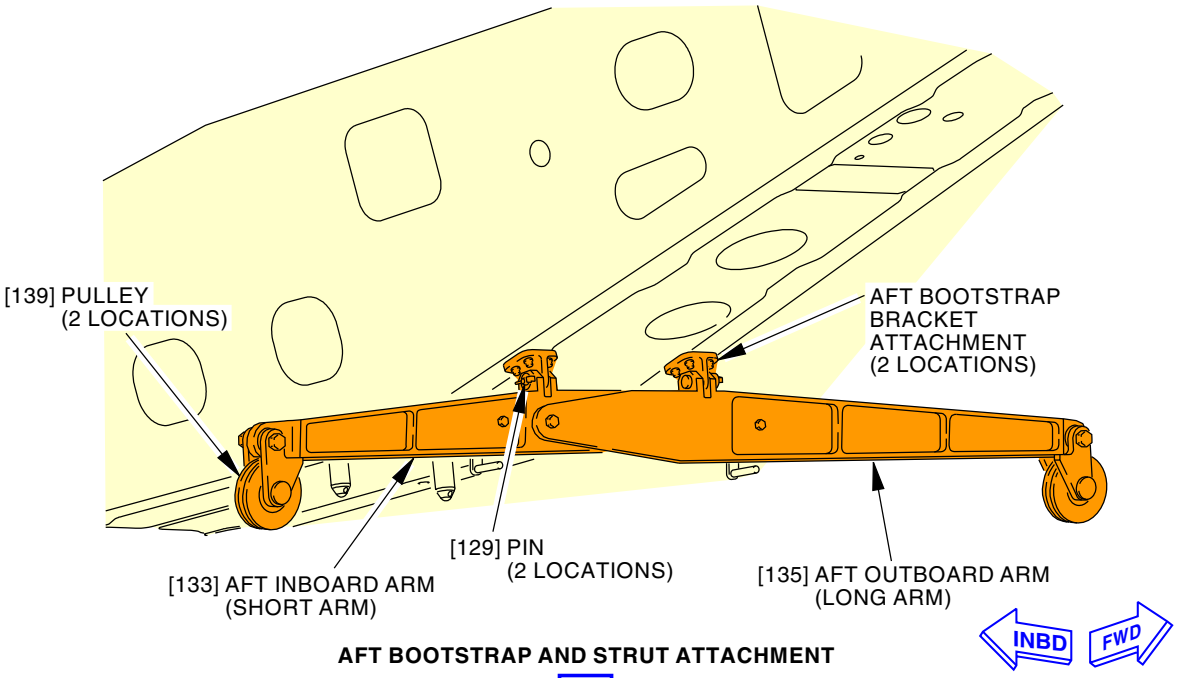


FORWARD BOOTSTRAP AND STRUT ATTACHMENT

A



AFT BOOTSTRAP AND STRUT ATTACHMENT

B

J91766 S0000185664_V3

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 2 of 6)

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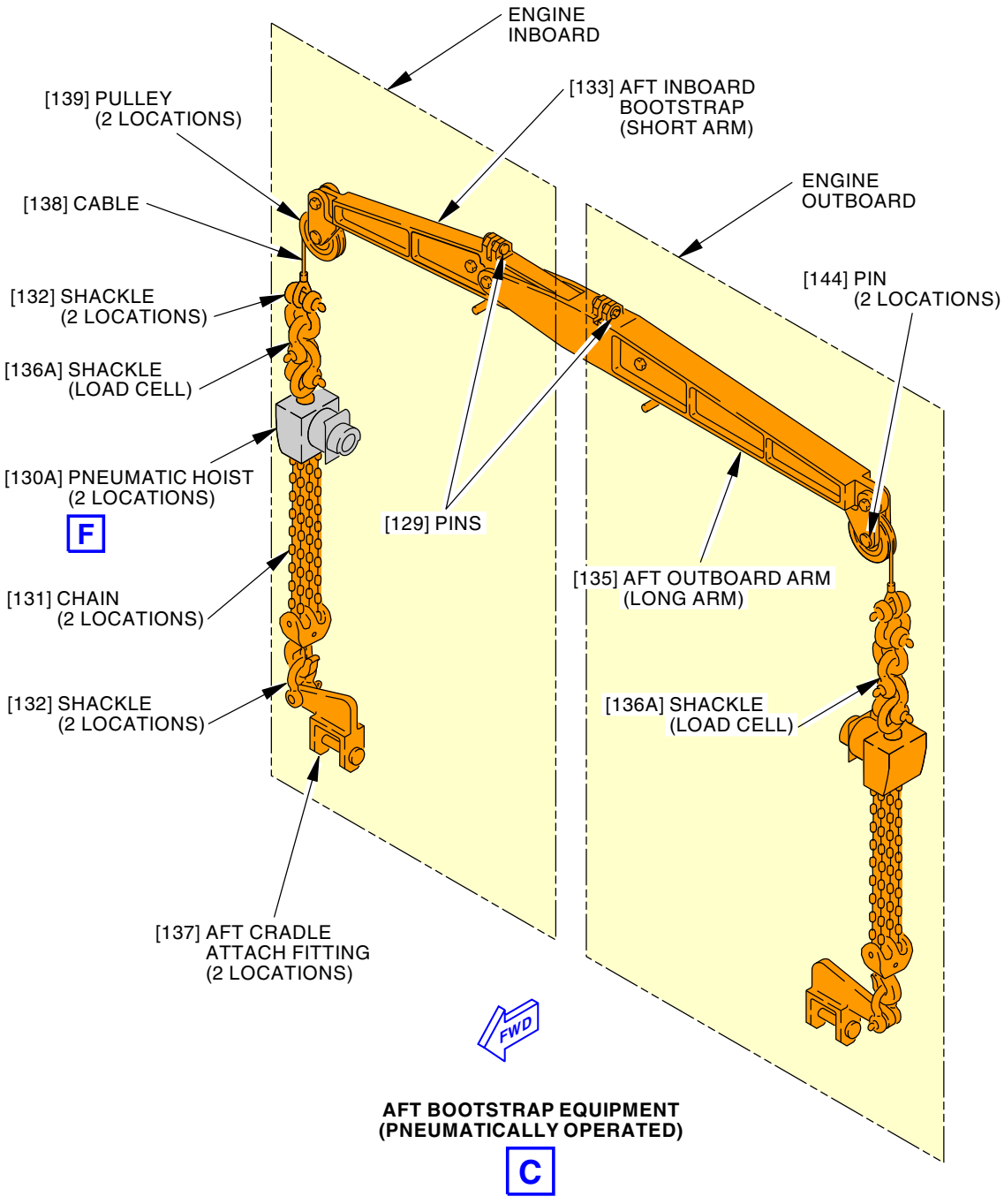

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 3 of 6)

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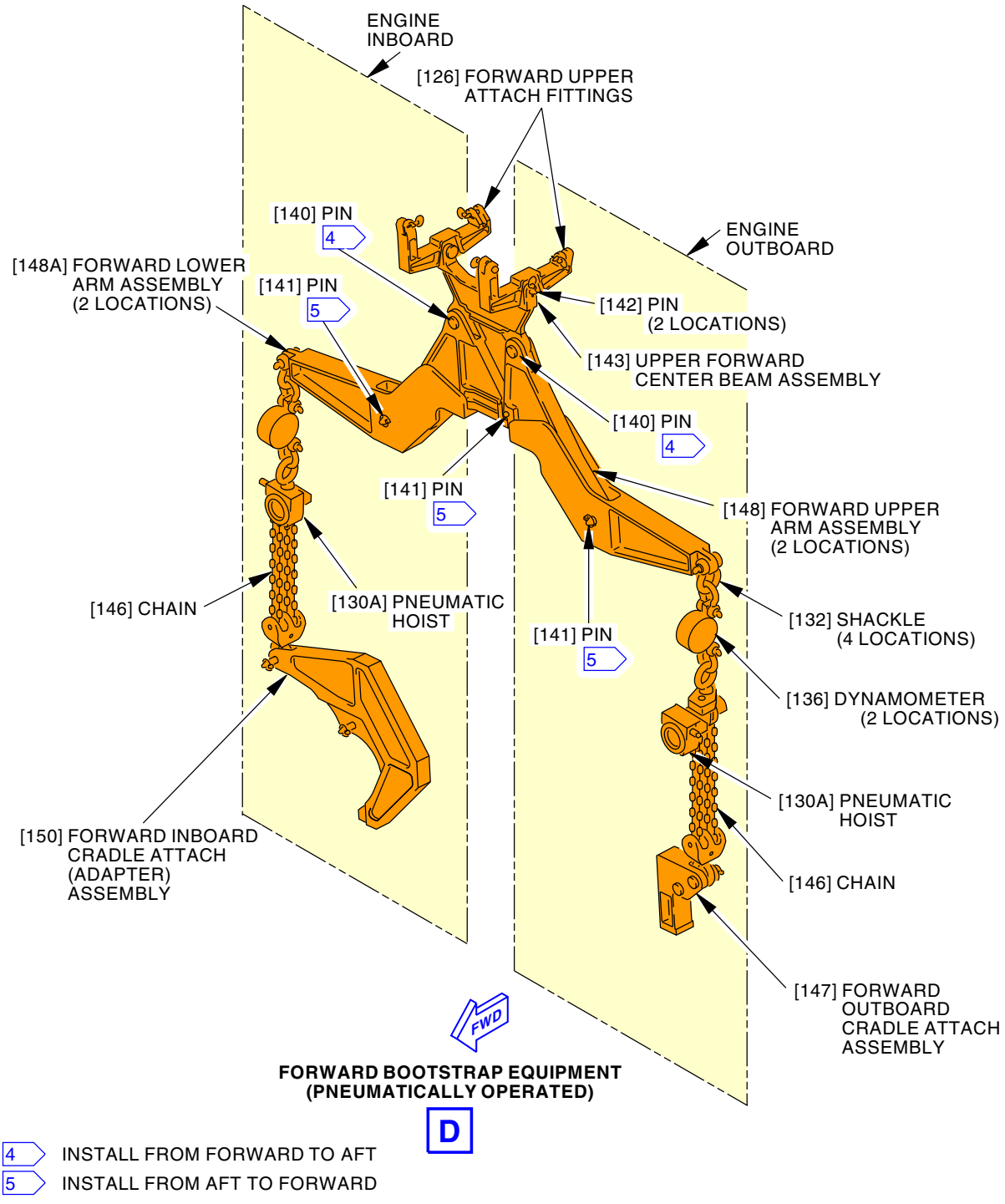

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 4 of 6)

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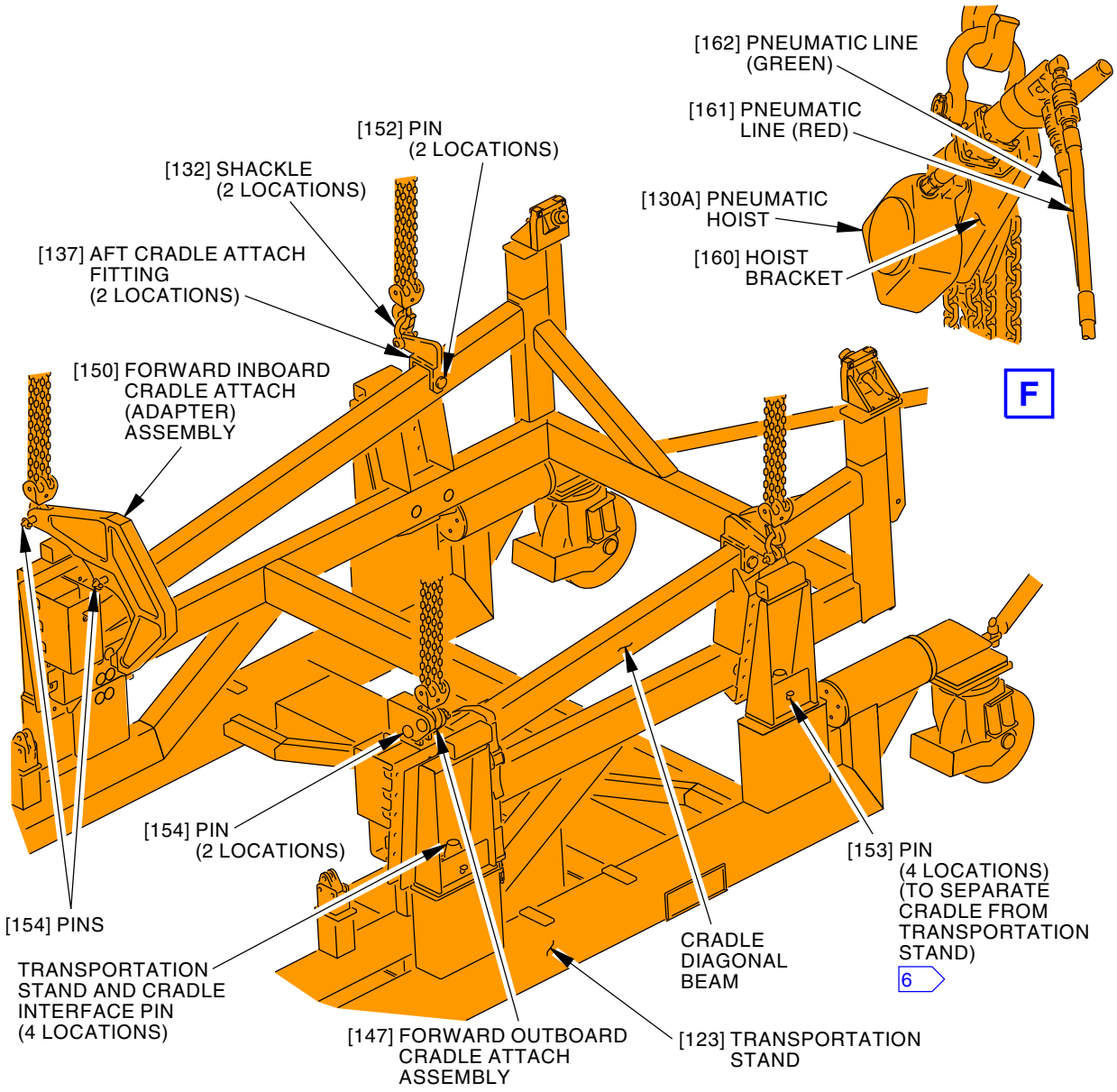

BOOTSTRAP EQUIPMENT-TO-CRADLE ASSEMBLY (PNEUMATICALLY OPERATED)

E

6 FOR 9C6025P02 STAND, THERE ARE 10 BOLTS, LOCK WASHERS AND HEX NUTS THAT ATTACH THE CRADLE TO THE STAND.

1875059 S0000341884_V4

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 5 of 6)

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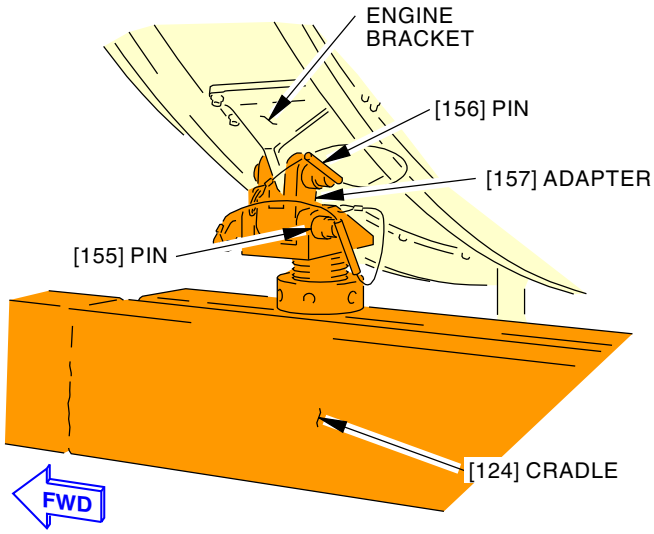
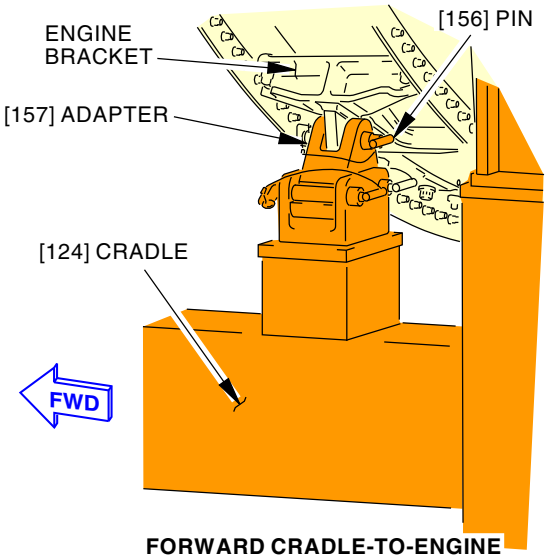


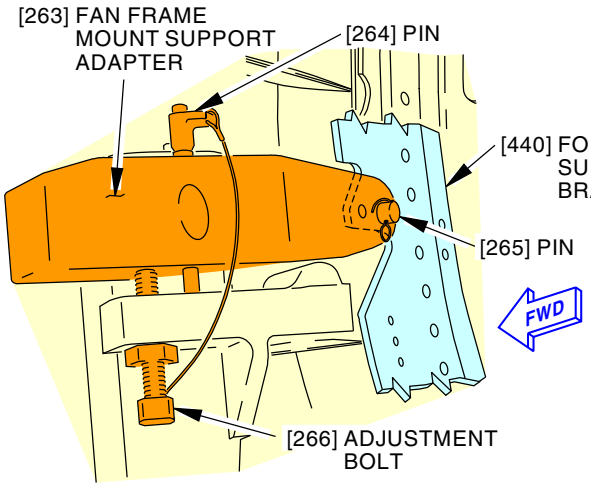
FORWARD CRADLE-TO-ENGINE ATTACHMENT

G 1 2



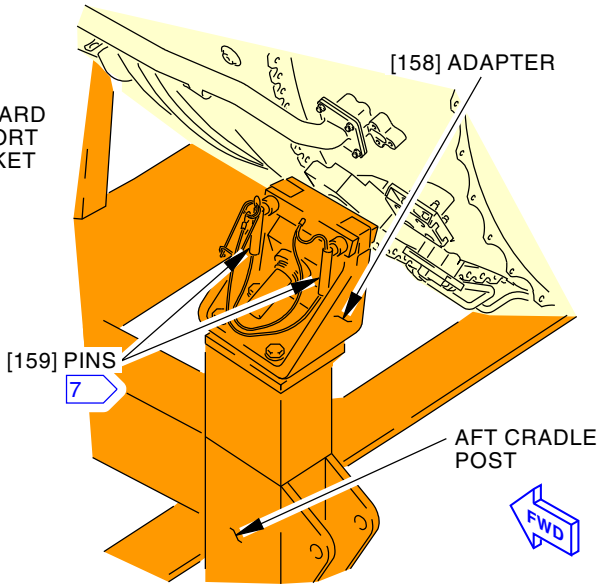
FORWARD CRADLE-TO-ENGINE ATTACHMENT

G 1 2



FORWARD CRADLE-TO-ENGINE ATTACHMENT

H 1 2



AFT CRADLE-TO-ENGINE ATTACHMENT

I 1 2

1 LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME

2 SOME ENGINE STANDS WILL HAVE A DIFFERENT ADAPTER, ATTACHMENT POINTS, OR DIFFERENT CRADLE BASE

7 SOME ADAPTERS DO NOT HAVE A LOCKED PIN

J92309 S0000186001_V5

Bootstrap Equipment Installation (Pneumatically Operated)
Figure 414/71-00-02-990-841-H00 (Sheet 6 of 6)

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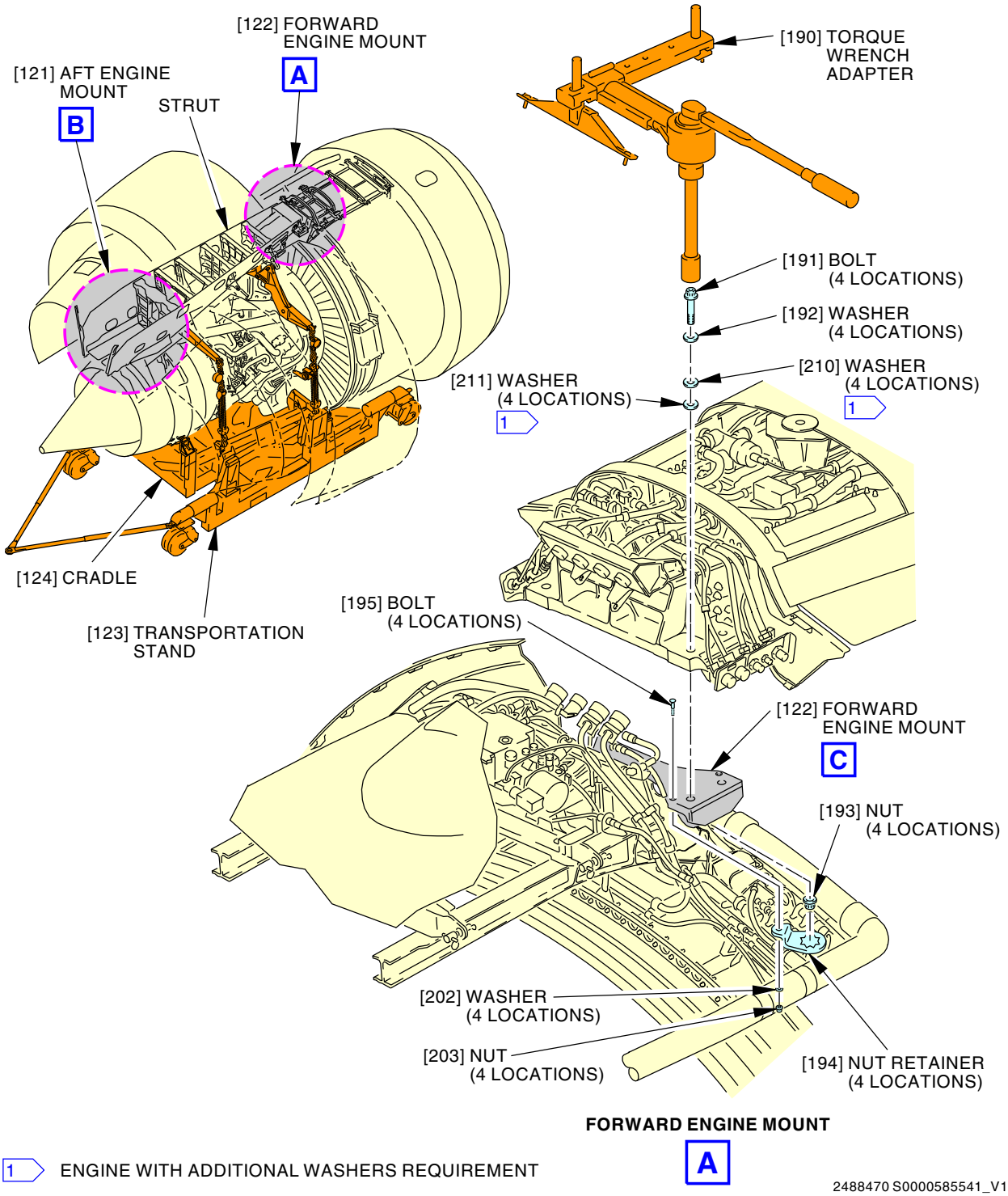

Engine Mounts Installation
Figure 415/71-00-02-990-823-H01 (Sheet 1 of 4)

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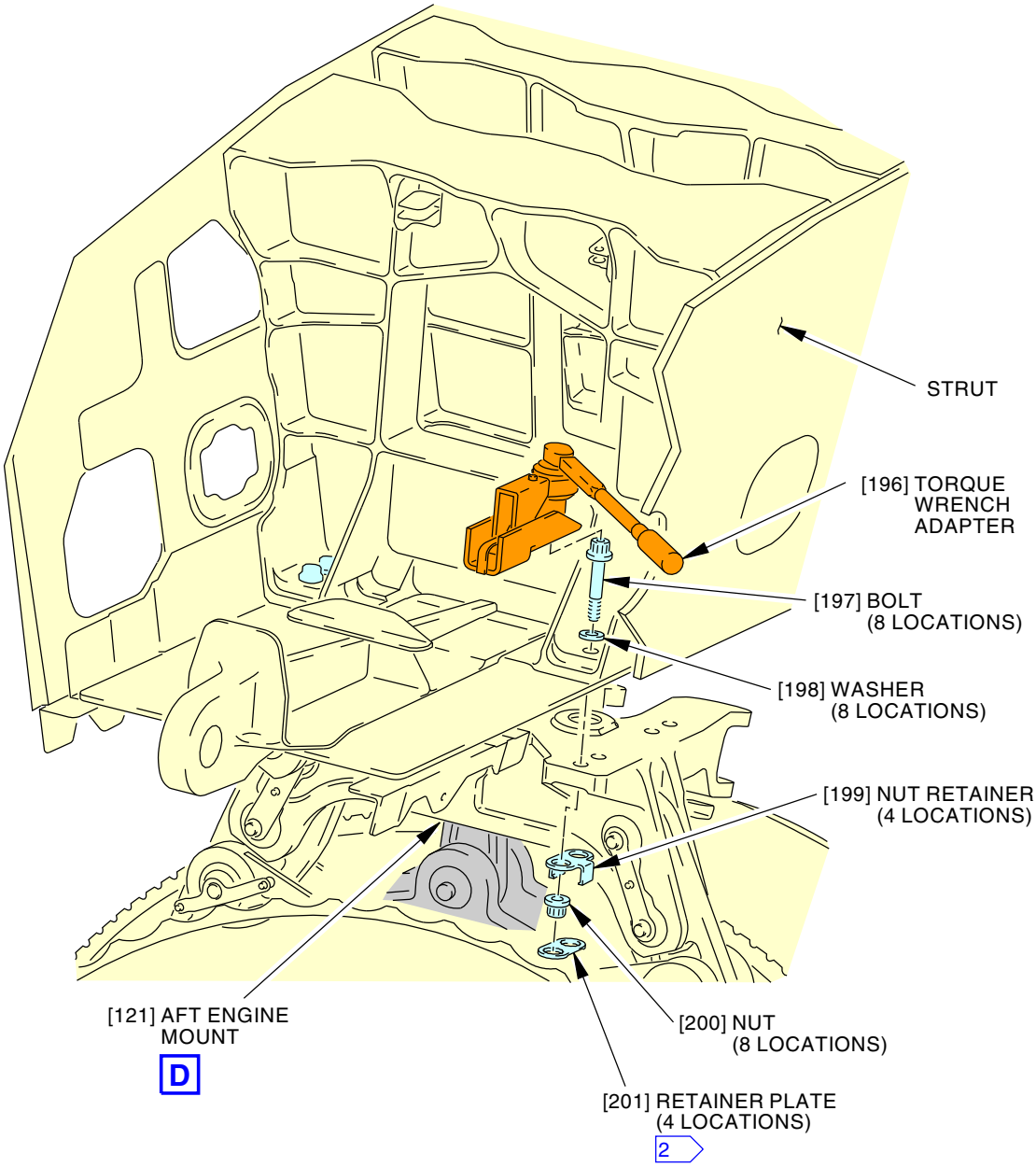

AFT ENGINE MOUNT

B

2 BEVEL SURFACE FACES DOWN.

2488683 S0000585542_V1

Engine Mounts Installation
Figure 415/71-00-02-990-823-H01 (Sheet 2 of 4)

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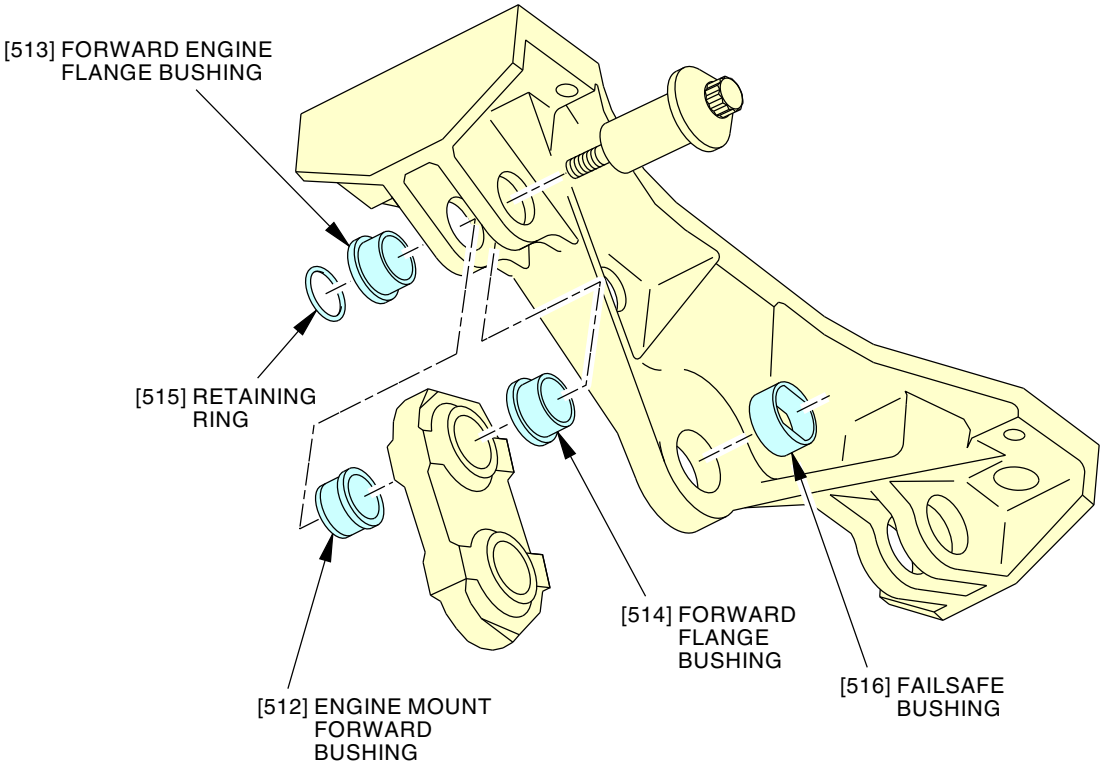

FORWARD ENGINE MOUNT

C

2488699 S0000585543_V1

Engine Mounts Installation
Figure 415/71-00-02-990-823-H01 (Sheet 3 of 4)

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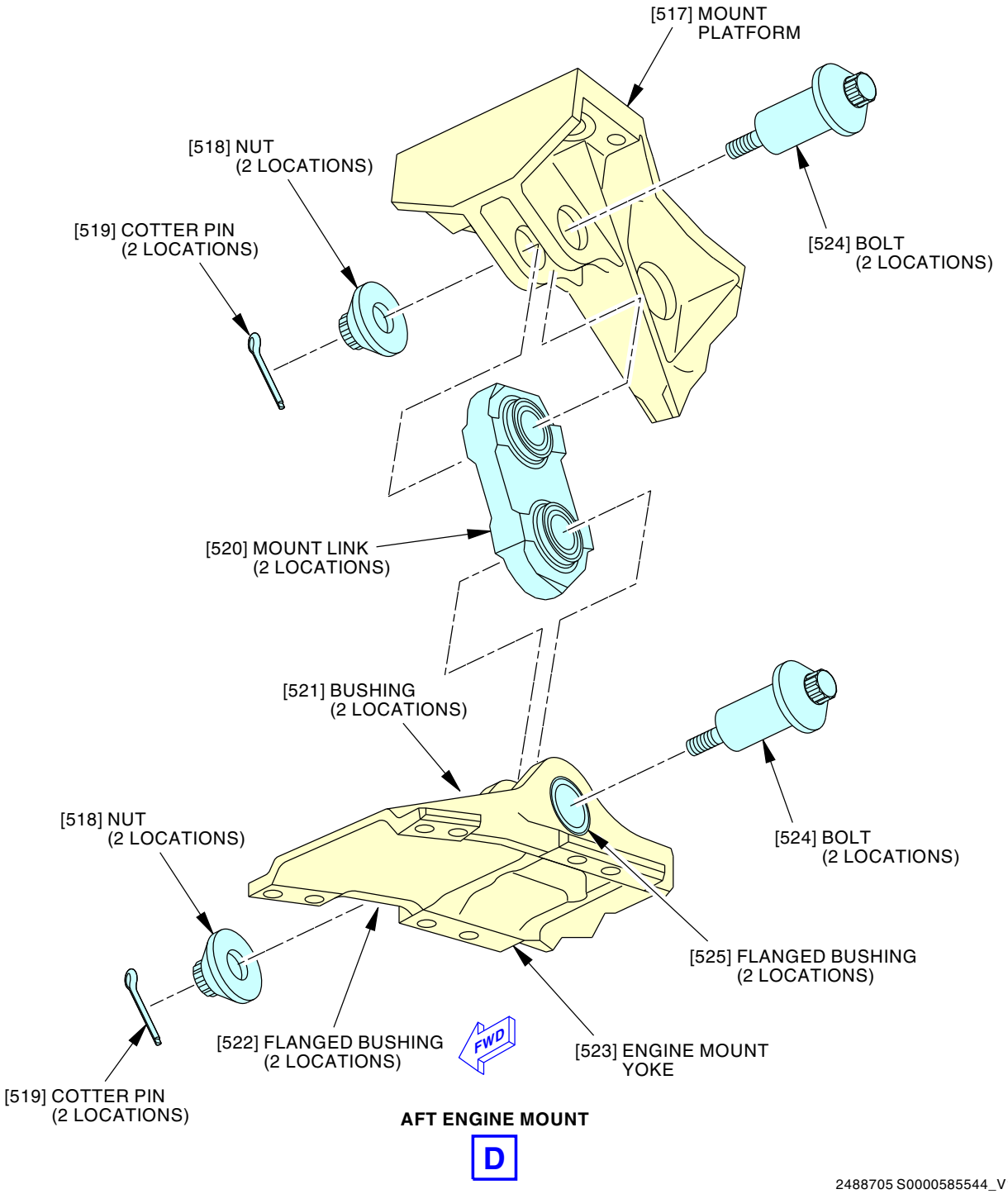

Engine Mounts Installation
Figure 415/71-00-02-990-823-H01 (Sheet 4 of 4)

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TASK 71-00-02-400-811-H00

3. Power Plant Installation

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411,Figure 412, Figure 413, Figure 414, and Figure 415)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) Boeing recommends that you use the 4-points bootstrap equipment, SPL-4947 (J71043-131) bootstrap equipment for the GE100 series engines change.

(2) There are two methods of power plant installation: manually or pneumatically operated.

(3) If the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) is used, and if it is necessary, use GE engine sling (engine sling, SPL-4920 (9C6020G03, 9C6020G04, 9C6020G05, or 9C6020G06)) to transfer the engine from the transportation stand [123] (shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)) to the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M)).

(4) You can install an engine with the inlet cowl or without the inlet cowl installed. Without the inlet cowl installed, the aft loads will be 1000 pounds higher than the engine with the inlet cowl installed. This procedure is written for the engine installation with the inlet cowl installed.

(5) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(6) The installation task has these sections:

(a) Preparation for the Installation

(b) Install the Power Plant with the Bootstrap Equipment (Manually Operated)

(c) Install the Power Plant with the Pneumatic Bootstrap Equipment (Pneumatically Operated)

(7) You must do these steps to install the engine:

(a) Make sure that you level the airplane if the airplane is not leveled.

(b) Remove the shipping stabilizer on the forward engine mount if it is installed.

(c) Make sure the aft engine mount positioning tool is installed correctly, if you intend to use the position fixture for the engine installation.

(d) Do a check on the engine mount bolts.

(e) Install the forward and aft bootstrap equipment (if it is necessary).

1) See the removal task - Paragraph of the Remove the Power Plant with the Bootstrap Equipment (Manually Operated)

2) See the removal task - Paragraph of the Remove the Power Plant with the Pneumatic Bootstrap Equipment (Pneumatically Operated).

a) Connect pneumatic supply hoses (if operated by pneumatic power) to the hoists.

(f) Install the inlet cowl if it is necessary.

(g) Move the engine below the airplane.

(h) Lift the engine and the cradle to the strut.

(i) Install the engine on the strut.

(j) Lower the cradle into the transportation stand.

(k) Move the transportation stand away from the airplane.

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(l) Remove the aft engine mount positioning tool, if it is installed.

(m) Remove the bootstrap equipment.

(n) Remove electrical power if it is on the airplane.

(o) Connect the electrical connectors, ducts, fuel hose, pneumatic sense lines, and the hydraulic plumbing to the engine.

(p) Connect the left and right thrust reverser V-groove latch bands.

(q) Connect the left and right aft tension straps to the aft deflection limiter rods.

(r) Remove the tapes from the bleed air deflector panels.

(s) Supply electrical power.

(t) Do a check for the fuel system for leaks.

(u) Do the engine, IDG and VSCF generators oil servicing.

(v) Remove the thrust reverser hold-open equipment.

(w) Install the fan cowl panels and put them in the open positions.

(x) Cycle the thrust reversers to bleed off the air in the system.

(y) Close the thrust reversers.

(z) Do the thrust reverser adjustment if the engine is replaced.

(aa) Cycle the fan cowl panels to bleed off the air in the system.

(ab) Close the fan cowl panels.

(ac) Do the PDOS oil servicing if it is necessary.

(ad) Install the aft mount access panels and close the pressure relief door.

(ae) Install the aft cowl forward fairings.

(af) Install the No. 1 forward fairing.

(ag) Install the left and right forward side fairings.

(ah) Install the left and right forward fairings on the thrust reverser hinges.

(ai) IF THE ENGINE FAN AND CORE WERE SEPARATED; Do the steps that follow:

1) Connect the starter air valve manual control shaft from the starter air valve. (Refer to Figure 71-00-05-990-801-H01.)

a) Install the two bolts [12] and washers [12A] on the cable flange at the starter air valve.

<1> Tighten the bolts [12] to 110 in-lb (12.4 N·m) - 120 in-lb (13.6 N·m).

<2> Install the bolt [11A] and nut [11B] that attaches the clamp [11] to the bracket.

<a> Tighten the bolt [11A] to 55 in-lb (6.2 N·m) - 70 in-lb (7.9 N·m).

<3> Install the bolt [10A] and nut [10B] that attaches the clamp [10] to the bracket.

<a> Tighten the bolt [10A] to 55 in-lb (6.2 N·m) - 70 in-lb (7.9 N·m).

2) Make sure the left and right QEC flange bolts at the ground handling brackets are installed.

(aj) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Install the left and right blank off panels and the air bleed deflector panels on the forward inner cowl support at the fan hub frame.

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(ak) Supply pneumatic pressure.

(al) Open the supply shutoff valve for the engine driven pump (EPD).

(am) Remove the fall arrest equipment.

(an) Pressurize the applicable hydraulic system and its reservoir.

(ao) Do the activation procedure for the thrust reversers.

(ap) Do the activation procedure for the leading edge slats.

(aq) Do the check on the EEC (FADEC) software part number.

(ar) If it is necessary, do the AVM SCU software installation and enter the new software part number in the MAT.

(as) Do the operational test for the engine.

B. References

Reference	Title
07-11-05-580-801	Make the Airplane Stable to Prevent Tipping (P/B 201)
08-21-00-580-801	Make the Airplane Level (P/B 201)
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
12-13-03-600-802	IDG Oil Fill (P/B 301)
12-13-07-600-801	Backup Generator Oil Fill (P/B 301)
12-15-01-610-810	Main Landing Gear Shock Strut Servicing (P/B 301)
20-41-00-910-801	Static Grounding (P/B 201)
24-11-01-200-805	IDG Disconnect Check (P/B 601)
24-22-00-860-805	Supply Electrical Power (P/B 201)
24-22-00-860-806	Remove Electrical Power (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
29-11-00-860-801	Main Hydraulic System Pressurization (P/B 201)
30-21-06-400-804-001	Engine Anti-Ice Duct Installation (P/B 401)
36-00-00-860-802	Pressurize the Pneumatic System (P/B 201)
45-10-00-820-801	How to Start the Engine Balancing Function (P/B 201)
54-05-03-210-812	EXTERNAL - GENERAL VISUAL: POWERPLANT, LEFT (P/B 201)
54-05-03-210-813	EXTERNAL - GENERAL VISUAL: POWERPLANT, RIGHT (P/B 201)
54-05-03-211-811	EXTERNAL - DETAILED: POWERPLANT, LEFT (P/B 201)
54-05-03-211-812	EXTERNAL - DETAILED: POWERPLANT, RIGHT (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
54-52-01-400-801-001	Forward Fairings Installation (P/B 401)
54-52-01-400-802-001	Fan Cowl Support Beam Fairings Installation (P/B 401)
54-52-05-000-801	Aft Fairing Access Door Removal (P/B 401)
54-53-01-400-802-001	Strut Access Doors Installation (P/B 401)
54-53-02-400-801-001	Strut Fairings Installation (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
70-00-04-000-802-H01	E, C, and W Metal Seal Removal (P/B 201)
70-00-04-400-802-H01	E, C, and W Metal Seal Installation (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)

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Reference	Title
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-00-800-833-H00	Power Plant Test Reference Table (P/B 501)
71-00-03-600-806-H01	Depreservation of An Installed Engine (P/B 201)
71-00-04-800-801-H00	Engine and Engine Stand Preparation (P/B 201)
71-00-04-800-802-H00	Restore the Engine and Engine Stand (9C6025P02) Components to Its Usual Condition (P/B 201)
71-00-05-990-801-H01	Figure: Drain and Service Module Assembly Installation (P/B 401)
71-11-01-400-802-H01	Inlet Cowl Installation (P/B 401)
71-11-04-400-805-H01	Fan Cowl Panels Installation (P/B 401)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-21-00-200-802-H01	Forward Mount to Fan Case Attachment Features (Scheduled Maintenance Requirement) Inspection (P/B 601)
71-21-00-200-809-H00	Engine Mounts Inspection (P/B 601)
71-21-03-200-801-H01	Engine Mount Bolts and Nuts Inspection (P/B 601)
73-21-15-400-802-H01	EEC (FADEC) Software Installation (on the MAT) (P/B 201)
73-21-19-400-801-H01	Engine Rating Plug Installation (P/B 401)
77-31-03-400-801-H01	Airborne Vibration Monitoring (AVM) Signal Conditioner Unit Software Installation (P/B 201)
77-31-06-400-802-H01	Turbine Center Frame Accelerometer Activation (P/B 201)
78-11-00-210-801-H01	Turbine Exhaust System Visual Inspection (P/B 601)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-01-200-802-H01	Thrust Reverser Inspection (P/B 601)
78-31-01-830-801-H01	Thrust Reverser Adjustment (P/B 501)
80-11-07-400-801-H01	Starter Air Valve Manual Control Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-2073	Fixture - Stabilizer, Forward Engine Mount Part #: 9C6016G01 Supplier: 06083
SPL-2078	Equipment - Torque, GE90 Engine Mount Bolts Part #: J71002-75 Supplier: 81205 Opt Part #: J71002-74 Supplier: 81205
SPL-2085	Equipment - Hold-Open, GE90 Engine Fan Reverser Part #: J78003-27 Supplier: 81205
SPL-4919	Stand - Engine Cradle and Transport, GE90-100 Series Part #: 9C6001G07 Supplier: 06083 Opt Part #: 9C6001G05 Supplier: 06083

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Reference	Description
SPL-4920	Sling - Engine Transfer, Overhead Lift Part #: 9C6020G05 Supplier: 06083 Part #: 9C6020G06 Supplier: 06083 Opt Part #: 9C6020G03 Supplier: 06083 Opt Part #: 9C6020G04 Supplier: 06083
SPL-4921	Stand - Shipping, Deluxe Air/Truck, Engine Cradle and Transport Part #: 9C6025P02 Supplier: 06083 Part #: 9C6025P03 Supplier: 06083
SPL-4947	Equipment - Bootstrap, 4-pt. Pick, GE90 Engine Part #: J71043-131 Supplier: 81205 Opt Part #: J71043-129 Supplier: 81205 Opt Part #: J71043-130 Supplier: 81205
SPL-7749	Fixture - Position, Aft Engine Mount, GE90-115B Part #: 9C1165G02 Supplier: 06083
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-583	Mallet - Non-metallic
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-1208	Lever - Wood, 2 Inch by 4 Inch, 4-7 Feet Long

D. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	BAC5008
D00139	Lubricant - Oil - WD-40	
D00633	Grease - Aircraft General Purpose	BMS3-33
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G02421	Lockwire	NASM20995C40
G50463	Pad - Fluid Absorbent (Anti-static)	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
191	Bolt	71-21-01-03-012	ARO ALL
197	Bolt	71-21-01-03-006	ARO ALL
		71-21-01-03-012	ARO ALL

F. Location Zones

Zone	Area
211	Flight Compartment, Left
212	Flight Compartment, Right
410	PowerPlant, Left
420	PowerPlant, Right

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G. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
415EL	Forward Thrust Reverser Hinge Cover, Left Engine
416AR	Right Thrust Reverser, Left Engine
416ER	Forward Thrust Reverser Hinge Cover, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
425EL	Forward Thrust Reverser Hinge Cover, Right Engine
426AR	Right Thrust Reverser, Right Engine
426ER	Forward Thrust Reverser Hinge Cover, Right Engine
431AT	Thumbnail Fairing, Left Strut
431BT	PDOS Pump Access Door
432AL	Left Forward Side Fairing, Left Strut
432AR	Right Forward Side Fairing, Left Strut
433CL	Left Pressure Relief Door, Left Strut
433CR	Right Aft Mount Access Panel, Left Strut
433DL	Left Aft Mount Access Panel, Left Strut
433DR	Right Pressure Relief Door, Left Strut
433EL	Left Aft Cowl Forward Fairing, Left Strut
433ER	Right Aft Cowl Forward Fairing, Left Strut
434CL	Left Forward Access Door, Left Strut Aft Fairing
441AT	Thumbnail Fairing, Right Strut
441BT	PDOS Pump Access Door
442AL	Left Forward Side Fairing, Right Strut
442AR	Right Forward Side Fairing, Right Strut
443CL	Left Pressure Relief Door, Right Strut
443CR	Right Aft Mount Access Panel, Right Strut
443DL	Left Aft Mount Access Panel, Right Strut
443DR	Right Pressure Relief Door, Right Strut
443EL	Left Aft Cowl Forward Fairing, Right Strut
443ER	Right Aft Cowl Forward Fairing, Right Strut
444CL	Left Forward Access Door, Right Strut Aft Fairing

H. Prepare to Install the Power Plant

SUBTASK 71-00-02-869-006-H00

(1) Do this task: Static Grounding, TASK 20-41-00-910-801.

NOTE: Use the approved ground lugs to ground the airplane.

SUBTASK 71-00-02-869-004-H00

(2) Make sure the airplane is at 3/4 ± 1/4 degree pitch (nose down) and zero ± 1/4 degree roll (TASK 08-21-00-580-801).

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SUBTASK 71-00-02-869-005-H00

CAUTION

MAKE SURE THAT THERE IS SUFFICIENT CLEARANCE BETWEEN THE BOTTOM OF THE ENGINE AND CRADLE BEFORE YOU MAKE THE AIRPLANE LEVEL. IF THERE IS NOT SUFFICIENT CLEARANCE, YOU CAN CAUSE DAMAGE TO THE ENGINE AND THE AIRPLANE.

(3) Make sure that there is a minimum of 10.0 inches (25.4 cm) (shock strut chrome) at the applicable main landing gear oleo.

(a) If for other reasons the clearance is insufficient, do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-01-610-810.

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-02-869-007-H00

(4) If it is necessary, install the tail jack (TASK 07-11-05-580-801).

NOTE: Tail jack installation is recommended to keep the airplane stable with the power plant removed.

SUBTASK 71-00-02-010-011-H01

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 PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) If the thrust reversers are closed, do the task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00.

(a) Open these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-02-480-020-H01

WARNING

DO NOT TRY TO REMOVE THE HOLD-OPEN RODS UNLESS THERE IS EQUIPMENT TO HOLD THE THRUST REVERSERS OPEN. MAKE SURE THAT YOU INSTALL THE HOLD-OPEN EQUIPMENT CORRECTLY. THE THRUST REVERSER CAN FALL QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(6) Install the hold-open equipment [12] (GE90 engine fan reverser hold open equipment, SPL-2085) on each thrust reverser PDOS actuator if it is not installed.

(a) Put the hold-open equipment [12] on each thrust reverser PDOS actuator rod which is in the open position.

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(b) If installed, remove the lockwire from the gland nuts on the thrust reverser PDOS actuator rods.

(c) Put the retainers [13] on bolt of the thrust reverser bracket.

(d) Install the upper clamp block [11] over the hold-open equipment [12].

(e) Tighten the clamp screws [14].

(f) Tighten the screw [15].

(g) Slowly lower each thrust reverser so that the extended length of the actuator rod is the same as the hold-open equipment [12].

SUBTASK 71-00-02-300-002-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(7) If it is not already done, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-00-02-080-005-H01

(8) Remove the forward engine mount stabilizer fixture, SPL-2073 from the forward engine mount, if it is installed.

SUBTASK 71-00-02-480-022-H01

(9) Make sure the aft engine mount position fixture, SPL-7749 is installed correctly, if you intend to use the position fixture for the engine installation.

(a) Adjust the aft engine mount position fixture, SPL-7749 so that it stays in the center of the aft engine mount.

SUBTASK 71-00-02-230-001-H01

(10) Get new engine mount bolts [191], bolts [197], nuts [193] and nuts [200] or bolts and nuts that were examined as follows:

(a) If the bolts [191], the bolts [197], the nuts [193] and the nuts [200] are not new, examine the bolts and the nuts with a dye penetrant inspection.

1) Do this task: Engine Mount Bolts and Nuts Inspection, TASK 71-21-03-200-801-H01.

(b) Make sure that the bolts [191] for the forward mount and the bolts [197] for the aft mount have the correct length.

NOTE: The bolts for the aft mount are longer than the bolts for the forward mount. Make sure you install the correct size bolts in the proper locations.

NOTE: The length of the bolt can be found from the part number for the bolt that is shown in the AIPC (Airplane Illustrated Parts Catalog).

SUBTASK 71-00-02-210-001-H01

(11) Look at the aft engine mount [121], the forward engine mount [122], the forward and aft strut mounts and assembles for the conditions that follow (TASK 71-21-00-200-809-H00).

(a) Discoloration, cracks, corrosion, or signs of worn areas

(b) Fasteners that are loose, installed thrust link clevis bushings, worn bearings, or signs of failures in the adjacent structure.

(c) Do the inspections of the components and areas that follow:

NOTE: These inspections are required by scheduled maintenance at the engine change.

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1) Do a check of the forward engine mount to the fan case for damage (TASK 71-21-00-200-802-H01).
2) Do a check of the forward and aft strut mount for damage (TASK 54-05-03-210-812 and TASK 54-05-03-210-813).
3) Do a check of the forward and aft strut mount assemblies for damage (TASK 54-05-03-211-811 and TASK 54-05-03-211-812).
4) Do a check of the exhaust sleeve and center body for damage (TASK 78-11-00-210-801-H01).
5) Make sure that you do the IDG disconnect operational check (TASK 24-11-01-200-805).

SUBTASK 71-00-02-640-001-H01

(12) Prepare the aft engine mount [121] and the forward engine mount [122] for the installation of the engine.

(a) Make sure the surfaces of the forward and the aft mounts (that touch) are free of oil, grease, and other unwanted material.

(b) Apply the Never-Seez NSBT compound, D00006 to the shear pins on the forward and the aft mounts.

(c) Make sure that these parts are installed in the eight outboard clevis holes of both the forward mount platform and the forward mount yoke (Refer to Figure 415):

- engine mount forward bushings [512]
- forward engine flanged bushings [513]
- forward flange bushings [514]
- retaining rings [515]

Also -

- fail safe bushing [516]

SUBTASK 71-00-02-720-001-H01

(13) Do a check of the self-locking torque of the (captive) nuts [193] and nuts [200] in the aft engine mount [121] and the forward engine mount [122].

NOTE: The retainers safety the captive nuts.

(a) Apply the Never-Seez NSBT compound, D00006 to the shank and to the threads of the bolts [191] and bolts [197].

(b) Install the bolts [191] and the bolts [197] in the (captive) nuts to do a check of the self-locking torque.

1) Monitor the torque that is necessary to turn the bolts [191] and bolts [197].

a) The torque must be between 50-800 pound-inches (5.7-90.4 newton-meters).

2) If the torque necessary to turn the bolt [191] or bolt [197] is not in the limits that follow, replace the nut [193] or nut [200].

NOTE: For the forward engine mount, if you must remove the nuts [193], remove the bolts [195], washers [202], nuts [203], and the nut retainers [194]. For the nuts [200] on the aft engine mount, remove the nut retainers [199] and the retainer plates [201]. If you replace a nut, do a check of the torque again.

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SUBTASK 71-00-02-490-004-H00

(14) If the engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) is used and if it is necessary, use GE engine sling (engine sling, SPL-4920 (9C6020G03, 9C6020G04, 9C6020G05, or 9C6020G06)) to transfer the engine from the transportation stand [123] (shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)) to the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M)).

NOTE: Refer to the GE Engine representative for the GE Engine Sling equipment usage.

SUBTASK 71-00-02-420-051-H00

CAUTION

DO NOT REMOVE THE CAPTIVE SCREWS FROM THE BLANK-OFF PANEL. DAMAGE CAN OCCUR TO THE PANELS OR THE CAPTIVE SCREWS.

(15) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS (or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)); If it is necessary, install the forward support brackets on the forward inner cowl support at the fan hub frame (Figure 408).

(a) If the forward support brackets are not installed on the engine, do these steps.

1) Remove the eight fan hub frame mount bolts from the forward inner cowl support at the fan hub frame.

2) Remove the blank off panels [260] (left) (locations 2, 3 and 4), the blank off panels [261] (right) (locations 5, 6 and 7), the air bleed deflector panels [421] (left) (locations 3 and 4), and the air bleed deflector panels [422] (right) (locations 7 and 8) from the forward inner cowl support at the fan hub frame (TASK 71-00-04-800-801-H00).

3) Remove the flow shield brackets [450] (TASK 71-00-04-800-801-H00).

(b) Install the forward support brackets [440] and the reinstall the flow shield brackets [450] (TASK 71-00-04-800-801-H00).

NOTE: The instructions on how to install the flow shield brackets and the forward support brackets can also be found in GE Engine Manual 72-00-00 Assembly 001/002.

1) Install the eight fan hub frame mount bolts that attach the forward support brackets [440] on the forward inner cowl support.

a) Lubricate the bolts [451] thread with Acheson GP460 compound, D50043 [C02-058].

b) Install the eight bolts [451] on the forward support brackets [440].

c) Tighten the bolts [451] to 368-432 pound-inches (41.6-48.8 Newton-meters).

SUBTASK 71-00-02-030-016-H00

(16) If it is necessary, disconnect the brackets from the left side of the fan frame hub (Figure 410):

NOTE: The brackets may interfere with the installation of the left forward arm assembly.

(a) Remove the bolt [361] from the bracket [360].

(b) Remove the bolts [365] from the bracket [364].

SUBTASK 71-00-02-490-008-H00

(17) Put the thrust link pads over the thrust links to prevent scratches, if it is not installed.

NOTE: Aft bootstrap cable can cause scratches on the thrust links.

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SUBTASK 71-00-02-030-019-H00

(18) If installed, disconnect the lower anti-ice duct assembly [320] from the upper anti-ice duct assembly at the 12:00 position:

(a) Remove the couplings [321] and seals [322] from each end of the duct assembly.

(b) Loosen the bolt [324], washer [325], bushing [326], washer [327], and nut [328] from each link assembly [323] on the engine.

NOTE: You do not need to remove the lower anti-ice duct assembly [320]. You need to loosen the link assemble so the lower anti-ice duct assembly [320] can be pushed back to provide clearance for the forward bootstrap installation.

(c) Install the protective caps on all the anti-ice duct assemblies.

(d) Make sure the duct assembly is clear from the forward bootstrap equipment.

SUBTASK 71-00-02-420-055-H00

(19) Install the inlet cowl if it is necessary (TASK 71-11-01-400-802-H01).

SUBTASK 71-00-02-860-019-H01

(20) To install the power plant with manually operated bootstrap equipment, go to the paragraph “Install the Power Plant with the Bootstrap Equipment (Manually Operated)”. For pneumatically operated bootstrap equipment, go to the paragraph “Install the Power Plant with the Bootstrap Equipment (Pneumatically Operated)”.

I. Power Plant Installation (with the Bootstrap Equipment (Manually Operated))

SUBTASK 71-00-02-480-023-H01

(1) Install the bootstrap equipment, SPL-4947 (J71043-131) on the strut if it is not installed (Figure 412).

NOTE: Refer to instructions in the removal task. After the bootstrap equipment is installed, continue the below steps.

SUBTASK 71-00-02-940-002-H01

CAUTION

MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

(2) Put the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) or shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)), with the cradle [124] and the engine [1] attached, below the strut.

(a) Move the transportation stand [123] into its position from the front of the airplane.

SUBTASK 71-00-02-480-080-H00

(3) Connect the bootstrap equipment to the cradle [124].

(a) Install the forward and aft fittings on the cradle [124].

NOTE: There are four attach locations. Two are for the forward bootstrap and the other two are for the aft bootstrap.

1) Install the forward inboard cradle attach (adapter) assembly [150] on the forward inboard side of the cradle (of the engine to be changed).

2) Install the pin [154] on the cradle lug.

3) Install the forward outboard cradle attach assembly [147] on the forward outboard side of the cradle (of the engine to be changed).

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4) Install the pin [154] on the cradle lug.

5) Install the aft cradle attach fittings [137] on the cradle diagonal beams.

6) Install the pins [152] on the cradle lug.

(b) Attach the lever hoist [130] with the shackles [132] from the cable [138] of the aft inboard arm [133] to the aft cradle attach fitting [137].

1) Make sure the chains [131] are not twisted.

(c) Attach the lever hoist [130], the dynamometer [136], and the shackles [132] from the cable [138] of the aft outboard arm [135] to the aft cradle attach fitting [137].

NOTE: Make sure the cable end fittings are approximately the same distance from the ground on each sides.

1) Make sure the chains [131] are not twisted.

(d) Attach the forward lever hoists [130] with the shackles [132] from the forward lower arm assemblies [148A] to the forward outboard cradle attach assembly [147] and to the forward inboard cradle attach (adapter) assembly [150].

1) Attach the block end of the inboard lever hoist [130] to the forward inboard cradle attach (adapter) assembly [150] with the pin [154].

2) Attach the block end of the outboard lever hoist [130] to the forward outboard cradle attach assembly [147] with the pin [154].

3) Make sure the chains [146] are not twisted.

(e) Take up the slack in the lever hoists [130].

SUBTASK 71-00-02-820-001-H01

(4) Align the engine [1] below the strut before the installation.

(a) Take up the slack in the lever hoists [130].

WARNING LET ONLY APPROVED PERSONNEL OPERATE THE HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT USE THE BOOTSTRAP EQUIPMENT TO LIFT OR LOWER THE ENGINE, CRADLE AND TRANSPORTATION STAND TOGETHER TO THE ENGINE PYLON. YOU CAN USE THE BOOTSTRAP EQUIPMENT TO LIFT THE ENGINE, CRADLE AND STAND 1.5 ±0.5 IN. (38.1 ±12.7 MM) TO LET THEM HANG FREELY. THE BOOTSTRAP FUNCTION IS TO LIFT OR LOWER ONLY THE ENGINE AND CRADLE TO THE ENGINE PYLON. INCORRECT OPERATION OF THE BOOTSTRAP EQUIPMENT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION DO NOT PUT MORE THAN 3000 POUNDS (1363 KG) ON AN AFT OUTBOARD BOOTSTRAP HOIST. MAKE SURE THAT ALL OF THE WHEELS OF THE TRANSPORTATION STAND TOUCH THE GROUND AT THE SAME TIME. IF ONLY THE FRONT WHEELS TOUCH THE GROUND, THE POSITION OF THE CENTER OF GRAVITY ON THE AFT LOAD WILL CHANGE. THIS WILL CAUSE THE LOADS TO BE MORE THAN THE LOAD LIMITS FOR THE AFT BOOTSTRAP HOISTS. IF THE LOADS ARE TOO LARGE, THIS CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION

MAKE SURE THAT THE LOAD DIFFERENCE BETWEEN THE INBOARD AND THE OUTBOARD FORWARD BOOTSTRAP EQUIPMENT IS LESS THAN 5000 POUNDS (2273 KG). THIS LIMIT APPLIES WHEN YOU LIFT THE ENGINE IN ALL OF THE OPERATION. IF THE LOAD DIFFERENCE IS MORE THAN THE LIMIT, DAMAGE TO THE ENGINE AND EQUIPMENT CAN OCCUR.

(b) Lift the engine [1] and the cradle [124] with the transportation stand [123] attached to align below the strut.

1) Make sure that the aft outboard load is not more than 3000 pounds (1363 kg).

a) If the load is more than the limit, lower the engine [1] and move and reposition the transportation stand [123] again.

b) Do the procedure to align the engine [1] again.

(c) When the engine [1] is aligned with the strut, lower the engine [1], the cradle [124], and the transportation stand [123] to the ground.

(d) Disconnect the engine [1] and the cradle [124] from the transportation stand [123].

1) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, remove the bolts (8 locations) that attach the cradle [124] from the shipping stand, SPL-4921.

2) Remove the pins [153] (4 locations) that attach the cradle [124] to the transportation stand [123].

SUBTASK 71-00-02-420-003-H01

WARNING

MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOISTS. MAKE SURE THE LOADS ARE LESS THAN THESE LOAD LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DYNAMOMETER,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DYNAMOMETER,

4000 POUNDS (1818 KILOGRAMS) ON AN AFT DYNAMOMETER.

IF THE LOADS ARE MORE THAN THE LOAD LIMITS GIVEN, THE ENGINE CAN FALL AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Lift the engine [1] and the cradle [124] to the strut.

(a) Make sure that the forward outboard and inboard dynamometers are less than 15000 pounds (6818 kg) and 11000 pounds (5000 kg) respectively, and aft dynamometer is not more than 4000 pounds (1818 kg).

CAUTION

MONITOR THE THRUST LINKS AND THE AFT MOUNT WHEN YOU TURN THE ENGINE. MAKE SURE THAT THEY DO NOT HIT THE PRECOOLER. DO NOT LET THE ENGINE PITCH OR ROLL WHEN YOU INITIALLY LIFT IT FROM THE TRANSPORTATION STAND. MAKE SURE THE CRADLE DOES NOT CATCH ON THE TRANSPORTATION STAND. IF THE CRADLE IS CAUGHT ON THE TRANSPORTATION STAND, DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE READING HAS EXCEEDED THE GIVEN LOAD LIMITS.

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(CAUTION PRECEDES)

CAUTION MAKE SURE THAT THE ENGINE CAN MOVE FREELY. IF A PART OF THE ENGINE IS CAUGHT, IT CAN MOVE QUICKLY AFTER IT IS FREE. THIS CAN CAUSE DAMAGE TO OTHER ENGINE COMPONENTS.

(b) Operate the lever hoists [130] equally to lift the engine [1] with the cradle [124] from the transportation stand [123].

NOTE: Make sure you lift the engine slowly. Use the inboard hoist to change the roll of the cradle. Use the forward hoists or the aft hoist to change the pitch of the cradle.

NOTE: If it is necessary, move the transportation base aft to gain clearance for cradle lifting. Make sure you keep the wheels alignment in place.

1) Make sure you lift the cradle [124] slowly until it clears the transportation stand and cradle interface pins.

2) Use the forward lever hoists [130] to change the roll of the cradle [124] for the engine mount platform to the strut alignment.

3) Use the forward or the aft lever hoists [130] to change the pitch of the cradle [124].

CAUTION DO NOT LIFT THE FORWARD END OF THE ENGINE ABOVE THE AFT END. THE UPPER FAN CASE WILL HIT THE THRUST REVERSERS. DAMAGE TO THE THRUST REVERSERS WILL OCCUR.

(c) Lift the engine [1] until there is approximately 6.0 inches (15.2 cm) between the mounts on the engine and the strut.

1) Make sure you monitor the clearance between the engine [1] and the thrust reversers while you lift the engine [1].

CAUTION MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

2) Make sure that the engine is clear from the thrust links, the precooler, and the forward thrust reverser hinge beam flanges.

NOTE: Do not move or turn the engine too quickly.

(d) Operate the lever hoists [130] until the clearance is equal and the mounts are aligned.

CAUTION MAKE SURE THAT THE SHEAR PINS FOR THE FORWARD MOUNT ARE LOWER THAN THE SHEAR PINS ON THE AFT MOUNT WHEN YOU LIFT THE ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FLANGE ON THE TOP OF THE ENGINE CAN OCCUR.

(e) Lift the engine [1] until you have a clearance of 0.50 inch (1.27 cm) between the aft mounts.

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(f) When the shear pins touch the surface of the aft mount, level the aft mount platform to the strut platform.

NOTE: If the angular position of the aft mount is not aligned correctly, it will cause binding of the shear pins and lockup. A 2 inch by 4 inch, 4-7 feet long wood lever, STD-1208 or equivalent, may be used between the aft engine mount and the strut platform to joggle free the aft mount to a proper angular position. Make sure that you monitor the loads and do not damage other components during usage.

(g) Adjust the forward lever hoists [130] until the forward shear pins will engage the mount approximately 0.10 inch (0.25 cm) before the aft shear pins.

WARNING

MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOISTS. MAKE SURE THE LOADS ARE LESS THAN THESE LOAD LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DYNAMOMETER,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DYNAMOMETER,

4000 POUNDS (1818 KILOGRAMS) ON AN AFT DYNAMOMETER.

IF THE LOADS ARE MORE THAN THE LOAD LIMITS GIVEN, THE ENGINE CAN FALL AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(h) Lift the engine [1] until you see no clearance between the upper and lower parts of the (forward and aft) mounts.

1) Apply an additional preload of 150-750 pounds (68-341 kilograms) maximum total on the each forward dynamometer.

2) Apply an additional preload of 1500 pounds (682 kilograms) maximum total on the aft dynamometer.

3) Make sure that the forward outboard and inboard dynamometers are less than 15000 pounds (6818 kg) and 11000 pounds (5000 kg) respectively, and aft dynamometer is not more than 4000 pounds (1818 kg).

SUBTASK 71-00-02-420-004-H01

(6) Connect the aft engine mount [121] and the forward engine mount [122] (Figure 413).

NOTE: The torque adapter wrenches will be necessary when you install the engine mount bolts for the engine mounts.

NOTE: Make sure that the anti-backlash ratchet switch of the torque wrench tool is properly set so that the socket turns in the correct direction for tightening and or loosening the bolts. False torque reading can occur if the ratchet switch is not set in the correct position.

CAUTION

INSTALL ONLY NEW BOLTS OR BOLTS THAT WERE EXAMINED. IF YOU USE DAMAGED BOLTS, YOU CAN DAMAGE THE STRUT AND ENGINE MOUNTS OR WILL POSSIBLY DROP THE ENGINE.

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(CAUTION PRECEDES)

CAUTION

THE BOLTS FOR THE AFT MOUNT ARE LONGER THAN THE BOLTS FOR THE FORWARD MOUNT. MAKE SURE YOU INSTALL THE BOLTS IN THE CORRECT LOCATIONS. YOU CAN CAUSE DAMAGE TO THE BOLT AND THE NUT IF YOU DO NOT OBEY THIS INSTRUCTION.

(a) Connect the forward engine mount [122].

1) Make sure that the nut retainers [194] and the bolts [195], washers [202], and nuts [203] are not bent, or have cracks, corrosion, or signs of worn areas.

2) Align the nuts [193] with the forward engine mount holes.

NOTE: The nuts [193] are held by the nut retainers [194].

3) Lubricate the bolts [191] with Never-Seez NSBT compound, D00006.

4) Install the four lubricated bolts [191] with the four washers [192], the four washers [210] (P/N BACW10BP16APU), and the four washers [211] (P/N NAS1149E1632R) from the strut through the forward engine mount.

NOTE: Install the countersunk side of the washer adjacent to the bolt head.

5) Engage the bolts [191] threads with the nuts [193].

6) If the torque wrench adapter [190] (GE90 engine mount bolts torque equipment, SPL-2078) is used to tighten the forward mount bolts [191], do these steps:

a) Turn each bolts [191] to 525-641 pound-inches (59.3-72.4 Newton-meters) or 44-53 pound-feet (50% of final torque).

b) Tighten the bolts [191] to 1050-1283 pound-inches (118.6-144.8 Newton-meters) or 88-107 pound-feet.

c) Make sure the threads of the nuts [193] are fully engaged; and, the complete chamfer on the end of the forward mount bolts [191] extends out of the nuts.

7) If the standard torque wrench is used to tighten the forward mount bolts [191], do these steps:

a) Turn each bolts [191] to 3150-3850 pound-inches (356.0-435.0 Newton-meters) or 263-321 pound-feet (50% of final torque).

b) Tighten the bolts [191] to 6300-7700 pound-inches (711.9-870.1 Newton-meters) or 525-641 pound-feet.

c) Make sure the threads of the nuts [193] are fully engaged; and, the complete chamfer on the end of the forward mount bolts [191] extends out of the nuts.

(b) Connect the aft engine mount [121].

1) Make sure that the nut retainers [199] and the retainer plates [201] are not bent, or have cracks, corrosion, or signs of worn areas.

2) Align the nuts [200] with the aft engine mount holes.

NOTE: The nuts [200] are installed between the nut retainers [199] and the retainer plates [201].

NOTE: Make sure that you install the retainer plates [201] with the bevel surface facing down.

3) Lubricate the bolts [197] with Never-Seez NSBT compound, D00006.

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4) Install the eight lubricated bolts [197] with the washers [198] from the strut through the aft mount.

NOTE: Install the countersunk side of the washer adjacent to the bolt head.

5) Engage the bolts [197] threads with the nuts [200].

6) If the torque wrench adapter [196] (GE90 engine mount bolts torque equipment, SPL-2078) is used to tighten the aft mount bolts [197], do these steps:

a) Turn each bolt [197] to 675-825 in-lb (76.3-93.3 N.m) or 57-69 ft-lb (50% of final torque).

b) Tighten the bolts [197] to 1350-1650 in-lb (152.6-186.5 N.m) or 113-138 ft-lb.

c) Make sure the threads of the nuts [200] are fully engaged; and, the complete chamfer on the end of the aft mount bolts [197] extends out of the nuts.

7) If the standard torque wrench is used to tighten the aft mount bolts [197], do these steps:

a) Turn each bolt [197] to 2025-2475 pound-inches (228.8-279.7 Newton-meters) or 169-206 pound-feet (50% of final torque).

b) Tighten the bolts [197] to 4050-4950 pound-inches (457.6-559.3 Newton-meters) or 338-412 pound-feet.

c) Make sure the threads of the nuts [200] are fully engaged; and, the complete chamfer on the end of the aft mount bolts [197] extends out of the nuts.

SUBTASK 71-00-02-080-043-H00

(7) Disconnect the cradle [124] from the engine [1] (Figure 412).

(a) CRADLE THAT USES THE FORWARD ADAPTERS; Disconnect the forward and the aft (engine to cradle interface) adapters [157] and adapters [158] from each side of the cradle [124].

1) Disconnect the pins [156] and the pins [159] from the adapters [157] and adapters [158].

(b) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Disconnect the (engine to cradle interface) fan frame mount support adapters [263] and the adapters [158] from each side of the cradle [124].

1) Loosen the adjustment bolt [266] if necessary.

2) Disconnect the pins [265] and the pins [159] from the fan frame mount support adapters [263] and the adapters [158].

(c) Operate the lever hoists [130] to lower the cradle [124] to the transportation stand [123].

NOTE: Cradle could swing inboard slightly when the adapters are removed.

1) Attach the cradle [124] to the transportation stand [123] with the pins [153] (4 locations).

(d) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, install the bolts (8 locations) that attach the cradle [124] to the shipping stand, SPL-4921.

(e) Remove the lever hoists [130], the dynamometers [136], and the shackles [132] from the cradle [124] and from the bootstrap equipment.

1) Disconnect the block ends of the lever hoists [130] from the forward inboard cradle attach (adapter) assembly [150] and from the forward outboard cradle attach assembly [147].

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2) Remove the lever hoists [130] from the (inboard and outboard) forward lower arm assemblies [148A].

3) Remove the forward inboard cradle attach (adapter) assembly [150] from the cradle [124].

4) Remove the forward outboard cradle attach assembly [147] from the cradle [124].

5) Disconnect the block ends of the lever hoists [130] from the aft cradle attach fittings [137].

6) Remove the lever hoists [130] with the dynamometer [136] and the shackles [132] from the aft inboard arm [133] and the aft outboard arm [135].

7) Remove the aft cradle attach fittings [137] from the cradle diagonal beams.

(f) Move the transportation stand [123] with the cradle [124] away from the airplane in the aft direction.

1) CRADLE THAT USES THE FORWARD ADAPTERS; Remove the remaining of the forward and the aft adapter [157] and the adapter [158] from the engine [1] and attach to the cradle [124] with the pins [155], pins [156] , and the pins [159].

2) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Remove the remaining of the fan frame mount support adapter [263] and the aft adapters [158] from the engine [1] and attach to the cradles [124] with the pins [265], and the pins [159].

SUBTASK 71-00-02-080-007-H01

(8) Remove the bootstrap equipment (Figure 412).

(a) Remove the forward bootstrap equipment.

1) Remove the forward lower arm assemblies [148A] from the forward upper arm assemblies [148].

2) Remove the forward upper arm assemblies [148] (inboard and the outboard) from the upper forward center beam assembly [143].

3) Remove the upper forward center beam assembly [143] from the forward upper attach fittings [126].

4) Remove the forward upper attach fittings [126] from the strut.

(b) Remove the aft bootstrap equipment.

1) Remove the aft inboard arm [133] and the aft outboard arm [135] from the aft strut brackets.

SUBTASK 71-00-02-080-008-H01

(9) Remove the aft engine mount position fixture, SPL-7749 from the aft engine mount, if it is installed.

SUBTASK 71-00-02-860-020-H01

(10) This concludes the installation procedure of the power plant with manually operated bootstrap equipment. Go to the paragraph “Put the Engine Back to Its Usual Condition”.

J. Power Plant Installation (with the Pneumatic Bootstrap Equipment (Pneumatically Operated))

SUBTASK 71-00-02-480-025-H01

(1) Install the bootstrap equipment, SPL-4947 (J71043-131) on the strut if it is not installed (Figure 414)

NOTE: Refer to instructions in the removal task. After the bootstrap equipment is installed, continue the below steps.

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SUBTASK 71-00-02-480-026-H01

CAUTION: MAKE SURE YOU ARE CERTIFIED AND TRAINED TO USE THE EQUIPMENT. IF YOU ARE NOT CERTIFIED OR TRAINED TO USE THE EQUIPMENT, YOU CAN DAMAGE THE AIRPLANE STRUT OR THE ENGINE.

(2) Use an approved pneumatic hoist equipment installation instructions to connect the supply air lines, the hoist air supply lines, and the load cell assemblies if it is not connected.

(a) Make sure you read the operation manual of the pneumatic hoist system before you operate the bootstrap equipment.

CAUTION: LUBRICATE THE PNEUMATIC HOISTS BEFORE EACH CYCLE OF THE HOISTS. YOU MUST LUBRICATE THE PNEUMATIC HOISTS FREQUENTLY TO PREVENT DAMAGE.

(b) Make sure you lubricate the gears inside the pneumatic hoists [130A] with WD-40 lubricant, D00139 through the hose fittings before you connect the pneumatic lines to the pneumatic hoists. Repeat the lubrication after each cycle of the hoists up and down.

(c) Make sure you install the hoist bracket [160] and the pneumatic line (red) [161] and the pneumatic line (green) [162] to the pneumatic hoists [130A] correctly.

SUBTASK 71-00-02-940-003-H01

CAUTION: MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

(3) Put the transportation stand [123] (engine cradle/stand, SPL-4919 (9C6001G05 or AM2702M) or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)), with the cradle [124] and the engine [1] attached, below the strut.

(a) Move the transportation stand [123] into its position from the front of the airplane.

SUBTASK 71-00-02-480-081-H00

(4) Connect the bootstrap equipment to the cradle [124].

(a) Install the forward and aft fittings on the cradle [124].

NOTE: There are four attach locations. Two are for the forward bootstrap and other two are for the aft bootstrap.

1) Install the forward inboard cradle attach (adapter) assembly [150] on the forward inboard side of the cradle (of the engine to be changed).

2) Install the pin [154] on the cradle lug.

3) Install the forward outboard cradle attach assembly [147] on the forward outboard side of the cradle (of the engine to be changed).

4) Install the pin [154] on the cradle lug.

5) Install the aft cradle attach fittings [137] on the cradle diagonal beams.

a) Install the pins [152] on the cradle lug.

(b) Attach the pneumatic hoist [130A] with the shackles [132] from the cable [138] of the aft inboard arm [133] to the aft cradle attach fitting [137].

1) Make sure the chains [131] are not twisted.

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(c) Attach the pneumatic hoist [130A], the shackle (load cell) [136A] with the shackles [132] from the cable [138] of the aft outboard arm [135] to the aft cradle attach fitting [137].

NOTE: Make sure the cable end fittings are approximately the same distance from the ground on each sides.

1) Make sure the chains [131] are not twisted.

(d) Attach the forward pneumatic hoists [130A] with the shackles (load cell) [136A] and the shackles [132] from the forward lower arm assemblies [148A] to the forward outboard cradle attach assembly [147] and to the forward inboard cradle attach (adapter) assembly [150].

1) Attach the block end of the inboard pneumatic hoist [130A] with the shackle (load cell) [136A] to the forward inboard cradle attach (adapter) assembly [150] with the pin [154].

2) Attach the block end of the outboard pneumatic hoist [130A] with the shackle (load cell) [136A] to the forward outboard cradle attach assembly [147] with the pin [154].

3) Make sure the chains [146] are not twisted.

(e) Take up the slack in the pneumatic hoists [130A].

SUBTASK 71-00-02-820-002-H01

(5) Align the engine [1] below the strut before the installation.

(a) Take up the slack in the pneumatic hoists [130A].

WARNING LET ONLY APPROVED PERSONNEL OPERATE THE PNEUMATIC HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING DO NOT USE THE BOOTSTRAP EQUIPMENT TO LIFT OR LOWER THE ENGINE, CRADLE AND TRANSPORTATION STAND TOGETHER TO THE ENGINE PYLON. YOU CAN USE THE BOOTSTRAP EQUIPMENT TO LIFT THE ENGINE, CRADLE AND STAND 1.5 ±0.5 IN. (38.1 ±12.7 MM) TO LET THEM HANG FREELY. THE BOOTSTRAP FUNCTION IS TO LIFT OR LOWER ONLY THE ENGINE AND CRADLE TO THE ENGINE PYLON. INCORRECT OPERATION OF THE BOOTSTRAP EQUIPMENT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION DO NOT PUT MORE THAN 3000 POUNDS (1363 KG) ON AN AFT OUTBOARD BOOTSTRAP HOIST. MAKE SURE THAT ALL OF THE WHEELS OF THE TRANSPORTATION STAND TOUCH THE GROUND AT THE SAME TIME. IF ONLY THE FRONT WHEELS TOUCH THE GROUND, THE POSITION OF THE CENTER OF GRAVITY ON THE AFT LOAD WILL CHANGE. THIS WILL CAUSE THE LOADS TO BE MORE THAN THE LOAD LIMITS FOR THE AFT BOOTSTRAP HOISTS. IF THE LOADS ARE TOO LARGE, THIS CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION

MAKE SURE THAT THE LOAD DIFFERENCE BETWEEN THE INBOARD AND THE OUTBOARD FORWARD BOOTSTRAP EQUIPMENT IS LESS THAN 5000 POUNDS (2273 KG). THIS LIMIT APPLIES WHEN YOU LIFT THE ENGINE IN ALL OF THE OPERATION. IF THE LOAD DIFFERENCE IS MORE THAN THE LIMIT, DAMAGE TO THE ENGINE AND EQUIPMENT CAN OCCUR.

(b) Lift the engine [1] and the cradle [124] with the transportation stand [123] attached to align below the strut.

1) Make sure that the aft outboard load is not more than 3000 pounds (1363 kg).

a) If the load is more than the limit, lower the engine [1] and move and reposition the transportation stand [123] again.

b) Do the procedure to align the engine [1] again.

(c) When the engine [1] is aligned with the strut, lower the engine [1], the cradle [124], and the transportation stand [123] to the ground.

(d) Disconnect the engine [1] and the cradle [124] from the transportation stand [123].

1) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, remove the bolts (8 locations) that attach the cradle [124] from the shipping stand, SPL-4921.

2) Remove the pins [153] (4 locations) that attach the cradle [124] to the transportation stand [123].

SUBTASK 71-00-02-420-005-H01

WARNING

MONITOR THE PENDANT DISPLAY FOR THE FORWARD AND THE AFT HOIST WEIGHTS. MAKE SURE THAT THE LOADS ARE LESS THAN THESE LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DISPLAYS,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DISPLAYS,

4000 POUNDS (1818 KILOGRAMS) ON THE AFT DISPLAY.

IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN BREAK THE HOIST AND FALL. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Lift the engine [1] and the cradle [124] to the strut.

(a) Make sure that the forward outboard and inboard pendant displays are less than 15000 pounds (6818 kg) and 11000 pounds (5000 kg) respectively, and aft pendant display is not more than 4000 pounds (1818 kg).

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CAUTION

MONITOR THE THRUST LINKS AND THE AFT MOUNT WHEN YOU TURN THE ENGINE. MAKE SURE THAT THEY DO NOT HIT THE PRECOOLER. DO NOT LET THE ENGINE PITCH OR ROLL WHEN YOU INITIALLY LIFT IT FROM THE TRANSPORTATION STAND. MAKE SURE THE CRADLE DOES NOT CATCH ON THE TRANSPORTATION STAND. IF THE CRADLE IS CAUGHT ON THE TRANSPORTATION STAND, DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE READING HAS EXCEEDED THE GIVEN LOAD LIMITS.

CAUTION

MAKE SURE THAT THE ENGINE CAN MOVE FREELY. IF A PART OF THE ENGINE IS CAUGHT, IT CAN MOVE QUICKLY AFTER IT IS FREE. THIS CAN CAUSE DAMAGE TO OTHER ENGINE COMPONENTS.

(b) Operate the pneumatic hoists [130A] equally to lift the engine [1] with the cradle [124] from the transportation stand [123].

NOTE: Make sure you lift the engine slowly. Use the inboard hoist to change the roll of the cradle. Use the forward hoists or the aft hoist to change the pitch of the cradle.

NOTE: If it is necessary, move the transportation base aft to gain clearance for cradle lifting. Make sure you keep the wheels alignment in place.

1) Make sure you lift the cradle [124] slowly until it clears the transportation stand and cradle interface pins.

2) Use the aft pneumatic hoist [130A] to change the roll of the cradle [124] for the engine mount platform to the strut alignment.

3) Use the forward or the aft pneumatic hoists [130A] to change the pitch of the cradle [124].

CAUTION

DO NOT LIFT THE FORWARD END OF THE ENGINE ABOVE THE AFT END. THE UPPER FAN CASE WILL HIT THE THRUST REVERSERS. DAMAGE TO THE THRUST REVERSERS WILL OCCUR.

(c) Lift the engine [1] until there is approximately 6.0 inches (15.2 cm) between the mounts on the engine and the strut.

1) Make sure you monitor the clearance between the engine [1] and the thrust reversers while you lift the engine [1].

CAUTION

MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

a) Make sure that the engine is clear from the thrust links, the precooler, and the forward thrust reverser hinge beam flanges.

NOTE: Do not move or turn the engine too quickly.

(d) Operate the pneumatic hoists [130A] until the clearance is equal and the mounts are aligned.

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CAUTION

MAKE SURE THAT THE SHEAR PINS FOR THE FORWARD MOUNT ARE LOWER THAN THE SHEAR PINS ON THE AFT MOUNT WHEN YOU LIFT THE ENGINE. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FLANGE ON THE TOP OF THE ENGINE CAN OCCUR.

(e) Lift the engine [1] until you have a clearance of 0.50 inch (1.27 cm) between the aft mounts.

(f) When the shear pins touch the surface of the aft mount, level the aft mount platform to the strut platform.

NOTE: If the angular position of the aft mount is not aligned correctly, it will cause binding of the shear pins and lockup. A 2 inch by 4 inch, 4-7 feet long wood lever, STD-1208 or equivalent, may be used between the aft engine mount and the strut platform to joggle free the aft mount to a proper angular position. Make sure that you monitor the loads and do not damage other components during usage.

(g) Adjust the forward pneumatic hoists [130A] until the forward shear pins will engage the mount approximately 0.10 inch (0.25 cm) before the aft shear pins.

WARNING

MONITOR THE PENDANT DISPLAY FOR THE FORWARD AND THE AFT HOIST WEIGHTS. MAKE SURE THAT THE LOADS ARE LESS THAN THESE LIMITS:

15000 POUNDS (6818 KILOGRAMS) ON THE FORWARD OUTBOARD DISPLAYS,

11000 POUNDS (5000 KILOGRAMS) ON THE FORWARD INBOARD DISPLAYS,

4000 POUNDS (1818 KILOGRAMS) ON THE AFT DISPLAY.

IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN BREAK THE HOIST AND FALL. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(h) Lift the engine [1] until you see no clearance between the upper and lower parts of the (forward and aft) mounts.

1) Apply an additional preload of 150-750 pounds (68-341 kilograms) maximum total on each of the forward bootstraps readings.

2) Apply an additional preload of 1500 pounds (682 kilograms) maximum total on the aft bootstrap reading.

3) Make sure that the forward outboard and inboard pendant displays are less than 15000 pounds (6818 kg) and 11000 pounds (5000 kg) respectively, and aft pendant display is not more than 4000 pounds (1818 kg).

SUBTASK 71-00-02-420-006-H01

(7) Connect the aft engine mount [121] and the forward engine mount [122] (Figure 415).

NOTE: The torque adapter wrenches will be necessary when you install the engine mount bolts for the engine mounts.

NOTE: Make sure that the anti-backlash ratchet switch of the torque wrench tool is properly set so that the socket turns in the correct direction for tightening and or loosening the bolts. False torque reading can occur if the ratchet switch is not set in the correct position.

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CAUTION INSTALL ONLY NEW BOLTS OR BOLTS THAT WERE EXAMINED. IF YOU USE DAMAGED BOLTS, YOU CAN DAMAGE THE STRUT AND ENGINE MOUNTS OR WILL POSSIBLY DROP THE ENGINE.

CAUTION THE BOLTS FOR THE AFT MOUNT ARE LONGER THAN THE BOLTS FOR THE FORWARD MOUNT. MAKE SURE YOU INSTALL THE BOLTS IN THE CORRECT LOCATIONS. YOU CAN CAUSE DAMAGE TO THE BOLT AND THE NUT IF YOU DO NOT OBEY THIS INSTRUCTION.

(a) Connect the forward engine mount [122].

1) Make sure that the nut retainers [194] and the bolts [195], the washers [202], the nuts [203] are not bent, or have cracks, corrosion, or signs of worn areas.

2) Align the nuts [193] with the forward engine mount holes.

NOTE: The nuts [193] are held by the nut retainers [194].

3) Lubricate the bolts [191] with Never-Seez NSBT compound, D00006.

4) Install the four lubricated bolts [191] with the four washers [192], the four washers [210] (P/N BACW10BP16APU), and the four washers [211] (P/N NAS1149E1632R) from the strut through the forward engine mount.

NOTE: Install the countersunk side of the washer adjacent to the bolt head.

5) Engage the bolts [191] threads with the nuts [193].

6) If the torque wrench adapter [190] (GE90 engine mount bolts torque equipment, SPL-2078) is used to tighten the forward mount bolts [191], do these steps:

a) Turn each bolt [191] to 525-641 pound-inches (59.3-72.4 Newton-meters) or 44-53 pound-feet (50% of final torque).

b) Tighten the bolts [191] to 1050-1283 pound-inches (118.6-144.8 Newton-meters) or 88-107 pound-feet.

c) Make sure the threads of the nuts [193] are fully engaged; and, the complete chamfer on the end of the forward mount bolts [191] extends out of the nuts.

7) If the standard torque wrench is used to tighten the forward mount bolts [191], do these steps:

a) Turn each bolt [191] to 3150-3850 pound-inches (356.0-435.0 Newton-meters) or 263-321 pound-feet (50% of final torque).

b) Tighten the bolts [191] to 6300-7700 pound-inches (711.9-870.1 Newton-meters) or 525-641 pound-feet.

c) Make sure the threads of the nuts [193] are fully engaged; and, the complete chamfer on the end of the forward mount bolts [191] extends out of the nuts.

(b) Connect the aft engine mount [121].

1) Make sure that the nut retainers [199] and the retainer plates [201] are not bent, or have cracks, corrosion, or signs of worn areas.

2) Align the nuts [200] with the aft engine mount holes.

NOTE: The nuts [200] are installed between the nut retainers [199] and the retainer plates [201].

NOTE: Make sure that you install the retainer plates [201] with the bevel surface facing down.

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3) Lubricate the bolts [197] with Never-Seez NSBT compound, D00006.

4) Install the eight lubricated bolts [197] with the washers [198] from the strut through the aft mount.

NOTE: Install the countersunk side of the washer adjacent to the bolt head.

5) Engage the bolts [197] threads with the nuts [200].

6) If the torque wrench adapter [196] (GE90 engine mount bolts torque equipment, SPL-2078) is used to tighten the aft mount bolts [197], do these steps:

a) Turn each bolt [197] to 675-825 pound-inches (76.3–93.3 Newton-meters) or 57-69 pound-feet (50% of final torque).

b) Tighten the bolts [197] to 1350-1650 pound-inches (152.6-186.5 Newton-meters) or 113-138 pound-feet.

c) Make sure the threads of the nuts [200] are fully engaged; and, the complete chamfer on the end of the aft mount bolts [197] extends out of the nuts.

7) If the standard torque wrench is used to tighten the aft mount bolts [197], do these steps:

a) Turn each bolt [197] to 2025-2475 pound-inches (228.8-279.7 Newton-meters) or 169-206 pound-feet (50% of final torque).

b) Tighten the bolts [197] to 4050-4950 pound-inches (457.6-559.3 Newton-meters) or 338-412 pound-feet.

c) Make sure the threads of the nuts [200] are fully engaged; and, the complete chamfer on the end of the aft mount bolts [197] extends out of the nuts.

SUBTASK 71-00-02-080-044-H00

(8) Disconnect the cradle [124] from the engine [1] (Figure 414).

(a) CRADLE THAT USES THE FORWARD ADAPTERS; Disconnect the forward and the aft (engine to cradle interface) adapters [157] and adapters [158] from each side of the cradle [124].

1) Disconnect the pins [156] and the pins [159] from the adapters [157] and the adapters [158].

(b) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Disconnect the fan frame mount support adapters [263] (engine to cradle interface) and the adapters [158] from each side of the cradle [124].

1) Loosen the adjustment bolt [266] if necessary.

2) Disconnect the pins [265] and the pins [159] from the fan frame mount support adapters [263] and the adapters [158].

(c) Operate the pneumatic hoists [130A] to lower the cradle [124] to the transportation stand [123].

NOTE: Cradle could swing inboard slightly when the adapters are removed.

1) Attach the cradle [124] to the transportation stand [123] with the pins [153] (4 locations).

2) If the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03) is used, install the bolts (8 locations) that attach the cradle [124] to the shipping stand, SPL-4921.

(d) Remove the pneumatic hoists [130A], the shackles (load cell) [136A], and the shackles [132] from the cradle [124] and from the bootstrap equipment.

1) Release the pneumatic pressure to the pneumatic hoists [130A].

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2) Disconnect the hoist bracket [160], the pneumatic line (red) [161] and the pneumatic line (green) [162] from the pneumatic hoists [130A].

3) Disconnect the block ends of the pneumatic hoists [130A] from the forward inboard cradle attach (adapter) assembly [150] and from the forward outboard cradle attach assembly [147].

4) Remove the pneumatic hoists [130A] from the forward lower arm assemblies [148A].

5) Remove the forward inboard cradle attach (adapter) assembly [150] from the cradle [124].

6) Remove the forward outboard cradle attach assembly [147] from the cradle [124].

7) Disconnect the block ends of the pneumatic hoists [130A] from the aft cradle attach fittings [137].

8) Remove the pneumatic hoists [130A] with the shackle (load cell) [136A] and the shackles [132] from the cable [138] of the aft outboard arm [135] and the aft inboard arm [133].

9) Remove the aft cradle attach fittings [137] from the cradle diagonal beams.

10) Disconnect the hoist bracket [160] from the pneumatic hoists [130A], if it is necessary.

(e) Move the transportation stand [123] with the cradle [124] away from the airplane in the aft direction.

1) CRADLE THAT USES THE FORWARD ADAPTERS; Remove the remaining of the forward and the aft adapters [157] and the adapters [158] from the engine [1] and attach to the cradle [124] with the pins [155], pin [156], and the pin [159].

2) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS; Remove the remaining of the fan frame mount support adapters [263] and the adapters [158] from the engine [1] and attach to the cradle [124] with the pin [265], and the pin [159].

SUBTASK 71-00-02-080-010-H01

(9) Remove the bootstrap equipment (Figure 414).

(a) Remove the forward bootstrap equipment.

1) Remove the forward lower arm assemblies [148A] from the forward upper arm assemblies [148].

2) Remove the forward upper arm assemblies [148] (inboard and the outboard) from the upper forward center beam assembly [143].

3) Remove the upper forward center beam assembly [143] from the forward upper attach fittings [126].

4) Remove the forward upper attach fittings [126] from the strut.

(b) Remove the aft bootstrap equipment.

1) Remove the aft inboard arm [133] and the aft outboard arm [135] from the aft strut brackets.

SUBTASK 71-00-02-080-011-H01

(10) Remove the aft engine mount position fixture, SPL-7749 from the aft engine mount, if it is installed.

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SUBTASK 71-00-02-860-021-H01

(11) This concludes the installation procedure of the power plant with pneumatically operated bootstrap equipment. Continue on the paragraph “Put the Engine Back to Its Usual Condition”.

K. Put the Engine Back to Its Usual Condition

SUBTASK 71-00-02-090-001-H00

(1) Remove the thrust link pads from the thrust links.

SUBTASK 71-00-02-860-022-H01

(2) Remove the electrical power if it is on the airplane (TASK 24-22-00-860-806).

SUBTASK 71-00-02-430-003-H00

(3) Connect the pneumatic sense hose [87] for the PRSOV pneumatic sense line below the left strut disconnect (Figure 403):

NOTE: Do not bend or put the hose into a coil too tightly.

(a) Remove the protective caps from the pneumatic sense line and the pneumatic sense hose [87] fitting.

(b) Connect the pneumatic sense hose [87] to the PRSOV pneumatic sense line.

(c) Hand tighten the nuts at both ends of the hose.

(d) Make sure that the elbow is free and align with the mating connection with no twist or friction.

NOTE: Do not rotate the elbow more than 3 degrees.

(e) Tighten the pneumatic sense hose [87] fitting (TASK 70-51-00-910-801-H01).

SUBTASK 71-00-02-430-002-H00

(4) Connect the pneumatic sense hose [89] for the FAV pneumatic sense line below the forward side disconnect (Figure 403):

(a) Remove the protective caps from the pneumatic sense line and the pneumatic sense hose [89] fitting.

(b) Connect the pneumatic sense hose [89] to the FAV pneumatic sense line.

(c) Tighten the pneumatic sense hose [89] fitting (TASK 70-51-00-910-801-H01).

SUBTASK 71-00-02-420-009-H01

(5) Connect the main fuel supply hose [86] to the right side disconnect (Figure 405).

(a) Remove the protective caps from the main fuel supply hose [86] and from the fitting in the strut.

(b) Make sure that the preformed packing and the backup o-rings inside the strut coupling are not damage.

(c) Make sure the retainer ring is installed on the hose fitting of the main fuel supply hose [86].

(d) Engage the hose fitting with the strut coupling.

CAUTION

USE YOUR HAND TO TIGHTEN THE COUPLING. DO NOT USE PLIERS. DAMAGE TO THE COUPLING CAN OCCUR.

(e) Hand tighten the hose nut.

NOTE: The three pins in the coupling sleeve turn the hose nut when the coupling sleeve is turned.

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1) Make sure the hose nut teeth are engaged with the locknut teeth.

(f) Clean the fuel off that is on the surface of the main fuel supply hose [86].

(g) Install the fuel spray blanket [85] on the main fuel supply hose [86].

1) Safety the velcro double seam along the entire length of tab.

(h) Tighten the coupling at the strut.

SUBTASK 71-00-02-420-010-H01

(6) Install the LP/HP engine crossover duct [84] (Figure 404).

(a) Remove the protective caps from the ducts and the PRSOV valve.

(b) If installed, loosen both ends of the pneumatic sense hose [511] at the LP/HP mix crossover manifold duct and at the pneumatic sense line.

NOTE: This prevents the pneumatic sense hose [511] from kink or bend when you align the LP/HP engine crossover duct [84] to the LP/HP mix crossover manifold duct.

1) Make sure that you do not over-twist the elbow when you tighten the pneumatic sense hose nut.

(c) Make sure that the seals [83] are not damaged (TASK 70-00-04-000-802-H01).

(d) Install the seals [83] on the duct grooves (TASK 70-00-04-400-802-H01).

(e) Align the LP/HP engine crossover duct [84] with the PRSOV valve and with the lower LP/HP mix manifold duct.

(f) Install the couplings [82] at the ends of the duct.

(g) Tighten the couplings [82] to 175-185 pound-inches (19.8-20.9 Newton-meters).

(h) Use a non-metallic mallet, STD-583 slightly hit outer periphery of the couplings [82].

(i) Tighten the couplings [82] again to 175-185 pound-inches (19.8-20.9 Newton-meters).

(j) If not installed, do these steps to install the pneumatic sense hose [511] at the LP/HP mix crossover manifold duct and at the pneumatic sense line

1) Remove the protective caps from the pneumatic sense line and the pneumatic sense hose [511] fitting.

2) Connect the pneumatic sense hose [511] to the LP/HP mix crossover manifold duct and at the pneumatic sense line.

3) Hand tighten the nuts at both ends of the hose.

4) Do these steps to ensure that the hose is properly aligned:

NOTE: Do not rotate the elbow more than 3 degrees.

a) Make sure that the elbow is free and align with the mating connection with no twist or friction.

b) Make sure that the pneumatic sense hose [511] has a minimum of 0.5 in. (12.7 mm) clearance to the fuel hose.

NOTE: Loosen both ends of the hose when adjusting the hose to meet the required clearance or damage due to twisting may occur.

5) Tighten both ends of the pneumatic sense hose [511] at the LP/HP mix crossover manifold duct and at the pneumatic sense line (TASK 70-51-00-910-801-H01).

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SUBTASK 71-00-02-430-001-H00

CAUTION

BEFORE THE FINAL ASSEMBLY AND ADJUSTMENT OF THE INTERFACE DUCT, MAKE SURE THERE IS NO PRELOAD ON THE DUCT. A PRELOAD CONDITION CAN CAUSE FAILURE OF THE DUCTS AND THE SUBSEQUENT RELEASE OF HOT GASES INTO THE CORE AREA.

(7) Connect the lower anti-ice duct assembly [320] to the upper anti-ice duct assembly (TASK 30-21-06-400-804-001):

(a) Remove the protective caps from the anti-ice duct assemblies.

(b) Align the lower anti-ice duct assembly [320] to the upper anti-ice duct assembly at the upper fire wall and the anti-ice valve on the engine.

1) If it is necessary, loosen the clamps or the couplings on other ducts for the alignment.

NOTE: Do not forget to tighten the clamps and couplings if loosen (TASK 30-21-06-400-804-001).

(c) Make sure that the seals [322] are not damaged (TASK 70-00-04-000-802-H01).

(d) Install the couplings [321] and the seals [322] at each end of the duct assembly (TASK 70-00-04-400-802-H01).

(e) Install the link assembly [323] as follows:

1) Install the bolt [324], the washer [325], the bushing [326], the washer [327], and the nut [328] to connect each link assembly [323] to the duct assembly.

2) Tighten the jamnuts and secure with lockwire, G02421.

(f) Examine the sealing surfaces of the seals and the flanges on the duct assembly to make sure there are no scratches, cuts, pits or unwanted material.

(g) Turn the coupling to maximize clearance.

(h) Tighten the coupling [321] to 70-80 pound-inches (7.9-9.0 Newton-meters).

(i) Use a non-metallic mallet, STD-583 and tap on the coupling lightly.

(j) Tighten the coupling [321] again to 70-80 pound-inches (7.9-9.0 Newton-meters).

SUBTASK 71-00-02-210-002-H01

(8) Make sure the starter duct support bracket and linkage are correctly installed.

SUBTASK 71-00-02-430-015-H00

(9) IF THE ENGINE FAN AND CORE WERE SEPARATED; Do the steps that follow:

(a) Put the starter air valve manual control shaft into position.

(b) Connect the starter air valve manual control shaft from the starter air valve (TASK 80-11-07-400-801-H01).

SUBTASK 71-00-02-420-011-H01

(10) Install the upper starter duct [45] that attaches to the left side of the strut (Figure 403).

(a) Remove the protective caps from the upper starter duct [45] and from the strut.

(b) Make sure that the seals [44] are not damaged (TASK 70-00-04-000-802-H01).

(c) Install the seals [44] on the duct grooves (TASK 70-00-04-400-802-H01).

(d) Align the upper starter duct [45] with the strut and with the lower starter duct.

(e) Install the couplings [43] on the ends of the upper starter duct [45].

(f) Tighten the couplings [43] to 115-125 pound-inches (13.0-14.1 Newton-meters).

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(g) Use a non-metallic mallet, STD-583 slightly hit outer periphery of the couplings [43].

(h) Tighten the couplings [43] again to 115-125 pound-inches (13.0-14.1 Newton-meters).

SUBTASK 71-00-02-420-012-H01

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION

USE A BACK-UP WRENCH TO MAKE SURE THAT THE HOSE DOES NOT TURN WHEN YOU TIGHTEN THE B-NUT. IF THE HOSE TURNS, DAMAGE TO THE HOSE CAN OCCUR.

CAUTION

DO NOT LET HYDRAULIC FLUID LEAKAGE COLLECT ON THE ENGINE CASE. CLEAN THE AREA IF HYDRAULIC FLUID COLLECTS ON THE ENGINE CASE. IF YOU LEAVE HYDRAULIC FLUID ON THE ENGINE CASE, ENGINE CASE DAMAGE CAN OCCUR.

(11) Connect the hydraulic case drain hose [31], the hydraulic pressure hose [33], and the hydraulic supply hose [34] (3 locations) to the left strut disconnect (Figure 403).

(a) If desired, put a fluid absorbent pad, G50463 below the hydraulic case drain hose, the hydraulic pressure hose, and the hydraulic supply hose on the engine case to catch any fluid which may otherwise collect on the engine.

(b) Remove the protective caps from the hydraulic case drain hose [31], the hydraulic pressure hose [33], the hydraulic supply hose [34] and the fittings.

(c) Install the hydraulic pressure hose [33] on the pressure fitting.

1) Tighten the hydraulic pressure hose [33] fitting (TASK 70-51-00-910-801-H01).

(d) Install the hydraulic supply hose [34] on the supply fitting.

1) Hand tighten until the ratchet locks.

2) Make sure the collar engages the ratchet.

3) Tighten the hydraulic supply hose [34] fitting (TASK 70-51-00-910-801-H01).

(e) Install the hydraulic case drain hose [31] on the case drain fitting.

1) Tighten the hydraulic case drain hose [31] fitting (TASK 70-51-00-910-801-H01).

CAUTION

DO NOT PUT THE HYDRAULIC SPRAY BLANKET ON TOP OF THE ENGINE FIRE DISCHARGE PORT. IF THE BLANKET IS ON THE DISCHARGE PORT, THE FIRE EXTINGUISHING AGENT CAN NOT PUT OUT AN ENGINE FIRE. DAMAGE TO THE ENGINE CAN OCCUR.

(f) Install the hydraulic spray blanket [32] on the hydraulic case drain hose [31], the hydraulic pressure hose [33], and the hydraulic supply hose [34] and the fittings.

1) Install the bolts [35] and the washers [36] that attach the hydraulic spray blanket [32] to the brackets.

2) Safety the velcros double seam along the entire length of the hydraulic spray blanket [32].

(g) Do a check of the EDP supply hose in the area of the case drain hose lower clamp support structure for any signs of chafing.

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1) Make sure there is a minimum clearance of 3/8 inch (9.5 mm) between the EDP supply hose and the support structure for the lower clamp of the case drain hose.
2) If the clearance is less than 3/8 inch (9.5 mm), slacken the supply hose clamps and turn it to give the required 3/8 inch (9.5 mm) clearance.
   a) Tighten all clamps.
3) Make sure the lower clamp for the case drain hose is firmly secured in place.
   a) If the lower clamp is not secure, tighten all bolts on the clamp.

SUBTASK 71-00-02-420-013-H01

(12) Connect the IDG feeder cable [41] (Figure 403).

(a) Remove the bolts [54], and the terminal block cover [53] from the terminal block base.

ARO 001-014 PRE SB 777-24-0143

(b) Remove the eight nuts [55] that attach the lower IDG feeder cable [41].

ARO 015-999; ARO 001-014 POST SB 777-24-0143

(c) Remove the eight nuts [55], eight lock washers [65] and eight washers [66] that attach the lower IDG feeder cable [41].

1) Replace the nuts if they have been previously installed or tightened to the installation torque.

ARO ALL

(d) Make sure the terminal studs, terminal ends, and the fasteners are clean.

CAUTION BE CAREFUL WITH THE POWER FEEDER CABLES. DO NOT BEND OR PUT THE CABLES INTO COILS TOO TIGHTLY. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE CABLES.

(e) Install the upper IDG feeder cable [41] on the top of the lower IDG feeder cable [41] on the terminal block base.

ARO 001-014 PRE SB 777-24-0143

1) Install the eight nuts [55] on the studs.

ARO 015-999; ARO 001-014 POST SB 777-24-0143

2) Install the eight washers [66], eight lock washers [65] and eight nuts [55] on the studs.

ARO ALL

3) Tighten the nuts [55] to 200-240 pound-inches (22.6-27.1 Newton-meters).

(f) Install the terminal block cover [53] with the bolts [54] (2 locations).

1) Tighten the bolts [54] to 25-31 pound-inches (2.8-3.5 Newton-meters).

SUBTASK 71-00-02-420-014-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(13) Connect the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52] (7 locations) to the left strut disconnect with the teflon-jawed pliers, STD-664 (TASK 70-00-01-400-807-H01) (Figure 403).

(a) Remove the protective caps from the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52], and from the receptacles.

(b) Connect the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52] (7 locations) to the left strut disconnect.

1) Remove the tags from the wire harnesses.

(c) Tighten the electrical connector [46], the electrical connector [47], the electrical connector [48], the electrical connector [49], the electrical connector [50], the electrical connector [51], and the electrical connector [52].

SUBTASK 71-00-02-420-015-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION USE A BACK-UP WRENCH TO MAKE SURE THAT THE HOSE DOES NOT TURN WHEN YOU TIGHTEN THE B-NUT. IF THE HOSE TURNS, DAMAGE TO THE HOSE CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(14) Connect the forward side hydraulic flexhoses [56] for the thrust reverser of the PDOS system.

(a) Remove the protective caps from the hydraulic flexhoses and from the hydraulic quick disconnect ports.

(b) Connect the forward side hydraulic flexhoses [56] (2 locations) to the hydraulic quick disconnect ports.

SUBTASK 71-00-02-420-016-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION

USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(15) Connect the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60] (4 locations) to the forward side disconnect with the teflon-jawed pliers, STD-664 (TASK 70-00-01-400-807-H01) (Figure 403).

(a) Remove the protective caps from the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60] and from the receptacles.

(b) Connect the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60] (4 locations) to the forward side disconnect.

1) Remove the tags from the wire harnesses.

(c) Tighten the electrical connector [57], the electrical connector [58], the electrical connector [59], and the electrical connector [60].

SUBTASK 71-00-02-420-017-H01

(16) Connect the left and right thrust reverser V-groove latch bands [61] to the fan case bracket (Figure 403).

(a) Apply the grease, D00633 to the shank of the bolts [64].

NOTE: Keep the grease, D00633 off the threads of the bolts.

(b) Install the bolts [64], the washers [63], and the nuts [62] that attach the thrust reverser V-groove latch bands [61] to the brackets.

SUBTASK 71-00-02-420-019-H01

(17) Install the aft deflection limiter rod [110] on the aft tension straps (Figure 407).

(a) If you replaced the engine or the engine core, install the aft deflection limiter rod [110] from the removed engine (TASK 78-31-01-830-801-H01).

1) Install the bolts [302] and the washers [303] that attach the stop [301] to the turbine rear frame.

a) If it is necessary, install the two bracket [116] and the bracket [120] to the rear mount flange of the turbine rear frame.

NOTE: Make sure you have the correct bolt hole positions 2, 3 and 56 and 57.

b) Apply Acheson GP460 compound, D50043 [C02-058] to the threads of the bolts [117].

c) Install the bolts [117] (bolt heads forward) to the brackets with the spacers [118], and the nuts [119].

d) Tighten the nuts [119] to 100-120 pound-inches (11.3-13.6 Newton-meters).

(b) If the aft deflection limiter rod [110] length has been disturbed, you must do a dimension adjustment on the aft deflection limiter rod (TASK 78-31-01-830-801-H01).

(c) Connect the left and right aft tension straps to the aft deflection limiter rod [110].

1) Apply the grease, D00633, to the shank of the bolt [111].

NOTE: Do not put the grease, D00633, on the bolt threads.

2) Install the bolts [111], the bushings [112] and the bushings [113], and the nuts [114].

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3) Tighten the nuts [114] to 480-790 pound-inches (54.2-89.3 Newton-meters).

SUBTASK 71-00-02-860-023-H01

(18) Remove the Scotch Flatback Masking Tape 250, G00270 from the bleed air deflector panels.

SUBTASK 71-00-02-020-029-H00

(19) CRADLE THAT USES THE FAN FRAME MOUNT SUPPORT ADAPTERS (or the shipping stand, SPL-4921 (9C6025P02 or 9C6025P03)); If it is necessary, remove the forward support brackets [440] from the forward inner cowl support at the fan hub frame (Figure 408).

(a) Remove the eight fan hub frame mount bolts [451] that attach the forward support brackets [440] to the forward inner cowl support.

NOTE: When you remove the forward support brackets [440], make sure that you install the eight fan hub frame mount bolts [451] back on the forward support brackets [440] and store with the engine stand.

(b) Remove the flow shield brackets [450] and the forward support brackets [440] from the engine (TASK 71-00-04-800-802-H00).

NOTE: The instructions on how to remove these flow shield brackets and the forward support brackets can also be found in GE Engine Manual 72-00-00 Assembly 001/002.

1) Install the eight fan hub frame mount bolts (engine hardware) on the forward inner cowl support at the fan hub frame.

a) Lubricate the bolt threads with Acheson GP460 compound, D50043 [C02-058].

b) Install the eight bolts on the fan hub frame to attach the forward inner cowl support.

c) Tighten the bolts to 368-432 pound-inches (41.6-48.8 Newton-meters).

(c) Reinstall the flow shield brackets [450] (TASK 71-00-04-800-802-H00).

(d) Install the blank off panels [260] (left) (locations 2, 3 and 4), the blank off panels [261] (right) (locations 5, 6 and 7), the air bleed deflector panels [421] (left) (locations 3 and 4), and the air bleed deflector panels [422] (right) (locations 7 and 8) on the forward inner cowl support at the fan hub frame (TASK 71-00-04-800-802-H00).

SUBTASK 71-00-02-430-013-H00

(20) Connect the brackets to the left side of the fan frame hub (Figure 410):

(a) Install the bracket [360] with the bolt [361].

(b) Install the bracket [364] with the bolts [365].

(c) Tighten the bolt [361] and the bolts [365] (TASK 70-51-00-910-801-H01).

SUBTASK 71-00-02-630-001-H01

(21) If the power plant was preserved, do this task: Depreservation of An Installed Engine, TASK 71-00-03-600-806-H01.

NOTE: Do not motor or operate the engine.

SUBTASK 71-00-02-860-024-H01

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

SUBTASK 71-00-02-790-001-H01

(23) Do a check of the fuel system for leaks.

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CAUTION DO NOT TURN THE FIRE HANDLE AFTER YOU PULLED IT UP. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(a) Put the applicable engine fire switch handle (DISCH LEFT or RIGHT) to its usual position.

1) Remove the DO-NOT-OPERATE tag from the engine fire switch handle (DISCH LEFT or RIGHT).

(b) For the applicable engine, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE
A	19	C28002	R ENGINE FUEL SPAR VALVE
B	4	C76601	L ENG FUEL VALVE
B	19	C76600	R ENG FUEL VALVE

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

Standby Power Management Panel, P310

Row	Col	Number	Name
G	5	C76605	L ENG IGN CTRL
G	6	C76604	R ENG IGN CTRL

(d) Look at the FUEL QUANTITY indicator for the fuel quantity.

(e) Remove the DO-NOT-OPERATE tag from the applicable FUEL CONTROL switch on the control stand panel, P10.

(f) Move the applicable L(R) FUEL CONTROL switch to the RUN position.

(g) Put the applicable BOOST PUMP switch to the ON position.

(h) Examine the fuel system on the engine for leaks.

NOTE: Look carefully at the connection for the main fuel supply line at the strut.

(i) Put the applicable BOOST PUMP switch to the OFF position.

(j) Move the applicable L(R) FUEL CONTROL switch to the CUTOFF position.

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1

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(Continued)

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

Standby Power Management Panel, P310

Row	Col	Number	Name
G	5	C76605	L ENG IGN CTRL
G	6	C76604	R ENG IGN CTRL

SUBTASK 71-00-02-610-001-H01

(24) Make sure the engine oil system is serviced correctly.

(a) Do this task: Engine Oil Replenishing, TASK 12-13-01-130-803-002.

SUBTASK 71-00-02-610-003-H01

(25) Make sure the oil system for the integrated drive generator (IDG) is serviced correctly.

(a) Do this task: IDG Oil Fill, TASK 12-13-03-600-802.

SUBTASK 71-00-02-610-004-H01

(26) Make sure the oil system for the variable speed constant frequency (VSCF) generator is serviced correctly.

(a) Do this task: Backup Generator Oil Fill, TASK 12-13-07-600-801.

SUBTASK 71-00-02-940-005-H01

WARNING REMOVE ALL TOOLS AND OTHER OBJECTS FROM THE INLET COWL, STRUT, OR ENGINE. LOOSE OBJECTS WILL COME THROUGH THE ENGINE AT HIGH SPEED WHEN IT OPERATES. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(27) Make sure there are no tools, equipment, or other unwanted material on the engine, the inlet cowl, or in the strut area.

SUBTASK 71-00-02-080-012-H01

WARNING ENGAGE THE HOLD-OPEN RODS FOR THE THRUST REVERSERS BEFORE YOU REMOVE THE HOLD-OPEN EQUIPMENT. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONNEL AND DAMAGE TO THE THRUST REVERSERS CAN OCCUR.

(28) Do these steps to remove the hold-open equipment [12] (GE90 engine fan reverser hold open equipment, SPL-2085) from the thrust reverser PDOS actuators (Figure 402):

(a) Install the thrust reverser hold-open rods on the engine bracket assemblies.

(b) Slowly open the thrust reversers so that the extended length of the actuator rods are longer than the length of the hold-open equipment [12].

(c) Loosen the clamp screws [14] on the hold-open equipment [12].

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(d) Remove the upper clamp block [11] from the hold-open equipment [12].

(e) Loosen the screws [15] on the hold-open equipment [12].

(f) Disengage the retainers [13] from the bolts of the thrust reverser brackets.

(g) Remove the hold-open equipment [12] with the retainers [13] from the thrust reverser PDOS actuator rods.

(h) Install the lockwire on the gland nuts of the thrust reverser PDOS actuator rods (TASK 70-41-00-910-803-H00).

SUBTASK 71-00-02-420-020-H01

(29) Install the fan cowl panels [2] (TASK 71-11-04-400-805-H01).

NOTE: Put the fan cowl panels on the open position.

(a) Install these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-00-02-710-001-H01

CAUTION

IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(30) Cycle the thrust reversers a minimum of three times to remove the air from the thrust reverser PDOS system (TASK 78-31-00-410-816-H00).

(a) Make sure there is no hydraulic leaks on the PDOS system.

SUBTASK 71-00-02-410-008-H01

(31) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

(a) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-02-820-003-H01

(32) Do this task: Thrust Reverser Inspection, TASK 78-31-01-200-802-H01.

SUBTASK 71-00-02-440-001-H01

CAUTION

MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

(33) Close and open the fan cowl panels [2] a minimum of three times to remove the air from the fan cowl PDOS system (TASK 71-11-04-410-814-H00).

SUBTASK 71-00-02-420-021-H01

(34) Close the fan cowl panels [2] (TASK 71-11-04-410-814-H00).

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(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-00-02-610-005-H01

CAUTION MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(35) Do the oil servicing for the PDOS system if it is necessary.

(a) Do this task: Fill the PDOS Pump with Oil, TASK 12-12-02-610-803-004.

SUBTASK 71-00-02-420-022-H01

(36) Install the aft mount access panels and close the pressure relief door (TASK 54-53-01-400-802-001).

NOTE: Some panels have thermal installation blankets installed. Make sure they are not damaged when you install them.

(a) Install these access panels:

Number	Name/Location
433CL	Left Pressure Relief Door, Left Strut
433CR	Right Aft Mount Access Panel, Left Strut
433DL	Left Aft Mount Access Panel, Left Strut
433DR	Right Pressure Relief Door, Left Strut
443CL	Left Pressure Relief Door, Right Strut
443CR	Right Aft Mount Access Panel, Right Strut
443DL	Left Aft Mount Access Panel, Right Strut
443DR	Right Pressure Relief Door, Right Strut

SUBTASK 71-00-02-410-004-H01

(37) Install the aft cowl forward fairings (TASK 54-53-02-400-801-001).

(a) Install these access panels:

Number	Name/Location
433EL	Left Aft Cowl Forward Fairing, Left Strut
433ER	Right Aft Cowl Forward Fairing, Left Strut
443EL	Left Aft Cowl Forward Fairing, Right Strut
443ER	Right Aft Cowl Forward Fairing, Right Strut

SUBTASK 71-00-02-420-023-H01

(38) Install the No. 1 forward fairing (TASK 54-52-01-400-802-001).

(a) Install these access panels:

Number	Name/Location
431AT	Thumbnail Fairing, Left Strut
431BT	PDOS Pump Access Door
441AT	Thumbnail Fairing, Right Strut
441BT	PDOS Pump Access Door

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SUBTASK 71-00-02-420-024-H01

(39) Install the left and right forward side fairings (TASK 54-52-01-400-801-001).

(a) Install these access panels:

Number	Name/Location
432AL	Left Forward Side Fairing, Left Strut
432AR	Right Forward Side Fairing, Left Strut
442AL	Left Forward Side Fairing, Right Strut
442AR	Right Forward Side Fairing, Right Strut

SUBTASK 71-00-02-410-005-H01

(40) Install the left and right forward fairings on the thrust reverser hinges for the applicable engine.

(a) Install these access panels:

Number	Name/Location
415EL	Forward Thrust Reverser Hinge Cover, Left Engine
416ER	Forward Thrust Reverser Hinge Cover, Left Engine
425EL	Forward Thrust Reverser Hinge Cover, Right Engine
426ER	Forward Thrust Reverser Hinge Cover, Right Engine

L. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-02-863-001-H01

CAUTION MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIR CONDITIONING SYSTEM CAN OCCUR.

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

SUBTASK 71-00-02-869-001-H00

(2) Do these steps to open the supply shutoff valve for the engine driven pump (EPD) (Figure 401):

CAUTION DO NOT TURN THE FIRE HANDLE AFTER YOU PULLED IT UP. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(a) Put the applicable engine fire switch handle (DISCH LEFT or RIGHT) to its usual position.

1) Remove the DO-NOT-OPERATE tag from the engine fire switch handle (DISCH LEFT or RIGHT).

(b) Open the aft strut fairing access doors on the applicable engine

(TASK 54-52-05-000-801)

Number	Name/Location
434CL	Left Forward Access Door, Left Strut Aft Fairing
444CL	Left Forward Access Door, Right Strut Aft Fairing

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	5	C29603	LEFT EDP SUPPLY SHUTOFF VALVE

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

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	20	C29602	RIGHT EDP SUPPLY SHUTOFF VALVE

(e) For the left engine, remove the safety tags and close these circuit breakers:

Standby Power Management Panel, P310

Row	Col	Number	Name
L	2	C26633	FIRE EXT L ENG BTL 1
L	4	C26635	FIRE EXT L ENG BTL 2

(f) For the right engine, remove the safety tags and close these circuit breakers:

Standby Power Management Panel, P310

Row	Col	Number	Name
L	1	C26632	FIRE EXT R ENG BTL 1
L	3	C26634	FIRE EXT R ENG BTL 2

(g) Make sure the position indicator on the supply shutoff valve moves to the OPEN position.

(h) Close these aft strut fairing access doors:

(TASK 54-52-05-000-801)

Number	Name/Location
434CL	Left Forward Access Door, Left Strut Aft Fairing
444CL	Left Forward Access Door, Right Strut Aft Fairing

SUBTASK 71-00-02-840-002-H01

(3) Do the shock strut deflation, if it is necessary (TASK 12-15-01-610-810).

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

Left Power Management Panel, P110

Row	Col	Number	Name
L	17	C32636	SEMI-LEVER GEAR CONTROL, LEFT

Right Power Management Panel, P210

Row	Col	Number	Name
L	22	C32637	SEMI-LEVER GEAR CONTROL, RIGHT

SUBTASK 71-00-02-080-013-H01

(4) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

SUBTASK 71-00-02-080-014-H01

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

(a) For the left engine, pressurize the left hydraulic system.

(b) For the right engine, pressurize the right hydraulic system.

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SUBTASK 71-00-02-440-002-H01

(6) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

SUBTASK 71-00-02-440-004-H01

(7) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-00-02-860-026-H01

(8) Remove the DO-NOT-OPERATE tag from the thrust levers.

SUBTASK 71-00-02-860-027-H01

(9) Remove the DO-NOT-OPERATE tag from the flap control lever.

SUBTASK 71-00-02-080-015-H01

(10) Remove the tail jack, if it is installed (TASK 07-11-05-580-801).

SUBTASK 71-00-02-860-028-H01

(11) Do a check of the EEC (FADEC) software part number, (TASK 73-21-15-400-802-H01).

SUBTASK 71-00-02-420-057-H00

(12) Make sure the engine rating plug has been installed and the engine thrust rating setting is applicable for the airplane (TASK 73-21-19-400-801-H01).

SUBTASK 71-00-02-210-004-H00

(13) Do a check if the TCF accelerometer is or is not installed on the replacement engine.

(a) If it is necessary, load the proper trim balance data for the replacement engine (TASK 45-10-00-820-801).

SUBTASK 71-00-02-470-001-H01

(14) If the replacement engine is different from the removed engine, do the AVM SCU software installation and make sure the new software part number is entered in the MAT correctly (TASK 77-31-03-400-801-H01).

NOTE: Boeing software P/N 777F-AEK-GE2-00 (S332W401-5200) is used on the No. 1 bearing accelerometer. Boeing software P/N 777E-AEK-GE3-00 (S332W401-5300) is used on the TCF accelerometer.

NOTE: Boeing software P/N 7713-VIB-G80-01 (S332W402-6200) is used on both No. 1 bearing accelerometer and TCF accelerometer.

(a) FOR ENGINES WITH THE TURBINE CENTER FRAME (TCF) ACCELEROMETER CONFIGURATION;

If it is necessary, you must activate the TCF accelerometer by loading the Boeing software P/N 777E-AEK-GE3-00 (S332W401-5300) or P/N 7713-VIB-G80-01 (S332W402-6200) (TASK 77-31-06-400-802-H01).

(b) If the fan balance weight on the replacement engine is different from the removed engine, make sure you edit the new balance weights to the ENGINE BALANCING PERFORM BALANCE EXISTING BALANCE WEIGHTS page on the MAT.

M. Power Plant Test

SUBTASK 71-00-02-710-002-H01

(1) Do the tests listed in the Power Plant Test Reference Table (TASK 71-00-00-800-833-H00).

——— END OF TASK ———

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POWER PLANT (ENGINE PRESERVATION AND DEPRESERVATION) - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Preservation of an engine (task selection)

(2) Preservation of an installed engine for 10 days (Engine On-Wing)

(3) Preservation of an installed engine for 30 days (Engine On-Wing)

(4) Preservation of an installed engine for not more than three months (Engine On-Wing)

(5) Preservation of an installed engine for not more than two years (Engine On-Wing)

(6) Re-preservation and Maintenance Requirement for Engine That Has Expired Preservation (Engine On-Wing)

(7) Depreservation of an installed engine

(8) Dry-out of an installed engine after an in-flight shutdown (Engine On-Wing).

(9) Guidelines for removal / installation of Line Replaceable Unit (LRU) from Preserved Engine.

TASK 71-00-03-600-801-H01

2. Preservation of An Engine (Task Selection)

A. General

(1) The purpose of this task is to permit you to select the applicable method to do the engine preservation.

(2) These tasks apply to an installed engine.

(a) The preservation tasks prevent these conditions:

1) Corrosion

2) Entry of unwanted material into the engine

3) The effects of the climate and weather conditions.

(3) The preservation procedures will protect an installed engine from climate and weather when not in operation. The preservation tasks are satisfactory for the weather conditions in dry climates.

(a) If you preserve an installed engine in a climate other than a dry climate, you could need more protection from these conditions:

1) High relative humidity

2) Large temperature changes

3) Salt water.

(b) Make an analysis of the preservation tasks to increase or decrease the necessary preservation period for your climate and weather conditions.

(4) Make sure that you operate the installed engine before the preservation period ends to continue the preservation schedule. When you continue the preservation, it must match the preservation task for the period you will not operate the engine.

(5) If the engine does not operate, or is not installed, refer to the GE Engine Manual GEK 100700, 72-00-00 STORAGE 002, ENGINE ASSEMBLY PRESERVATION procedure.

(6) For engine storage after preservation, refer to Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

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B. References

Reference	Title
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Procedure

SUBTASK 71-00-03-620-001-H01

(1) From the time specifications for the preservation tasks, select the applicable task to do the engine preservation:

(a) Do this task: Re-preservation and Maintenance Requirement for Engine That Has Expired Preservation (Engine On-Wing), TASK 71-00-03-600-805-H01.

(b) Do this task: Preservation of An Installed Engine for 10 Days (Engine On-Wing), TASK 71-00-03-600-802-H01.

(c) Do this task: Preservation of An Installed Engine for 30 Days (Engine On-Wing), TASK 71-00-03-600-808-H01.

(d) Do this task: Preservation of An Installed Engine for not more than Three Months (Engine On-Wing), TASK 71-00-03-600-803-H01.

(e) Do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

——— END OF TASK ———

TASK 71-00-03-600-802-H01

3. Preservation of An Installed Engine for 10 Days (Engine On-Wing)

A. General

(1) This procedure has the steps that are necessary for preservation of an installed engine for 10 days.

(2) For engine storage after preservation, refer to Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

B. References

Reference	Title
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
78-31-00-710-821-H00	Thrust Reverser - Operational Test (Engine Not In Operation) (P/B 501)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

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D. Preservation Procedure

NOTE: Idle run or dry motor and thrust reverser operational test is not necessary if the engine and thrust reversers have been operated during the 24 hours before the start of the preservation.

SUBTASK 71-00-03-860-001-H01

(1) With Engine Idle Run - this procedure will use engine idle run for the preservation procedure.

(a) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(b) Make sure the engine is stable at ground idle for 15 minutes.

(c) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-03-860-058-H00

(2) (Alternative procedure) With Engine Dry Motor - this procedure can be used where engine idle run is not possible for the preservation procedure.

(a) If the engine cannot be started, then dry motor the engine for three cycles of five minutes each, (Dry Motor, TASK 71-00-00-800-836-H00).

(b) During motoring, follow the starter duty cycle for a maximum of 5 minutes.

(c) Let the starter cool for a minimum of 10 minutes before subsequent operation.

NOTE: The preferred procedure is a ground idle for 15 minutes. This is to let the engine oil warm up and remove any water or moisture from the engine oil. As a secondary method, you can dry motor the engine, which is limited by the starter duty cycle, to circulate the oil. This method is not as effective to remove water or moisture from the engine oil. The dry motor procedure is to be used only if the engine cannot be started.

SUBTASK 71-00-03-710-001-H01

(3) Do this task: Thrust Reverser - Operational Test (Engine Not In Operation), TASK 78-31-00-710-821-H00.

SUBTASK 71-00-03-860-004-H01

(4) Attach a preservation tag to the forward thrust lever with this data:

(a) Type of preservation

(b) Date of the preservation.

SUBTASK 71-00-03-480-001-H01

(5) Put the core exhaust plug on the primary nozzle.

SUBTASK 71-00-03-480-002-H01

(6) Put the discharge plug on the thrust reverser discharge ports.

SUBTASK 71-00-03-480-003-H01

(7) Put the inlet cover on the inlet cowl.

E. Preservation Renewal Procedure

SUBTASK 71-00-03-620-009-H00

(1) If you do a 10-day preservation with engine idle run, this procedure can be renewed as many times as necessary.

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SUBTASK 71-00-03-620-010-H00

(2) If you do a 10-day preservation with engine dry motor, this procedure can be renewed eight more times for a total of 90 days. If it is necessary to preserve the engine for more than 90 days, then do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

NOTE: During engine idle run, both oil and fuel circulate through its system. During engine dry motor, the fuel does not circulate through the complete fuel system. For long term preservation, the operator must do a two-year preservation procedure.

——— END OF TASK ———

TASK 71-00-03-600-808-H01

4. Preservation of An Installed Engine for 30 Days (Engine On-Wing)

A. General

(1) This procedure has the steps that are necessary for preservation of an installed engine for 10 days.

(2) This procedure can be done as many times as necessary.

(3) This procedure includes optional steps to extend this preservation from 10 days to 30 days.

(4) For engine storage after preservation, refer to Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

B. References

Reference	Title
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00920	Tape - Waterproof, Packaging	ASTM D5486

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Preservation Procedure

NOTE: Idle run or dry motor and thrust reverser operational test is not necessary if the engine and thrust reversers have been operated during the 24 hours before the start of the preservation.

SUBTASK 71-00-03-620-015-H00

(1) Do this task: Preservation of An Installed Engine for 10 Days (Engine On-Wing), TASK 71-00-03-600-802-H01.

SUBTASK 71-00-03-620-018-H00

(2) Tightly seal the engine with barrier material, G00253 and tape, G00920:

(a) The aft centerbody vent tube

(b) The inlet cowl ports

(c) The bleed air deflector panels

(d) The access doors on the fan cowl panels and the thrust reversers

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(e) The overboard drain ports

(f) All the openings on the inlet cowl, the fan cowl panels, and each thrust reverser half.

F. Preservation Renewal Procedure

SUBTASK 71-00-03-620-016-H00

(1) If you do a 30-day preservation with engine idle run, this procedure can be renewed five more times for a total of 180 days. If it is necessary to preserve the engine for more than 180 days, then do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

SUBTASK 71-00-03-620-017-H00

(2) If you do a 30-day preservation with engine dry motor, this procedure can be renewed two more times for a total of 90 days. If it is necessary to preserve the engine for more than 90 days, then do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

NOTE: During engine idle run, both oil and fuel circulate through its system. During engine dry motor, the fuel does not circulate through the complete fuel system. For long term preservation, the operator must do a two-year preservation procedure.

——— END OF TASK ———

TASK 71-00-03-600-803-H01

5. Preservation of An Installed Engine for not more than Three Months (Engine On-Wing)

(Figure 201 and Figure 202)

A. General

(1) This task provides the instructions on how to preserve an installed engine for not more than three months.

(2) The preservation task prevents these conditions:

(a) Corrosion

(b) Entry of unwanted material into the engine.

(3) The preservation procedure protects an installed engine from climate and weather when you do not operate the engine for an extended period.

(a) The preservation task is primarily for weather conditions in dry climates.

(b) If you preserve an installed engine in a climate other than a dry climate, you may need more protection from these conditions:

1) High relative humidity

2) Large temperature changes

3) Salt water.

(c) Make an analysis of the preservation task to increase or decrease the necessary preservation period for your climate and weather conditions.

(4) Make sure that you operate the installed engine before the preservation period ends to continue the preservation schedule. When you continue the preservation, it must match the preservation task for the period you will not operate the engine.

(5) For engine storage after preservation, refer Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

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B. References

Reference	Title
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
78-31-00-710-821-H00	Thrust Reverser - Operational Test (Engine Not In Operation) (P/B 501)

C. Tools/Equipment

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

Reference	Description
SPL-10698	Cover, Inlet, GE9X Part #: FC-GE90-11B-EIC Supplier: 7S813
SPL-10699	Plug - Thrust Reverser, GE90-115B Part #: RA70301 Supplier: 2R201
SPL-10700	Plug - Exhaust Nozzle, GE90-115B Part #: RA70302 Supplier: 2R201
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
C50034 [C02-051]	Compound - Corrosion inhibitor - Brayco 599	D50TF6, Class A
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00920	Tape - Waterproof, Packaging	ASTM D5486

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Preservation Procedure

SUBTASK 71-00-03-610-001-H01

(1) Add 1.5 quarts (1.4 liters) of Brayco 599 corrosion inhibitor, C50034 [C02-051] in the oil tank (TASK 12-13-01-130-803-002).

(a) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the overflow oil from the oil tank.

SUBTASK 71-00-03-860-005-H01

(2) With Engine Idle Run - this procedure will use engine idle run for the preservation procedure.

(a) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(b) Make sure the engine is stable at ground idle for 15 minutes.

(c) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

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SUBTASK 71-00-03-860-059-H00

(3) (Alternative procedure) With Engine Dry Motor - this procedure can be used where engine idle run is not possible for the preservation procedure.

(a) If the engine cannot be started, then dry motor the engine for three cycles of five minutes each, (Dry Motor, TASK 71-00-00-800-836-H00).

(b) During motoring, follow the starter duty cycle for a maximum of 5 minutes.

(c) Let the starter cool for a minimum of 10 minutes before subsequent operation.

NOTE: The preferred procedure is a ground idle for 15 minutes. This is to let the engine oil warm up and remove any water or moisture from the engine oil. As a secondary method, you can dry motor the engine, which is limited by the starter duty cycle, to circulate the oil. This method is not as effective to remove water or moisture from the engine oil. The dry motor procedure is to be used only if the engine cannot be started.

SUBTASK 71-00-03-710-004-H00

(4) Do this task: Thrust Reverser - Operational Test (Engine Not In Operation), TASK 78-31-00-710-821-H00.

SUBTASK 71-00-03-860-008-H01

(5) Attach a preservation tag to the forward thrust lever with this data:

(a) Type of preservation

(b) Date of the preservation.

SUBTASK 71-00-03-620-002-H01

(6) Tightly seal the engine with barrier material, G00253 and tape, G00920:

(a) The aft centerbody vent tube

(b) The inlet cowl ports

(c) The bleed air deflector panels

(d) The access doors on the fan cowl panels and the thrust reversers

(e) The overboard drain ports

(f) All the openings on the inlet cowl, the fan cowl panels, and each thrust reverser half.

SUBTASK 71-00-03-480-004-H01

(7) Put the exhaust nozzle plug, SPL-10700 on the primary nozzle.

SUBTASK 71-00-03-480-005-H01

(8) Put thrust reverser plug, SPL-10699 on the thrust reverser discharge ports.

SUBTASK 71-00-03-480-006-H01

(9) Put inlet cover, SPL-10698 on the inlet cowl.

G. Preservation Renewal Procedure

SUBTASK 71-00-03-620-012-H00

(1) If you do a three-month preservation with engine idle run, this procedure can be renewed one more time for a total of 180 days. If it is necessary to preserve the engine for more than 180 days, then do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

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SUBTASK 71-00-03-620-013-H00

(2) If you do a three-month preservation with engine dry motor, this procedure cannot be renewed. If it is necessary to preserve the engine for more than three months, then do this task: Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing), TASK 71-00-03-600-804-H01.

NOTE: During engine idle run, both oil and fuel circulate through its system. During engine dry motor, the fuel does not circulate through the complete fuel system. For long term preservation, the operator must do a two-year preservation procedure.

——— END OF TASK ———

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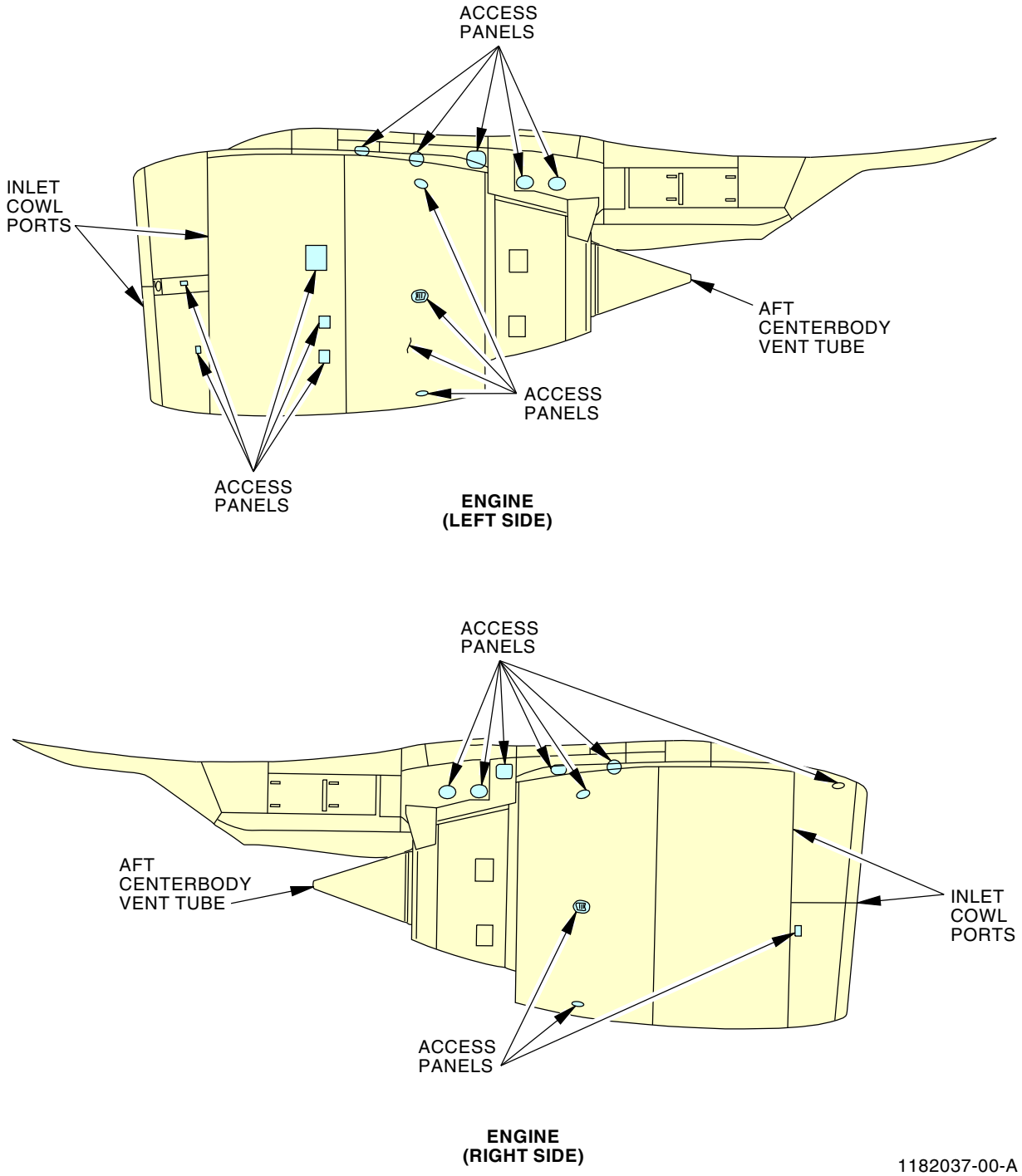

Location of Access Panels, Aft Centerbody Vent Tube, and Inlet Cowl Ports
Figure 201/71-00-03-990-801-H01

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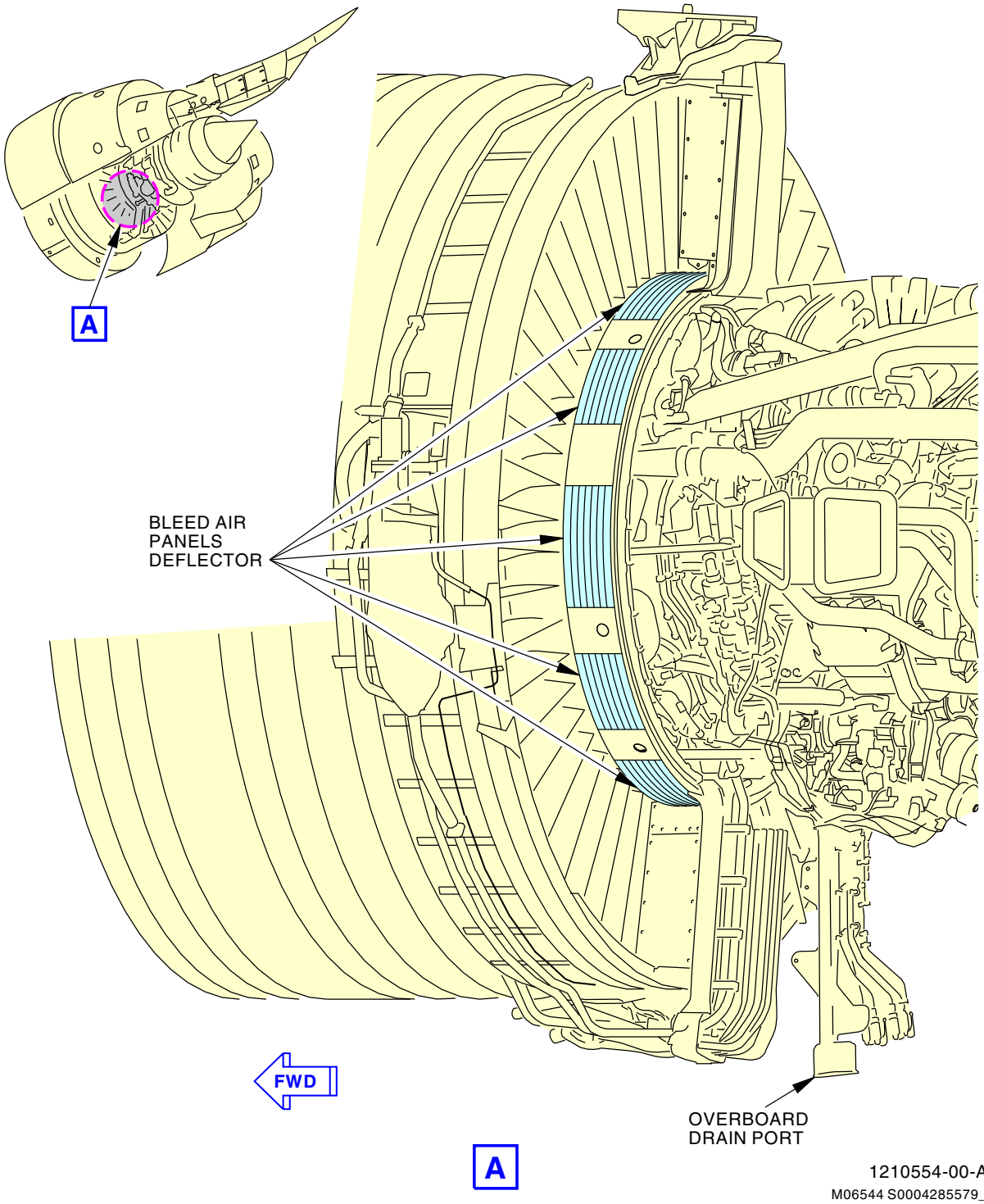

Location of Bleed Air Deflector Panels and Overboard Drain Port
Figure 202/71-00-03-990-806-H01

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TASK 71-00-03-600-804-H01

6. Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing)

(Figure 203 and Figure 204)

A. General

(1) This task provides the instructions on how to preserve an engine that is installed on the wing for more than two years.

(2) The preservation of an installed engine for not more than two years may be extended as follows:

(a) If the engine has been sealed with barrier material, G00253 and tape, G00920, the two years preservation may be extended by one month for a total of 25 months maximum.

(b) You must do one engine oil system inspection daily for 5 days when you continue engine operation.

1) Do this task: Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection, TASK 79-00-00-200-804-H01.

(3) The preservation task prevents these conditions:

(a) Corrosion

(b) Entry of unwanted material into the engine.

(4) The preservation procedures protect an installed engine from climate and weather when you do not operate the engine for an extended period.

(a) The preservation tasks are primarily for weather conditions in dry climates.

(b) If you preserve an installed engine in a climate other than a dry climate, you may need more protection from these conditions:

1) High relative humidity

2) Large temperature changes

3) Salt water.

(c) Make an analysis of the preservation task to increase or decrease the necessary preservation period for your climate and weather conditions.

(5) Make sure that you operate the installed engine before the preservation period ends to continue the preservation schedule. When you continue the preservation, it must match the preservation task for the period you will not operate the engine.

(6) Locally manufactured equivalent tooling may be used.

(7) For engine storage after preservation, refer to Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

B. References

Reference	Title
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
12-22-01-610-805-002	Engine Oil Change (P/B 301)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
36-00-00-860-801	Depressurize the Pneumatic System (P/B 201)
70-00-04-400-803-H01	Gasket Seal (with Imbedded Flexible Seal Material) Installation (P/B 201)

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(Continued)

Reference	Title
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
71-00-00-800-812-H01	Wet Motor (P/B 201)
71-00-00-800-834-H00	Engine Operation Preparation (P/B 201)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-00-710-821-H00	Thrust Reverser - Operational Test (Engine Not In Operation) (P/B 501)
79-00-00-200-804-H01	Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection (P/B 601)

C. Tools/Equipment

Reference	Description
STD-162	Cart - Oil, Pressurized 50 PSI (345 kPa) max,10 Gallon (38 Liter) cap
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

D. Consumable Materials

Reference	Description	Specification
C00792	Oil - Aircraft Engine Corrosion Preventive	MIL-C-6529
C50034 [C02-051]	Compound - Corrosion inhibitor - Brayco 599	D50TF6, Class A
D00124	Oil - Jet Engine, Lubricating	MIL-PRF-6081 Grade 1010 (NATO O-133)
D00552 [C02-019]	Oil - Engine Lubricating	GE Spec. D50TF1
D00554 [C02-021]	Oil - Jet Engine Lubricating Oil	MIL-PRF-6081, Grade 1010
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00920	Tape - Waterproof, Packaging	ASTM D5486

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Preformed packing	73-11-01-03-085	ARO ALL
6	Gasket seal	73-11-07-03B-030	ARO ALL

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F. Access Panels

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

G. Preservation of An Installed Engine For Not More Than Two Years (Engine On-Wing)

SUBTASK 71-00-03-680-003-H01

(1) Do this task: Engine Oil Change, TASK 12-22-01-610-805-002.

SUBTASK 71-00-03-600-001-H01

(2) Do this task: Engine Oil Replenishing, TASK 12-13-01-130-803-002.

SUBTASK 71-00-03-610-002-H01

(3) Add 1.5 quarts (1.4 liters) of Brayco 599 corrosion inhibitor, C50034 [C02-051] in the oil tank (Engine Oil Replenishing, TASK 12-13-01-130-803-002).

(a) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the overflow oil from the oil tank.

SUBTASK 71-00-03-860-009-H01

(4) With Engine Idle Run - this procedure will use engine idle run for the preservation procedure.

(a) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(b) Make sure the engine is stable at ground idle for 15 minutes.

(c) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-03-860-010-H01

(5) (Alternative procedure) With Engine Dry Motor - this procedure can be used where engine idle run is not possible for the preservation procedure.

(a) If the engine cannot be started, then dry motor the engine for three cycles of five minutes each, (Dry Motor, TASK 71-00-00-800-836-H00).

(b) During motoring, follow the starter duty cycle for a maximum of 5 minutes.

(c) Let the starter cool for a minimum of 10 minutes before subsequent operation.

NOTE: The preferred procedure is a ground idle for 15 minutes. This is to let the engine oil warm up and remove any water or moisture from the engine oil. As a secondary method, you can dry motor the engine, which is limited by the starter duty cycle, to circulate the oil. This method is not as effective to remove water or moisture from the engine oil. The dry motor procedure is to be used only if the engine cannot be started.

SUBTASK 71-00-03-710-003-H01

(6) Do this task: Thrust Reverser - Operational Test (Engine Not In Operation), TASK 78-31-00-710-821-H00.

SUBTASK 71-00-03-860-044-H01

(7) Do these steps to make sure the fuel control valve and the spar valve stay in the closed position:

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(a) Make sure that the FUEL CONTROL switch is in the CUTOFF position.

1) Install a DO-NOT-OPERATE tag on the FUEL CONTROL switch.

(b) Push the STAT switch on the display select panel of the glareshield (P55).

1) Make sure you do not see the applicable ENG FUEL VALVE L(R) or FUEL SPAR VALVE L(R) status messages.

(c) For the applicable engines, open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	5	C28001	L ENGINE FUEL SPAR VALVE
A	19	C28002	R ENGINE FUEL SPAR VALVE
B	4	C76601	L ENG FUEL VALVE
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-03-010-004-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-03-680-001-H01

WARNING DO NOT GET FUEL IN YOUR MOUTH, 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.

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(WARNING PRECEDES)

CAUTION A LARGE VOLUME OF FUEL WILL DRAIN FROM THE FUEL SUPPLY SYSTEM. TO PREVENT A FUEL SPILL, YOU MUST USE A MINIMUM OF TWO CONTAINERS TO DRAIN THE FUEL SYSTEM.

(9) Drain the fuel filter.

(a) Put the 5 U.S.-gal (19 l) fuel resistant container, STD-201 below the fuel filter bowl.

(b) Remove the bleeder (drain) plug [4] from the fuel filter bowl and permit the fuel to drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

(c) Remove and discard the preformed packing [5] from the bleeder (drain) plug [4].

(d) Lubricate a new preformed packing [5] with oil, D00552 [C02-019].

CAUTION THERE ARE SEVERAL SIMILAR PREFORMED PACKINGS IN THIS AREA OF THE ENGINE. USE THE CORRECT PREFORMED PACKING OR FUEL LEAKAGE CAN OCCUR.

1) Make sure that you put the correct preformed packing [5] on the bleeder (drain) plug [4].

NOTE: Do not twist the preformed packing, fuel leakage can occur.

CAUTION MAKE SURE THAT THE BLEEDER DRAIN PLUG THREADS DO NOT TOUCH THE PERFORMED PACKINGS. IF IT TOUCHES, IT CAN CAUSE DAMAGE TO THE PERFORMED PACKINGS AND CAN CAUSE FUEL LEAKAGE.

(e) Put a short piece of string through the new preformed packing [5].

(f) Put the new preformed packing [5] on the bleeder (drain) plug [4].

(g) Use the string to pull the new preformed packing [5] away from the threads of the drain plug.

CAUTION TWISTING OF THE PREFORMED PACKING CAN CAUSE DAMAGE TO THE PREFORMED PACKING AND CAUSE FUEL LEAKAGE.

1) Pull the string around the new preformed packing [5] twice to remove any twisting of the preformed packing [5].

(h) Install the bleeder (drain) plug [4] in the fuel filter bowl.

1) Make sure that you feel the plug makes a click sound during the installation.

NOTE: If you do not feel the plug make a click sound, there may be damage to the bleeder drain plug.

CAUTION USE A TORQUE WRENCH WHEN INSTALLING THE BLEEDER DRAIN PLUG. THE ANTI-ROTATION FITTINGS CAN MAKE THE INSTALLATION TORQUE MORE DIFFICULT TO FEEL.

(i) Use the torque wrench when you install the bleeder (drain) plug [4].

1) Tighten the bleeder (drain) plug [4] to 105-120 pound-inches (11.9-13.6 Newton-meters).

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SUBTASK 71-00-03-680-002-H01

(10) Drain the MFP fuel supply system :

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201 below the strainer on the MFP [1].

(b) Remove the locking drain plug [2] from the MFP inlet strainer and permit the fuel to drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

(c) Remove and discard the preformed packing [3] from the locking drain plug [2].

(d) Use a cotton wiper, G00034 to clean the locking drain plug [2].

(e) Lubricate a new preformed packing [3] for the locking drain plug [2] with oil, D00552 [C02-019].

(f) Put the preformed packing [3] on the locking drain plug [2].

(g) Install the locking drain plug [2] in the MFP inlet strainer.

(h) Tighten the locking drain plug [2] to 105.0-120.0 pound-inches (11.9-13.6 Newton-meters).

SUBTASK 71-00-03-020-001-H01

(11) Remove the main fuel supply tube-hose [8] from the MFP [1].

(a) Remove the four bolts [7] that attach the fuel hose shroud [9] and main fuel supply tube-hose [8] to the MFP [1].

(b) Remove the fuel hose shroud [9] and disconnect the main fuel supply tube-hose [8] and move it away from the MFP [1].

(c) Remove the gasket seal [6] from the inlet port of the MFP [1].

1) Examine the gasket seal [6] for damage (TASK 70-00-04-400-803-H01).

2) Discard the gasket seal [6] if you find the damage.

(d) Install a protective cover in the main fuel supply tube-hose [8] and the inlet port of the MFP [1].

SUBTASK 71-00-03-020-002-H01

(12) Remove the drain plug [21] from the drain port of the hydromechanical unit (HMU).

(a) Remove the lockwire from the drain plug [21].

(b) Remove and discard the preformed packing [22] from the drain plug [21].

(c) Install a drain hose from the drain port of the HMU to the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

SUBTASK 71-00-03-860-013-H01

CAUTION

MAKE SURE THAT THE TEMPERATURE OF THE PRESERVATION OIL IS 70°F (21°C) TO 120°F (49°C). IF THE PRESERVATION OIL TEMPERATURE IS LESS THAN THIS RANGE, DAMAGE TO THE FUEL SYSTEM CAN OCCUR.

(13) Make sure the temperature of the oil, C00792 or oil, D00554 [C02-021] in the oil cart, STD-162 is between 70-120 °F (21-49 °C).

NOTE: The oil pressurizing cart pressurizes the preservation oil and lets you add pressurized oil to the engine.

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SUBTASK 71-00-03-420-001-H01

WARNING

DO NOT USE A SILICONE-BASED OIL WHEN YOU CONNECT THE OIL CART TO FLUSH THE OIL. KEEP C0NTAMINATION OUT OF THE FUEL SYSTEM WHEN YOU CONNECT THE CART. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO THE ENGINE COMPONENTS.

(14) Connect the oil cart, STD-162 to the inlet of the main fuel pump.

(a) Visually inspect the preservation oil and make sure it is clean and free from unwanted material or contamination.

(b) Install the gasket seal [6] on the fuel pump inlet.

(c) Install a supply line from the oil cart, STD-162 to the inlet of the MFP fuel supply inlet.

NOTE: Keep the fuel supply line connection clean to prevent contamination in the fuel system.

1) Install the four bolts [7] that attach the main fuel supply hose to the inlet port of the MFP [1].

2) Tighten the four bolts [7] to 180 in-lb (20.3 N·m) - 220 in-lb (24.9 N·m).

(d) Optional Procedure: You can use a supply line with a 10 micron filter from the oil cart to the inlet of the MFP fuel supply inlet.

SUBTASK 71-00-03-010-002-H01

(15) Use the oil cart, STD-162 to supply the oil, C00792 or oil, D00554 [C02-021] to the fuel pump at a flow pressure of not more than 50.0 psig (345.0 kpa) maximum.

NOTE: If the oil pressurizing cart is not available, use a vented oil resistant 10 gallon (38 liters) gravity flow container connected to the inlet pad of the MFP. You must put the gravity flow container at least 1 foot (305 mm) above the MFP fuel supply inlet. Make sure the preservation oil in the gravity flow container is clean. As optional procedure you can use a supply line with a 10 micron filter.

SUBTASK 71-00-03-620-003-H01

(16) Permit the oil, C00792 or oil, D00554 [C02-021] to flow into the main fuel supply inlet until only the preservation oil flows from the drain line at the HMU.

SUBTASK 71-00-03-860-014-H01

(17) Stop the flow of the oil, C00792 or oil, D00554 [C02-021] to the engine.

SUBTASK 71-00-03-080-001-H01

(18) Remove the drain hose from the drain port of the HMU.

SUBTASK 71-00-03-420-002-H01

(19) Install the drain plug [21] in the drain port of the HMU (Figure 204).

(a) Lubricate a new preformed packing [22] with clean oil, D00552 [C02-019].

(b) Install the new preformed packing [22] to the drain plug [21].

(c) Install the drain plug [21] in the HMU.

(d) Tighten the drain plug [21] to 38.0-42.0 pound-inches (4.3-4.8 Newton-meters).

(e) Install the lockwire from the drain plug [21] to the HMU (TASK 70-41-00-910-803-H00).

SUBTASK 71-00-03-940-001-H01

(20) Do this task: Engine Operation Preparation, TASK 71-00-00-800-834-H00.

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SUBTASK 71-00-03-860-016-H01

(21) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the TEST position.

SUBTASK 71-00-03-860-056-H00

(22) Do these steps to put the fuel control valve to the serviceable condition:

(a) Make sure that the FUEL CONTROL switch is in the CUTOFF position.

(b) For the applicable engine, remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
B	4	C76601	L ENG FUEL VALVE
B	19	C76600	R ENG FUEL VALVE

SUBTASK 71-00-03-860-017-H01

(23) Do this task: Wet Motor, TASK 71-00-00-800-812-H01.

NOTE: 10-15 seconds of time is sufficient to pump the preservation oil through the system. The L/R ENGINE FUEL SPAR VALVE circuit breakers should be open for the wet motor to ensure that the fuel supply line previously capped does not fill up with fuel.

SUBTASK 71-00-03-860-018-H01

(24) Move the forward thrust lever to minimum idle.

SUBTASK 71-00-03-860-019-H01

(25) Make sure that he FUEL CONTROL switch is in the CUTOFF position.

SUBTASK 71-00-03-860-020-H01

(26) Make sure that the engine START/IGNITION switch is in the NORM position.

SUBTASK 71-00-03-860-048-H00

(27) For the applicable engine open these circuit breakers and install safety tags:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-03-860-023-H01

(28) Remove the DO-NOT-OPERATE TAG from the FUEL CONTROL switch.

SUBTASK 71-00-03-860-024-H01

(29) Set the engine START/IGNITION switch to the START position.

SUBTASK 71-00-03-210-001-H01

(30) Monitor the SAV and N2 speeds.

(a) Make sure that the N2 rotor turns.

(b) Make sure that the SAV is open.

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SUBTASK 71-00-03-210-003-H01

(31) Monitor the main oil pressure.

NOTE: The main oil pressure must be positive and continuous.

SUBTASK 71-00-03-860-045-H01

(32) Continue to wet motor the engine:

(a) Set the FUEL CONTROL switch to RUN position.

(b) Wait at least 90 seconds for an oil mist that comes out of the primary nozzle.

(c) Set the FUEL CONTROL SWITCH to CUTOFF position.

(d) Make sure that the starter does not go more than the time limits of the starter duty cycle.

SUBTASK 71-00-03-860-025-H01

(33) Set the engine START/IGNITION switch to the NORM position.

SUBTASK 71-00-03-860-026-H01

(34) Set the EEC MAINT L or R ENG POWER switch on the aft overhead maintenance panel, P61, to the NORM position.

SUBTASK 71-00-03-860-027-H01

(35) Stop the flow of the oil, C00792 or oil, D00124 to the engine.

SUBTASK 71-00-03-860-028-H01

(36) Attach the DO-NOT-OPERATE TAG to the START/IGNITION switch.

SUBTASK 71-00-03-860-029-H01

(37) Attach the DO-NOT-OPERATE TAG to the FUEL CONTROL switch.

SUBTASK 71-00-03-864-001-H01

CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

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

SUBTASK 71-00-03-860-031-H01

(39) Attach a preservation tag to the forward thrust lever with this data:

(a) Type of preservation

(b) Date of the preservation.

SUBTASK 71-00-03-080-002-H01

(40) Disconnect the supply hose from the oil, C00792 or oil, D00554 [C02-021] cart from the inlet of the MFP.

(a) Remove the four bolts [7] that attach the supply hose to the inlet port of the MFP [1].

(b) Remove and discard the gasket seal [6] from the inlet port of the MFP [1].

SUBTASK 71-00-03-420-003-H01

(41) Connect the main fuel supply tube-hose [8] to the fuel inlet port of the MFP.

(a) Put a new gasket seal [6] on the fuel inlet port.

(b) Put the fuel hose shroud [9] and main fuel supply tube-hose [8] in its position on the MFP [1].

(c) Install the four bolts [7] that attach the fuel hose shroud [9] and main fuel supply tube-hose [8] to the MFP [1].

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(d) Tighten the four bolts [7] to 180-220 pound-inches (20.3-24.9 Newton-meters).

SUBTASK 71-00-03-620-004-H01

(42) Tightly seal the engine with barrier material, G00253 and tape, G00920:

(a) The fan inlet duct

(b) The aft centerbody vent tube

(c) The primary nozzle

(d) The fan bypass outlet duct

(e) The inlet cowl ports

(f) The bleed air deflector panels

(g) The access doors of the fan cowl panels and the thrust reversers

(h) The overboard drain ports

(i) All the openings on the inlet cowl, the fan cowl panels, and each thrust reverser half.

H. Preservation Renewal Procedure

SUBTASK 71-00-03-620-014-H00

(1) You can do the two-year preservation renewal task as many times as necessary.

I. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-03-860-057-H00

(1) For the applicable engine remove the safety tags and close these circuit breakers:

Overhead Circuit Breaker Panel, P11

Row	Col	Number	Name
A	1	C74401	L ENG STBY IGN 1
A	2	C74407	L ENG STBY IGN 2
A	5	C28001	L ENGINE FUEL SPAR VALVE
A	14	C74400	R ENG STBY IGN 1
A	15	C74406	R ENG STBY IGN 2
A	19	C28002	R ENGINE FUEL SPAR VALVE
E	1	C74403	L ENG IGN 1
E	2	C74404	R ENG IGN 2
E	14	C74405	L ENG IGN 2
E	15	C74402	R ENG IGN 1

SUBTASK 71-00-03-410-003-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine

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(Continued)

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

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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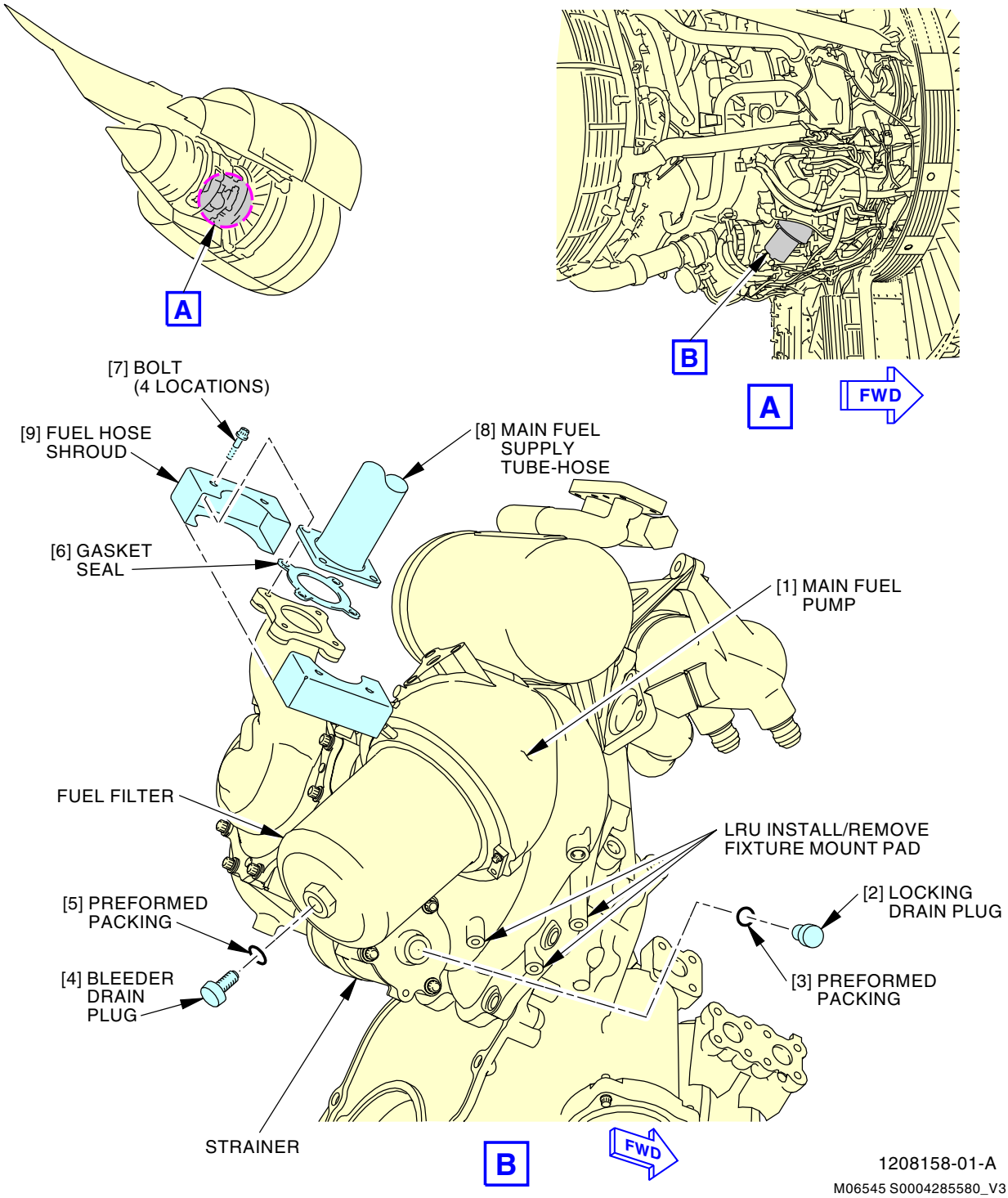

Main Fuel Pump Drain Plugs Installation
Figure 203/71-00-03-990-803-H01

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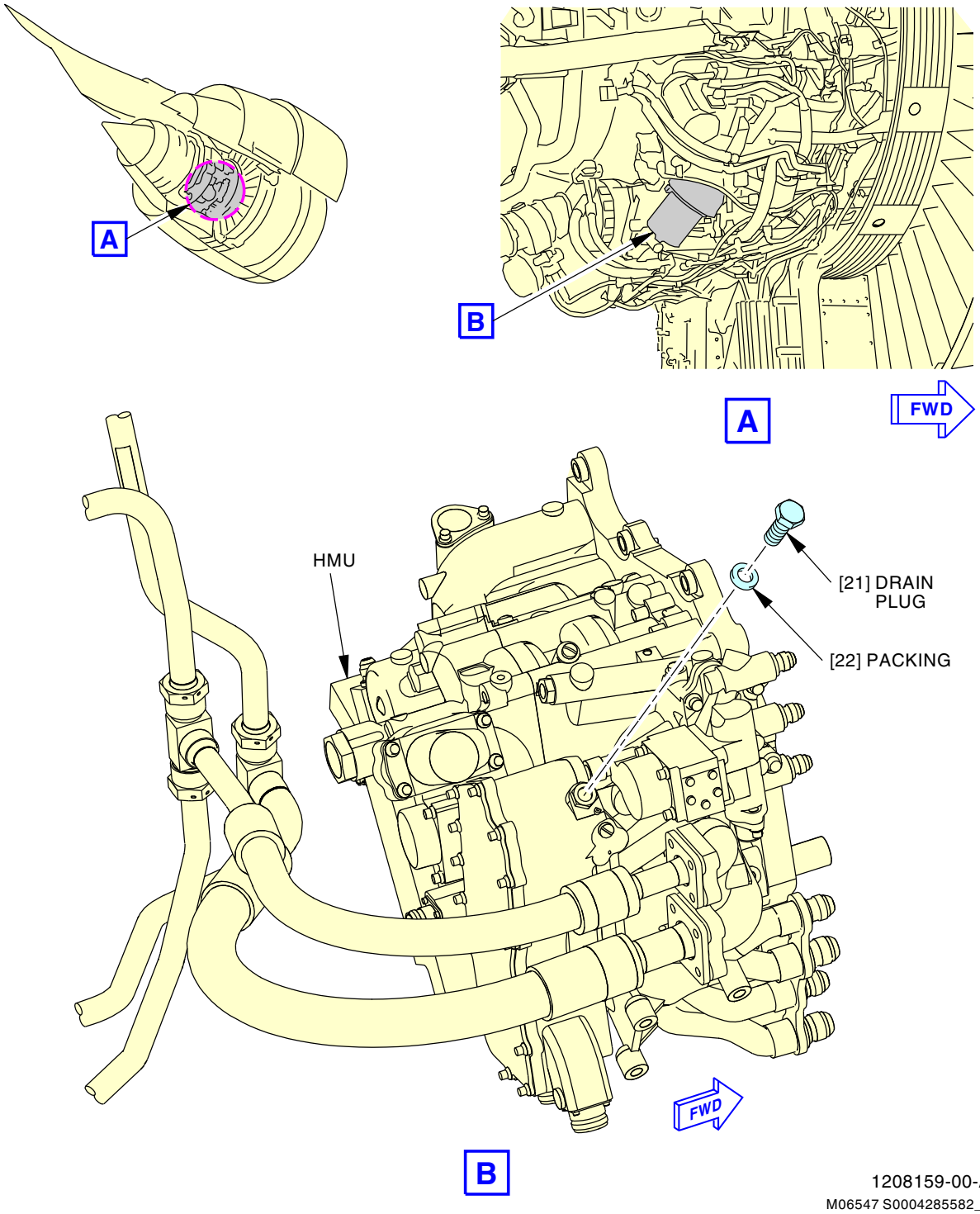

HMU Drain Plug Installation
Figure 204/71-00-03-990-805-H01

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TASK 71-00-03-600-805-H01

7. Re-preservation and Maintenance Requirement for Engine That Has Expired Preservation (Engine On-Wing)

A. General

(1) This procedure has the steps that are necessary for preservation of an installed engine that has an expired preservation and maintenance requirement when you bring the engine back in service.

(2) During the complete storage period, the engine must be correctly preserved, blanked, covered and if whenever possible, kept in a controlled space such as a hangar facility or other controlled facility. This helps to prevent corrosion, prevent entry of unwanted material into the engine and control the effects of the climate and weather conditions.

(3) GE always recommends:

(a) Preservation of the engine for a time period for which the engine will not be operated.

(b) Preservation renewal before preservation due date. There are no limits to the number of times a preservation procedure can be done on an installed engine.

(c) If you do these procedures, it will not be necessary to do the maintenance requirement before the engine is put back in service.

B. References

Reference	Title
12-22-01-170-803-002	Flush the Engine Oil System (P/B 301)
71-00-00-700-813-H01	Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test) (P/B 501)
71-00-00-700-814-H01	Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test) (P/B 501)
71-00-00-700-815-H01	Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test) (P/B 501)
71-00-00-700-822-H00	Test No. 21 - High-Power Leak Check (P/B 501)
71-00-00-800-835-H00	Engine Start (Selection) (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
72-00-00-290-804-H01	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Inspection (P/B 601)
73-11-01-000-801-H01	Main Fuel Pump Removal (P/B 401)
73-11-01-400-801-H01	Main Fuel Pump Installation (P/B 401)
73-11-02-000-801-H01	Fuel Filter Element Removal (P/B 401)
73-11-02-400-801-H01	Fuel Filter Element Installation (P/B 401)
73-21-14-000-801-H01	Hydromechanical Unit Removal (P/B 401)
73-21-14-400-801-H01	Hydromechanical Unit Installation (P/B 401)
73-31-01-000-801-H01	Fuel Flow Transmitter Removal (P/B 401)
73-31-01-400-801-H01	Fuel Flow Transmitter Installation (P/B 401)
79-00-00-200-804-H01	Engine Oil System (DMS) (Scheduled Maintenance Task) Inspection (P/B 601)
79-00-00-200-805-H01	Engine Oil System (Lube and Scavenge Pump Screens and Magnetic Plugs) Inspection (P/B 601)
79-21-03-000-801-H01	Lube and Scavenge Pump Removal (P/B 401)
79-21-03-400-801-H01	Lube and Scavenge Pump Installation (P/B 401)

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(Continued)

Reference	Title
79-21-07-000-801-H01	Oil Filter Element Removal (P/B 401)
79-21-07-400-801-H01	Oil Filter Element Installation (P/B 401)
80-11-01-000-801-H01	Engine Starter Removal (P/B 401)
80-11-01-400-801-H01	Engine Starter Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Procedure: Re-preservation of Engine That Has Expired Preservation

NOTE: This task is for when engine preservation has expired and it is necessary to continue to preserve the engine.

NOTE: Make a record of the number of days the preservation was expired. When you put the engine back into service, make sure to complete the appropriate maintenance requirement, as shown in step (E).

SUBTASK 71-00-03-860-036-H01

(1) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

SUBTASK 71-00-03-860-052-H00

(2) Make sure the engine is stable at ground idle for 15 minutes.

SUBTASK 71-00-03-860-037-H01

(3) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

SUBTASK 71-00-03-220-001-H01

(4) Do an inspection of the engine DMS sensor, TASK 79-00-00-200-804-H01.

SUBTASK 71-00-03-220-002-H01

(5) Do an inspection of the lube unit scavenge screens, TASK 79-00-00-200-805-H01.

SUBTASK 71-00-03-620-005-H01

(6) Do the preservation task for the period of time that the installed engine will not be used.

E. Procedure: Maintenance requirement to bring the engine back in service

NOTE: This task is to be carried out when you bring the engine back into service for which preservation was expired in the past.

NOTE: Make a record of the number of days the engine preservation was expired. The number of days the preservation has expired can change the maintenance requirement.

SUBTASK 71-00-03-860-053-H00

(1) Maintenance requirement for preservation expired less than 6 months:

(a) Carry out depreservation of the engine, TASK 71-00-03-600-806-H01.

(b) Do this task: Engine Start (Selection), TASK 71-00-00-800-835-H00.

(c) Make sure the engine is stable at ground idle for 15 minutes.

(d) Do this task: Usual Engine Stop, TASK 71-00-00-800-837-H00.

(e) Do an inspection of the engine DMS sensor, TASK 79-00-00-200-804-H01.

(f) Do an inspection of the lube unit scavenge screens, TASK 79-00-00-200-805-H01.

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(g) Do an inspection of the engine DMS sensor every day for 10 days, TASK 79-00-00-200-804-H01.

(h) After 10 days, do an inspection of the DMS sensor and scavenge screens once a week for three additional weeks, TASK 79-00-00-200-804-H01.

SUBTASK 71-00-03-860-054-H00

(2) Maintenance requirement for preservation expired 6 months to 3 years:

(a) Do the depreservation of the engine, TASK 71-00-03-600-806-H01.

(b) Do this task: Flush the Engine Oil System, TASK 12-22-01-170-803-002.

(c) Replace the oil filter element, TASK 79-21-07-000-801-H01 and TASK 79-21-07-400-801-H01.

(d) Replace the fuel filter, TASK 73-11-02-000-801-H01 and TASK 73-11-02-400-801-H01.

(e) Do this task: Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01.

(f) Do this task: Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-813-H01.

(g) Do this task: Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-814-H01.

(h) Do this task: Test No. 21 - High-Power Leak Check, TASK 71-00-00-700-822-H00.

(i) Do an inspection of the engine DMS sensor, TASK 79-00-00-200-804-H01.

(j) Do an inspection of the lube unit scavenge screens, TASK 79-00-00-200-805-H01.

(k) Do an inspection of the engine DMS sensor every day for 10 days, TASK 79-00-00-200-804-H01.

(l) Do an inspection of the lube unit scavenge screens every day for 10 days, TASK 79-00-00-200-805-H01.

(m) Do a check on the fuel system for fuel maintenance messages every day for 10 days.

(n) After 10 days, do an inspection of the DMS sensor and scavenge screens once a week for three additional weeks (TASK 79-00-00-200-804-H01 and TASK 79-00-00-200-805-H01).

(o) After 10 days, do an inspection of the fuel system for fuel maintenance messages once a week for three additional weeks.

(p) After 10 days, do a hot section BSI of the fuel nozzles for damage (TASK 72-00-00-290-804-H01).

SUBTASK 71-00-03-860-055-H00

(3) Maintenance requirement for preservation expired more than 3 years:

NOTE: Do not use removed lube unit, MFP, HMU, fuel flow transmitter and starter as is. All these LRU's must be sent to overhaul.

(a) Do the depreservation of the engine, TASK 71-00-03-600-806-H01.

(b) Replace the lube and scavenge pump (Lube Unit), TASK 79-21-03-000-801-H01 and TASK 79-21-03-400-801-H01.

(c) Replace the main fuel pump (MFP), TASK 73-11-01-000-801-H01 and TASK 73-11-01-400-801-H01.

(d) Replace the HMU, TASK 73-21-14-000-801-H01 and TASK 73-21-14-400-801-H01.

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(e) Replace the fuel flow transmitter, TASK 73-31-01-400-801-H01 and TASK 73-31-01-000-801-H01.

(f) Replace the starter, TASK 80-11-01-000-801-H01 and TASK 80-11-01-400-801-H01.

(g) Do this task: Flush the Engine Oil System, TASK 12-22-01-170-803-002.

(h) Replace the oil filter element, TASK 79-21-07-000-801-H01 and TASK 79-21-07-400-801-H01.

(i) Replace the fuel filter element, TASK 73-11-02-000-801-H01 and TASK 73-11-02-400-801-H01.

(j) Do this task: Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01.

(k) Do this task: Test No. 14 - Engine Fuel Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-813-H01.

(l) Do this task: Test No. 15 - Engine Air Driven Actuator Test (MAT Initiated Test), TASK 71-00-00-700-814-H01.

(m) Do this task: Test No. 21 - High-Power Leak Check, TASK 71-00-00-700-822-H00.

(n) Do an inspection of the engine DMS sensor, TASK 79-00-00-200-804-H01.

(o) Do an inspection of the lube unit scavenge screens, TASK 79-00-00-200-805-H01.

(p) Do an inspection of the engine DMS sensor every day for 10 days, TASK 79-00-00-200-804-H01.

(q) Do an inspection of the lube unit scavenge screens every day for 10 days, TASK 79-00-00-200-805-H01.

(r) Do a check on the fuel system for fuel maintenance messages every day for 10 days.

(s) After 10 days, do an inspection of the DMS sensor and scavenge screens once a week for three additional weeks (TASK 79-00-00-200-804-H01 and TASK 79-00-00-200-805-H01).

(t) After 10 days, do an inspection of the fuel system for fuel maintenance messages once a week for three additional weeks.

(u) After 10 days, do a hot section BSI of the fuel nozzles for damage (TASK 72-00-00-290-804-H01).

——— END OF TASK ———

TASK 71-00-03-600-806-H01

8. Depreservation of An Installed Engine

A. General

(1) This procedure has the steps that are necessary for depreservation of an installed engine.

(2) The depreservation procedure puts the installed engine back in operation.

(3) There are no limits to the number of times a preservation procedure can be done on an installed engine.

B. References

Reference	Title
71-00-00-800-812-H01	Wet Motor (P/B 201)
71-00-00-800-833-H00	Power Plant Test Reference Table (P/B 501)

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C. Consumable Materials

Reference	Description	Specification
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00920	Tape - Waterproof, Packaging	ASTM D5486

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Procedure

SUBTASK 71-00-03-030-001-H01

(1) Remove the protective cover from the engine.

SUBTASK 71-00-03-080-003-H01

(2) Remove the core exhaust plug from the primary nozzle.

SUBTASK 71-00-03-080-004-H01

(3) Remove the discharge plug from the thrust reverser discharge ports.

SUBTASK 71-00-03-080-005-H01

(4) Remove the inlet cover from the inlet cowl.

SUBTASK 71-00-03-080-006-H01

(5) Remove the barrier material, G00253 and tape, G00920 from:

(a) The aft centerbody vent tube

(b) The primary nozzle

(c) The fan bypass outlet duct

(d) The inlet cowl ports

(e) The bleed air deflector panels

(f) The access doors from the fan cowl panels and the thrust reversers

(g) The overboard drain ports

SUBTASK 71-00-03-860-038-H01

(6) Make sure these areas are clean and there is no unwanted material:

(a) The inlet cowl

(b) The fan bypass outlet duct

(c) The primary nozzle

(d) The aft centerbody vent tube

(e) The bleed air deflector panels

(f) The overboard drain ports.

SUBTASK 71-00-03-160-001-H01

(7) Remove the unwanted materials from the nacelle overboard discharge ports, and all the openings on the fan cowl panels and the thrust reversers.

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SUBTASK 71-00-03-860-039-H01

(8) If the preservation of the engine was more than two years, do this task: Wet Motor, TASK 71-00-00-800-812-H01.

NOTE: If the engine was preserved for less than the two year, the wet motor procedure is not necessary.

SUBTASK 71-00-03-220-003-H01

(9) If the engine preservation was expired anytime between the total preservation period, then carry out the applicable maintenance requirement before the engine put back in service. Refer to: E. Procedure: Maintenance requirement to bring the engine back in service (TASK 71-00-03-600-805-H01).

SUBTASK 71-00-03-790-001-H01

(10) Do the tests listed in the Power Plant Test Reference Table (TASK 71-00-00-800-833-H00).

END OF TASK

TASK 71-00-03-600-807-H01

9. Dry-Out of An Installed Engine After An In-flight Shutdown (Engine On-Wing)

A. General

CAUTION

DRY THE ENGINE BEFORE THE SPECIFIED TIME LIMIT. IF YOU DO NOT OBEY THIS INSTRUCTION, CORROSION CAN OCCUR.

(1) This procedure has the steps that are necessary to dry-out an installed engine after an In-flight shutdown (IFSD) in or less than 48 hours after landing.

(2) If the engine already operated at idle for three minutes in the last 48 hours, you do not need to do this procedure.

(3) If you do the Engine Dry Motor as shown in TASK 71-00-00-800-836-H00 for four minutes in or less than last 48 hours of landing after the IFSD, you do not need to do this procedure.

(4) This procedure is to be done to remove water condensation from the internal oil system parts.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-00-800-836-H00	Dry Motor (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-00-00-980-802-H01	Electrical Motoring of the HPC Rotor (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-1125	Heater - Blower, Explosion Proof

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Access Panels

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

F. Procedure

SUBTASK 71-00-03-010-005-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-00-03-480-007-H01

(2) Connect the hot air source explosion proof heater, STD-1125 duct to the aft centerbody vent tube at the primary exhaust nozzle.

SUBTASK 71-00-03-620-006-H01

(3) Start the hot air source explosion proof heater, STD-1125.

(a) Make sure the duct temperature is approximately 325° F (163° C).

SUBTASK 71-00-03-860-040-H01

(4) Do the electrical motoring of the high pressure compressor. To do the motoring, do this task:Electrical Motoring of the HPC Rotor, TASK 72-00-00-980-802-H01.

(a) Operate the drive motor for approximately 12 minutes.

SUBTASK 71-00-03-860-041-H01

(5) Make sure the fan rotor turns:

CAUTION MAKE SURE THE FAN ROTOR TURNS WHEN YOU MOTOR THE ENGINE. THE FAN ROTOR MUST TURN TO DRY-OUT THE PRIMARY BEARINGS IN THE ENGINE. IF THE FAN ROTOR DOES NOT TURN, DAMAGE TO THE PRIMARY BEARINGS CAN OCCUR.

(a) If the fan rotor does not turn when you operate the drive motor, do these steps:

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585 in the lower half of the inlet cowl to prevent damage to the inlet cowl and the engine.

WARNING MAKE SURE YOU USE HEAVY PROTECTIVE GLOVES TO TURN THE FAN ROTOR BLADES WITH YOUR HANDS. IF YOU DO NOT USE HEAVY PROTECTIVE GLOVES, HANDS INJURY CAN OCCUR.

WARNING MAKE SURE TO KEEP YOUR BALANCE WHEN YOU TURN THE FAN ROTOR BLADES. IF YOU DO NOT WATCH YOUR BALANCE, YOU CAN FALL AND CAUSE INJURY.

2) With your hands protected by heavy gloves, turn the fan rotor four times in 12 minutes in the counterclockwise direction.

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CAUTION MAKE SURE THERE ARE NO TOOLS, PARTS, OR OTHER UNWANTED MATERIAL IN THE INLET COWL. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE ENGINE.

3) Remove the protective mat, STD-585 from the inlet cowl.

SUBTASK 71-00-03-620-007-H01

(6) Dry the engine with the hot air source (explosion proof heater, STD-1125) for approximately four hours.

SUBTASK 71-00-03-860-042-H01

(7) Stop the hot air source (explosion proof heater, STD-1125) to the aft centerbody vent tube.

SUBTASK 71-00-03-080-007-H01

(8) Disconnect the hot air source (explosion proof heater, STD-1125) duct from the aft centerbody vent tube.

SUBTASK 71-00-03-620-008-H01

(9) If you will do a preservation of an installed engine, make sure you use the correct preservation schedule to preserve the engine.

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-03-410-004-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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TASK 71-00-03-600-809-H01

10. Guidelines for Removal/Installation of Line Replaceable Unit (LRU) from Preserved Engine

A. General

(1) This task provides guidelines for removal/installation of Line Replaceable Unit (LRU) from a preserved engine.

(2) Important factor need to be considered while you do LRU removal/installation. This will minimize any loss of preservation fluids and help keep out unwanted material. This minimizes the impact on preservation.

(3) Any LRUs that are installed on a preserved engine must be preserved first. LRUs are shipped from component shops preserved. If a non-preserved LRU is installed on a preserved engine, the engine is NOT completely preserved.

B. References

Reference	Title
70-00-05-500-801-H00	Engine Storage Standard Practices (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Procedure

SUBTASK 71-00-03-800-001-H00

(1) Do any LRU removal/installation in a protected environment, preferably indoors.

NOTE: Replacing/installing LRUs outdoors in heavy rain, snow, wind or other severe weather condition will have more impact on preservation.

(a) Remove the minimum engine cover to get access for LRU removal from preserved engine.

(b) Make sure the LRU removal/installation area is free from contaminant and debris.

1) Clean the area around the LRU.

(c) Make sure to have correct covers immediately available for installation on all open connections.

SUBTASK 71-00-03-800-002-H00

(2) Remove/install the required LRU by referring to the applicable removal/installation task.

(a) Remove any split fluid from the engine surface.

SUBTASK 71-00-03-620-023-H00

(3) Install correct covers immediately after LRU removal/installation on all open connections.

NOTE: This minimizes the impact on preservation by minimizing any loss of preservation fluids and helping keep out unwanted material.

SUBTASK 71-00-03-620-024-H00

(4) Cover any exposed electrical harness connectors with the correct plastic caps to keep out unwanted material.

NOTE: If you remove an electrical harness and cover all open connectors, this has NO impact on preservation. If you remove an electrical harness and do not cover all open electrical connectors, this has an impact on preservation.

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E. Preservation Renewal Procedure

SUBTASK 71-00-03-940-002-H00

(1) Remove all tools and materials.

SUBTASK 71-00-03-620-025-H00

(2) Cover the engine immediately after the completion of any LRU removal/installation.

(a) Restore the original engine preservation.

1) For engine storage standard practices, refer to task Engine Storage Standard Practices, TASK 70-00-05-500-801-H00.

——— END OF TASK ———

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POWER PLANT TRANSPORTATION - MAINTENANCE PRACTICES

1. General

A. This procedure contains these two tasks:

NOTE: Power plant transportation tasks are in the General Electric Engine Manual.

(1) Engine and Engine Stand (9C6025P02) Preparation

(2) Restore the Engine and Engine Stand (9C6025P02) Components to Its Usual Condition

TASK 71-00-04-800-801-H00

2. Engine and Engine Stand Preparation

(Figure 201)

A. General

(1) This task gives the instructions to prepare the engine or the engine shipping stand (9C6025P02 or P03) for the power plant removal.

(2) This task also provides the typical illustrations of the engine shipping stand (9C6025P02 or P03).

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-4921	Stand - Shipping, Deluxe Air/Truck, Engine Cradle and Transport Part #: 9C6025P02 Supplier: 06083 Part #: 9C6025P03 Supplier: 06083

C. Consumable Materials

Reference	Description	Specification
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A
D50215 [C02-079]	Lubricant - Liquid Thread (Cal Lube 7030)	A50TF310 Class A
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)

D. Procedure

SUBTASK 71-00-04-020-005-H00

(1) Remove the blank off panels [260A](left), [260B](left), and [260C](left) (locations 2, 3 and 4) and the blank off panels [261A] (right), [261B] (right), and [261C] (right) (locations 5, 6, and 7) from the forward inner cowl support at the fan hub frame (View look forward).

(a) Remove the screws that attach the blank off panels to the forward inner cowl support.

1) Remove the blank off panels from the forward inner cowl support.

SUBTASK 71-00-04-020-002-H00

(2) Remove the air bleed deflector panels [421A] (left) and [421B] (left) (locations 3 and 4) and the air bleed deflector panels [422A] (right) and [422B] (right) (locations 7 and 8) from the forward inner cowl support at the fan hub frame (View look forward).

(a) Remove the screws that attach the air bleed deflector panels to the forward inner cowl support.

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1) Remove the air bleed deflector panels from the forward inner cowl support.

(b) Put Scotch Flatback Masking Tape 250, G00270 on the openings as necessary.

SUBTASK 71-00-04-020-006-H00

(3) Remove the flow shield brackets [450] at 3:30 and 9:30 o'clock from the inner cowl support as follows (View look forward):

(a) Remove the bolts from the applicable flow shield bracket [450].

(b) Remove the flow shield brackets [450].

SUBTASK 71-00-04-420-006-H00

(4) For the engine removal, install the forward support brackets [440] (9426M55P02 and P03) on the forward inner cowl support at the fan hub frame.

(a) Remove the 16 bolts [451] that attach the forward inner cowl support to the fan hub frame at 2:30, 3:30, 4:00, 4:30, 7:30, 8:00, 8:30, and 9:30 o'clock positions (Viewed aft looking forward).

NOTE: Do not use the removed attachment bolts for the forward inner cowl supports to install the forward support brackets. Damage to the engine or tools or injury to personnel can occur.

(b) Lubricate the bolts [451] with Acheson GP460 compound, D50043 [C02-058] or Cal Lube 7030, D50215 [C02-079].

(c) Install the forward support brackets [440] with the bolts [451].

NOTE: Make sure that all 16 attachment bolts included with the forward support brackets are used to install the brackets. Damage to the engine or tools or injury to personnel can occur if the forward support brackets are installed incorrectly.

(d) Tighten the bolts [451] to 368-432 pound-inches (41.6-48.8 Newton-meters).

SUBTASK 71-00-04-420-009-H00

(5) Install the flow shield brackets [450] at 3:30 and 9:30 o'clock on the forward inner cowl support as follows (View look forward):

NOTE: Flow shield bracket installations will prevent components movement when the engine is transported.

(a) Lubricate four bolts with Acheson GP460 compound, D50043 [C02-058].

(b) Install the four bolts to attach the ACC duct and the flow shield bracket [450] to the forward inner cowl support.

(c) Tighten the bolts to 109-127 pound-inches (12.3-14.3 Newton-meters).

SUBTASK 71-00-04-420-007-H00

(6) If it is necessary, install the aft ground handling mounts (adapters) (9426M25G01) of the shipping stand, SPL-4921 on the turbine rear frame (aft cradle-to-engine attachment).

(a) Remove the four pins that attach the aft mount retainer bars to the adapter base of the shipping stand, SPL-4921.

1) Remove the retainer bars from the adapter base.

(b) Remove the aft ground handling mounts from the adapter base.

(c) Install the aft ground handling mounts on the turbine rear frame at 4:00 and 8:00 o'clock positions with the bolts and nuts.

(d) Tighten the nuts to 55-70 pound inches (6.2-7.9 Newton meters).

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SUBTASK 71-00-04-420-008-H00

(7) If it is necessary, install the forward mount adapters (9426M59P02 and P03) of the shipping stand, SPL-4921 to the forward support brackets (9426M55P02 and P03) (forward cradle-to-engine attachment).

(a) Remove the T-handle pins and remove the forward mount adapters from the shipping stand, SPL-4921 that attach the adapters to the stand forward mounts.

1) Remove the adapters.

(b) Install the forward mount adapters on the forward support brackets.

1) Install the pins from the aft side of the forward mount adapters.

——— END OF TASK ———

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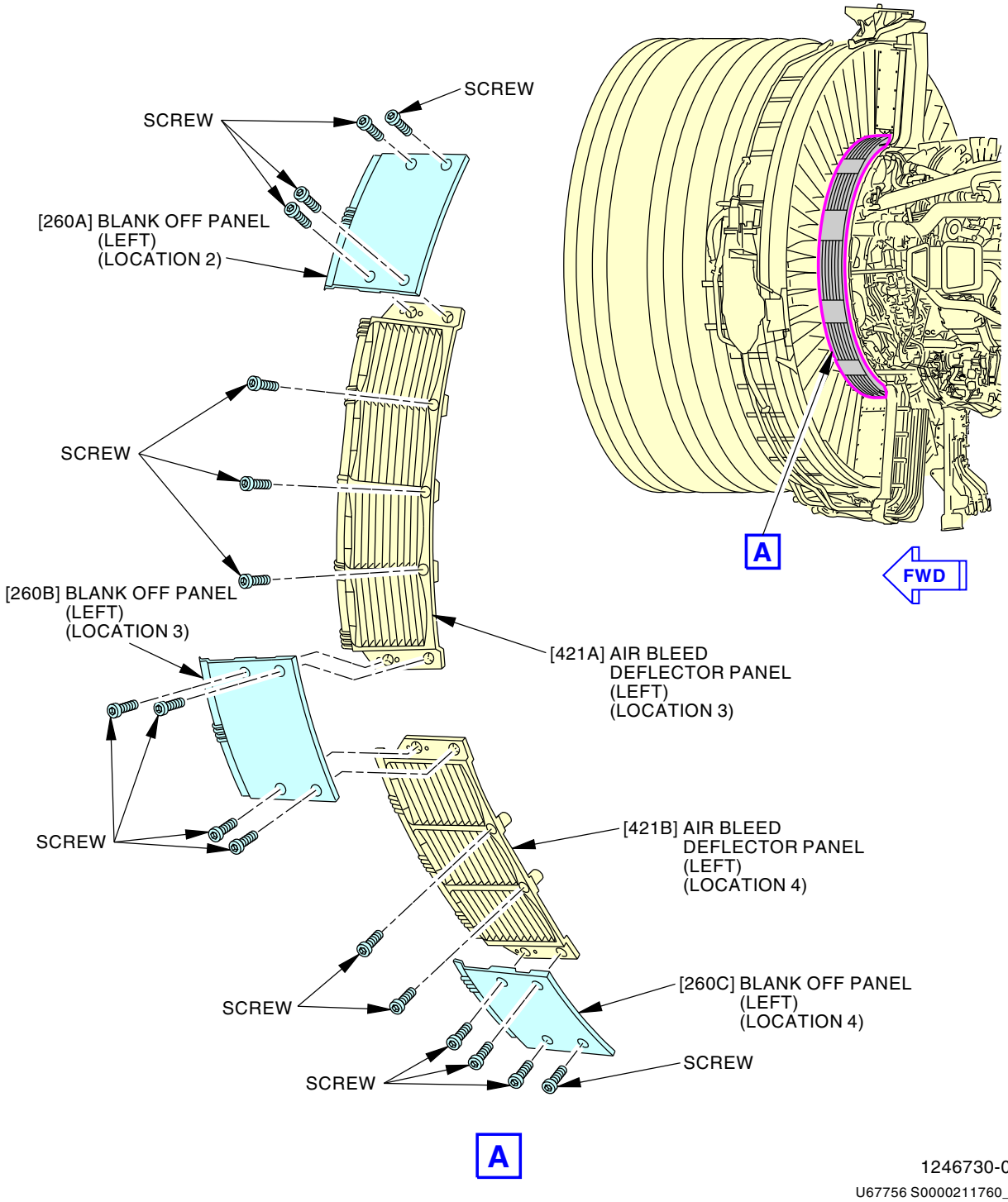

Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 1 of 8)

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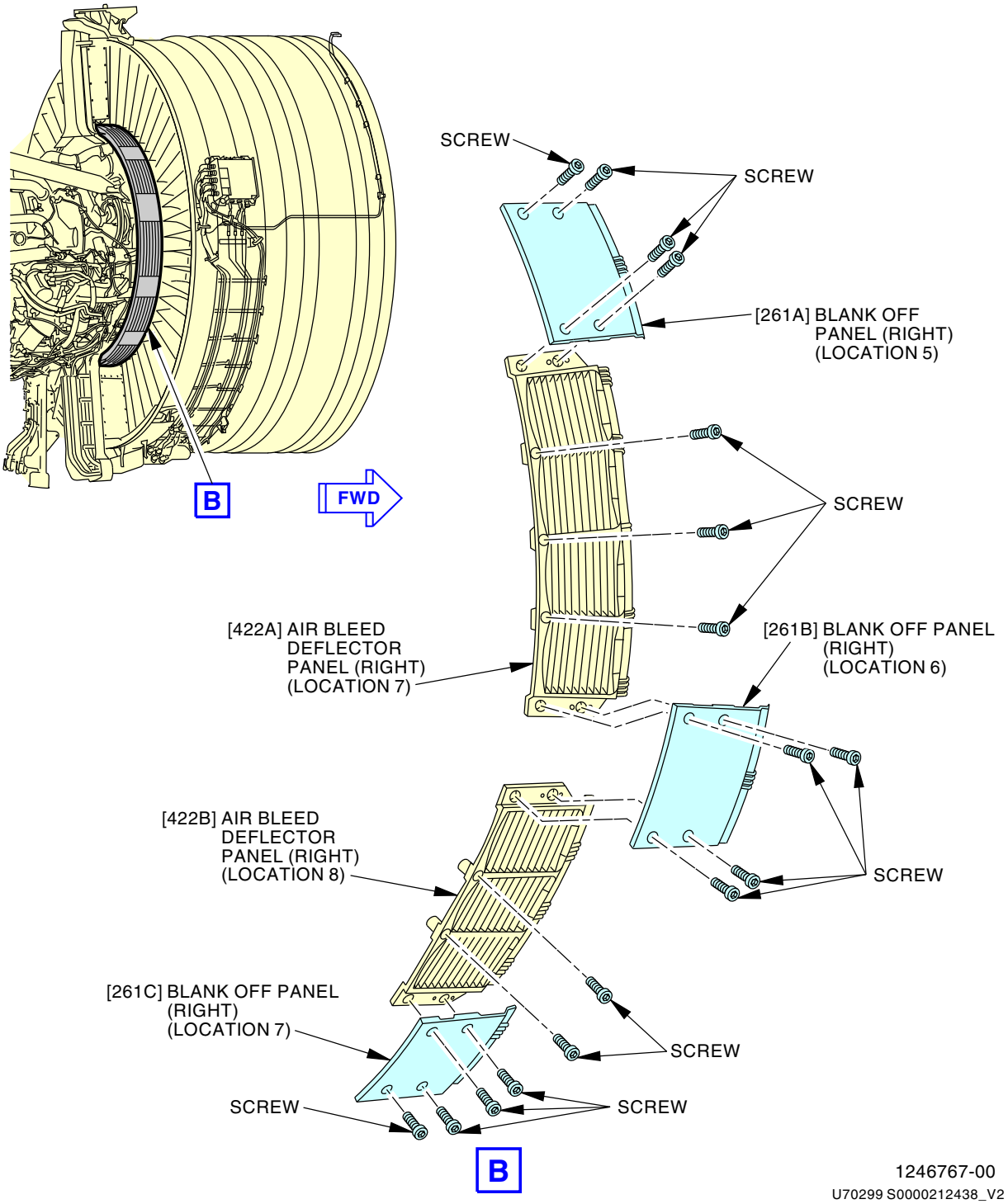

Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 2 of 8)

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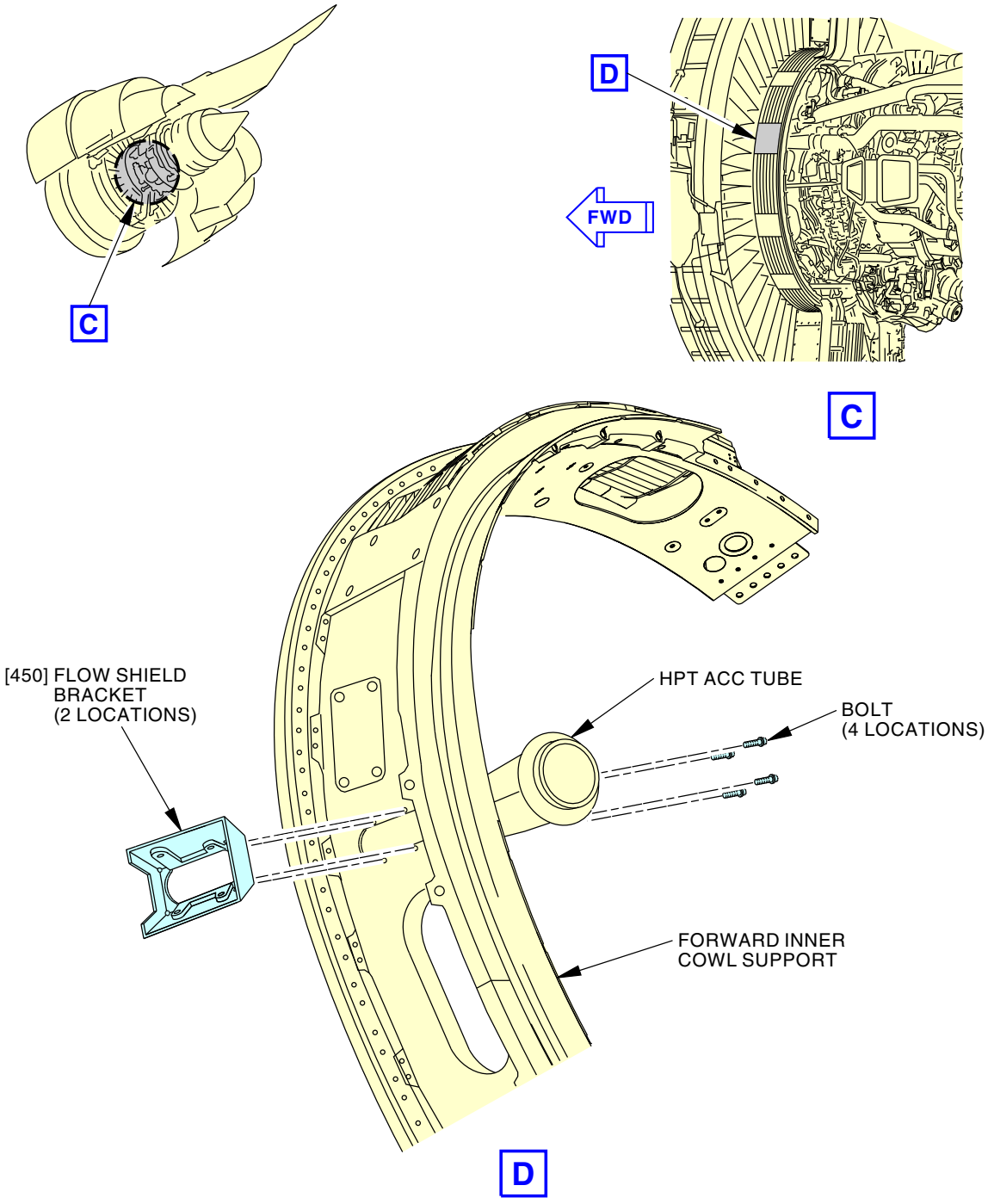

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Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 3 of 8)

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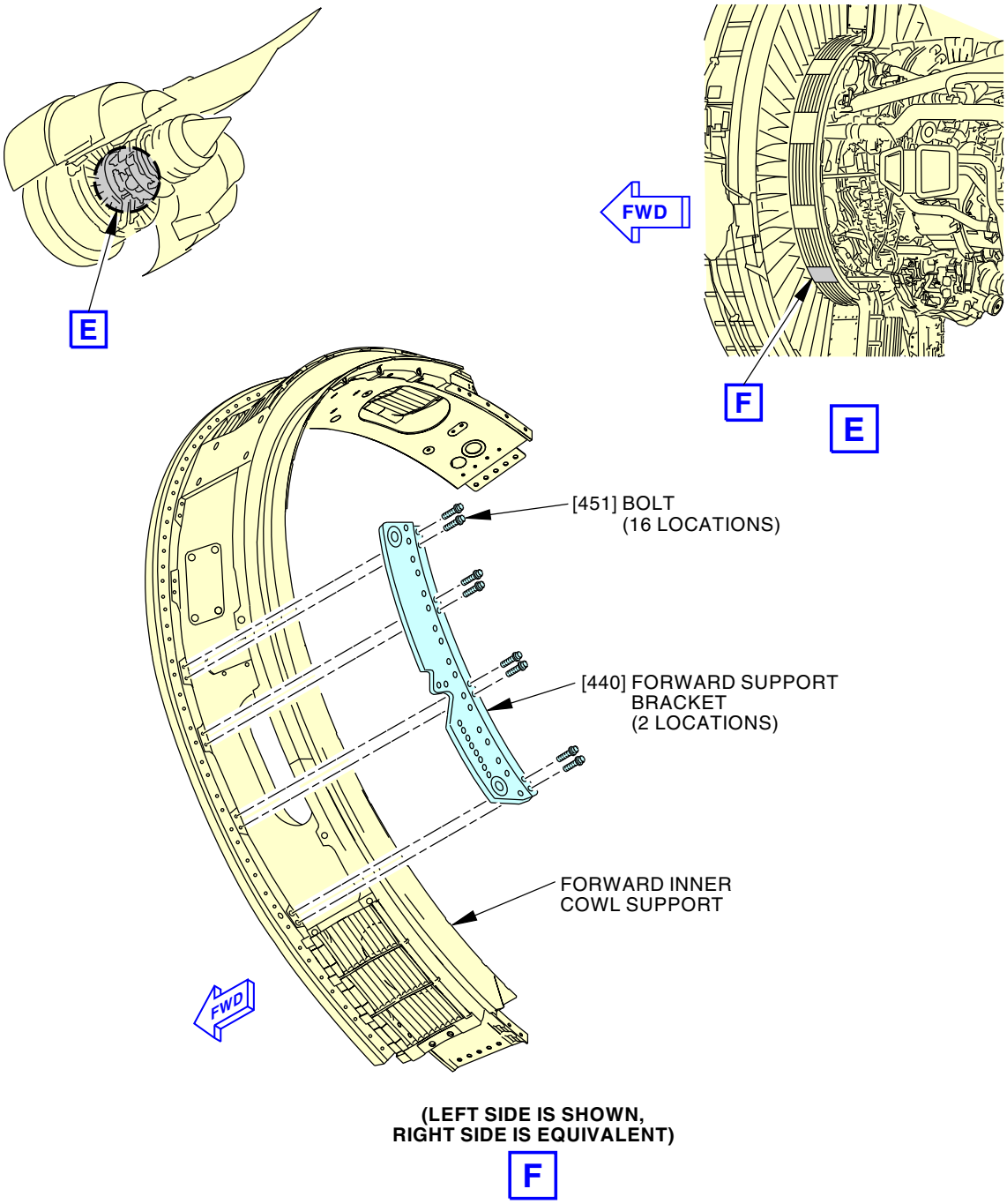

**(LEFT SIDE IS SHOWN,
RIGHT SIDE IS EQUIVALENT)**

F

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**Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 4 of 8)**

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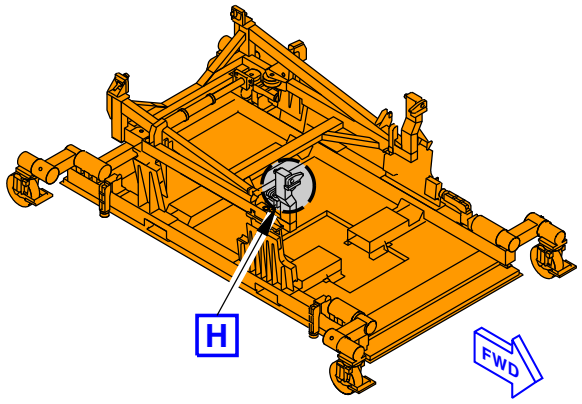
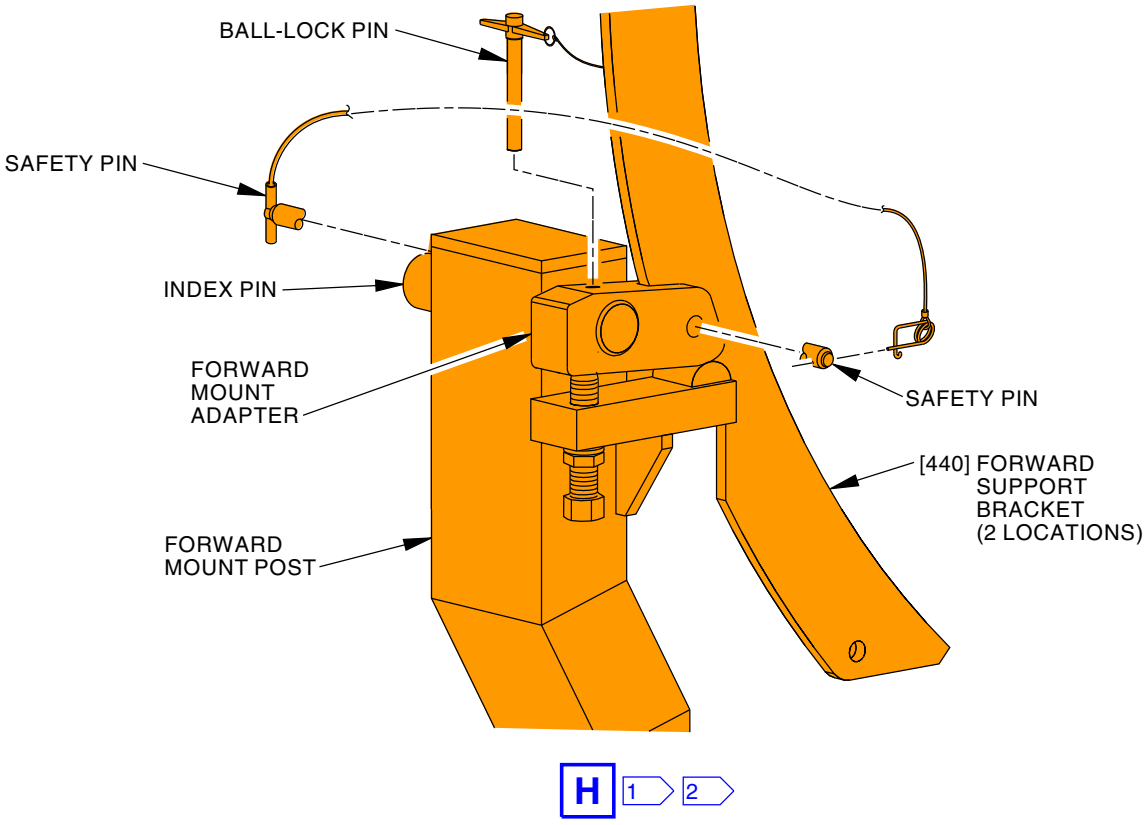


SHIPPING STAND, 9C6025P02



1 LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME.

2 SOME ENGINE STANDS WILL HAVE A DIFFERENT ADAPTER OR A DIFFERENT CRADLE BASE.

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Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 5 of 8)

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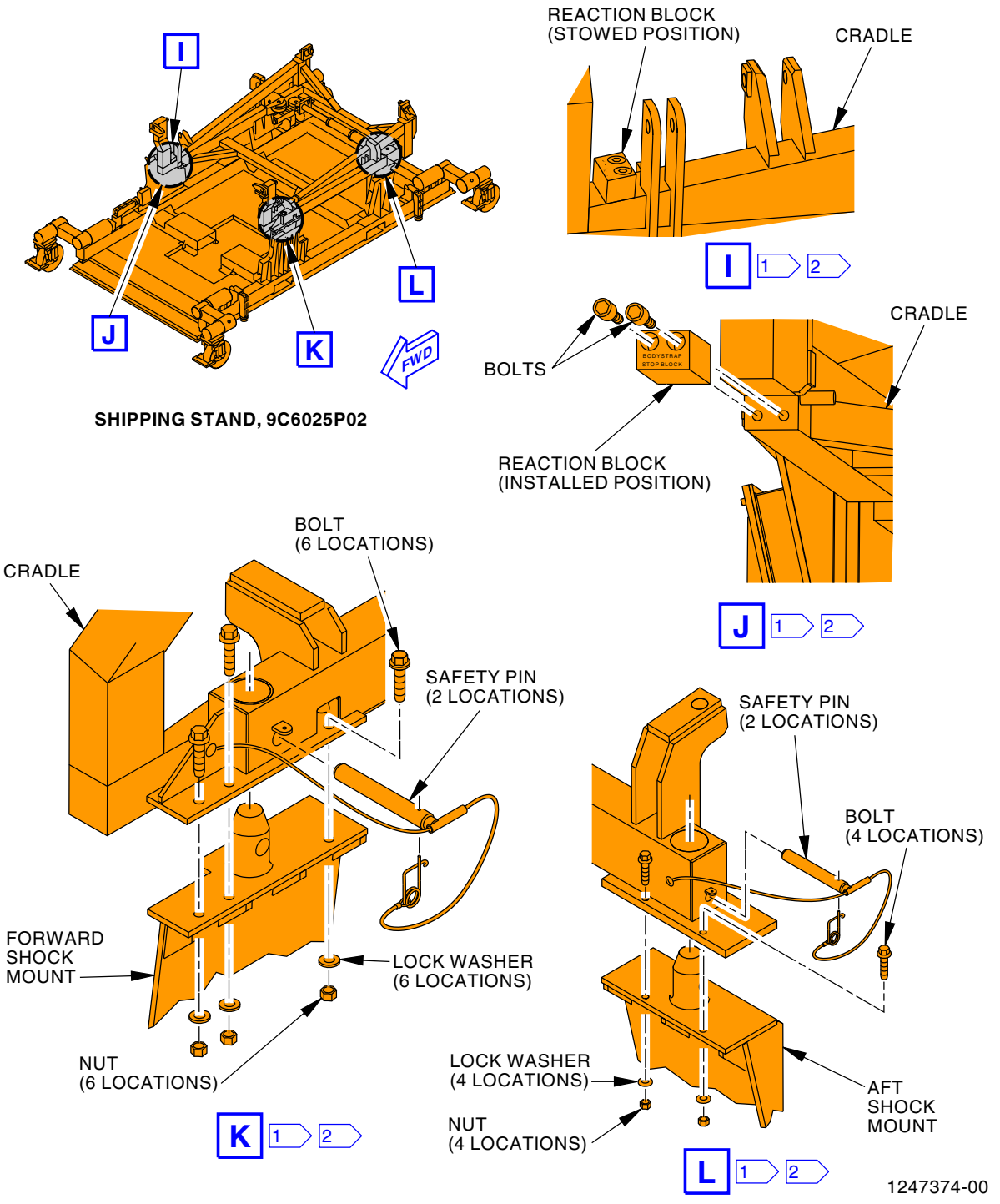

Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 6 of 8)

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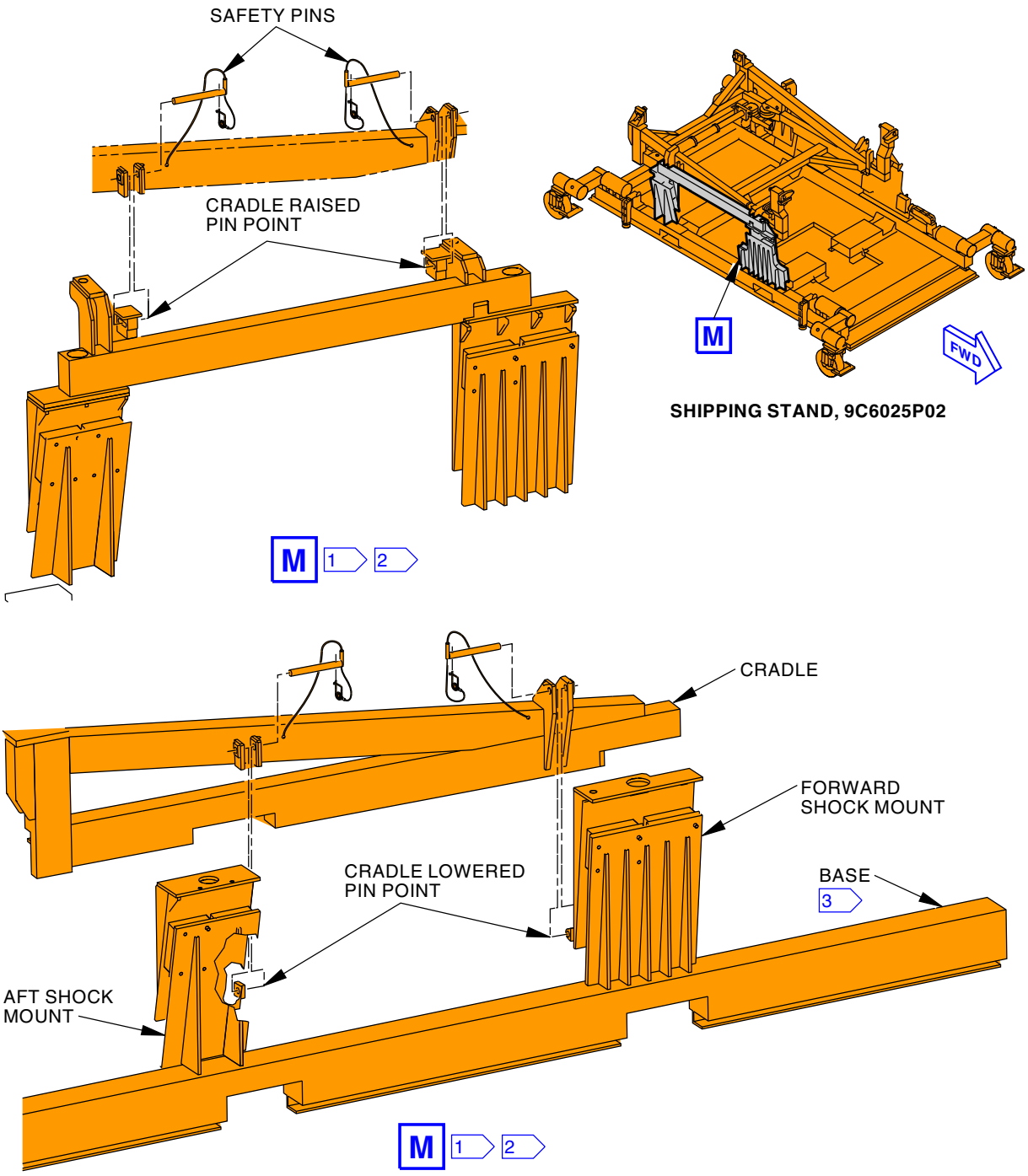

3 BEAM REMOVED FROM BASE FOR CLARITY

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Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 7 of 8)

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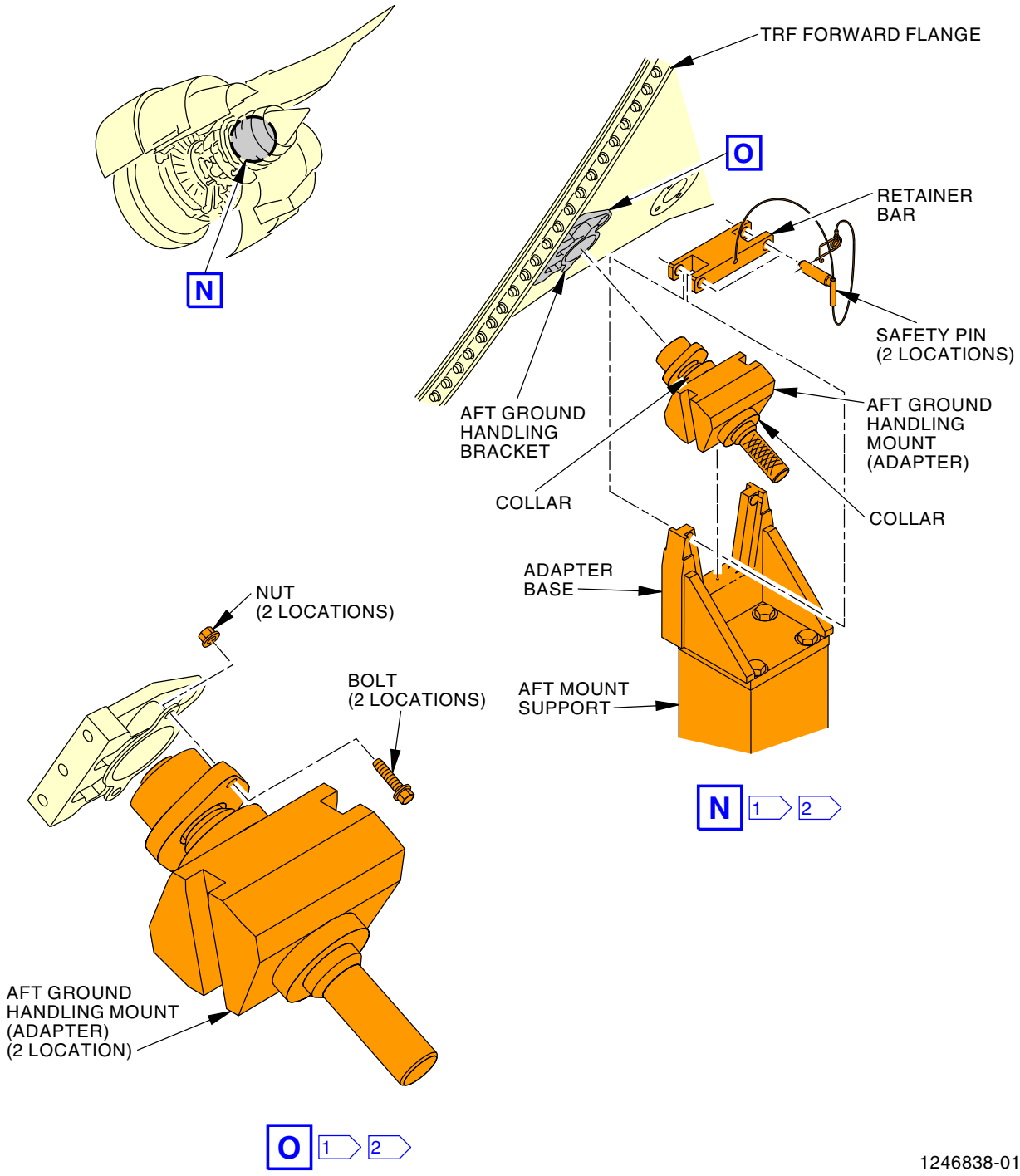

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Engine and Engine Stand Preparation
Figure 201/71-00-04-990-818-H00 (Sheet 8 of 8)

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TASK 71-00-04-800-802-H00

3. Restore the Engine and Engine Stand (9C6025P02) Components to Its Usual Condition

(Figure 201)

A. General

(1) This task gives the instructions to put the engine back to its usual condition if the engine shipping stand (9C6025P02) is used for the power plant installation.

B. Tools/Equipment

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

Reference	Description
SPL-4921	Stand - Shipping, Deluxe Air/Truck, Engine Cradle and Transport Part #: 9C6025P02 Supplier: 06083 Part #: 9C6025P03 Supplier: 06083

C. Consumable Materials

Reference	Description	Specification
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A

D. Procedure

SUBTASK 71-00-04-020-004-H00

(1) If installed, remove the flow shield brackets [450] at 3:30 and 9:30 o'clock from the inner cowl support as follows (View from aft look forward):

(a) Remove the bolts from the applicable flow shield bracket [450].

(b) Remove the flow shield brackets [450].

SUBTASK 71-00-04-020-003-H00

(2) Remove the forward support brackets [440] (9426M55P02 and P03) from the engine.

(a) Remove the 16 bolts [451] that attach the forward support brackets to the fan hub frame at 2:30, 3:30, 4:00, 4:30, 7:30, 8:00, 8:30, and 9:30 o'clock positions (View from aft look forward).

NOTE: When you remove the forward support bracket, make sure that you install the eight fan hub frame mount bolts [451] back on the forward support bracket and store with the engine stand.

(b) Remove the forward support brackets [440].

(c) Lubricate the bolt (engine hardware) threads with Acheson GP460 compound, D50043 [C02-058].

(d) Install the bolts on the fan hub frame to attach the forward inner cowl support.

(e) Tighten the bolts to 368-432 pound-inches (41.6-48.8 Newton-meters).

SUBTASK 71-00-04-420-013-H00

(3) Install the flow shield brackets [450] at 3:30 and 9:30 o'clock on the forward inner cowl support as follows (View from aft look forward):

NOTE: Flow shield bracket installations will prevent components movement when the engine is transported.

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(a) Lubricate four bolts with Acheson GP460 compound, D50043 [C02-058].

(b) Install the four bolts to attach the ACC duct and the flow shield bracket [450] to the forward inner cowl support.

(c) Tighten the bolts to 109-127 pound-inches (12.3-14.3 Newton-meters).

SUBTASK 71-00-04-420-010-H00

(4) Install the air bleed deflector panels [421A] (left) and [421B] (left) (locations 3 and 4) and the air bleed deflector panels [422A] (right) and [422B] (right) (locations 7 and 8) on the forward inner cowl support at the fan hub frame (View look forward):

(a) Remove the tape from the air bleed ports in the inner cowl support.

(b) Lubricate 16 screws and the friction surfaces of the deflector panels with Acheson GP460 compound, D50043 [C02-058].

(c) Install air bleed deflector panels on the inner cowl support with screws.

1) Loosely tighten the screws.

SUBTASK 71-00-04-420-011-H00

(5) Install the blank off panels [260A](left), [260B](left), and [260C](left) (locations 2, 3 and 4) and the blank off panels panels [261A] (right), [261B] (right), and [261C] (right) (locations 5, 6, and 7) on the forward inner cowl support at the fan hub frame (View look forward):

(a) Lubricate the screws and the friction surfaces of the blankoff panels with Acheson GP460 compound, D50043 [C02-058].

(b) Put the blank off panels in positions.

(c) Tighten the screws on the blank off panels to 40-60 pound-inches (4.5-6.8 Newton-meters).

SUBTASK 71-00-04-869-005-H00

(6) Make sure that the blank off panels and the air bleed deflector panels are aligned properly.

SUBTASK 71-00-04-420-012-H00

(7) Tighten the screws on the air bleed deflector panels to 40-60 pound-inches (4.5-6.8 Newton-meters).

SUBTASK 71-00-04-869-003-H00

(8) If it is necessary, put the aft ground handling mounts (adapters) (9426M25G01) and the forward mount adapters (9426M59P02 and P03) in the stand stow container of the shipping stand, SPL-4921.

SUBTASK 71-00-04-869-004-H00

(9) Store the forward support brackets [440] to the shipping stand, SPL-4921 in the designated stow area.

——— END OF TASK ———

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POWER PLANT (FAN STATOR MODULE TO ENGINE) - REMOVAL/INSTALLATION

1. General

A. This procedure contains two tasks:

(1) A removal of the fan stator module to the engine

(2) An installation of the fan stator module to the engine.

TASK 71-00-05-000-801-H01

2. Fan Stator Module to Engine Removal

(Figure 401, Figure 402,Figure 403, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411, and Figure 412)

A. General

(1) This task is the removal procedure for the fan stator module to engine.

(2) You must have the GSE engine and fan dolly equipment for this procedure.

(3) To remove the fan stator module, you must do these steps:

(a) Do a preparation for the engine removal.

(b) Drain the oil from the IDG and the backup generators.

(c) Disconnect the fire detection system from the engine.

(d) Remove the drain and service module assembly.

(e) Disconnect the electrical harnesses from the fan stator module, bifurcation assembly.

(f) Remove the lower bifurcation assembly.

(g) Remove the power plant.

(h) Remove the blank off panels.

(i) Remove the upper and the lower fillet fairings.

(j) Disconnect the seal pressurization tube and the oil tank ventilation tube.

(k) Disconnect the EAI duct at the upper bifurcation.

(l) Remove the bleed air deflector panels.

(m) Remove the fan rotor spinner.

(n) Remove the fan blades.

(o) Remove the acoustic panels.

(p) Remove the leading edge splitter.

NOTE: A general visual inspection of all fan hardware on removal is recommended so you can do repairs or get replacements before installation.

B. References

Reference	Title
12-22-01-610-805-002	Engine Oil Change (P/B 301)
12-22-01-610-806-002	Flush the Oil Tank (P/B 301)
12-22-07-600-802	IDG Oil Change (P/B 301)
12-22-09-600-802	Backup Generator Oil Change (P/B 301)
26-11-01-000-809-001	Engine Fire Detector Element Removal (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)

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(Continued)

Reference	Title
70-00-04-200-801-H01	Gasket Seal (with Imbedded Flexible Seal Material) Removal (P/B 201)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
72-21-01-000-801-H01	Fan Rotor Spinner Removal (P/B 401)
72-21-02-020-802-H01	Fan Blade Set 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
COM-7293	Pick - O-Ring, 90-degree Tip Part #: YA145-2 Supplier: 55719
SPL-4135	Protector - Stage 1 Fan Disk Part #: 9C1376G01 Supplier: 06083
SPL-4136	Personal Stand - Fan Inlet Part #: 9C6014G03 Supplier: 06083
SPL-4137	Protector - Fan Case Acoustic Liner, GE90-115B Part #: 9C3013G01 Supplier: 06083
SPL-4184	Fixture - Separation, Fan Case, GE90-70/80/90 and GE90-100 Series Part #: 9C6030P01 Supplier: 06083
SPL-4919	Stand - Engine Cradle and Transport, GE90-100 Series Part #: 9C6001G07 Supplier: 06083 Opt Part #: 9C6001G05 Supplier: 06083
STD-205	Container - Oil Resistant, 5 U.S.-Gal (19 l)
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

Reference	Description	Specification
G02061	Marker - Permanent, Felt Tip Pen	
G02350 [C10-012]	Tape - High Temperature Masking	

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Prepare for the Removal

SUBTASK 71-00-05-010-001-H01

(1) Do a preparation procedure before you remove the engine (TASK 71-00-02-000-811-H00).

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G. Fan Stator Module to Engine Removal

SUBTASK 71-00-05-480-001-H01

(1) Install the fan case acoustic liner protector, SPL-4137 (9C3013G01) on the forward flange of the fan module at the 6:00 o'clock position with the ball lock pins.

NOTE: This will prevent the forward acoustic liner from damage when you do maintenance work on the fan case module.

SUBTASK 71-00-05-610-001-H01

(2) Drain the oil from the integrated drive generator (IDG) and the backup generator (VSCF).

(a) Do this task: IDG Oil Change, TASK 12-22-07-600-802.

(b) Do this task: Backup Generator Oil Change, TASK 12-22-09-600-802.

SUBTASK 71-00-05-610-002-H01

(3) Drain the oil tank (TASK 12-22-01-610-805-002).

CAUTION

MAKE SURE THAT THE OIL IS DRAINED FROM THE TANK AND THE OIL TUBES THAT ARE ATTACHED TO THE FAN STATOR MODULE. THIS WILL AVOID TRANSFER OF OIL CONTAMINATION FROM THE REMOVED ENGINE TO THE SERVICEABLE ENGINE.

(a) If the engine is removed because of DMS debris or MCD particle findings, do this task: Flush the Oil Tank, TASK 12-22-01-610-806-002.

NOTE: Do this procedure if the same fan stator module is used on another serviceable engine.

SUBTASK 71-00-05-020-001-H01

(4) Disconnect the fire detection system.

(a) Do this task: Engine Fire Detector Element Removal, TASK 26-11-01-000-809-001.

SUBTASK 71-00-05-020-002-H01

(5) Remove the drain and service module assembly [22] (Figure 401).

(a) Put a 5 U.S.-gal (19 l) oil resistant container, STD-205 below the drain and service module assembly [22].

(b) Disconnect these eight drain tube B-nuts below at the 12:00 o'clock position of the drain and service module assembly [22].

1) IDG pad tube [5]
2) HYD pump tube [6]
3) HYDR pump pad tube [7]
4) VSCF pad tube [8]
5) HMU tube [13]
6) MFP tube [14]
7) VBV-VSV tube [15]
8) HPTACC tube [16].

(c) Disconnect the starter air valve manual control [9] from the starter air valve.

1) Remove the two bolts [12] and washers [12A] from the cable flange at the starter air valve.
2) Remove the bolt [10A] and nut [10B] that attach the clamp [10] to the bracket.
3) Remove the bolt [11A] and nut [11B] that attach the clamp [11] to the bracket.

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(d) Remove the two bolts [18] and nuts [19] from the drain and service module assembly [22] at the upper bracket of the lower bifurcation assembly.

(e) Remove the bolt [21], washer [20], and nut [19] that attach the drain and service module assembly [22] to the lower bracket of the lower bifurcation assembly.

(f) Remove the drain and service module assembly [22].

1) Install the protective covers on the all tubes and the starter air valve manual control [9].

SUBTASK 71-00-05-020-003-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(6) Use the teflon-jawed pliers, STD-664 to disconnect the electrical connectors from the receptacles at the support bracket (7:00 o'clock position) of the fan stator module (TASK 70-00-01-400-807-H01) (Figure 402):

(a) Disconnect the electrical connectors at the support bracket of the fan stator module that follows:

1) Electrical harness W724 [44]
2) Electrical harness W722 [42]
3) Electrical harness W728 [45]
4) Electrical harness W738 [43]
5) Electrical harness W729 [49].

(b) Remove two nuts [54] and remove the lower half of the lower bifurcation fire seal.

(c) Disengage the electrical harnesses W724 [44], W722 [42], W728 [45], W738 [43] and W729 [49] from the spring clips.

(d) Install the protective covers on the electrical connectors and the receptacles.

SUBTASK 71-00-05-020-004-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(7) Use the teflon-jawed pliers, STD-664 to disconnect the electrical connectors from the receptacles at the support bracket (6:00 o'clock position) of the fan stator module (TASK 70-00-01-400-807-H01).

(a) Disconnect the electrical connectors at the support bracket of the fan stator module.

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1) Electrical harness W739 [48]
2) Electrical harness W723 [46]
3) Electrical harness W737 [41]
4) Electrical harness W727 [47]
5) Electrical harness W721 [50].

(b) Disengage the electrical harnesses W739 [48], W723 [46], W737 [41], W727 [47] and W721 [50] from the spring clips forward of the lower bifurcation fire seal.

(c) Install the protective covers on the electrical connectors and receptacles.

SUBTASK 71-00-05-020-005-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(8) Use the teflon-jawed pliers, STD-664 to remove the electrical harnesses W723 [46], W727 [47], W739 [48], W721 [50] and W737 [41] from the right side of the lower bifurcation assembly spring clips and fan bracket spring clips (TASK 70-00-01-400-807-H01).

(a) Tie the electrical harnesses W723 [46], W727 [47], W739 [48], W721 [50] and W737 [41] out of the way.

SUBTASK 71-00-05-020-006-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(9) Use the teflon-jawed pliers, STD-664 to remove the electrical harnesses W729 [49], W722 [42], W724 [44], W728 [45], and W738 [43] from the left side of the lower bifurcation assembly spring clips and fan bracket spring clips (TASK 70-00-01-400-807-H01).

(a) Tie the electrical harnesses W729 [49], W722 [42], W724 [44], W728 [45], and W738 [43] out of the way.

SUBTASK 71-00-05-020-007-H01

(10) Remove the lower bifurcation assembly [85] from the engine (Figure 403).

(a) Disconnect these eight pressure tube B-nuts below in front of the fire seal at the lower bifurcation assembly:

1) bleed bias line tube [71]
2) ECS air tube [72]
3) PS3 tube [73]

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4) HPSOV LB air tube [74]
5) PRSOV air tube (brg No. 1) [75]
6) EAI air tube (brg No. 3) [76]
7) CDP air tube (brg No. 2) [77]
8) PT25 tube [78].
9) Install the protective covers on the tube B-nuts at the forward side of the fire seal.

(b) Disconnect the oil tank tube [83] at the forward side of the fire seal.
1) Remove the four bolts [80] from the oil tank tube [83].
2) Remove the gasket seal [82] from the oil tank tube [83].
3) Examine the gasket seal [82] for damage (TASK 70-00-04-200-801-H01).
a) Discard the gasket seal [82] if you find the damage.
4) Install the protective covers on the oil tank tube [83].

(c) Disconnect the oil return tube [79] at the forward side of the fire seal.
1) Remove the four bolts [80] from the oil return tube [79].
2) Remove the gasket seal [81] from the oil return tube [79].
3) Examine the gasket seal [81] for damage (TASK 70-00-04-200-801-H01).
a) Discard the gasket seal [81] if you find the damage.
b) If it is not damage, keep it for the installation task.
4) Install the protective covers on the oil return tube [79].

(d) Disconnect the other end of the oil tank tube [83] at the 12:00 position of the lower bifurcation assembly.
1) Remove the four bolts [80] from the upper end of the oil tank tube [83].
2) Remove the gasket seal [82] from the oil tank tube [83].
3) Examine the gasket seal [82] for damage (TASK 70-00-04-200-801-H01).
a) Discard the gasket seal [82] if you find the damage.
b) If it is not damage, keep it for the installation task.
4) Install the protective covers on the oil tank tube [83].

(e) Disconnect the other end of the oil return tube [79] at the 12:00 position of the lower bifurcation assembly.
1) Remove the four bolts [80] from the upper end of the oil return tube [79].
2) Remove the gasket seal [81] from the oil return tube [79].
3) Examine the gasket seal [81] for damage (TASK 70-00-04-200-801-H01).
a) Discard the gasket seal [81] if you find the damage.
b) If it is not damage, keep it for the installation task.
4) Install the protective covers on the oil return tube [79].

(f) Disconnect the B-nuts at the other end of these eight pressure tubes and the two drain tubes below at the 12:00 o'clock position of the lower bifurcation assembly [85].
1) bleed bias line tube [71]
2) ECS air tube [72]
3) PS3 tube [73]

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4) HPSOV LB air tube [74]
5) PRSOV air tube (brg No. 1) [75]
6) EAI air tube (brg No. 3) [76]
7) CDP air tube (brg No. 2) [77]
8) PT25 tube [78]
9) VBV-VSV tube [15]
10) HPTACC tube [16].
11) Install the protective covers on the tube B-nuts.

(g) Remove the lower bifurcation assembly [85] from the fan stator module.

NOTE: There are four bolts at each end of the four bracket locations which attach the lower bifurcation assembly to the fan stator module.

1) Remove the sixteen bolts [84] that attach the lower bifurcation assembly to the fan stator module.
2) Remove the four bolts [87] that attach the fan stator module to the fire seal.
3) Remove the six bolts [86] from the transfer gearbox bracket at the top of the lower bifurcation assembly.
4) Remove the lower bifurcation assembly [85] from the fan stator module.

SUBTASK 71-00-05-020-008-H01

(11) Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.

SUBTASK 71-00-05-020-009-H01

(12) Remove the eight blank off panels [101], blank off panels [102], blank off panels [103], and the blank off panels [104] from the forward inner cowl support at the fan hub frame (Figure 404).

(a) Remove the thirty two screws [105] from the blank off panels.
(b) Remove the blank off panels [101], blank off panels [102], blank off panels [103], and blank off panels [104] from the forward inner cowl support.

SUBTASK 71-00-05-020-010-H01

(13) Remove the upper fillet fairing [121] and lower fillet fairing [123] from the bleed air deflector panels and the upper and lower bifurcation firewall (at the 12:00 and 6:00 o'clock positions) (Figure 405).

(a) Make a mark with a marker, G02061 each of the fillet fairings and locations of the installation.
(b) Remove the screws [122] and screws [124] from the upper fillet fairing [121] and lower fillet fairing [123].

NOTE: Screws [124] (4 locations) are much longer than screws [122].

(c) Remove the upper fillet fairing [121] and lower fillet fairing [123] from the bleed air deflector panels.

SUBTASK 71-00-05-020-011-H01

(14) Disconnect the seal pressurization tube [141] and the oil tank ventilation tube [142] B-nuts from the fitting inside the upper bifurcation fire wall (Figure 406).

(a) Install protective covers on the tubes and fittings.

SUBTASK 71-00-05-020-012-H01

(15) Disconnect the engine anti-ice duct [151] at the upper bifurcation fire wall (Figure 407).

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(a) Remove the coupling [152] from the engine anti-ice duct [151].

(b) Remove and discard the seal [153].

(c) Install the protective covers on the engine anti-ice ducts.

SUBTASK 71-00-05-020-013-H01

(16) Remove the bleed air deflector panels [171], bleed air deflector panels [172], bleed air deflector panels [173], bleed air deflector panels [174] and the bleed air deflector panel [175] from the forward inner cowl support on the fan hub frame (Figure 408).

(a) Remove the screws [176] from the bleed air deflector panels.

(b) Remove the bleed air deflector panels [171], bleed air deflector panels [172], bleed air deflector panels [173], bleed air deflector panels [174] and the bleed air deflector panel [175] from the forward inner cowl support.

(c) Apply the tape, G02350 [C10-012] to the openings in the forward inner cowl support.

SUBTASK 71-00-05-020-014-H01

(17) Remove the lower bifurcation bridge [190] at the 6:00 o'clock position of the forward inner cowl support (Figure 409).

NOTE: Do not remove the lower firewall assembly from the aft fan case.

(a) Remove the five nuts [197] and washers [192] at the lower bifurcation bridge [190].

(b) Remove the four bolts [193] and washers [194] from the lower bifurcation bridge [190].

(c) Remove the lower bifurcation bridge [190] up and away from the lower bifurcation firewall [191].

SUBTASK 71-00-05-020-015-H01

(18) Remove the upper bifurcation bridge [196] at the 12:00 o'clock position of the forward inner cowl support (Figure 409).

NOTE: Do not remove the upper firewall assembly from the aft fan case.

(a) Remove the nine nuts [197] and washers [192] at the upper bifurcation bridge.

(b) Remove the four bolts [193] and washers [194] from the upper bifurcation bridge.

(c) Remove the upper bifurcation bridge [196] down and away from the upper bifurcation firewall [195].

SUBTASK 71-00-05-020-016-H01

(19) Do this task: Fan Rotor Spinner Removal, TASK 72-21-01-000-801-H01.

SUBTASK 71-00-05-020-017-H01

(20) Remove all the fan blades (TASK 72-21-02-020-802-H01).

SUBTASK 71-00-05-010-003-H00

(21) Pull the fan blade shim forward and remove the disk post.

SUBTASK 71-00-05-010-004-H00

(22) Remove the barrel nut and retaining ring from radial hole on the forward end of the fan disk post.

(a) Insert the o-ring pick, COM-7293 (or equivalent) into the opening of the retaining ring.

(b) Hook into the side of the retaining ring and remove the barrel nut and retaining ring unit.

SUBTASK 71-00-05-020-018-H01

(23) Remove the six booster acoustic panels [221] from the fan booster (Figure 410).

(a) Loosen or remove the fifty four screws [222] that attach the acoustic panels to the fan booster.

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CAUTION

DO NOT USE A SHARP TOOL TO PRY OR REMOVE THE ACOUSTIC PANELS, DAMAGE TO THE ACOUSTIC PANELS OR THE FAN BOOSTER CAN OCCUR.

(b) Pull the booster acoustic panels [221] forward to disengage from the fan booster.

(c) Remove the booster acoustic panels [221] from the fan booster.

SUBTASK 71-00-05-010-002-H00

(24) Remove the leading edge splitter [270] from the fan booster:

ARO ALL PRE SB 777-GE100-75-0003

(a) Remove the bolts [272] that attach the four low pressure compressor anti-ice tubes [273] to the leading edge splitter [270].

NOTE: The low pressure compressor anti-ice tubes [273] are located at he 1:30, 4:30, 7:30 and 10:30 o'clock positions.

ARO ALL

(b) Remove the fifty bolts [271] that attach the leading edge splitter [270] to the stage 1 and stage 2 vane assembly flange.

NOTE: Do not remove the bolts and nuts in the bolt hole number 7, 21, 35, and 47. The bolts and nuts at these locations are held the stage 1 and stage 2 vane assembly together while the leading edge splitter is removed.

(c) Remove the leading edge splitter [270] from the fan booster.

SUBTASK 71-00-05-480-002-H01

CAUTION

USE EXTREME CARE WHEN YOU HANDLE THE POWER PLANT BECAUSE OF THE WEIGHT INVOLVED. THE POWER PLANT COULD DROP AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE POWER PLANT.

CAUTION

TURN THE FRONT WHEELS OF THE TRANSPORTATION STAND UNTIL THEY ARE PERPENDICULAR TO THE REAR WHEELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE STAND OR THE FAN STATOR MODULE CAN OCCUR.

(25) Install the separation fixture, SPL-4184 (9C6030P01), under the fan stator module [224].

(a) Use the engine stand jacks to level and stabilize the engine cradle/stand, SPL-4919 (9C6001G05).

NOTE: There are three different transportation stands that you can use; 9C6001G05, or 9C6025P02.

(b) Swivel forward casters parallel to the engine cradle/stand, SPL-4919.

(c) Attach the forward support plates [231] from the separation fixture, SPL-4184 (9C6030P01) to the two ground handling brackets located on the stiffening rib of the fan case [235] just aft of the forward flange with four bolts and nuts.

NOTE: Ground handling brackets are located on the horizontal centerline and approximately 45 degrees below the center line.

(d) Attach the aft support plates [232] from the separation fixture, SPL-4184 (9C6030P01) to the aft end of the fan case [235].

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1) Attach with pins to the lower ground handling brackets.

NOTE: Twenty inches above the pin attachment point there are padded brackets that rest against the case.

(e) Attach the aft support plate strap to the thrust reverser support bracket approximately 20 inches above the aft support plates [232].

(f) Roll the two side frames into position adjusting the height by using the landing jacks to raise and lower them.

(g) Attach the two forward support plates [231] to the two side frames by putting them on the forward side of the support beam and positioning them over a pin at the center and installing two 4 inch bolts and nuts.

(h) Attach the two aft support plates [232] to the two side frames by positioning them over a pin and attaching them with three bolts and nuts.

(i) Adjust the caster legs until the separation fixture, SPL-4184 (9C6030P01) supports the fan case [235].

(j) Remove the stabilizer wheel assemblies [236] before separating the fan case from the propulsor.

(k) Install the fan frame mount support adapters [234] on the fan hub frame mount brackets at the 3:00 and 9:00 o'clock positions.

1) Adjust the fan frame mount support adapters [234] by the adapter adjustment nuts to the same height as the fan hub frame.

SUBTASK 71-00-05-480-003-H01

(26) Install the stand, SPL-4136 (9C6014G03) on the inside of the fan stator case.

(a) Put the stand, SPL-4136 (9C6014G03) against the OGV's.

(b) Put the straps of the stand around the OGV's.

(c) Tighten the straps to hold the stand against the OGV's.

SUBTASK 71-00-05-020-019-H01

(27) Remove the fan stator module [224] from the engine fan hub frame (Figure 411).

(a) Remove the bolts on the OGVs; do these steps:

1) Remove the one hundred and eight bolts [243] from the fan stator module.

2) Remove the one hundred and eight bolts [243] from the fan hub frame.

(b) Remove the stand, SPL-4136 (9C6014G03) from the inside of the fan stator module.

1) Remove the straps around the OGV's.

2) Remove the stand, SPL-4136 (9C6014G03) from the fan stator module.

CAUTION

THE JOINT BETWEEN THE FAN CASE AND THE PROPULSOR MAY BE TIGHT. IT MAY REQUIRE ADDITIONAL FORCE TO BREAK LOOSE. DO NOT USE THE DOLLY TO APPLY THIS FORCE. PUSH AGAINST THE ENGINE STAND. IT CAN DAMAGE THE ENGINE OR THE DOLLY.

(c) Move the fan stator module [224] slowly away from the engine propulsor.

1) Carefully push the separation fixture, SPL-4184 (9C6030P01), away from the propulsor, adjust legs as necessary to clear fan stator from the propulsor and engine stand.

(d) Remove the fan case acoustic liner protector, SPL-4137 (9C3013G01), from the fan case module at the 6:00 o'clock position.

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(e) Install the protector, SPL-4135 (9C1376G01), on the fan booster.

——— END OF TASK ———

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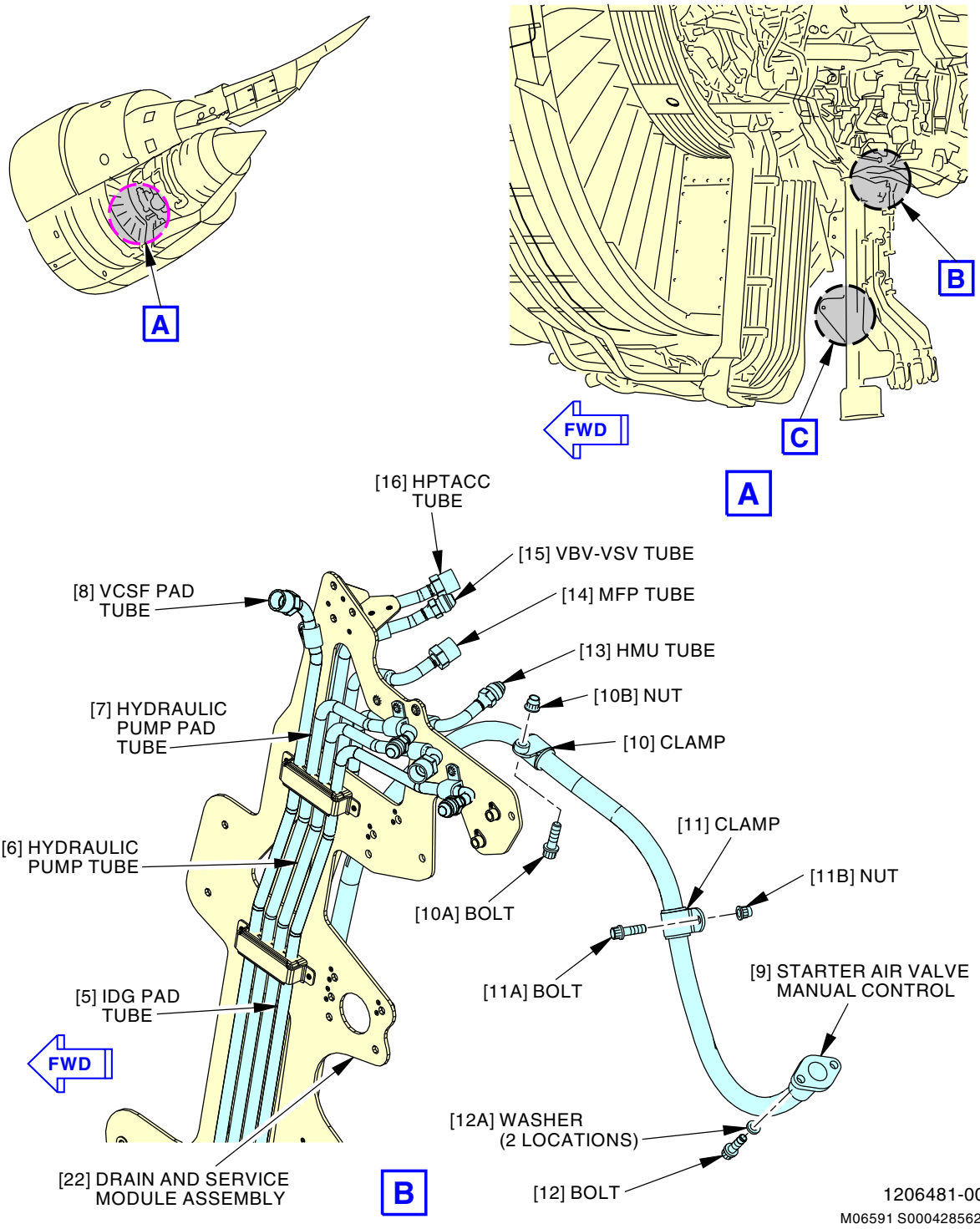

Drain and Service Module Assembly Installation
Figure 401/71-00-05-990-801-H01 (Sheet 1 of 2)

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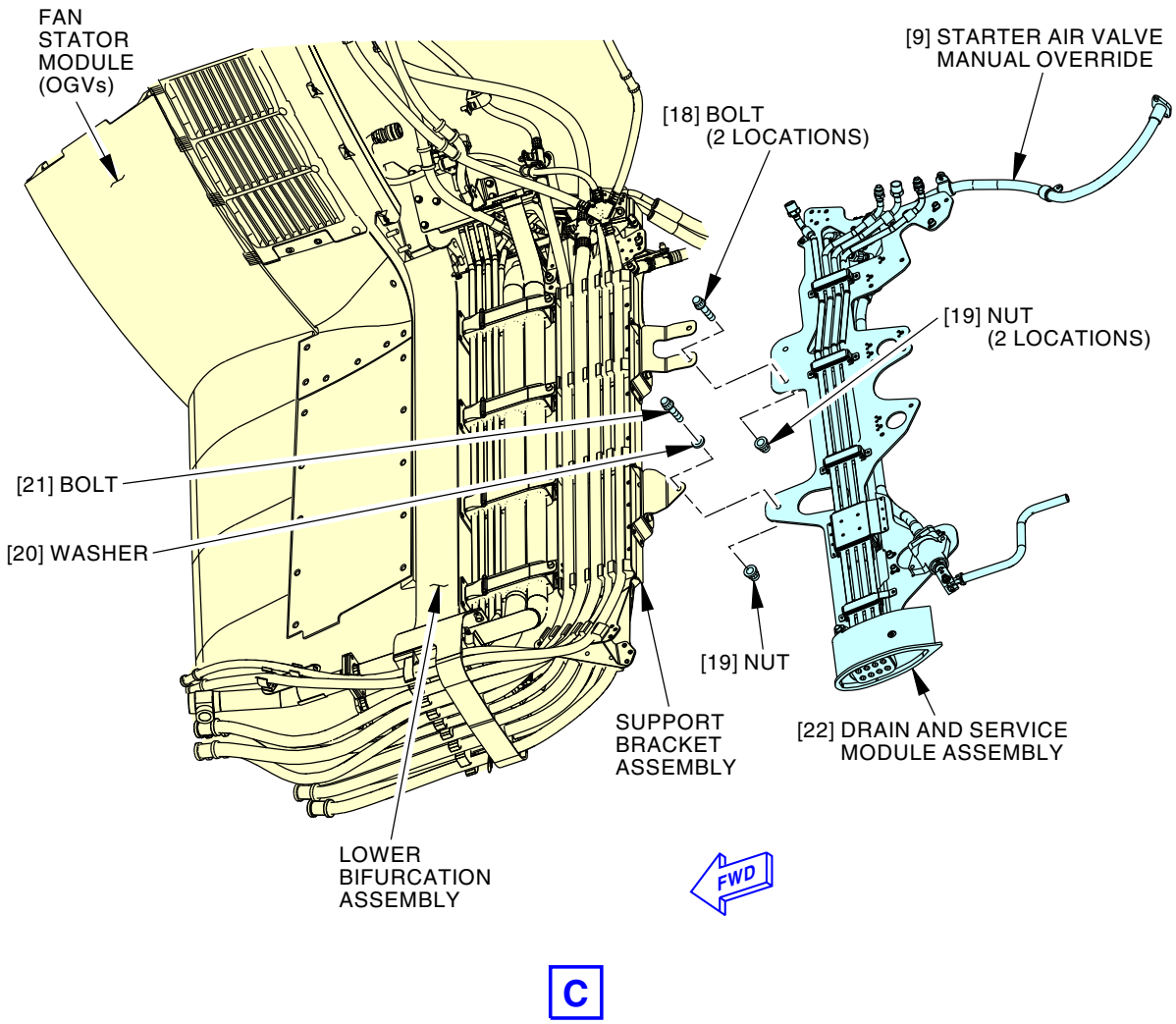

1206482-00-A
M06592 S0004285627_V2

Drain and Service Module Assembly Installation
Figure 401/71-00-05-990-801-H01 (Sheet 2 of 2)

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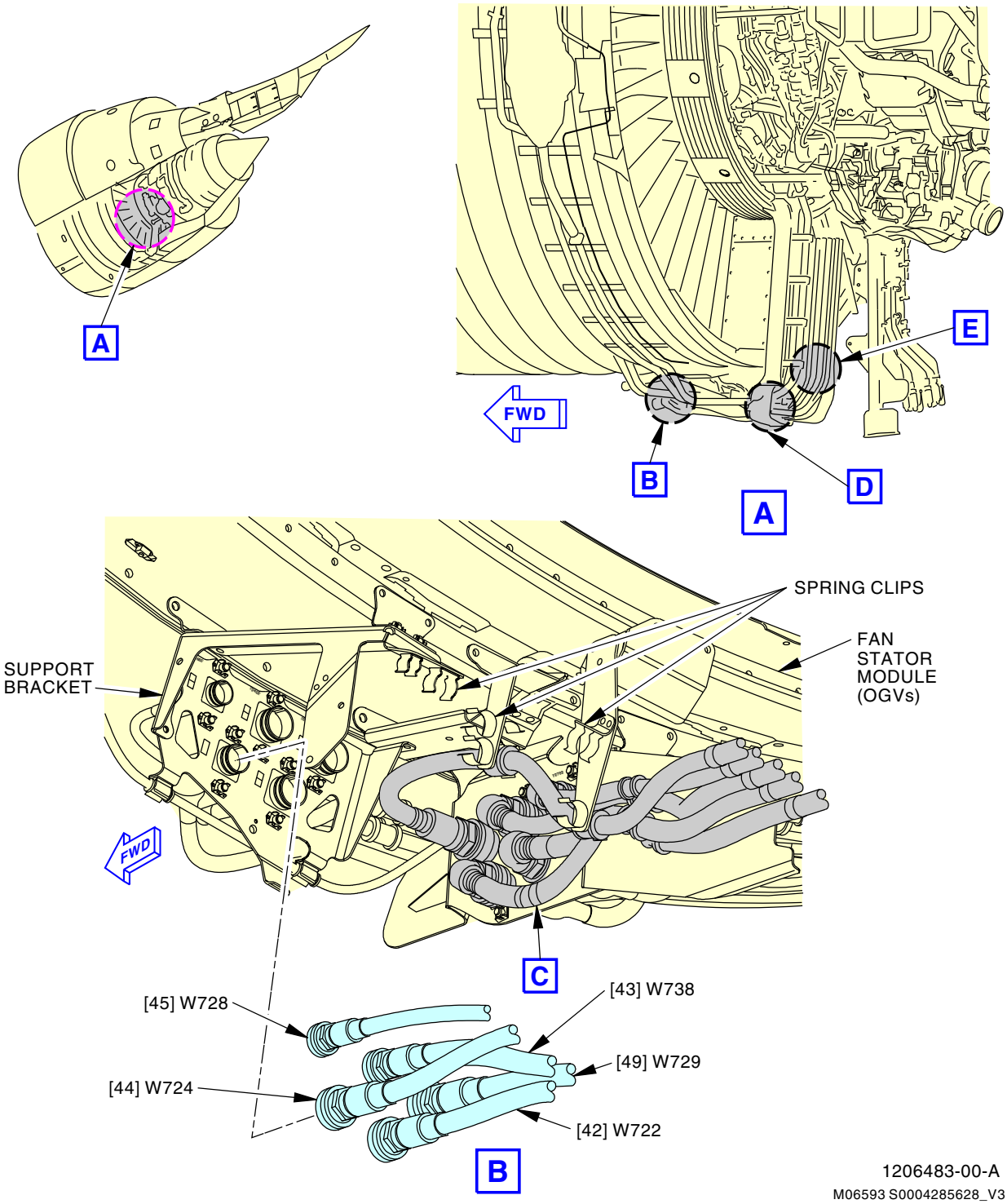

Electrical Harnesses Installation
Figure 402/71-00-05-990-802-H01 (Sheet 1 of 4)

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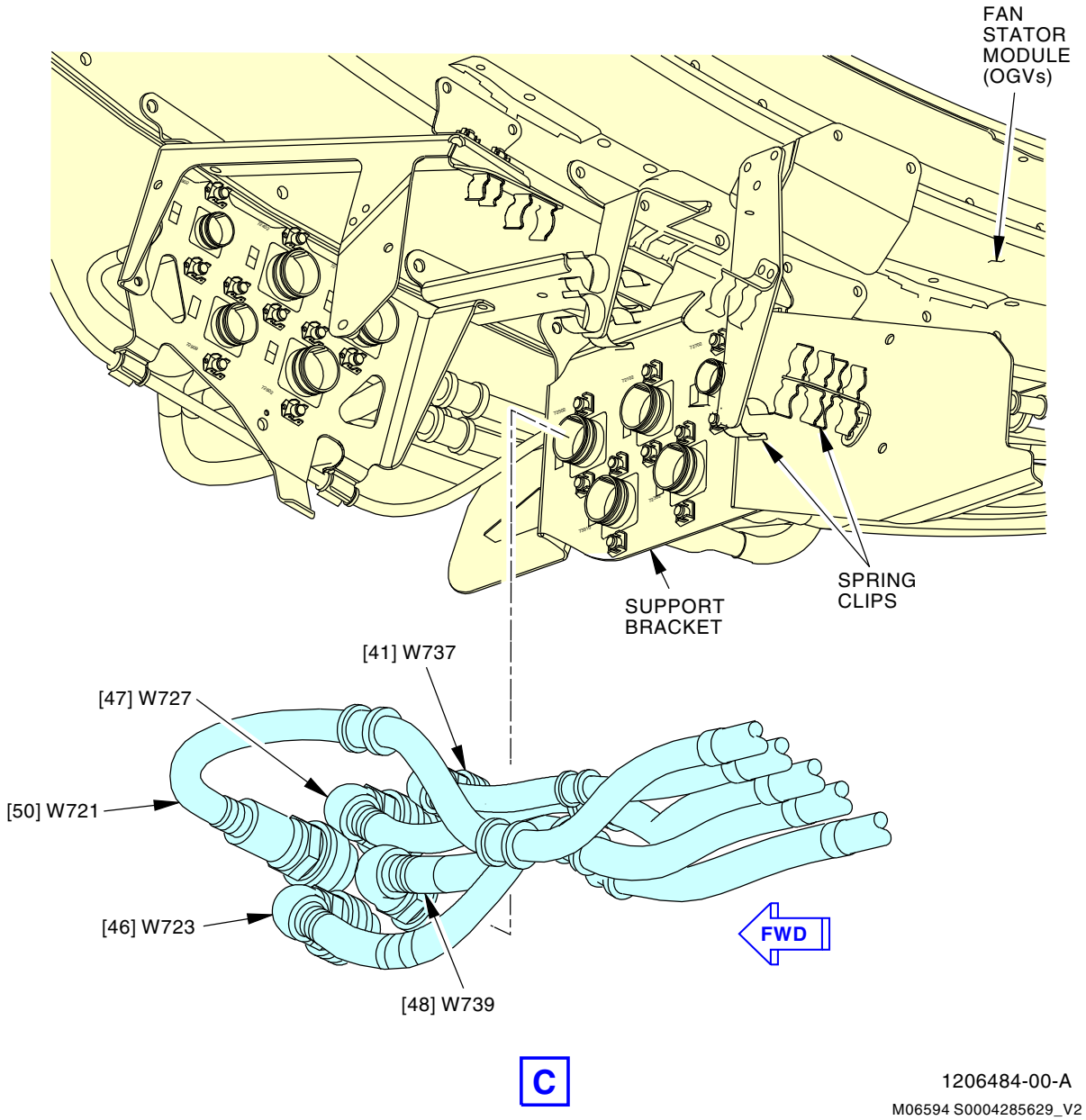

Electrical Harnesses Installation
Figure 402/71-00-05-990-802-H01 (Sheet 2 of 4)

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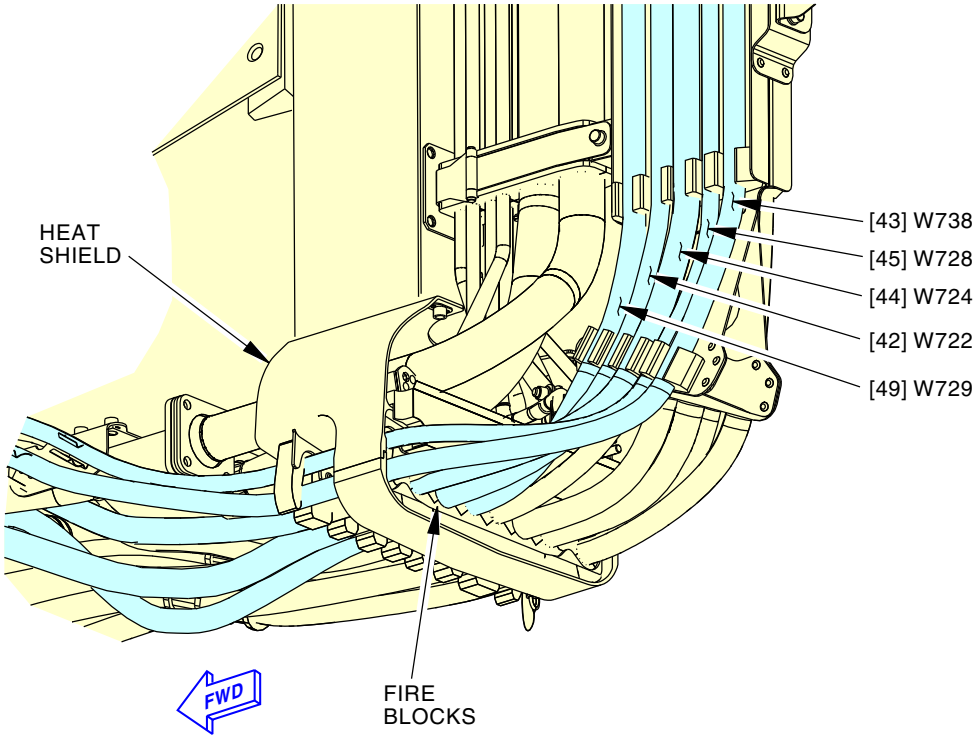

1206485-00-A
M06595 S0004285630_V2

Electrical Harnesses Installation
Figure 402/71-00-05-990-802-H01 (Sheet 3 of 4)

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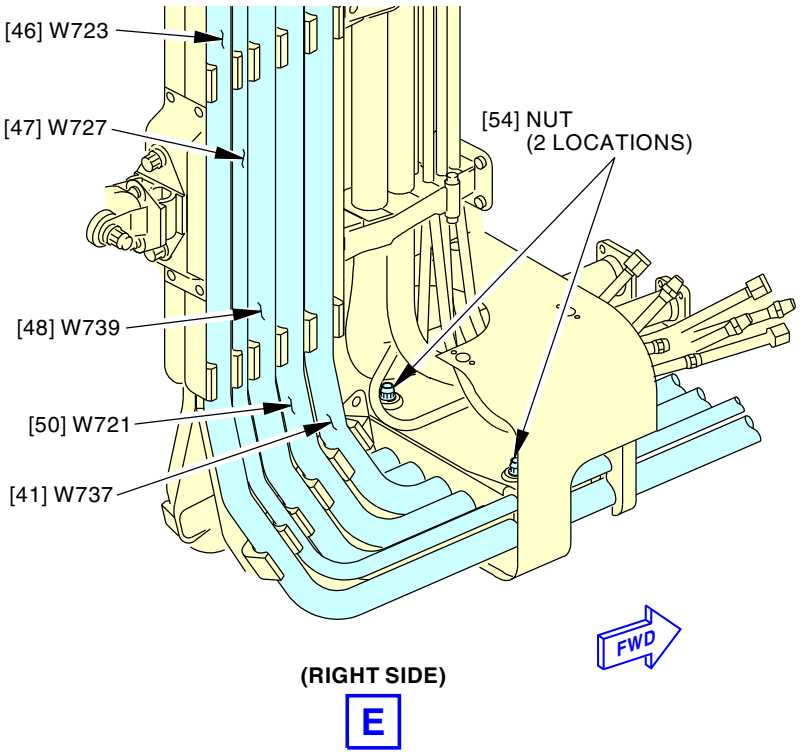

1134065-05-A
M06596 S0004285631_V2

Electrical Harnesses Installation
Figure 402/71-00-05-990-802-H01 (Sheet 4 of 4)

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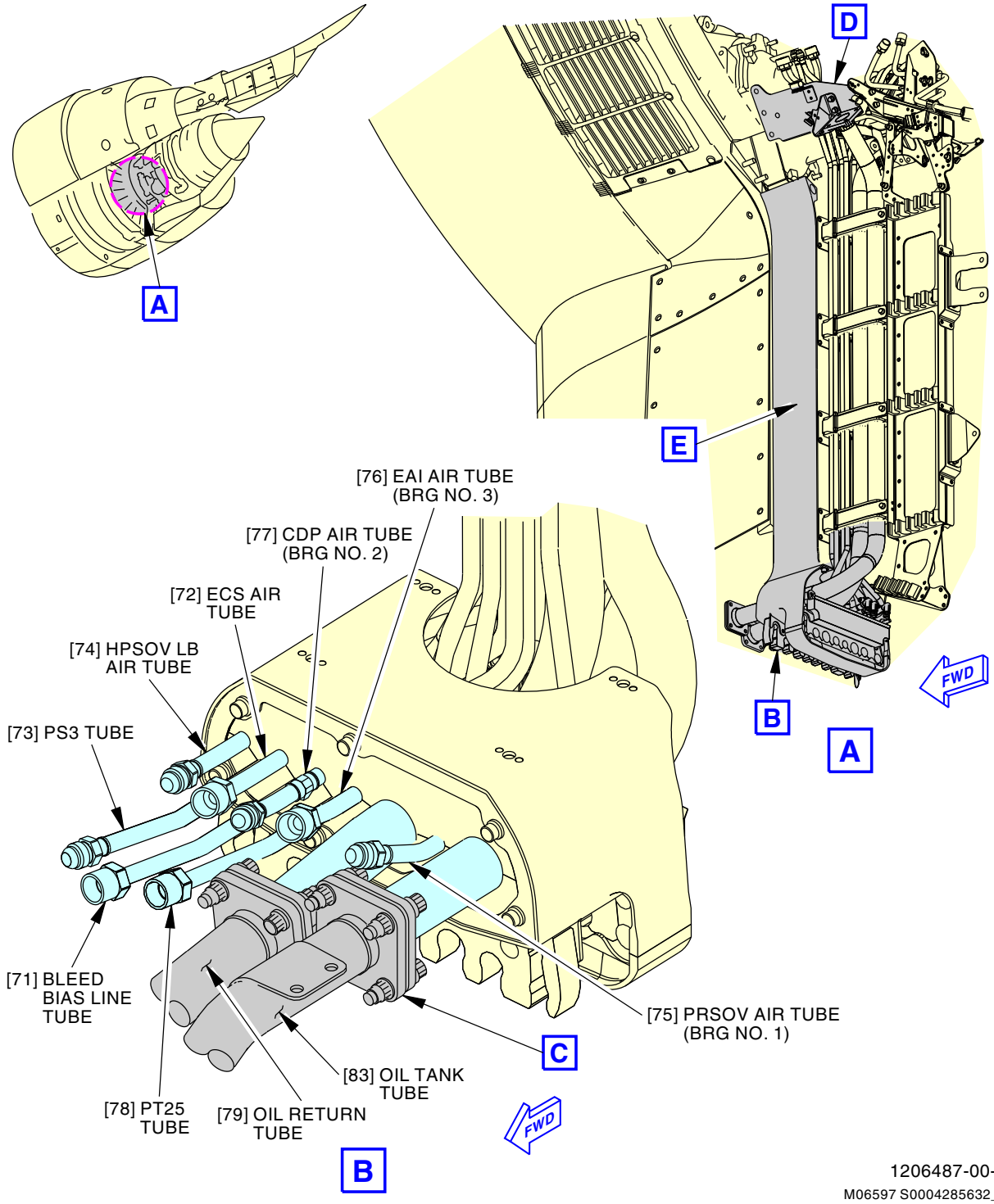
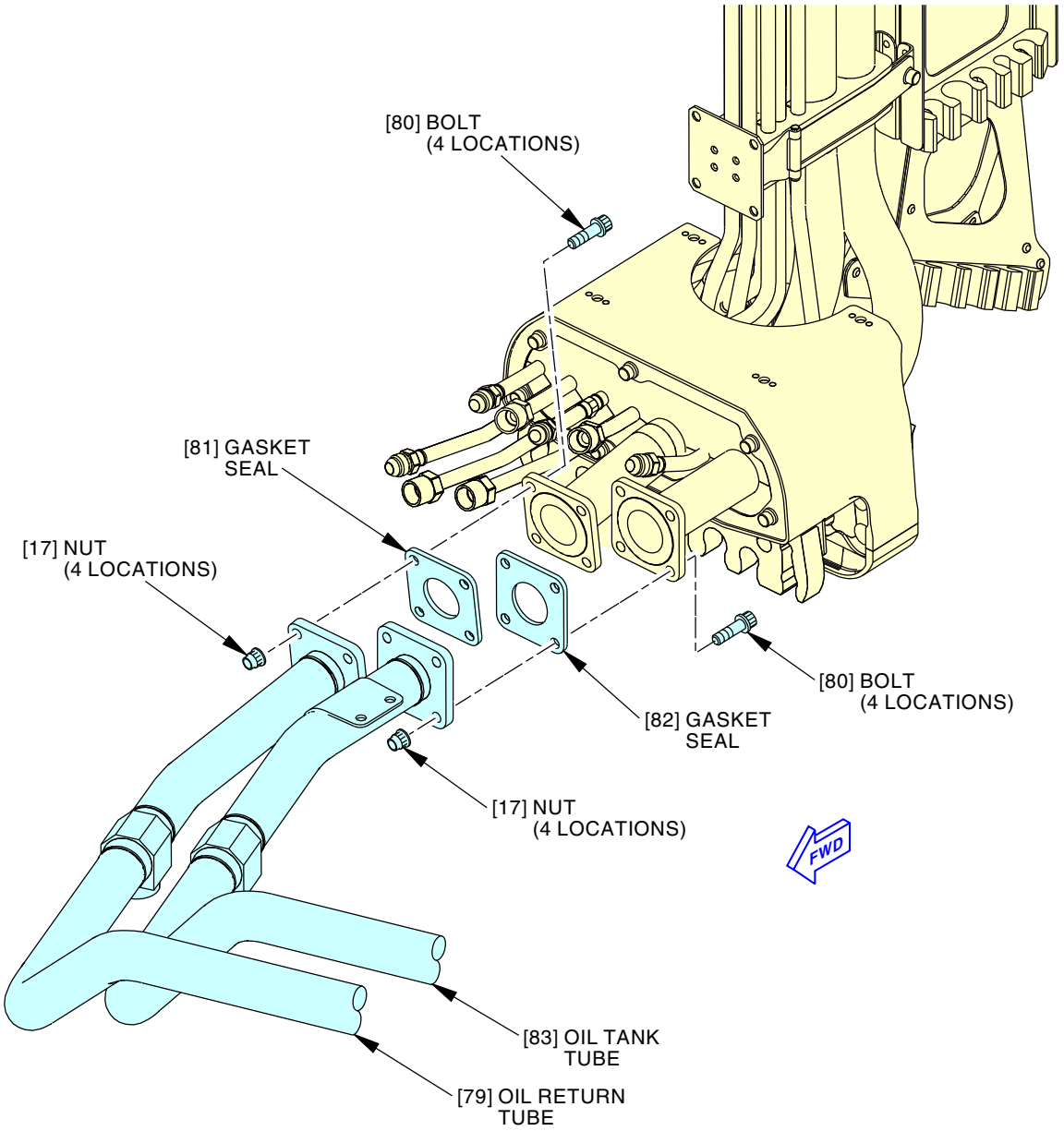


Lower Bifurcation Assembly Installation
Figure 403/71-00-05-990-803-H01 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details



1206488-00-A
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Lower Bifurcation Assembly Installation
Figure 403/71-00-05-990-803-H01 (Sheet 2 of 4)

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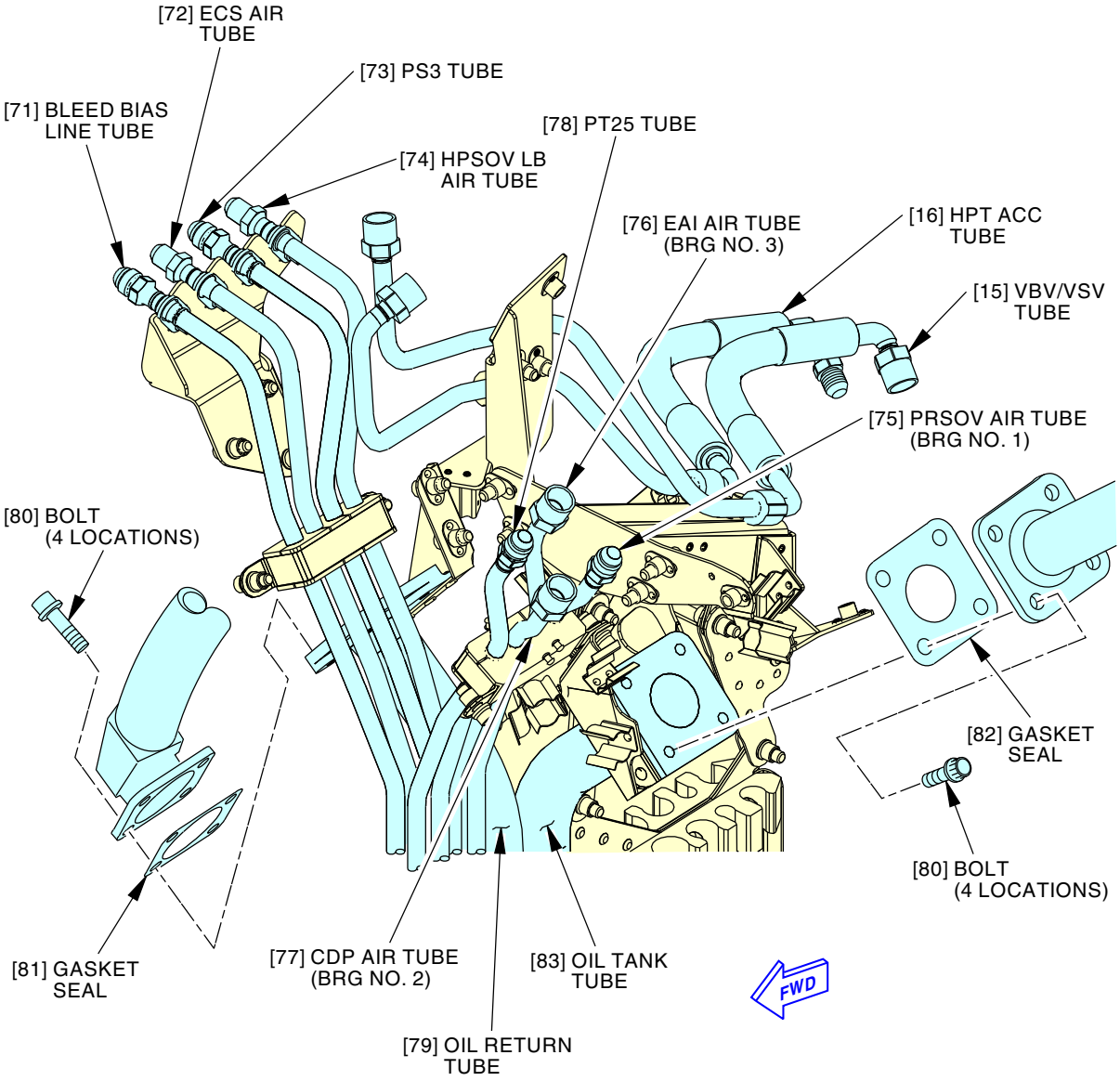

1206489-00-A
M06599 S0004285634_V2

Lower Bifurcation Assembly Installation
Figure 403/71-00-05-990-803-H01 (Sheet 3 of 4)

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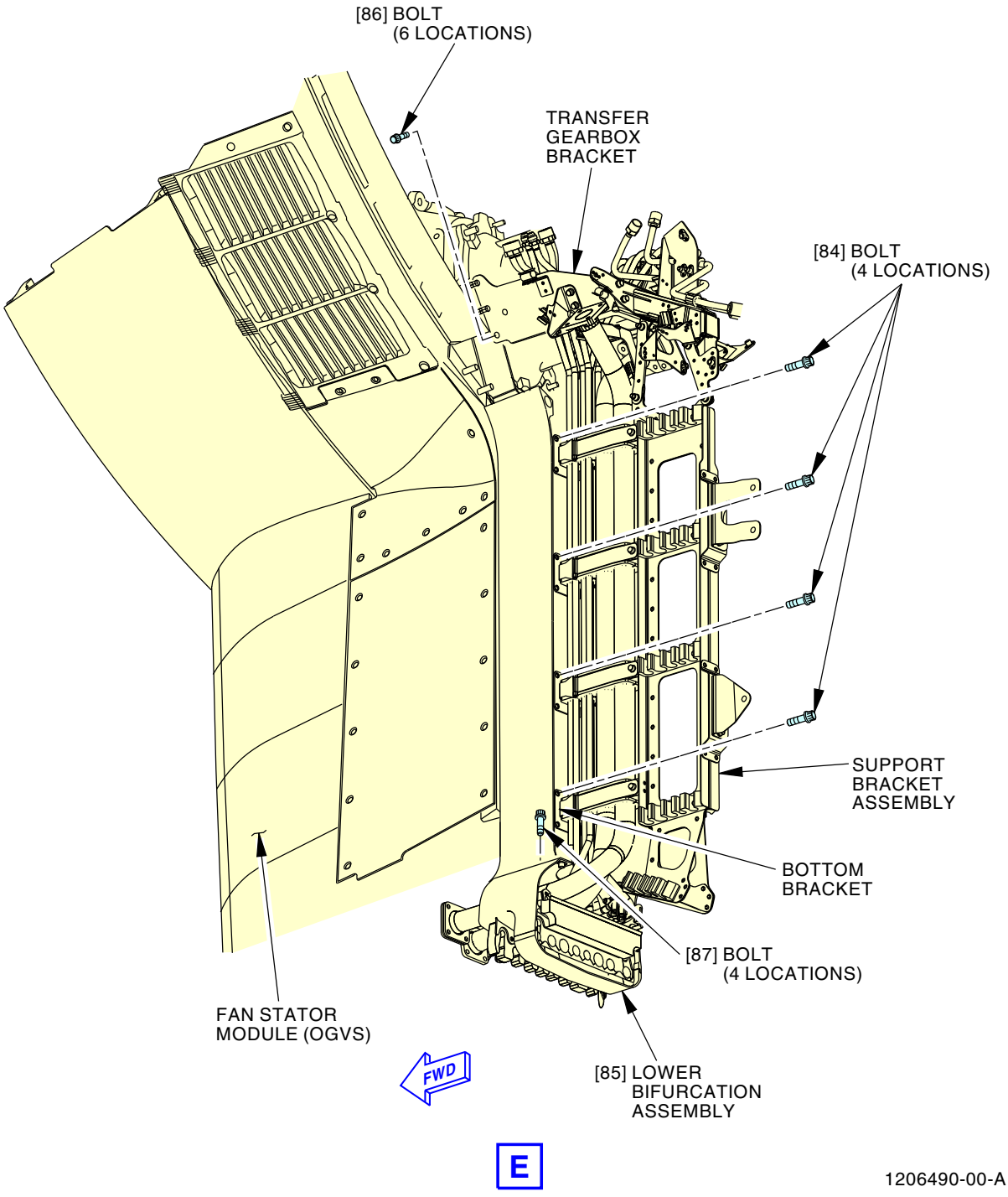

Lower Bifurcation Assembly Installation
Figure 403/71-00-05-990-803-H01 (Sheet 4 of 4)

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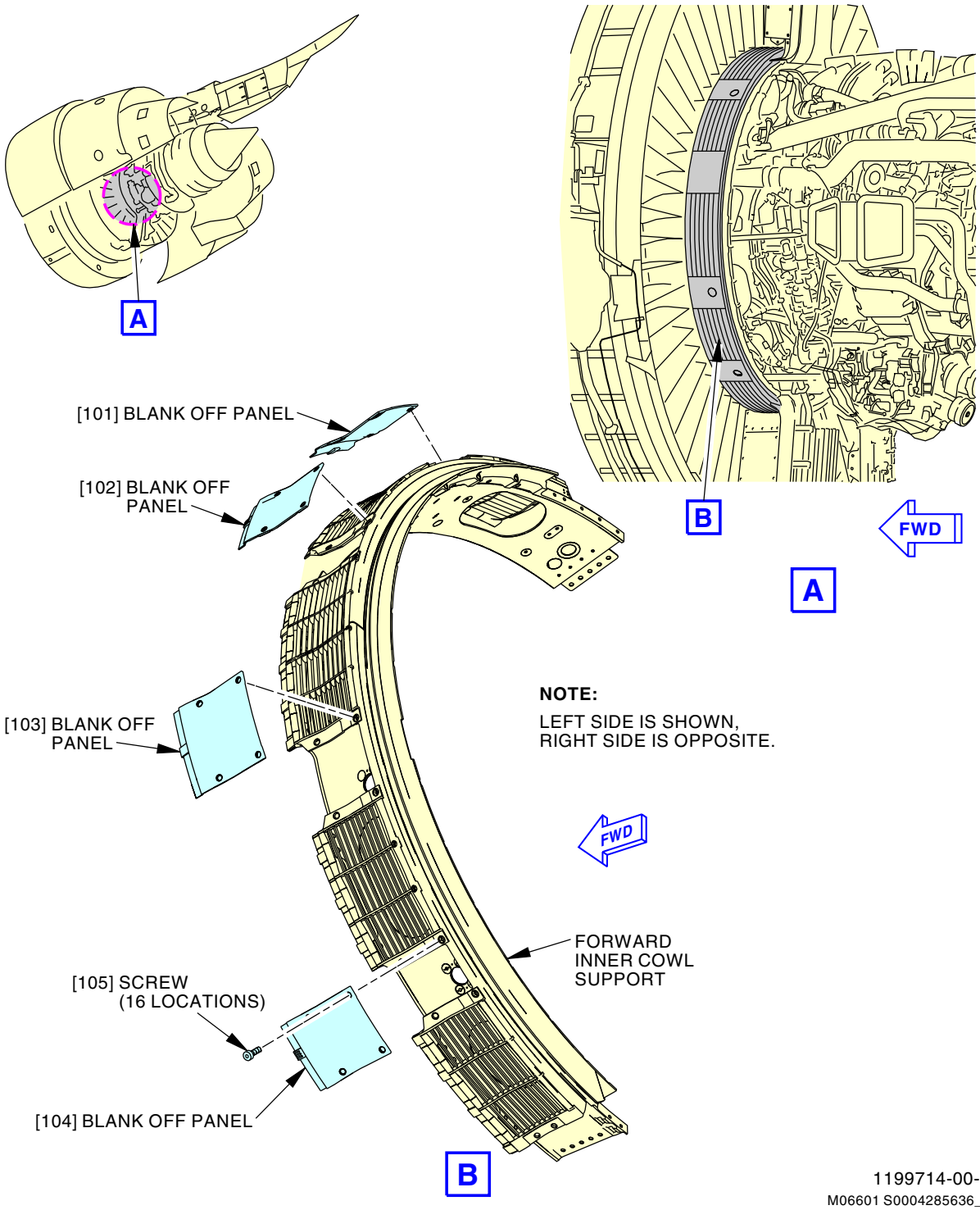

Blank Off Panels Installation
Figure 404/71-00-05-990-804-H01

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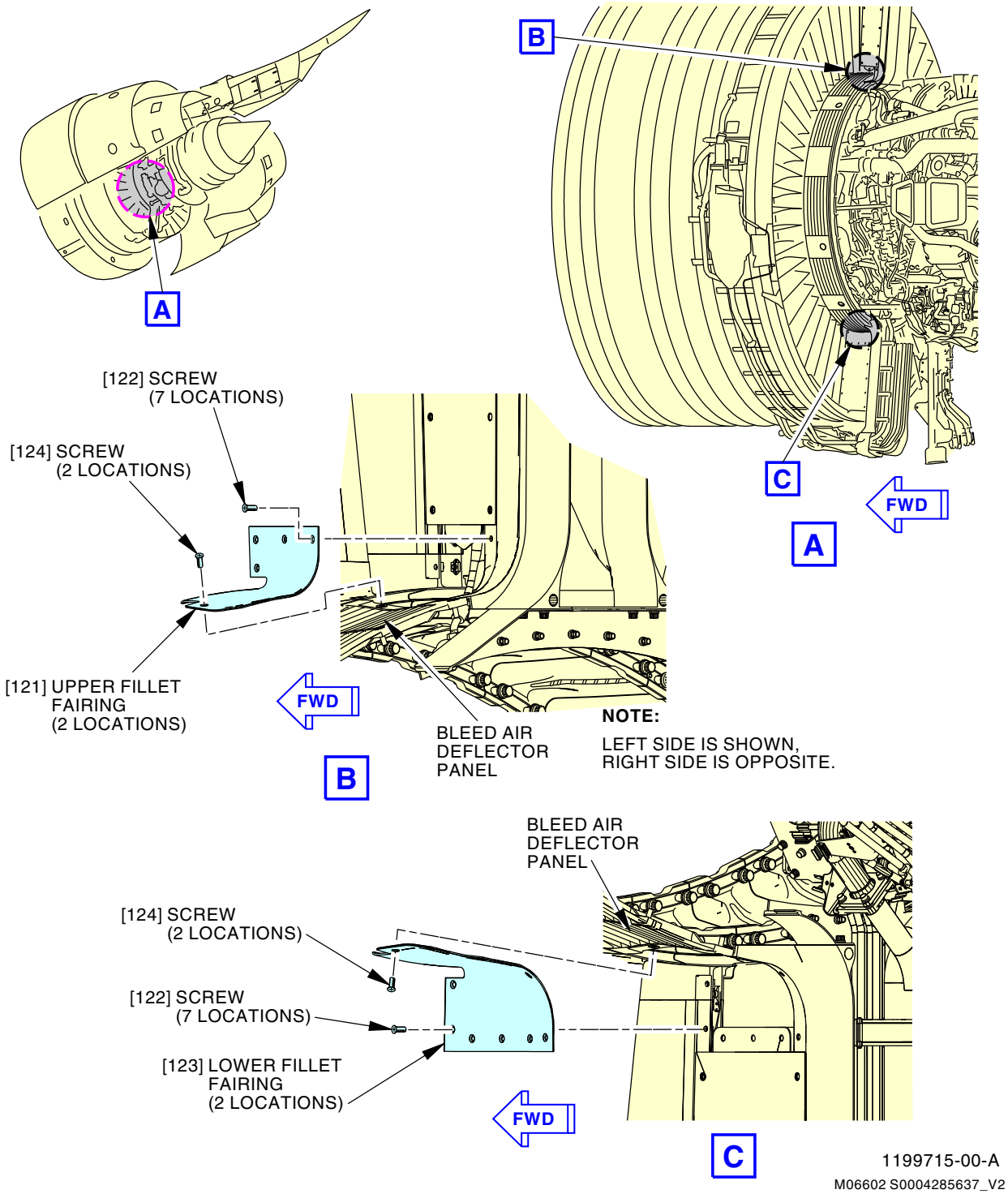

Fillet Fairings Installation
Figure 405/71-00-05-990-805-H01

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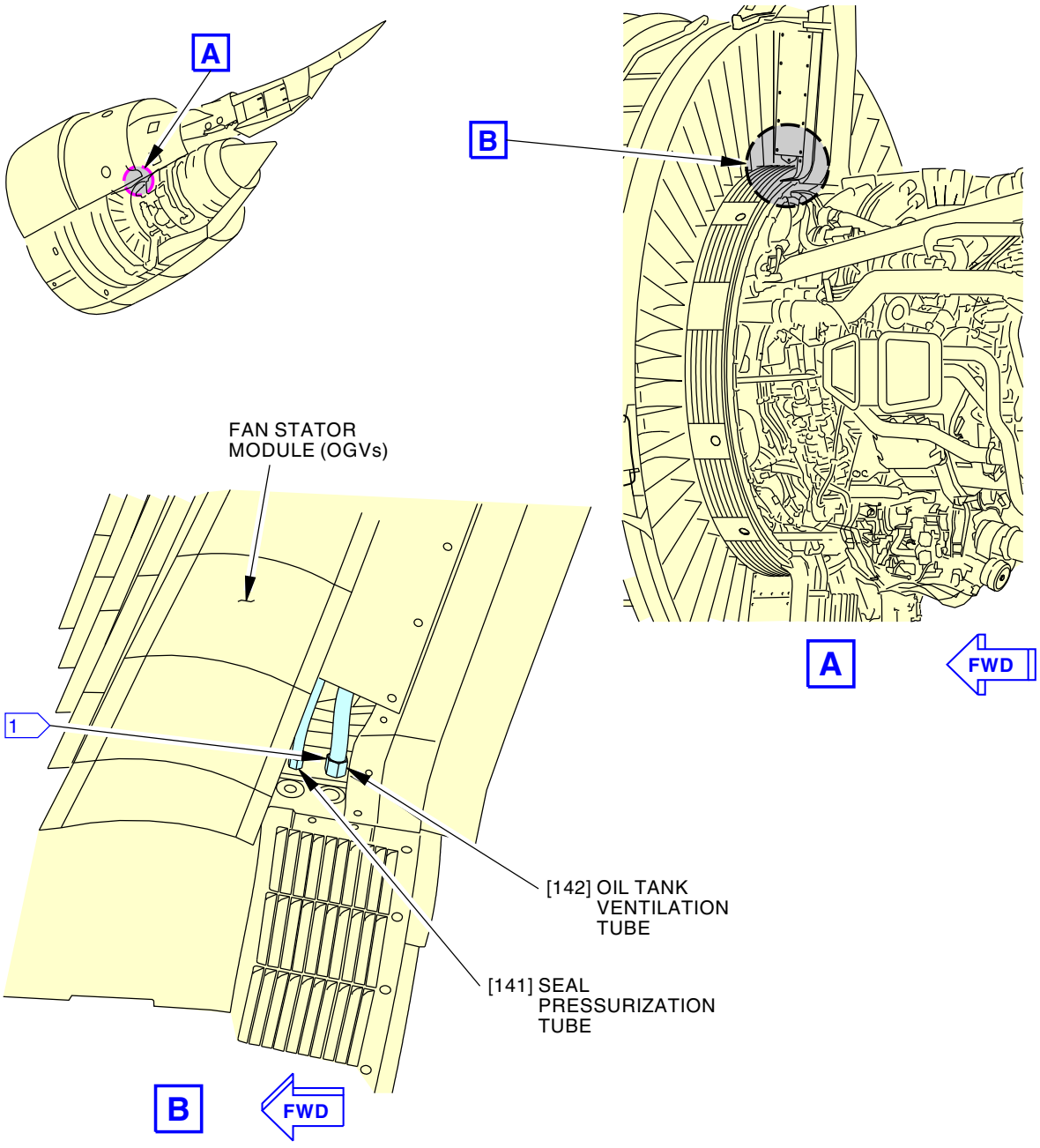

1 A LOOSE B-NUT ON THE OIL TANK VENT TUBE CAN CAUSE OIL LEAKAGE EVENTS WHICH MAY RESULT IN FIRE HAZARDS IN THE GE90 FLEET.

1209546-00-A

M06603 S0004285638_V2

Seal Pressurization and Oil Tank Ventilation Tubes Installation
Figure 406/71-00-05-990-806-H01

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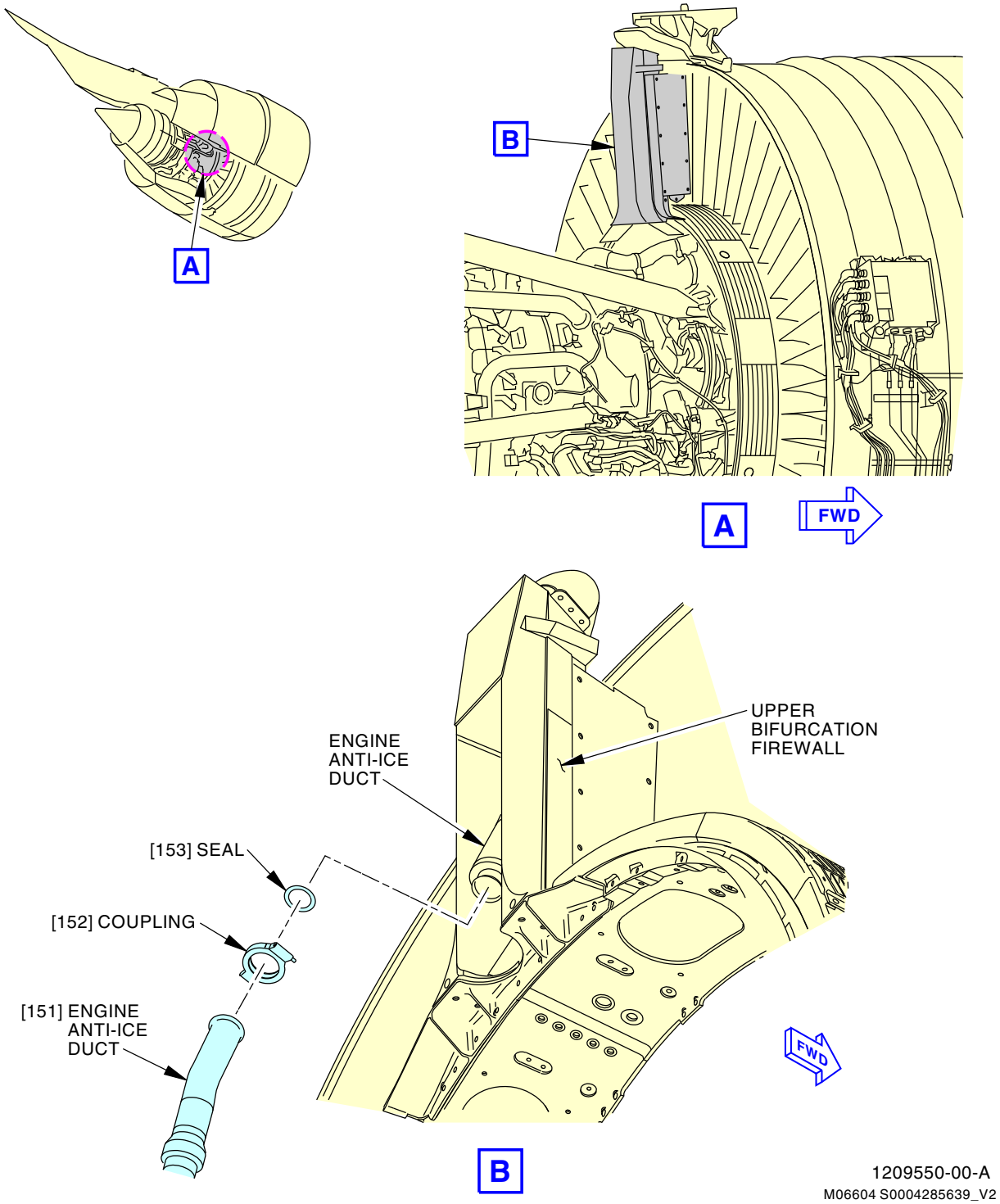

Engine Anti-Ice Duct Installation
Figure 407/71-00-05-990-807-H01

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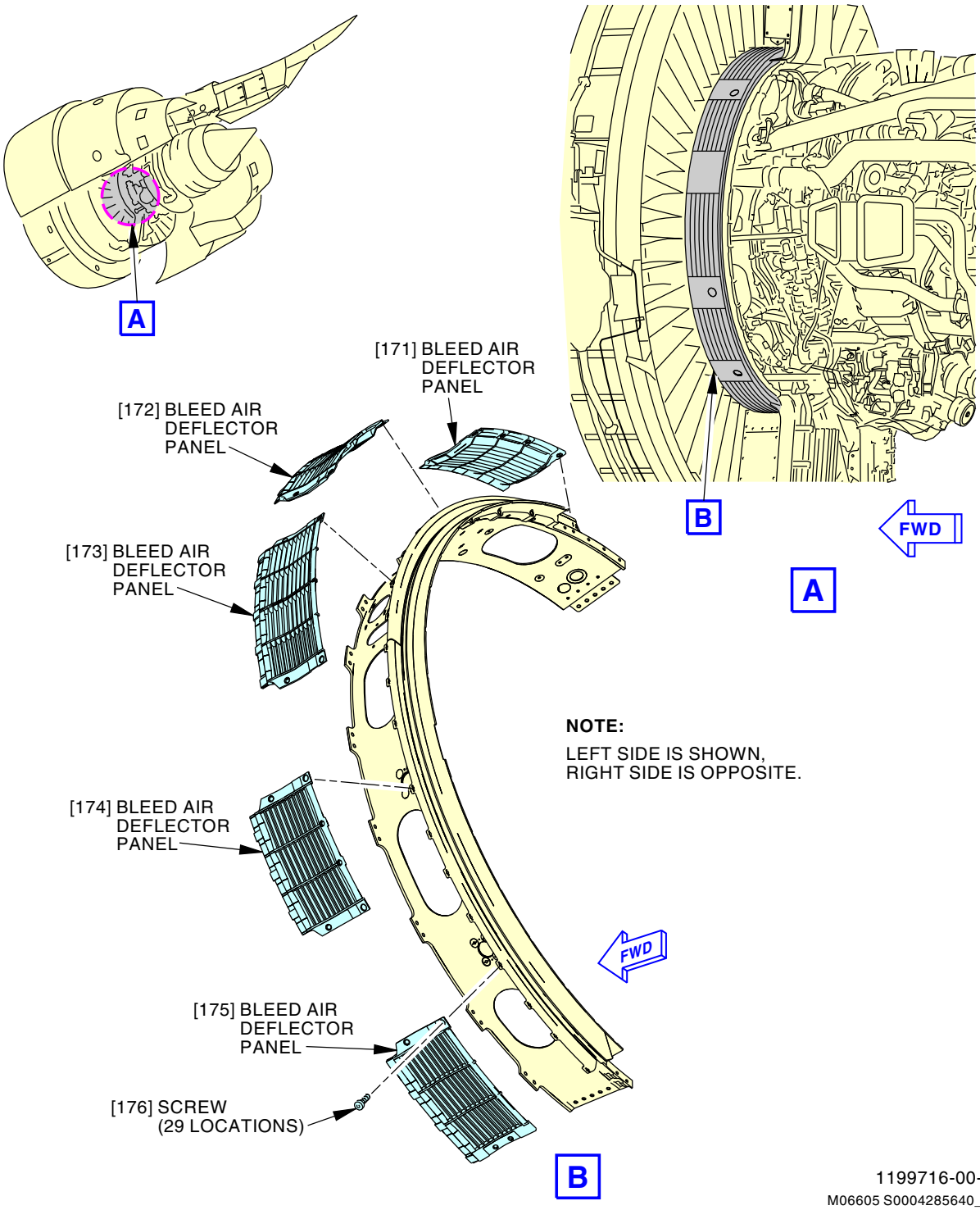
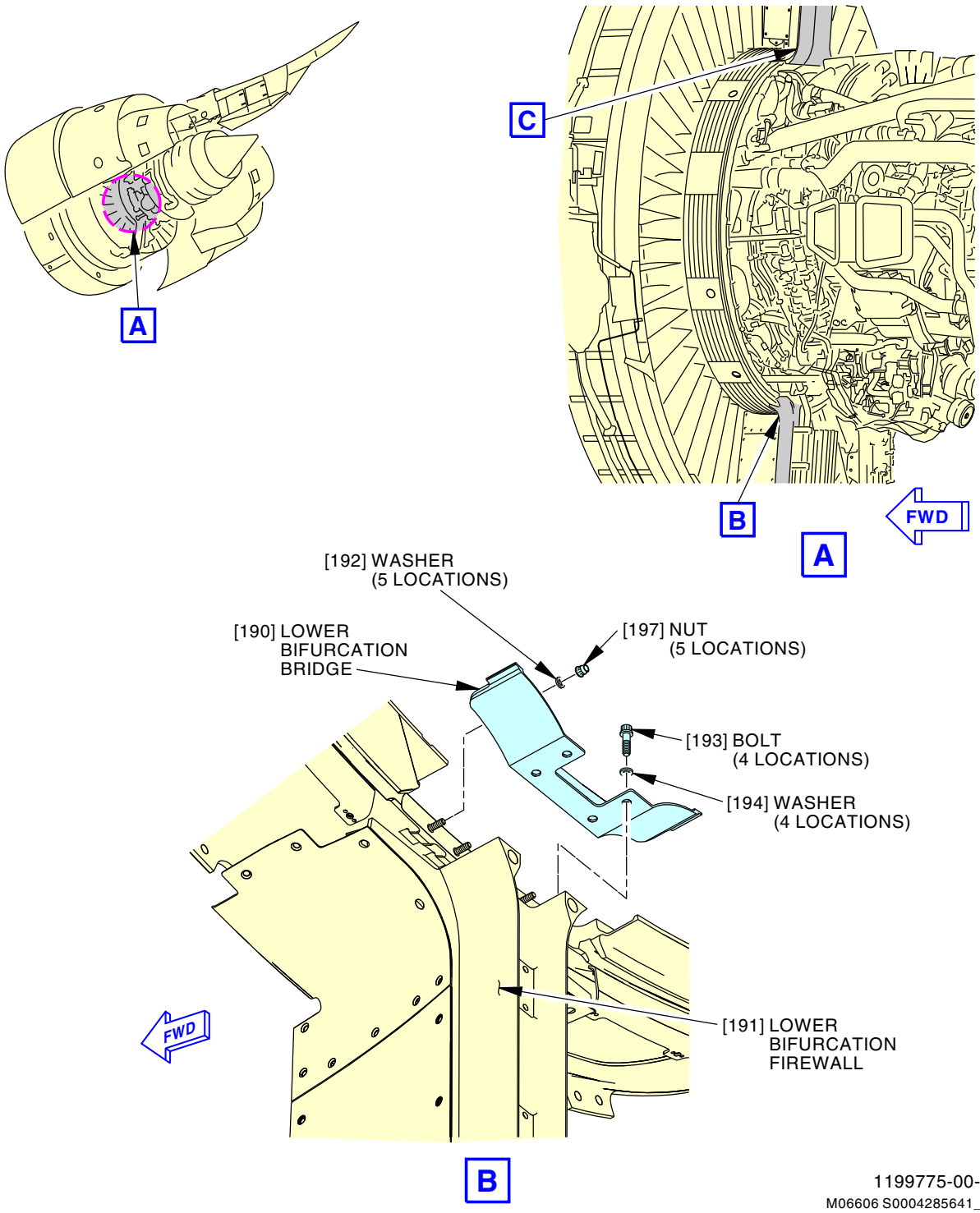


Bleed Air Deflector Panels Installation
Figure 408/71-00-05-990-808-H01

ECCN 9E991 BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details



Lower and Upper Bifurcation Bridges Installation
Figure 409/71-00-05-990-809-H01 (Sheet 1 of 2)

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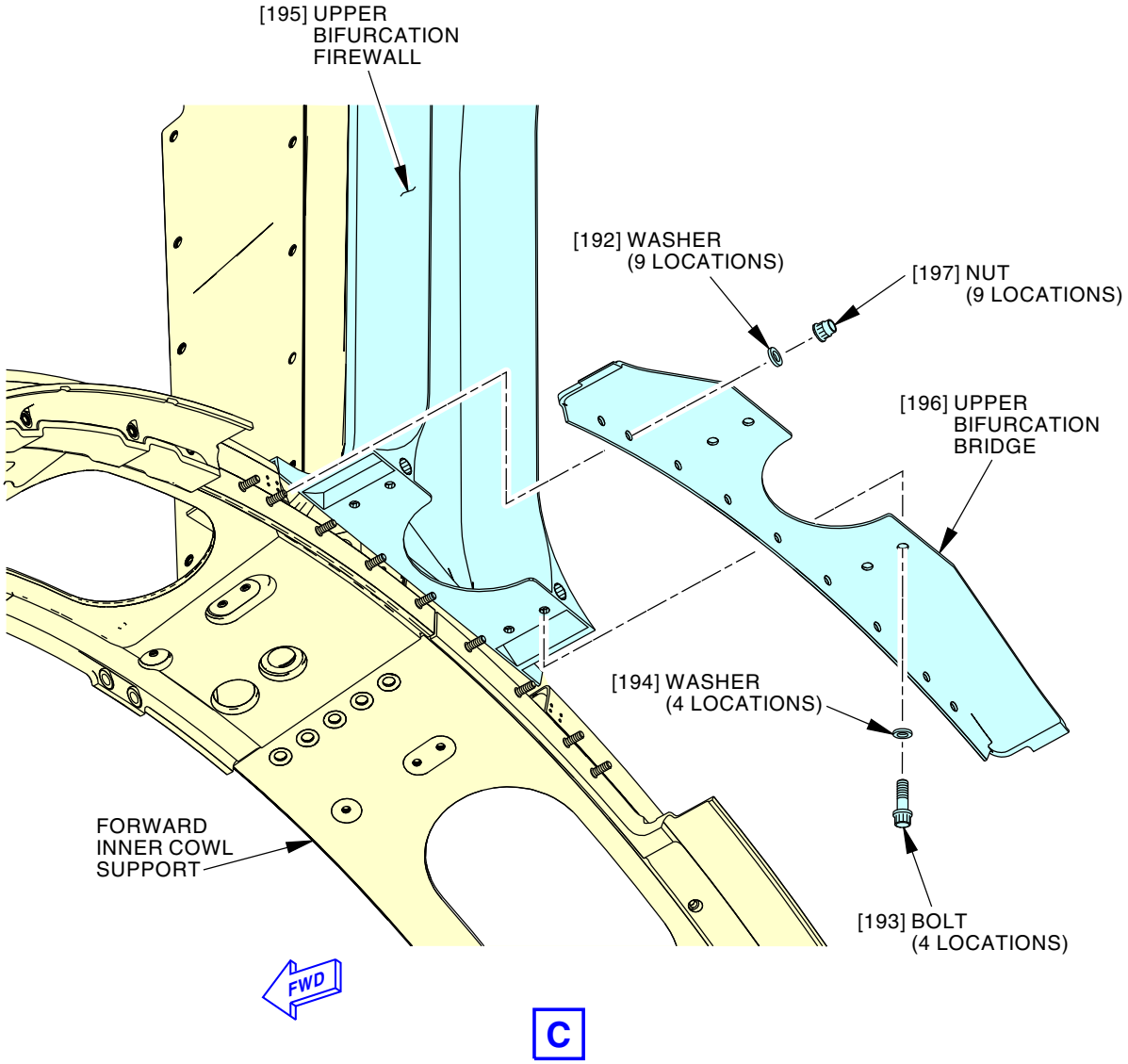

1199776-00-A
M06607 S0004285642_V2

Lower and Upper Bifurcation Bridges Installation
Figure 409/71-00-05-990-809-H01 (Sheet 2 of 2)

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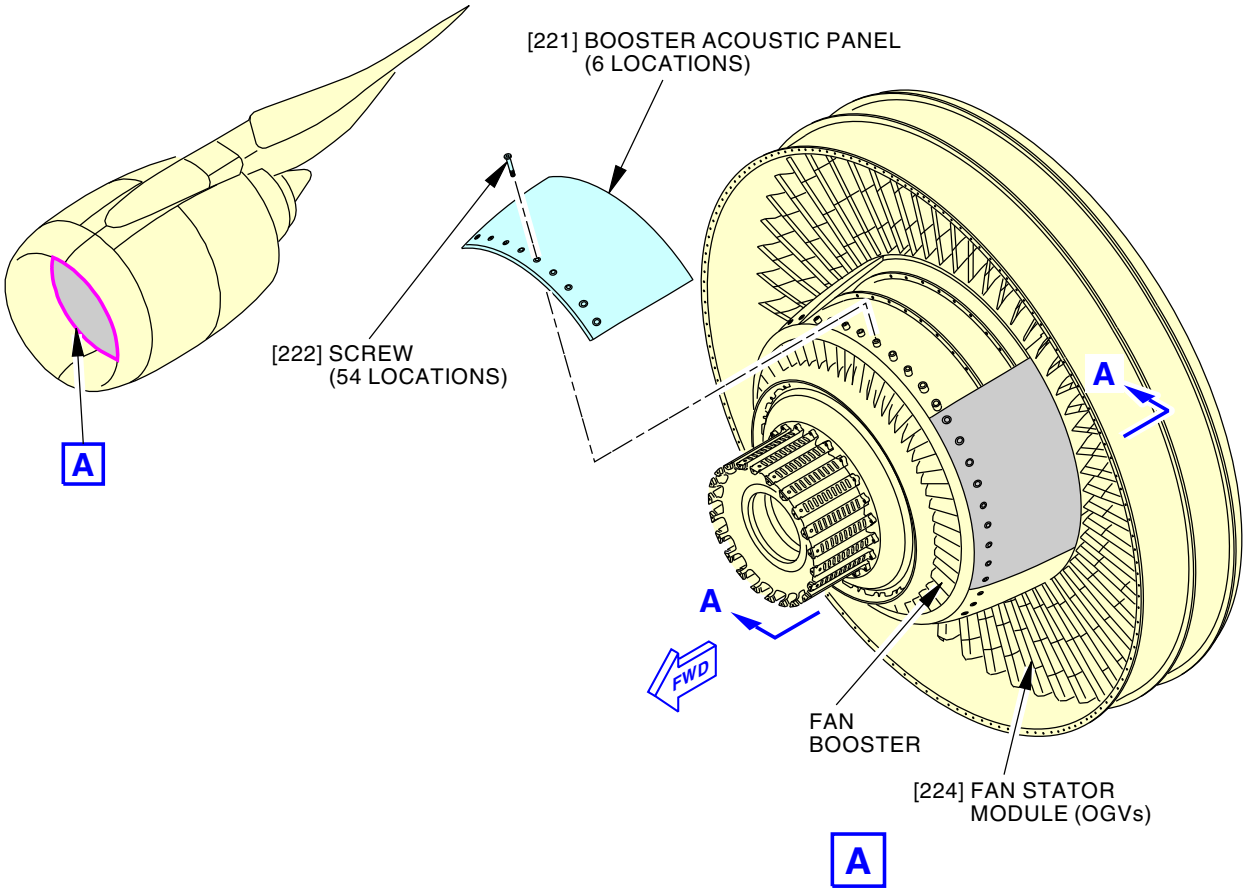

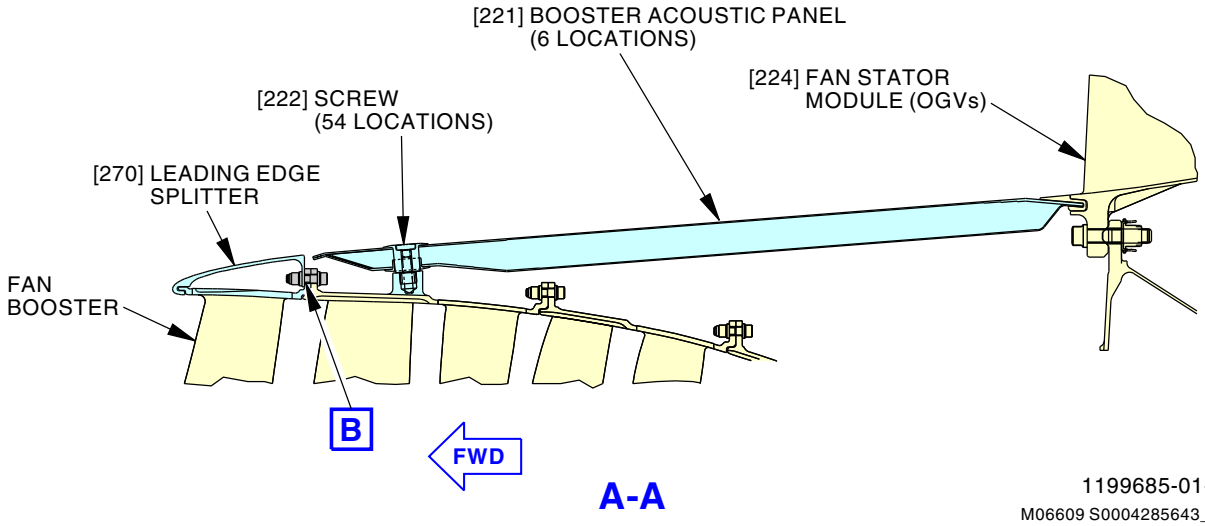

1199685-01-A
M06609 S0004285643_V3

Acoustic Panels and Leading Edge Splitter Installation
Figure 410/71-00-05-990-810-H01 (Sheet 1 of 3)

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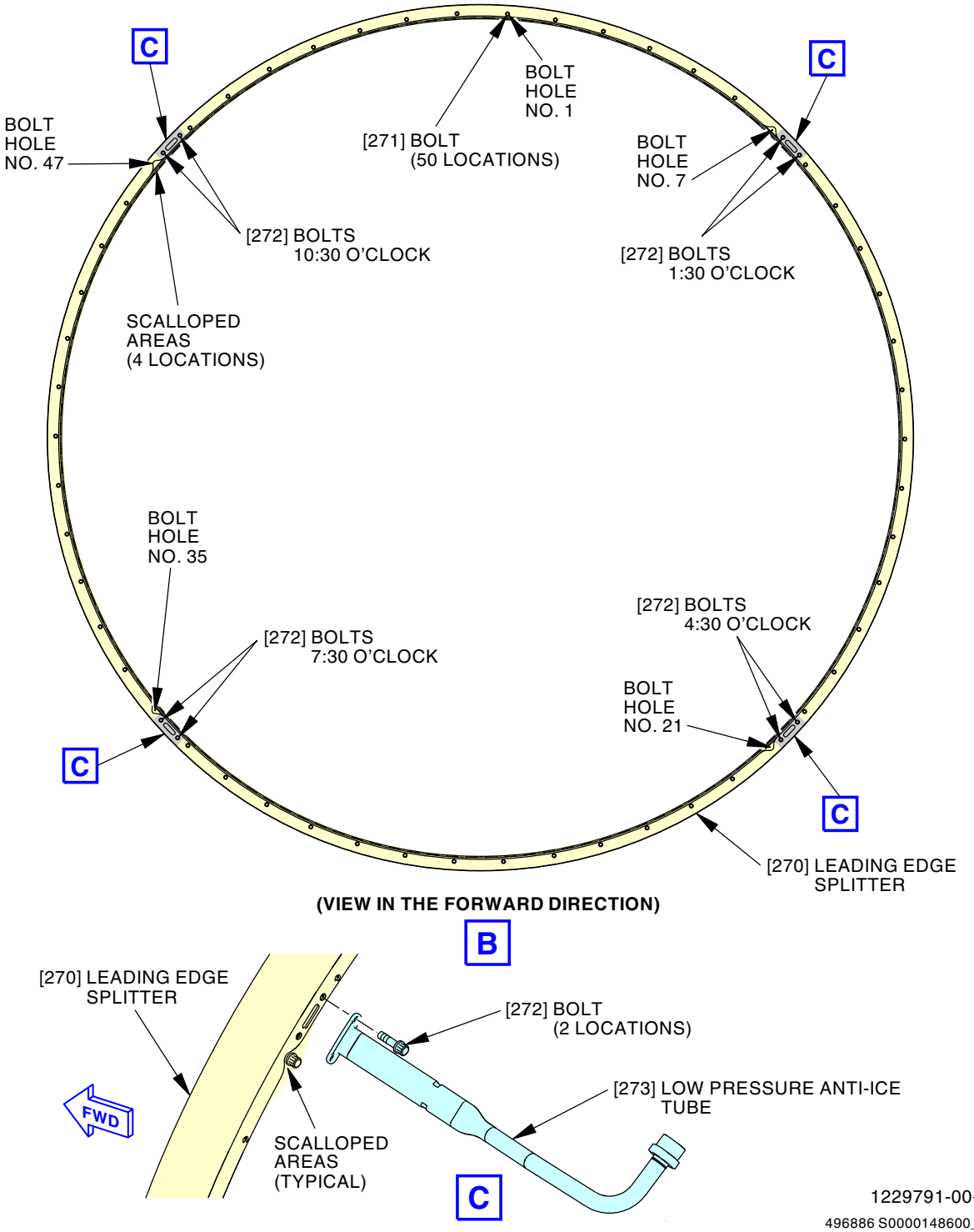

Acoustic Panels and Leading Edge Splitter Installation
Figure 410/71-00-05-990-810-H01 (Sheet 2 of 3)

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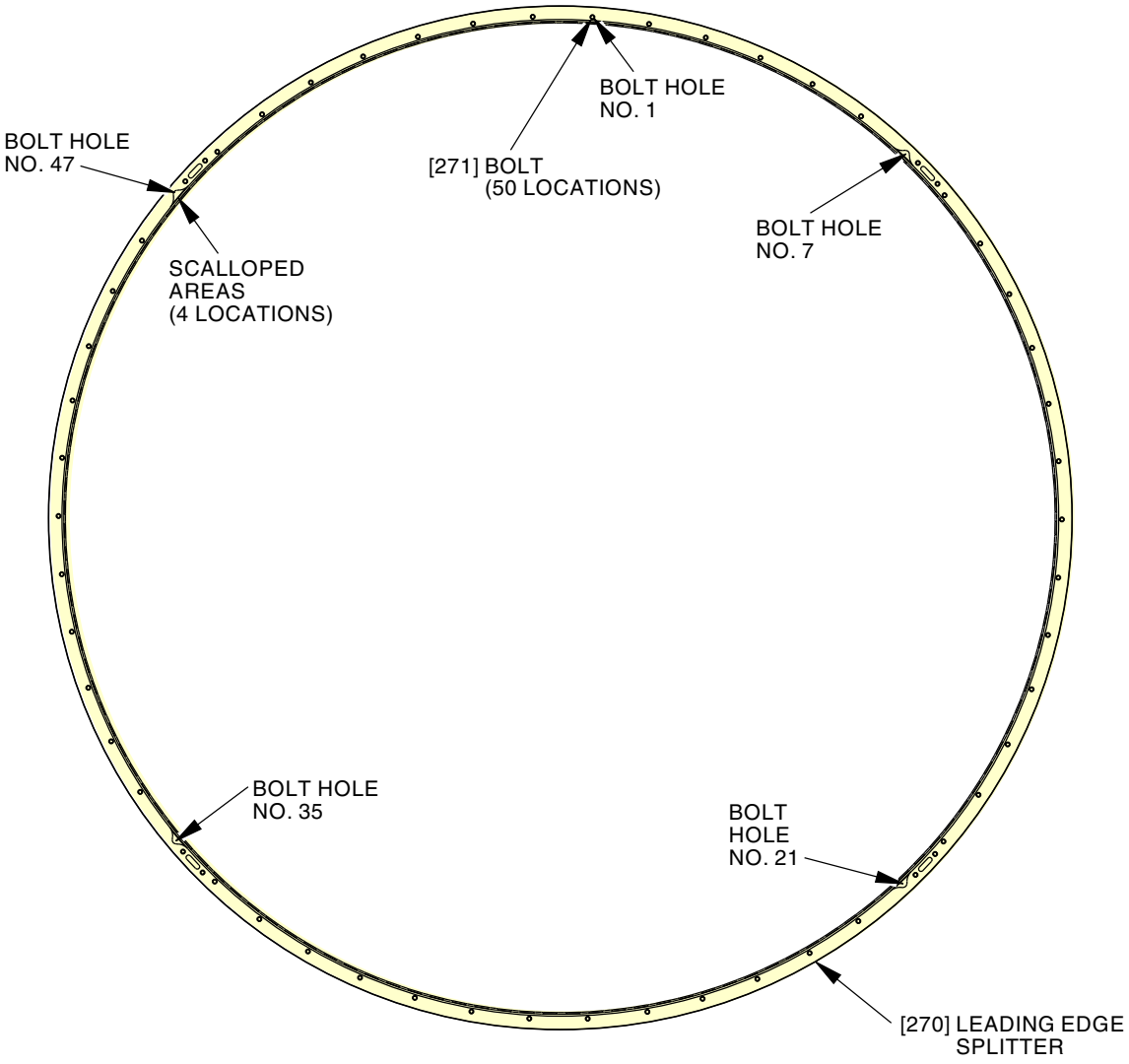

(VIEW IN THE FORWARD DIRECTION)

B

1229791-00-A

2329005 S0000529316_V2

Acoustic Panels and Leading Edge Splitter Installation
Figure 410/71-00-05-990-810-H01 (Sheet 3 of 3)

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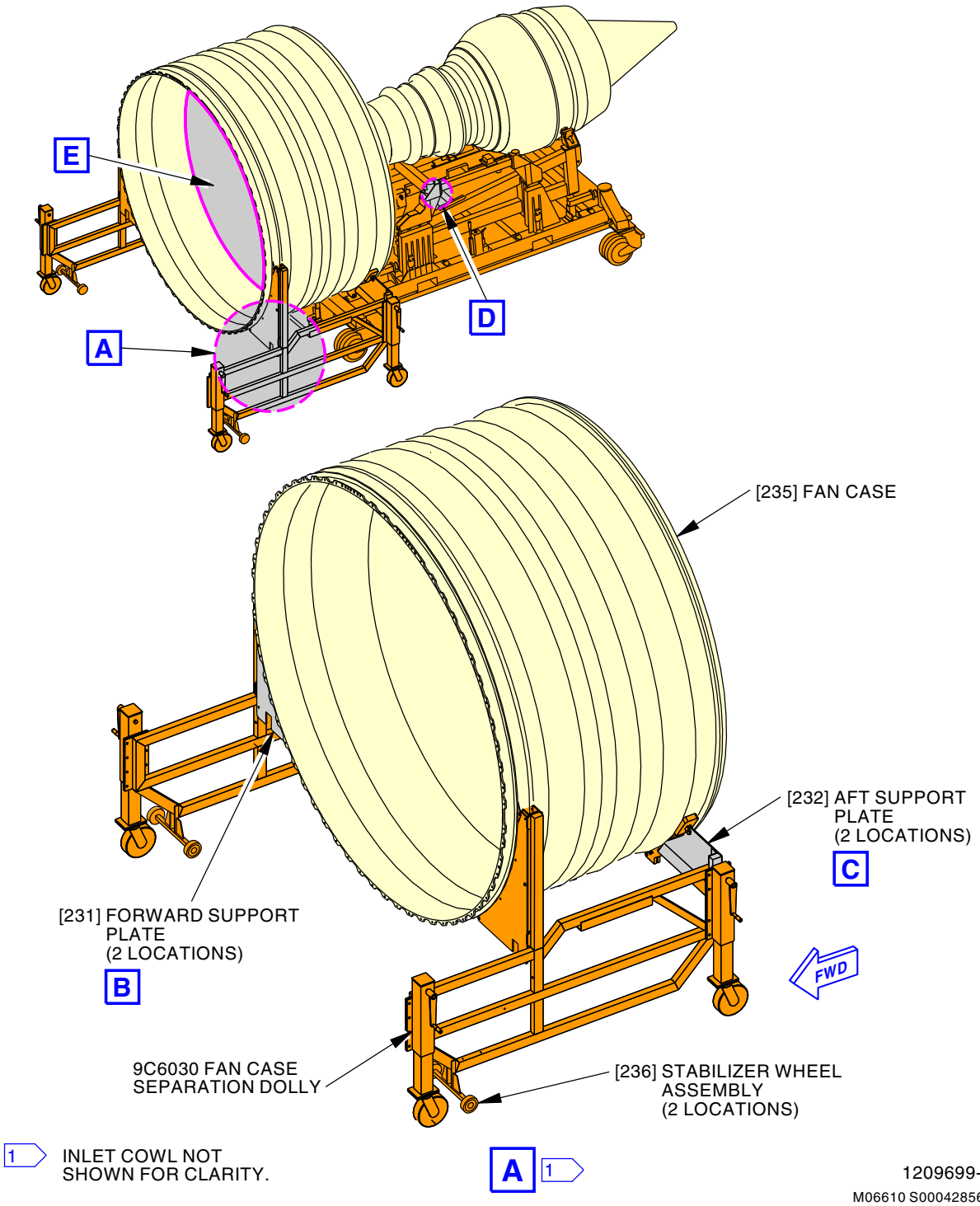

Fan Stator Module Assembly Installation
Figure 411/71-00-05-990-811-H01 (Sheet 1 of 5)

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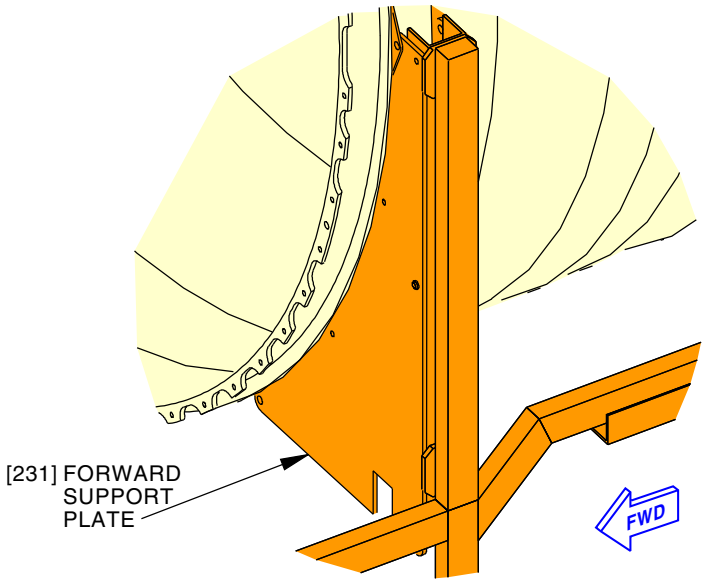
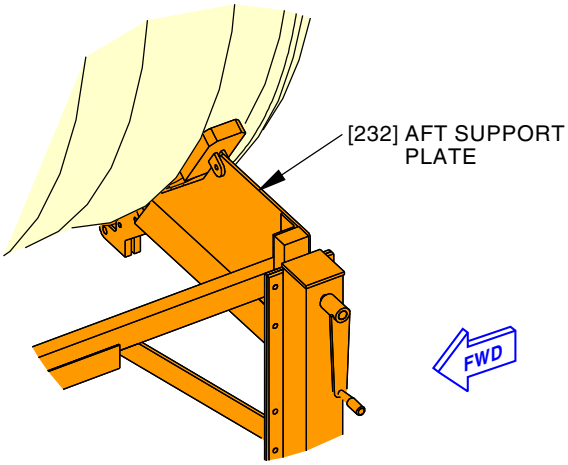


FORWARD SUPPORT PLATE
(2 LOCATIONS)

B



AFT SUPPORT PLATE
(2 LOCATIONS)

C

M06611 S0004285645_V2

Fan Stator Module Assembly Installation
Figure 411/71-00-05-990-811-H01 (Sheet 2 of 5)

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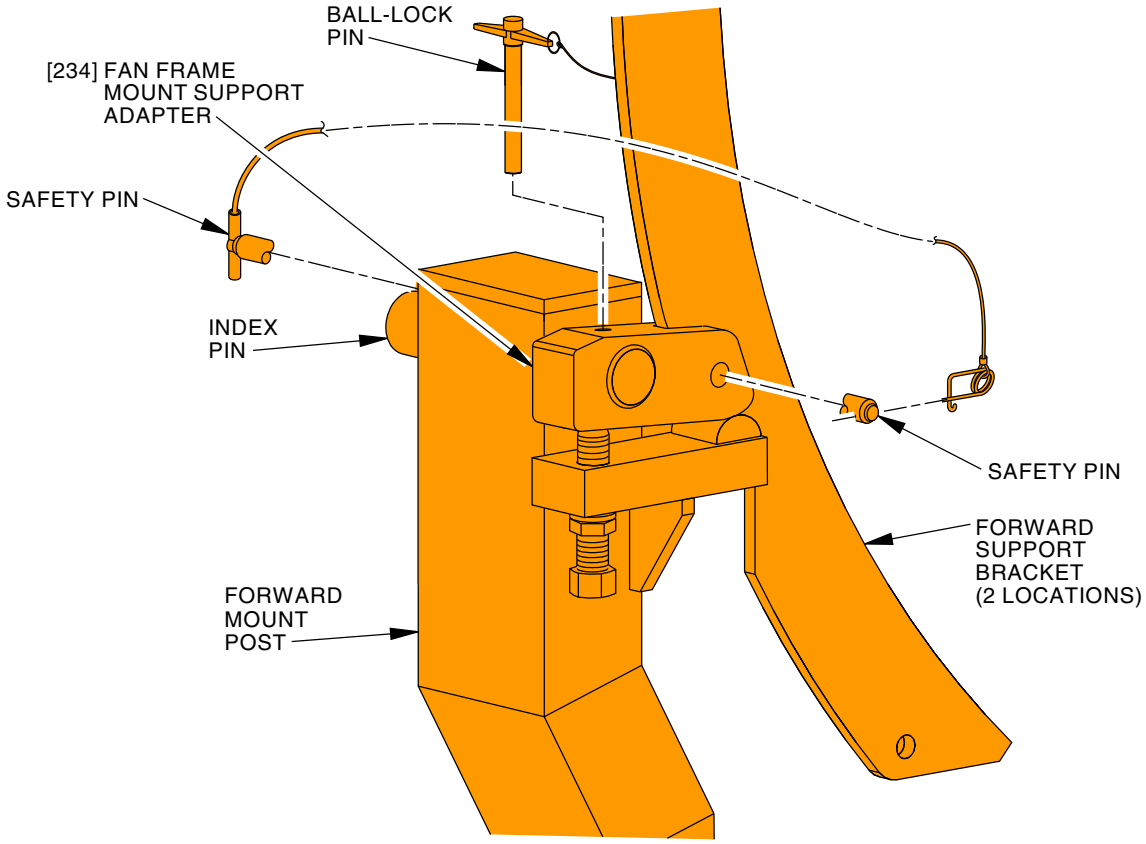

D 2

2 LEFT SIDE INSTALLATION USES TWO BALL LOCK PINS.
LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME.
SOME ENGINE STANDS WILL HAVE A DIFFERENT ADAPTER OR A DIFFERENT CRADLE BASE.

1259834-00
M06612 S0004285646_V3

Fan Stator Module Assembly Installation
Figure 411/71-00-05-990-811-H01 (Sheet 3 of 5)

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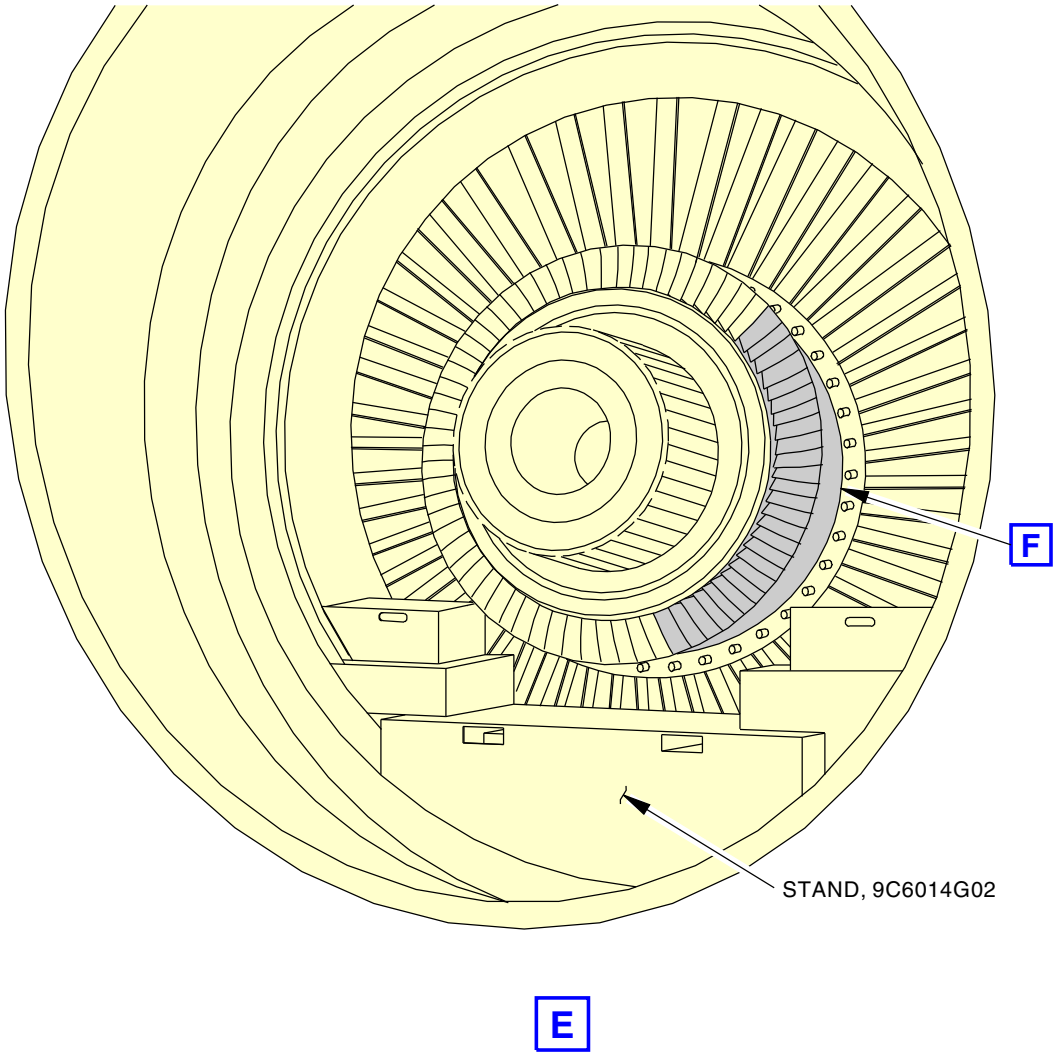

1209708-01-A
M06613 S0004285647_V3

Fan Stator Module Assembly Installation
Figure 411/71-00-05-990-811-H01 (Sheet 4 of 5)

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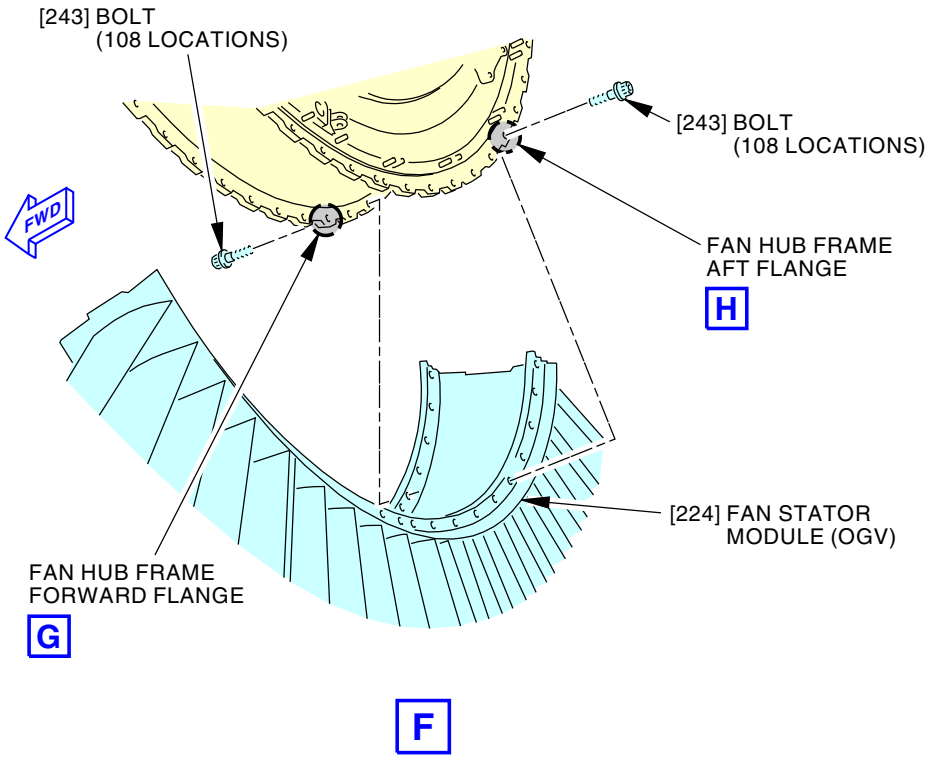
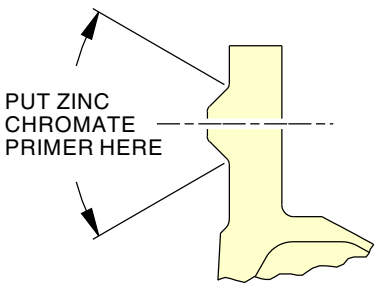
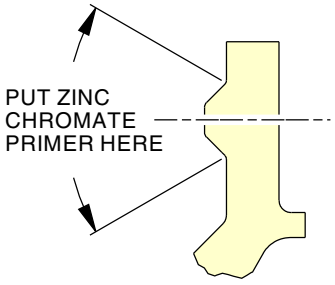




FAN HUB FRAME FORWARD FLANGE

G



FAN HUB FRAME AFT FLANGE

H

1229757-00-A
M06614 S0004285648_V3

Fan Stator Module Assembly Installation
Figure 411/71-00-05-990-811-H01 (Sheet 5 of 5)

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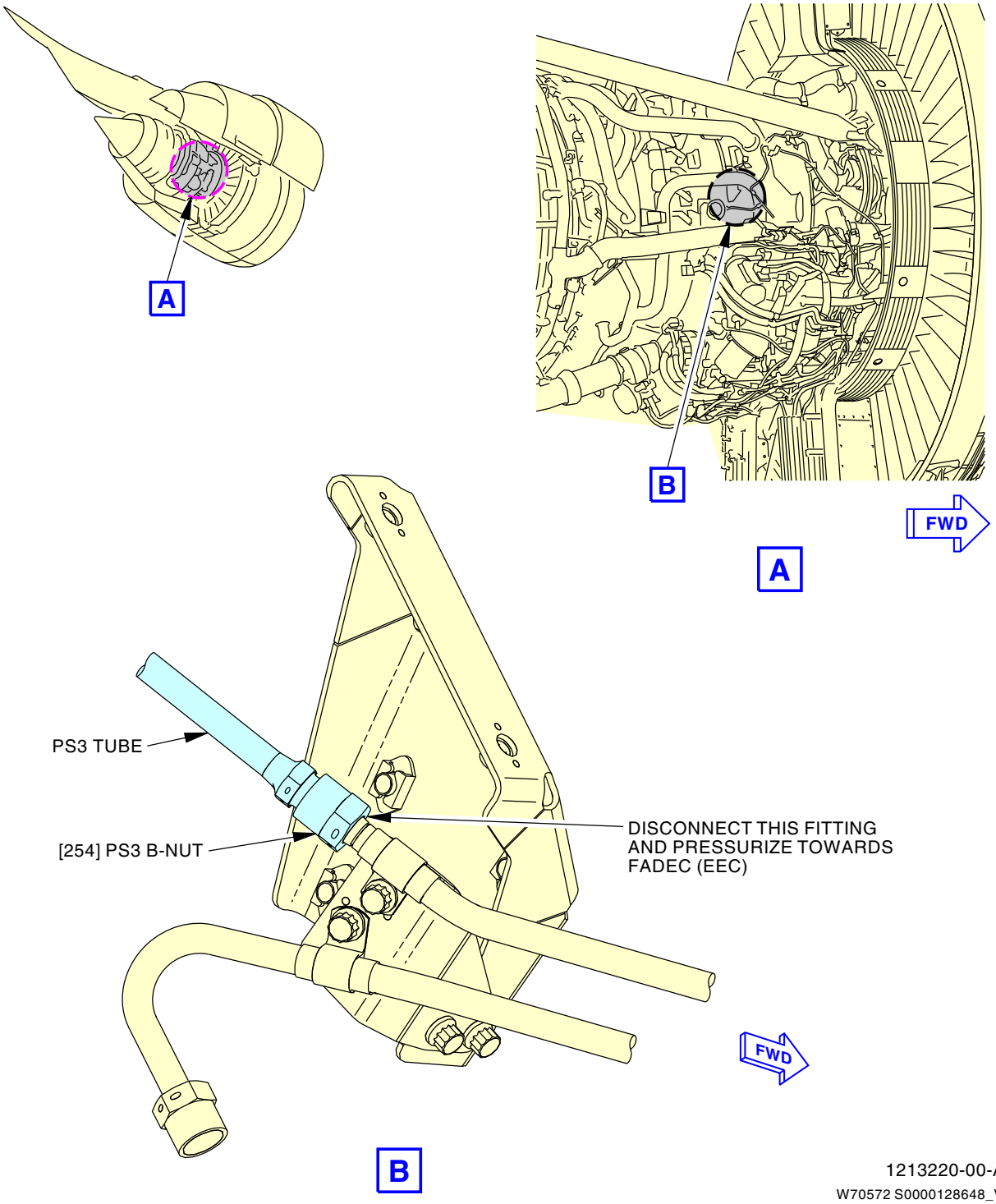

PS3 Pressure Test Installation
Figure 412/71-00-05-990-812-H01

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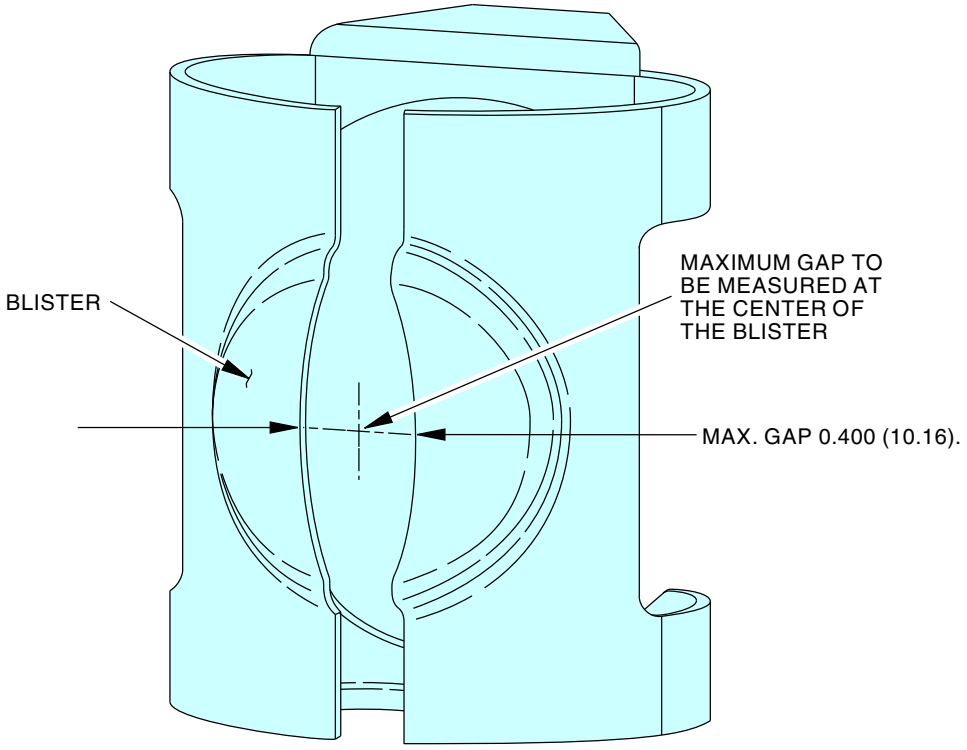

NOTE:

DIMENSIONS ARE IN INCHES WITH MILLIMETERS IN PARENTHESIS

2800450 S0000641434_V1

Retainer clip
Figure 413/71-00-05-990-813-H00

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TASK 71-00-05-400-801-H01

3. Fan Stator Module to Engine Installation

(Figure 401, Figure 402,Figure 403, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411, Figure 412 and Figure 413)

A. General

(1) This task is the installation procedure for the fan stator module to the engine.

(2) You must have the GSE engine and fan dolly equipment for this procedure.

(3) To install the fan stator module, you must do these steps:

(a) Flush the fan stator module lube system hardware.

(b) Mate the fan stator module to the propulsor.

(c) Install the acoustic panels.

(d) Install the leading edge splitter.

(e) Install the bleed air deflector panels.

(f) Install the blank off panels.

(g) Connect the seal pressurization tube and the oil tank ventilation tube.

(h) Connect the EAI duct at the upper bifurcation.

(i) Install the upper and the lower fillet fairings.

(j) Install the power plant.

(k) Install the lower bifurcation assembly.

(l) Connect the electrical harnesses to the fan stator module, bifurcation assembly.

(m) Install the drain and service module assembly.

(n) Connect the fire detection system to the engine.

(o) Do the oil service for the IDG and the backup generators.

(p) Install the fan blades.

(q) Install the forward and aft spinners.

(r) If it is necessary, do the fan blade tip clearance inspection.

NOTE: A general visual inspection of all fan hardware before installation is recommended.

(4) Do the operational test for the engine.

B. References

Reference	Title
12-13-01-130-803-002	Engine Oil Replenishing (P/B 301)
12-13-07-200-801	Backup Generator Oil Level Check (P/B 301)
12-22-01-610-806-002	Flush the Oil Tank (P/B 301)
12-22-07-200-803	IDG Oil Level Check (P/B 301)
26-11-01-400-809-001	Engine Fire Detector Element Installation (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-00-800-833-H00	Power Plant Test Reference Table (P/B 501)
71-00-02-400-811-H00	Power Plant Installation (P/B 401)
72-21-01-200-801-H01	Fan Rotor Spinner Inspection (P/B 601)

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(Continued)

Reference	Title
72-21-01-400-801-H01	Fan Rotor Spinner Installation (P/B 401)
72-21-02-200-801-H01	Fan Blade Inspection (P/B 601)
72-21-02-200-802-H01	Fan Blade Tip Clearance Inspection (P/B 601)
72-21-02-400-802-H01	Fan Blade Set Installation (P/B 401)
72-21-03-220-801-H01	Fan Blade Platform Inspection (P/B 601)
72-24-00-200-802-H01	Fan Abradable Shroud Inspection (P/B 601)
72-24-00-200-803-H01	Fan Case Inspection (P/B 601)
72-24-00-200-804-H01	Fan Outlet Guide Vane (OGV) Inspection (P/B 601)
72-24-01-200-801-H01	Fan Stator Case Forward Outer Acoustic Liner Inspection (P/B 601)
72-24-01-200-802-H01	Fan Stator Case Aft Outer Acoustic Liner Inspection (P/B 601)
73-21-15-000-801-H01	EEC (FADEC) Removal (P/B 401)
73-21-15-400-801-H01	EEC (FADEC) Installation (P/B 401)
73-21-20-800-801-H00	Engine Identification (Serial Number) Installation (ESN Special Function) (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-2147	Pin Set - Guide, Fan Stator Module / Fan Hub Module Part #: 9C1277G01 Supplier: 06083
SPL-4135	Protector - Stage 1 Fan Disk Part #: 9C1376G01 Supplier: 06083
SPL-4136	Personal Stand - Fan Inlet Part #: 9C6014G03 Supplier: 06083
SPL-4137	Protector - Fan Case Acoustic Liner, GE90-115B Part #: 9C3013G01 Supplier: 06083
SPL-4184	Fixture - Separation, Fan Case, GE90-70/80/90 and GE90-100 Series Part #: 9C6030P01 Supplier: 06083
SPL-4919	Stand - Engine Cradle and Transport, GE90-100 Series Part #: 9C6001G07 Supplier: 06083 Opt Part #: 9C6001G05 Supplier: 06083
STD-583	Mallet - Non-metallic
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-3918	Pressure Source - Dry Nitrogen, 0 to 5000 psi (0 to 3447 kPa)

D. Consumable Materials

Reference	Description	Specification
A01050 [C01-007]	Adhesive - Silicone Elastomer - RTV 106	
B00679 [C04-035]	Alcohol - Isopropyl	
C00057	Primer - Zinc Chromate	TT-P-1757B
D00504	Grease - Petrolatum	VV-P-236

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(Continued)

Reference	Description	Specification
D00552 [C02-019]	Oil - Engine Lubricating	GE Spec. D50TF1
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G01043	Cloth - Lint-free	
G50135	Leak Detector - Liquid, Non-Corrosive Soap Compound	MIL-PRF-25567

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Fan Stator Module to Engine Installation

SUBTASK 71-00-05-220-001-H01

(1) Do these tasks: Fan Stator Case Forward Outer Acoustic Liner Inspection, TASK 72-24-01-200-801-H01 and Fan Stator Case Aft Outer Acoustic Liner Inspection, TASK 72-24-01-200-802-H01.

SUBTASK 71-00-05-220-002-H01

(2) Do this task: Fan Abradable Shroud Inspection, TASK 72-24-00-200-802-H01.

SUBTASK 71-00-05-220-003-H01

(3) Do this task: Fan Outlet Guide Vane (OGV) Inspection, TASK 72-24-00-200-804-H01.

SUBTASK 71-00-05-220-004-H01

(4) Do this task: Fan Case Inspection, TASK 72-24-00-200-803-H01.

SUBTASK 71-00-05-090-001-H01

(5) Remove the protector, SPL-4135 (9C1376G01) from the fan booster.

SUBTASK 71-00-05-480-004-H01

(6) Install the stand, SPL-4136 (9C3013G01), on the forward flange of the fan module at the 6:00 o'clock position with the ball lock pins.

NOTE: This will prevent the forward acoustic liner from damage when you do maintenance work on the fan case module.

SUBTASK 71-00-05-170-001-H00

(7) Do this task if any debris (including fuzz) was found on the DMS magnetic sensor or if any distress occurred to the engine Flush the Oil Tank, TASK 12-22-01-610-806-002:

(a) Make sure that the oil is drained from the tank and the oil tubes are attached to the fan stator module.

(b) Put clean oil into the tank and then drain it to fully remove the used oil from the lube system hardware.

(c) Examine the oil you removed for unwanted material or contamination. If you find unwanted material or contamination, collect it for analysis.

1) Flush the oil tank and lube system hardware again until you fully remove the unwanted material and contamination from the system.

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2) After the results of the contamination analysis, continue with the fan stator module installation.

SUBTASK 71-00-05-480-005-H01

(8) Install the fan stator module in the fixture, separation fixture, SPL-4184 (9C6030P01), if it is necessary.

SUBTASK 71-00-05-420-001-H01

CAUTION USE EXTREME CARE WHEN YOU HANDLE THE POWER PLANT BECAUSE OF THE WEIGHT INVOLVED. THE POWER PLANT COULD DROP AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE POWER PLANT.

CAUTION THE FRONT WHEELS OF THE TRANSPORTATION STAND MUST BE TURNED PERPENDICULAR TO THE REAR WHEELS. DAMAGE TO THE STAND OR THE FAN STATOR MODULE MAY OCCUR

(9) Install the fan stator module [224] on the engine propulsor (Figure 411).

(a) Remove the protective covers from the engine propulsor and the fan stator module.

(b) Move the separation fixture, SPL-4184 (9C6030P01) with fan stator module [224] up to the engine cradle/stand, SPL-4919 (9C6001G05).

NOTE: There are three different transportation stands that you can use; 9C6001G05, or 9C6025P02.

(c) Make sure that the front wheels of the engine cradle/stand, SPL-4919 (9C6001G05) are turned 90 degrees to the fan dolly.

(d) Install the guide fan stator / fan hub guide pin set, SPL-2147 (9C1277G01) on the fan hub and the OGV's.

(e) Push the separation fixture, SPL-4184 (9C6030P01) with the fan stator module forward into the engine cradle/stand, SPL-4919.

(f) Adjust the separation fixture, SPL-4184 (9C6030P01), to align the fan stator module [224] with the guide fan stator / fan hub guide pin set, SPL-2147 (9C1277G01) on the fan hub frame inside the inlet.

(g) Move the fan stator module [224] forward and contact the fan hub frame.

(h) Make sure that the guide fan stator / fan hub guide pin set, SPL-2147 (9C1277G01) on the fan hub frame are in the correct hole in the fan stator module.

(i) Make sure that the bolt holes align between the fan hub frame and the fan stator module.

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(j) Clean the contact surfaces of the fan hub frame and the fan case OGV flanges with a clean cotton wiper, G00034.

1) Apply alcohol, B00679 [C04-035] with clean cotton wiper, G00034 to the fan hub frame and the fan case OGV flanges.

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2) Clean the contact surfaces to remove foreign matters before you install the fan stator module to the fan hub frame.

3) Make sure that there is no foreign materials or raised metal on the contact surfaces.

4) Coat the flanges of the fan hub frame with primer, C00057.

(k) Push the fan stator module [224] forward in contact with the fan hub frame flange.

1) Make sure that the guide fan stator / fan hub guide pin set, SPL-2147 (9C1277G01) go into the bolt holes in the flange of the OGV's and the bolt holes of the fan hub frame.

(l) Remove the fan stator / fan hub guide pin set, SPL-2147 (9C1277G01) from the fan stator module and the fan hub frame.

(m) Install the stand, SPL-4136 (9C6014G03) on the inside of the fan stator case.

1) Put the stand, SPL-4136 (9C6014G03) against the OGV's.

2) Put the straps of the stand around the OGV's.

3) Tighten the straps to hold the stand against the OGV's.

CAUTION

MAKE SURE YOU TIGHTEN THE FAN STATOR MODULE BOLTS AND THE FAN HUB FRAME BOLTS AT THE SAME TIME. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE CAN OCCUR.

(n) Install the two hundred and sixteen bolts [243] (with permanently attached washers) on the fan hub frame and the fan stator module [224].

NOTE: Make sure that the washers are permanently attached to the bolts.

1) Apply the Acheson GP460 compound, D50043 [C02-058] to the threads of the bolts.

2) Apply the primer, C00057 to all surfaces of the bolts but not on the threads or wrenching surfaces.

3) Install the one hundred and eight bolts [243] by hand through the fan hub frame while the primer is wet.

4) Install the one hundred and eight bolts [243] by hand through the fan stator module [224] while the primer is wet.

5) Tighten the bolts [243] on the fan hub frame to 40-42 pound-foot (54.3-56.9 Newton-meters) in pair 180 degrees across from each other around the circumference of the bolt flange.

6) Tighten the bolts [243] on the fan stator module to 40-42 pound-foot (54.3-56.9 Newton-meters) in pair 180 degrees across from each other around the circumference of the bolt flange.

7) Tighten the bolts [243] on the fan hub frame again to 53.4-56.6 pound-foot (72.5-76.7 Newton-meters) in pair 180 degrees across from each other around the circumference of the bolt flange.

8) Tighten the bolts [243] on the fan stator module again to 53.4-56.6 pound-foot (72.5-76.7 Newton-meters) in pair 180 degrees across from each other around the circumference of the bolt flange.

(o) Remove the stand, SPL-4136 (9C6014G03) from the inside of the fan stator module.

1) Remove the straps around the OGV's.

2) Remove the stand, SPL-4136 (9C6014G03) from the fan stator module.

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(p) Make sure that you re-install the bolts after you remove the front mount of the transportation stand.

SUBTASK 71-00-05-080-001-H01

(10) Remove the separation fixture, SPL-4184 (9C6030P01), from the engine cradle/stand, SPL-4919 (Figure 411).

(a) Remove the fan frame mount support adapters [234] from the fan hub frame mount brackets at the 3:00 and 9:00 o'clock positions.

(b) Swivel the forward casters of the separation fixture, SPL-4184 (9C6030P01) parallel to the engine stand.

(c) Install the stabilizer wheel assemblies [236] to the separation fixture, SPL-4184 (9C6030P01).

(d) Remove the aft support plate strap from the thrust reverser support bracket.

(e) Remove the pins attaching the aft support plates [232] to the fan case [235].

(f) Remove the four bolts and nuts attaching the forward support plates [231] to the fan case [235].

(g) Move the separation fixture, SPL-4184 (9C6030P01), now in two pieces away from the fan case.

(h) Remove the fan case acoustic liner protector, SPL-4137 (9C3013G01), from the engine.

SUBTASK 71-00-05-410-001-H00

(11) Install the leading edge splitter [270] to the fan booster:

(a) If installed, remove the fifty bolts [271] from the stage 1 and stage 2 vane assembly flange.

NOTE: Do not remove the bolts and nuts in the bolt hole number 7, 21, 35, and 47. The bolts and nuts at these locations are held the stage 1 and stage 2 vane assembly together while the leading edge splitter is removed.

(b) Position the leading edge splitter [270] on the fan booster.

NOTE: Position the leading edge splitter so the bolts in the bolt holes 7, 21, 35 and 47 are located in the scalloped areas of the leading edge splitter at the 1:30, 4:30, 7:30 and 10:30 o'clock positions.

(c) Install the fifty bolts [271] to attach the leading edge splitter [270] on the fan booster.

WARNING REFER TO THE PRODUCT LABEL AND THE MANUFACTURER'S (MATERIAL) SAFETY DATA SHEET FOR INSTRUCTIONS ON THE HAZARDS, STORAGE, SAFE HANDLING AND PROPER USE OF THESE PRODUCTS.

1) Apply primer, C00057 to the hardware and holes that follow:

a) Shank and bearing faces of the bolts [271].

b) Mating faces of the leading edge splitter [270] flange.

c) Inner mating surfaces of the holes in the leading edge splitter [270], stage 1 and stage 2 vane assembly flange.

NOTE: The bolts must be wet with primer, C00057 during installation.

2) Apply oil, D00552 [C02-019] to the threads of the bolts and seating surface of the nuts.

3) Tighten the bolts [271] to 152 in-lb (17.2 N·m) - 178 in-lb (20.1 N·m).

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ARO ALL PRE SB 777-GE100-75-0003

(d) Install the bolts [272] that attach the four low pressure compressor anti-ice tubes [273] to the leading edge splitter [270].

1) Tighten the bolts [272] to 109-121 pound-inches (12.3-13.7 Newton-meters).

ARO ALL

SUBTASK 71-00-05-420-002-H01

(12) Install the six booster acoustic panels [221] (Figure 410).

(a) Apply the Acheson GP460 compound, D50043 [C02-058] to the threads of the fifty four screws [222] and friction surfaces at the acoustic panels.

(b) Apply the grease, D00504 on the rubber bumpers of the acoustic panels.

(c) Install the booster acoustic panels [221] with screws [222] on the fan booster:

1) Make sure that the first acoustic panel you install is to the right of the 12:00 o'clock position.

2) Push the acoustic panel aft to engage to the fan booster.

3) Tighten the fifty four screws [222] to 60-70 pound-inches (6.7-7.9 Newton-meters).

SUBTASK 71-00-05-420-003-H01

(13) Install the bleed air deflector panels [171], bleed air deflector panels [172], bleed air deflector panels [173], bleed air deflector panels [174], and the bleed air deflector panels [175] on the forward inner cowl support (Figure 408).

(a) Remove the tape from the openings in the forward inner cowl support.

(b) Apply the Acheson GP460 compound, D50043 [C02-058] to the threads of the screws [176] and friction surfaces of the bleed air deflector panels.

(c) Put the bleed air deflector panels on the forward inner cowl support.

(d) Install the screws [176] on the bleed air panels.

(e) Make sure that the bleed air deflector panels are installed on the correct position.

(f) Tighten the screws [176] to 40-60 pound-inches (4.5-6.8 Newton-meters).

SUBTASK 71-00-05-420-004-H01

CAUTION

DO NOT REMOVE THE SCREWS FROM THE BLANK OFF PANELS. DAMAGE TO THE PANEL OR THE SCREWS CAN OCCUR.

(14) Install the eight blank off panels [101], blank off panels [102], blank off panels [103], and the blank off panels [104] with the screws [105] to the forward inner cowl support at the fan hub frame (Figure 404).

(a) Put the blank off panels on the forward inner cowl support.

(b) Apply the Acheson GP460 compound, D50043 [C02-058] to the threads of the screws [105].

(c) Install the thirty two screws [105] on the blank off panels.

(d) Tighten the screws [105] to 40-60 pound-inches (4.5-6.8 Newton-meters).

SUBTASK 71-00-05-420-005-H01

(15) Install the lower bifurcation bridge [190] on the forward inner cowl support at the 6:00 o'clock position (Figure 409).

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(a) Clean the contact surfaces of the lower bifurcation bridge [190] with the clean cotton wiper, G00034.

1) Apply alcohol, B00679 [C04-035] with a clean cotton wiper, G00034 to the lower bifurcation bridge [190].

2) Clean the contact surfaces to remove foreign matters.

3) Make sure that there is no foreign materials or raised metal on the contact surfaces.

(b) Put the lower bifurcation bridge [190] on top of the lower bifurcation firewall [191].

(c) Lubricate the bolts [193] and nuts [197] with Acheson GP460 compound, D50043 [C02-058].

(d) Install the four bolts [193] and the washers [194] on the lower bifurcation bridge.

(e) Install the nuts [197] and washers [192] at the lower bifurcation bridge.

(f) Tighten the bolts [193] to 230-260 pound-inches (26.0-29.4 Newton-meters).

(g) Tighten the nuts [197] to 80-100 pound-inches (9.0-11.3 Newton-meters).

(h) Apply RTV 106 adhesive, A01050 [C01-007] between the contact surfaces of the lower bifurcation bridge, fire seal, and forward inner cowl support.

SUBTASK 71-00-05-420-006-H01

(16) Install the upper bifurcation bridge [196] on the forward inner cowl support at the 12:00 o'clock position (Figure 409).

WARNING DO NOT GET SOLVENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENT. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE SOLVENT. KEEP THE SOLVENT AWAY FROM SPARKS, FLAME, AND HEAT. THE SOLVENT IS POISONOUS AND FLAMMABLE LIQUID WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Clean the contact surfaces of the upper bifurcation bridge [196] with a clean cotton wiper, G00034.

1) Apply alcohol, B00679 [C04-035] with a clean cotton wiper, G00034 to the upper bifurcation bridge [196].

2) Clean the contact surfaces to remove foreign matters.

3) Make sure that there is no foreign materials or raised metal on the contact surfaces.

(b) Put the upper bifurcation bridge [196] on top of the upper bifurcation firewall [195].

(c) Lubricate the bolts [193] and nuts [197] with Acheson GP460 compound, D50043 [C02-058].

(d) Install the four bolts [193] and the washers [194] on the upper bifurcation bridge [196].

(e) Install the nuts [197] and washers [192] at the upper bifurcation bridge [196].

(f) Tighten the bolts [193] to 230-260 pound-inches (26.0-29.4 Newton-meters).

(g) Tighten the nuts [197] to 80-100 pound-inches (9.0-11.3 Newton-meters).

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(h) Apply RTV 106 adhesive, A01050 [C01-007] between the contact surfaces of the upper bifurcation bridge, fire seal, and forward inner cowl support.

SUBTASK 71-00-05-420-007-H01

(17) Connect the seal pressurization tube [141] and the oil tank ventilation tube [142] to the fittings inside the upper bifurcation fire wall (Figure 406).

(a) Tighten the B-nut of the seal pressurization tube [141] to 263-307 pound-inch (30-35 Newton-meters).

CAUTION A LOOSE B-NUT ON THE OIL TANK VENT TUBE CAN CAUSE OIL LEAKAGE EVENTS WHICH MAY RESULT IN FIRE HAZARDS IN THE GE90 FLEET.

(b) Tighten the B-nut of the oil tank ventilation tube [142] with the triple torque method as follows:

1) Tighten the B-nut connection to 1332-1548 pound-inches (150-175 Newton-meters).

2) Loosen the B-nut of the oil tank ventilation tube and tighten it again to 1332-1548 pound-inches (150-175 Newton-meters).

3) Apply the specified torque again to make sure the torque of the B-nut of the oil tube/hose is 1332-1548 pound-inches (150-175 Newton-meters).

(c) For the post engine installation leak check, do an inspection of the oil tank vent tube B-nut for any oil leakage.

SUBTASK 71-00-05-420-008-H01

(18) Install the upper fillet fairing [121] and lower fillet fairing [123] on the bleed air deflector panels and the upper and lower bifurcation firewall (at the 12:00 and 6:00 o'clock positions) (Figure 405).

(a) Lubricate screws [122] and screws [124] with Acheson GP460 compound, D50043 [C02-058].

(b) Install screws [122] and screws [124] on the upper fillet fairing [121] and lower fillet fairing [123].

NOTE: Screws [124] (4 locations) are much longer than screws [122].

(c) Tighten the screws [122] and screws [124] to 60-70 pound-inches (6.8-7.9 Newton-meters).

SUBTASK 71-00-05-420-009-H01

(19) Attach the engine anti-ice duct [151] at the upper bifurcation fire wall (Figure 407).

(a) Install the seal [153] on the engine anti-ice duct flange.

(b) Install the coupling [152] on the engine anti-ice duct [151].

1) Tighten the coupling [152] 75 ±5 in-lb (8 ±1 N·m).

(c) Lightly hit the outer diameter of the coupling [152] with the non-metallic mallet, STD-583.

1) Tighten the coupling [152] again to 75 ±5 in-lb (8 ±1 N·m).

SUBTASK 71-00-05-420-010-H01

(20) Do this task Power Plant Installation, TASK 71-00-02-400-811-H00.

SUBTASK 71-00-05-420-011-H01

(21) Install the lower bifurcation assembly [85] on the engine (Figure 403).

(a) Install the lower bifurcation assembly [85] on the fan stator module.

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1) Position the lower bifurcation assembly [85] against the fan stator module.
2) Install the six bolts [86] to the transfer gearbox bracket at the top of the lower bifurcation assembly.
   a) Tighten the bolts [86] to 110-120 pound-inches (12.4-13.6 Newton-meters).
      NOTE: There are four bolts for each end of the four bracket locations which attach the lower bifurcation assembly to the fan stator module
3) Install sixteen bolts [84] that attach the lower bifurcation assembly to the fan stator module.
   a) Tighten the sixteen bolts [84] to 110-120 pound-inches (12.4-13.6 Newton-meters).
4) Install the four bolts [87] that attach the fan stator module to the fire seal.
   a) Tighten the bolts [87] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(b) Connect the oil return tube [79] at the forward side of the fire seal.
1) Remove the protective covers from the oil return tube [79].
2) Apply clean oil, D00552 [C02-019] to the gasket seal [81].
3) Put the gasket seal [81] to the bolt flange of the oil return tube [79].
4) Apply clean Acheson GP460 compound, D50043 [C02-058] to the threads of bolts [80].
5) Install the oil return tube [79] with four bolts [80] and nuts [17].
6) Tighten the bolts [80] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(c) Connect the oil tank tube [83] at the forward side of the fire seal.
1) Remove the protective covers from the oil tank tube [83].
2) Apply clean oil, D00552 [C02-019] to the gasket seal [82].
3) Put the gasket seal [82] to the bolt flange of the oil tank tube [83].
4) Apply clean Acheson GP460 compound, D50043 [C02-058] to the threads of bolts [80].
5) Install the oil tank tube [83] with four bolts [80] and nuts [17].
6) Tighten the bolts [80] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(d) Connect the other end of the oil return tube [79] at the upper end of the lower bifurcation assembly.
1) Remove the protective covers from the oil return tube [79].
2) Apply clean oil, D00552 [C02-019] to the gasket seal [81].
3) Put the gasket seal [81] to the bolt flange of the oil return tube [79].
4) Apply clean Acheson GP460 compound, D50043 [C02-058] to the thread of bolts [80].
5) Install the four bolts [80] on the upper end of the oil return tube [79].
6) Tighten the bolts [80] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(e) Connect the other end of the oil tank tube [83] at the 12:00 o'clock position of the lower bifurcation assembly.
1) Remove the protective covers from the oil tank tube [83].
2) Apply clean oil, D00552 [C02-019] to the gasket seal [82].

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3) Put the gasket seal [82] to the bolt flange of the oil tank tube [83].
4) Apply clean Acheson GP460 compound, D50043 [C02-058] to the threads of bolts [80].
5) Install the four bolts [80] on the upper end of the oil tank tube [83].
6) Tighten the bolts [80] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(f) Remove the protective covers from the eight pressure tubes.

(g) Connect the B-nuts of the eight pressure tubes and the two drain tubes below at the 12:00 o'clock position of the lower bifurcation assembly.
1) bleed bias line tube [71]
2) ECS air tube [72]
3) PS3 tube [73]
4) HPSOV LB air tube [74]
5) PRSOV air tube (brg No. 1) [75]
6) EAI air tube (brg No. 3) [76]
7) CDP air tube (brg No. 2) [77]
8) PT25 tube [78].
9) VBV-VSV tube [15]
10) HPTACC tube [16].
11) Tighten the tube B-nuts (TASK 70-51-00-910-801-H01).

(h) Remove the protective covers from six pressure tubes below at the forward side of the fire seal.

(i) Do a check on the EEC (FADEC) pressure sense lines to make sure they are clean and free of debris. If it is necessary, clean the pressure sense lines.
1) Disconnect the pressure sense line B-nuts P3, PO, P25 and PS3 from the EEC (FADEC) (TASK 73-21-15-000-801-H01).
2) Blow low pressure filtered air, 20-100 psi (138-690 KPa) through each pressure sense hose in the direction of the engine sensors for a minimum of 1 minute.
3) Connect the pressure sensor hose B-nuts P3, PO, P25 and PS3 to the EEC (FADEC) (TASK 73-21-15-400-801-H01).
4) Tighten the pressure sensor line B-nuts (TASK 70-51-00-910-801-H01).

(j) Connect the B-nuts of the eight pressure tubes below at the front of the fire seal of the lower bifurcation assembly.
1) bleed bias line tube [71]
2) ECS air tube [72]
3) PS3 tube [73]
4) HPSOV LB air tube [74]
5) PRSOV air tube (brg No. 1) [75]
6) EAI air tube (brg No. 3) [76]
7) CDP air tube (brg No. 2) [77]
8) PT25 tube [78].
9) Tighten the tube B-nuts (TASK 70-51-00-910-801-H01).

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SUBTASK 71-00-05-790-001-H01

(22) Do a high pressure leak test of the PS3 tube (Figure 412).

CAUTION MAKE SURE THAT THE GAS REGULATOR IS SET TO THE CORRECT PRESSURE BEFORE THE GAS PRESSURE IS APPLIED TO THE PS3 TUBE. IF THE GAS PRESSURE IS NOT CORRECT, YOU CAN CAUSE DAMAGE TO THE ENGINE COMPONENTS.

(a) Use a clean, 0 to 5000 psi (0 to 3447 kPa) dry nitrogen pressure source, STD-3918 to apply 100 PSI to the PS3 B-nut [254].

NOTE: The PS3 B-nut is located near the bleed bias sensor.

WARNING MAKE SURE THAT YOU PUT ON GLOVES AND GOGGLES WHEN YOU PRESSURIZE AND EXAMINE THE PS3 WEEP HOLES. THE GAS THAT FLOWS FROM THE WEEP HOLES IS UNDER HIGH PRESSURE CAN CAUSE INJURY TO PERSONS.

(b) Make sure that the gas flows freely from the PS3 weep holes in the lower bifurcation.

(c) Examine the tube connections between the B-nut [254] and the FADEC as follows.

1) Use the leak detector, G50135 or a mixture of liquid soap and water to examine the tube connections for leaks.

a) Tighten the loose connection if you find a leak, (TASK 70-51-00-910-801-H01).

SUBTASK 71-00-05-420-012-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

CAUTION MAKE SURE THERE IS NO TENSION IN THE ELECTRICAL HARNESSES WHEN YOU CONNECT THE ELECTRICAL CONNECTORS. IF THERE IS TENSION, ADJUST THE HARNESS IN THE SPRING CLIPS AND HINGE CLAMPS AS IT IS NECESSARY. IF YOU CONNECT THE ELECTRICAL CONNECTORS WITH TENSION IN THE ELECTRICAL HARNESSES, YOU CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS AND THE HARNESSES.

(23) Use the teflon-jawed pliers, STD-664 to install the electrical harnesses W737 [41], W723 [46], W727 [47],W739 [48], and W721 [50] on the right side of the lower bifurcation assembly spring clips (TASK 70-00-01-400-807-H01).

(a) Put each of the electrical harnesses in the spring clips of the lower bifurcation assembly.

(b) Remove the protective covers from each of the electrical connectors and receptacles.

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SUBTASK 71-00-05-420-013-H01

CAUTION	MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION	USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

CAUTION	MAKE SURE THERE IS NO TENSION IN THE ELECTRICAL HARNESSES WHEN YOU CONNECT THE ELECTRICAL CONNECTORS. IF THERE IS TENSION, ADJUST THE HARNESS IN THE SPRING CLIPS AND HINGE CLAMPS AS IT IS NECESSARY. IF YOU CONNECT THE ELECTRICAL CONNECTORS WITH TENSION IN THE ELECTRICAL HARNESSES, YOU CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS AND THE HARNESSES.

(24) Use the teflon-jawed pliers, STD-664 to install the electrical harnesses W722 [42], W738 [43], W724 [44], W728 [45], and W729 [49] on the left side of the lower bifurcation assembly spring clips (TASK 70-00-01-400-807-H01):

(a) Put each of the electrical harnesses in the spring clips of the lower bifurcation assembly.

(b) Remove the protective covers from each of the electrical connectors and receptacles.

SUBTASK 71-00-05-420-014-H01

CAUTION	MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION	USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

CAUTION	MAKE SURE THERE IS NO TENSION IN THE ELECTRICAL HARNESSES WHEN YOU CONNECT THE ELECTRICAL CONNECTORS. IF THERE IS TENSION, ADJUST THE HARNESS IN THE SPRING CLIPS AND HINGE CLAMPS AS IT IS NECESSARY. IF YOU CONNECT THE ELECTRICAL CONNECTORS WITH TENSION IN THE ELECTRICAL HARNESSES, YOU CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS AND THE HARNESSES.

(25) Use the teflon-jawed pliers, STD-664 to connect the electrical connectors to the receptacles at the support bracket (6:00 o'clock position) of the fan stator module (TASK 70-00-01-400-807-H01).

(a) Remove the protective covers from the electrical connectors and receptacles.

(b) Connect the electrical connectors at the support bracket of the fan stator module.

1) Electrical harness W737 [41]

2) Electrical harness W727 [47]

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3) Electrical harness W721 [50]
4) Electrical harness W739 [48]
5) Electrical harness W723 [46].

(c) Attach the electrical harnesses W737 [41], W727 [47], W721 [50], W739 [48] and W723 [46] to the spring clips forward of the lower bifurcation fire seal.

(d) Tighten the electrical connectors.

SUBTASK 71-00-05-420-015-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

CAUTION MAKE SURE THERE IS NO TENSION IN THE ELECTRICAL HARNESSES WHEN YOU CONNECT THE ELECTRICAL CONNECTORS. IF THERE IS TENSION, ADJUST THE HARNESS IN THE SPRING CLIPS AND HINGE CLAMPS AS IT IS NECESSARY. IF YOU CONNECT THE ELECTRICAL CONNECTORS WITH TENSION IN THE ELECTRICAL HARNESSES, YOU CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS AND THE HARNESSES.

(26) Use the teflon-jawed pliers, STD-664 to connect the electrical connectors to the receptacles at the support bracket (7:00 o'clock position) of the fan stator module (TASK 70-00-01-400-807-H01) (Figure 402):

(a) Remove the protective covers from the electrical connectors and the receptacles.

(b) Connect the electrical connectors at the support bracket of the fan stator module.

1) Electrical harness W729 [49]
2) Electrical harness W738 [43]
3) Electrical harness W728 [45]
4) Electrical harness W722 [42]
5) Electrical harness W724 [44].

(c) Attach the electrical harnesses W729 [49], W738 [43], W728 [45], W722 [42], and W724 [44] to the spring clips forward of the lower bifurcation fireseal.

(d) Install the lower half of the lower bifurcation fire seal with two nuts [54]:

1) Tighten the nuts [54] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(e) Tighten the electrical connectors.

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SUBTASK 71-00-05-670-001-H01

WARNING DO NOT GET SOLVENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENT. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE SOLVENT. KEEP THE SOLVENT AWAY FROM SPARKS, FLAME, AND HEAT. THE SOLVENT IS POISONOUS AND FLAMMABLE LIQUID WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(27) Clean the contact surfaces of the lower bifurcation firewall [191] and the lower bifurcation assembly with a clean cotton wiper, G00034.

(a) Apply alcohol, B00679 [C04-035] with a clean cotton wiper, G00034 to the lower bifurcation firewall [191] and the lower bifurcation assembly.

(b) Clean the contact surfaces to remove foreign matters.

(c) Apply RTV 106 adhesive, A01050 [C01-007] on the contact surfaces.

SUBTASK 71-00-05-420-016-H01

(28) Install the drain and service module assembly [22] (Figure 401).

(a) Remove the protective covers from all the tubes and the starter air valve manual control [9].

(b) Install the drain and service module assembly [22] on the lower bifurcation assembly.

1) Install the two bolts [18] and nut [19] that attach the drain and service module assembly [22] to the upper bracket of the lower bifurcation assembly.

2) Install the bolt [21], washer [20], and nut [19] that attach the drain and service module assembly [22] to the lower bracket of the lower bifurcation assembly.

3) Tighten the nuts [19] to 110-120 pound-inches (12.4-13.6 Newton-meters).

(c) Connect the B-nuts of the eight drain tube below at the 12:00 position of the drain and service module assembly [22].

1) IDG pad tube [5]

2) HYD pump tube [6]

3) HYDR pump pad tube [7]

4) VSCF pad tube [8]

5) HMU tube [13]

6) MFP tube [14]

7) VBV-VSV tube [15]

8) HPTACC tube [16].

9) Tighten the tube B-nuts (TASK 70-51-00-910-801-H01).

(d) Connect the starter air valve manual control [9] to the starter air valve.

1) Install the two bolts [12] and washers [12A] on the cable flange at the starter air valve.

a) Tighten the bolts [12] to 110.0 - 120.0 pound-inches (12.4 - 13.6 Newton-meters).

2) Install the bolt [11A] and nut [11B] that attaches the clamp [11] to the bracket.

a) Tighten the bolt [11A] to 55-70 pound-inches (6.2-7.9 Newton-meters).

3) Install the bolt [10A] and nut [10B] that attaches the clamp [10] to the bracket.

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a) Tighten the bolt [10A] to 55-70 pound-inches (6.2-7.9 Newton-meters).

SUBTASK 71-00-05-420-017-H01

(29) Connect the fire detection system (Engine Fire Detector Element Installation, TASK 26-11-01-400-809-001).

SUBTASK 71-00-05-610-003-H01

(30) Do this task: Engine Oil Replenishing, TASK 12-13-01-130-803-002.

SUBTASK 71-00-05-610-004-H01

(31) Do this task: IDG Oil Level Check, TASK 12-22-07-200-803.

SUBTASK 71-00-05-610-005-H01

(32) Do this task: Backup Generator Oil Level Check, TASK 12-13-07-200-801.

SUBTASK 71-00-05-220-005-H01

(33) Do this task: Fan Blade Inspection, TASK 72-21-02-200-801-H01.

SUBTASK 71-00-05-220-007-H00

(34) Do this task: Fan Blade Platform Inspection, TASK 72-21-03-220-801-H01.

SUBTASK 71-00-05-420-020-H00

(35) Install the barrel nut and retainer into the radial hole on the forward end of the fan disk post.

NOTE: If the barrel nut is loosely assembled, it can be bent to expand the gap between the retainer clips up to a maximum of 0.400 in. (10.160 mm). This will make sure the barrel nut retainer is tightly attached (Figure 413).

SUBTASK 71-00-05-420-021-H00

(36) Install the fan blade shims.

WARNING

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

(a) Use alcohol, B00679 [C04-035] and lint-free cloth, G01043 to clean the inner and outer surfaces of each shim and each side of the related disk post slot.

(b) Start the fan blade shim on the disk post.

(c) Move the shim aft on the disk post until the shim is fully seated.

NOTE: You will know when the shim is fully seated when the aft tab of the shim touches the forward face of the disk aft bolt flange.

(d) Make sure all the fan blade shims are fully seated aft before you install the fan blades.

SUBTASK 71-00-05-420-018-H01

(37) Do this task: Fan Blade Set Installation, TASK 72-21-02-400-802-H01.

SUBTASK 71-00-05-220-006-H01

(38) Do this task: Fan Rotor Spinner Inspection, TASK 72-21-01-200-801-H01.

SUBTASK 71-00-05-420-019-H01

(39) Do this task: Fan Rotor Spinner Installation, TASK 72-21-01-400-801-H01.

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SUBTASK 71-00-05-210-001-H01

(40) Do the fan blade tip clearance inspection and fan case grinding (if necessary) at or before 125 cycles if one or more of the conditions that follow occur (TASK 72-21-02-200-802-H01):

NOTE: The inspection and repair of the fan case abradable to get the correct tip clearance can be done during different maintenance periods, but must be done in less than 125 cycles of the blade installation. It is recommended to do the inspection much before the 125 cycle limit to have time to plan for repair (if necessary) of the fan case abradable.

(a) The serial number of the installed Fan Stator Module (FSM) is different from the FSM that was last removed from the engine (propulsor).

NOTE: If the engine (propulsor) is mated to a different FSM, then do the tip clearance inspection because the FSM S/N is different from the FSM last removed from the engine (propulsor).

(b) If four or more fan blades have different serial numbers from the last build for this same engine.

(c) The forward fan case has been replaced since the FSM was last removed.

(d) The forward fan case abradable has been machined since the FSM was last removed.

G. Put the Airplane Back to its Usual Condition

SUBTASK 71-00-05-860-001-H01

(1) Do this task: Power Plant Installation, TASK 71-00-02-400-811-H00.

SUBTASK 71-00-05-860-002-H00

(2) Do this task: Engine Identification (Serial Number) Installation (ESN Special Function), TASK 73-21-20-800-801-H00.

H. Fan Stator Module and Engine Installation Test

SUBTASK 71-00-05-710-001-H01

(1) Do the tests listed in the Power Plant Test Reference Table (TASK 71-00-00-800-833-H00).

——— END OF TASK ———

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ENGINE COWLING (AERODYNAMIC SMOOTHNESS) - MAINTENANCE PRACTICES

1. General

A. This task gives the permitted tolerances for the aerodynamic smoothness of the large cowl components for airplane gap and fair checks. The expanded tolerances given in the table represents the as-built tolerances for the installed cowling at the time of delivery for that specific airplane.

B. The access doors and panels on the engine cowling are very important areas for aerodynamic smoothness. After a removal or an installation, you must adjust the access doors and panels to the specified tolerances.

C. The tolerances for the smaller access doors and panels on the engine cowling are given in the removal/installation procedure for that component.

TASK 71-11-00-800-801-H01

2. Engine Cowling Adjustment

A. Location Zones

Zone	Area
411	Engine, Left
412	Inlet Cowl - Left Engine
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine
416	Right Thrust Reverser - Left Engine
421	Engine, Right
422	Inlet Cowl - Right Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine
426	Right Thrust Reverser - Right Engine

B. Procedure

SUBTASK 71-11-00-869-001-H01

(1) For clearances, gaps, or steps between the engine cowling components that are concerns, contact Boeing for assistances.

(a) If the installation of a replacement engine cowling component that is not correctly fitted or is not looked correctly on aerodynamic smoothness, contact Boeing.

(b) If possible, document the clearance problem with digital photos that can be sent by e-mail or provide a sketch that can be faxed or email.

(c) Indicate on the photo or sketch what the problem is, where the problem occurs and include the applicable measurements.

(d) Do the measurements for the steps and gaps at more than three locations along the entire component interface.

END OF TASK

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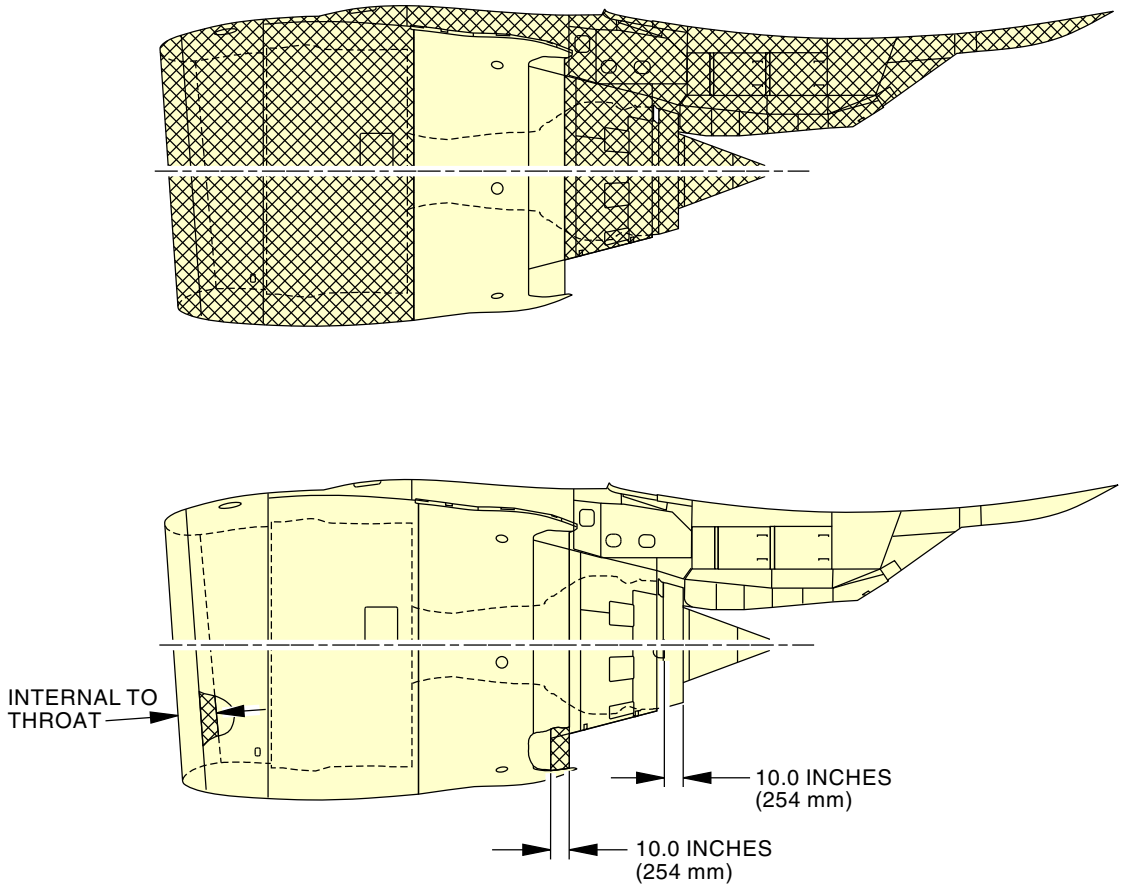

LEGEND:

NON-CRITICAL

CRITICAL - REQUIRES HIGH DEGREE OF AERODYNAMIC SMOOTHNESS

SKIN SMOOTHNESS IN CRITICAL AND NON-CRITICAL AREAS ON THE CONTINUOUS SKIN MUST BE IN THE LIMITS SPECIFIED IN TABLE A. MAXIMUM PERMITTED WAVE DEPTH IN THE AREA OF THE STATIC PRESSURE PORTS IS 0.01 INCH (0.25 mm) ACROSS A WAVE LENGTH OF 6 INCHES (152 mm).

M06615 S0004285649_V2

Critical and Non-Critical Areas
Figure 201/71-11-00-990-801-H01 (Sheet 1 of 2)

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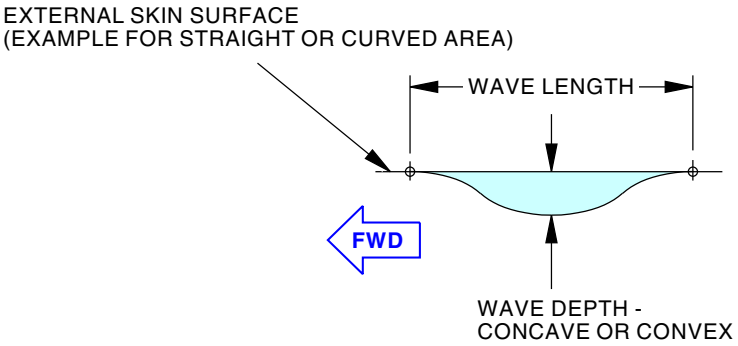
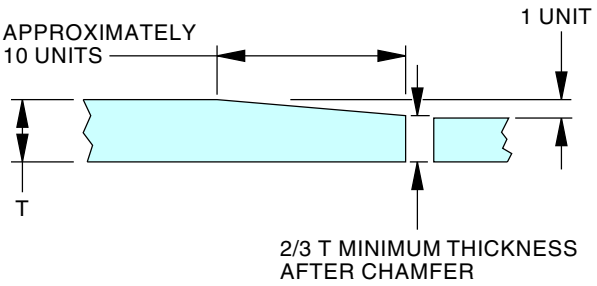
SKIN WAVINESS:

CONDITION	LOCATION	CRITICAL	NON-CRITCAL
WAVE DEPTH TO LENGTH RATIO	ALL SKINS	0.0025 IN. MAX (0.0635 mm)	0.0050 IN. MAX (0.1270 mm)
WAVE DEPTH TO LENGTH RATIO	AT FASTENERS	0.0050 IN. MAX (0.1270 mm)	0.0100 IN. MAX (0.2540 mm)

TABLE A



FLUSHNESS:



THE NOMINAL DESIGNED MISMATCH FOR BUTT-TYPE JOINTS IS FLUSH FOR CRITICAL AND NON-CRITICAL AREAS.

CHAMFER ONLY DOWNSTREAM EDGE OF POSITIVE STEP.

IF THE MISMATCH OF THE SKIN TRANSVERSE BUTT JOINTS, OTHER THAN CLAD ALUMINUM, IS MORE THAN THE VALUES SPECIFIED, ROUND OR CHAMFER THE BUTT JOINTS TO THE VALUES SPECIFIED. THE SHAPE OF THE EDGE SHALL BE AS SHOWN.

M06616 S0004285650_V3

Critical and Non-Critical Areas
Figure 201/71-11-00-990-801-H01 (Sheet 2 of 2)

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INLET COWL - MAINTENANCE PRACTICES

1. General

A. This procedure has two tasks:

(1) A disassembly of the inlet cowl

(2) An assembly of the inlet cowl.

TASK 71-11-01-000-801-H01

2. Inlet Cowl Disassembly

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205, Figure 206, and Figure 207)

A. General

(1) This task is the disassembly procedure for the upper and lower inlet cowl halves. You use this task when it is necessary to separate the upper and lower inlet cowl halves for storage or transport.

(2) You must remove the inlet cowl from the engine to do this task.

(3) Use standard industry practices and these procedures to disassemble this component.

(4) Refer to (SOPM 20-10-08) for instructions on removal of faying surface sealed components.

(5) Make sure you record the thickness and location of the shims upon removal for use during assembly, if applicable.

(6) Make sure you remove the fasteners with care from the composite parts because they can be damaged easily.

B. References

Reference	Title
71-11-01-000-802-H01	Inlet Cowl Removal (P/B 401)
73-21-06-000-801-H01	T12 Sensor Removal (P/B 401)

C. Prepare for the Disassembly

SUBTASK 71-11-01-010-002-H01

(1) Do this task: Inlet Cowl Removal, TASK 71-11-01-000-802-H01.

SUBTASK 71-11-01-010-003-H01

(2) Remove the PDOS switch connector [1] from the aft flange of the inlet cowl assembly at the 3:00 o'clock position (Figure 207):

NOTE: It is easier to remove the PDOS switch connector while the inlet assembly is still in the .

(a) Remove the nuts [3] and the screws [2] (4 locations).

(b) Remove the screw [4] and the washer [5] from the clamp [6] that attach the PDOS switch wire bundle to the aft flange bracket.

NOTE: The washer is installed under the clamp.

(c) Attach the loose section of the PDOS switch wire bundle to the lower half of the inlet cowl.

(d) Put fasteners into a bag.

1) Label the bag PDOS fasteners.

2) Keep the bag for the subsequent installation.

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D. Procedure

SUBTASK 71-11-01-860-006-H01

> **WARNING** MAKE SURE YOU SECURELY SUPPORT EACH INLET COWL HALF SEPARATELY. THE INLET COWL WEIGHS APPROXIMATELY 1000 POUNDS (455 KGS) (500 POUNDS (223 KGS) FOR EACH HALF OF THE INLET COWL). IF YOU DO NOT SUPPORT THE INLET COWL HALVES CORRECTLY, THE INLET COWL HALVES CAN FALL AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

(1) Carefully turn the inlet assembly to a horizontal position and lower to a suitable fixtures with the lip assembly upward:

NOTE: Make sure the fixtures do not block access to the left split and right split lines.

> **WARNING** MAKE SURE THAT THE FIXTURES ARE CLEAR FROM THE PDOS SWITCHES, BRACKETS, SPLICE LINES T12 CONNECTOR, AND EAI DUCT CONNECTION. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(a) Make sure that the fixtures are clear from the PDOS switches, brackets, splice lines, T12 connector, and the EAI duct connection.

SUBTASK 71-11-01-010-004-H01

(2) Remove the from the inlet cowl.

SUBTASK 71-11-01-010-005-H01

(3) Do this task: T12 Sensor Removal, TASK 73-21-06-000-801-H01.

SUBTASK 71-11-01-010-006-H01

(4) Do the steps that follow to remove the upper outer barrel panel assembly [21] (Figure 202):

(a) Remove the bolts [22] (100 locations), the bolts [23] (4 locations), the bolts [26] (2 locations), and the bolt [29] from the forward outer of the upper outer barrel panel assembly [21].

NOTE: The bolts [23] are found on the clockwise (aft view) positions 13, 43, 74, and 104. The bolts [26] are found on the clockwise positions 61 and 63. The bolt [29] is found on the clockwise position 62.

1) Remove the bolts [27] (10 locations), the bolts [30] (2 locations), and the bolts [31] (4 locations) that attach the upper outer barrel panel assembly [21] to the forward outer split line of the lower outer barrel panel assembly.

NOTE: The bolts [27] are at the split line between the upper and the lower outer barrel panel assemblies. The bolts [31] are found on the clockwise positions 6 and 8. The bolt [30] is found between the bolts [31] on the clockwise position 7 of the outer barrel panel assemblies.

2) Do this step again at the other end of the split line.

NOTE: The left split line and the right split line attachments are the same.

(b) Remove the bolts [22] (116 locations) and the bolts [24] (5 locations) from the aft outer of the upper outer barrel panel assembly [21].

NOTE: The bolts [24] are found on the clockwise (aft view) positions 5, 34, 65, 96, and 125.

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1) Remove the bolts [28] (18 locations), the bolts [30] (3 locations), the bolts [29] (2 locations), and the bolts [27] (9 (on left), 7 (on right) locations) that attach the upper outer barrel panel assembly [21] to the aft split line of the lower outer barrel panel assembly.

NOTE: The bolts [29], the bolt [27], and the bolts [30] are at the split line between the upper and the lower outer barrel panel assemblies. The remained bolts [27] are found on the clockwise positions 3 and 4 of the outer barrel panel assemblies.

2) Do this step again at the other end of the split line.

NOTE: The left split line and the right split line attachments are the same.

(c) Remove the upper outer barrel panel assembly [21] from the inlet assembly.

(d) Keep all the fasteners in a bag and add a label.

SUBTASK 71-11-01-010-007-H01

(5) Do the steps that follow to remove the left aft bulkhead out of core splice [41] and the right aft bulkhead out of core splice [44] from the aft outer flanges (Figure 203):

NOTE: Make sure you keep the right and left splices and fasteners separately after you removed them.

(a) Remove the left aft bulkhead out of core splice [41] from the inner side of the aft outer flange.

1) Remove the nuts [43] (8 locations) and the bolts [42] (8 locations) that attach the left aft bulkhead out of core splice [41] to the aft flange.

2) Keep the left aft bulkhead out of core splice [41] and the fasteners in the bag and put on a label.

(b) Remove the right aft bulkhead out of core splice [44] from the inner side of the aft outer flange.

1) Remove the nuts [46] (8 locations) and the bolts [45] (8 locations) that attach the right aft bulkhead out of core splice [44] to the aft flange.

2) Keep the right aft bulkhead out of core splice [44] and the fasteners in a bag and add a label.

SUBTASK 71-11-01-010-008-H01

(6) Do the steps that follow to remove the left outer barrel splice tee [48] and the right outer barrel splice tee [50] from the lower outer barrel panel assembly (Figure 203).

NOTE: Removal of the splice tees from the upper and the lower outer barrel panels will permit the inlet halves to be removed and assembled more easily.

(a) Remove the left outer barrel splice tee [48] from the lower outer barrel panel assembly.

1) Remove the remaining bolts [49] (18 locations) from the left outer barrel splice tee [48].

2) Remove the left outer barrel splice tee [48].

3) Keep the left outer barrel splice tee [48] and the fasteners in a bag and add a label.

(b) Remove the right outer barrel splice tee [50] from the lower outer barrel panel assembly.

1) Remove the remaining bolts [51] (18 locations) from the right outer barrel splice tee [50].

2) Remove the right outer barrel splice tee [50].

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3) Keep the right outer barrel splice tee [50] and the fasteners in a bag and add a label.

SUBTASK 71-11-01-010-009-H01

CAUTION: USE CAUTION WHEN YOU REMOVE THE BOLTS FROM THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(7) Do the steps that follow to remove the left forward bulkhead splice fitting assembly [165] and the right forward bulkhead splice fitting assembly [196] from the forward wall (Figure 205):

NOTE: Make sure you keep the left and right components and fasteners separated after you remove them.

(a) Remove the left forward bulkhead splice fitting assembly [165] from the forward wall:

1) Remove the bolts [161] (24 locations) and the washers [162] (24 locations); the bolts [163] (40 locations) and the washers [164] (40 locations), that attach the left forward bulkhead splice fitting assembly [165] to the upper lip skin.

2) Remove the nuts [176] (14 locations) and the bolts [177] (14 locations) that attach the left forward bulkhead splice fitting assembly [165] to the outer lip skin at the split line.

3) Remove the bolts [178] (10 locations) and the nuts [179] (10 locations); the bolts [180] (14 locations) and the nuts [181] (14 locations), that attach the left forward bulkhead splice fitting assembly [165] to the forward flanges.

NOTE: Do not remove the center fasteners from the left forward bulkhead splice fitting assembly [165]. Do not separate the left forward bulkhead splice angle from the left forward bulkhead splice fitting assembly [165]. Remove the left forward bulkhead splice fitting assembly [165] as a completed assemble fitting

4) Remove the left forward bulkhead splice fitting assembly [165].

5) Keep the left forward bulkhead splice fitting assembly [165] and all fasteners in a bag and add a label.

(b) Remove the right forward bulkhead splice fitting assembly [196] from the forward wall:

1) Remove the bolts [192] (24 locations) and the washers [193] (24 locations); the bolts [194] (40 locations) and the washers [195] (40 locations), that attach the right forward bulkhead splice fitting assembly [196] to the upper lip skin.

2) Remove the nuts [199] (14 locations) and the bolts [198] (14 locations) that attach the right forward bulkhead splice fitting assembly [196] to the outer lip skin at the split line.

3) Remove the bolts [202] (10 locations) and the nuts [203] (10 locations); the bolts [201] (14 locations) and the nuts [200] (14 locations), that attach the right forward bulkhead splice fitting assembly [196] to the forward flanges.

NOTE: Do not remove the center fasteners from the right forward bulkhead splice fitting assembly [196]. Do not separate the left forward bulkhead splice angle from the right forward bulkhead splice fitting assembly [196]. Remove the right forward bulkhead splice fitting assembly [196] as a completed assemble fitting

4) Remove the right forward bulkhead splice fitting assembly [196].

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5) Keep the right forward bulkhead splice fitting assembly [196] and the fasteners in a bag and add a label.

SUBTASK 71-11-01-010-010-H01

CAUTION

USE CAUTION WHEN YOU REMOVE THE BOLTS FROM THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(8) Do the steps that follow to remove the left aft bulkhead splice [61] and the right aft bulkhead splice [101] from the composite surfaces (or web assemblies) (Figure 203):

NOTE: Make sure you keep the left and right splices and fasteners separated after you remove them.

(a) Disconnect the left engine attach ring from the aft inner flange to gain access for the removal of the left aft bulkhead splice [61]:

1) Remove the nuts [65] (10 locations) and the bolts [64] (10 locations), and the nuts [63] (2 locations), the washers [71] (2 locations), and the bolts [62] (2 locations) from the two side of the split line at the left engine attach ring.

2) Remove the nuts [77] (8 locations) and the bolts [76] (8 locations) that attach the left aft bulkhead splice [61] to the left engine attach ring.

3) Remove the engine attach angle bracket [70] from the split line at the left engine attach ring.

a) Remove the nuts [67] (6 locations) and the bolts [66] (6 locations); and the nuts [69] (4 locations) and the bolts [68] (4 locations), that attach the engine attach angle bracket [70] to the left engine attach ring at the inner aft flange.

b) Keep the engine attach angle bracket [70] and all fasteners in the bag and put label.

4) Remove the remaining nuts [77] (4 locations) and the bolts [76] (4 locations) at the inner wall of the inlet.

5) Keep the engine attach angle bracket [70] and all fasteners in a bag and add a label.

(b) Remove the left aft bulkhead splice [61] from the composite surface:

1) Remove the nuts [80] (12 locations) and the bolts [81] (12 locations); and the nuts [78] (44 locations) and the bolts [79] (44 locations), that attach the left aft bulkhead splice [61] to the composite surface.

2) Remove the left aft bulkhead splice [61].

3) Keep the left aft bulkhead splice [61] and all fasteners in a bag and add a label.

(c) Disconnect the right engine attach ring from the aft inner flange to gain access for the removal the right aft bulkhead splice [101]:

1) Remove the nuts [105] (8 locations) and the bolts [104] (8 locations); and the nuts [103] (2 locations), the washers [108] (2 locations), and the bolts [102] (2 locations) from the two side of the split line at the right engine attach ring.

2) Remove the nuts [110] (8 locations) and the bolts [109] (8 locations) that attach the right aft bulkhead splice [101] to the right engine attach ring.

3) Remove the engine attach angle bracket [120] from the split line at the right engine attach ring.

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a) Remove the nuts [107] (6 locations) and the bolts [106] (6 locations); and the nuts [117] (4 locations) and the bolts [116] (4 locations), that attach the engine attach angle bracket [120] to the right engine attach ring at the inner aft flange.

b) Keep the engine attach angle bracket [120] and all fasteners in a bag and add a label.

4) Remove the remaining nuts [110] (4 locations) and the bolts [109] (4 locations) at the inner wall of the inlet.

5) Remove the PDOS bracket [130] from the right engine attach ring.

a) Remove the nuts [132] (2 locations) and the bolts [131] (2 locations) from the split line that attach the PDOS bracket [130] to the right engine attach ring at the aft composite wall of the inlet.

b) Keep the PDOS bracket [130] and the fasteners in a bag and add a label.

6) Keep the engine attach angle bracket [120] and the PDOS bracket [130] and all fasteners in a bag and add a label.

(d) Remove the right aft bulkhead splice [101] from the composite surface:

1) Remove the nuts [133] (12 locations) and the bolts [134] (12 locations); and the nuts [135] (44 locations) and the bolts [136] (44 locations), that attach the right aft bulkhead splice [101] to the composite surface.

2) Remove the right aft bulkhead splice [101].

3) Keep the right aft bulkhead splice [101] and all fasteners in a bag and add a label.

SUBTASK 71-11-01-010-011-H01

CAUTION

USE CAUTION WHEN YOU REMOVE THE BOLTS FROM THE LIP ASSEMBLY AREA. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE LIP ASSEMBLY.

(9) Do the steps that follow to remove the left splice strap [263] and the right splice strap [277] from the lip assembly (Figure 206):

NOTE: Make sure you keep the left and the right fasteners separated after you remove them.

(a) Remove the left splice strap [263] from the left lip skin:

1) Remove the nuts [266] (70 locations) and the washers [265] (70 locations) from the inside of the left lip skin area.

NOTE: Remove only those fasteners from the upper inlet half that will facilitate disassembly of the upper and the lower lip skins. Do not completely remove the splice straps from the lip assemblies. The splice straps (left and right) will remain attached to the lower half of the inlet assembly.

2) Remove the bolts [264] (70 locations) from the outside of the left lip skin area.

3) Keep the left lip assembly fasteners in a bag and add a label.

(b) Remove the right splice strap [277] from the right lip skin:

1) Remove the nuts [276] (70 locations) and the washers [275] (70 locations) from the inside of the right lip skin area.

NOTE: Remove only those fasteners from the upper inlet half that will facilitate disassembly of the upper and the lower lip skins. Do not completely remove the splice straps from the lip assemblies. The splice straps (left and right) will remain attached to the lower half of the inlet assembly.

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2) Remove the bolts [274] (70 locations) from the outside of the right lip skin area.

3) Keep the left lip assembly fasteners in a bag and add a label.

SUBTASK 71-11-01-010-012-H01

CAUTION

USE CAUTION WHEN YOU REMOVE THE BOLTS FROM THE INNER BARREL SKIN AREA. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE INNER BARREL ASSEMBLY.

(10) Do the steps that follow to remove the left inner barrel panel splice [291] and the right inner barrel panel splice [299] from the inlet assembly (Figure 207):

(a) Remove the left inner barrel panel splice [291] from the inlet assembly:

1) Remove the nuts [292] (4 locations), and the bolts [293] (4 locations); the nuts [295] (50 locations), and the bolts [294] (50 locations); the nuts [297] (2 locations) and the bolts [296] (2 locations), that attach the left inner barrel panel splice [291] to the left inner wall.

2) Keep the left inner barrel panel splice [291] and the fasteners in a bag and add a label.

(b) Remove the right inner barrel panel splice [299] from the inlet assembly:

1) Remove the nuts [300] (4 locations), and the bolts [301] (4 locations); the nuts [303] (50 locations), and the bolts [302] (50 locations); the nuts [303] (2 locations) and the bolts [304] (2 locations), that attach the right inner barrel panel splice [299] to the right inner wall.

2) Keep the right inner barrel panel splice [299] and the fasteners in a bag and add a label.

SUBTASK 71-11-01-010-013-H01

CAUTION

MAKE SURE EACH INLET COWL HALF IS SUPPORTED SECURELY AND SEPARATELY. THE INLET COWL WEIGHS APPROXIMATELY 1000 POUNDS (455 KGS) (500 POUNDS (427 KGS) FOR EACH HALF OF THE INLET COWL). IF YOU DO NOT SUPPORT THE INLET COWL HALVES SECURELY AND SEPARATELY, ONE OR BOTH OF THE INLET COWL HALVES COULD FALL WHEN THE INLET COWL IS SEPARATED AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

(11) Carefully separate the inlet assembly halves.

SUBTASK 71-11-01-410-004-H01

(12) Do the steps that follow to temporarily re-install the upper outer barrel panel assembly [21] (Figure 202):

(a) Place the upper outer barrel panel assembly [21] in its position on the upper half of the inlet assembly.

(b) Install the bolts [22] and the bolts [28] in every other third hole in the remaining bolt holes to sufficiently attach the forward outer of the upper outer barrel panel assembly [21].

(c) Install bolts [22] in every other third hole in the remaining bolt holes to sufficiently attach the aft outer of the upper outer barrel panel assembly [21].

(d) Install bolts [28] in every other third hole in the left and right outer barrel splice tees to sufficiently attach the upper outer barrel panel assembly.

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SUBTASK 71-11-01-869-002-H01

(13) Use the to put the inlet halves into the shipping container.

——— END OF TASK ———

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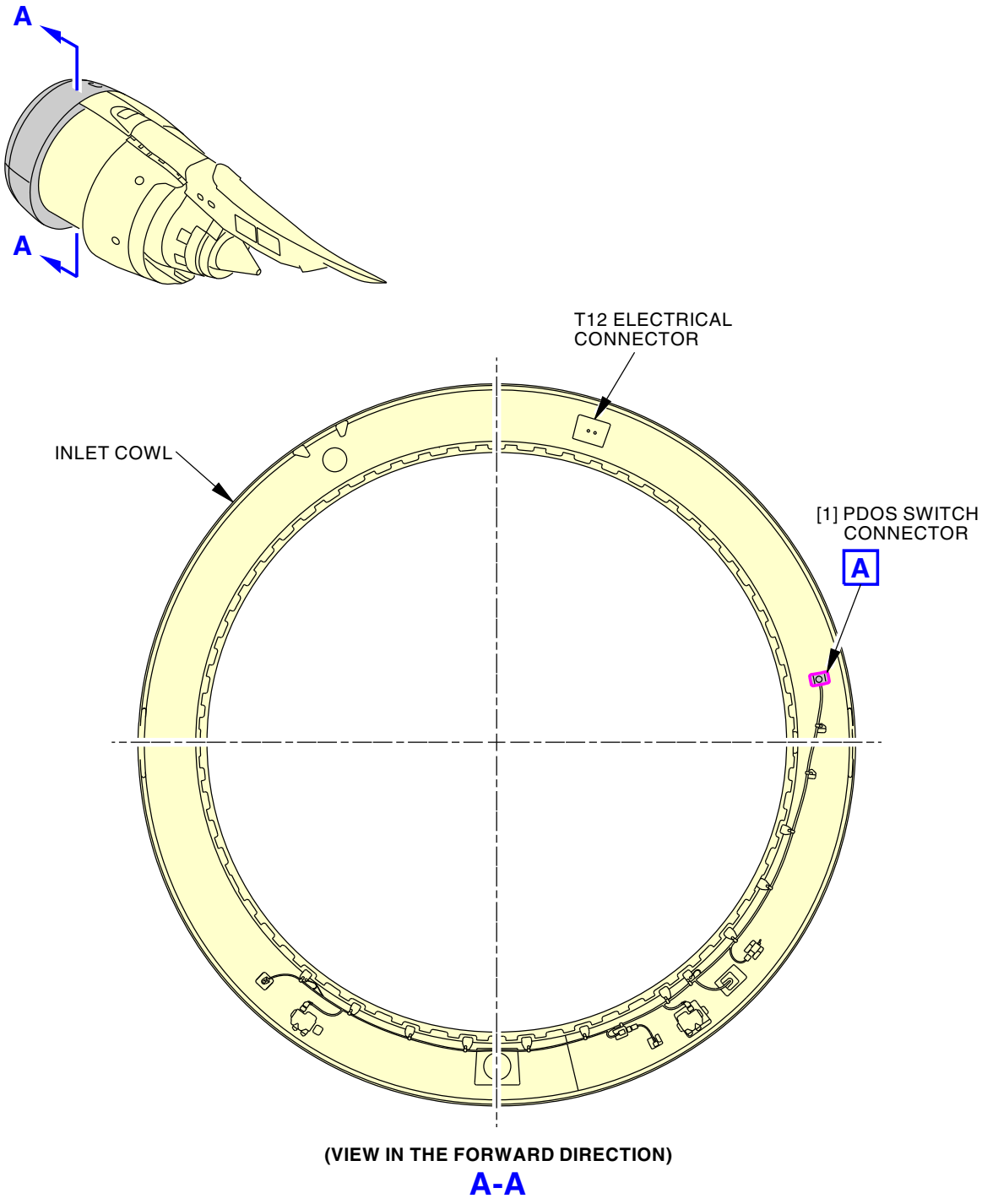

PDOS Switch Connector Installation
Figure 201/71-11-01-990-807-H01 (Sheet 1 of 2)

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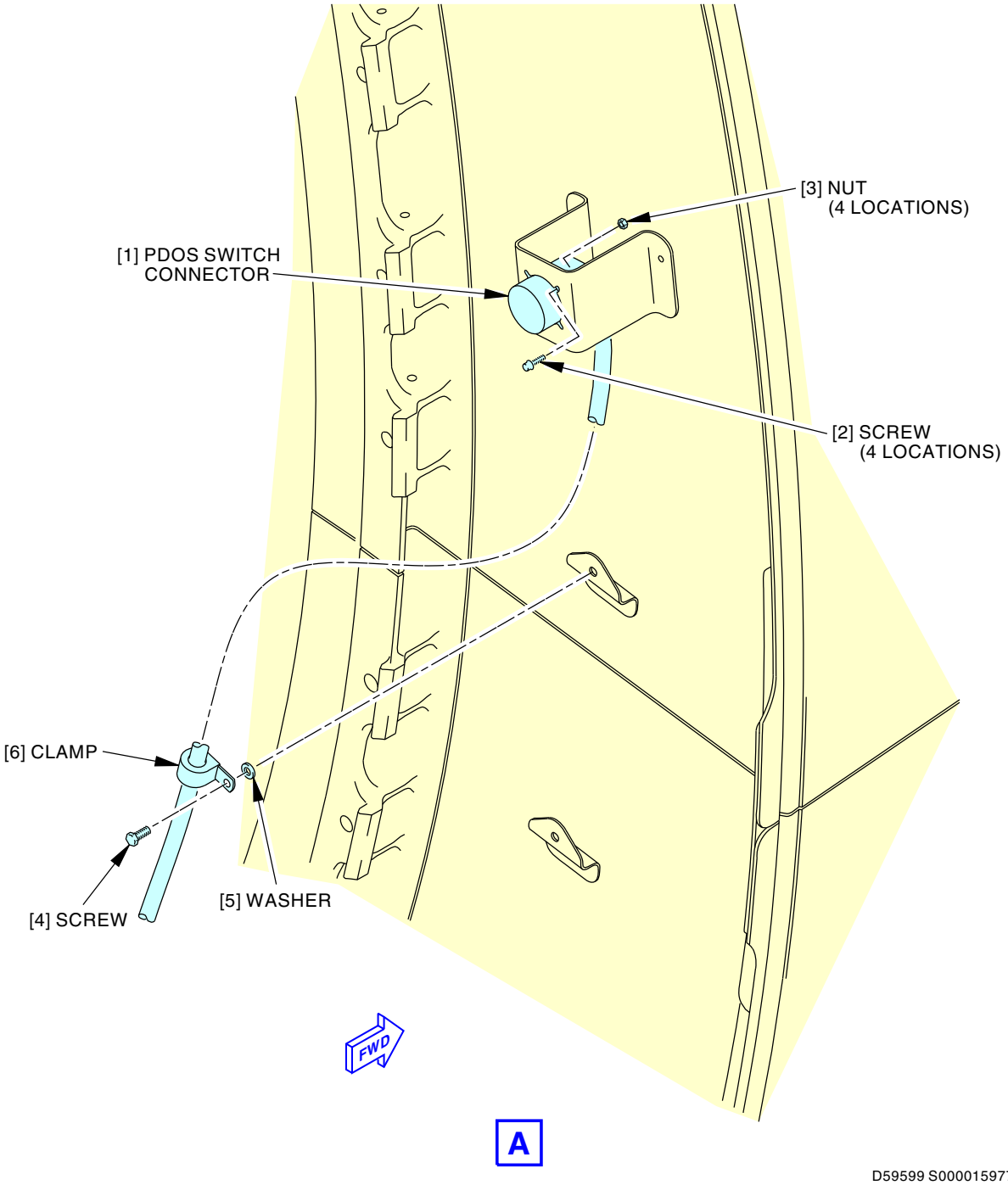

PDOS Switch Connector Installation
Figure 201/71-11-01-990-807-H01 (Sheet 2 of 2)

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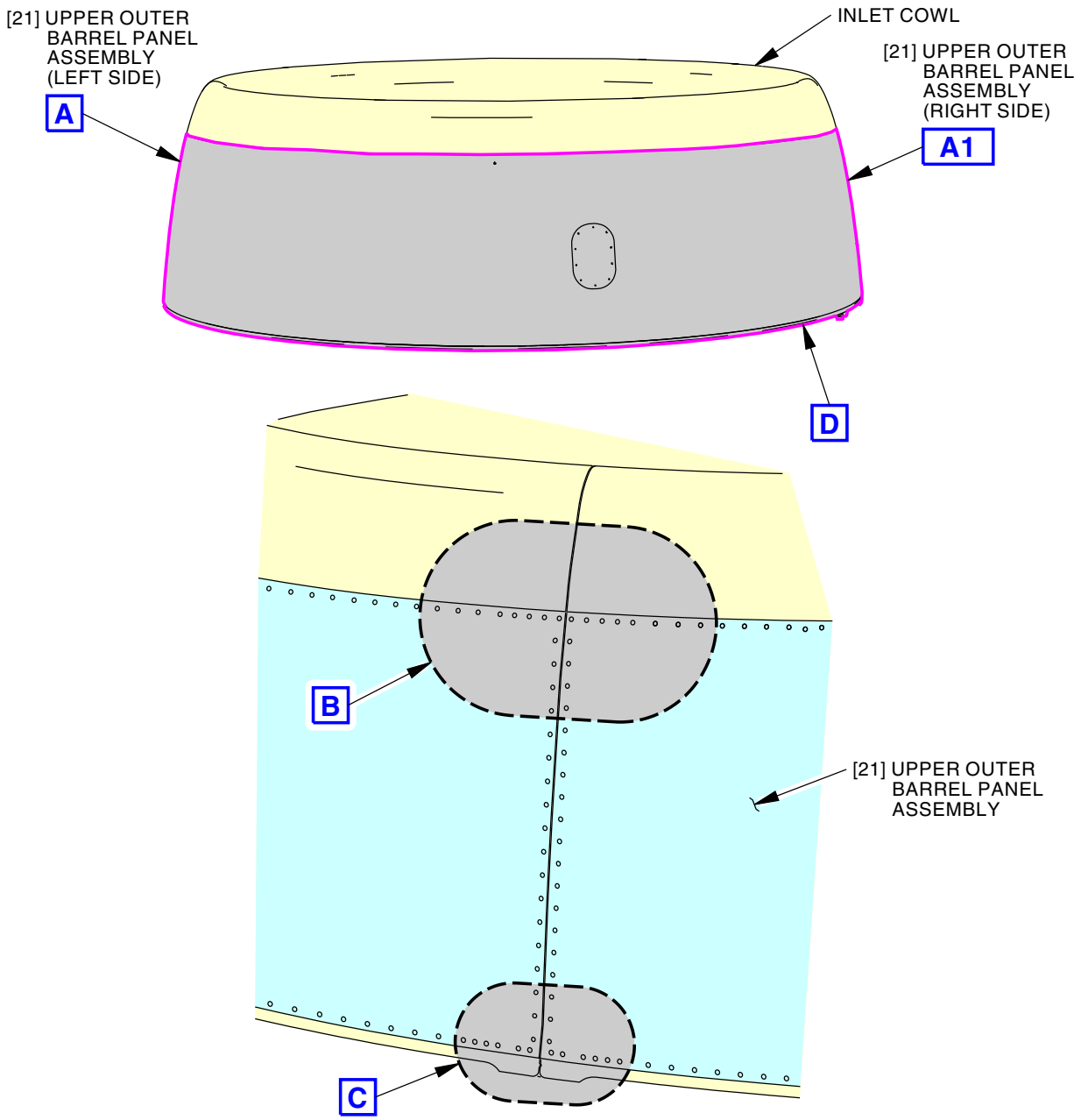

UPPER OUTER BARREL PANEL ASSEMBLY

A

M06625 S0004285659_V4

Upper Outer Barrel Panel Assembly
Figure 202/71-11-01-990-808-H01 (Sheet 1 of 4)

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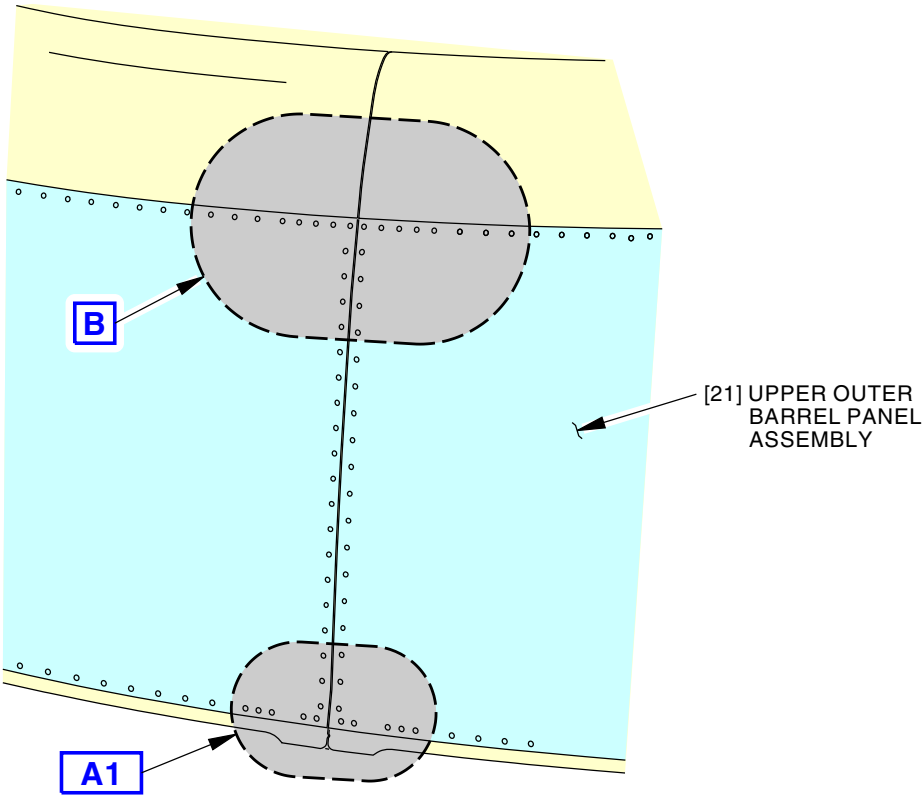
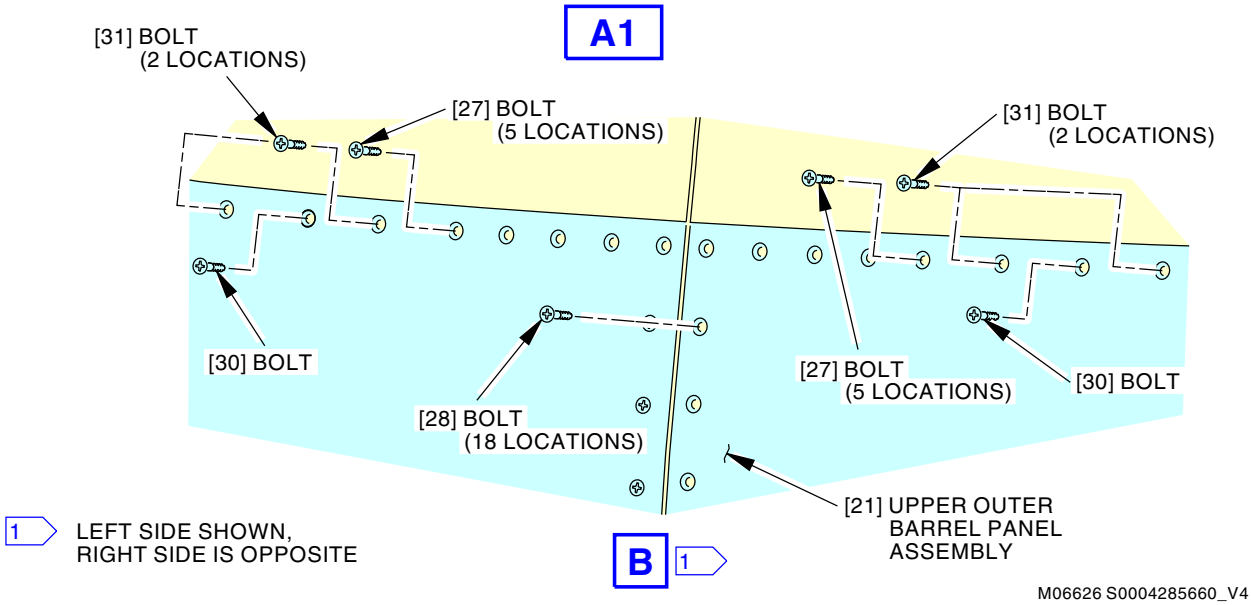


UPPER OUTER BARREL PANEL ASSEMBLY



Upper Outer Barrel Panel Assembly
Figure 202/71-11-01-990-808-H01 (Sheet 2 of 4)

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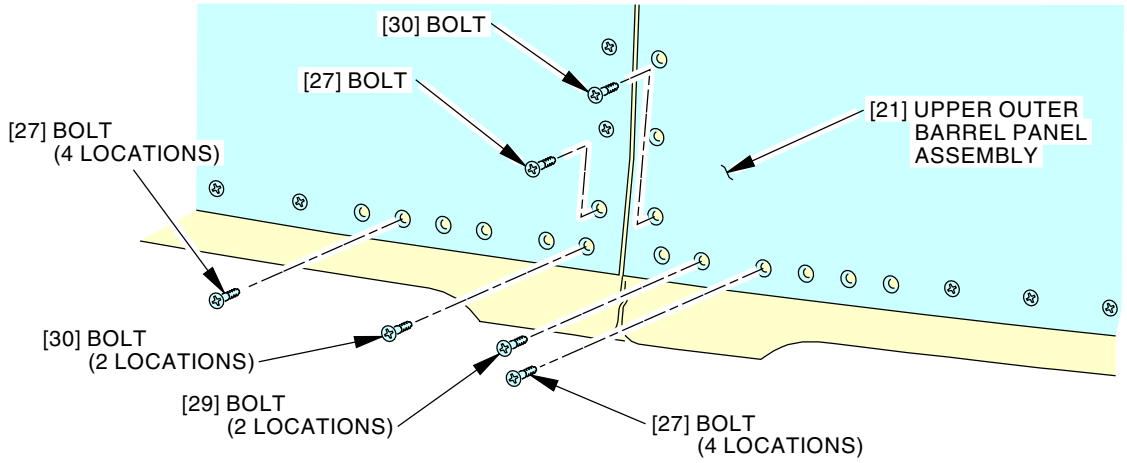
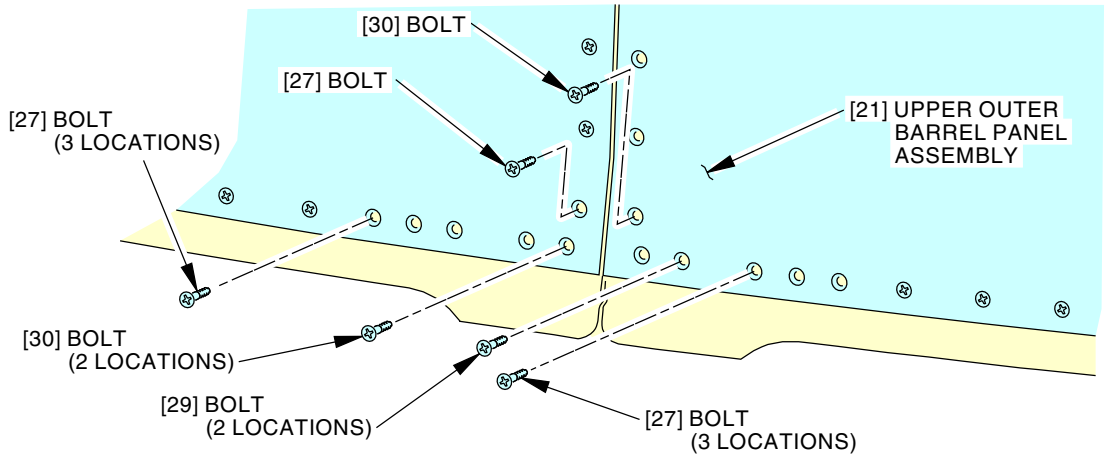


C



C1

TYPE BOLT	TYPE NUT	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30NN3K*	Nutplate	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30LH3*	Nutplate	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACN10KA4ACD	Nutplate	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)

D61608 S0000161593_V2

Upper Outer Barrel Panel Assembly
Figure 202/71-11-01-990-808-H01 (Sheet 3 of 4)

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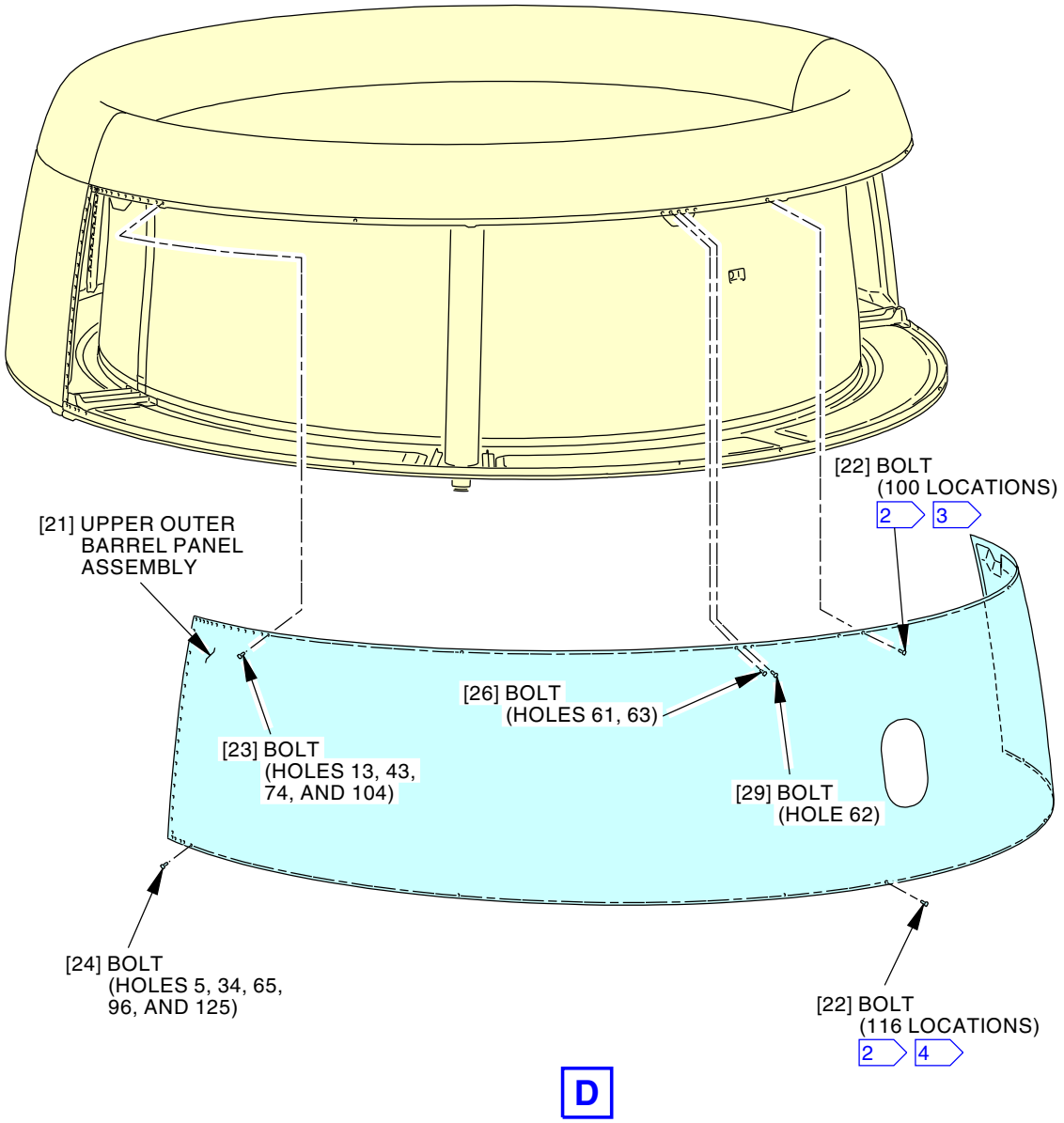

2 INSTALL IN HOLE LOCATIONS FROM LEFT TO RIGHT
3 EXCEPT LOCATIONS 13, 43, 74, AND 104; 61, 62, AND 63
4 EXCEPT LOCATIONS 5, 34, 65, 96, AND 125

W10566 S0000116640_V3

Upper Outer Barrel Panel Assembly
Figure 202/71-11-01-990-808-H01 (Sheet 4 of 4)

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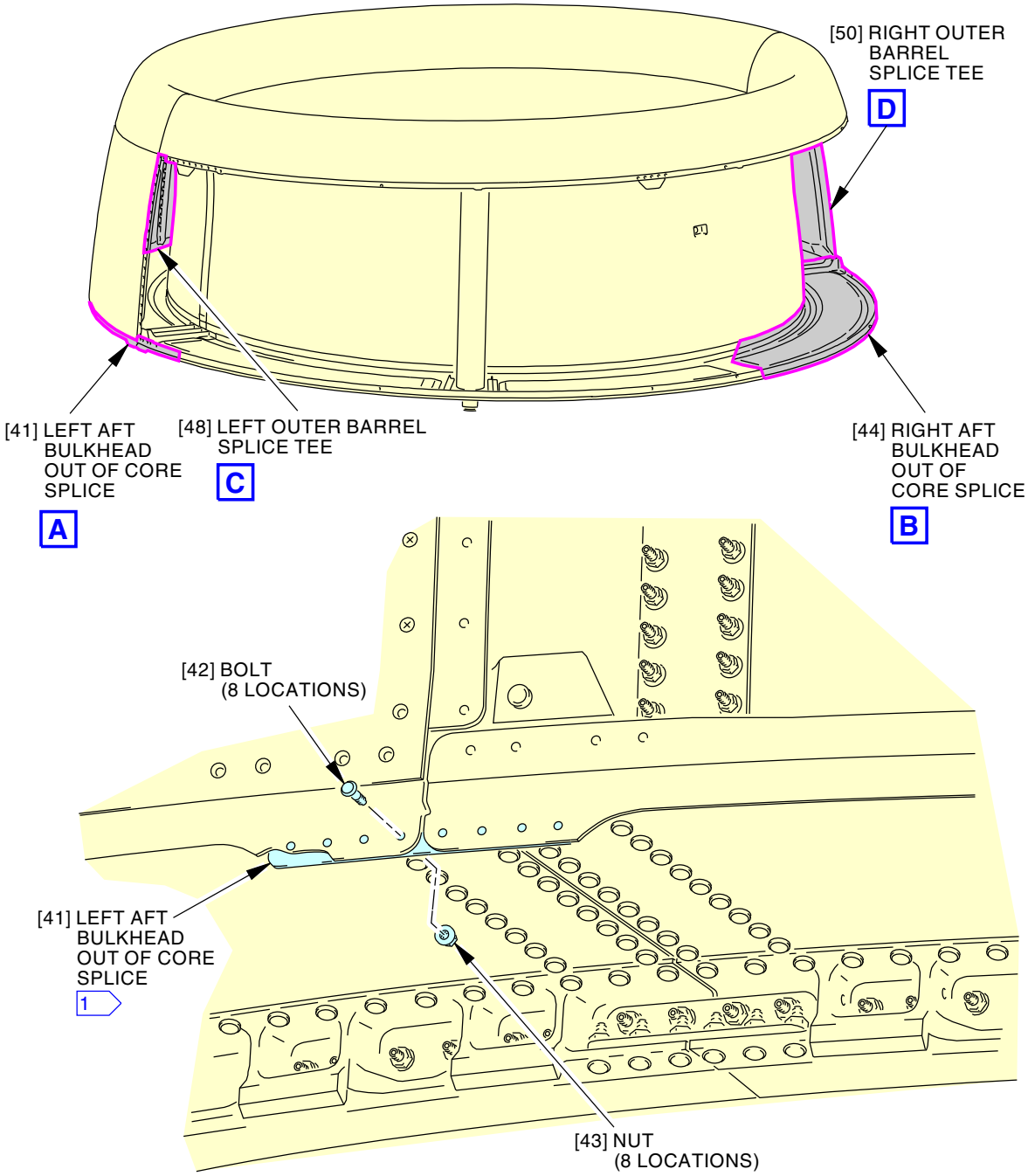

LEFT AFT BULKHEAD OUT OF CORE SPLICE

A

1 APPLY SEALANT, BMS 5-26 UNDER THE SPLICE.

M06627 S0004285661_V3

Aft Bulkhead Out of Core Splices and Splice Tee Installation
Figure 203/71-11-01-990-809-H01 (Sheet 1 of 4)

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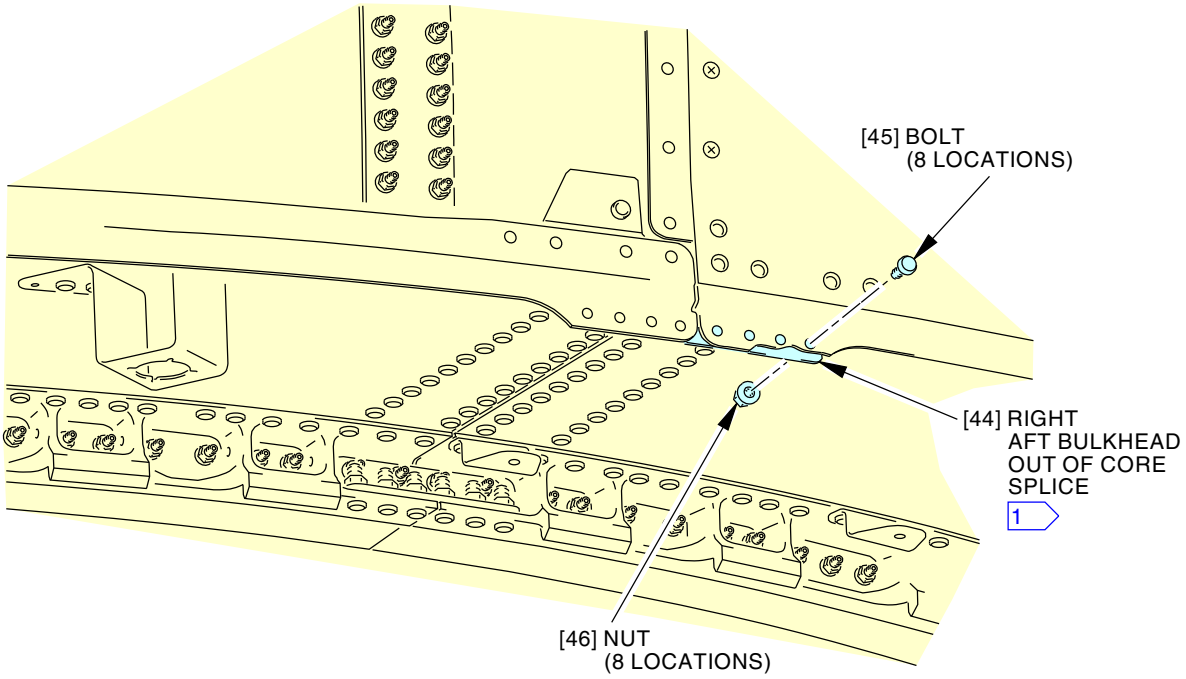

RIGHT AFT BULKHEAD OUT OF CORE SPLICE

B

M06628 S0004285662_V3

Aft Bulkhead Out of Core Splices and Splice Tee Installation
Figure 203/71-11-01-990-809-H01 (Sheet 2 of 4)

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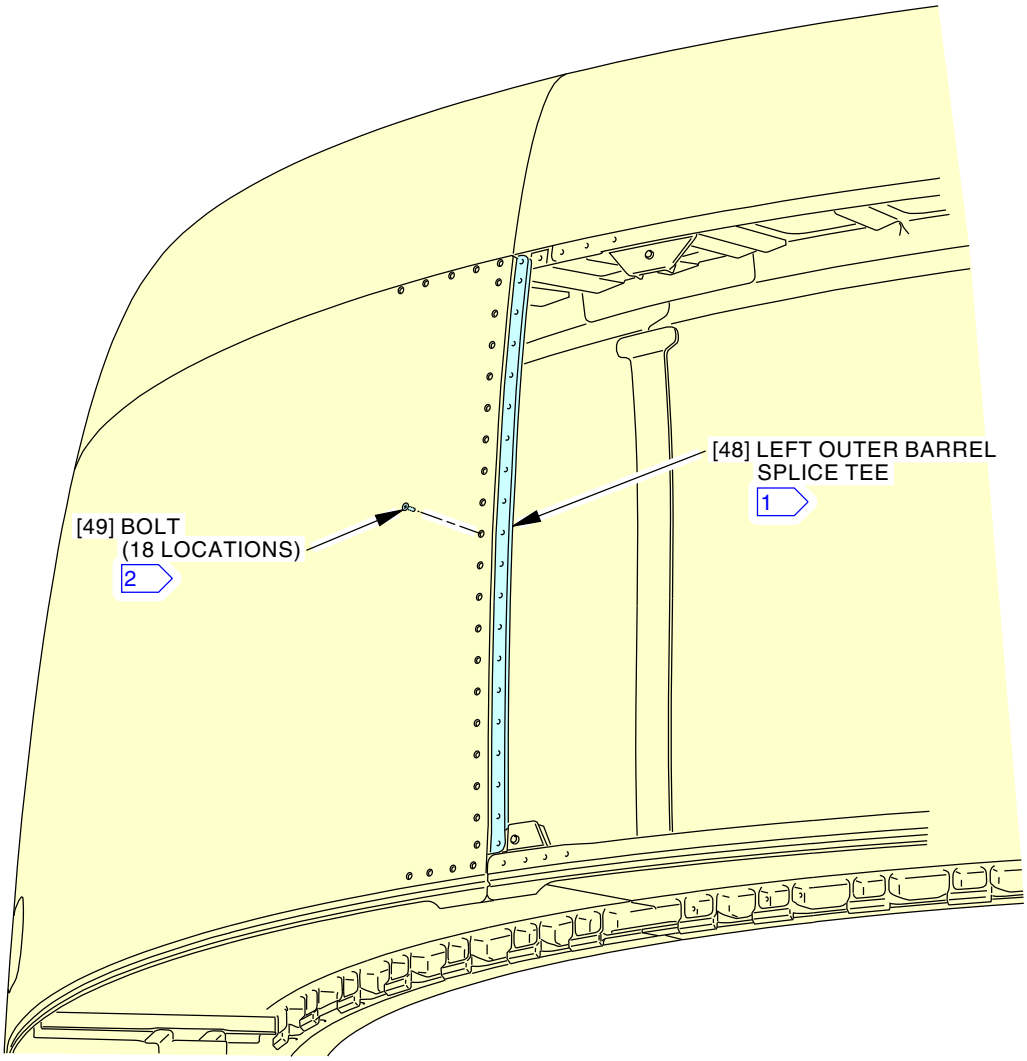

LEFT OUTER BARREL SPLICE TEE

C

2 APPLY GREASE, BMS 3-33 ON BOLTS

M06636 S0004285670_V4

Aft Bulkhead Out of Core Splices and Splice Tee Installation
Figure 203/71-11-01-990-809-H01 (Sheet 3 of 4)

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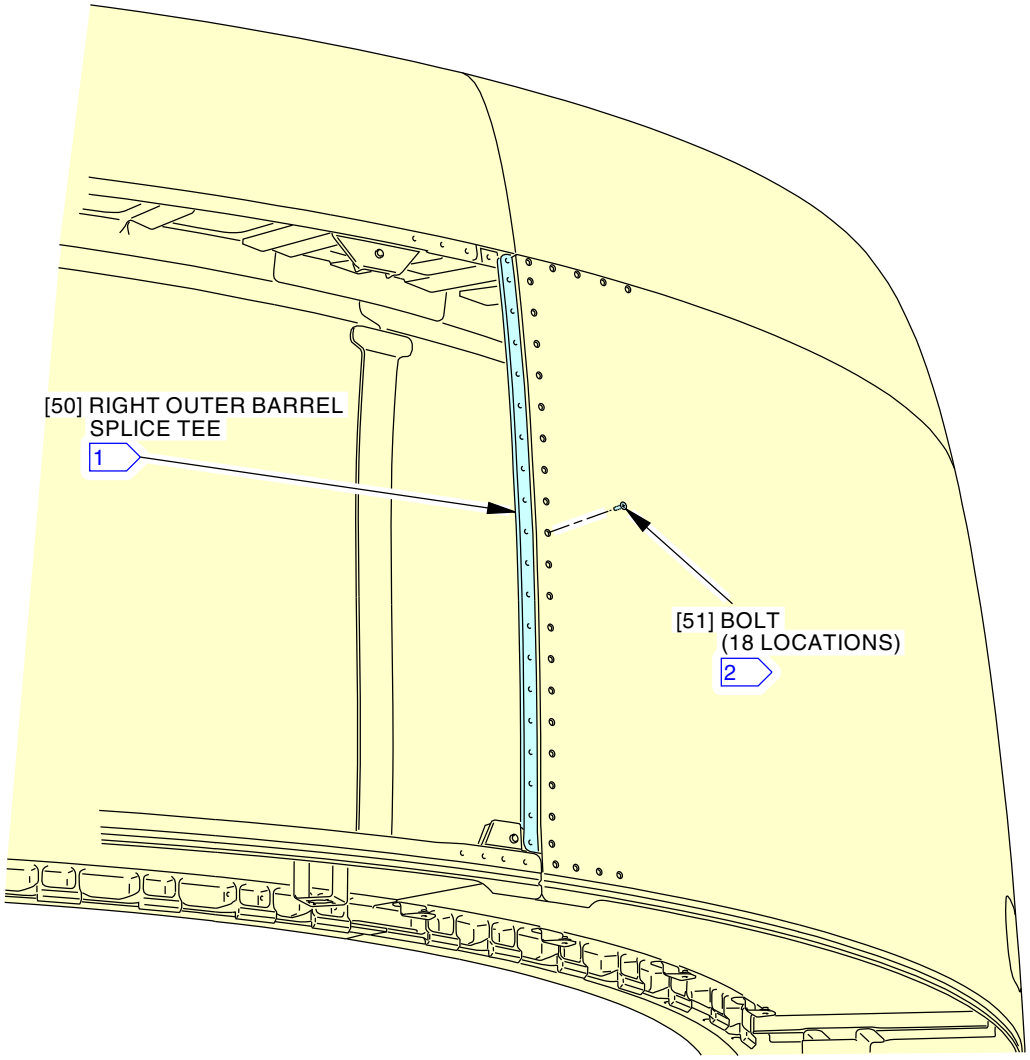

RIGHT OUTER BARREL SPLICE TEE

D

TYPE BOLT	TYPE NUT	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30NN3K4	BACN10JR3CFD	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30YP*K*	BACN10ZV*	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)

M06629 S0004285663_V3

Aft Bulkhead Out of Core Splices and Splice Tee Installation
Figure 203/71-11-01-990-809-H01 (Sheet 4 of 4)

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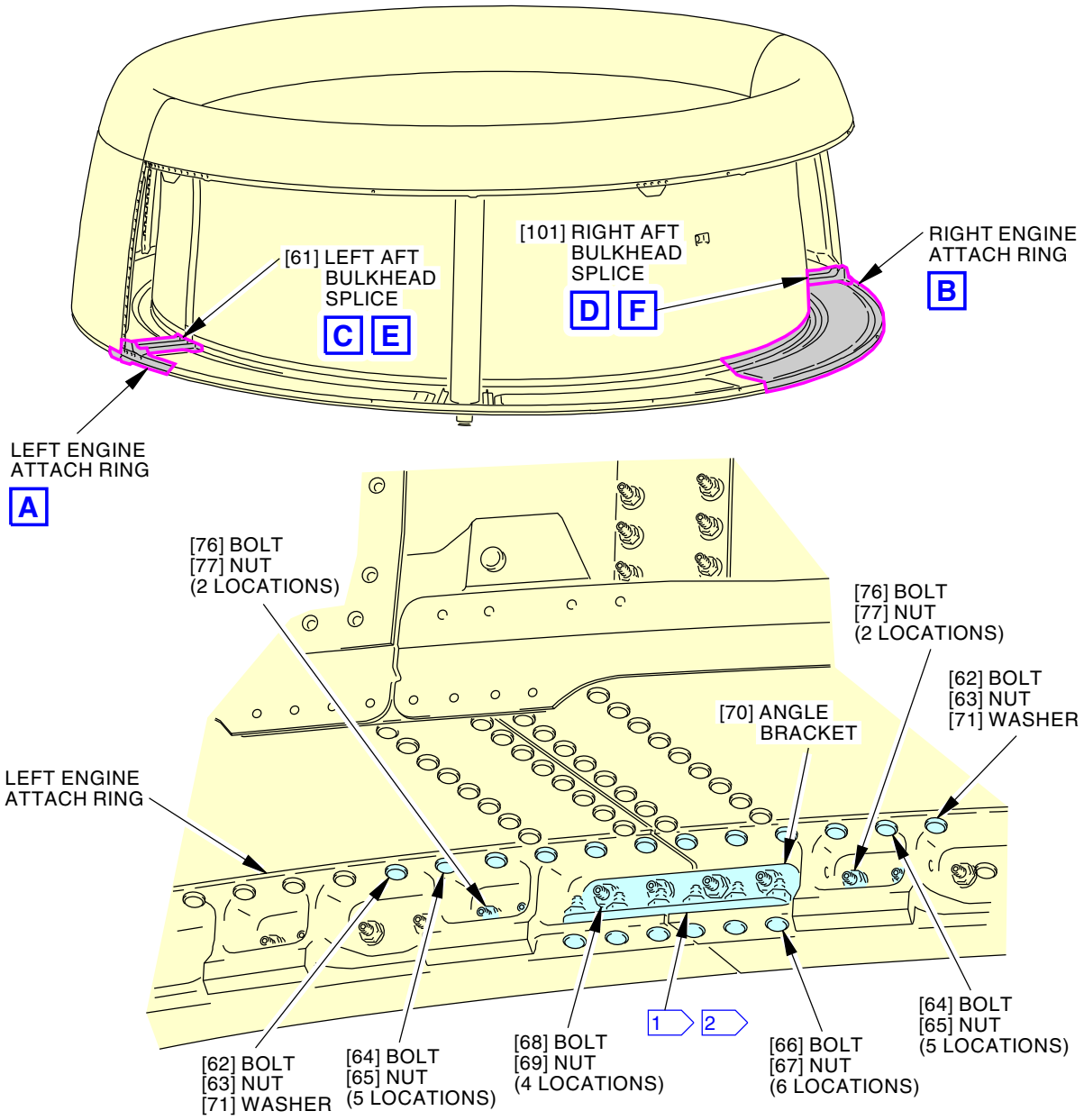

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 1 of 6)

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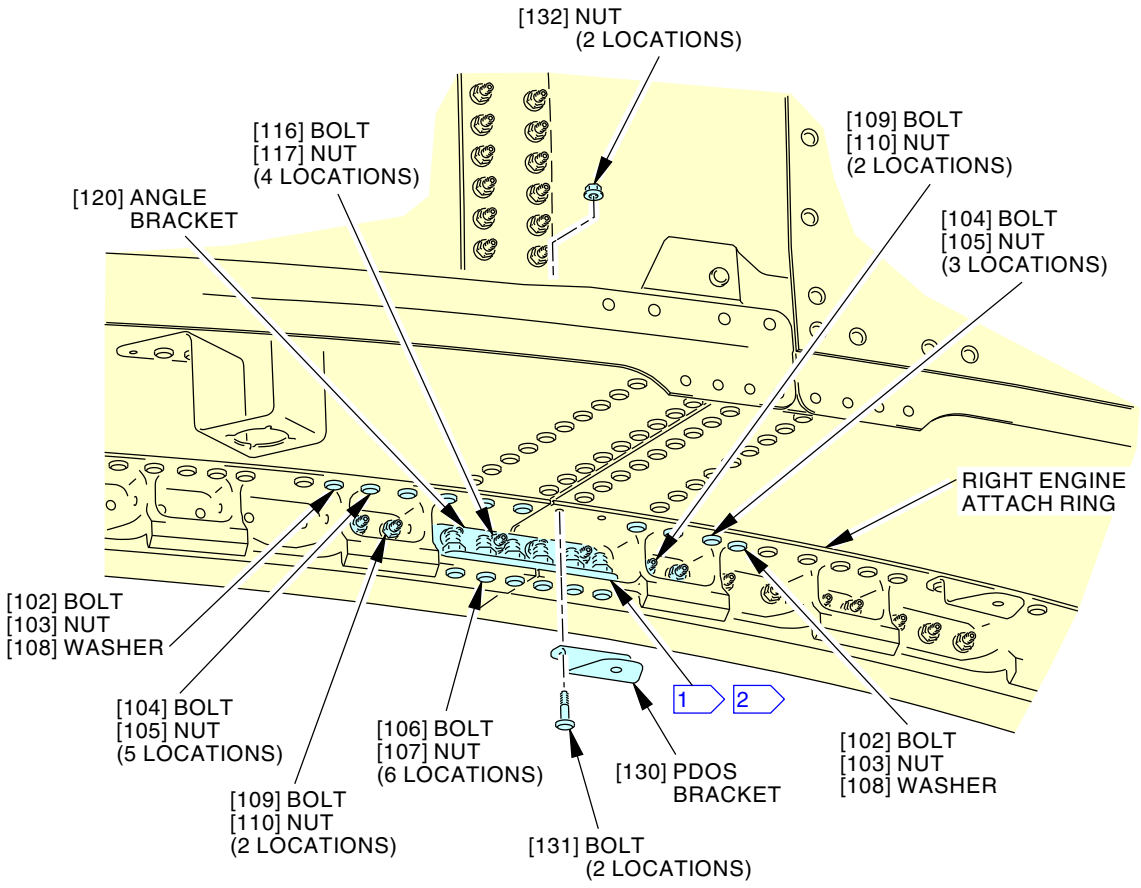

RIGHT ENGINE ATTACH RING

B

M06631 S0004285665_V3

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 2 of 6)

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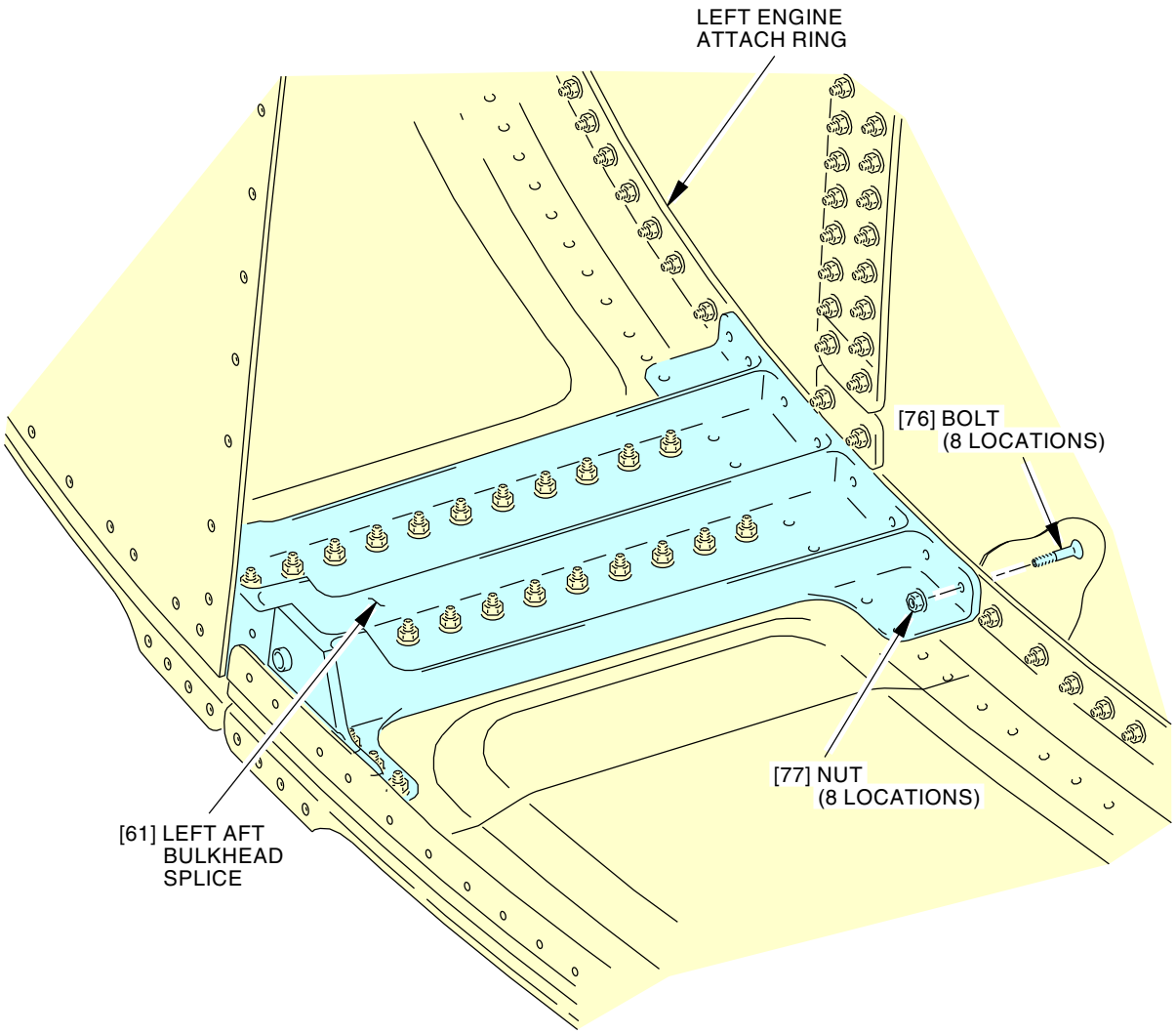

LEFT AFT BULKHEAD SPLICE

C

M06632 S0004285666_V3

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 3 of 6)

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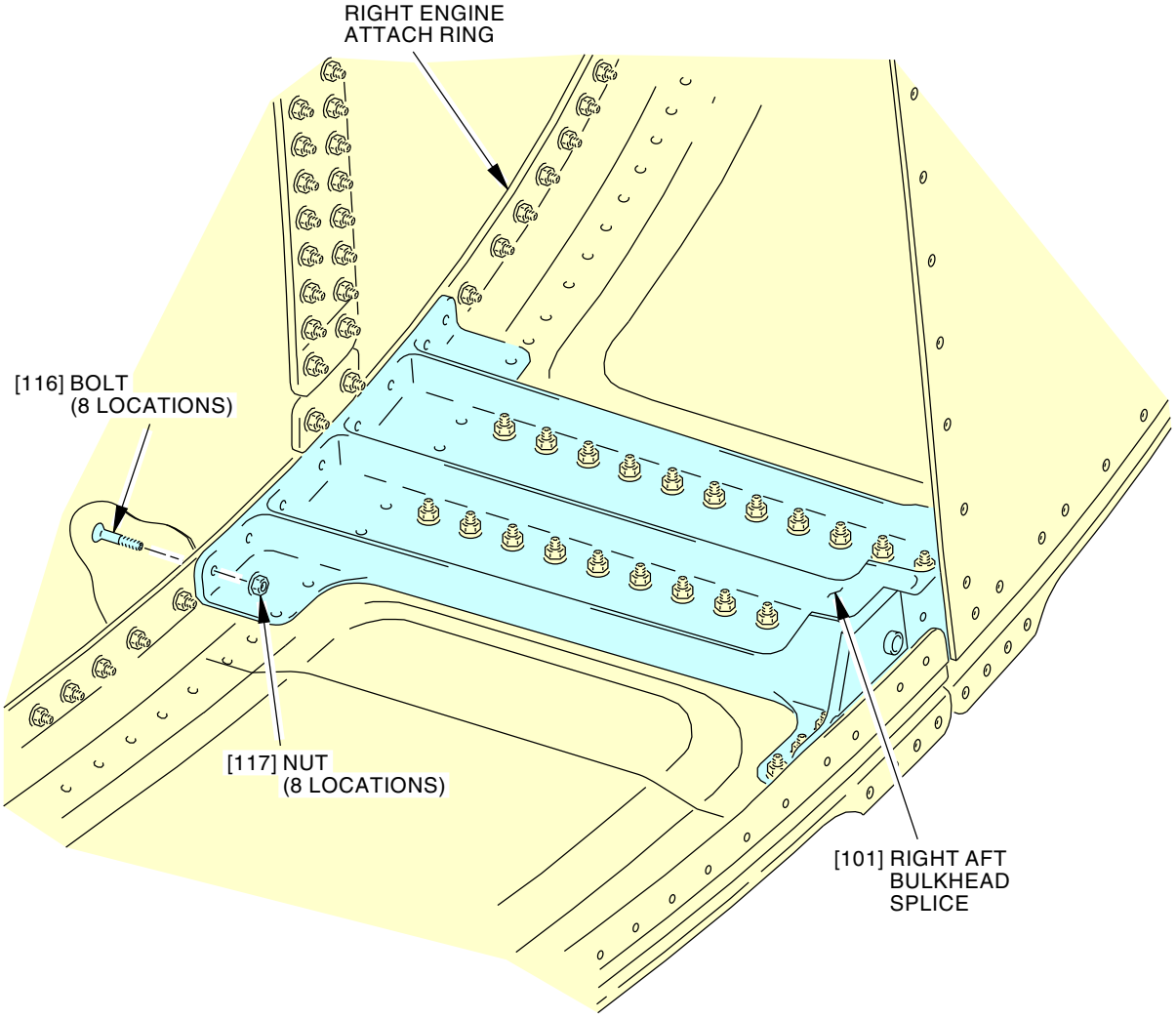

RIGHT AFT BULKHEAD SPLICE

D

M06633 S0004285667_V3

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 4 of 6)

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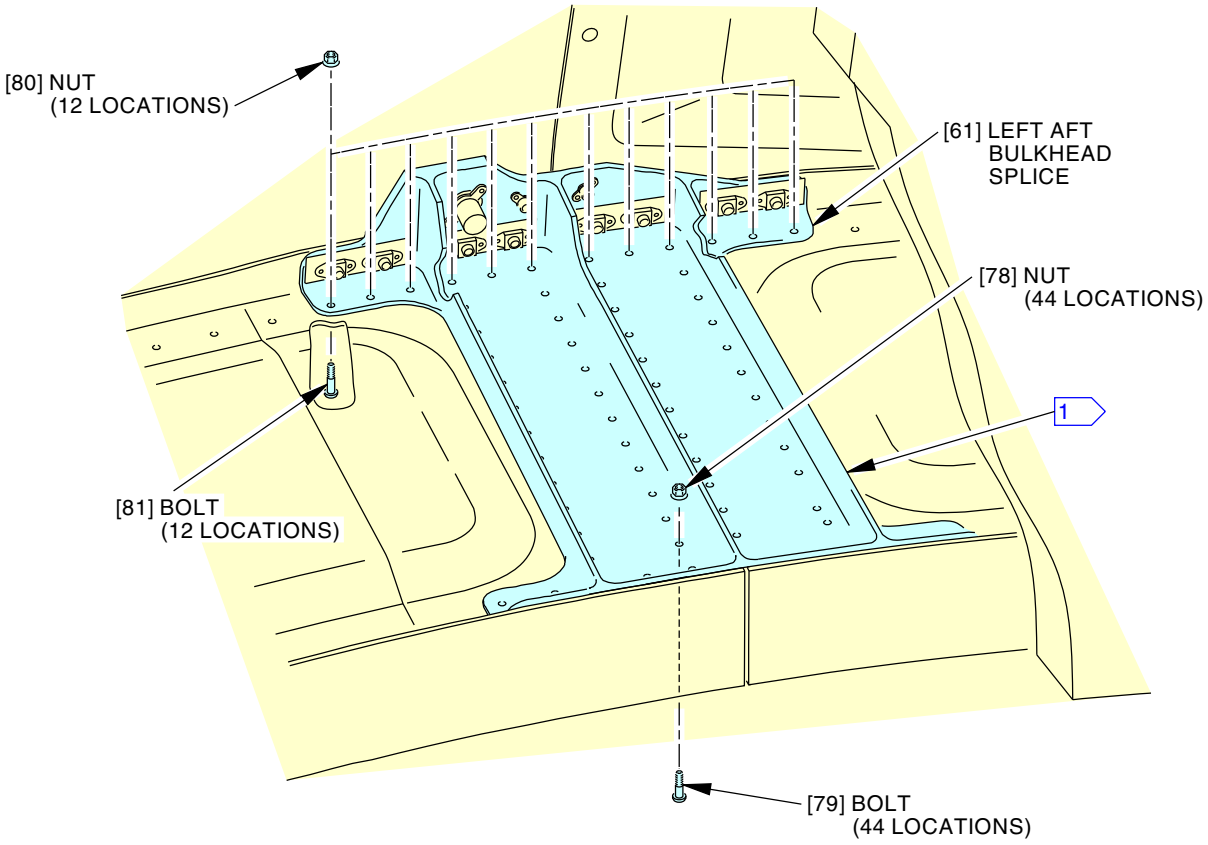

LEFT AFT BULKHEAD SPLICE

E

M06637 S0004285671_V3

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 5 of 6)

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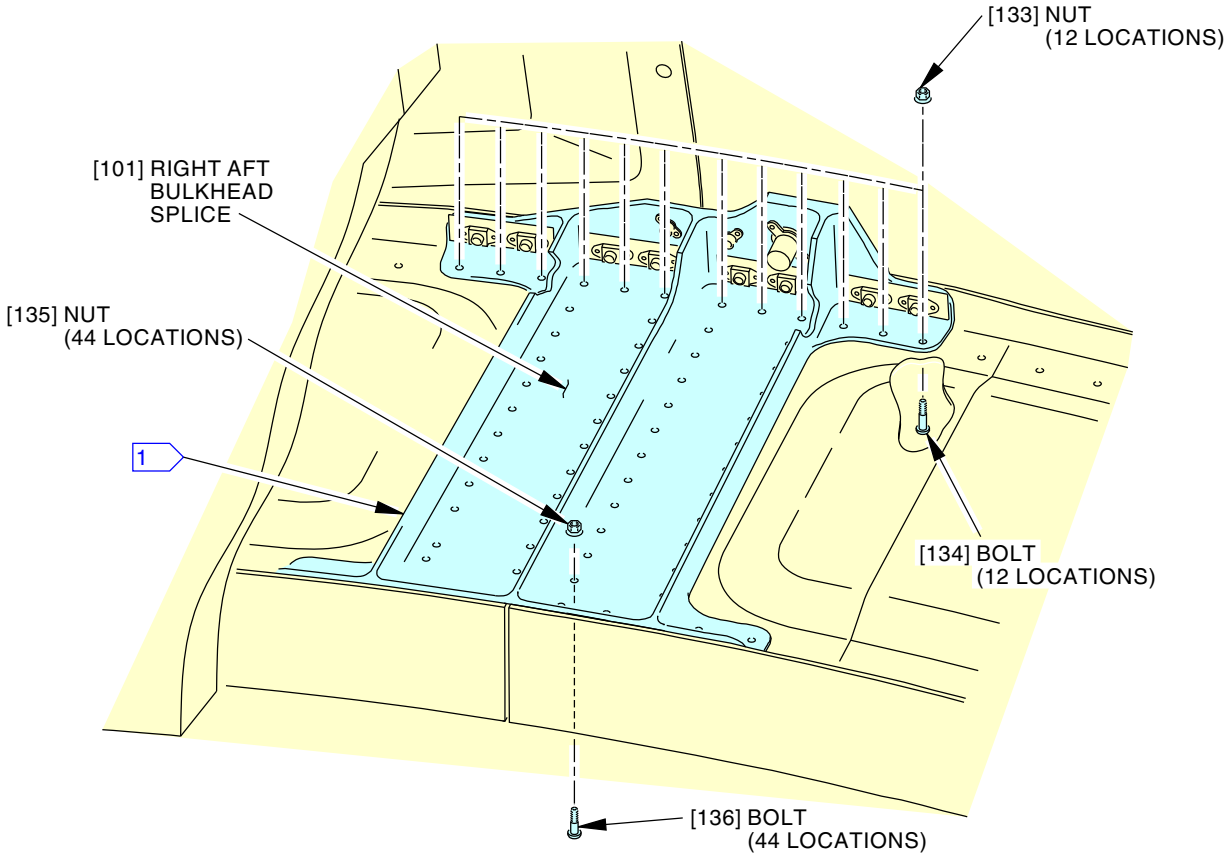

RIGHT AFT BULKHEAD SPLICE

F

TYPE BOLT	TYPE NUT/WASHER	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30VT*K*	BACN10ZV*	0.190-0.193 (4.83-4.90) 0.250-0.253 (6.35-6.43)	25-35 (2.8-4.0) 55-65 (6.2-7.3)
BACB30YP*K	BACN10ZV*	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30MY*K	BACN10YT*CS BACW10BP*NAPU	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30NX*K	BACN10ZV*	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30NY*K	BACN10XJ*	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)

M06639 S0004285673_V3

Aft Bulkhead Splices Installation
Figure 204/71-11-01-990-811-H01 (Sheet 6 of 6)

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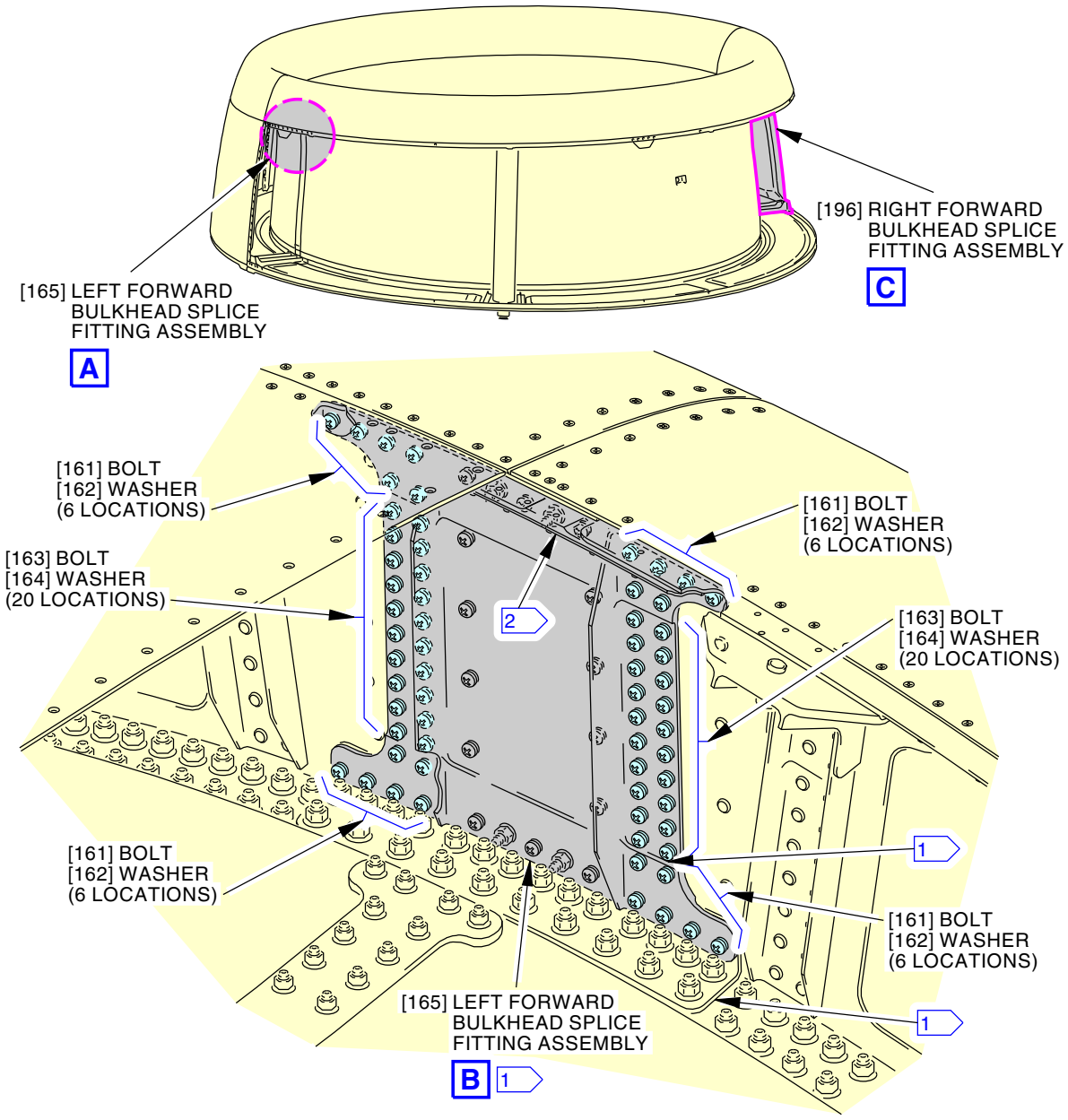

LEFT FORWARD BULKHEAD SPLICE FITTING ASSEMBLY

A

1 APPLY SEALANT BMS5-63 TO ASSEMBLY PERIPHERY FILLING IN THE GAP

2 SHIM IF AND AS REQUIRED, UP TO A MAXIMUM SHIM THICKNESS OF 0.040 INCH (1.016 mm)

M06634 S0004285668_V4

Forward Bulkhead Splice Fitting Assembly Installation
Figure 205/71-11-01-990-814-H01 (Sheet 1 of 4)

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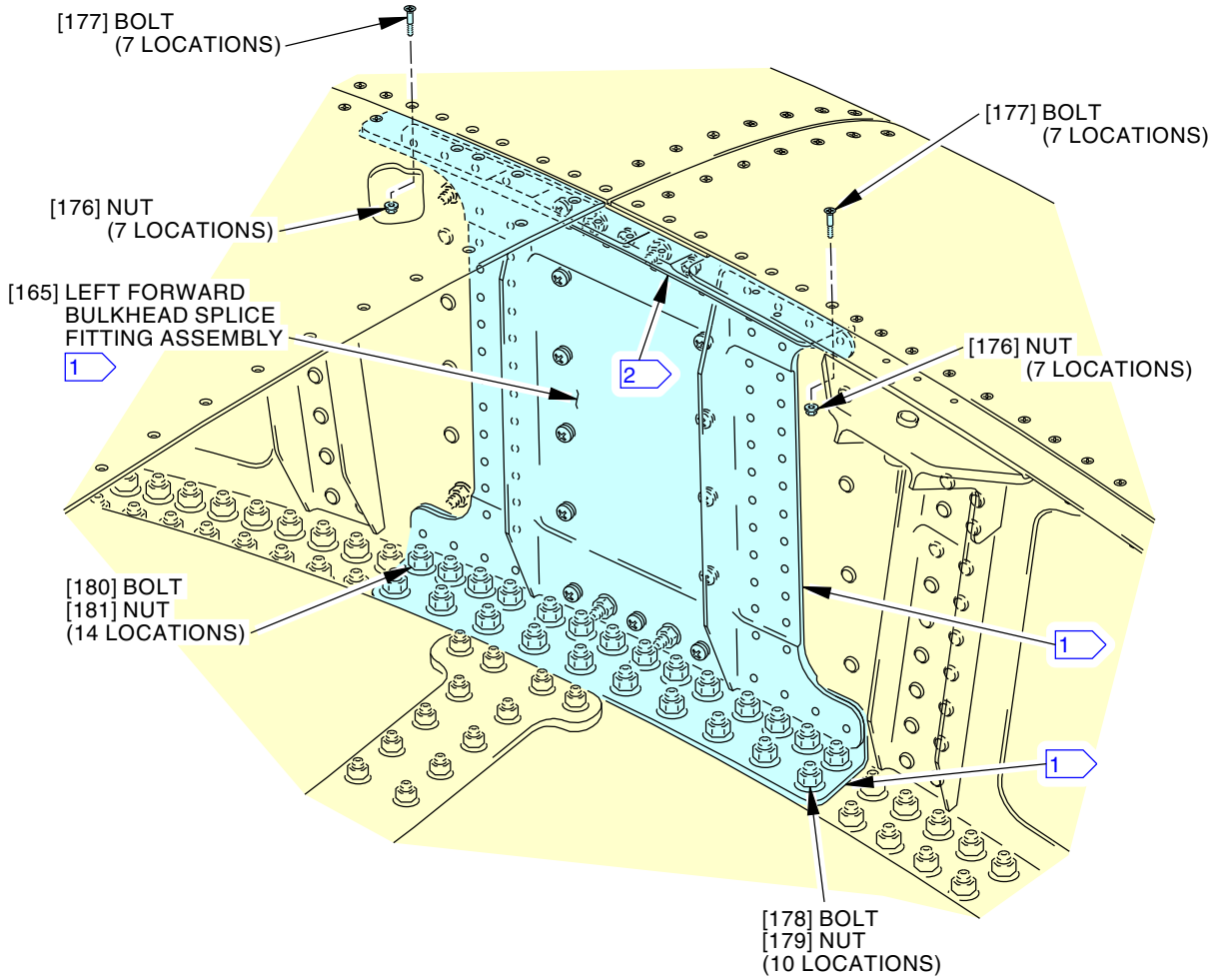

LEFT FORWARD BULKHEAD SPLICE FITTING ASSEMBLY

B

M06635 S0004285669_V4

Forward Bulkhead Splice Fitting Assembly Installation
Figure 205/71-11-01-990-814-H01 (Sheet 2 of 4)

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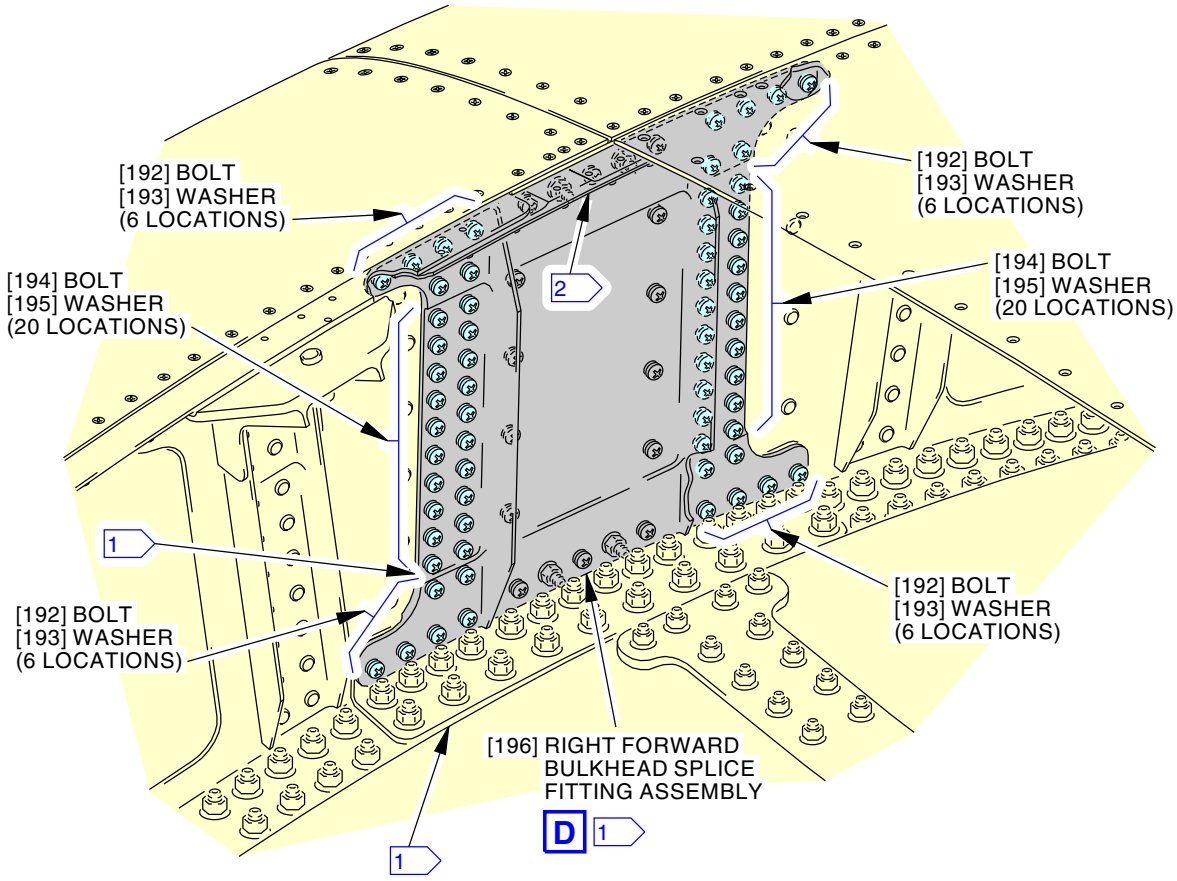

RIGHT FORWARD BULKHEAD SPLICE FITTING ASSEMBLY

C

M06640 S0004285674_V4

Forward Bulkhead Splice Fitting Assembly Installation
Figure 205/71-11-01-990-814-H01 (Sheet 3 of 4)

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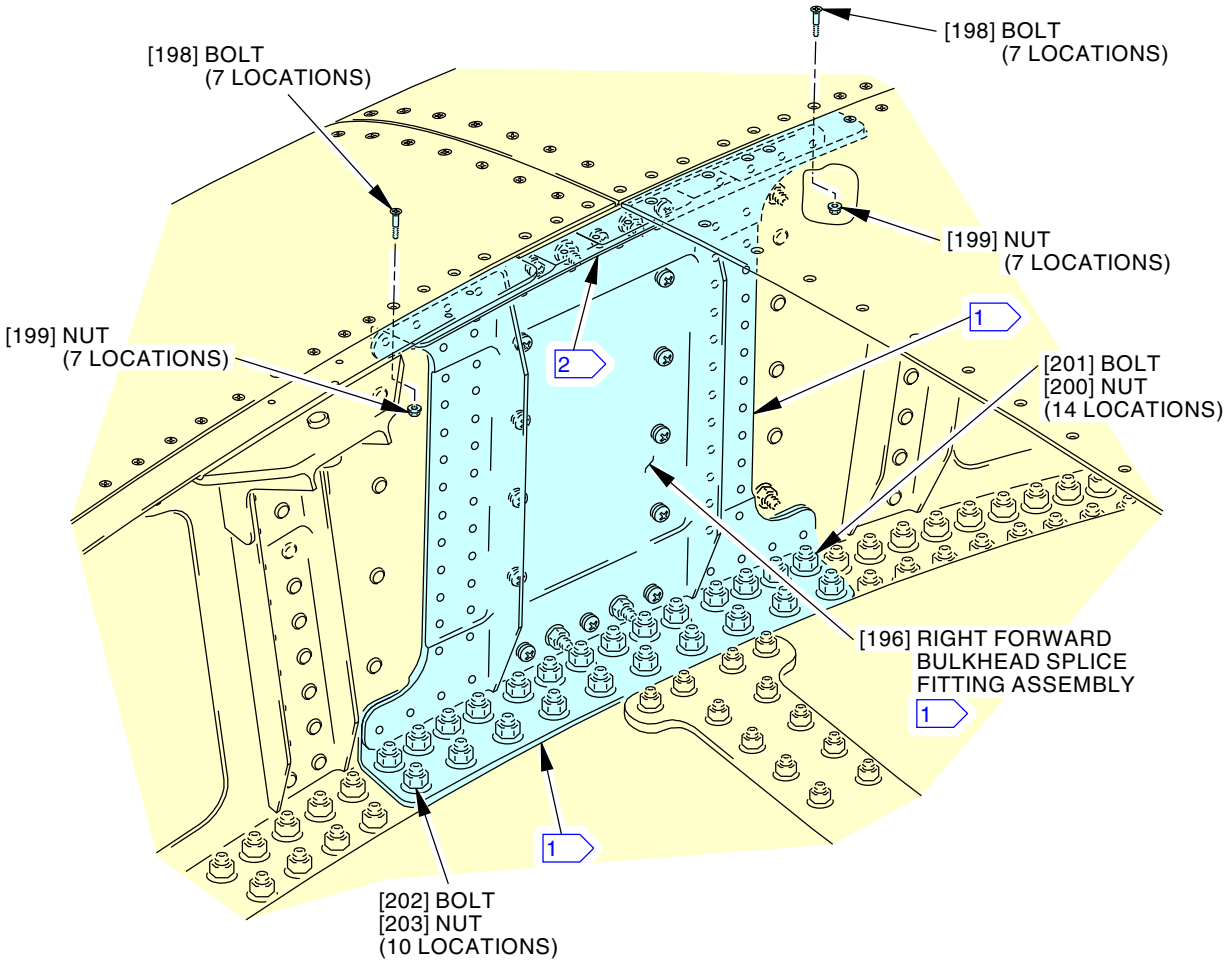

RIGHT FORWARD BULKHEAD SPLICE FITTING ASSEMBLY

D

TYPE BOLT	TYPE NUT/WASHER	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30NT3K*	BACW10BP3CD	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30YP*K*	BACN10ZV*	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30NY*K	BACN10ZZ*D	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)
BACB30NW*K*	BACN10ZZ*D	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)

M06641 S0004285675_V4

Forward Bulkhead Splice Fitting Assembly Installation
Figure 205/71-11-01-990-814-H01 (Sheet 4 of 4)

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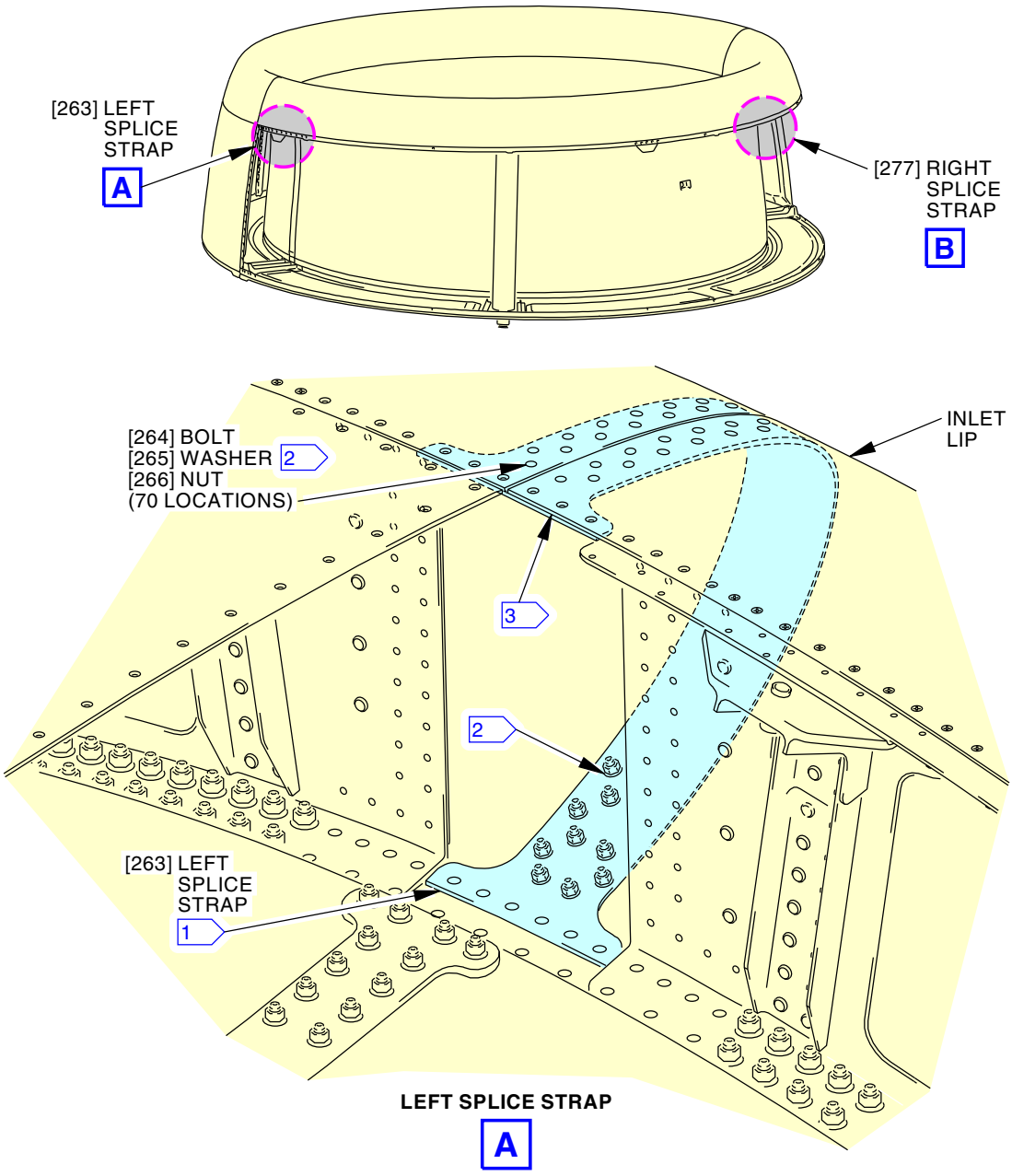

LEFT SPLICE STRAP

A

1 SHIM AS REQUIRED ALONG ENTIRE LENGTH OF SPLICE STRAP UP TO 0.040 INCH (1.016 mm) THICKNESS

2 APPLY SEALANT, BMS5-63 BETWEEN WASHER AND SPLICE STRAP

3 CLEAN AND FILL GAP WITH DC93-006 SEALANT OR PR-2001 SEALANT AFTER FINISHING

M06642 S0004285676_V4

Lip Assemblies Installation
Figure 206/71-11-01-990-813-H01 (Sheet 1 of 2)

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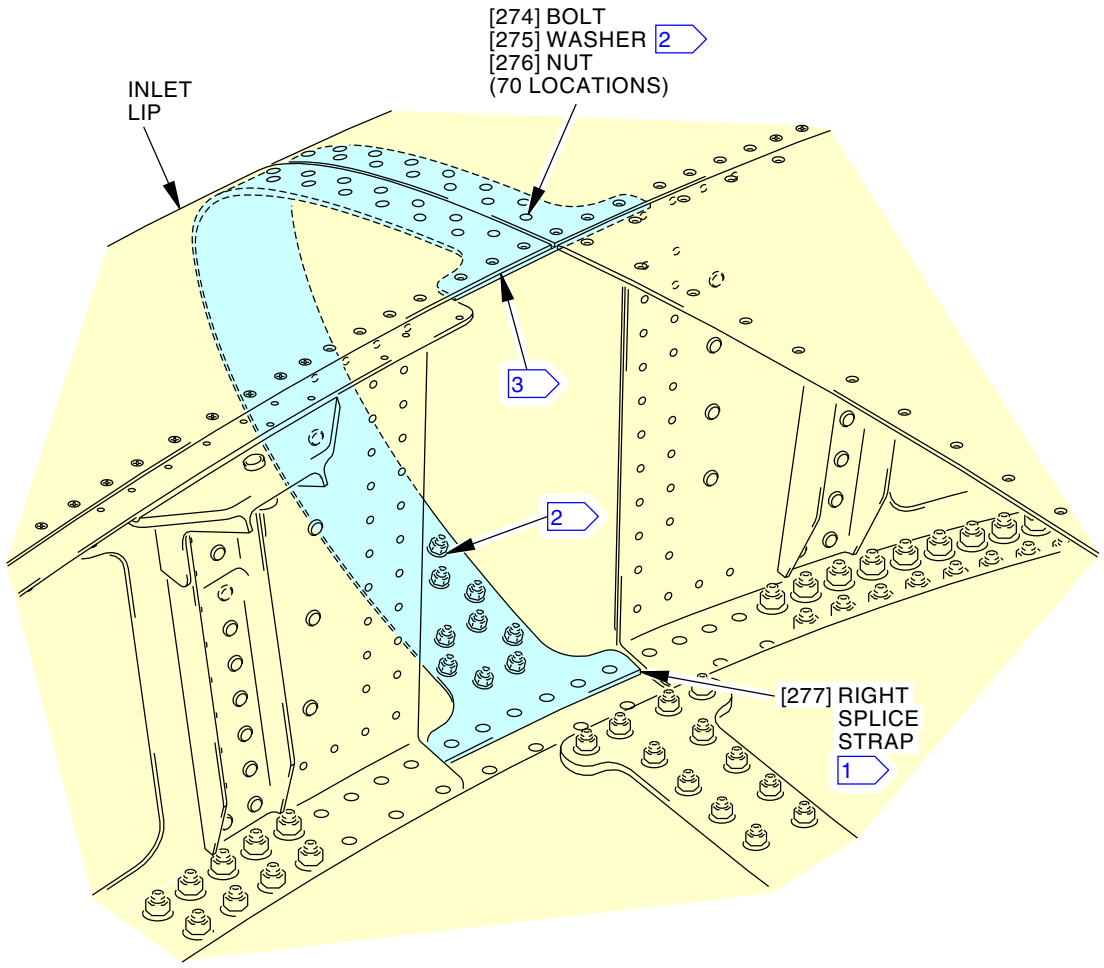

RIGHT SPLICE STRAP

B

TYPE BOLT	TYPE NUT	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30NW*K*	BACN10YT*CS	0.190-0.193 (4.83-4.90)	25-35 (2.8-4.0)

M06643 S0004285677_V3

Lip Assemblies Installation
Figure 206/71-11-01-990-813-H01 (Sheet 2 of 2)

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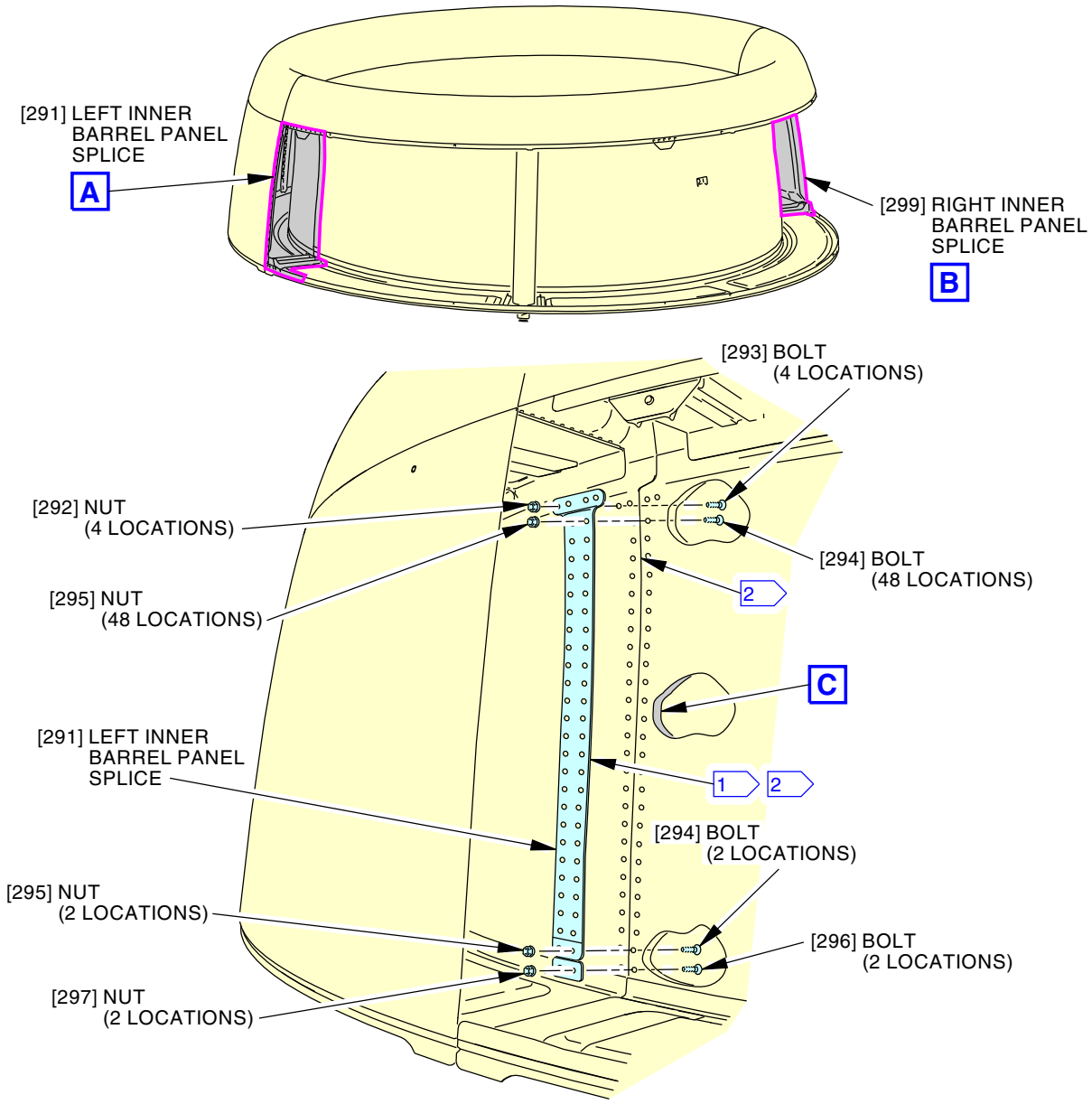

LEFT INNER BARREL PANEL SPLICE

A

1 SHIM IF REQUIRED UP TO 0.060 INCH (1.524 mm) THICKNESS

2 APPLY SEALANT, BMS 5-26 TO FILL THE GAP FROM OUTER WALL TO A DEPTH OF 0.25-0.50 INCH (6.35-12.7 mm)

M06644 S0004285678_V4

Inner Barrel Panel Splices Installation
Figure 207/71-11-01-990-812-H01 (Sheet 1 of 2)

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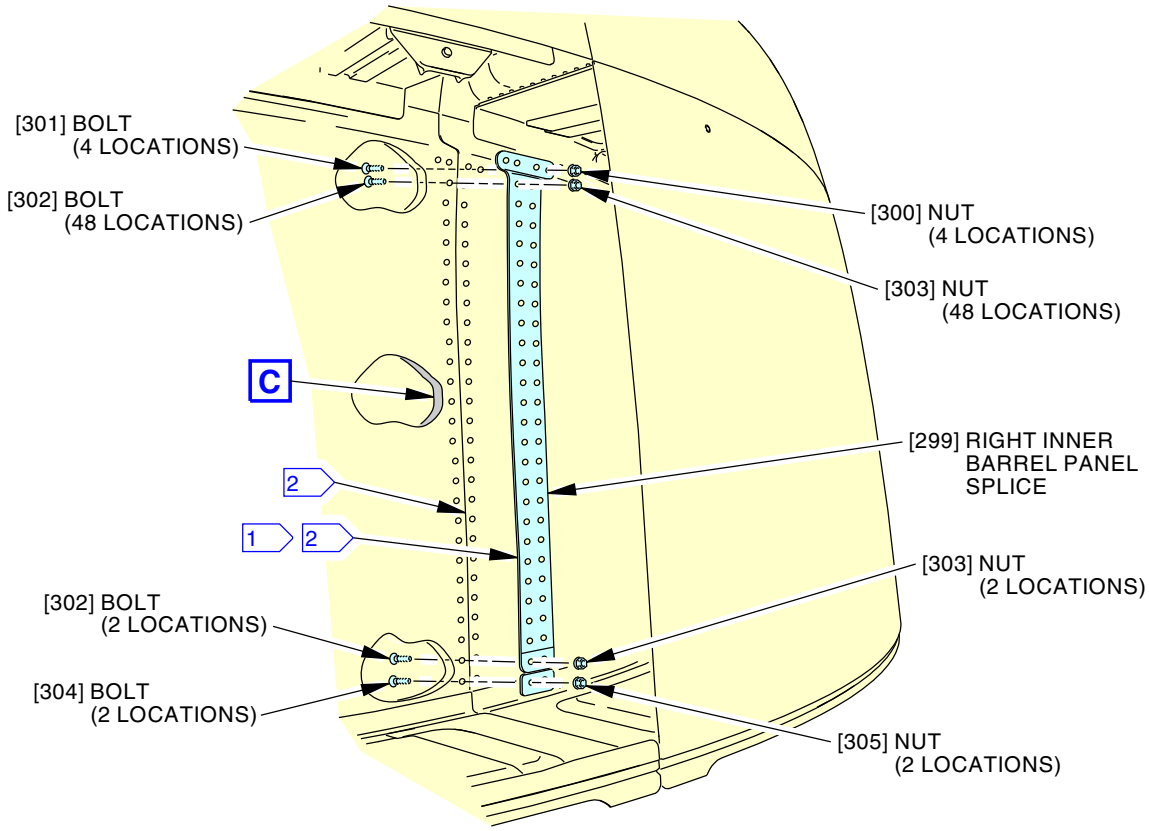
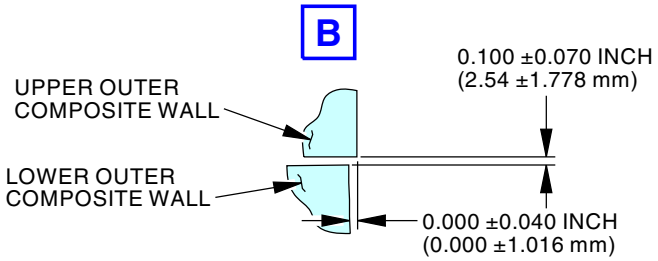


RIGHT INNER BARREL PANEL SPLICE



(VIEW FROM OUTSIDE OF THE INNER BARREL PANEL)

C

TYPE BOLT	TYPE NUT	LENGTH INCH (MILLIMETER)	TORQUE VALUE POUND-INCHES (NEWTON-METERS)
BACB30NY*K*	BACN10ZZ*D	0.190-0.193 (4.83-4.90)	55-65 (6.2-7.3)
BACB30NY*K*	BACN10XJ*	0.190-0.193 (4.83-4.90)	55-65 (6.2-7.3)

M06645 S0004285679_V4

Inner Barrel Panel Splices Installation
Figure 207/71-11-01-990-812-H01 (Sheet 2 of 2)

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TASK 71-11-01-400-801-H01

3. Inlet Cowl Assembly

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205, Figure 206, and Figure 207)

A. General

(1) This task is the assembly procedure for the upper and lower engine inlet cowl halves.

(2) You will use standard industry practices with the steps in this task that follows to assemble the engine inlet cowl halves.

B. References

Reference	Title
73-21-06-400-801-H01	T12 Sensor Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-2075	Equipment - Sling, Inlet Cowl Part #: J71001-66 Supplier: 81205 Opt Part #: J71001-63 Supplier: 81205
STD-1161	Gauge - Grip (Fastener Length Selection)
STD-1163	Gauge - Go/No Go

D. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
A00551	Sealant - Fuel Tank	BAC5010 Type 44 (BMS5-44, BMS5-45)
A00900	Sealant - Silicone, RTV - Dow Corning 93-006-1RF (Formerly 93-006-1. Use until Stock depleted)	
A50158	Sealant - Class B Rapid Curing Fuel Tank (PRC-Desoto PR-2001 Class B)	AMS 3277 Type 2 Class B
B00102	Abrasive - Aluminum Oxide Coated Cloth	
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B01019	Solvent - Final Cleaning Of Composites Prior To Structural Bonding - Series 99	
C00047	Adhesive - Silicone RTV, 1 Part, Sealant Primer	MIL-A-46106
C00580	Primer - Adhesive Bonding, RTV - PR-1200 (Formerly DC 1200)	
C00927	Topcoat - Silicone Rubber, Flame Resistant & Insulative (Use With BMS10-102, Type I)	BMS10-102 Type II
D00633	Grease - Aircraft General Purpose	BMS3-33
G01043	Cloth - Lint-free	

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(Continued)

Reference	Description	Specification
G02185	Agent - Peelable Parting (Valspar - 4A-183 Green Strippable Coating)Manufacturing discontinued, use stock until depleted	
G50077	Abrasive - Aluminum Oxide Paper, 240 grit or finer	
G50365	Agent - Peelable Parting (AC Products - AC962-73C) Production discontinued, use stock until depleted.	BAC5000
G50367	Agent - Peelable Parting (Aztec Chemical AZ 634-2)	MIL-PRF-6799, BAC5000
G50368	Agent - Peelable Parting (Rexco Chemical Company - Partall Coverall Film)	BAC5000
G50369	Coating - Alkaline Removable, Water Resistant	BMS15-12 Type I Class 1

E. Prepare for the Procedure

SUBTASK 71-11-01-490-005-H01

CAUTION

MAKE SURE YOU SECURELY SUPPORT EACH INLET COWL HALF SEPARATELY. THE INLET COWL WEIGHS APPROXIMATELY 1000 POUNDS (455 KGS) (500 POUNDS (223 KGS) FOR EACH HALF OF THE INLET COWL). IF YOU DO NOT SUPPORT THE INLET COWL CORRECTLY, THE INLET CAN FALL AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

(1) Use the inlet cowl inlet cowl sling, SPL-2075 to move or lift the upper and lower inlet cowl halves from the shipping container(s) and put them on suitable fixtures in a horizontal position (with lip assembly upward).

NOTE: You will need to be able to get access to the forward leading edge, aft bulkhead, and inner and outer panels to assemble the upper and the lower inlet cowl halves. Place the appropriate assembly kit near each inlet assembly half.

WARNING

MAKE SURE THAT THE FIXTURES ARE CLEAR FROM THE PDOS SWITCHES, BRACKETS, SPLICE LINES T12 CONNECTOR, AND EAI DUCT CONNECTION. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(a) Make sure that the fixtures are clear from the PDOS switches, brackets, splice lines, T12 connector, and the EAI duct connection.

F. Procedure

SUBTASK 71-11-01-010-014-H01

(1) If temporarily installed, do the steps that follow to remove the upper outer barrel panel assembly [21] from the inlet assembly (Figure 202):

NOTE: Store the upper outer barrel panel assembly away from the work area so that it will not get damaged.

(a) Remove the bolts [22] and the bolts [28] in every other third hole in the bolt holes from the forward outer of the upper outer barrel panel assembly [21].

(b) Remove the bolts [22] in every other third hole in the bolt holes from the aft outer of the upper outer barrel panel assembly [21].

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(c) Install the bolts [28] in every other third hole in the left and right outer barrel splice tees from the upper outer barrel panel assembly [21].

SUBTASK 71-11-01-410-005-H01

(2) Do this task: T12 Sensor Installation, TASK 73-21-06-400-801-H01.

SUBTASK 71-11-01-210-002-H01

(3) Do an inspection of the fastener holes in the splice areas:

(a) Use a go/no go gauge, STD-1163 to make sure that the hole tolerances in the splice areas are acceptable.

NOTE: The hole tolerance is 0.1915 ±0.0015 in. (4.8641 ±0.0381 mm).

1) Make sure the oversize holes are in the limits.

(b) If it is necessary, use a hole reamer to make the holes between 1/64 to 1/32 inch oversize to remove the damage or wear that is found.

(c) Use the permanent felt tip marker to mark the holes which were previously or are now oversize.

SUBTASK 71-11-01-910-002-H01

(4) Prepare the mating surfaces of the splice areas in the inner barrel splices, aft bulkhead splices, and the outer barrel panel assembly:

NOTE: The use of parting agents on the composite surfaces that will be in contact with sealant surfaces is to prevent damage in removal.

(a) Clean the splice area faying surfaces of the inner barrel splices, the aft bulkhead splices, and the upper and the lower outer barrel panel assemblies with solvent, B00148.

(b) Apply one of the parting agents that follow, to the composite mating surfaces of the inboard and the outboard inner barrel splices.

1) Rexco Partall Coverall Film peelable parting agent, G50368

2) temporary coating, G50369

3) AZ 634-2 peelable parting agent, G50367

4) AC962-73C peelable parting agent, G50365

5) Valspar 4A-183 green strippable coating, G02185

(c) Make sure that you do not apply the parting agent to the edges of the inner barrel splice.

1) If the parting agent gets on the edges of the inner barrel splice, then use a clean lint-free cloth, G01043 that is damped with solvent, B00148 to remove it.

(d) Apply the parting agent to the composite surface of the web assemblies, where the aft bulkhead splices are installed.

1) Make sure that you do not apply parting agent to the edges of the web assembly.

a) If the parting agent gets on the edges of the web assembly, then use a clean lint-free cloth, G01043 that is damped with solvent, B00148 to remove it.

(e) Apply the parting agent to the mating surfaces of the upper and lower outer barrel panel assemblies.

1) Make sure that you do not apply parting agent to the edges of the outer barrel panel assemblies.

a) If the parting agent gets on the edges of the outer barrel panels, then use a clean lint-free cloth, G01043 that is damped with solvent, B00148 to remove it.

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SUBTASK 71-11-01-840-002-H01

CAUTION: BE CAREFUL WHEN YOU JOIN THE INLET ASSEMBLY HALVES BECAUSE THE LIP SKIN SPLICE AREA CAN BE EASILY DAMAGED. DO NOT USE THE LIP SKIN SPLICE HOLES TO ALIGN THE INLET HALVES BECAUSE HOLE DAMAGE CAN OCCUR.

(5) Carefully put the inlet assembly halves together.

SUBTASK 71-11-01-410-006-H01

CAUTION: USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION: USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE INNER BARREL SKIN AREA. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE INNER BARREL ASSEMBLY.

(6) Do the steps that follow to install the left inner barrel panel splice [291] and the right inner barrel panel splice [299] on the inlet assembly (Figure 207):

NOTE: Shim if as required permitted up to a thickness of 0.060 inch (1.524 mm). The maximum pull down after shimming is 0.005 inch (0.127 mm). Apply sealant, A00436 or sealant, A00551 to both sides of the shim.

(a) Apply sealant, A00436 to the mating surfaces between the inboard, the left inner barrel panel splice [291], and the right inner barrel panel splice [299].

(b) Align the holes of the left inner barrel panel splice [291] with the holes of the left composite surfaces.

(c) Align the holes of the right inner barrel panel splice [299] with the holes of the right composite surfaces.

(d) Use a fastener selection grip gauge, STD-1161 to determine the fasteners length on the left inner barrel panel splice [291] and the right inner barrel panel splice [299].

1) Make sure the step limits are within the 0.1000 ± 0.0700 inch (2.540 ± 1.778 mm) vertically (positive step as shown) and 0.0000 ± 0.0400 inch (0.0000 ± 1.016 mm) horizontally.

(e) Install the left inner barrel panel splice [291] on the inlet assembly:

1) Install the nuts [292] (4 locations), and the bolts [293] (4 locations); and the nuts [295] (50 locations), and the bolts [294] (50 locations); and the nuts [297] (2 locations) and the bolts [296] (2 locations), that attach the left inner barrel panel splice [291] to the left inner wall.

NOTE: Fasteners are installed in the direction from the inboard to the outboard of the inner barrel splices.

2) Tighten the nuts [292], the nuts [295], and the nuts [297] to 55-65 pound-inches (6.2-7.3 Newton-meters).

3) Leave a small amount sealant, A00436 as fillet seal around the nuts.

4) Apply sealant, A00436 to fill the gap between the outer wall to a depth of 0.25-0.50 inch (6.35-12.7 mm).

NOTE: Do this step after you have completely installed the split inlet.

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(f) Install the right inner barrel panel splice [299] on the inlet assembly:

1) Install the nuts [300] (4 locations), and the bolts [301] (4 locations); and the nuts [303] (50 locations), and the bolts [302] (50 locations); and the nuts [303] (2 locations) and the bolts [304] (2 locations), that attach the right inner barrel panel splice [299] to the right inner wall.

NOTE: Fasteners are installed in the direction from the inboard to the outboard of the inner barrel splices.

2) Tighten the nuts [300], the nuts [303], and the nuts [303] to 55-65 pound-inches (6.2-7.3 Newton-meters).

3) Leave a small amount sealant, A00436 as fillet seal around the nuts.

4) Apply sealant, A00436 to fill the gap between the outer wall to a depth of 0.25-0.50 inch (6.35-12.7 mm).

NOTE: Do this step after you have completely installed the split inlet.

SUBTASK 71-11-01-410-007-H01

CAUTION

USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION

USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(7) Do the steps that follow to install the left aft bulkhead splice [61] and the right aft bulkhead splice [101] on the composite surfaces (or web assemblies) (Figure 203):

(a) Install the left aft bulkhead splice [61] on the composite surface:

1) Apply sealant, A00436 to the surface of the left aft bulkhead splice [61] that is in contact to the composite surface.

NOTE: Do not apply parting agent to the edge of the web.

2) Align the holes of the left aft bulkhead splice [61] with the holes of the composite surface.

3) Install the nuts [80] (12 locations) and the bolts [81] (12 locations); and the nuts [78] (44 locations) and the bolts [79] (44 locations), that attach the left aft bulkhead splice [61] to the composite surface.

a) Tighten the nuts [80] and the nuts [78] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(b) Connect the left engine attach ring and install the engine attach angle bracket [70] on the aft inner flange:

1) Apply sealant, A00436 to the surfaces of the left engine attach ring which are in contact to the composite surface (web assembly).

2) Align the holes of the left aft bulkhead splice [61] and the left engine attach ring with the holes of the inner wall.

3) Install the nuts [77] (8 locations) and the bolts [76] (8 locations) that attach the left aft bulkhead splice [61] to the left engine attach ring.

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4) Tighten the nuts [77] to 55-65 pound-inches (6.2-7.3 Newton-meters).

5) Install the nuts [65] (10 locations) and the bolts [64] (10 locations); and the nuts [63] (2 locations), the washers [71] (2 locations), and bolts [62] (2 locations) to the two side of the split line at the left engine attach ring.

6) Tighten the nuts [65] and the nuts [63] to 25-35 pound-inches (2.8-4.0 Newton-meters).

7) Install the nuts [77] (4 locations) and the bolts [76] (4 locations) at the inner wall of the inlet.

8) Tighten the nuts [77] to 55-65 pound-inches (6.2-7.3 Newton-meters).

9) Install the engine attach angle bracket [70] on the split line on the left engine attach ring at the inner aft flange.

   a) Apply sealant, A00436 to the surfaces of the engine attach angle bracket [70] which is in contact to the left engine attach ring.

   b) Align the holes of the engine attach angle bracket [70] with the holes of the left engine attach ring.

   c) Install the nuts [67] (6 locations) and the bolts [66] (6 locations); the nuts [69] (4 locations) and the bolts [68] (4 locations), that attach the engine attach angle bracket [70] to the left engine attach ring at the inner aft flange.

   d) Tighten the nuts [67] to 25-35 pound-inches (2.8-4.0 Newton-meters).

   e) Tighten the nuts [69] to 55-65 pound-inches (6.2-7.3 Newton-meters).

(c) Install the right aft bulkhead splice [101] on the composite surface:

1) Apply sealant, A00436 to the surface of the right aft bulkhead splice [101] that is in contact to the composite surface.

   NOTE: Do not apply parting agent to the edge of the web.

2) Align the holes of the right aft bulkhead splice [101] with the holes of the composite surface.

3) Install the nuts [133] (12 locations) and the bolts [134] (12 locations); and the nuts [135] (44 locations) and the bolts [136] (44 locations), that attach the right aft bulkhead splice [101] to the composite surface.

   a) Tighten the nuts [133] and the nuts [135] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(d) Connect the right engine attach ring and install the engine attach angle bracket [120] and the PDOS bracket [130] on the aft inner flange:

1) Apply sealant, A00436 to the surfaces of the right engine attach ring which are in contact to the composite surface (web assembly).

2) Align the holes of the right aft bulkhead splice [101] and the right engine attach ring with the holes of the inner wall.

3) Install the nuts [110] (8 locations) and the bolts [109] (8 locations) that attach the right aft bulkhead splice [101] to the right engine attach ring.

4) Tighten the nuts [110] to 55-65 pound-inches (6.2-7.3 Newton-meters).

5) Install the nuts [105] (8 locations) and the bolts [104] (8 locations); and the nuts [103] (2 locations), the washers [108] (2 locations) and the bolts [102] (2 locations) to the two side of the split line at the right engine attach ring.

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6) Tighten the nuts [105] and the nuts [103] to 25-35 pound-inches (2.8-4.0 Newton-meters).

7) Install the nuts [110] (4 locations) and the bolts [109] (4 locations) at the inner wall of the inlet.

8) Tighten the nuts [110] to 55-65 pound-inches (6.2-7.3 Newton-meters).

9) Install the engine attach angle bracket [120] on the split line on the right engine attach ring at the inner aft flange.

   a) Apply sealant, A00436 to the surfaces of the engine attach angle bracket [120] which is in contact to the right engine attach ring.

   b) Align the holes of the engine attach angle bracket [120] with the holes of the right engine attach ring.

   c) Install the nuts [107] (6 locations) and the bolts [106] (6 locations); and the nuts [117] (4 locations) and the bolts [116] (4 locations), that attach the engine attach angle bracket [120] to the right engine attach ring at the inner aft flange.

   d) Tighten the nuts [107] to 25-35 pound-inches (2.8-4.0 Newton-meters).

   e) Tighten the nuts [117] to 55-65 pound-inches (6.2-7.3 Newton-meters).

10) Install the PDOS bracket [130] on the right engine attach ring.

   a) Align the holes of the PDOS bracket [130] with the right engine attach ring.

   b) Apply sealant, A00436 to the bolts [131] (2 locations) and the nuts [132] (2 locations).

   c) Install the nuts [132] (2 locations) and the bolts [131] (2 locations) from the split line that attach the PDOS bracket [130] to the right engine attach ring at the aft composite wall of the inlet.

   d) Tighten the nuts [132] to 25-35 pound-inches (2.8-4.0 Newton-meters).

SUBTASK 71-11-01-410-008-H01

CAUTION USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(8) Do the steps that follow to install the left splice strap [263] and the right splice strap [277] on the lip assembly (Figure 206):

   (a) Align the lip skin holes of the upper inlet half with the holes of the lower inlet half at the left and right sides.

   (b) Install the left splice strap [263] in the left lip skin:

      NOTE: Shim is required along the entire length of the splice strap permitted up to a thickness of 0.040 inch (1.016 mm).

      1) Install the bolts [264] (70 locations) from the outside of the left lip skin area through the skin into the left splice strap [263].

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2) Apply sealant, A00160 to the surfaces of the washers [265] (70 locations) which are in contact with the splice plates.

3) Install the nuts [266] (70 locations).

a) Tighten the nuts [266] to 25-35 pound-inches (2.8-4.0 Newton-meters).

4) Fillet seal the joint edges between the splice plates and the lip skins with Dow Corning 93-006-1 RF sealant, A00900 or PR-2001 sealant, A50158.

a) Mask off the lip skin and adjacent panel.

b) Use abrasive cloth, B00102 and Series 99 solvent, B01019 to clean the splice plates and the lip skins.

c) Use 240 grit or finer abrasive paper, G50077 or finer aluminum to clean the gap.

d) Fill gap with Dow Corning 93-006-1 RF sealant, A00900 or PR-2001 sealant, A50158.

(c) Install the right splice strap [277] in the right lip skin:

NOTE: Shim is required along the entire length of the splice strap permitted up to a thickness of 0.040 inch (1.016 mm).

1) Install the bolts [274] (70 locations) from the outside of the right lip skin area through the skin into the right splice strap [277].

2) Apply sealant, A00160 to the surfaces of the washers [275] (70 locations) which are in contact with the splice plates.

3) Install the nuts [276] (70 locations).

a) Tighten the nuts [276] to 25-35 pound-inches (2.8-4.0 Newton-meters).

4) Fillet seal the joint edges between the splice plates and the lip skins with Dow Corning 93-006-1 RF sealant, A00900 or PR-2001 sealant, A50158.

a) Mask off the lip skin and adjacent panel.

b) Use abrasive cloth, B00102 and Series 99 solvent, B01019 to clean the splice plates and the lip skins.

c) Use 240 grit or finer abrasive paper, G50077 or finer aluminum to clean the gap.

d) Fill gap with Dow Corning 93-006-1 RF sealant, A00900 or PR-2001 sealant, A50158.

SUBTASK 71-11-01-410-009-H01

CAUTION

USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION

USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(9) Do the steps that follow to install the left forward bulkhead splice fitting assembly [165] and the right forward bulkhead splice fitting assembly [196] on the forward wall (Figure 205):

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(a) Install the left forward bulkhead splice fitting assembly [165] on the forward wall:

NOTE: Prime bulkhead and mating surfaces with the PR-1200 primer, C00580 and topcoat, C00927 or sealant, A00436 to approximately 0.015 inch (0.381 mm) of thickness in mixing. Apply 5.0 PSI pressure and squeeze out from around the edges of blanket. If the squeeze out is not achieved, remove the region blanket to expose bond surface and apply appropriate amount of topcoat, C00927 or sealant, A00436 to obtain the squeeze out. Smooth the squeeze out to seal approximately 0.18 inch (4.57 mm) up on the blanket from the bond line.

NOTE: Install the left forward bulkhead splice fitting assembly [165] as a completed assemble fitting.

1) Apply PR-1200 primer, C00580 and topcoat, C00927 or sealant, A00436 to the surfaces of the left forward bulkhead splice fitting assembly [165] which are in contact with the forward wall and the outer lip skin.

2) Align the holes of the left forward bulkhead splice fitting assembly [165] with the holes on the forward wall.

3) Install the nuts [176] (14 locations) and the bolts [177] (14 locations) that attach the left forward bulkhead splice fitting assembly [165] to the outer lip skin at the split line.

NOTE: Shim (Aluminum shim stock) if as required permitted up to a thickness of 0.040 inch (1.016 mm).

a) Tighten the nuts [176] to 25-35 pound-inches (2.8-4.0 Newton-meters).

b) Fill gap with the sealant, A00436 around the edges of the left forward bulkhead splice fitting assembly [165].

4) Install the bolts [178] (10 locations) and the nuts [179] (10 locations); and the bolts [180] (14 locations) and the nuts [181] (14 locations), that attach the left forward bulkhead splice fitting assembly [165] to the forward flanges.

NOTE: Shim (Aluminum shim stock) if as required permitted up to a thickness of 0.040 inch (1.016 mm).

a) Apply the sealant, A00436 to the surfaces of the left forward bulkhead splice fitting assembly [165] which are in contact with the forward wall.

b) Tighten the nuts [179] and the nuts [181] to 25-35 pound-inches (2.8-4.0 Newton-meters).

c) Fill gap with the sealant, A00436 around the edges of the left forward bulkhead splice fitting assembly [165].

5) Install the bolts [161] (24 locations) and the washers [162] (24 locations); and the bolts [163] (40 locations) and the washers [164] (40 locations), that attach the left forward bulkhead splice fitting assembly [165] to the upper lip skin.

NOTE: You must install the bolts at each of the corners first to prevent interference with other fasteners.

a) Tighten the bolts [161] and the bolts [163] to 25-35 pound-inches (2.8-4.0 Newton-meters).

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(b) Install the right forward bulkhead splice fitting assembly [196] on the forward wall:

NOTE: Prime bulkhead and mating surfaces with the PR-1200 primer, C00580 and topcoat, C00927 or sealant, A00436 to approximately 0.015 inch (0.381 mm) of thickness in mixing. Apply 5.0 PSI pressure and squeeze out from around the edges of blanket. If the squeeze out is not achieved, remove the region blanket to expose bond surface and apply appropriate amount of topcoat, C00927 or sealant, A00436 to obtain the squeeze out. Smooth the squeeze out to seal approximately 0.18 inch (4.57 mm) up on the blanket from the bond line.

NOTE: Install the right forward bulkhead splice fitting assembly [196] as a completed assemble fitting.

1) Apply PR-1200 primer, C00580 and topcoat, C00927 or sealant, A00436 to the surfaces of the right forward bulkhead splice fitting assembly [196] which are in contact with the forward wall and the outer lip skin.

2) Align the holes of the right forward bulkhead splice fitting assembly [196] with the holes on the forward wall.

3) Install the nuts [199] (14 locations) and the bolts [198] (14 locations) that attach the right forward bulkhead splice fitting assembly [196] to the outer lip skin at the split line.

NOTE: Shim (Aluminum shim stock) if as required permitted up to a thickness of 0.040 inch (1.016 mm).

a) Tighten the nuts [199] to 25-35 pound-inches (2.8-4.0 Newton-meters).

b) Fill gap with the sealant, A00436 around the edges of the right forward bulkhead splice fitting assembly [196].

4) Install the bolts [202] (10 locations) and the nuts [203] (10 locations); and the bolts [201] (14 locations) and the nuts [200] (14 locations), that attach the right forward bulkhead splice fitting assembly [196] to the forward flanges.

NOTE: Shim (Aluminum shim stock) if as required permitted up to a thickness of 0.040 inch (1.016 mm).

a) Apply the sealant, A00436 to the surfaces of the right forward bulkhead splice fitting assembly [196] which are in contact with the forward wall.

b) Tighten the nuts [203] and the nuts [200] to 25-35 pound-inches (2.8-4.0 Newton-meters).

c) Fill gap with the sealant, A00436 around the edges of the right forward bulkhead splice fitting assembly [196].

5) Install the bolts [192] (24 locations) and the washers [193] (24 locations); and the bolts [194] (40 locations) and the washers [195] (40 locations), that attach the right forward bulkhead splice fitting assembly [196] to the upper lip skin.

NOTE: You must install the bolts at each of the corners first to prevent interference with other fasteners.

a) Tighten the bolts [192] and the bolts [194] to 25-35 pound-inches (2.8-4.0 Newton-meters).

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SUBTASK 71-11-01-914-001-H01

CAUTION MAKE SURE ALL OF THE SEALANT IS FULLY CURED BEFORE YOU APPLY NEW SEALANT TO THE VOIDS. IF YOU DO NOT OBEY THIS INSTRUCTIONS, VOIDS OF THE SPLICE SURFACES WILL NOT BE PROPERLY BONDED.

(10) Fill all the voids under the left forward bulkhead splice fitting assembly [165] and the right forward bulkhead splice fitting assembly [196]; and the left aft bulkhead splice [61] and the right aft bulkhead splice [101] with sealant, A00160.

SUBTASK 71-11-01-410-010-H01

CAUTION USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

(11) Do the steps that follow to install the left aft bulkhead out of core splice [41] and the right aft bulkhead out of core splice [44] on the aft outer flange (Figure 203):

(a) Install the left aft bulkhead out of core splice [41] on the inner side of the aft outer flange.

1) Apply sealant, A00436 to the bolts [42] (8 locations) and the nuts [43] (8 locations).

2) Align the holes of the left aft bulkhead out of core splice [41] with the holes on the inner side of the aft outer flange.

3) Install the bolts [42] (8 locations) and the nuts [43] (8 locations) that attach the left aft bulkhead out of core splice [41] to the aft flange.

a) Tighten the nuts [43] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(b) Install the right aft bulkhead out of core splice [44] on the inner side of the aft outer flange.

1) Apply sealant, A00436 to the bolts [45] (8 locations) and the nuts [46] (8 locations).

2) Align the holes of the right aft bulkhead out of core splice [44] with the holes on the inner side of the aft outer flange.

3) Install the bolts [45] (8 locations) and the nuts [46] (8 locations) that attach the right aft bulkhead out of core splice [44] to the aft flange.

a) Tighten the nuts [46] to 25-35 pound-inches (2.8-4.0 Newton-meters).

SUBTASK 71-11-01-410-011-H01

CAUTION USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(12) Install the left outer barrel splice tee [48] and the right outer barrel splice tee [50] on the lower outer barrel panel assembly (Figure 203).

(a) Install the left outer barrel splice tee [48] on the lower outer barrel panel assembly.

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1) Apply sealant, A00436 to the surfaces of the left outer barrel splice tee [48] which are in contact with the lower outer barrel panel assembly.
2) Apply grease, D00633 to the bolts [49] (18 locations).
3) Align the holes of the left outer barrel splice tee [48] with the holes on the lower outer barrel panel assembly.
4) Install the bolts [49] (18 locations) that attach the left outer barrel splice tee [48] to the lower outer barrel panel assembly.
   a) Tighten the bolts [49] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(b) Install the right outer barrel splice tee [50] on the lower outer barrel panel assembly.
1) Apply sealant, A00436 to the surfaces of the right outer barrel splice tee [50] which are in contact with the lower outer barrel panel assembly.
2) Apply grease, D00633 to the bolts [51] (18 locations).
3) Align the holes of the right outer barrel splice tee [50] with the holes on the lower outer barrel panel assembly.
4) Install the bolts [51] (18 locations) that attach the right outer barrel splice tee [50] to the lower outer barrel panel assembly.
   a) Tighten the bolts [51] to 25-35 pound-inches (2.8-4.0 Newton-meters).

SUBTASK 71-11-01-410-012-H01

CAUTION USE ONLY TITANIUM OR CORROSION RESISTANT STEEL FASTENERS WITH GRAPHITE COMPONENTS. DO NOT SUBSTITUTE ALUMINUM OR PLATED ALLOY STEEL BECAUSE GALVANIC CORROSION WILL OCCUR AND SHORTEN THE SERVICE LIFE.

CAUTION USE CAUTION WHEN YOU INSTALL THE BOLTS ON THE COMPOSITE SURFACE AREAS. THE HOLES ARE CLOSE TOLERANCE HOLES. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE COMPOSITE SURFACES.

(13) Install the upper outer barrel panel assembly [21] (Figure 202):
(a) Apply sealant, A00436 to the surfaces of the upper outer barrel panel assembly which are in contact with the lower outer barrel panel assembly.
(b) Align the holes of the upper outer barrel panel assembly [21] with the holes on the left and the right outer barrel splice tees.
(c) Apply grease, D00633 to the bolts [22], the bolts [23], the bolts [26], the bolt [29], the bolts [27], the bolts [30], and the bolts [31].
(d) Install the bolts [22] (100 locations), the bolts [23] (4 locations), the bolts [26] (2 locations), and the bolt [29] from the forward outer of the upper outer barrel panel assembly [21].

NOTE: The bolts [23] are found on the clockwise (aft view) positions 13, 43, 74, and 104. The bolts [26] are found on the clockwise positions 61 and 63. The bolt [29] is found on the clockwise position 62.

1) Tighten the bolts [22], the bolts [23], the bolts [26], and the bolt [29] to 25-35 pound-inches (2.8-4.0 Newton-meters).

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(e) Install the bolts [27] (10 locations), the bolts [30] (2 locations), and the bolts [31] (4 locations) that attach the upper outer barrel panel assembly [21] to the forward outer split line of the lower outer barrel panel assembly.

NOTE: The bolts [27] are at the split line between the upper and the lower outer barrel panel assemblies. The bolts [31] are found on the clockwise positions 6 and 8. The bolt [30] is found between the bolts [31] on the clockwise position 7 of the outer barrel panel assemblies.

1) Tighten the bolts [27], the bolts [30], and the bolts [31] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(f) Do this step again at the other end of the split line.

NOTE: The left split line and the right split line attachments are the same.

(g) Apply grease, D00633 to the bolts [22], the bolts [24], the bolts [28], the bolts [30], the bolts [29], and the bolts [27].

(h) Install the bolts [22] (116 locations) and the bolts [24] (5 locations) from the aft outer of the upper outer barrel panel assembly [21].

NOTE: The bolts [24] are found on the clockwise (aft view) positions 5, 34, 65, 96, and 125.

1) Tighten the bolts [22] and the bolts [24] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(i) Install the bolts [28] (18 locations), the bolts [30] (3 locations), the bolts [29] (2 locations), and the bolts [27] (9 (on left), 7 (on right) locations) that attach the upper outer barrel panel assembly [21] to the aft split line of the lower outer barrel panel assembly.

NOTE: The bolts [29], the bolt [27], and the bolts [30] are at the split line between the upper and the lower outer barrel panel assemblies. The remained bolts [27] are found on the clockwise positions 3 and 4 of the outer barrel panel assemblies.

1) Tighten the bolts [28], the bolts [30], the bolts [29], and the bolts [27] to 25-35 pound-inches (2.8-4.0 Newton-meters).

(j) Do this step again at the other end of the split line.

NOTE: The left split line and the right split line attachments are the same.

SUBTASK 71-11-01-914-002-H01

(14) Seal the gaps between the halves of the inlet assembly:

NOTE: It is possible to install a spare inlet assembly without aerosealant installed between the upper and the lower inlet halves on a temporary basis to dispatch the airplane. The installation of the spare inlet without the aerosealant will cause an increase in aerodynamic drag and therefore should be done only on a temporary basis. All contaminants must be removed from the skin gaps before you apply sealant.

(a) Clean all the fixed skin gaps, the upper outer barrel panel assembly [21], and the lip skins before you apply the sealant.

(b) Apply sealant, A00436 to the gap between the outboard inner barrel splices to a depth of 0.25 - 0.50 inch (6.35 - 12.7 mm).

NOTE: Do not apply the sealant to a gap that is less than 0.030 inch (0.762 mm) in width.

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(c) Apply sealant, A00436 to the gap between the upper and the lower outer barrel panel assemblies.

NOTE: Do not apply the sealant to a gap that is less than 0.030 inch (0.762 mm) in width. Maximum gap is permitted up to 0.100 ± 0.070 inch (2.540 ± 1.778 mm).

1) Make sure the surface step gap is within 0.000 ± 0.040 inch (0.000 ± 1.016 mm) between the upper and the lower outer barrel panel assemblies.

(d) Mask the area near the gap between the lip skins and the upper outer barrel panel assembly [21] for use in sealant application.

(e) Sand the gap between the lip skins, the upper outer barrel panel assembly [21] with 240 grit or finer abrasive paper, G50077.

1) Clean the gaps with solvent, B00148.

(f) Apply adhesive, C00047 to the gap between the lip skins and the upper outer barrel panel assembly [21].

(g) Apply Dow Corning 93-006-1 RF sealant, A00900 or PR-2001 sealant, A50158 to the gap between the lip skins and the upper outer barrel panel assembly [21].

SUBTASK 71-11-01-410-013-H01

(15) Install the PDOS switch connector [1] on the aft flange of the inlet cowl assembly at the 3:00 o'clock position Figure 201:

(a) Align the holes of the wire bundle electrical connector with the holes of the aft flange connector bracket.

(b) Install the screws [2] (4 locations) and the nuts [3] (4 locations).

(c) Install the screw [4] and the washer [5] with the clamp [6] that attach the PDOS switch wire bundle to the aft flange bracket.

NOTE: The washer is installed under the clamp.

——— END OF TASK ———

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INLET COWL - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the inlet cowl

(2) An installation of the inlet cowl.

TASK 71-11-01-000-802-H01

2. Inlet Cowl Removal

A. General

(1) You must use the inlet cowl sling, SPL-2075 to remove the inlet cowl.

(2) The inlet cowl sling, SPL-2075 includes these components:

(a) Four strap assemblies

(b) Two lever hoists and a loadcell

(c) Four master links and six shackles

(d) A center beam and two outer beam assemblies.

(3) Do these steps before you remove the inlet cowl:

(a) Open the fan cowl panels.

(b) Disconnect the T12 sensor connector.

(c) Disconnect the engine anti-ice (EAI) duct coupling at the 11:00 o'clock position.

(d) Disconnect the power door opening system (PDOS) switch connector.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-2075	Equipment - Sling, Inlet Cowl Part #: J71001-66 Supplier: 81205 Opt Part #: J71001-63 Supplier: 81205
SPL-4137	Protector - Fan Case Acoustic Liner, GE90-115B Part #: 9C3013G01 Supplier: 06083
SPL-7879	Stand - Storage, Inlet Assembly, GE90-115B Engine Part #: AM-2764 Supplier: 9M323 Part #: J71038-70 Supplier: 81205
STD-246	Crane - Lift, 2000 lb (907 kg) capacity, 30 ft (9.1 m) height
STD-748	Rope - 12 ft (3.6 m) minimum

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D. Location Zones

Zone	Area
412	Inlet Cowl - Left Engine
422	Inlet Cowl - Right Engine

E. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Prepare for the Removal

SUBTASK 71-11-01-860-001-H01

(1) For the left engine, open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-11-01-860-002-H01

(2) For the right engine, open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-11-01-869-001-H01

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(3) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-01-040-002-H01

(4) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-01-010-001-H01

(5) For the left and right fan cowl panels on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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SUBTASK 71-11-01-030-001-H01

CAUTION: MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION: USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(6) Disconnect the T12 sensor connector [30] at the 1:00 o'clock position (TASK 70-00-01-400-807-H01).

(a) Put the protective caps on the electrical connector and the receptacle.

SUBTASK 71-11-01-030-002-H01

(7) Disconnect the engine anti-ice duct [5] that is attached to the inlet cowl [1] (at the 11:00 o'clock position):

(a) Remove the coupling cover [8], coupling [6], and the seal [7] that attaches the engine anti-ice duct [5] to the inlet cowl [1].

(b) Put the protective caps on the open ends of the EAI duct and the duct connection on the inlet cowl [1].

SUBTASK 71-11-01-030-003-H01

CAUTION: MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION: USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(8) Disconnect the PDOS switch connector [31] from the aft flange of the inlet cowl [1] at the 3:00 o'clock position (TASK 70-00-01-400-807-H01):

(a) Put the protective caps on the electrical connector and the receptacle.

G. Inlet Cowl Removal

SUBTASK 71-11-01-490-001-H01

(1) Assemble the inlet cowl sling, SPL-2075:

(a) Connect the right outer beam [15], the center beam [16], and the left outer beam [17] together.

(b) Put the long cable [21] through the two pulleys.

NOTE: The long cable is approximately 24.5 feet (294.0 inches) long in length and has a blue color code identifier.

(c) Connect the master (side) links [20] to the beam with the shakles [18].

(d) Connect the short cable [19] to the beam with the the shakles [18].

NOTE: The short cable is approximately 7.2 feet (87.0 inches) long in length and has a white color code identifier.

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(e) Connect the short cable [19] to the master link [13] with the two lok-A-loys [12].

(f) Connect the dynamometer [14] to the master link [13].

SUBTASK 71-11-01-490-002-H01

(2) Install the inlet cowl sling, SPL-2075 on the inlet cowl [1]:

(a) Install the straps [23] with the hoist pins [24] to the inlet cowl [1].

(b) Install the chain hoists [22] to the forward straps [23].

(c) With the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246, lift the inlet cowl sling, SPL-2075 and put it over the inlet cowl [1].

(d) Connect the chain hoists [22] to the master (side) links [20].

(e) Connect the long cable [21] to the straps [23] with shackles.

(f) With the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 and the chain hoists [22], tighten the chains and the cables.

WARNING

MAKE SURE THE WEIGHT OF THE INLET COWL AND THE SLING EQUIPMENT IS BALANCED WITH THE CRANE FORCE. IF THE WEIGHT OF THE INLET COWL AND THE CRANE FORCE ARE NOT BALANCED, THE COWL COULD MOVE QUICKLY WHEN YOU DISCONNECT THE INLET COWL. THIS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(g) With the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246, lift until a 1100 pound (499 kiligram) load is on the inlet cowl sling, SPL-2075.

NOTE: The inlet cowl weighs approximately 953 pounds (433 kilograms). The sling equipment weighs approximately 120 pounds (55 kilograms).

1) Monitor the load during adjustment.

2) Adjust the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 and the inlet cowl sling, SPL-2075 until all of the strap assemblies are not loose.

SUBTASK 71-11-01-020-001-H01

(3) Remove the inlet cowl [1]:

(a) Remove the bolts [32], spacers [34], washers [41], and the nuts [37] (64 locations) that attach the inlet cowl [1] to the fan case flange.

(b) Move the inlet cowl [1] forward, away from the fan case flange, until the two shear pins [38] (at the 3:30 and 8:30 o'clock positions) disengage.

(c) To help during installation, mark the locations of the shear pins [38] on the inlet cowl and the fan case flange.

(d) If the inlet stand is used, put the inlet cowl [1] on inlet assembly storage stand, SPL-7879 (or equivalent platform) and move the inlet cowl [1] with the inlet assembly storage stand, SPL-7879 away from the airplane.

(e) Put the inlet cowl [1] on top of the inlet assembly storage stand, SPL-7879 (or equivalent platform) in an area that is away from the airplane.

1) If the inlet assembly storage stand, SPL-7879 has no clearance for the shear pins [38], remove the two shear pins [38], washers [39], and the nuts [40] from the inlet cowl [1].

(f) Install a rope - 12 ft (3.6 m) minimum, STD-748 to guide the movement of the inlet cowl [1].

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(g) Turn the inlet cowl [1] with the help of the rope - 12 ft (3.6 m) minimum, STD-748 to the horizontal position until it is parallel with the inlet assembly storage stand, SPL-7879.

(h) Slowly lower the inlet cowl [1] until the mounting edge rests evenly on the inlet assembly storage stand, SPL-7879.

(i) Disconnect the straps [23] from the inlet cowl [1].

1) Remove the hoist pins [24] that attach the straps [23] to the inlet cowl [1].

(j) Remove the rope - 12 ft (3.6 m) minimum, STD-748 from the inlet cowl [1].

SUBTASK 71-11-01-860-003-H01

(4) Install the fan case acoustic liner protector, SPL-4137 on the flange of the fan module at the 6:00 o'clock position.

NOTE: This will protect the forward acoustic liner from damage when you do the maintenance work on the fan case module.

——— END OF TASK ———

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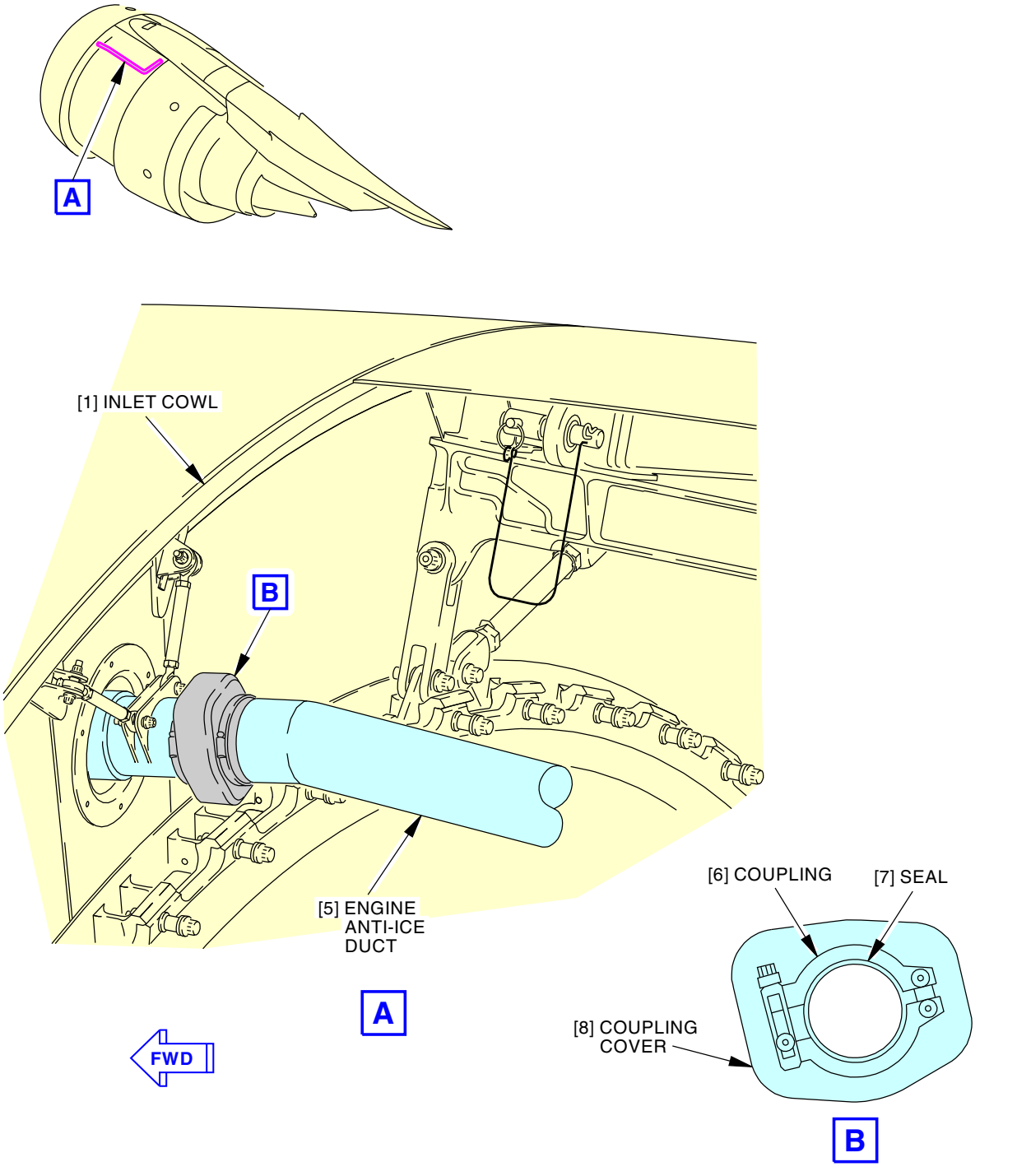

Engine Anti-Ice Duct Installation
Figure 401/71-11-01-990-801-H01

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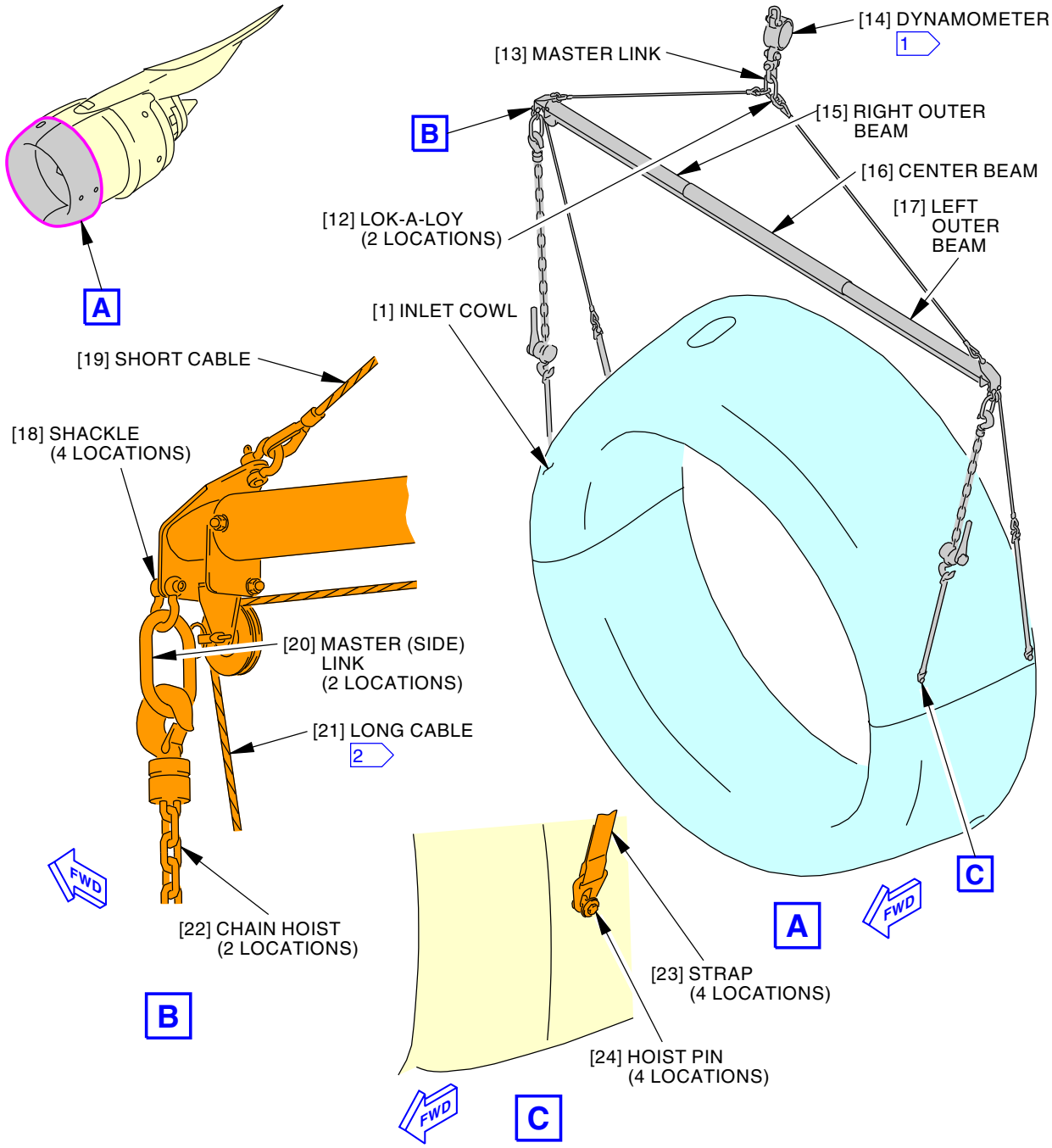

1 PRELOAD THE DYNAMOMETER TO 1000 POUNDS BEFORE REMOVAL.

2 DO NOT USE THE EXTRA LONG CABLE FOR THIS PROCEDURE.

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Inlet Cowl Sling Installation
Figure 402/71-11-01-990-802-H01

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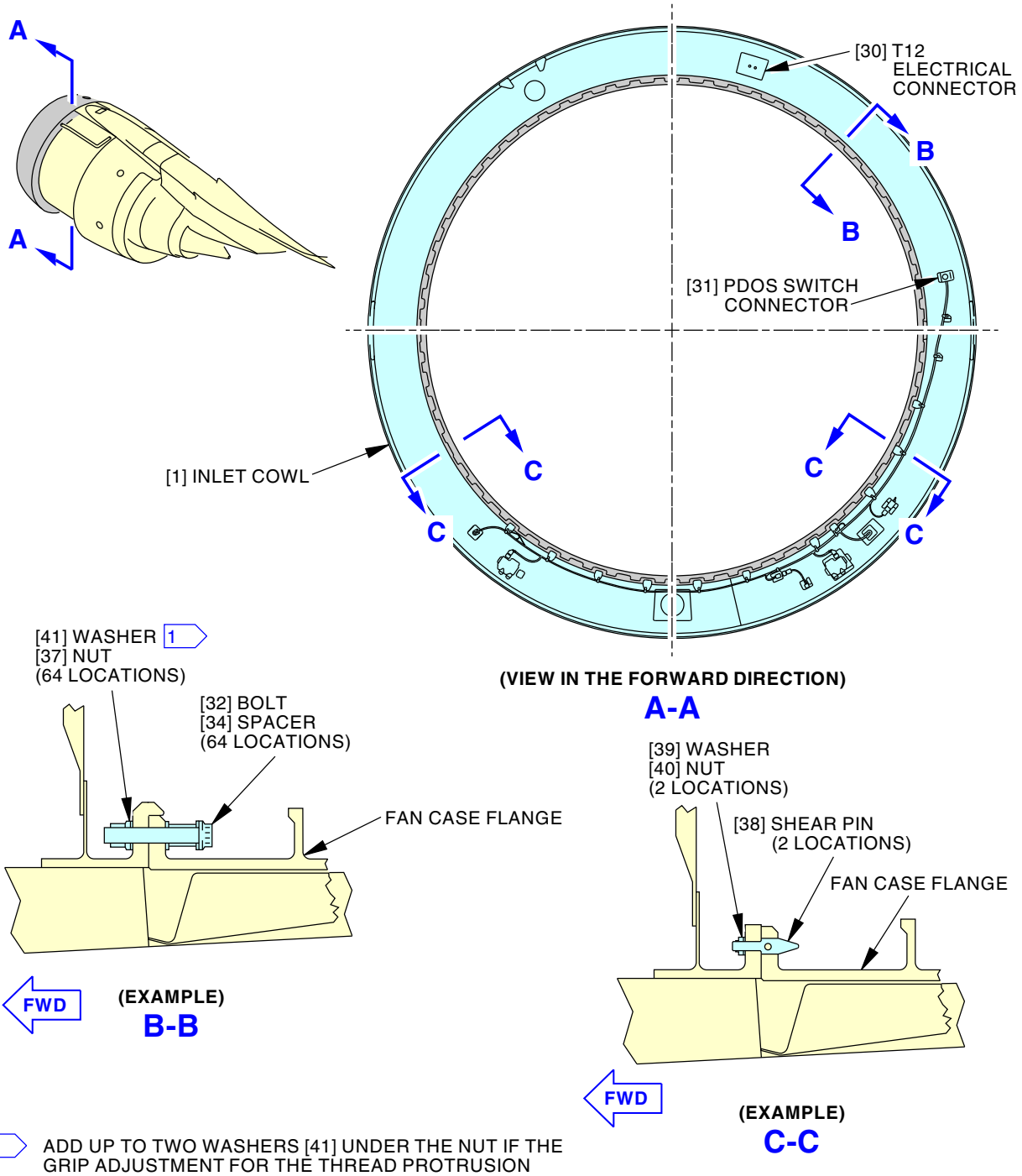

1 ADD UP TO TWO WASHERS [41] UNDER THE NUT IF THE GRIP ADJUSTMENT FOR THE THREAD PROTRUSION BEYOND THE WRENCHABLE SURFACE IS MORE THAN 0.658 INCH (16.7 mm)

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Inlet Cowl Installation
Figure 403/71-11-01-990-803-H01

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TASK 71-11-01-400-802-H01

3. Inlet Cowl Installation

A. General

(1) You must use the inlet cowl sling, SPL-2075 to install the inlet cowl.

(a) Install the sling on the inlet cowl.

(b) Install the inlet cowl on the fan case flange.

(2) You must do these steps after you install the inlet cowl:

(a) Connect the power door opening system (PDOS) switch connector to the aft inlet cowl.

(b) Connect the engine anti-ice (EAI) duct at the 11:00 o'clock position.

(c) Connect the T12 sensor connector.

(d) Close the fan cowl panels.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-00-00-800-833-H00	Power Plant Test Reference Table (P/B 501)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-2075	Equipment - Sling, Inlet Cowl Part #: J71001-66 Supplier: 81205 Opt Part #: J71001-63 Supplier: 81205
SPL-4137	Protector - Fan Case Acoustic Liner, GE90-115B Part #: 9C3013G01 Supplier: 06083
SPL-7879	Stand - Storage, Inlet Assembly, GE90-115B Engine Part #: AM-2764 Supplier: 9M323 Part #: J71038-70 Supplier: 81205
STD-246	Crane - Lift, 2000 lb (907 kg) capacity, 30 ft (9.1 m) height
STD-583	Mallet - Non-metallic
STD-748	Rope - 12 ft (3.6 m) minimum

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Inlet cowl	54-10-00-03-005	ARO ALL

E. Location Zones

Zone	Area
412	Inlet Cowl - Left Engine
422	Inlet Cowl - Right Engine

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F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

G. Inlet Cowl Installation

SUBTASK 71-11-01-490-003-H01

(1) If the sling equipment is not assembled, refer to the removal task to assemble the inlet cowl sling, SPL-2075.

SUBTASK 71-11-01-581-001-H01

(2) Lift the inlet cowl [1] from the inlet assembly storage stand, SPL-7879 (or equivalent platform):

(a) Adjust the inlet assembly storage stand, SPL-7879 and the straps [23] until the straps are not loose.

(b) Install a rope - 12 ft (3.6 m) minimum, STD-748 to guide the movement of the inlet cowl [1].

(c) Lift the inlet cowl [1] until you have sufficient clearance to turn the inlet cowl to the vertical position.

(d) Turn the inlet cowl with the help of the rope - 12 ft (3.6 m) minimum, STD-748 to the vertical position.

SUBTASK 71-11-01-090-001-H01

(3) Remove the fan case acoustic liner protector, SPL-4137 from the fan module at the 6:00 o'clock position.

SUBTASK 71-11-01-490-004-H01

(4) Install the inlet cowl [1].

(a) Remove the rope - 12 ft (3.6 m) minimum, STD-748 from the inlet cowl [1].

(b) Put the inlet cowl [1] in its position to align the mounting flange on the inlet cowl [1] with the fan case flange.

NOTE: To help during installation, use the marked locations of the shear pins on the inlet cowl and the fan case flange.

1) If the two shear pins [38] are not installed, install the shear pins [38], washers [39], and the nuts [40] on the inlet cowl [1].

a) Tighten the nuts [40] to 50-80 pound-inches (5.7-9.0 Newton-meters).

(c) Push the inlet cowl [1] aft to engage the shear pins [38] with the mating holes on the fan cowl flange (3:30 and 8:30 o'clock positions).

(d) Install the bolts [32], spacers [34], washers [41], and the nuts [37] (64 locations) that attach the inlet cowl [1] to the fan case flange.

NOTE: Do not tighten the bolts at this time.

1) Make sure the bolt grip for thread protrusion beyond the wrenchable surface is not more than 0.658 inch (1.67 cm) .

a) If the bolt grip for thread protrusion beyond the wrenchable surface is more than 0.658 inch (1.67 cm), add washer [41] to adjust the bolt grip.

NOTE: You can add up to two washers under the nut.

2) METHOD 1 - SNUG FIT METHOD;

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a) At these pairs of positions, 3:00 and 9:00 o'clock, 6:00 and 12:00 o'clock, tighten the nuts to approximately 37-43 pound-inches (4.2-4.9 Newton-meters) to get a snug fit.

NOTE: Fasteners tightened to 10 percent of the final torque are snug fit. This means there is no gap between the mating flanges. The position to start is optional.

b) In sequence and in pairs at opposite positions, tighten all the remaining nuts to approximately 37-43 pound-inches (4.2-4.9 newton-meters) to get a snug fit.

c) At these pairs of positions, 3:00 and 9:00 o'clock, 6:00 and 12:00 o'clock, tighten the nuts to the final torque of 370-430 pound-inches (42.0-48.8 Newton-meters).

d) In sequence and in pairs at opposite positions, tighten all the remaining nuts to the final torque of 370-430 pound-inches (42.0-48.8 Newton-meters).

3) METHOD 2 - OPTIONAL 2 PERSON METHOD;

a) Two persons start at opposite positions (180 degrees apart) on the circumference of the inlet cowl and tighten the nuts to the final torque of 370-430 pound-inches (42.0-48.8 Newton-meters).

<1> Both persons tighten nuts around the circumference of the inlet cowl in the clockwise or the counterclockwise direction.

NOTE: To tighten in the clockwise direction, the person at 9:00 o'clock position tightens fasteners from the 9:00 o'clock position to the 12:00 o'clock position to the 3:00 o'clock position. The person at 3:00 o'clock position tightens fasteners from the 3:00 o'clock position to the 6:00 o'clock position to the 9:00 o'clock position. This work continues until all the fasteners are tightened.

NOTE: To tighten in the counterclockwise direction, the person at 9:00 o'clock position tightens fasteners from the 9:00 o'clock position to the 6:00 o'clock position to the 3:00 o'clock position. The person at 3:00 o'clock position tightens fasteners from the 3:00 o'clock position to the 12:00 o'clock position to the 9:00 o'clock position. This work continues until all the fasteners are tightened.

<2> When all the fasteners have been tightened, you must do a check of the torque on all fasteners again; work around the circumference of the inlet cowl in the same direction.

<a> If any fasteners is not in the torque range of 370-430 pound-inches (42.0-48.8 Newton-meters), you must tighten the fasteners again.

<b> Continue until the torque values of all fasteners have been checked.

(e) Disconnect the straps [23] from the inlet cowl [1].

1) Remove the hoist pins [24] that attach the straps [23] to the inlet cowl [1].

SUBTASK 71-11-01-840-001-H01

(5) Move the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 with the inlet cowl sling, SPL-2075 away from the airplane.

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SUBTASK 71-11-01-430-001-H01

CAUTION: MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION: USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(6) Connect the PDOS switch connector [31] (TASK 70-00-01-400-807-H01):

(a) Remove the protective caps from the switch connector and the receptacle.

(b) Connect the switch connector to the receptacle.

SUBTASK 71-11-01-430-002-H01

(7) Connect the engine anti-ice duct [5]]:

(a) Remove the protective caps from the ends of the engine anti-ice duct [5].

(b) Do a check on the seal [7] and the surfaces of the engine anti-ice duct [5] for scratches, cuts, pits, creases, and unwanted material.

(c) Install the seal [7] in the recess of the engine anti-ice duct [5].

1) Align the engine anti-ice duct [5] and the duct of the inlet cowl [1].

(d) Install the coupling [6] that attaches the engine anti-ice duct [5] to the inlet cowl [1].

1) Turn the coupling I-bolt until it is approximately outboard of the fan case .

2) Tighten the coupling [6] to 70-85 pound-inches (7.9-9.6 Newton-meters).

3) Lightly hit the outer diameter of the coupling [6] with a non-metallic mallet, STD-583.

4) Tighten the coupling [6] again to 70-85 pound-inches (7.9-9.6 Newton-meters).

(e) Install the coupling cover [8] on top of the coupling [6].

1) Tighten the coupling cover [8] clamp to 18-22 pound-inches (2.0-2.5 Newton-meters).

2) Make sure the arrow on the coupling cover [8] is pointed downward.

SUBTASK 71-11-01-430-003-H01

CAUTION: MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION: USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(8) Connect the T12 sensor connector [30] (TASK 70-00-01-400-807-H01).

(a) Remove the protective caps from the T12 sensor connector [30] and the receptacle.

(b) Connect the T12 sensor connector [30] to the T12 sensor.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-01-860-004-H01

(1) For the left engine, remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-11-01-860-005-H01

(2) For the right engine, remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-11-01-760-001-H01

(3) Do the tests listed in the Power Plant Test Reference Table (TASK 71-00-00-800-833-H00).

SUBTASK 71-11-01-410-003-H01

(4) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-01-440-001-H01

(5) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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INLET COWL - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) An inspection of the inlet cowl.

TASK 71-11-01-200-804-H00

2. Inlet Cowl Inspection

A. General

(1) This task gives a visual inspection on the inlet cowl for panel delamination and inlet cowl anti-ice exhaust screen.

(2) On the inlet cowl anti-ice exhaust ports, an unlimited number of wires missing is acceptable for indefinite operation.

B. References

Reference	Title
71-11-01-000-802-H01	Inlet Cowl Removal (P/B 401)
71-11-01-400-802-H01	Inlet Cowl Installation (P/B 401)

C. Location Zones

Zone	Area
412	Inlet Cowl - Left Engine
422	Inlet Cowl - Right Engine

D. Procedure

SUBTASK 71-11-01-220-001-H01

(1) Examine the inlet cowl for panel delamination with the limits that follow:

(a) Delamination of the perforated facesheet is permitted if all the limits that follow are satisfied:

1) The delamination is more than 3.0 inches (76.2 mm) from the edges.

2) Each area of delamination is less than 4.00 inches by 4.00 inches (101.6 x 101.6 mm).

3) The total area of all the delaminations is less than 50.0 square-inches (1270 square-mm).

(b) If the delamination is in the permitted limits, do an inspection of the area at next maintenance check; and, repair the delamination of the acoustic panel (or replace it if more than the acoustic area loss limits) at the subsequent heavy maintenance check (SRM 54-00-01).

(c) If the delamination is not in the permitted limits, repair the delamination of the acoustic panel (or replace it if more than the acoustic area loss limits) (SRM 54-00-01); or, replace the inlet cowl (TASK 71-11-01-000-802-H01 and TASK 71-11-01-400-802-H01).

SUBTASK 71-11-01-210-001-H01

(2) Examine the inlet cowl anti-ice exhaust duct assembly for bird screen wires missing:

(a) On the inlet cowl anti-ice exhaust ports, an unlimited number of wires missing is acceptable but the inlet exhaust duct is to be replaced at the next convenient heavy maintenance check.

END OF TASK

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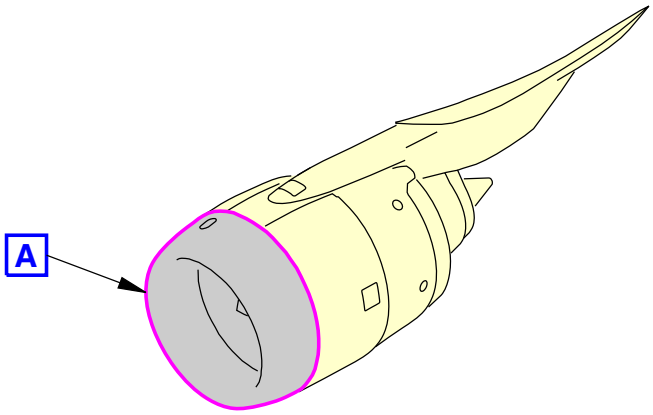

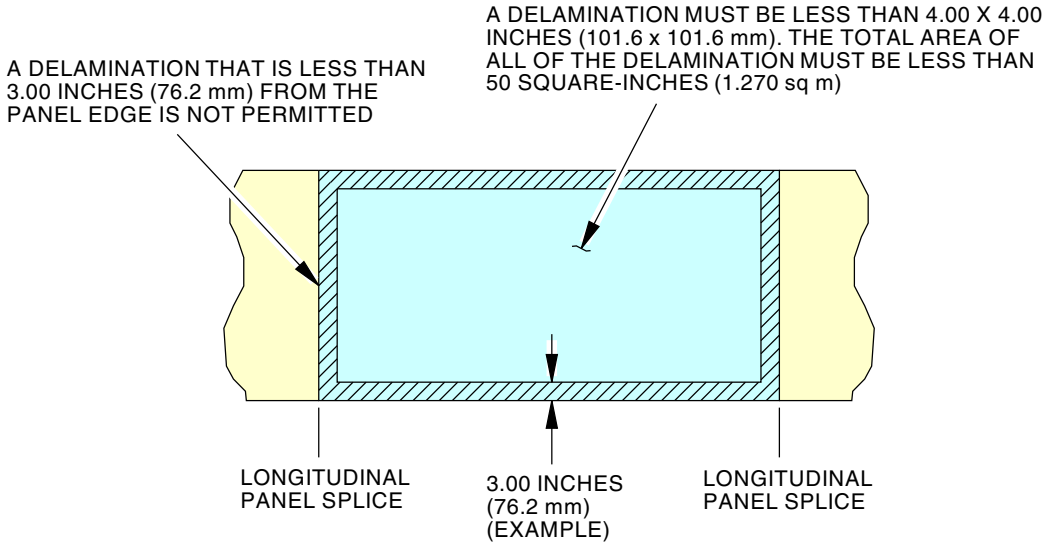

DELAMINATION DAMAGE PERMITTED ON THE PERFORATED FACESHEET

A

M06652 S0004285687_V2

Inlet Cowl Delamination Inspection
Figure 601/71-11-01-990-806-H01

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FAN COWL CHINE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the fan cowl chine

(2) An installation of the fan cowl chine.

TASK 71-11-02-000-801-H01

2. Fan Cowl Chine Removal

A. General

(1) The fan cowl chine (referred to as the chine) is installed on the fan cowl panel on the inboard side of the power plant.

(2) The fan cowl chines are not interchangeable from the left engine to the right engine.

(3) You must open the applicable fan cowl panel to do this task.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

E. Prepare for the Removal

SUBTASK 71-11-02-868-001-H01

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-02-040-001-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-02-010-002-H01

(3) For the inboard fan cowl panels, open the fan cowl panels:

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

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F. Fan Cowl Chine Removal

SUBTASK 71-11-02-020-002-H01

(1) Remove the chine [1] from the fan cowl panel [5].

(a) Remove the bolts [2], bolts [6], washers (large) [8], washers [3], and the nuts [4] (36 locations) that attach the chine [1] to the applicable fan cowl panel.

(b) Remove the shim [7] if it is installed.

——— END OF TASK ———

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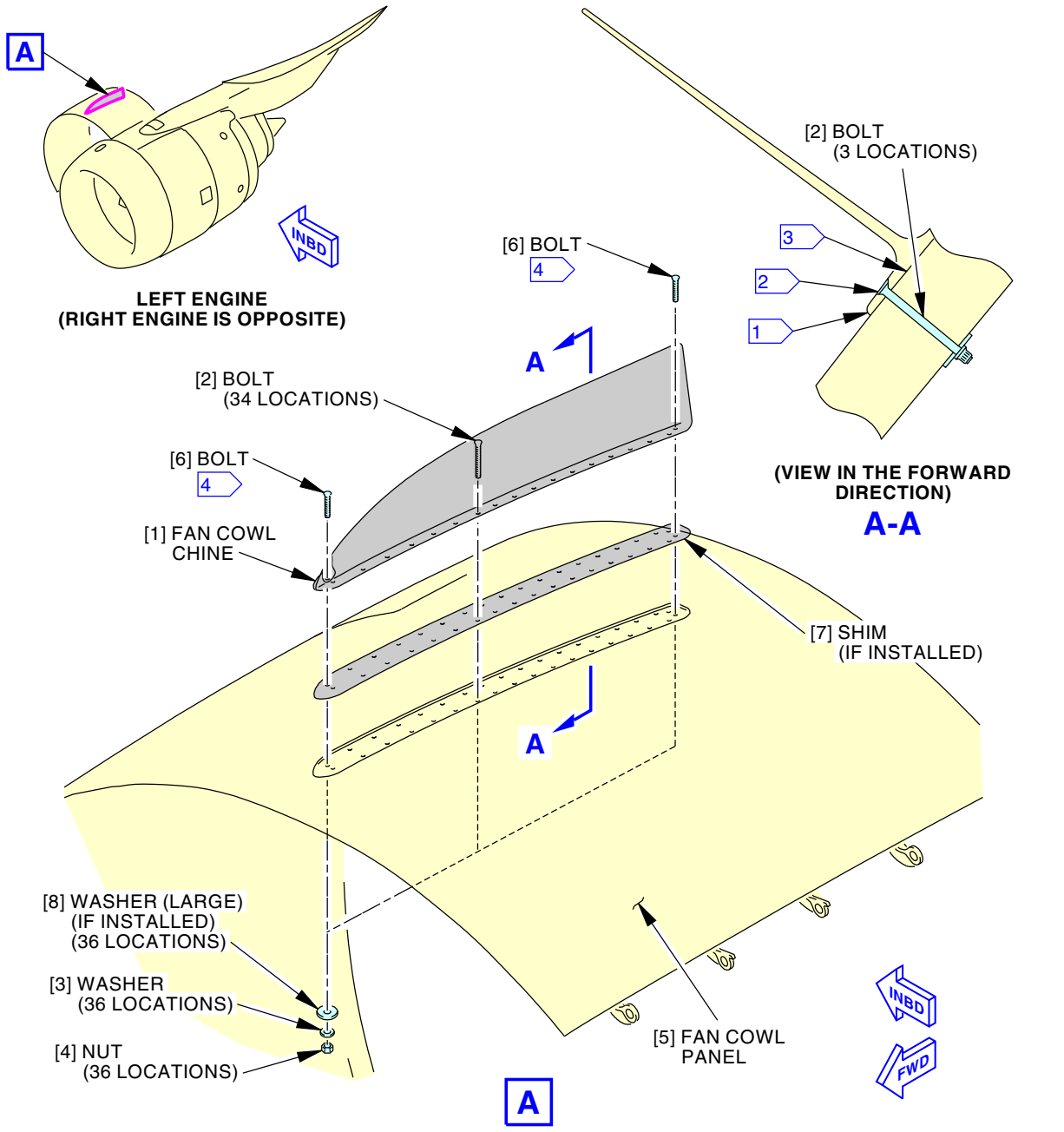

Fan Cowl Chine Installation
Figure 401/71-11-02-990-801-H01

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TASK 71-11-02-400-801-H01

3. Fan Cowl Chine Installation

A. General

(1) You must do these steps to install the fan cowl chine:

(a) Prepare the surfaces for the sealant.

(b) Apply the conductive coating to two of the countersink areas on the chine.

(c) Apply the parting agent to the fan cowl panel surface.

(d) Apply the sealant to the mating faces of the fan cowl panel and the chine.

(e) Install the bolts wet with sealant.

(f) Apply a fillet seal around the chine.

(g) Apply the sealant to the countersink areas on the chine to form a smooth surface.

(h) Permit 30 minutes for the sealant to cure.

(i) Close the applicable fan cowl panel.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
51-24-02-370-801	Apply The BMS 10–21 Type III Conductive Coating to Specified External Surfaces (P/B 701)
51-31-01-160-801	Prepare For Sealing (P/B 201)
51-31-01-390-801	Non-Removable Faying (Mated) Surface Seal Application (P/B 201)
51-31-01-390-804	Fillet Seal Application (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
C00767	Coating - Anti-Static Coating	BMS10-21 Type III
G02185	Agent - Peelable Parting (Valspar - 4A-183 Green Strippable Coating)Manufacturing discontinued, use stock until depleted	
G50365	Agent - Peelable Parting (AC Products - AC962-73C) Production discontinued, use stock until depleted.	BAC5000
G50367	Agent - Peelable Parting (Aztec Chemical AZ 634-2)	MIL-PRF-6799, BAC5000
G50368	Agent - Peelable Parting (Rexco Chemical Company - Partall Coverall Film)	BAC5000
G50369	Coating - Alkaline Removable, Water Resistant	BMS15-12 Type I Class 1

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Chine	71-11-02-01D-010	ARO ALL
		71-11-02-01D-015	ARO ALL

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E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

G. Fan Cowl Chine Installation

SUBTASK 71-11-02-840-001-H01

(1) Prepare to install the chine [1]:

(a) Do this task: Prepare For Sealing, TASK 51-31-01-160-801.

1) Clean the mating surfaces of the fan cowl panel [5] and the chine [1].

NOTE: Do not remove finish from around the countersink and the fan cowl panel. Lightly abrade bagside area under washer.

2) If there is parting agent, lightly abrade the two locations where the washers [3] for the bolts [6] will touch on the inside of the fan cowl panel [5].

NOTE: Only abrade to remove the primer and make a clean contact surface. Do not damage the fan cowl panel.

NOTE: Do this only for the washers for the two bolts indicated on the illustration page, but not for the others thirty-four bolts.

(b) Apply the coating, C00767, to the countersink areas on the chine [1] for the two bolts [6] (TASK 51-24-02-370-801).

1) Do not remove the finish from around the countersink.

(c) Do this task: Non-Removable Faying (Mated) Surface Seal Application, TASK 51-31-01-390-801.

1) Apply one of the parting agents that follow, to the chine [1] interface surface.

NOTE: Do not remove the paint from the fan cowl panel.

a) Rexco Partall Coverall Film peelable parting agent, G50368

b) temporary coating, G50369

c) AZ 634-2 peelable parting agent, G50367

d) AC962-73C peelable parting agent, G50365

e) Valspar 4A-183 green strippable coating, G02185

(d) Apply the sealant, A00436 to the surface of the chine [1] that attaches to the fan cowl surface.

(e) Apply the coating, C00767 to the bolts [6] holes (2 locations).

(f) Apply the sealant, A00436 to the shank and threads of the bolts [2] (34 locations).

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SUBTASK 71-11-02-420-001-H01

CAUTION INSTALL THE CHINE ONLY ON THE INBOARD SIDE OF THE FAN COWL PANEL. THE INCORRECT INSTALLATION OF THE FAN COWL CHINE CAN CAUSE UNSATISFACTORY AIRPLANE PERFORMANCE.

(2) Install the chine [1]:

(a) If the clearance of the chine [1] surface and the fan cowl chine interface surface is more than 0.005 in. (0.127 mm), install a shim [7], adjusted to the correct thickness.

NOTE: Shim cannot be more than 0.06 in. (1.52 mm) in thickness.

(b) Install the chine [1] on the fan cowl panel [5].

1) Install the two bolts [6], thirty-four bolts [2], washers (large) [8], washers [3], and the nuts [4] (36 locations) that attach the chine [1] to the fan cowl panel [5].

NOTE: The two bolts are installed on the forward upper and the aft lower position of the chine bolt holes pattern.

2) Tighten the nuts [4] to 20-30 pound-inches (2.3-3.4 Newton-meters).

SUBTASK 71-11-02-915-001-H01

(3) Apply the sealant, A00436 to the chine [1]:

(a) Apply the sealant, A00436 on the bolt heads of the bolts [2] after installation.

1) Make sure the sealant, A00436 is level with the top of the attach flange surface of the chine [1].

(b) Apply the sealant, A00436 to the interface of the fan cowl panel [5] and the chine [1] to form a fillet seal. To apply the sealant do this task: Fillet Seal Application, TASK 51-31-01-390-804.

(c) Apply the sealant, A00436 to the countersink areas on the chine [1].

1) Make the wet sealant flush with the chine [1], with a fairing tool made moist with water.

SUBTASK 71-11-02-914-001-H01

(4) Apply a fillet seal around the nuts [4] and the washers [3]. To apply the sealant do this task: Fillet Seal Application, TASK 51-31-01-390-804.

SUBTASK 71-11-02-860-001-H01

(5) Let the sealant and the fillet sealant dry for 30 minutes.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-02-420-002-H01

(1) For the inboard fan cowl panels, close the fan cowl panels:

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

SUBTASK 71-11-02-440-001-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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FAN COWL PANELS - MAINTENANCE PRACTICES

1. General

A. This procedure has eight tasks to operate the fan cowl panel:

(1) Open the fan cowl panel (Selection).

(2) Close the fan cowl panel (Selection).

(3) Open the fan cowl panel (Power Method).

(4) Close the fan cowl panel (Power Method).

(5) Open the fan cowl panel (Manual Method).

(6) Close the fan cowl panel (Manual Method).

(7) Open the fan cowl panel (Sling Method).

(8) Close the fan cowl panel (Sling Method).

TASK 71-11-04-010-814-H00

2. Open the Fan Cowl Panel (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to open a fan cowl panel.

(2) The procedure can be used for the left fan cowl panel or right fan cowl panel.

B. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

C. Procedure

SUBTASK 71-11-04-010-001-H01

(1) Do one of these tasks to open the applicable fan cowl panel:

(a) Do this task: Open the Fan Cowl Panel (Power Method), TASK 71-11-04-000-802-H01.

(b) Do this task: Open the Fan Cowl Panel (Manual Method), TASK 71-11-04-000-803-H01.

(c) Do this task: Open the Fan Cowl Panel (Sling Method), TASK 71-11-04-000-804-H01.

END OF TASK

TASK 71-11-04-410-814-H00

3. Close the Fan Cowl Panel (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to close a fan cowl panel.

(2) The procedure can be used for the left fan cowl panel or right fan cowl panel.

B. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine

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(Continued)

Zone	Area
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

C. Procedure

SUBTASK 71-11-04-410-001-H01

(1) Do one of these tasks to close the applicable fan cowl panel:

(a) Do this task: Close the Fan Cowl Panel (Power Method), TASK 71-11-04-400-802-H01.

(b) Do this task: Close the Fan Cowl Panel (Manual Method), TASK 71-11-04-400-803-H01.

(c) Do this task: Close the Fan Cowl Panel (Sling Method), TASK 71-11-04-400-804-H01.

——— END OF TASK ———

TASK 71-11-04-000-802-H01

4. Open the Fan Cowl Panel (Power Method)

(Figure 201 and Figure 202)

A. General

(1) This is the usual procedure to open the fan cowl panels with the power door opening system (PDOS).

(2) In this procedure, you operate the inlet-mounted control switches (referred to as fan cowl PDOS switches) which sets the electric solenoid valves on the PDOS unit to the correct position to open the fan cowl panels and operates the pump in the PDOS unit. The PDOS electric pump forces oil from the PDOS unit reservoir to extend the PDOS actuators to open the fan cowl panels.

(3) The fan cowl PDOS switches are installed on the inlet cowl at the 4:00 and 8:00 o'clock positions for the related fan cowl panel.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (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-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine

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(Continued)

Zone	Area
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-869-002-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-04-040-004-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-04-010-003-H01

(3) Push the applicable PDOS DOWN switch for a few seconds to depressurize the PDOS system.

SUBTASK 71-11-04-010-004-H01

(4) Open the latches (4 locations) at the 6:00 o'clock position on the fan cowl panel:

NOTE: Start from the aft latch and work forward. If it is necessary, use fan cowl latch tool, SPL-936 to unlatch the fan cowl panel.

(a) Push the triggers to release the handles.

(b) Pull the handles down to release the latches from the keepers.

(c) Make sure the fan cowl panels are disengaged completely from each other.

SUBTASK 71-11-04-010-005-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Open the applicable fan cowl panel with the applicable switch:

(a) Push the fan cowl PDOS UP switch to open the fan cowl panel until the fan cowl panel stops.

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WARNING

MAKE SURE THAT THE HOLD-OPEN RODS ARE FULLY EXTENDED AND LOCKED WHEN THE FAN COWL PANEL IS OPEN. THE HOLD-OPEN RODS ARE NOT LOCKED IF YOU SEE THE RED STRIPE WITH THE WORD "UNLOCKED" ON THE LOCK COLLAR. IF THE RODS ARE NOT LOCKED, THE FAN COWL PANEL CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(b) Make sure the fan cowl hold-open rods are fully locked into their extended position.

NOTE: You will see the YELLOW safety stripe on the lower side of the lock collar when the hold-open rod is fully locked.

(c) Push the DOWN switch to permit the weight of the fan cowl panel to rest on the hold-open rods.

1) Make sure you do not see the red stripe on the lock collar.

SUBTASK 71-11-04-710-001-H00

(6) Push the applicable PDOS DOWN switch for 5 seconds to depressurize the PDOS system.

ARO 001-004 PRE SB 777-54-0033

SUBTASK 71-11-04-210-004-H00

(7) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips as follow:

NOTE: The fan cowl vapor barrier fittings are subject to wear damage from the fastener heads that attach the fan cowl rub strip to the fan cowl panel.

(a) If the fan cowl vapor barrier fittings are worn or damage, repair any damage found.

(b) If the fan cowl rub strips are worn and missing, replace the new bonded fan cowl rub strips.

ARO 005-999; ARO 001-004 POST SB 777-54-0033

SUBTASK 71-11-04-210-005-H00

(8) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips.

(a) Make sure that there is no damage in the fan cowl vapor barrier fittings and fan cowl rub strips:

ARO ALL

F. Fan Cowl Panels - Tryout

NOTE: This tryout is to make sure that the fan cowl panels are in the fully open position.

SUBTASK 71-11-04-210-010-H00

(1) Make sure that the yellow safety stripe on the lower side of the lock collar is seen.

SUBTASK 71-11-04-210-011-H00

(2) Make sure that the red safety stripe on the lower side of the lock collar is not seen.

END OF TASK

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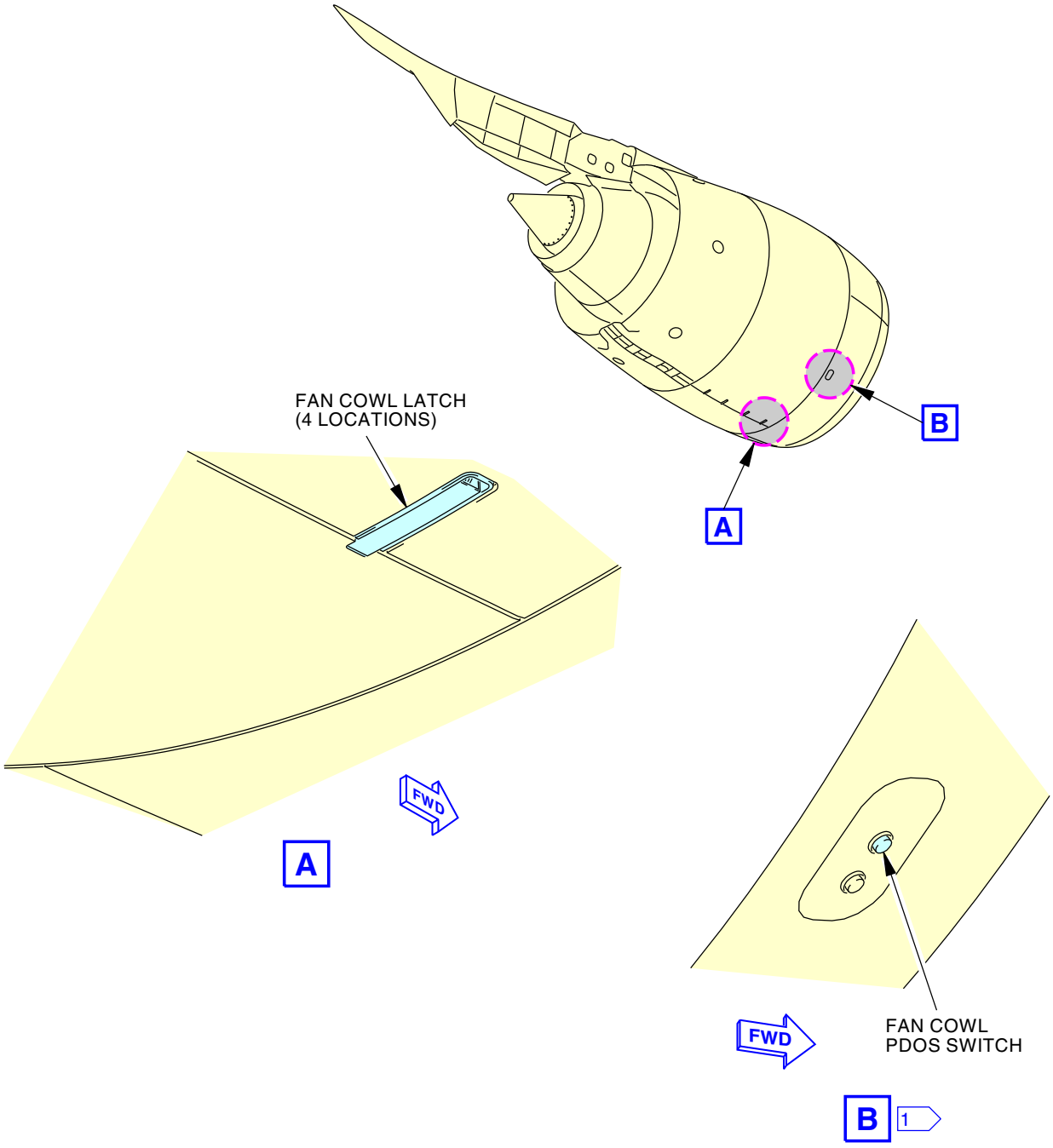

1 THE PDOS SWITCH FOR THE LEFT FAN COWL PANEL IS ON THE LEFT SIDE OF THE INLET COWL

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Fan Cowl Panel Open and Close (Power Method)
Figure 201/71-11-04-990-801-H01 (Sheet 1 of 2)

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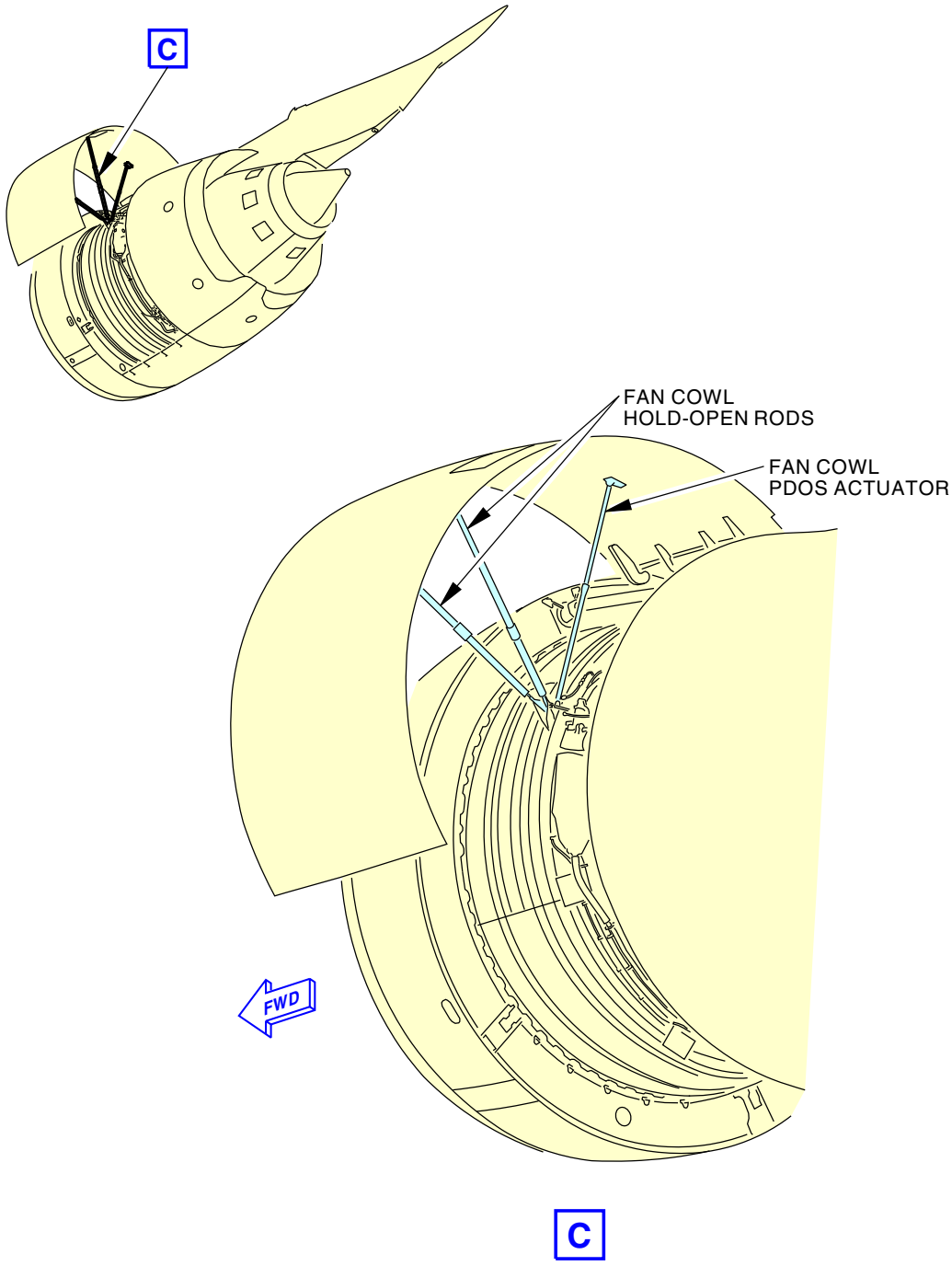

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Fan Cowl Panel Open and Close (Power Method)
Figure 201/71-11-04-990-801-H01 (Sheet 2 of 2)

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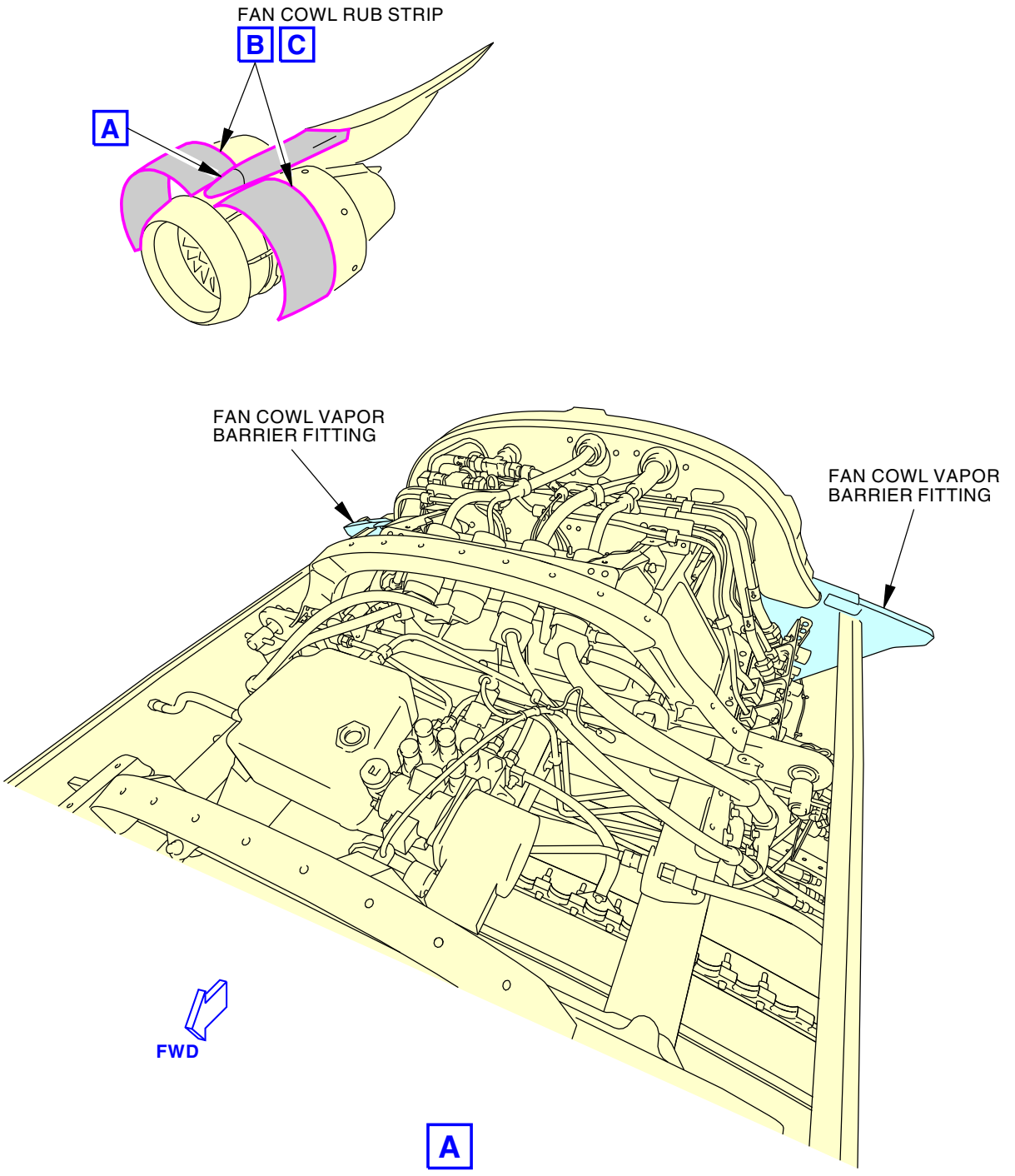

Fan Cowl Panel Inspection
Figure 202/71-11-04-990-809-H00 (Sheet 1 of 2)

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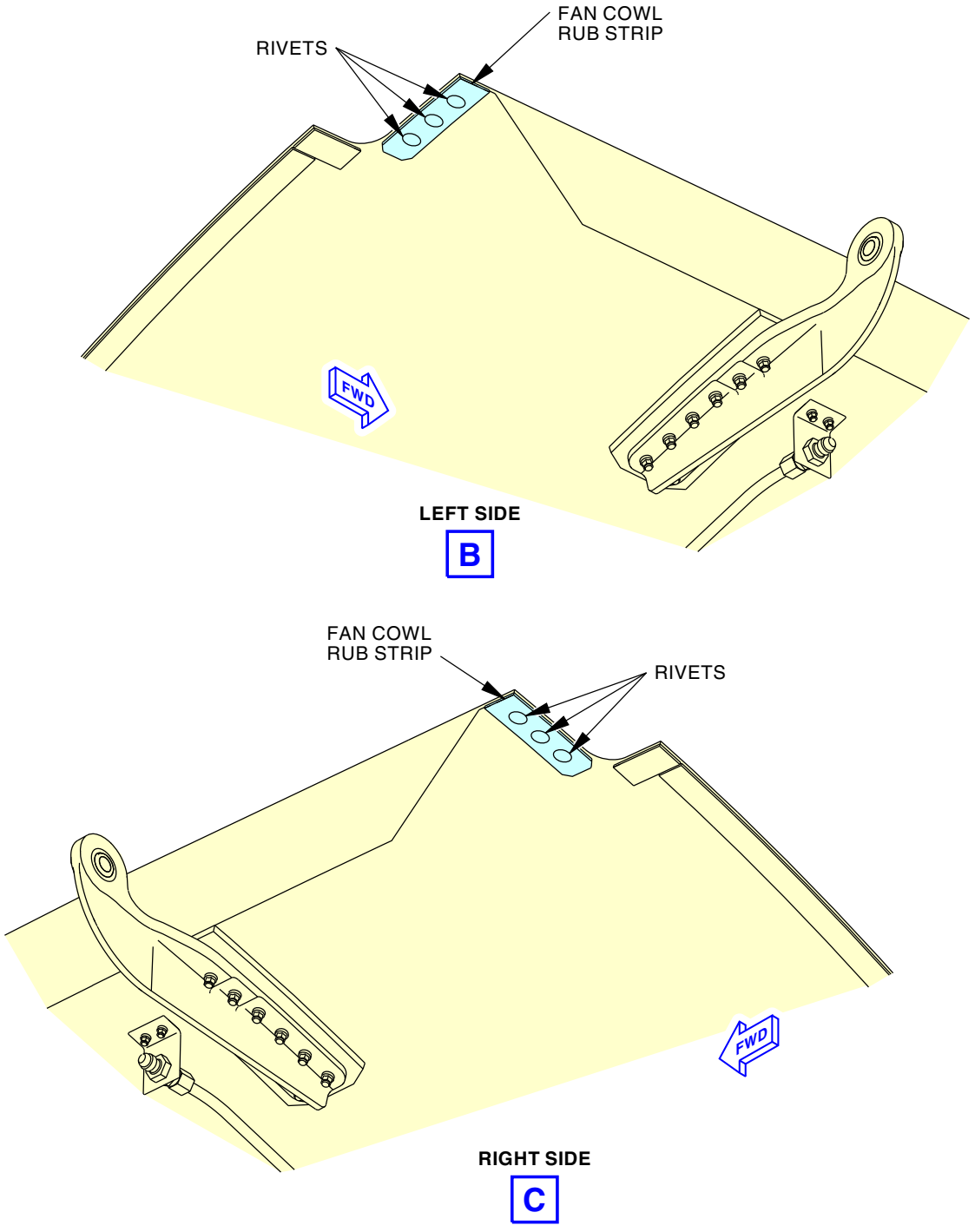

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Fan Cowl Panel Inspection
Figure 202/71-11-04-990-809-H00 (Sheet 2 of 2)

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TASK 71-11-04-400-802-H01

5. Close the Fan Cowl Panel (Power Method)

(Figure 201 and Figure 202)

A. General

(1) This is the usual procedure to close the fan cowl panels with the power door opening system (PDOS).

(2) In this procedure, you operate the inlet-mounted control switches (referred to as fan cowl PDOS switches) which sets the electric solenoid valves on the PDOS unit to the correct position to close the fan cowl panels. The weight of the fan cowl panels causes the fan cowl panels to close and forces the oil in the PDOS actuators to return to the reservoir in the PDOS unit.

(3) The fan cowl PDOS switches are installed on the inlet cowl at the 4:00 and 8:00 o'clock positions for the related fan cowl panel.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)

C. Tools/Equipment

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

Reference	Description
SPL-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-860-001-H01

CAUTION

MAKE SURE THAT THE THRUST REVERSERS ARE FULLY CLOSED BEFORE YOU CLOSE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FAN COWL PANELS AND THE THRUST REVERSER CAN OCCUR.

(1) Make sure the thrust reversers are closed and latched before you close the fan cowl panel.

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SUBTASK 71-11-04-860-002-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the applicable fan cowl panel with the applicable switch:

(a) Push the fan cowl PDOS UP switch on the applicable fan cowl panel until the fan cowl panel stops.

(b) Make sure the weight of the fan cowl panel is removed from the hold-open rods completely.

(c) Pull down the upper lock collar (towards the engine fan case) to unlock the hold-open rods.

NOTE: You will hear a CLICK. You will see the RED stripe on the upper side of the lock collar of the hold-open rods.

(d) Push the fan cowl PDOS DOWN switch to close the fan cowl panel until the fan cowl panel is fully closed and stopped.

NOTE: The hold-open rods will stow and reset automatically for the subsequent opening sequence. The second lock of the hold-open rod will be automatically unlocked by the first lock as the hold-open rod moves to the stowed position.

NOTE: If the fan cowl panel weight does not close the fan cowl panel, there is a hydraulic blockage at the PDOS solenoid valve or an electrical control problem that prevents the return of the oil to the PDOS reservoir. Use the manual close procedure.

1) Push and hold the fan cowl PDOS DOWN switch for five MORE seconds to permit the Actuator Lost motion device to move to its center position.

NOTE: This step is to bleed off any residual oil trapped in the Actuator.

2) Make sure the fan cowl panel is closed completely.

SUBTASK 71-11-04-860-003-H01

(3) Close the latches (4 locations) at the 6:00 o'clock position on the fan cowl panels:

NOTE: Start from the forward latch and work aft.

(a) Engage the keepers with the latches.

(b) Close the latches with the fan cowl latch tool, SPL-936.

(c) If the latch handles do not close smoothly, do the latch adjustment (TASK 71-11-05-800-801-H01).

(d) Push and hold the fan cowl PDOS DOWN switch again for five MORE seconds to permit the Actuator Lost motion device to move to its center position.

NOTE: This step is to bleed off any residual oil trapped in the Actuator.

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SUBTASK 71-11-04-440-002-H01

(4) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-11-04-000-803-H01

6. Open the Fan Cowl Panel (Manual Method)

(Figure 203 and Figure 204)

A. General

(1) This alternate procedure is used to open the fan cowl panels when there is a problem with the power door opening system (PDOS) unit's electric pump or solenoid valves, the control circuit, or the inlet mounted control switches (referred to as fan cowl PDOS switches).

(2) The manual method procedure can be used if there are no indications of oil leakage from the PDOS tubing or hoses, or the PDOS actuators under the fan cowl panels.

(3) In this procedure, you manually set the solenoid valves on the PDOS unit to the correct position to open the fan cowl panels and manually operate the pump in the PDOS unit through the manual drive. You can turn the manual drive with a hand or power tool. The instructions for the operation of the valves are on a placard on the PDOS unit.

(4) Access to the PDOS manual controls are under the No.1 fairing on the fan cowl support beam.

(5) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-997	Wrench - Speed, 3/8 Inch Square Drive
STD-4751	Speed Wrench - Pneumatic, 600 rpm, 15 in-lbs max

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine

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(Continued)

Zone	Area
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-030-001-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-04-040-005-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-04-300-001-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(3) Use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-11-04-010-009-H01

(4) Remove the applicable PDOS access door [1] from the forward fairing:

(a) Remove the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Place the protective mat, STD-585 on the forward fairing.

(c) Remove the PDOS access door [1]and let the PDOS access door [1] hang with the lanyard.

1) Make sure that you do not scratch the paint from the strut or the fairings.

SUBTASK 71-11-04-864-001-H01

(5) If the fan cowl latches are difficult to unlatch, do one of the step that follows to depressurize the PDOS:

(a) If the PDOS switch is operable, push the applicable PDOS DOWN switch for five seconds to depressurize the PDOS system.

(b) If the PDOS switch is not operable, do these steps:

1) Turn the applicable solenoid valve (V1 or V3) on the PDOS pump to the clockwise position.

2) Push the solenoid valve (V5) for five seconds to depressurize the PDOS.

SUBTASK 71-11-04-860-005-H01

(6) Open the latches (4 locations) at the 6:00 o'clock position on the applicable fan cowl panel:

NOTE: Start from the aft latch and work forward. If it is necessary, use fan cowl latch tool, SPL-936 to unlatch the fan cowl panel.

(a) Push the triggers to release the handles.

(b) Pull the handles down to release the latches from the keepers.

(c) Make sure the fan cowl panels are disengaged completely from each other.

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SUBTASK 71-11-04-860-006-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Open the applicable fan cowl panel:

(a) Turn the applicable solenoid valve (V1 or V3) in the clockwise position on the PDOS pump.

(b) Turn the manual drive shaft on the PDOS pump clockwise with a 3/8 inch square drive speed wrench, STD-997 or a pneumatic speed wrench, STD-4751 until the fan cowl panel stops.

WARNING MAKE SURE THAT THE HOLD-OPEN RODS ARE FULLY EXTENDED AND LOCKED WHEN THE FAN COWL PANEL IS OPEN. THE HOLD-OPEN RODS ARE NOT LOCKED IF YOU SEE THE RED STRIPE WITH THE WORD "UNLOCKED" ON THE LOCK COLLAR. IF THE RODS ARE NOT LOCKED, THE FAN COWL PANEL CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(c) Make sure the fan cowl hold-open rods are fully locked into their extended position.

NOTE: You will see the YELLOW safety stripe on the lower side of the lock collar when the hold-open rod is fully locked.

(d) Turn the applicable solenoid valve (V1 or V3) in the clockwise position.

(e) Push the solenoid valve (V5) on the PDOS pump until the weight of the fan cowl panel rests on the hold-open rods.

1) Make sure you do not see the red stripe on the lock collar of the hold-open rods.

ARO 001-004 PRE SB 777-54-0033

SUBTASK 71-11-04-210-006-H00

(8) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips as follow:

NOTE: The fan cowl vapor barrier fittings are subject to wear damage from the fastener heads that attach the fan cowl rub strip to the fan cowl panel.

(a) If the fan cowl vapor barrier fittings are worn or damage, repair any damage found.

(b) If the fan cowl rub strips are worn and missing, replace the new bonded fan cowl rub strips.

ARO 005-999; ARO 001-004 POST SB 777-54-0033

SUBTASK 71-11-04-210-007-H00

(9) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips.

(a) Make sure that there is no damage in the fan cowl vapor barrier fittings and fan cowl rub strips:

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F. Fan Cowl Panels - Tryout

NOTE: This tryout is to make sure that the fan cowl panels are in the fully open position.

SUBTASK 71-11-04-210-012-H00

(1) Make sure that the yellow safety stripe on the lower side of the lock collar is seen.

SUBTASK 71-11-04-210-013-H00

(2) Make sure that the red safety stripe on the lower side of the lock collar is not seen.

——— END OF TASK ———

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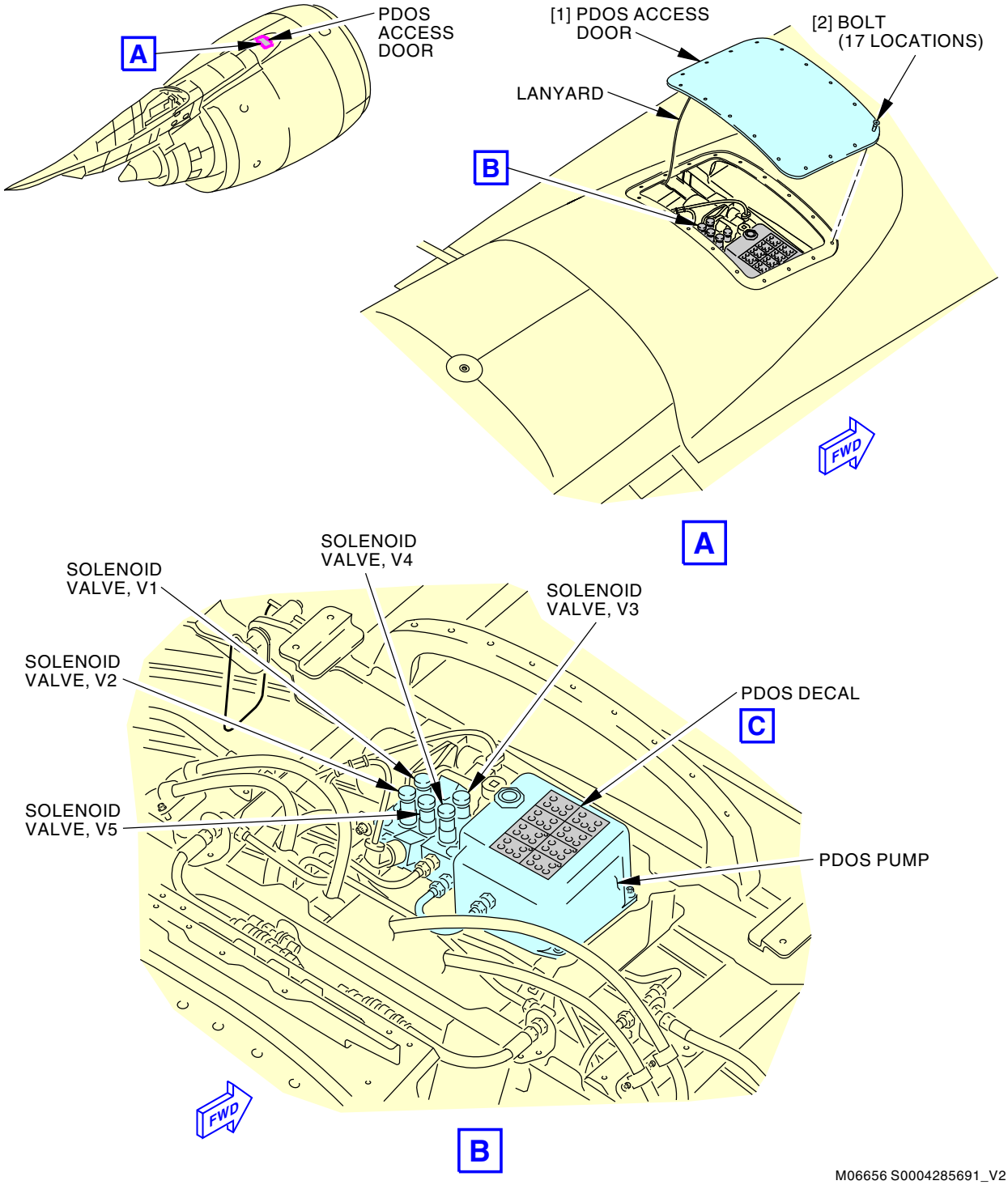

Fan Cowl Panel Open and Close (Manual Method)
Figure 203/71-11-04-990-802-H01 (Sheet 1 of 2)

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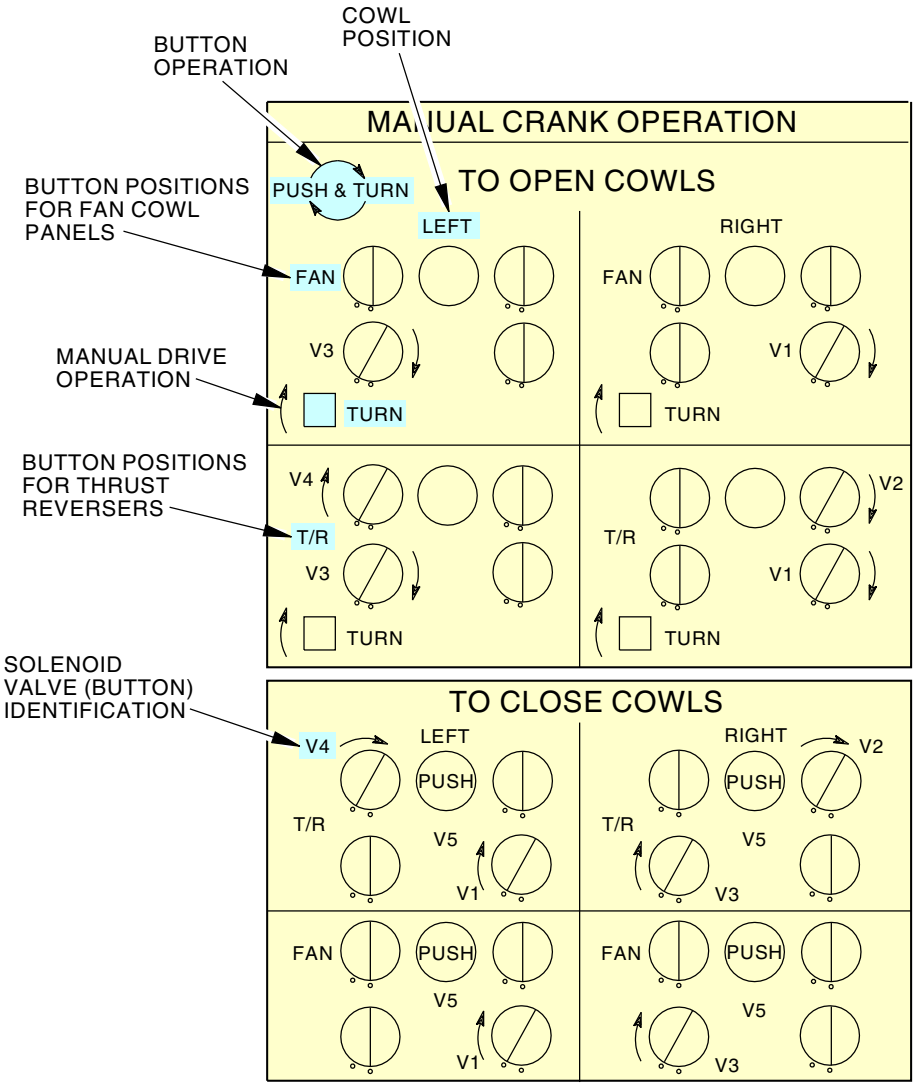

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Fan Cowl Panel Open and Close (Manual Method)
Figure 203/71-11-04-990-802-H01 (Sheet 2 of 2)

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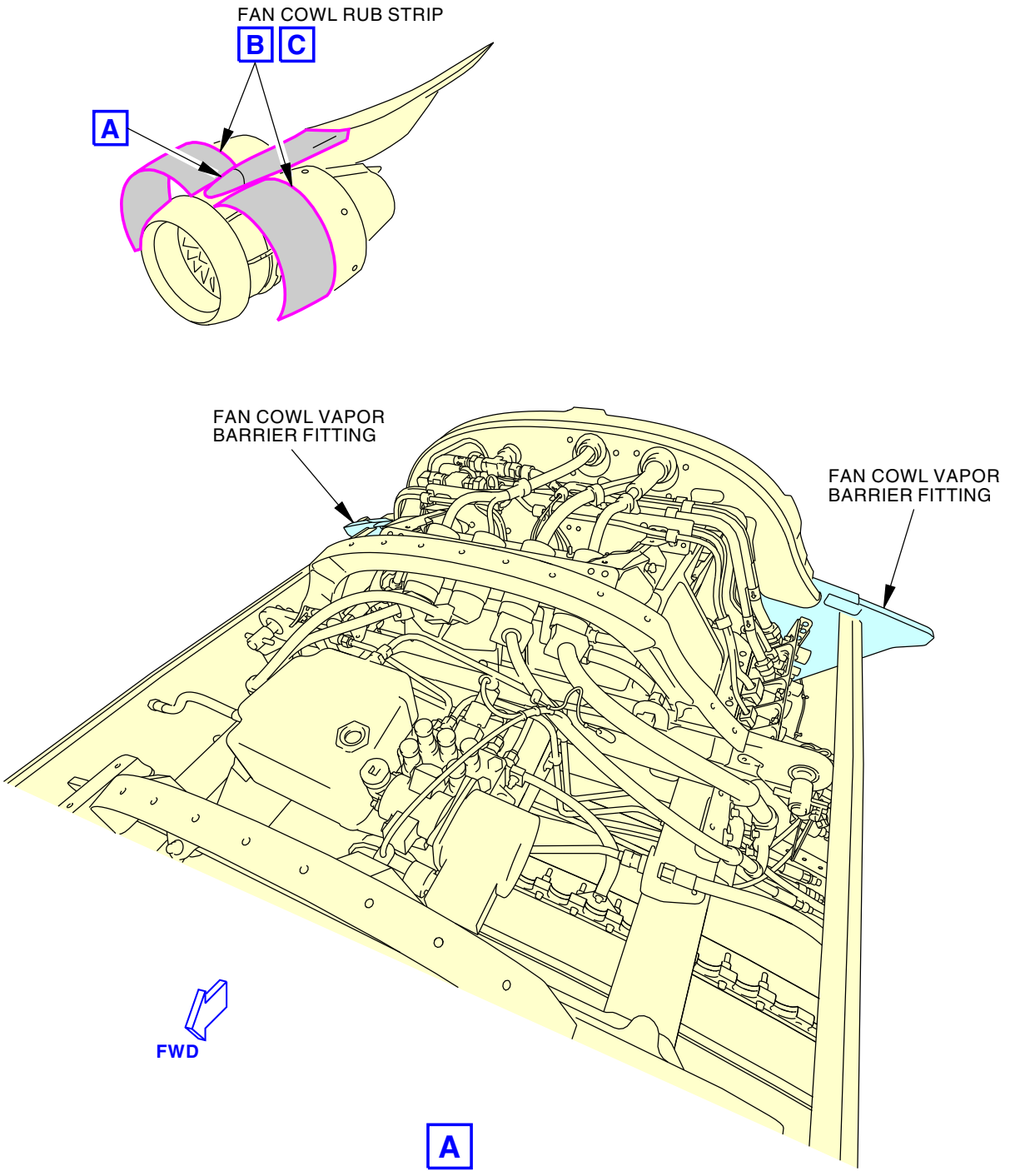

Fan Cowl Panel Inspection
Figure 204/71-11-04-990-810-H00 (Sheet 1 of 2)

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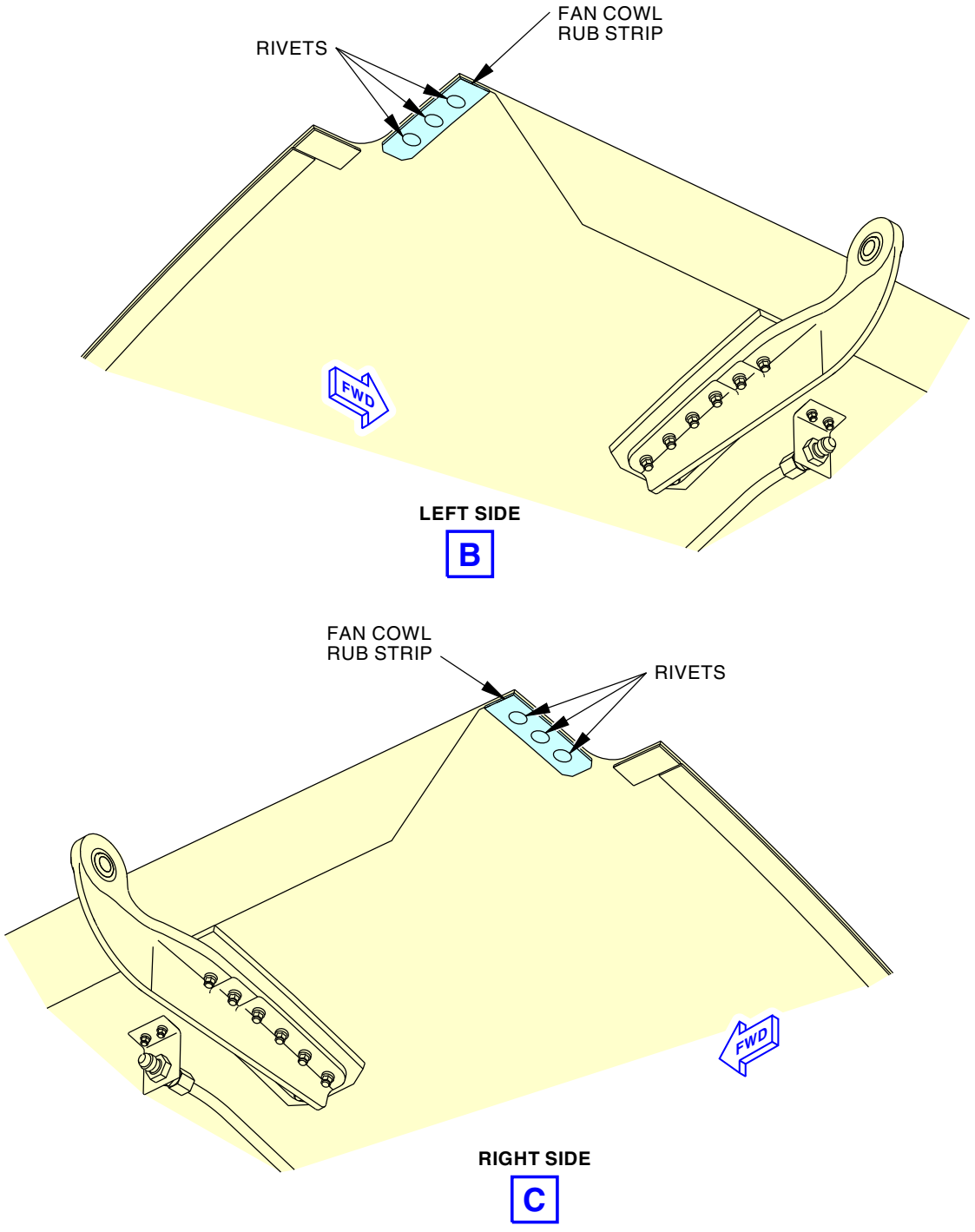

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Fan Cowl Panel Inspection
Figure 204/71-11-04-990-810-H00 (Sheet 2 of 2)

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TASK 71-11-04-400-803-H01

7. Close the Fan Cowl Panel (Manual Method)

(Figure 203 and Figure 204)

A. General

(1) This alternate procedure is used to close the fan cowl panels when there is a problem with the power door opening system (PDOS) unit's electric pump or solenoid valves, the control circuit, or the inlet mounted control switches.

(2) The manual method procedure can be used if there are no indications of oil leakage from the PDOS tubing or hoses, or the PDOS actuators under the fan cowl panels.

(3) In this procedure, you manually set and press the solenoid valves on the PDOS unit to the correct position to close the fan cowl panels. The weight of the fan cowl panels causes the fan cowl panels to close and forces the oil in the PDOS actuators to return to the reservoir in the PDOS unit.

(4) Access to the PDOS manual controls are under the No.1 fairing on the fan cowl support beam.

(5) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)

C. Tools/Equipment

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

Reference	Description
SPL-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-997	Wrench - Speed, 3/8 Inch Square Drive
STD-4751	Speed Wrench - Pneumatic, 600 rpm, 15 in-lbs max

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

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E. Procedure

SUBTASK 71-11-04-020-001-H01

(1) If the applicable PDOS access door is not removed when the cowlings are open, you must remove PDOS access door.

SUBTASK 71-11-04-300-002-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(2) If it is not already done, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-11-04-860-008-H01

CAUTION MAKE SURE THAT THE THRUST REVERSERS ARE FULLY CLOSED BEFORE YOU CLOSE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FAN COWL PANELS AND THE THRUST REVERSER CAN OCCUR.

(3) Make sure the thrust reversers are closed and latched before you close the fan cowl panel.

SUBTASK 71-11-04-860-009-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Close the applicable fan cowl panel:

(a) Turn the applicable solenoid valve (V1 or V3) on the PDOS pump to the clockwise position to open fan cowl panel.

(b) Turn the manual drive shaft on the PDOS pump clockwise with a 3/8 inch square drive speed wrench, STD-997 or a pneumatic speed wrench, STD-4751 until the fan cowl panel stops.

(c) Make sure the weight of the fan cowl panel is removed from the hold-open rods completely.

(d) Pull down the upper lock collar (towards the engine fan case) to unlock the hold-open rods.

NOTE: You will hear a CLICK. You will see the RED stripe on the upper side of the lock collar of the hold-open rods.

(e) Turn the applicable solenoid valve (V1 or V3) in the clockwise position to close the fan cowl panel.

(f) Push the solenoid valve (V5) on the PDOS pump until the fan cowl panel is in the closed position.

(g) After the fan cowl panel is completely closed, push the solenoid valve (V5) for an additional five seconds to depressurize the PDOS.

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SUBTASK 71-11-04-860-010-H01

(5) Close the latches (4 locations) at the 6:00 o'clock position on the fan cowl panels:

NOTE: Start from the forward latch and work aft.

(a) Engage the keepers with the latches.

(b) Close the latches with the fan cowl latch tool, SPL-936.

(c) If the latch handles do not close smoothly, do the latch adjustment (TASK 71-11-05-800-801-H01).

(d) After the fan cowl panel is completely closed, push the solenoid valve (V5) for an additional five seconds to depressurize the PDOS.

(e) Turn the applicable solenoid valve (V1 or V3) back to its normal position.

SUBTASK 71-11-04-410-006-H01

(6) Install the PDOS access door [1] on the forward fairing:

(a) Install the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Remove the protective mat, STD-585 from the forward fairing.

SUBTASK 71-11-04-440-003-H01

(7) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-11-04-090-001-H01

(8) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

——— END OF TASK ———

TASK 71-11-04-000-804-H01

8. Open the Fan Cowl Panel (Sling Method)

(Figure 205 and Figure 206)

A. General

(1) This alternate procedure is used to open the fan cowl panels when there is a problem with the power door opening system (PDOS) unit's electric pump or solenoid valves, the control circuit, or the inlet mounted control switches (referred to as fan cowl PDOS switches) and there are indications of oil leakage from the PDOS tubing or hoses, or the PDOS actuators under the fan cowl panels.

(2) You will need a special fan cowl sling, SPL-777 and a hoist, STD-467 to do this task.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (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-777	Sling - Fan Cowl Part #: J71004-9 Supplier: 81205

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(Continued)

Reference	Description
SPL-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-1098	Hoist - 500 Lb Capacity
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-030-002-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-04-040-006-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-04-864-002-H01

(3) If the fan cowl latches are difficult to unlatch, do one of the step that follows to depressurize the PDOS:

(a) If the PDOS switch is operable, push the applicable PDOS DOWN switch for five seconds to depressurize the PDOS system.

(b) If the PDOS switch is not operable, do these steps:

1) Open the PDOS access door to get access to the solenoid valve.

2) Turn the applicable solenoid valve (V1 or V3) on the PDOS pump to the clockwise position.

3) Push the solenoid valve (V5) for five seconds to depressurize the PDOS.

SUBTASK 71-11-04-010-007-H01

(4) Open the latches (4 locations) at the 6:00 o'clock position on the applicable fan cowl panel:

NOTE: Start from the aft latch and work forward. If it is necessary, use fan cowl latch tool, SPL-936 to unlatch the fan cowl panel.

(a) Push the triggers to release the handles.

(b) Pull the handles down to release the latches from the keepers.

(c) Make sure the fan cowl panels are disengaged completely from each other.

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SUBTASK 71-11-04-020-002-H01

(5) Attach the fan cowl sling, SPL-777 to the applicable fan cowl panel:

(a) Remove the plugs [3] from the fan cowl panel (2 lower locations).

1) Keep the plugs [3].

(b) Install the hoist pins [5] (2 locations) in the plug holes.

(c) Engage the hoist, STD-467 with the sling hoist plate.

(d) Attach the master link to a 500 lb capacity hoist, STD-1098.

(e) Attach a Load Cell, STD-1144, to the master link.

(f) Attach the sling link to the Load Cell, STD-1144.

(g) Put the hoist, STD-467 and the fan cowl sling, SPL-777 above the fan cowl panel.

(h) Make sure that the sling link does not touch the surface of the fan cowl.

(i) Attach the sling straps [4]to the sling link with the two lock-a-loys.

NOTE: You will not use the short sling strap in this procedure.

(j) Attach the sling straps [4] to the sling hoist plate.

SUBTASK 71-11-04-820-001-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Open the applicable fan cowl panel:

(a) Set the Load Cell, STD-1144, to zero.

1) Make sure that the weight of the fan cowl is not on the two sling straps [4].

WARNING MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

2) At the load cell, the maximum total weight to apply is 275 pounds (125 kilograms).

(b) Adjust the hoist, STD-467 to hold the weight of the fan cowl panel.

1) Make sure that the fan cowl sling, SPL-777 does not touch the surface of the fan cowl panel.

(c) Lift the fan cowl panel slowly to open the fan cowl to its fully open position.

NOTE: As the fan cowl panel is opened or closed with the sling, the check valves in the PDOS power unit will let the engine oil from the reservoir flow to the PDOS actuator. The fluid viscosity of the engine oil will become thicker as the oil temperature decreases. The task to lift the cowls will take a longer time at low temperatures. Do not force the cowls open or closed.

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WARNING

MAKE SURE THAT THE HOLD-OPEN RODS ARE FULLY EXTENDED AND LOCKED WHEN THE FAN COWL PANEL IS OPEN. THE HOLD-OPEN RODS ARE NOT LOCKED IF YOU SEE THE RED STRIPE WITH THE WORD "UNLOCKED" ON THE LOCK COLLAR. IF THE RODS ARE NOT LOCKED, THE FAN COWL PANEL CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(d) Make sure the fan cowl hold-open rods are fully locked into their extended position.

NOTE: You will see the YELLOW safety stripe on the lower side of the lock collar when the hold-open rod is fully locked.

(e) Lower the fan cowl panel until the weight of the fan cowl panel is held by the hold-open rods.

1) Make sure you do not see the red stripe on the lock collar of the hold-open rods.

SUBTASK 71-11-04-090-002-H01

(7) If you must remove the hoist, STD-467 equipment, disconnect and remove the fan cowl sling strap and the hoist pins:

(a) Disconnect the sling straps [4] from the fan cowl panel.

1) Remove the hoist pins [5] (2 locations) from the fan cowl panel.

(b) Move the hoist, STD-467 equipment, and the fan cowl sling, SPL-777, away from the fan cowl panel.

(c) Install the plugs [3] on the fan cowl panel.

(d) Tighten the plugs [3] hand tight.

ARO 001-004 PRE SB 777-54-0033

SUBTASK 71-11-04-210-008-H00

(8) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips as follow:

NOTE: The fan cowl vapor barrier fittings are subject to wear damage from the fastener heads that attach the fan cowl rub strip to the fan cowl panel.

(a) If the fan cowl vapor barrier fittings are worn or damage, repair any damage found.

(b) If the fan cowl rub strips are worn and missing, replace the new bonded fan cowl rub strips.

ARO 005-999; ARO 001-004 POST SB 777-54-0033

SUBTASK 71-11-04-210-009-H00

(9) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips.

(a) Make sure that there is no damage in the fan cowl vapor barrier fittings and fan cowl rub strips:

ARO ALL

F. Fan Cowl Panels - Tryout

NOTE: This tryout is to make sure that the fan cowl panels are in the fully open position.

SUBTASK 71-11-04-210-014-H00

(1) Make sure that the yellow safety stripe on the lower side of the lock collar is seen.

SUBTASK 71-11-04-210-015-H00

(2) Make sure that the red safety stripe on the lower side of the lock collar is not seen.

END OF TASK

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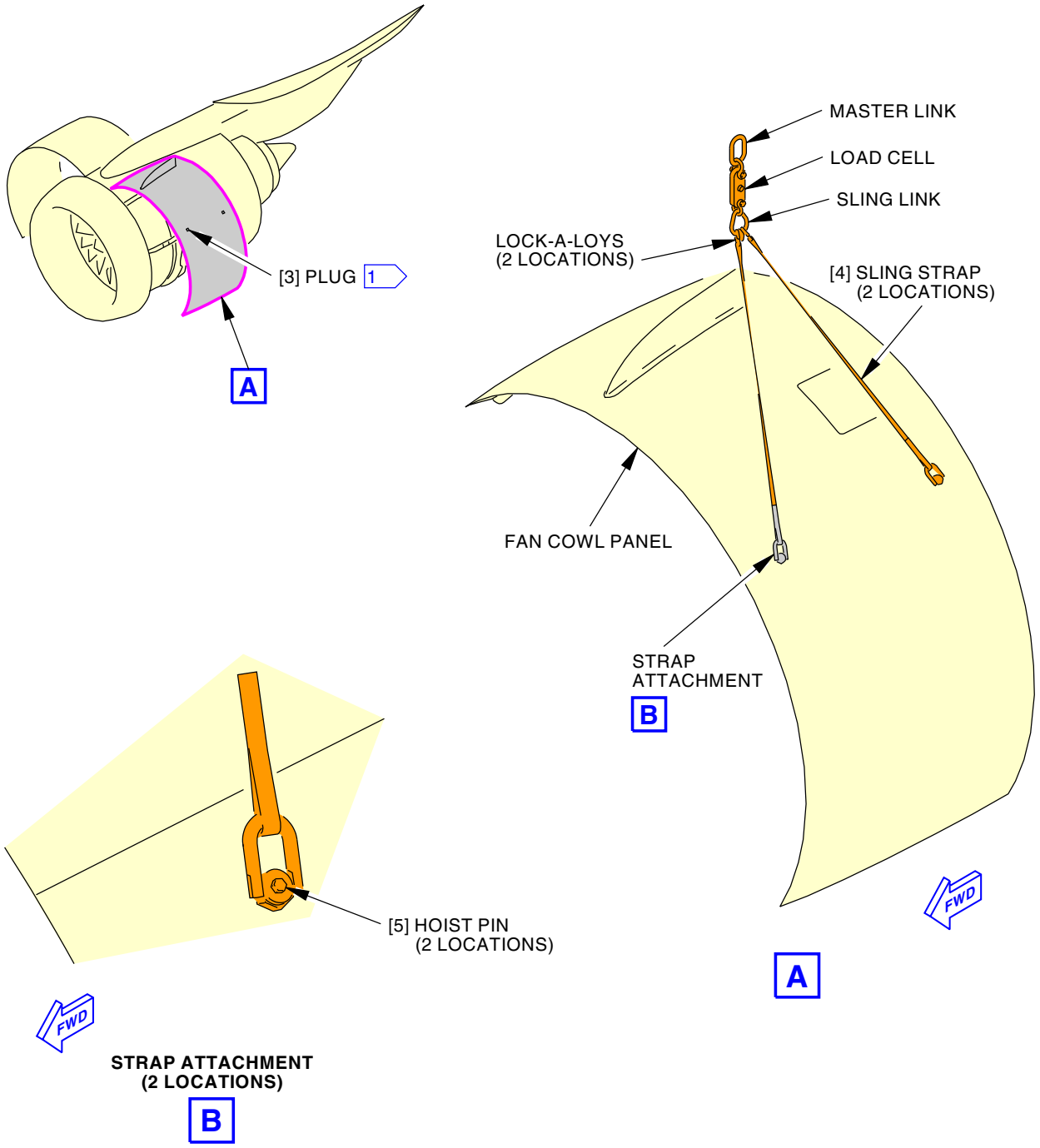

1 REMOVE PLUG [3] BEFORE HOIST PIN INSTALLATION

M06658 S0004285693_V5

Fan Cowl Panel Open and Close (Sling Method)
Figure 205/71-11-04-990-803-H01

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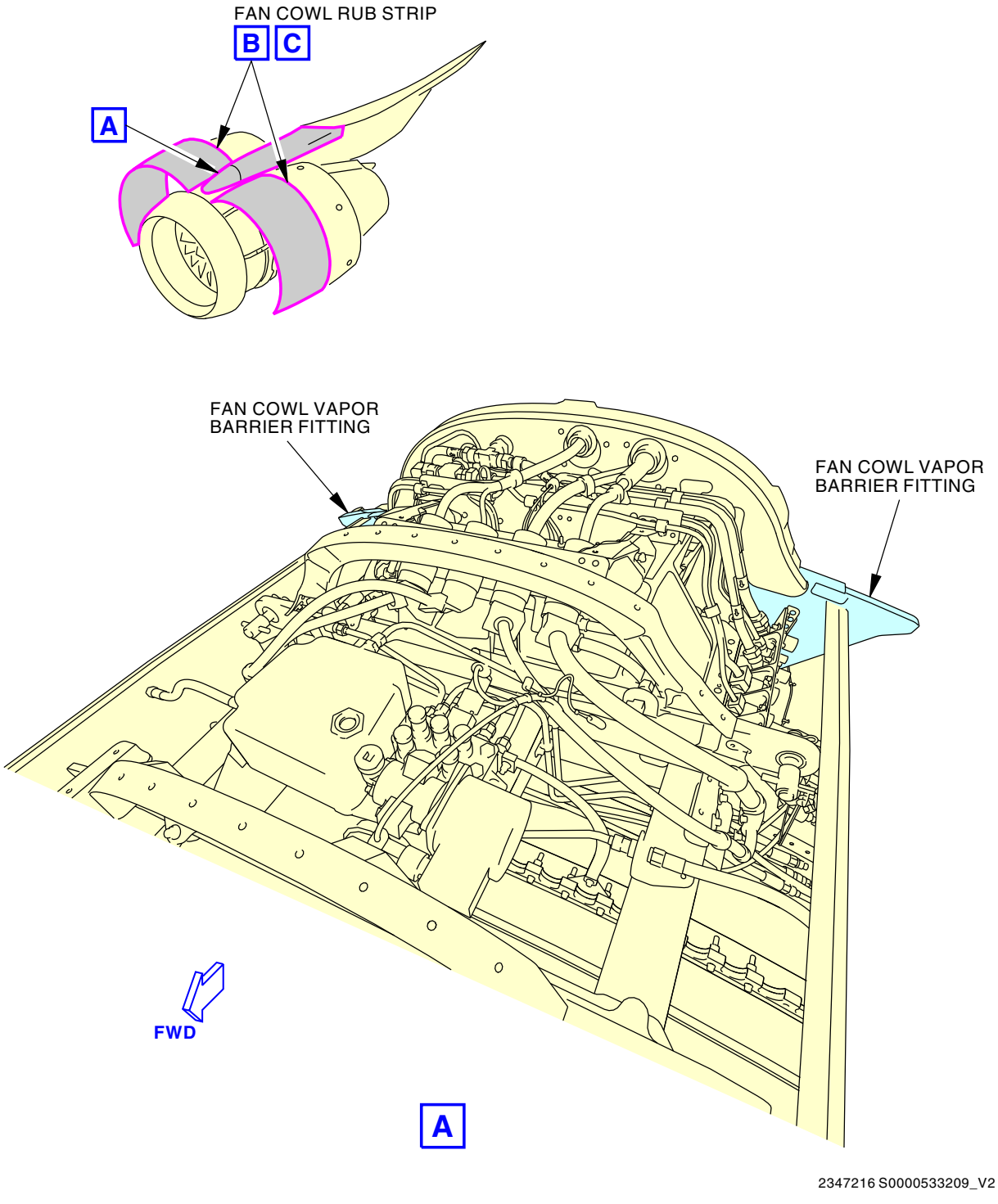

Fan Cowl Panel Inspection
Figure 206/71-11-04-990-811-H00 (Sheet 1 of 2)

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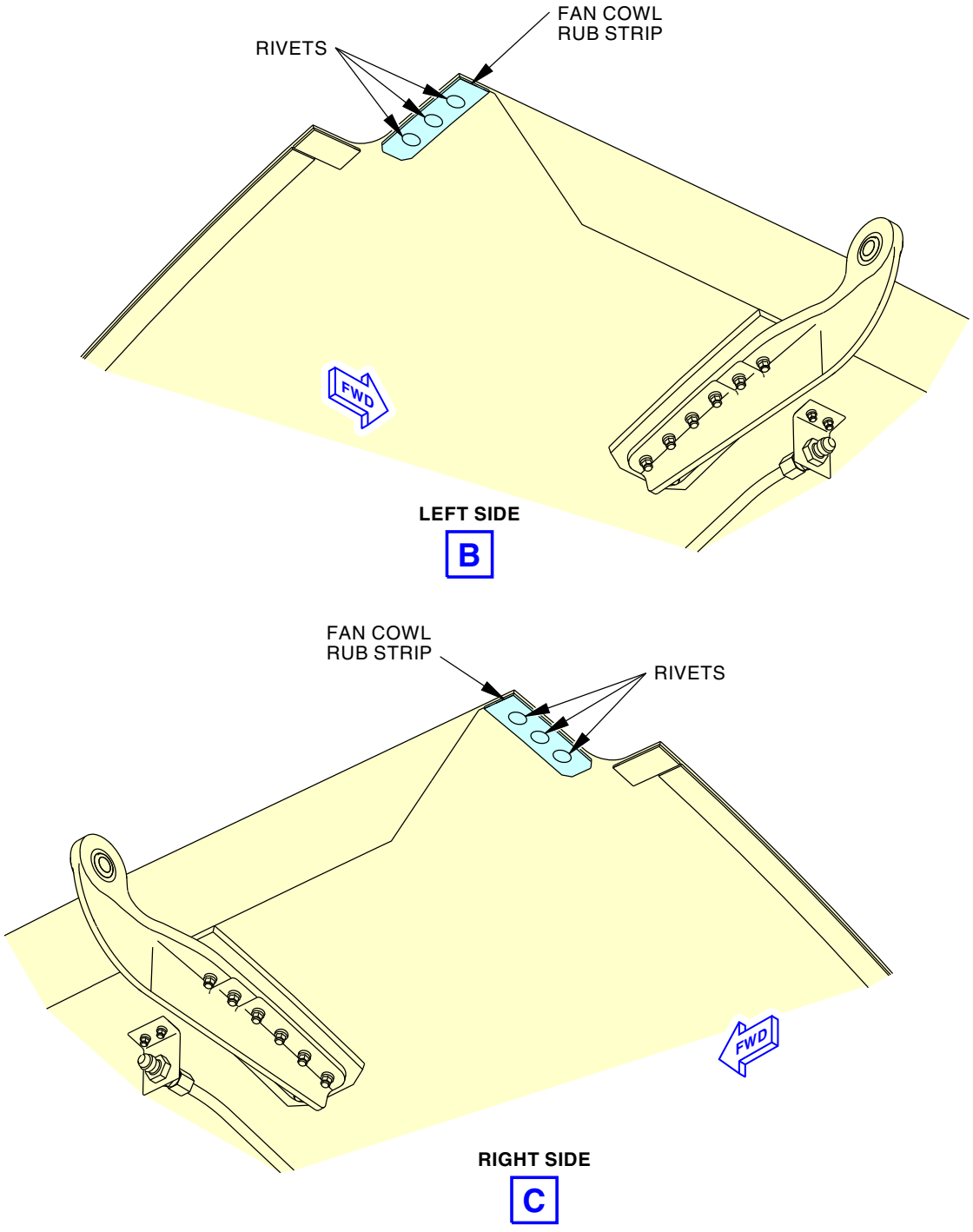

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Fan Cowl Panel Inspection
Figure 206/71-11-04-990-811-H00 (Sheet 2 of 2)

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TASK 71-11-04-400-804-H01

9. Close the Fan Cowl Panel (Sling Method)

(Figure 205 and Figure 206)

A. General

(1) You use this procedure when the PDOS pump (power door opening system) is inoperative.

(2) You will need a special fan cowl sling, SPL-777 and a hoist, STD-467 to do this task.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)
71-12-01-000-801-H01	Fan Cowl Opening Actuators 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-777	Sling - Fan Cowl Part #: J71004-9 Supplier: 81205
SPL-936	Tool - Fan Cowl Latch Part #: J71063-1 Supplier: 81205 Part #: ST9999CL-201 Supplier: 81205 Opt Part #: ST9999CL Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-1098	Hoist - 500 Lb Capacity
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

F. Procedure

SUBTASK 71-11-04-869-001-H01

CAUTION

MAKE SURE THAT THE THRUST REVERSERS ARE FULLY CLOSED BEFORE YOU CLOSE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE FAN COWL PANELS AND THE THRUST REVERSER CAN OCCUR.

(1) Make sure the thrust reversers are closed and latched before you close the fan cowl panel.

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SUBTASK 71-11-04-490-004-H01

(2) If the fan cowl sling, SPL-777 is not attached to the fan cowl panel, attach the fan cowl sling, SPL-777 as follows:

(a) Remove the plugs [3] from fan cowl panel (2 lower locations).

1) Keep the plugs [3].

(b) Install the hoist pins [5] (2 locations) in the plug holes.

(c) Engage the hoist, STD-467 with the sling hoist plate.

(d) Attach the master link to a 500 lb capacity hoist, STD-1098.

(e) Attach a Load Cell, STD-1144, to the master link.

(f) Attach the sling link to the Load Cell, STD-1144.

(g) Put the hoist, STD-467 and the fan cowl sling, SPL-777 above the fan cowl panel.

(h) Make sure that the sling link does not touch the surface of the fan cowl.

(i) Attach the sling straps [2] to the sling link with the two lock-a-loys.

(j) Set the Load Cell, STD-1144, to zero.

1) Make sure that the weight of the fan cowl is not on the two sling straps [2].

WARNING MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

2) At the load cell, the maximum total weight to apply is 275 pounds (125 kilograms).

3) Adjust the 500 lb capacity hoist, STD-1098 to hold the weight of the fan cowl panel.

(k) Make sure that the fan cowl sling, SPL-777 does not touch the surface of the fan cowl panel.

(l) Attach the sling straps [4] to the sling hoist plate.

SUBTASK 71-11-04-410-003-H01

WARNING DO NOT OPEN OR KEEP THE FAN COWL PANELS OPEN IF THE WIND IS MORE THAN 40 KNOTS. THE FAN COWL HOLD-OPEN RODS CAN HAVE A FAILURE WHICH COULD RELEASE THE FAN COWL PANEL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING USE CAUTION WHEN YOU OPEN THE FAN COWL PANELS IN A HIGH WIND. IF YOU DO NOT USE CAUTION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Close the applicable fan cowl panel:

(a) Make sure the weight of the fan cowl panel is removed from the hold-open rods completely.

(b) Pull down the upper lock collar (towards the engine fan case) to unlock the hold-open rods.

NOTE: You will hear a CLICK. You will see the RED stripe on the upper side of the lock collar of the hold-open rods.

(c) Lower the hoist, STD-467 until there is no load on the fan cowl sling, SPL-777.

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(d) If the fan cowl PDOS switch is operative, push the fan cowl PDOS DOWN switch to close the fan cowl panel until the fan cowl panel stops.

NOTE: The hold-open rods will stow and reset automatically for the subsequent opening sequence. The second lock of the hold-open rod will be automatically unlocked by the first lock as the hold-open rod moves to the stowed position.

(e) If the fan cowl PDOS switch is inoperative, manually close the fan cowl panel (TASK 71-11-04-400-803-H01).

(f) If the fan cowl PDOS switch and the solenoid valve (V5) are inoperative, do these steps to close the fan cowl panel:

WARNING MAKE SURE THAT THE HOLD-OPEN RODS ARE FULLY EXTENDED AND LOCKED WHEN THE FAN COWL PANEL IS OPEN. THE HOLD-OPEN RODS ARE NOT LOCKED IF YOU SEE THE RED STRIPE WITH THE WORD "UNLOCKED" ON THE LOCK COLLAR. IF THE RODS ARE NOT LOCKED, THE FAN COWL PANEL CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

1) Lock the fan cowl hold-open rods in their extended position.

NOTE: You will see the YELLOW safety stripe on the lower side of the lock collar when the hold-open rod is fully locked.

2) Lower the fan cowl panel until the weight of the fan cowl panel is held by the hold-open rods.

3) Make sure you do not see the red stripe on the lock collar of the hold-open rods.

4) Do this task: Fan Cowl Opening Actuators Removal, TASK 71-12-01-000-801-H01.

5) Put a cap on the PDOS line to make sure there is no leakage.

6) Make sure the weight of the fan cowl panel is removed from the hold-open rods completely.

7) Pull down the upper lock collar (towards the engine fan case) to unlock the hold-open rods.

NOTE: You will hear a CLICK. You will see the RED stripe on the upper side of the lock collar of the hold-open rods.

8) Lower the fan cowl panel to the closed position with the hoist, STD-467 until there is no load on the fan cowl sling, SPL-777.

SUBTASK 71-11-04-090-003-H01

(4) Remove the fan cowl sling, SPL-777:

(a) Disconnect the sling straps [4] from the fan cowl panel.

1) Remove the hoist pins [5] (2 locations) from the fan cowl panel.

(b) Move the hoist, STD-467 equipment away from the fan cowl panel.

(c) Disconnect the sling straps [4] from the sling hoist plate.

(d) Remove the sling hoist plate from the hoist, STD-467.

(e) Apply the sealant, A00247 on the plugs [3].

(f) Install the plugs [3] (2 locations) in the fan cowl panel.

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SUBTASK 71-11-04-410-004-H01

(5) Close the latches (4 locations) at the 6:00 o'clock position on the fan cowl panels:

NOTE: Start from the forward latch and work aft.

(a) Engage the keepers with the latches.

(b) Close the latches with the fan cowl latch tool, SPL-936.

(c) If the latch handles do not close smoothly, do the latch adjustment (TASK 71-11-05-800-801-H01).

SUBTASK 71-11-04-440-004-H01

(6) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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FAN COWL PANELS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the fan cowl panels

(2) An installation of the fan cowl panels.

TASK 71-11-04-000-805-H01

2. Fan Cowl Panels Removal

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

A. General

(1) The fan cowl panels are installed on the fan cowl support beam assembly.

(2) The removal and the installation procedures of the left and the right fan cowl panels are the same.

(3) You will need a special fan cowl sling, SPL-777 and a hoist, STD-467 to do this task.

(4) Each fan cowl panel weights approximately 270 pounds (123 kgs).

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-777	Sling - Fan Cowl Part #: J71004-9 Supplier: 81205
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-467	Hoist - 500 lb (226.8 kg)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-1098	Hoist - 500 Lb Capacity
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

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E. Prepare for the Removal

SUBTASK 71-11-04-030-003-H01

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-04-040-007-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

F. Fan Cowl Panels Removal

SUBTASK 71-11-04-020-003-H01

(1) Attach the fan cowl sling, SPL-777 to the applicable fan cowl panel [1]:

(a) Remove the plugs [5] from the fan cowl panel [1].

1) Keep the plugs [5].

NOTE: The plugs [5] will be used for the subsequent installation.

(b) Install the hoist pins [3] (3 locations) on the fan cowl panel [1].

(c) Attach the master link to a hoist, STD-467.

(d) Attach a Load Cell, STD-1144, to the master link.

(e) Attach the fan cowl sling, SPL-777, to the Load Cell, STD-1144.

(f) Use the 500 lb capacity hoist, STD-1098, to lift the fan cowl sling, SPL-777, fully off the ground.

(g) Set the Load Cell, STD-1144, to zero.

(h) Engage the hoist, STD-467 with the sling hoist plate.

(i) Lift the fan cowl sling, SPL-777 above the fan cowl panel [1].

(j) Make sure that the fan cowl sling, SPL-777 does not touch the surface of the fan cowl panel [1].

(k) Attach the sling straps [2] to the sling link with the two lock-a-loys.

(l) Attach the fan cowl sling, SPL-777, to the fan cowl panel [1] at the three hoist pins [3].

SUBTASK 71-11-04-010-008-H01

CAUTION

MAKE SURE THE SLING DOES NOT TOUCH THE SURFACE OF THE FAN COWL PANEL. DAMAGE TO THE EQUIPMENT CAN OCCUR.

(2) Open the applicable fan cowl panel [1] (Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00).

SUBTASK 71-11-04-030-004-H01

(3) Disconnect the applicable fan cowl static pressure sense hose [31] from the static port at the fan cowl support beam.

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SUBTASK 71-11-04-020-004-H01

WARNING MAKE SURE THE FAN COWL PANEL IS HELD OPEN BY THE SLING WHEN YOU DISCONNECT FAN COWL PDOS ACTUATOR AND HOLD-OPEN RODS. EACH FAN COWL PANEL WEIGHTS APPROXIMATELY 270 POUNDS (123 KGS). IF THE FAN COWL PANEL FALLS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Remove the fan cowl panel [1] from the engine, do these steps :

(a) Make sure that the fan cowl sling, SPL-777 does not touch the surface of the fan cowl panel [1].

(b) Adjust the hoist, STD-467 to hold the weight of the fan cowl panel [1].

(c) Disconnect the fan cowl PDOS actuator [8]:

1) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under fan cowl PDOS actuator [8].

2) Disconnect the PDOS hydraulic hose [9] at the lower end quick disconnect of the fan cowl PDOS actuator [8].

a) Catch the oil from the fan cowl PDOS actuator [8] and the PDOS hydraulic hose [9] with 1 U.S.-gal (3.81 l) oil resistant container, STD-203.

NOTE: Make sure that the nipple and the packing are installed on the fan cowl PDOS actuator [8] fitting.

3) Remove the quick-release pin [10] and disconnect the fan cowl PDOS actuator [8] from the fan case bracket assembly.

4) Align the fan cowl PDOS actuator [8] to the stowed bracket on the fan cowl panel.

5) Put the fan cowl PDOS actuator [8] to the stowed bracket.

NOTE: The stowed bracket is installed on the inboard of the fan cowl panel.

(d) Disconnect the forward and aft fan cowl hold-open rods [7] from the fan case bracket assemblies:

1) Remove the quick-release pin [11] that attach the hold-open rods [7] to the fan case bracket assemblies.

2) Retract the fan cowl hold-open rods [7] to the stowed position.

3) Put the fan cowl hold-open rods [7] on the stow brackets.

NOTE: The stowed brackets are installed on the inboard of the fan cowl panel.

(e) Use the fan cowl sling, SPL-777, to hold the fan cowl panel [1] in the open position as you disconnect the fan cowl panel [1].

(f) Remove the first and the fourth quick-release pins [4] from the first and the last hinge assemblies.

(g) Install the undersize pins on the first and the fourth hinge assemblies.

(h) Remove the second and the third quick-release pins [4] from the second and the third hinge assemblies.

(i) Remove the undersize pins slowly and in the same time adjust the fan cowl sling, SPL-777 to balance the weight of the fan cowl panel [1].

(j) Install a rope - 12 ft (3.6 m) minimum, STD-748 on the latch or keeper assembly.

NOTE: Use the rope - 12 ft (3.6 m) minimum, STD-748, so the fan cowl panel does not turn while the fan cowl panel is lifted.

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CAUTION DO NOT OPEN OR CLOSE THE FAN COWL PANEL AFTER THE REMOVAL OF THE HINGE QUICK-RELEASE PINS. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE TOP COWL SEAL CAN OCCUR.

(k) Lift the fan cowl panel [1] away with the help of the rope - 12 ft (3.6 m) minimum, STD-748 and put it on a clean, smooth surface which will not cause damage to the finish.

(l) Remove the rope - 12 ft (3.6 m) minimum, STD-748 from the latch or keeper assembly if the fan cowl panel will not be re-installed.

SUBTASK 71-11-04-090-004-H01

(5) Remove the sling strap [2] and the hoist pins [3] if the fan cowl panel will not be re-installed.

(a) Install the plugs [5] on the fan cowl panel [1].

ARO 001-004 PRE SB 777-54-0033

SUBTASK 71-11-04-210-002-H00

(6) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips as follow:

NOTE: The fan cowl vapor barrier fittings are subject to wear damage from the fastener heads that attach the fan cowl rub strip to the fan cowl panel.

(a) If the fan cowl vapor barrier fittings are worn or damage, repair any damage found.

(b) If the fan cowl rub strips are worn and missing, replace the new bonded fan cowl rub strips.

ARO 005-999; ARO 001-004 POST SB 777-54-0033

SUBTASK 71-11-04-210-003-H00

(7) Do a visual inspection of the fan cowl vapor barrier fittings and fan cowl rub strips.

(a) Make sure that there is no damage in the fan cowl vapor barrier fittings and fan cowl rub strips:

ARO ALL

END OF TASK

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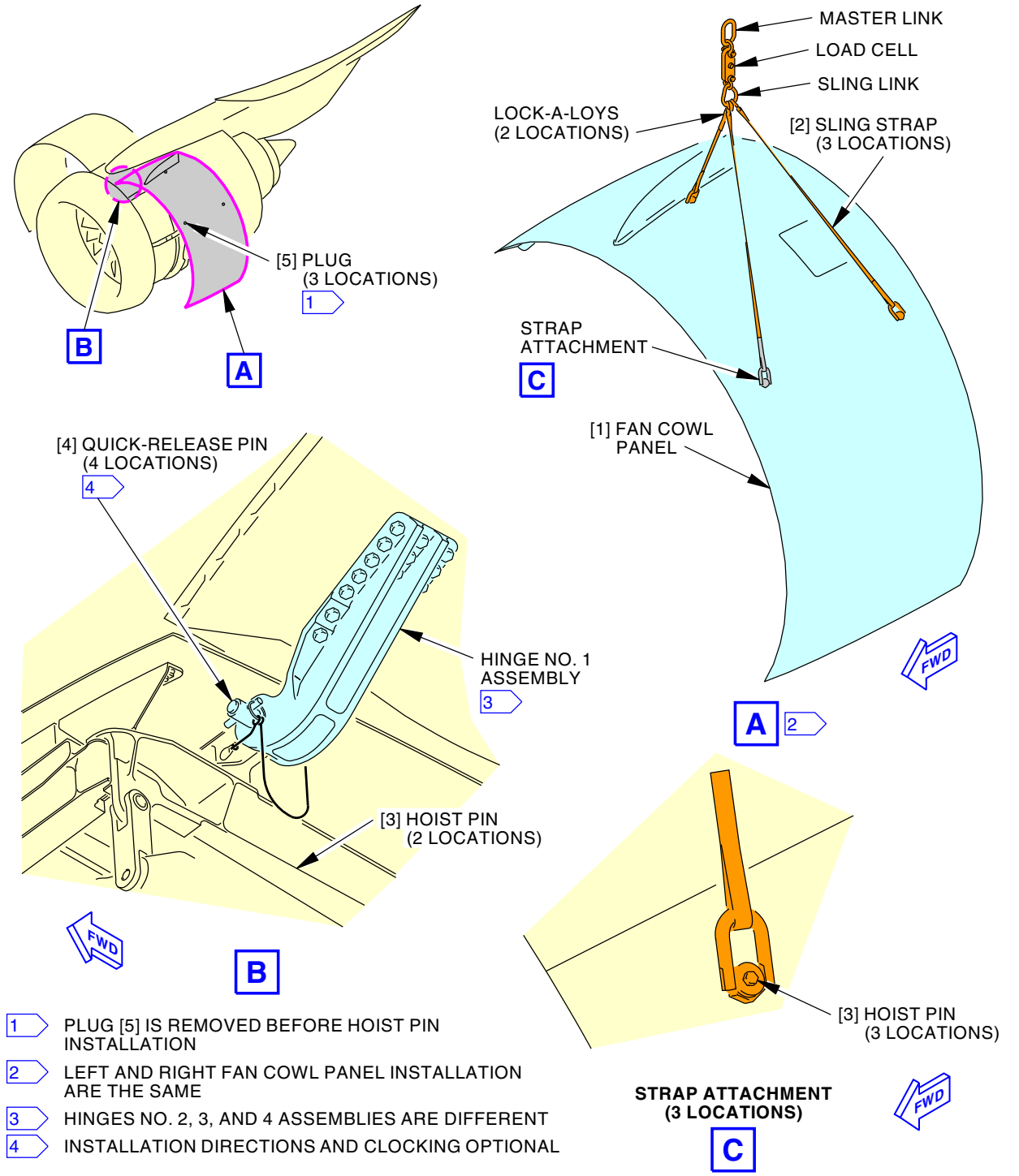

1. PLUG [5] IS REMOVED BEFORE HOIST PIN INSTALLATION
2. LEFT AND RIGHT FAN COWL PANEL INSTALLATION ARE THE SAME
3. HINGES NO. 2, 3, AND 4 ASSEMBLIES ARE DIFFERENT
4. INSTALLATION DIRECTIONS AND CLOCKING OPTIONAL

Fan Cowl Panel Installation
Figure 401/71-11-04-990-812-H00 (Sheet 1 of 3)

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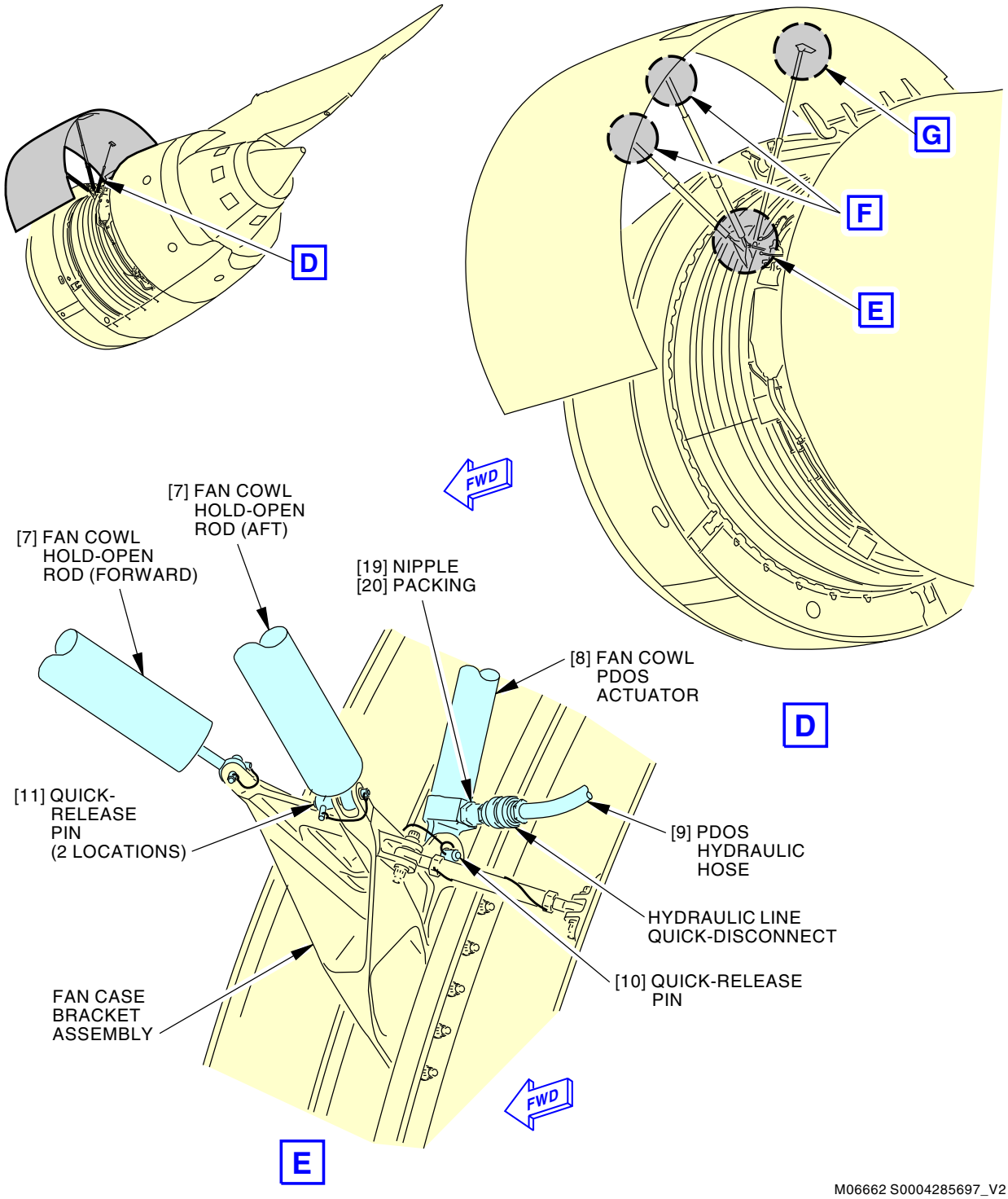

Fan Cowl Panel Installation
Figure 401/71-11-04-990-812-H00 (Sheet 2 of 3)

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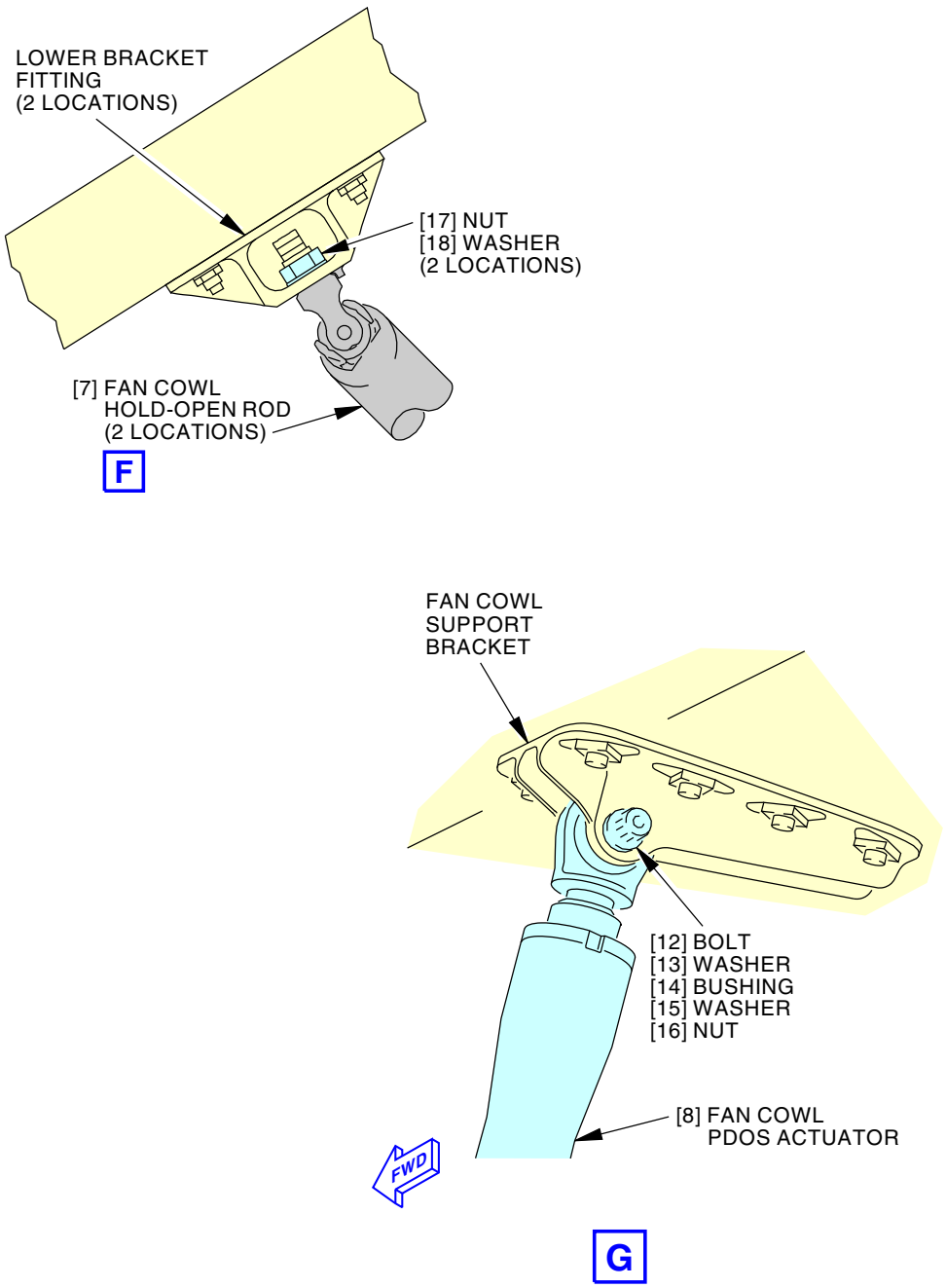

M06663 S0004285698_V2

Fan Cowl Panel Installation
Figure 401/71-11-04-990-812-H00 (Sheet 3 of 3)

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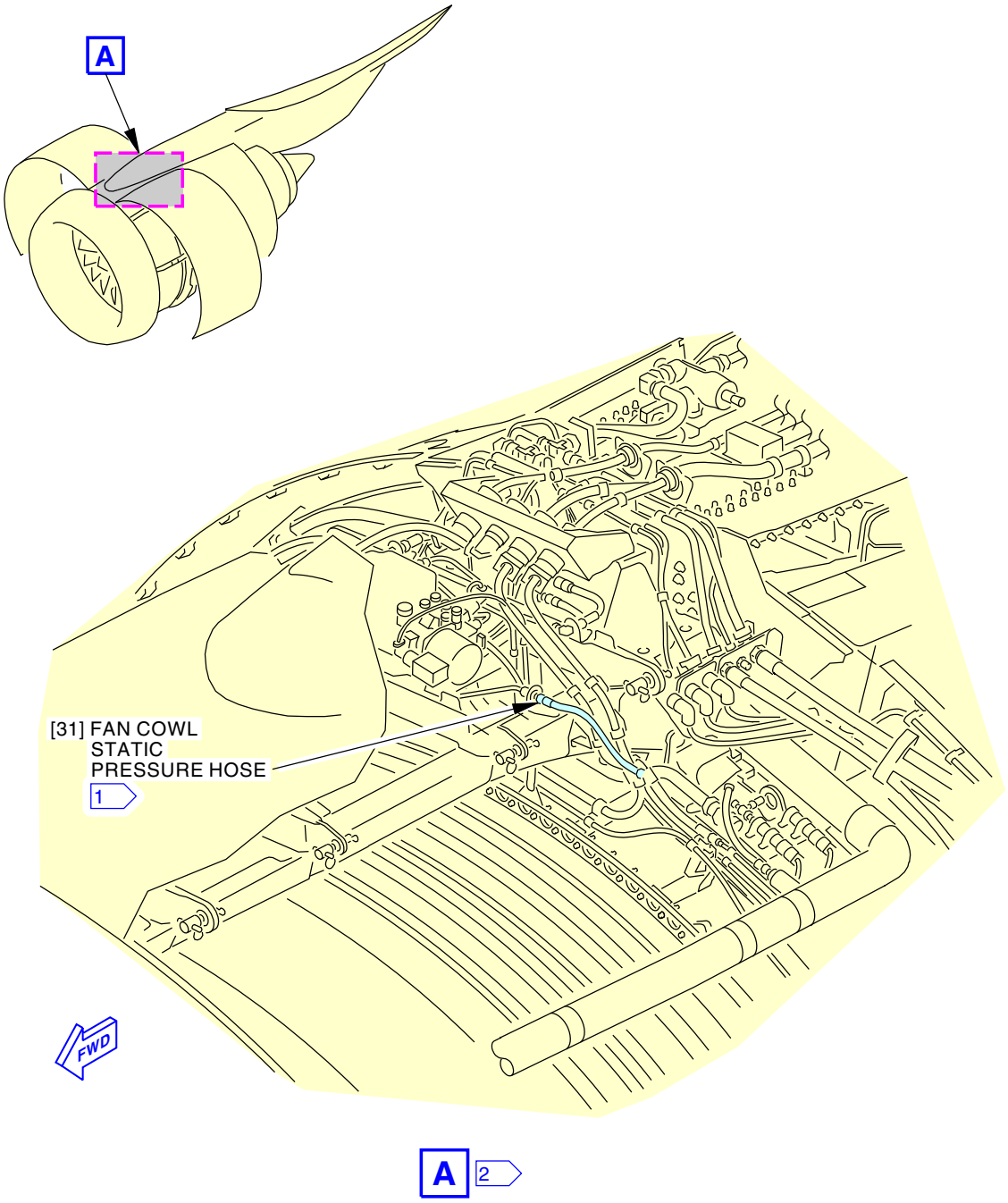

1 LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME.
2 FAN COWL PANELS AND FAIRINGS ARE NOT SHOWN.

M06664 S0004285699_V2

Fan Cowl Static Pressure Hoses Installation
Figure 402/71-11-04-990-813-H00

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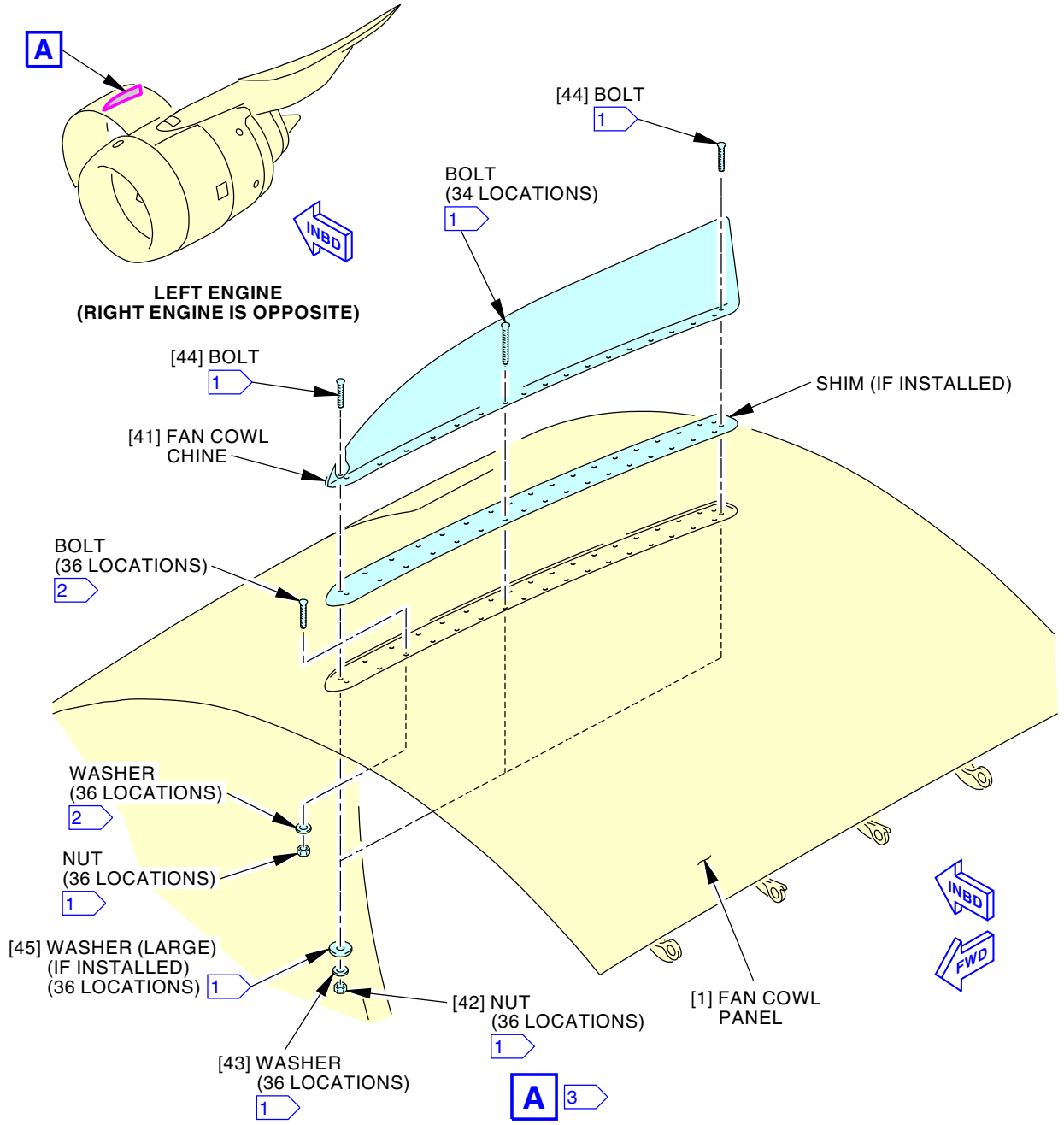

1 INSTALL BOLTS [44] IF FAN COWL CHINE IS INSTALLED

2 FASTENERS ARE DIFFERENT FROM FAN COWL CHINE FASTENERS

3 LEFT AND RIGHT SIDE INSTALLATIONS ARE THE SAME

M06665 S0004285700_V2

Fan Cowl Chine Provision Installation
Figure 403/71-11-04-990-814-H00

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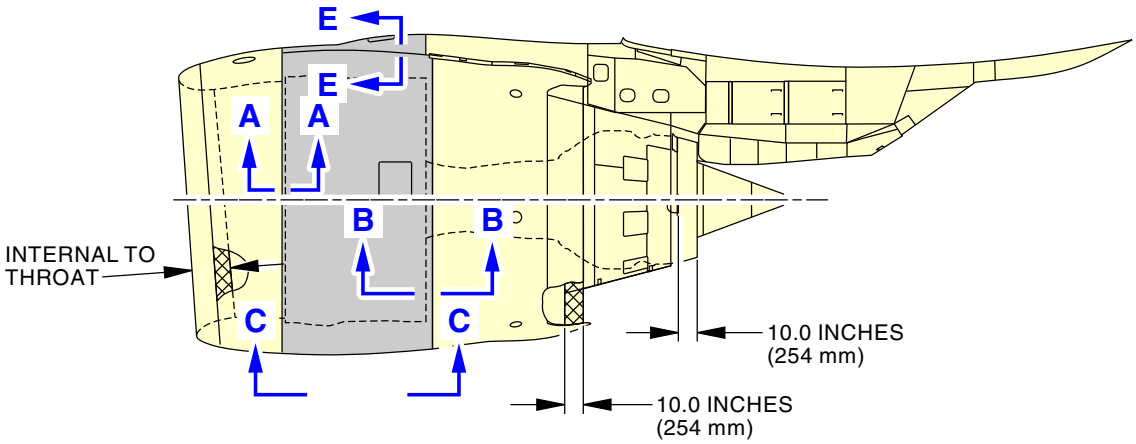

1 AIRFLOW ⇨ AIRFLOW ⇨

+ POSITIVE STEP - NEGATIVE STEP

2 AVERAGE FAIR IS CALCULATED FROM THE MEASURED READINGS USING THE FOLLOWING FORMULA:

$$\frac{\text{(SUM OF POSITIVE STEPS)+(-1.0 x SUM OF NEGATIVE STEPS)}}{\text{TOTAL NUMBER OF READINGS}}$$

3 AVERAGE GAP IS CALCULATED FROM THE MEASURED READINGS USING THE FOLLOWING FORMULA:

$$\frac{\text{SUM OF GAP MEASUREMENTS}}{\text{TOTAL NUMBER OF READINGS}}$$

M06617 S0004285651_V2

Fan Cowl Panel Aerodynamic Smoothness Limits
Figure 404/71-11-04-990-807-H01 (Sheet 1 of 3)

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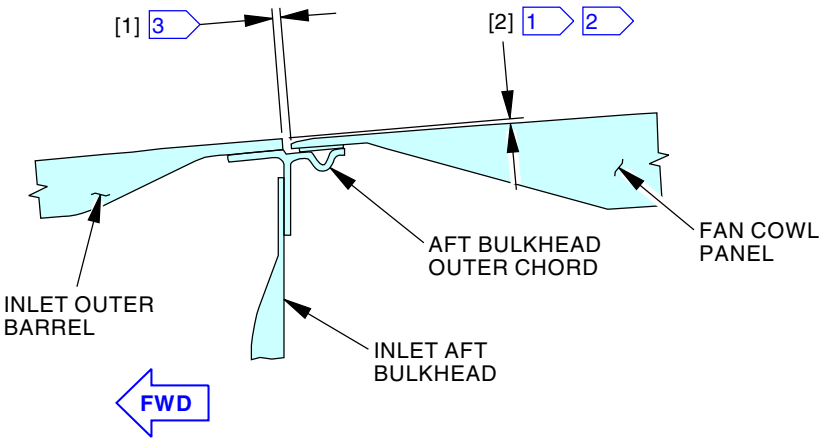
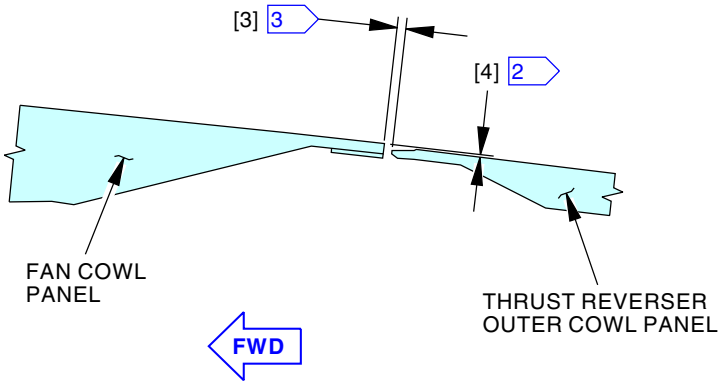


(VIEW IN THE UP DIRECTION)

A-A



(VIEW IN THE UP DIRECTION)

B-B

M06618 S0004285652_V2

Fan Cowl Panel Aerodynamic Smoothness Limits
Figure 404/71-11-04-990-807-H01 (Sheet 2 of 3)

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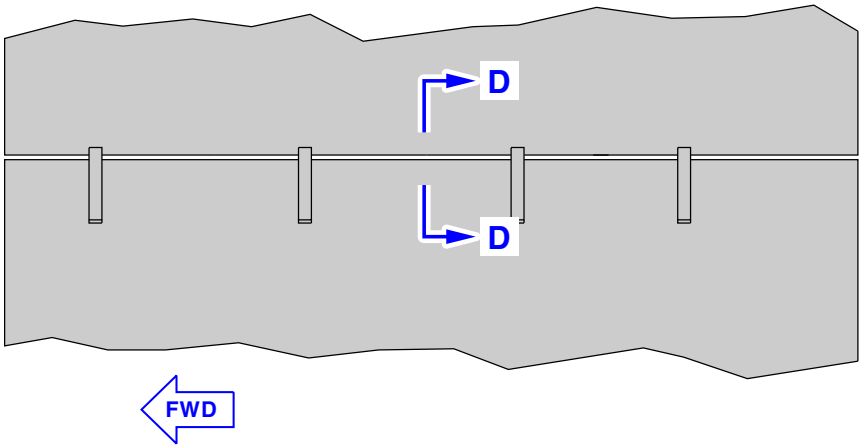
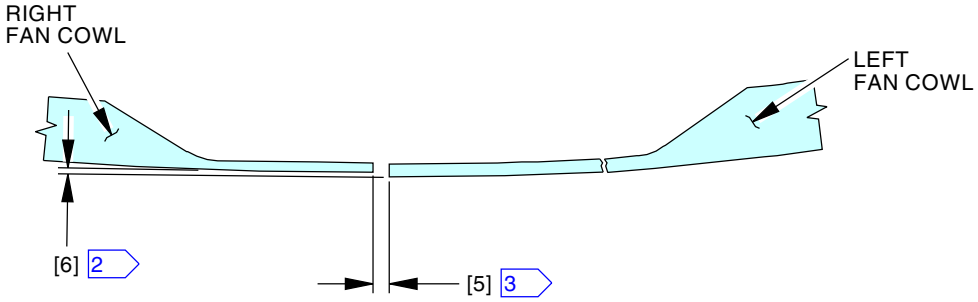


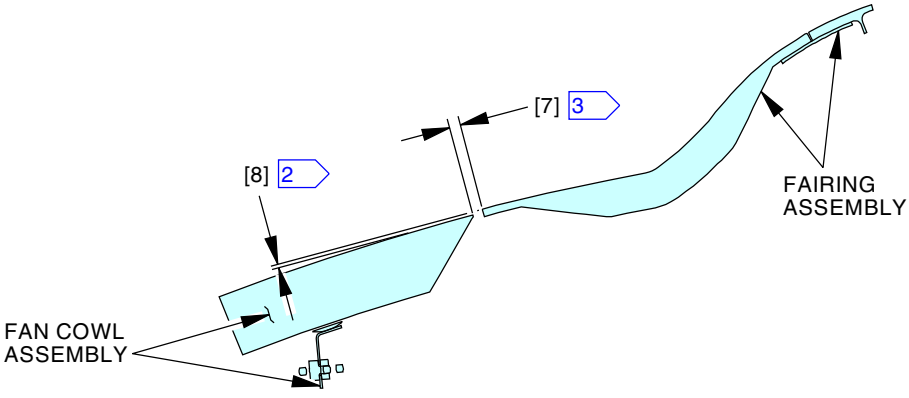
(VIEW IN THE UP DIRECTION)

C-C



(VIEW IN THE AFT DIRECTION)

D-D



(VIEW IN THE FORWARD DIRECTION)

E-E

M06619 S0004285653_V2

Fan Cowl Panel Aerodynamic Smoothness Limits
Figure 404/71-11-04-990-807-H01 (Sheet 3 of 3)

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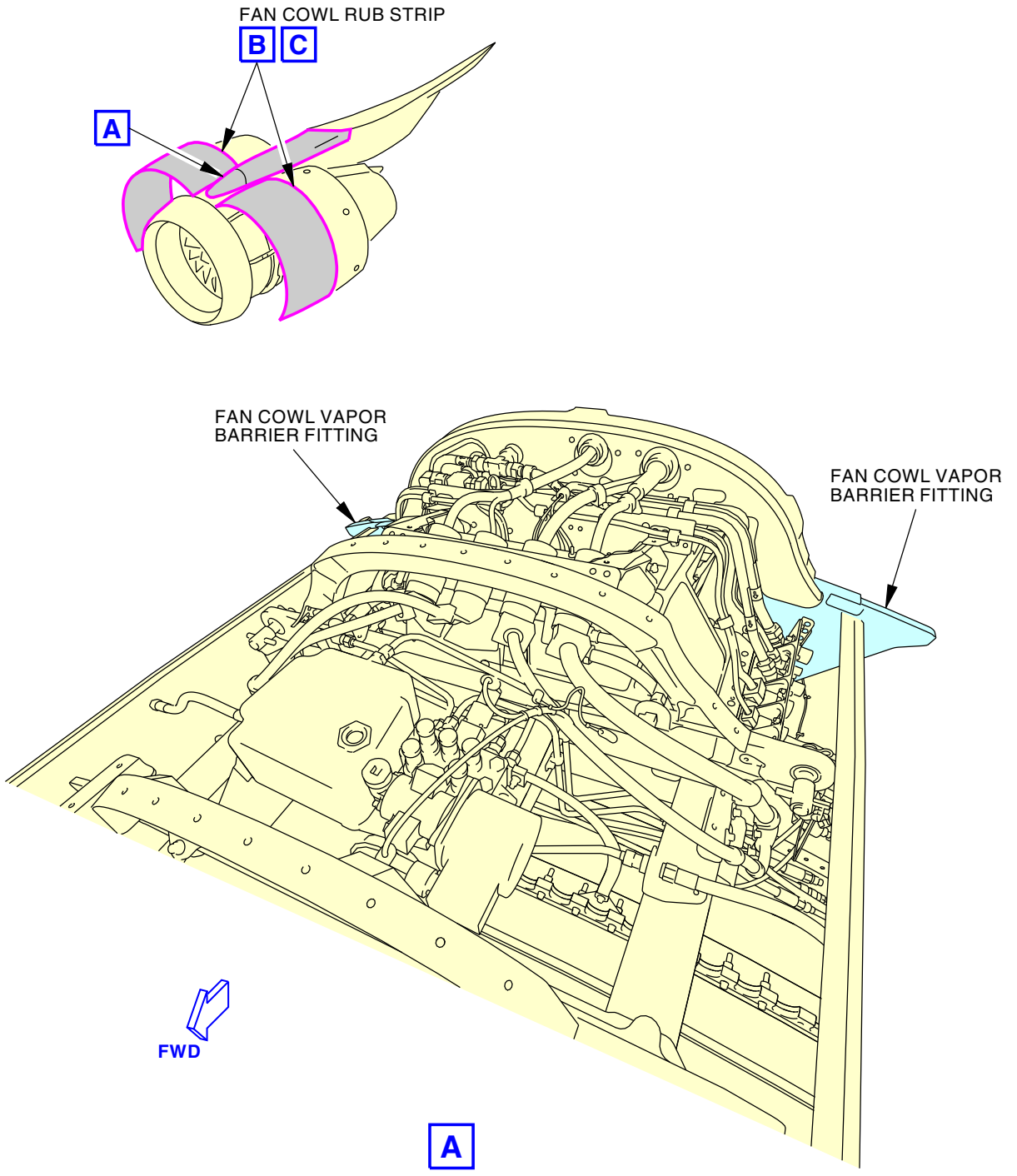

Fan Cowl Panel Inspection
Figure 405/71-11-04-990-808-H00 (Sheet 1 of 2)

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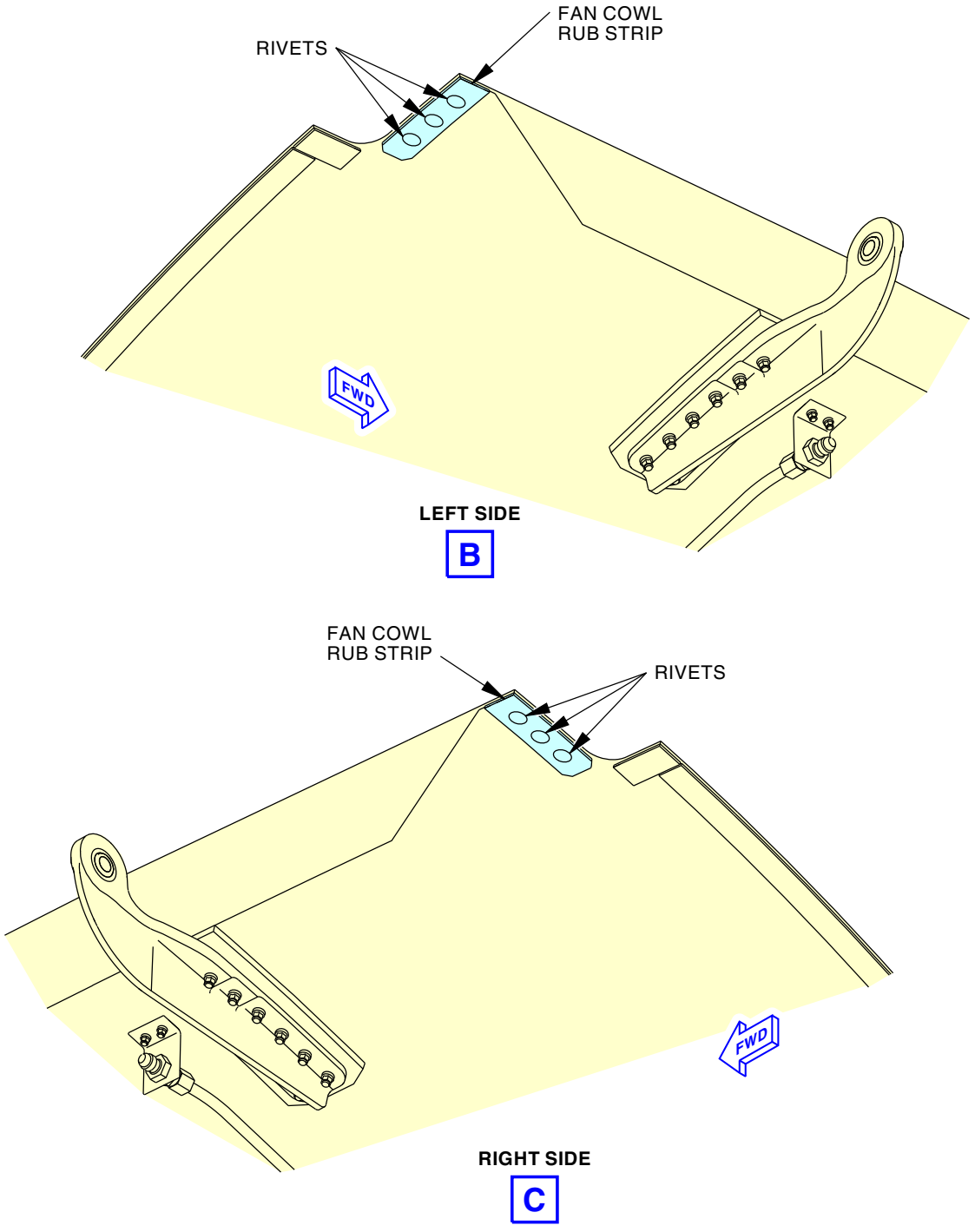

2347225 S0000533281_V2

Fan Cowl Panel Inspection
Figure 405/71-11-04-990-808-H00 (Sheet 2 of 2)

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TASK 71-11-04-400-805-H01

3. Fan Cowl Panels Installation

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

A. General

(1) To install the fan cowl panels, you must do these steps:

(a) You will need a special fan cowl sling, SPL-777 and a hoist, STD-467 to do this task.

(b) Install the fan cowl panel.

(c) Do the check of the fan cowl latches adjustment.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-00-800-801-H01	Engine Cowling Adjustment (P/B 201)
71-11-02-000-801-H01	Fan Cowl Chine Removal (P/B 401)
71-11-02-400-801-H01	Fan Cowl Chine Installation (P/B 401)
71-11-04-400-804-H01	Close the Fan Cowl Panel (Sling Method) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)

C. Tools/Equipment

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

Reference	Description
SPL-777	Sling - Fan Cowl Part #: J71004-9 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
D00014	Grease - Molybdenum Disulfide, Low & High Temperature	MIL-G-21164 (NATO G-353)
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3
G02185	Agent - Peelable Parting (Valspar - 4A-183 Green Strippable Coating)Manufacturing discontinued, use stock until depleted	
G50365	Agent - Peelable Parting (AC Products - AC962-73C) Production discontinued, use stock until depleted.	BAC5000

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(Continued)

Reference	Description	Specification
G50367	Agent - Peelable Parting (Aztec Chemical AZ 634-2)	MIL-PRF-6799, BAC5000
G50368	Agent - Peelable Parting (Rexco Chemical Company - Partall Coverall Film)	BAC5000
G50369	Coating - Alkaline Removable, Water Resistant	BMS15-12 Type I Class 1

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl panel	54-20-10-04-010	ARO ALL
19	Nipple	71-12-01-02A-040	ARO ALL

F. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

G. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

H. Fan Cowl Panels Installation

SUBTASK 71-11-04-020-005-H01

(1) If it is necessary, remove the fan cowl chine [41]:

NOTE: A fan cowl chine must be installed on an inboard fan cowl panel and not installed on an outboard fan cowl panel.

(a) Do this task: Fan Cowl Chine Removal, TASK 71-11-02-000-801-H01.

(b) Clean the surface of the fan cowl panel [1] under fan cowl chine [41].

NOTE: Do not damage the finish on the fan cowl panel.

(c) Apply one of the parting agents that follow, to the countersink surface on the fan cowl panel [1].

1) Rexco Partall Coverall Film peelable parting agent, G50368
2) temporary coating, G50369
3) AZ 634-2 peelable parting agent, G50367
4) AC962-73C peelable parting agent, G50365
5) Valspar 4A-183 green strippable coating, G02185

(d) Apply the sealant, A00436 to the flat head bolts [44] and the chine bolt holes (36 locations) in the fan cowl panel [1].

(e) Install the flat head bolts [44], washers (large) [45], washers [43], and the nuts [42] in the bolt holes on the fan cowl panel for the fan cowl chine.

NOTE: Get the flat head bolts, washers, and the nuts from the removed fan cowl panel.

(f) Tighten the nuts [42] to 20-30 pound-inches (2.3-3.4 Newton-meters).

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SUBTASK 71-11-04-420-001-H01

CAUTION

INSTALL THE CHINE ONLY ON THE INBOARD SIDE OF THE FAN COWL PANEL. THE INCORRECT INSTALLATION OF THE FAN COWL CHINE CAN CAUSE UNSATISFACTORY AIRPLANE PERFORMANCE.

(2) If it is necessary, install the fan cowl chine [41]:

NOTE: A fan cowl chine [41] must be installed on the inboard fan cowl panel.

(a) Remove the flat head bolts [44], washers (large) [45], washers [43], and the nuts [42] from the fan cowl chine bolt holes (36 locations).

(b) Do this task: Fan Cowl Chine Installation, TASK 71-11-02-400-801-H01

SUBTASK 71-11-04-020-006-H01

(3) If the replacement fan cowl panel does not have the hold-open rods [7] and the fan cowl PDOS actuator [8], do these steps:

(a) Remove the forward and aft fan cowl hold-open rods [7] from the removed fan cowl panel and install them on the replacement fan cowl panel [1].

1) Remove the nuts [17] and the washers [18] that attach the hold-open rods [7] to the fan cowl panel [1].

2) Move the forward and aft fan cowl hold-open rods [7] to the replacement fan cowl panel [1].

3) Put the hold-open rods [7] in their position on the replacement fan cowl panel [1].

4) Install the nuts [17] and the washers [18] that attach the hold-open rods [7] to the replacement fan cowl panel [1].

5) Tighten the nuts [17] to 160-240 pound-inches (18.1-27.1 Newton-meters).

6) Attach the hold-open rods [7] to the stow brackets of the replacement fan cowl panel [1].

(b) Remove the fan cowl PDOS actuator [8] from the removed fan cowl panel and install to the replacement fan cowl panel [1].

1) Remove the bolt [12], washer [13], bushing [14], washer [15], and nut [16] that attach the fan cowl PDOS actuator [8] to the replacement fan cowl panel [1].

2) Move the fan cowl PDOS actuator [8] from the removed fan cowl panel to the replacement fan cowl panel [1].

3) Put the fan cowl PDOS actuator [8] in its position on the replacement fan cowl panel [1].

a) Make sure that the PDOS hydraulic nipple [19] faces aft.

4) Install the bolt [12], washer [13], bushing [14], washer [15], and nut [16] that attach the fan cowl PDOS actuator [8] to the replacement fan cowl panel [1].

5) Attach the fan cowl PDOS actuator [8] to the stow brackets of the replacement fan cowl panel [1].

SUBTASK 71-11-04-490-005-H01

(4) If the fan cowl sling, SPL-777 is not attached to the fan cowl panel [1], attach the fan cowl sling, SPL-777 as follows:

(a) Remove the plugs [5] (3 locations) from fan cowl panel [1].

1) Keep the plugs [5].

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(b) Install the hoist pins [3] (3 locations) on the fan cowl panel [1].

(c) Engage the hoist, STD-467 with the sling hoist plate.

(d) Attach the master link to a hoist, STD-467.

(e) Attach a Load Cell, STD-1144, to the master link.

(f) Attach the sling link to the Load Cell, STD-1144.

(g) Put the hoist, STD-467 and the fan cowl sling, SPL-777 above the fan cowl panel [1].

(h) Make sure that the sling link does not touch the surface of the fan cowl.

(i) Set the Load Cell, STD-1144, to zero.

(j) Make sure that the fan cowl sling, SPL-777 does not touch the surface of the fan cowl panel [1].

1) Make sure that the weight of the fan cowl is not on the two sling straps [2].

WARNING

MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

2) At the load cell, the maximum total weight to apply is 275 pounds (125 kilograms).

(k) Adjust the hoist, STD-467 to hold the weight of the fan cowl panel.

(l) Attach the sling strap [2] to the fan cowl panel [1].

SUBTASK 71-11-04-420-002-H01

(5) Install the fan cowl panel [1] on the applicable engine, do these steps:

(a) If installed, remove the quick-release pins [4] from the hinges on the fan cowl support beam and permit them to hang by their lanyards.

(b) Install a rope - 12 ft (3.6 m) minimum, STD-748 on the latch or keeper assembly.

NOTE: Use the rope - 12 ft (3.6 m) minimum, STD-748, so the fan cowl panel does not turn while the fan cowl panel is lifted.

WARNING

MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(c) At the load cell, the maximum total weight to apply is 275 pounds (125 kilograms).

(d) Use the hoist, STD-467, and the fan cowl sling, SPL-777, to lift the fan cowl panel [1] off the ground handling dolly.

CAUTION

IF THE THRUST REVERSER IS OPEN, MAKE SURE THE FAN COWL PANEL DOES NOT CATCH ON THE THRUST REVERSER V-BAND LATCH HANDLE OR DAMAGE TO THE FAN COWL PANEL CAN OCCUR.

(e) Adjust the sling strap [2] until the fan cowl panel [1] hangs at 40 degrees (open position).

(f) Put the fan cowl panel [1] on the fan cowl support beam with the hinge fitting aligned.

(g) Install the undersize pins from the sling tool on the first and the fourth hinge assemblies.

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(h) Apply the grease, D00014 to the quick-release pins [4].

(i) Install and lock the quick-release pins [4] through the second and the third hinge assemblies.

NOTE: Quick disconnect pins [4] can be installed from either directions.

1) Make sure that you insert the safety pin through hole in the end of quick release pin after quick release pin is installed.

(j) Remove the undersize pins from the first and the last hinge assemblies.

(k) Install and lock the quick-release pins [4] through the first and the fourth hinge assemblies.

(l) Connect the forward and aft fan cowl hold-open rods [7] to the fan case bracket assemblies:

1) Align the fan cowl hold-open rods [7] ends with the fan case bracket bushings.

2) Install the quick-release pin [11].

(m) Connect the fan cowl PDOS actuator [8] as follows:

1) Align the fan cowl PDOS actuator [8] in the fan case bracket assembly.

2) Make sure the nipple [19] and the packing [20] are installed on the fan cowl PDOS actuator [8] fitting.

3) Connect the PDOS hydraulic hose [9] to the lower end quick disconnect of the fan cowl PDOS actuator [8].

NOTE: If it is necessary, use PDOS switch to extend or retract the fan cowl PDOS actuator for the alignment. Do not extend the fan cowl PDOS actuator unless the PDOS hydraulic hose is connected to prevent air from being drawn into the actuator.

4) Install the quick-release pin [10].

(n) Remove the rope - 12 ft (3.6 m) minimum, STD-748 from the latch or keeper assembly.

SUBTASK 71-11-04-430-001-H01

(6) Connect the fan cowl static pressure sense hose [31] to the static port at the fan cowl support beam.

(a) Tighten the fan cowl static pressure sense hose [31] fitting to 162-178 pound-inches (18.3-20.1 Newton-meters).

SUBTASK 71-11-04-490-006-H01

(7) Remove the fan cowl sling, SPL-777:

(a) Remove the fan cowl sling, SPL-777, from the three hoist pins [3].

(b) Make sure that the fan cowl sling, SPL-777. does not touch the surface of the fan cowl [1].

(c) Use the hoist, STD-467, to move the fan cowl sling, SPL-777, away from the fan cowl [1].

(d) Lower the hoist, STD-467 until there is no load on the fan cowl sling, SPL-777.

(e) Close the fan cowl panel [1] with the fan cowl sling, SPL-777 attached (TASK 71-11-04-400-804-H01).

(f) Disconnect the sling strap [2] from the fan cowl panel [1].

(g) Remove the sling hoist plate from the hoist, STD-467.

(h) Remove the hoist pins [3] (3 locations) from the fan cowl panel [1].

(i) Apply the sealant, A00436 on the plugs [5].

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(j) Install and tighten the plugs [5] (3 locations) on the fan cowl panel [1] until they are flush with the fan cowl panel [1] surface.

I. Fan Cowl Panels Test

SUBTASK 71-11-04-410-005-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-04-612-002-H01

CAUTION MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(2) Do a check of the oil level in the PDOS pump and fill with oil, D00071 or oil, D00068 if the oil level is low (TASK 12-12-02-610-803-004).

SUBTASK 71-11-04-870-001-H01

CAUTION MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

(3) Cycle the fan cowl panel [1] a minimum of three times to make sure all the air is removed from the system.

(a) Use the fan cowl PDOS switches to cycle the fan cowl panels.

(b) Do a visual check for leakage from the PDOS system.

SUBTASK 71-11-04-210-001-H01

(4) Do a check of the fan cowl latches adjustment and adjust them if it is necessary (TASK 71-11-05-800-801-H01).

SUBTASK 71-11-04-211-001-H01

(5) Do a check of the fan cowl panel aerodynamic smoothness and adjust them if it is necessary (TASK 71-11-00-800-801-H01)(Figure 404).

Table 401/71-11-04-993-801-H01 Aerodynamic Smoothness Limits

AERODYNAMIC SMOOTHNESS LIMITS - KEY TO FIGURE 404 ALL DIMENSIONS GIVEN IN INCHES (MILLIMETERS)					
AIRPLANE EFFECTIVITY	ITEM NO.	SHEET (DETAIL)	UPPER LIMIT	LOWER LIMIT	AVERAGE MAXIMUM
ALL	1	2 (A-A)	0.280 (7.112)	0.020 (0.508)	0.200 (5.080)
ALL	2	2 (A-A)	0.140 (3.556)	-0.090 (-2.286)	0.050 (1.270)

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Table 401/71-11-04-993-801-H01 Aerodynamic Smoothness Limits (Continued)

AERODYNAMIC SMOOTHNESS LIMITS - KEY TO FIGURE 404 ALL DIMENSIONS GIVEN IN INCHES (MILLIMETERS)					
ALL	3	2 (B-B)	0.350 (8.890)	0.040 (1.016)	0.250 (6.350)
ALL	4	2 (B-B)	0.120 (3.048)	-0.120 (-3.048)	0.035 (0.889)
ALL	5	3 (D-D)	0.350 (8.890)	0.180 (4.572)	----
ALL	6	3 (D-D)	0.090 (2.286)	-0.090 (-2.286)	----
ALL	7	3 (E-E)	0.440 (11.176)	0.260 (6.604)	----
ALL	8	3 (E-E)	0.090 (2.286)	-0.090 (-2.286)	----

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-440-006-H01

(1) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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FAN COWL PANELS - ENGINE FAN COWL UPPER EDGE AND INNER SURFACE INSPECTION

1. General

A. This procedure contains:

(1) The fan cowl upper edge inspection for cracked or missing potting.

(2) The fan cowl bag side inspection for signs of staining or discoloration.

(3) The inspection procedure for the fan cowl facesheet at stained or discolored areas.

B. These procedures only apply to areas of 3M 5004 tape removed in SUBTASK 71-11-04-300-005-H00.

ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4

TASK 71-11-04-200-801-H00

2. Fan Cowl Upper Edge General Visual Inspection

(Figure 601)

A. General

(1) This task gives the steps to clean the upper edge and inspect for cracked or missing potting at areas of removed 3M 5004 tape.

B. References

Reference	Title
SOPM 20-30-03	General Cleaning Procedures

C. Consumable Materials

Reference	Description	Specification
A50489	Compound - Honeycomb Edge Filling & Potting	BMS5-28 Type 26 Class 2
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B50073	Alcohol - Isopropyl	ASTM D 770
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
G02418	Water - De-ionized	
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Upper Edge Inspection/Check

SUBTASK 71-11-04-200-003-H00

(1) Clean exposed upper edge of the fan cowl to make sure there are no in-service contaminants as follows:

(a) Spray solvent, B50305, solvent, B00148 or alcohol, B50073 to the surfaces.

NOTE: The surface must not dry.

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ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4 (Continued)

1) Keep surface wet with solvent, B50305, solvent, B00148 or alcohol, B50073. Do “Solvent Cleaning (Final Cleaning)”, per SOPM 20-30-03.

(b) Rinse with de-ionized water, G02418 and check to make sure that the surface is clean.

1) Repeat (1) (a) and (1) (b), as necessary to achieve a clean surface.

(2) Abrade the exposed upper edge of the fan cowl (Figure 601).

(a) Abrade off all surface coatings from the upper fan cowl edge until potting compound, A50489 appears.

(b) Use sandpaper 320 grit or finer abrasive paper, G50078 to remove the surface coatings.

(3) Do a general visual inspection of the upper edge of the fan cowl compound, A50489, for cracked or missing potting.

——— END OF TASK ———

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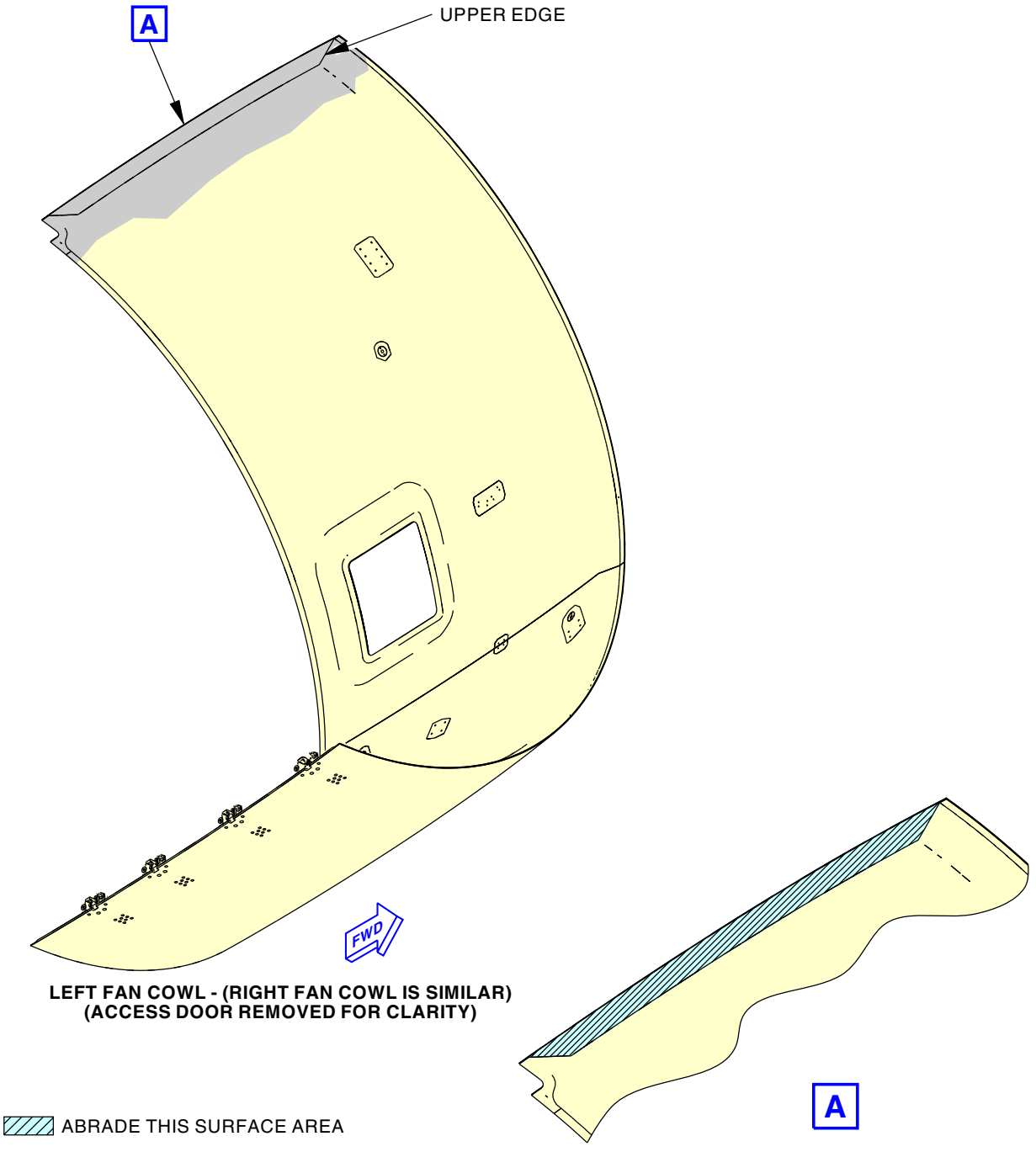

LEFT FAN COWL - (RIGHT FAN COWL IS SIMILAR)
(ACCESS DOOR REMOVED FOR CLARITY)

2793070 S0000635698_V2

Fan Cowl Upper Edge General Visual Inspection
Figure 601/71-11-04-990-815-H00

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076

TASK 71-11-04-200-802-H00

3. Fan Cowl Bag Side General Visual Inspection

A. General

(1) This task gives the steps to clean the fan cowl bag side and inspect for stains or discoloration at areas of removed 3M 5004 tape.

B. References

Reference	Title
SOPM 20-30-03	General Cleaning Procedures

C. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B50073	Alcohol - Isopropyl	ASTM D 770
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
C50323	Primer - Nonchromated Primer For Composites	BMS10-103 Type I Grade A
G02418	Water - De-ionized	
G51219	Abrasive - Non-Silicone Based, 180 Grit (Non-Stearated)	
G51294	Cloth - 100% Synthetic or Blended Synthetic, Cotton or Cellulose Material	AMS3819 Class 2 Grade A

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Bag Side Inspection/Check

SUBTASK 71-11-04-100-002-H00

(1) Clean the exposed inner surface of the fan cowl to make sure that there are no contaminates as follows:

(a) Spray apply solvent, B50305, alcohol, B50073 or solvent, B00148 to surfaces. Do “Solvent Cleaning (Final Cleaning)”, per SOPM 20-30-03.

(b) Do not allow to dry, keep surface wet with solvent, B50305, alcohol, B50073 or solvent, B00148.

(c) Rinse with de-ionized water, G02418 and make sure that surface is clean.

1) Repeat 1.(a), and 1.(b), as necessary to achieve a clean surface.

(2) Sand the exposed inner surface with 180 grit abrasive paper, G51219 or finer.

(a) Lightly abrade the exposed inner surface of the fan cowl, to remove primer, C50323.

NOTE: Be careful to not damage the composite structure.

(3) Remove sanding residue, then use a cloth, G51294 to lightly wipe surface.

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(4) Do a general visual inspection of the exposed inner surface of the fan cowl for stains or discoloration.

——— END OF TASK ———

TASK 71-11-04-200-803-H00

4. Fan Cowl Facesheet Staining Inspection

A. General

(1) This task contains the inspection procedure for the fan cowl facesheet at stained or discolored areas identified in TASK 71-11-04-200-802-H00.

B. References

Reference	Title
NDT Part 4, 51-00-01	Bondline/Disbond Delamination Inspection in Metal Bonded Parts and Non-metal Laminates
NDT Part 4, 51-00-05	Bondtest Inspection of Honeycomb Structure and Metal-To-Metal Skin Structure
SOPM 20-30-03	General Cleaning Procedures
SRM 51-70-04	Structural Repair Manual

C. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B50073	Alcohol - Isopropyl	ASTM D 770
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
G02418	Water - De-ionized	

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Fan Cowl Facesheet Staining Inspection/Check

SUBTASK 71-11-04-200-004-H00

(1) Do a Bondtest Non-Destructive Inspection (NDI) inside and 6 in. (15.24 cm) around any stained or discoloration areas for delaminations or disbonds (Refer to NDT Part 4, 51-00-01 and NDT Part 4, 51-00-05).

(a) If no delaminations or disbonds found:

1) Wipe any stained or discolored areas with a clean cloth to determine if it is caused by water or oil.

NOTE: Oil will leave a yellow or brown residue on the cloth and will have a strong oil smell. Water will leave no residue on the cloth and have no smell.

a) If there is any staining or discoloration caused by the water:

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

<1> Dry the stained or discolored area for 24 hours at a temperature between 180°F (82°C) and 190°F (88°C) under a vacuum bag (Refer to SRM 51-70-04).

NOTE: To protect the as-installed 3M 5004 tape, G51237 and sealant, use insulation to minimize the heat exposure to 3M 5004 tape, G51237 and sealant. Do not allow 3M 5004 tape, G51237 and sealant to reach above 180°F (82°C).

<2> Do a general visual of the inner surface of the fan cowl for stains or discoloration.

<a> If stains or discoloration are removed, no further action is necessary.

<b> If stains or discoloration are not removed, contact Boeing for repair instructions and do the repair.

b) If there are any stains or discoloration caused by oil:

<1> Clean the inner surface of the fan cowl to make sure there are no in-service contaminates as follows:

<a> Spray solvent, B50305, alcohol, B50073 or solvent, B00148 on the surfaces.

NOTE: The surface must not dry.

<b> Keep surface wet with solvent, B50305, alcohol, B50073 or solvent, B00148. Do “Solvent Cleaning (Final Cleaning)”, per SOPM 20-30-03.

<c> Rinse surface with de-ionized water, G02418.

<2> Do a general visual inspection surface of the fan cowl for stains or discoloration:

<a> If stains or discoloration are removed, no further action is necessary.

<b> If stains or discoloration are not removed, contact Boeing for repair instructions and do the repair.

(b) If delaminations or disbonds found:

1) Contact Boeing for repair instructions and do the repair.

——— END OF TASK ———

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FAN COWL PANELS - ENGINE FAN COWL UPPER EDGE AND INNER SURFACE 3M 5004 TAPE REPAIR

1. General

A. This procedure inspects and addresses any 3M 5004 tape defects (tears, wrinkles and bubbles) at the upper edge and bag side of the engine fan cowl panels.

NOTE: This procedure only allows defected repair up to 24” by 81” per repair. Otherwise, contact Boeing.

B. 3M 5004 tape is only applied on the fan cowl upper edge for SB 777-71-0076 R0 or SB 777-71-0076 R1 Work Package 3 or 4.

C. 3M 5004 tape is only applied on the fan cowl at the bag side for SB 777-71-0073 R3 or SB 777-71-0076.

ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076

TASK 71-11-04-300-801-H00

2. 3M 5004 Tape Repair at Engine Fan Cowl Panel Upper Edge and Bag side

(Figure 801)

A. General

(1) This task is to remove any 3M 5004 tape, G51237 defects (tears, wrinkles, and bubbles) and apply new 3M 5004 tape, G51237, over exposed areas at the upper edge and bag side of the engine fan cowl panels.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
51-24-10-370-802	BMS10-103 Primer Application (P/B 701)
71-11-04-000-805-H01	Fan Cowl Panels Removal (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-200-801-H00	Fan Cowl Upper Edge General Visual Inspection (P/B 601)
71-11-04-200-802-H00	Fan Cowl Bag Side General Visual Inspection (P/B 601)
71-11-04-200-803-H00	Fan Cowl Facesheet Staining Inspection (P/B 601)
71-11-04-400-805-H01	Fan Cowl Panels Installation (P/B 401)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
NDT Part 2, 51-00-01	X-Ray Inspection for Water in Honeycomb Structure
NDT Part 4, 51-00-01	Bondline/Disbond Delamination Inspection in Metal Bonded Parts and Non-metal Laminates
NDT Part 4, 51-00-05	Bondtest Inspection of Honeycomb Structure and Metal-To-Metal Skin Structure
NDT Part 9, 51-00-01	Inspection for Ice or Water in Honeycomb Parts
SOPM 20-30-03	General Cleaning Procedures
SRM 54-23-01	Structural Repair Manual

C. Tools/Equipment

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

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

Reference	Description
COM-14122	Squeegee, Tape Applicator (Composites) Part #: PA1-B Supplier: 28112
STD-4118	Straightedge
STD-7049	Marker

D. Consumable Materials

Reference	Description	Specification
A50326	Adhesive - Modified Epoxy For General Purpose Use	BMS5-92 Type I Class 4
A50489	Compound - Honeycomb Edge Filling & Potting	BMS5-28 Type 26 Class 2
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
C50323	Primer - Nonchromated Primer For Composites	BMS10-103 Type I Grade A
G00291	Tape - Aluminum Foil, Scotch 425	AMS-T-23397 / L-T-80
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	
G50737	Tape - Aluminum Foil Tape with Easy-Release Liner, Scotch 427	
G51237	Tape - 3M 5004 Paint Replacement Tape	

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

G. Prepare for Removal

SUBTASK 71-11-04-860-011-H00

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-04-040-008-H00

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

SUBTASK 71-11-04-010-010-H00

WARNING

MAKE SURE THAT THE HOLD-OPEN RODS ARE FULLY EXTENDED AND LOCKED WHEN THE FAN COWL PANEL IS OPEN. THE HOLD-OPEN RODS ARE NOT LOCKED IF YOU SEE THE RED STRIPE WITH THE WORD "UNLOCKED" ON THE LOCK COLLAR. IF THE RODS ARE NOT LOCKED, THE FAN COWL PANEL CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) For the left and right fan cowl panels on the applicable engine, do this task: Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

H. Fan Cowl Panel Removal - If Necessary

SUBTASK 71-11-04-000-001-H00

(1) If necessary, do this task: Fan Cowl Panels Removal, TASK 71-11-04-000-805-H01.

I. Fan Cowl Tape General Visual Inspection

SUBTASK 71-11-04-210-016-H00

(1) Do a visual inspection of the upper edge and bag side tape application.

(a) Look for 3M 5004 tape, G51237 defects (tears, wrinkles and bubbles) at exposed area around upper edge and bag side.

J. Fan Cowl 3M5004 Tape Wrinkle Repair Procedure

SUBTASK 71-11-04-300-003-H00

(1) For 3M 5004 tape, G51237 wrinkles at upper edge and bag side, perform one of the following three options within 10 days of the inspection finding:

NOTE: This procedure applies if there are no bubbles in the 3M 5004 tape, G51237.

(a) Option 1 - Smooth out the wrinkle with a squeegee, COM-14122 or straightedge, STD-4118.

(b) Option 2 - Remove and apply new 3M 5004 tape, G51237:

1) Use a marker, STD-7049 to make a trimline on the 3M 5004 tape, G51237:

a) Cut the 3M 5004 tape, G51237 at the trimline.

b) Remove the 3M 5004 tape, G51237.

c) Do these tasks to apply the new 3M 5004 tape, G51237 along the open area:

<1> Fan Cowl Upper Edge Tape Application, TASK 71-11-04-390-801-H00.

<2> Fan Cowl Bag Side Tape Application, TASK 71-11-04-390-802-H00.

(c) Option 3 - Keep wrinkles if there is no air caught in the 3M 5004 tape, G51237.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

K. Fan Cowl 3M5004 Tape Bubbling Repair Procedure

SUBTASK 71-11-04-300-004-H00

(1) For 3M 5004 tape, G51237 bubble repair at upper edge and bag side, perform the following within 10 days of the inspection finding:

(a) Decrease the bubble size by applying finger pressure around the perimeter of the bubble.

(b) Puncture the bubble at one end.

(c) Apply finger force at the opposite end to force the air out of the bubble.

(d) Repair the hole:

1) Apply adhesive, A50326 to seal the hole.

2) Set the fan cowl aside to cure for 30 minutes at ambient temperature. The fan cowl can be handled after 30 minutes.

NOTE: It is recommend, but not necessary, to wait for 24 hours for complete cure.

NOTE: If 3M 5004 tape, G51237 does not adhere, refer to the “Fan Cowl 3M5004 Tape Peeling, Tear, or Exposed Laminate Repair Procedure”. Any wrinkles should be treated as the “Fan Cowl 3M5004 Tape Wrinkle Repair Procedure”.

L. Fan Cowl 3M5004 Tape Peeling, Tear, or Exposed Area Repair Procedure

SUBTASK 71-11-04-300-005-H00

(1) For 3M 5004 tape, G51237 peeling, tear, or exposed area repair at upper edge and bag side:

(a) Remove peeled, torn, or irregular shape 3M 5004 tape, G51237 that show exposed potting or a laminate surface.

(b) Make cut out of 3M 5004 tape, G51237 into regular exposed surface shape.

1) Use a marker, STD-7049 to create a trimline on the 3M 5004 tape, G51237.

2) Cut the 3M 5004 tape, G51237 at the trimline.

3) Remove the 3M 5004 tape, G51237.

SUBTASK 71-11-04-200-001-H00

NOTE: The following step only applies if there is exposed potting.

(2) Carry out inspection on fan cowl upper edge, at the area of the removed tape. Do this task: Fan Cowl Upper Edge General Visual Inspection, TASK 71-11-04-200-801-H00.

(a) If no cracked or missing potting found, perform one of the following options:

1) Option 1 - Repair the 3M 5004 tape, G51237 per TASK 71-11-04-390-801-H00.

2) Option 2 - Apply Scotch 425 Aluminum Foil Tape, G00291/Scotch 427 Aluminum Foil Tape, G50737 or equivalent at areas of missing 3M 5004 tape, G51237. Repair the 3M 5004 tape, G51237 per TASK 71-11-04-390-801-H00 within 10 days of the initial inspection finding.

(b) If any cracked or missing potting is found:

1) Do a Thermographic Non-Destructive Inspection (NDI) or an X-Ray NDI from upper edge off the fan cowl to the chine attachment area (See hatched areas in Figure 801).

NOTE: Refer to NDT Part 9, 51-00-01 and NDT Part 2, 51-00-01 respectively.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

a) No fluid or ice found:

<1> Using 320 grit or finer abrasive paper, G50078, abrade the surface until the crack is removed with a taper ratio of 20:1.

<2> Fill the abraded potting area with compound, A50489 and cure.

<a> Refer to “Table 1 - Cure Procedure” at the end of this task.

<3> After cure, abrade the potting compound until flush.

b) Fluid or ice found:

<1> Do a Bondtest NDI at the areas where fluid or ice was found and record results.

NOTE: Refer to NDT Part 4, 51-00-01 and NDT Part 4, 51-00-05.

<2> Contact Boeing for repair instructions and do repair.

SUBTASK 71-11-04-200-002-H00

NOTE: The following step only applies if there is exposed laminate.

(3) Determine if the area of the removed tape defect is within the areas allowed to have fluid in SRM 54-23-01 Allowable Damage 2, Figure 102 or Figure 103.

(a) If the removed tape defect is within this area, perform the inspection & repair per step (4) within 10 days of the initial inspection finding.

(b) If the removed tape defect is not within this area, perform the inspection & repair per step (4) at this time.

(4) Carry out an inspection on fan cowl bag side, at the area of the removed tape defect. Do this task: Fan Cowl Bag Side General Visual Inspection, TASK 71-11-04-200-802-H00 for stains.

(a) If no stains or discoloration are found, no more action is necessary.

(b) If any stains or discoloration is found:

1) Do a Thermograhic NDI or an X-Ray NDI, inside and 6 in. (15.24 cm) around any staining or discoloration areas for fluid or ice.

NOTE: Refer to NDT Part 9, 51-00-01 and NDT Part 2, 51-00-01 respectively.

a) No fluid or ice found:

<1> Do this task: Fan Cowl Facesheet Staining Inspection, TASK 71-11-04-200-803-H00.

b) Fluid or ice found:

<1> Do a Bondtest NDI at the areas where fluid or ice was found and record results.

NOTE: Refer to NDT Part 4, 51-00-01 and NDT Part 4, 51-00-05.

<2> Contact Boeing for repair instructions and do repair.

SUBTASK 71-11-04-370-001-H00

(5) Apply primer, C50323 to the exposed fan cowl laminate surface.

(a) Clean inner surface using solvent, B50305. Do “Solvent Cleaning (Final Cleaning)”, per SOPM 20-30-03.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

(b) Apply two coats of primer, C50323 (Refer to BMS10-103 Primer Application, TASK 51-24-10-370-802).

(c) Allow surface to cure for two and a half hours at 180°F (82°C).

NOTE: Refer to BAC5325 when it's safe to handle the fan cowl after the primer, C50323 has been applied.

NOTE: To protect the as-installed 3M 5004 tape, G51237 and sealant, use insulation to minimize the heat exposure to 3M 5004 tape, G51237 and sealant. Do not allow 3M 5004 tape, G51237 and sealant to reach above 180°F (82°C).

(6) Apply new 3M 5004 tape, G51237 over the exposed area. Do these tasks:

(a) Fan Cowl Upper Edge Tape Application, TASK 71-11-04-390-801-H00.

(b) Fan Cowl Bag Side Tape Application, TASK 71-11-04-390-802-H00.

M. Cure Procedure

SUBTASK 71-11-04-340-001-H00

(1) Gel potting compounds at 75 ±10°F (24 ±6°C), before elevating the temperature to cure.

(2) Potting compounds shall be cured in accordance with the Table 1.

Table 1 - Cure Procedure

COMPOUND	MAXIMUM WORK LIFE TIME AT TEMP	MINIMUM INITIAL CURE	MINIMUM FULL CURE TIME AT TEMP
compound, A50489	1 hour at ambient temperature	4 hours at ambient temperature	7 days at ambient temperature. Cure may be staged by an initial cure for 8 hours at ambient temperature (or for 1.5 hours at 150°F (66°C)) then a full cure for 1.5 hours at 260°F (127°C) (or 1 hour at 350°F (177°C). If using an accelerated cure, either protect the as-installed 3M 5004 tape, G51237 or remove 3M 5004 tape, G51237 that will see temperatures above 180°F (82°C). To protect the as-installed 3M 5004 tape, G51237 and sealant, use insulation to minimize the heat exposure to 3M 5004 tape, G51237 and sealant. Do not allow 3M 5004 tape, G51237 and sealant to reach above 180°F (82°C). Make sure 3M 5004 tape, G51237 is not damaged.

(3) To achieve a cure sufficient to machine or sand, use initial cure conditions of Table 1.

(4) Before applying mechanical stress to the potting compound, it shall undergo a full cure as given in Table 1.

(5) Initial cure time may be considered as part of the full cure time.

N. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-410-007-H00

(1) Install the left and right fan cowl panels on the applicable engine, do this task: Fan Cowl Panels Installation, TASK 71-11-04-400-805-H01.

SUBTASK 71-11-04-410-008-H00

(2) Close the left and right fan cowl panels on the applicable engine, do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-04-440-007-H00

(3) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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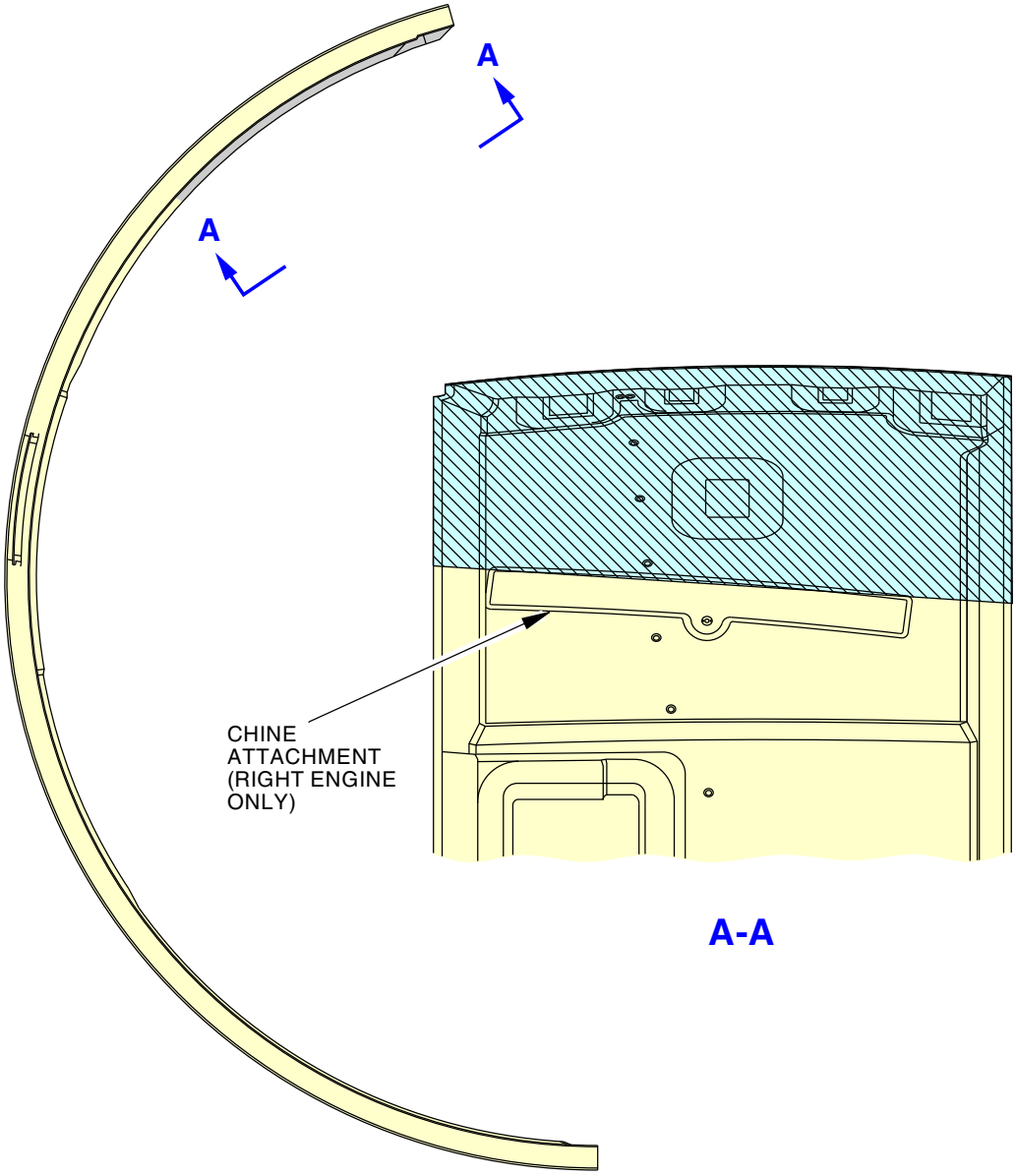

LEFT FAN COWL

2791547 S0000634812_V1

Fan Cowl Upper Edge to Chine Attachment Area Inspection
Figure 801/71-11-04-990-824-H00 (Sheet 1 of 2)

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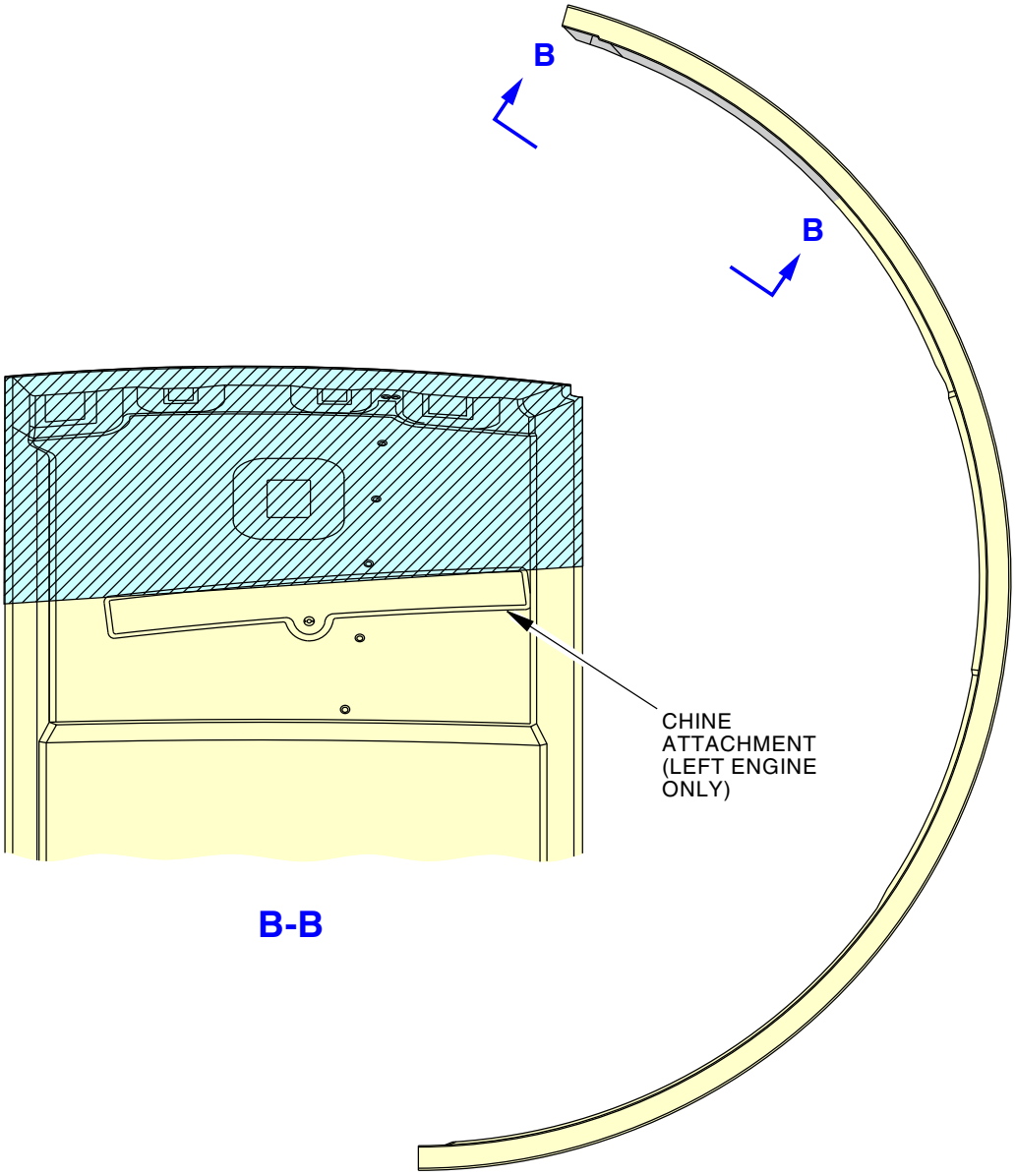

2791548 S0000634813_V1

Fan Cowl Upper Edge to Chine Attachment Area Inspection
Figure 801/71-11-04-990-824-H00 (Sheet 2 of 2)

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ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4

TASK 71-11-04-390-801-H00

3. Fan Cowl Upper Edge Tape Application

(Figure 802 and Figure 803)

A. General

(1) This task includes the steps to install the 3M 5004 tape, G51237 to the upper edge of the engine fan cowl panels at areas removed in SUBTASK 71-11-04-300-005-H00.

B. References

Reference	Title
CMM 71-11-30	Component Maintenance Manual
SOPM 20-30-03	General Cleaning Procedures

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-14122	Squeegee, Tape Applicator (Composites) Part #: PA1-B Supplier: 28112

D. Consumable Materials

Reference	Description	Specification
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B50073	Alcohol - Isopropyl	ASTM D 770
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
G50554	Tape - Polyethylene - 3M No. 5421	
G51237	Tape - 3M 5004 Paint Replacement Tape	

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

F. Prepare for Tape Application

SUBTASK 71-11-04-100-001-H00

(1) Before application of 3M 5004 tape, G51237:

(a) Use 3M No. 5421 tape, G50554 to cover the edge of the squeegee, COM-14122 that contacts the 3M 5004 tape, G51237.

1) Trim of the excess 3M No. 5421 tape, G50554 from the sides of the squeegee, COM-14122.

2) Periodically check squeegee, COM-14122 during use to make sure the taped edge remains smooth.

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ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4 (Continued)

(b) Use alcohol, B50073, solvent, B50305 or solvent, B00148, to clean the exposed upper edge surfaces of the fan cowl. Do "Solvent Cleaning (Final Cleaning)", per SOPM 20-30-03.

1) Make sure that the surface is dry before the application of 3M 5004 tape, G51237.

2) After completion of the solvent clean step, apply 3M 5004 tape, G51237 within four hours.

NOTE: Repeat solvent clean step if 3M 5004 tape, G51237 has not been applied within four hours.

(c) Use a wipe saturated with alcohol, B50073, to clean the 3M 5004 tape, G51237 outer surface and the release liner surface. Do "Solvent Cleaning (Final Cleaning)", per SOPM 20-30-03.

1) Apply the 3M 5004 tape, G51237, within four hours.

NOTE: The surface must be cleaned again if the 3M 5004 tape, G51237 is not applied within four hours.

G. Tape Application

SUBTASK 71-11-04-390-002-H00

(1) Install 3M 5004 tape, G51237 to the exposed upper edge of the fan cowl (See Figure 802).

(a) Apply 3M 5004 tape, G51237 in long continuous sections starting at the aft edge and moving forward.

(b) Apply 3M 5004 tape, G51237 with hand force, firmly and evenly to avoid wrinkles.

NOTE: 3M 5004 tape, G51237 can be applied within the footprint of the rub strip and v-blade. To remove v-blade or rub strip, refer to CMM 71-11-30.

1) Remove the liner from one corner of the 3M 5004 tape, G51237, where application will begin.

2) Make an index mark for alignment of 3M 5004 tape, G51237 to aid in application.

3) Hold the 3M 5004 tape, G51237 above the fan cowl.

a) From the exposed adhesive corner, use finger pressure to apply the exposed adhesive to this starting point.

4) Apply the 3M 5004 tape, G51237 to the fan cowl.

a) Only expose a section of adhesive that can be handled easily by the installation team.

5) Use finger pressure and/or a squeegee, COM-14122 to sweep the material with exposed adhesive onto the component.

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ARO 001-013 POST SB 777-71-0076; POST SB 777-71-0076 R0 OR SB 777-71-0076 R1 WORK PACKAGE 3 OR 4 (Continued)

CAUTION

AVOID EXCESSIVE LIFTING AND RE-APPLICATION OF THE 3M TAPE 5004 FOR THE PURPOSE OF REMOVING NON-COMFORMITIES (BUBBLES, WRINKLES). THE MATERIAL MAY ELONGATE EXCESSIVELY AND ADHESION PROPERTIES OF THE 3M TAPE 5004 WILL DIMINISH. START OVER WITH A NEW SHEET ON A CLEAN SURFACE IF THE QUALITIES OF THE 3M TAPE 5004 ARE SUSPECT.

6) If the 3M 5004 tape, G51237 does not line up with the index marks of the component, remove the 3M 5004 tape, G51237 locally by lifting off the fan cowl, reposition and continue to apply.

NOTE: Do not trap air bubbles or create wrinkles in the tape.

(c) Start on the inner surface approximately 2 in. (50.8 mm) below the potted edge.

NOTE: Do not apply 3M 5004 tape, G51237 onto the areas covered by the hinges. Notch the tape around the hinge assembly locations and over the upper edge.

(d) Trim tape as needed to avoid interference with hinge fitting footprint.

1) Refer to Trimming of 3M 5004 Tape, TASK 71-11-04-820-801-H00.

2) If the 3M 5004 tape, G51237 is cut into sections, make sure the splices are backward facing (not facing into the airstream) (See Figure 803).

3) Make sure that there is an overlap of between 0.5 in. (12.7 mm) and 1.0 in. (25.4 mm) between each section.

(e) Continue to apply tape towards the outer surface eventually transitioning from the inner surface to the outer surface.

(f) When applying tape at the leading edge, extend the tape over the leading from the outer surface and wrap onto the inner surface.

1) Refer to Ply 2 shown in Figure 802 for leading edge area.

(g) Apply edge finish at all tape seams, splices, and edges. Do this task: Edge Finish Application, TASK 71-11-04-390-803-H00.

(h) If air bubbles or wrinkles exist after application of the tape:

1) Refer to “Fan Cowl 3M5004 Tape Bubbling Repair Procedure” TASK 71-11-04-300-801-H00.

2) Refer to “Fan Cowl 3M5004 Tape Wrinkle Repair Procedure” TASK 71-11-04-300-801-H00.

END OF TASK

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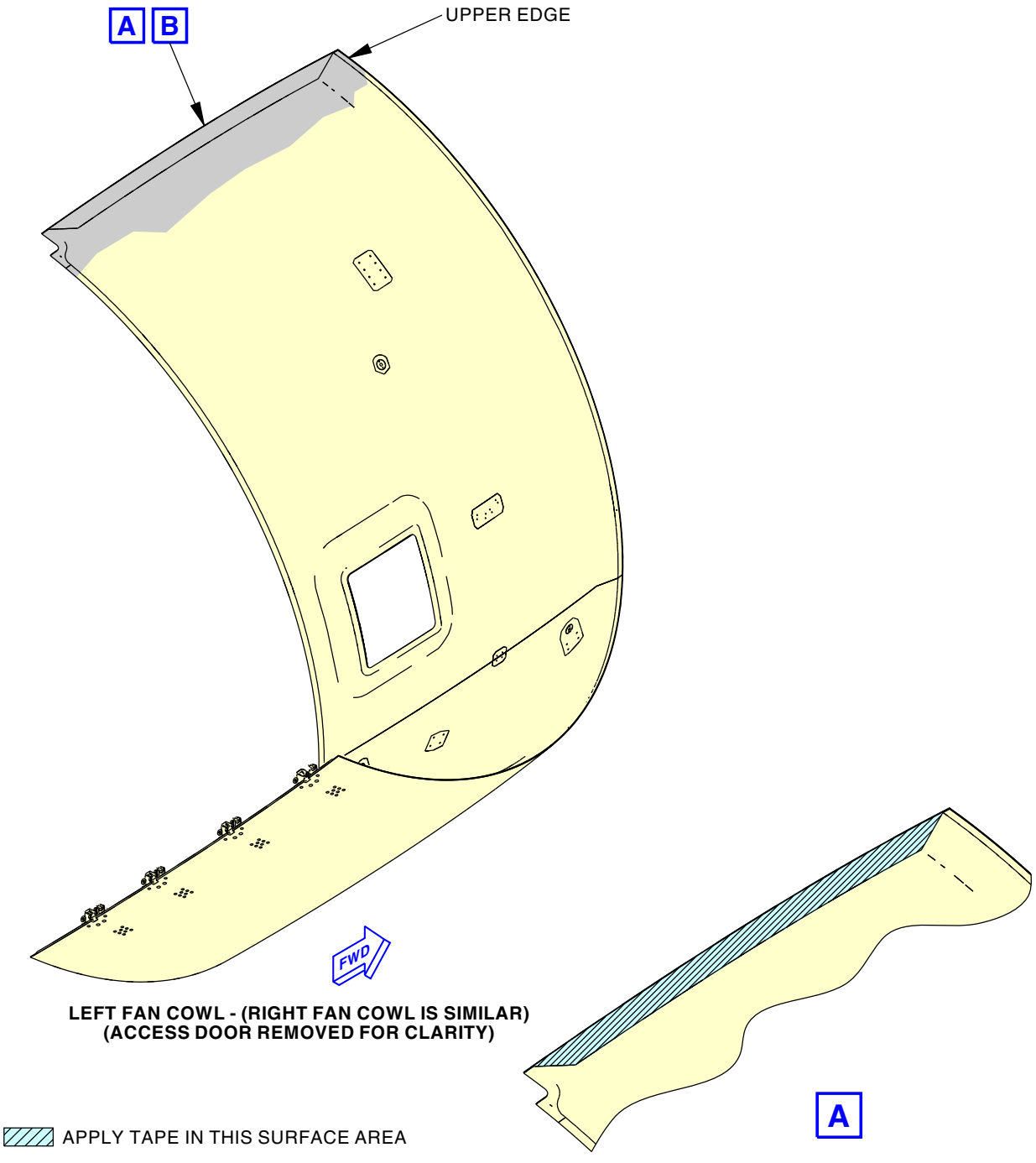

LEFT FAN COWL - (RIGHT FAN COWL IS SIMILAR)
(ACCESS DOOR REMOVED FOR CLARITY)

2791588 S0000634822_V2

Fan Cowl Upper Edge Tape Application
Figure 802/71-11-04-990-823-H00 (Sheet 1 of 3)

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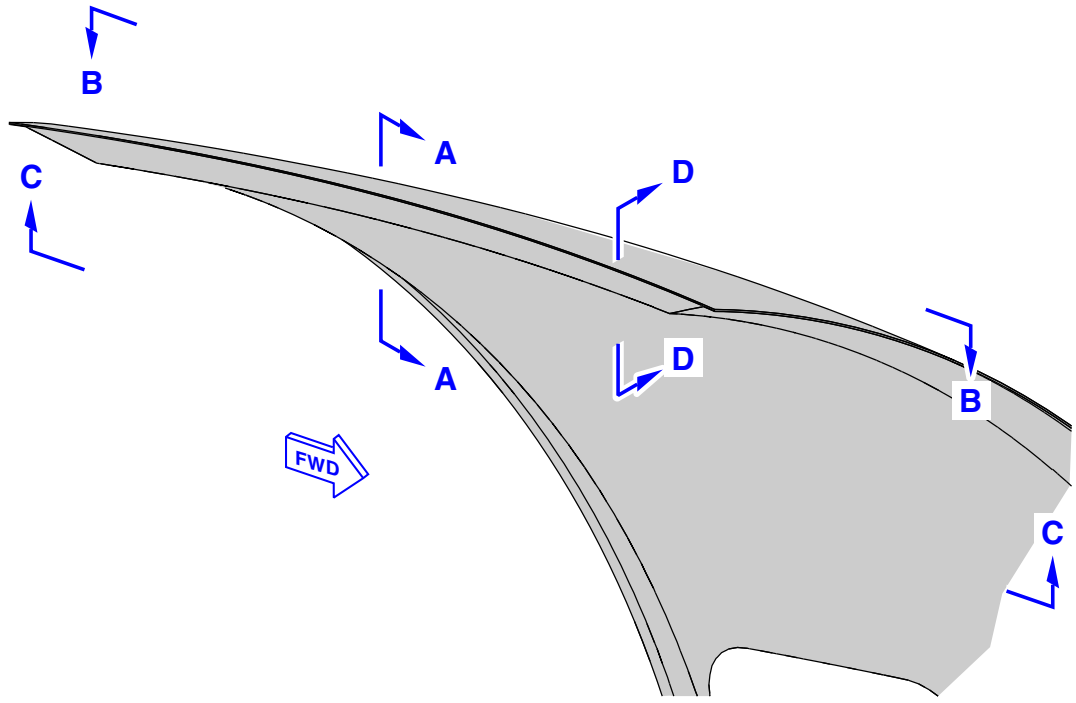

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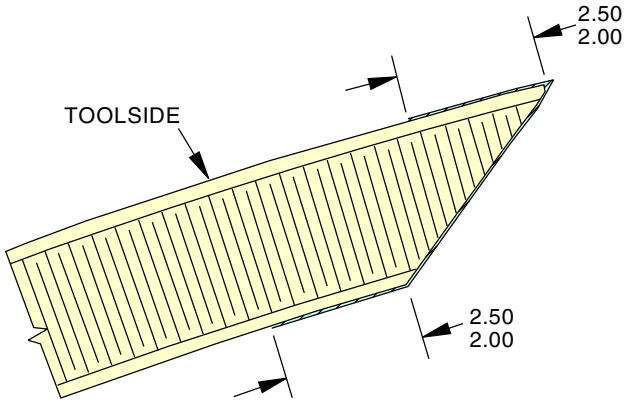

A-A

APPLY TAPE IN THIS SURFACE AREA

2791590 S0000634823_V2

Fan Cowl Upper Edge Tape Application
Figure 802/71-11-04-990-823-H00 (Sheet 2 of 3)

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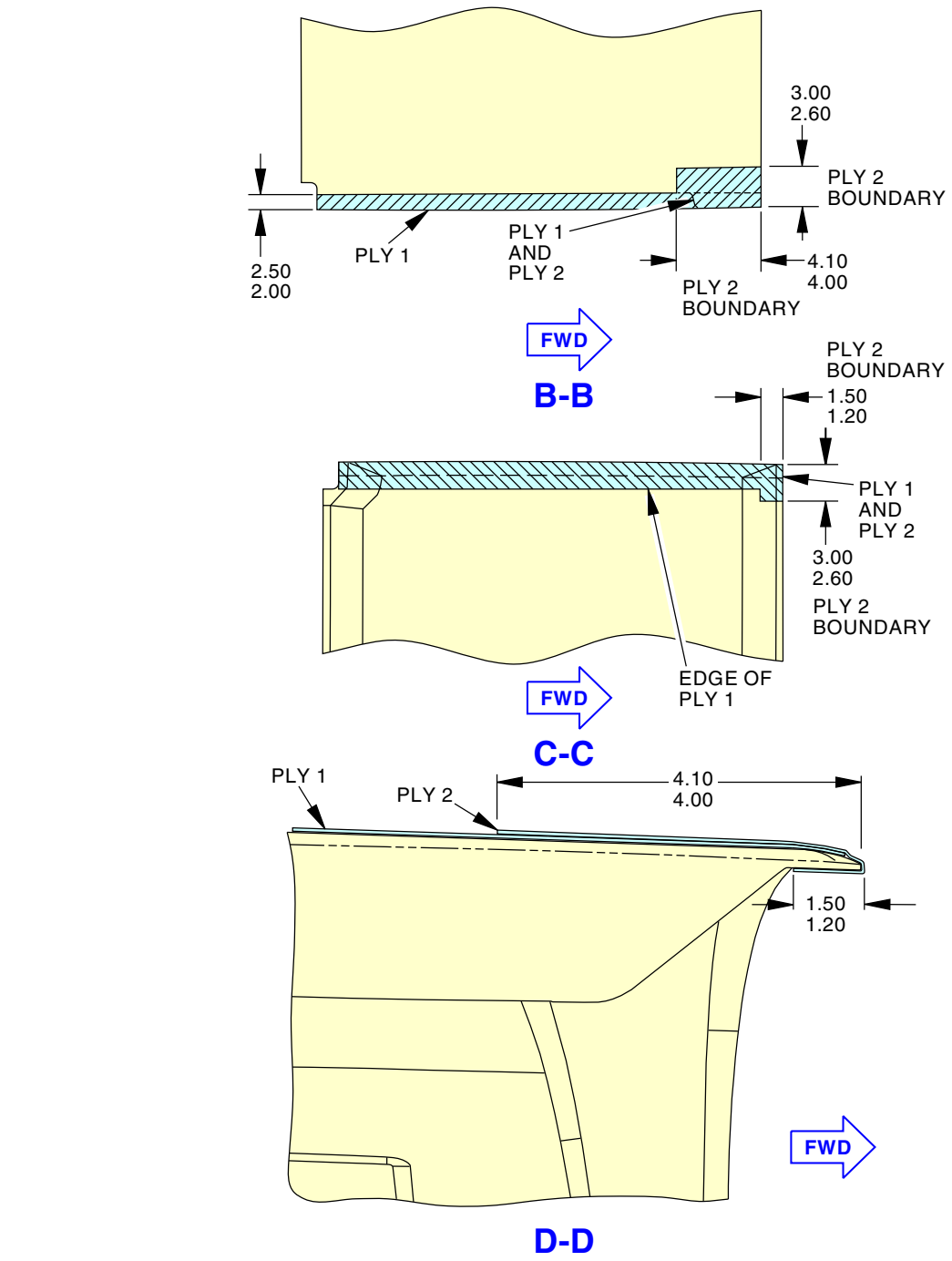

2791596 S0000634824_V1

Fan Cowl Upper Edge Tape Application
Figure 802/71-11-04-990-823-H00 (Sheet 3 of 3)

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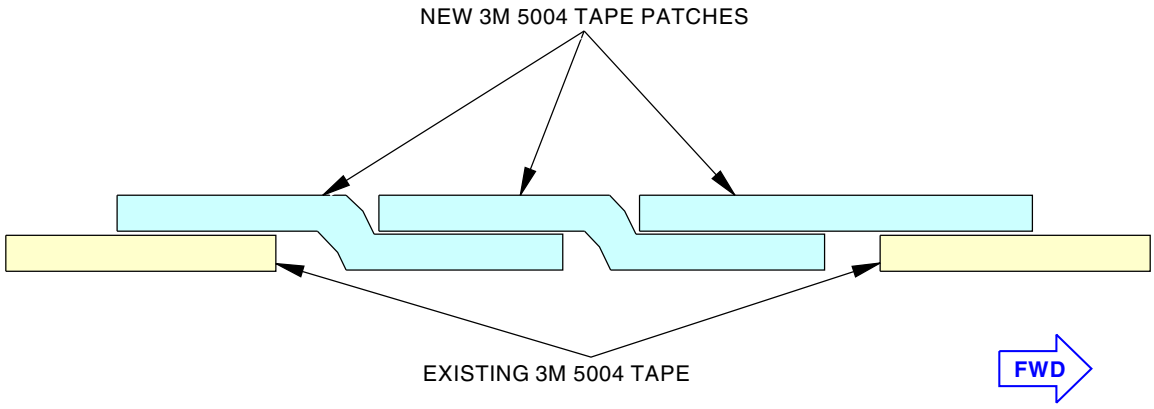
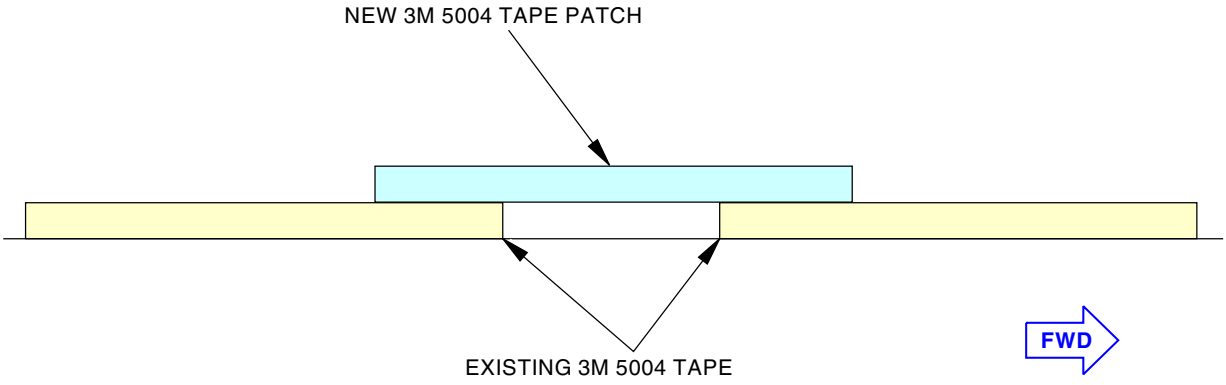


EXAMPLE INSTALLATION USING MULTIPLE PATCHES



EXAMPLE INSTALLATION USING SINGLE PATCH

2796919 S0000639165_V2

New 3M5004 Tape Application
Figure 803/71-11-04-990-826-H00

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TASK 71-11-04-390-802-H00

4. Fan Cowl Bag Side Tape Application

(Figure 805 and Figure 804)

A. General

(1) This task includes the steps to install the 3M 5004 tape, G51237 to the bagside of the engine fan cowl panels at areas removed in SUBTASK 71-11-04-300-005-H00.

B. References

Reference	Title
SOPM 20-30-03	General Cleaning Procedures

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-14122	Squeegee, Tape Applicator (Composites) Part #: PA1-B Supplier: 28112

D. Consumable Materials

Reference	Description	Specification
A50326	Adhesive - Modified Epoxy For General Purpose Use	BMS5-92 Type I Class 4
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B50073	Alcohol - Isopropyl	ASTM D 770
B50305	Solvent - Methyl Propyl Ketone	BMS11-9 Grade 1
G00111	Sheet - Mylar	
G50554	Tape - Polyethylene - 3M No. 5421	
G51237	Tape - 3M 5004 Paint Replacement Tape	

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

F. Prepare for Tape Application

SUBTASK 71-11-04-840-001-H00

(1) Before 3M 5004 tape, G51237 application:

(a) Use 3M No. 5421 tape, G50554 to cover the edge of the squeegee, COM-14122 that contacts the 3M 5004 tape, G51237.

1) Trim off excess 3M No. 5421 tape, G50554 from the sides of the squeegee, COM-14122.

2) Periodically check squeegee, COM-14122 during use to make sure the taped edge remains smooth.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

(b) Use alcohol, B50073, solvent, B50305 or solvent, B00148 to clean the exposed inner surface of the fan cowl. Do “Solvent Cleaning (Final Cleaning)”, per SOPM 20-30-03.

1) Make sure the surface is dry before the application of 3M 5004 tape, G51237.

2) After completion of the solvent clean step, apply 3M 5004 tape, G51237 within four hours.

NOTE: The surface must be cleaned again if the 3M 5004 tape, G51237 is not applied within four hours.

(c) Use a wipe saturated with alcohol, B50073 to clean the 3M 5004 tape, G51237 outer surface and then the release liner surface. Do “Solvent Cleaning “Final Cleaning)”, per SOPM 20-30-03.

1) Apply the 3M 5004 tape, G51237 within four hours.

NOTE: The surface must be cleaned again if the 3M 5004 tape, G51237 is not applied within four hours.

G. Tape Application

SUBTASK 71-11-04-390-001-H00

(1) Install 3M 5004 tape, G51237:

(a) Apply 3M 5004 tape, G51237 on the exposed inner surface of the fan cowl in horizontal strips parallel to the bottom edge of the fan cowl.

NOTE: Do not cover drain holes with 3M 5004 tape, G51237.

NOTE: Do not apply 3M 5004 tape, G51237 on the footprints of the existing hinges, latches, keepers, brackets, v-blades and rubstrips. Keep a 0.00 in. (0.00 mm) - 0.25 in. (6.35 mm) inch gap between 3M 5004 tape, G51237 and any existing component (hinges, latches, keepers, brackets, v-blades and rubstrips) on the fan cowl. 3M 5004 tape, G51237 does not cover or is it applied below any component that would be in direct contact with the 3M 5004 tape, G51237.

1) Start from the bottom of the fan cowl and works towards the top.

2) General 3M 5004 tape, G51237 installation steps:

a) Remove the liner from one corner of the 3M 5004 tape, G51237, where application will begin.

b) Make an index mark for alignment of 3M 5004 tape, G51237 to aid in application.

c) Hold the 3M 5004 tape, G51237 above the fan cowl. From the exposed adhesive corner, use finger pressure to apply the exposed adhesive to this starting point.

d) Apply the 3M 5004 tape, G51237 to the fan cowl. Only expose a section of adhesive that can be handled easily by the installation team.

e) Use finger pressure and/or a squeegee, COM-14122 to sweep the material with exposed adhesive onto the component.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

CAUTION

AVOID EXCESSIVE LIFTING AND RE-APPLICATION OF THE 3M TAPE 5004 FOR THE PURPOSE OF REMOVING NON-COMFORMITIES (BUBBLES, WRINKLES). THE MATERIAL MAY ELONGATE EXCESSIVELY AND ADHESION PROPERTIES OF THE 3M TAPE 5004 WILL DIMINISH. START OVER WITH A NEW SHEET ON A CLEAN SURFACE IF THE QUALITIES OF THE 3M TAPE 5004 ARE SUSPECT.

f) If the 3M 5004 tape, G51237 does not line up with the index marks of the component, remove the 3M 5004 tape, G51237 locally by lifting off the fan cowl, reposition and continue to apply.

NOTE: Do not trap air bubbles or create wrinkles in the tape.

3) For high contour areas, apply 3M 5004 tape, G51237 on flat surfaces first, followed by the contoured surfaces.

a) Refer to step 2) on how to install 3M 5004 tape, G51237.

b) It is recommended, but not required, to create mylar sheet, G00111 templates. Do this task: Mylar/Film Template, TASK 71-11-04-820-802-H00.

4) Apply 3M 5004 tape, G51237 to the exposed areas of laminate at the keeper fitting assembly (left fan cowl) and latch fitting assembly (right fan cowl) (See Figure 804).

NOTE: Step only applies if repair is needed in this area.

NOTE: If keeper and latch fittings are not removed, it is not required to apply 3M 5004 tape, G51237 below the keeper and latch fittings.

a) Refer to step 2) on how to install 3M 5004 tape, G51237.

b) Apply 3M 5004 tape, G51237 to the lower area of the keeper and latch fitting assembly, stopping half way up the ply drop off.

c) Apply 3M 5004 tape, G51237 to the superior area of the keeper and latch fitting assembly, stopping half way down the ply drop off.

<1> Ply 2 must overlap Ply 1 0.25 in. (6.35 mm) to 1.00 in. (25.40 mm).

d) Apply adhesive, A50326 to the bottom edge of the fan cowl where 3M 5004 tape, G51237 is trimmed off.

5) Apply 3M 5004 tape, G51237, to the exposed areas of laminate at the access door area (See Figure 805).

NOTE: Step only applies if repair is needed in this area.

a) Refer to step 2) on how to install 3M 5004 tape, G51237

b) Apply 3M 5004 tape, G51237, to the lower area access door ply drop off, stopping half way up ply drop off in the latch door area.

c) Apply 3M 5004 tape, G51237 to superior area of access door ply drop off, stopping half way down ply drop off. Ply 2 must overlap Ply 1 0.25 in. (6.35 mm) - 1.00 in. (25.40 mm).

6) Apply 3M 5004 tape, G51237 to the remaining areas of exposed laminate at the inner surface of the engine fan cowl panel (See Figure 805).

a) Refer to step 2) on how to install 3M 5004 tape, G51237.

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ARO 001-013 POST SB 777-71-0073 OR POST SB 777-71-0076; POST SB 777-71-0073 R3 OR SB 777-71-0076 (Continued)

7) Trim the 3M 5004 tape, G51237, do this task: Trimming of 3M 5004 Tape, TASK 71-11-04-820-801-H00.

8) Apply edge finish at all tape seams, splices, and edges. Do this task: Edge Finish Application, TASK 71-11-04-390-803-H00.

9) If air bubbles or wrinkles exist after application of the tape:

   a) Refer to “Fan Cowl 3M5004 Tape Bubbling Repair Procedure” TASK 71-11-04-300-801-H00.

   b) Refer to “Fan Cowl 3M5004 Tape Wrinkle Repair Procedure” TASK 71-11-04-300-801-H00.

——— END OF TASK ———

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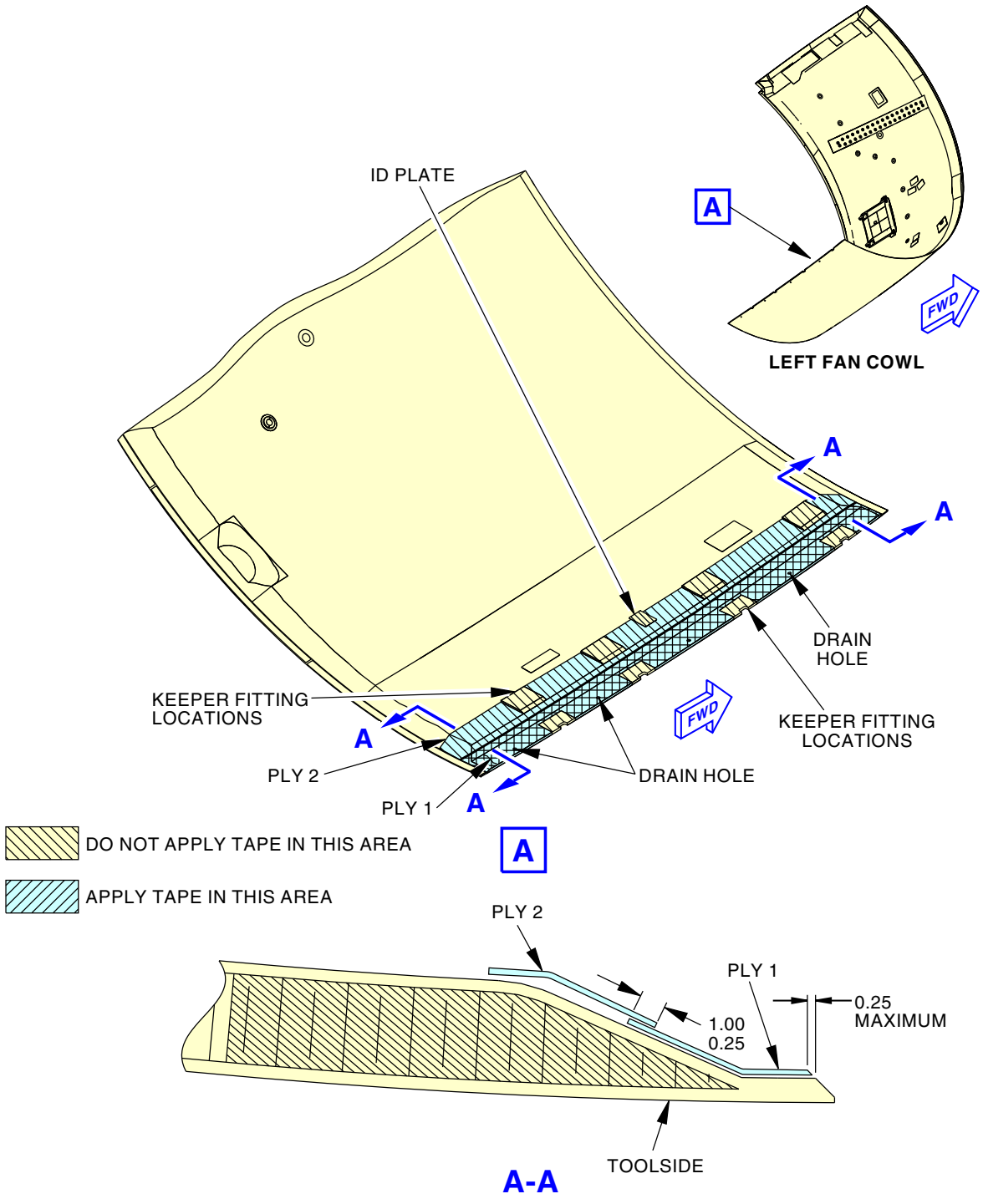

Fan Cowl Bag Side - 3M 5004 Latch and Keeper Area Tape Application
Figure 804/71-11-04-990-822-H00 (Sheet 1 of 2)

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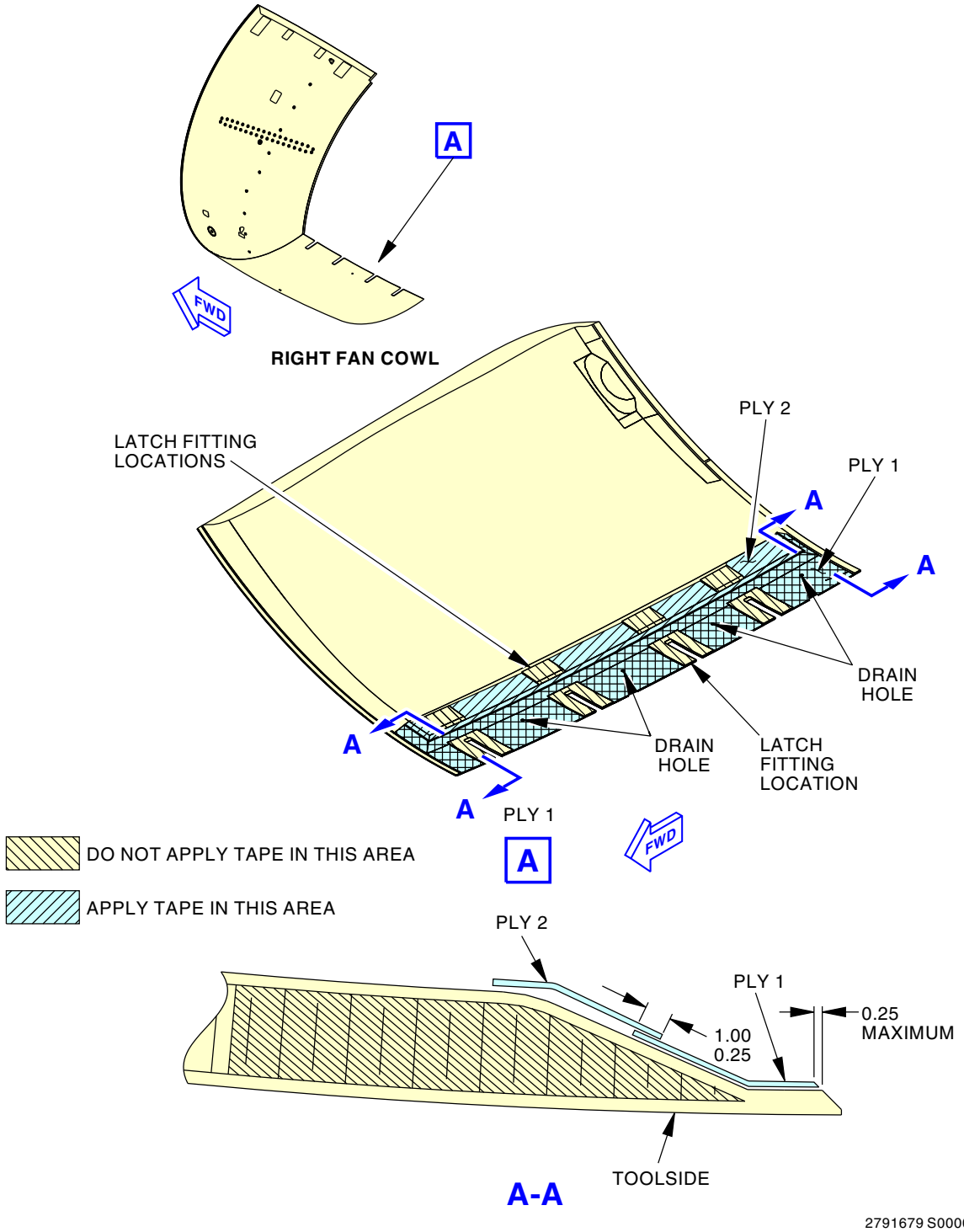

Fan Cowl Bag Side - 3M 5004 Latch and Keeper Area Tape Application
Figure 804/71-11-04-990-822-H00 (Sheet 2 of 2)

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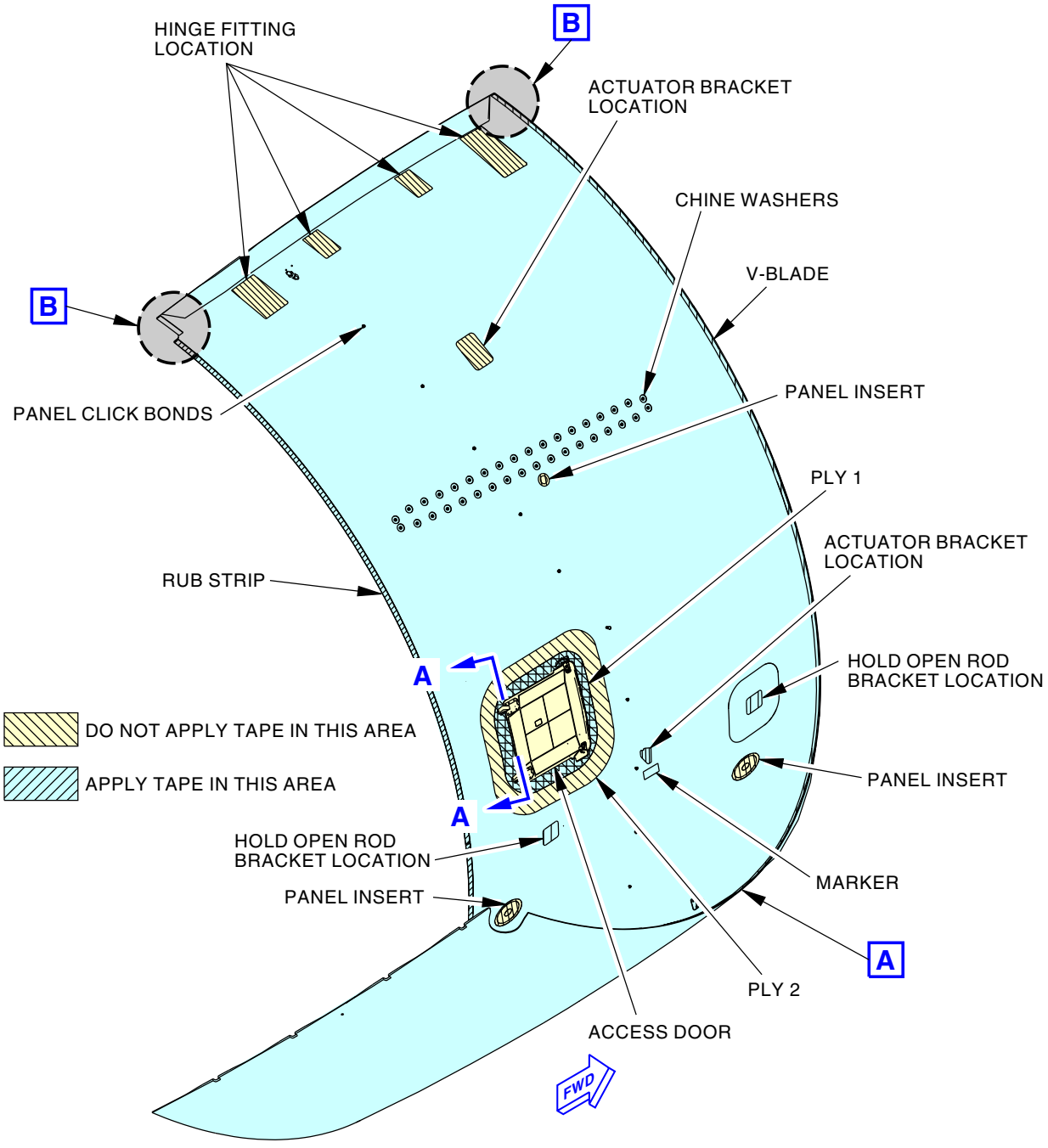

LEFT FAN COWL

2793093 S0000635761_V2

Fan Cowl Bag Side - 3M 5004 Inner Surface Tape Application
Figure 805/71-11-04-990-821-H00 (Sheet 1 of 4)

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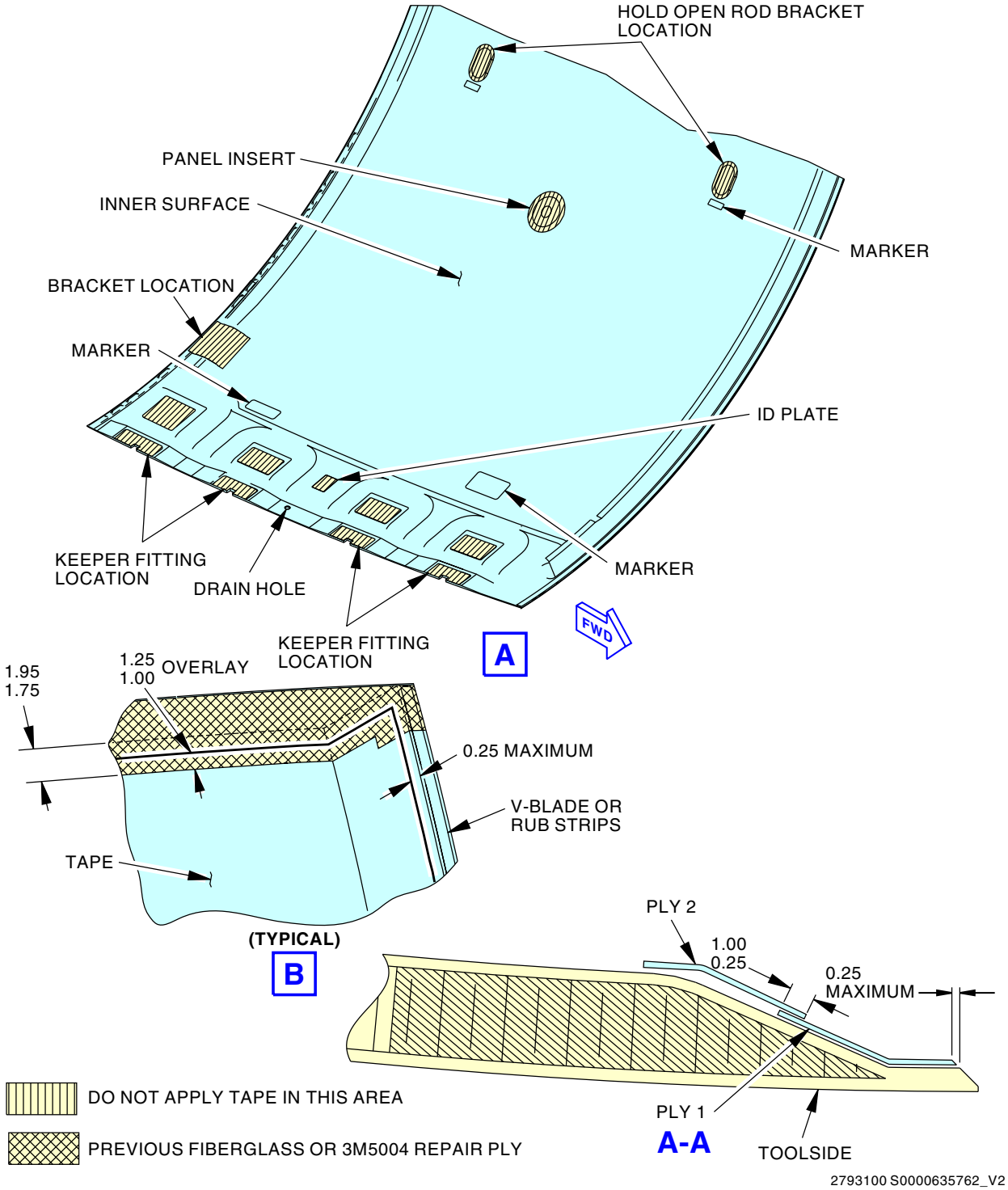

Fan Cowl Bag Side - 3M 5004 Inner Surface Tape Application
Figure 805/71-11-04-990-821-H00 (Sheet 2 of 4)

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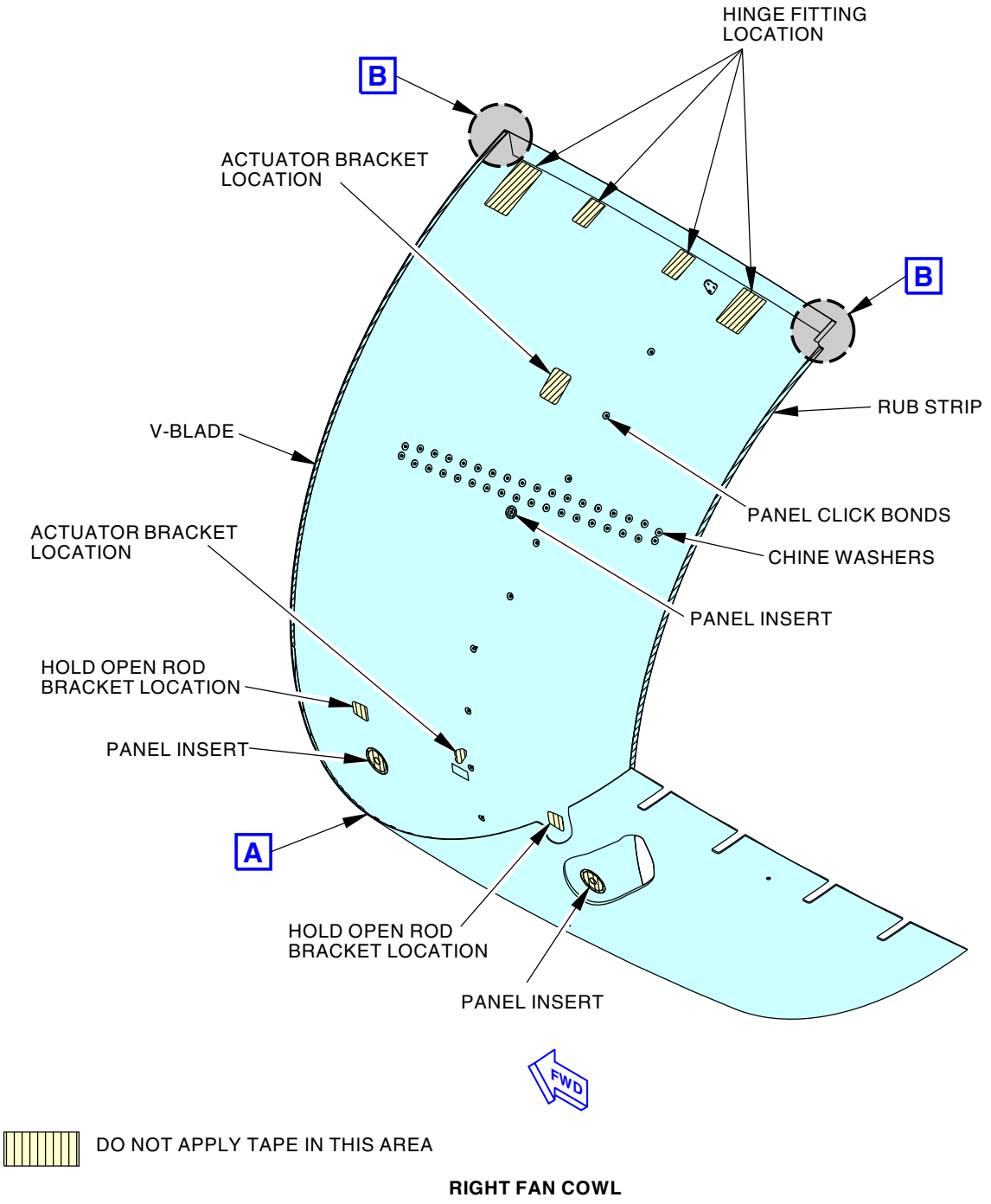

RIGHT FAN COWL

2793103 S0000635763_V1

Fan Cowl Bag Side - 3M 5004 Inner Surface Tape Application
Figure 805/71-11-04-990-821-H00 (Sheet 3 of 4)

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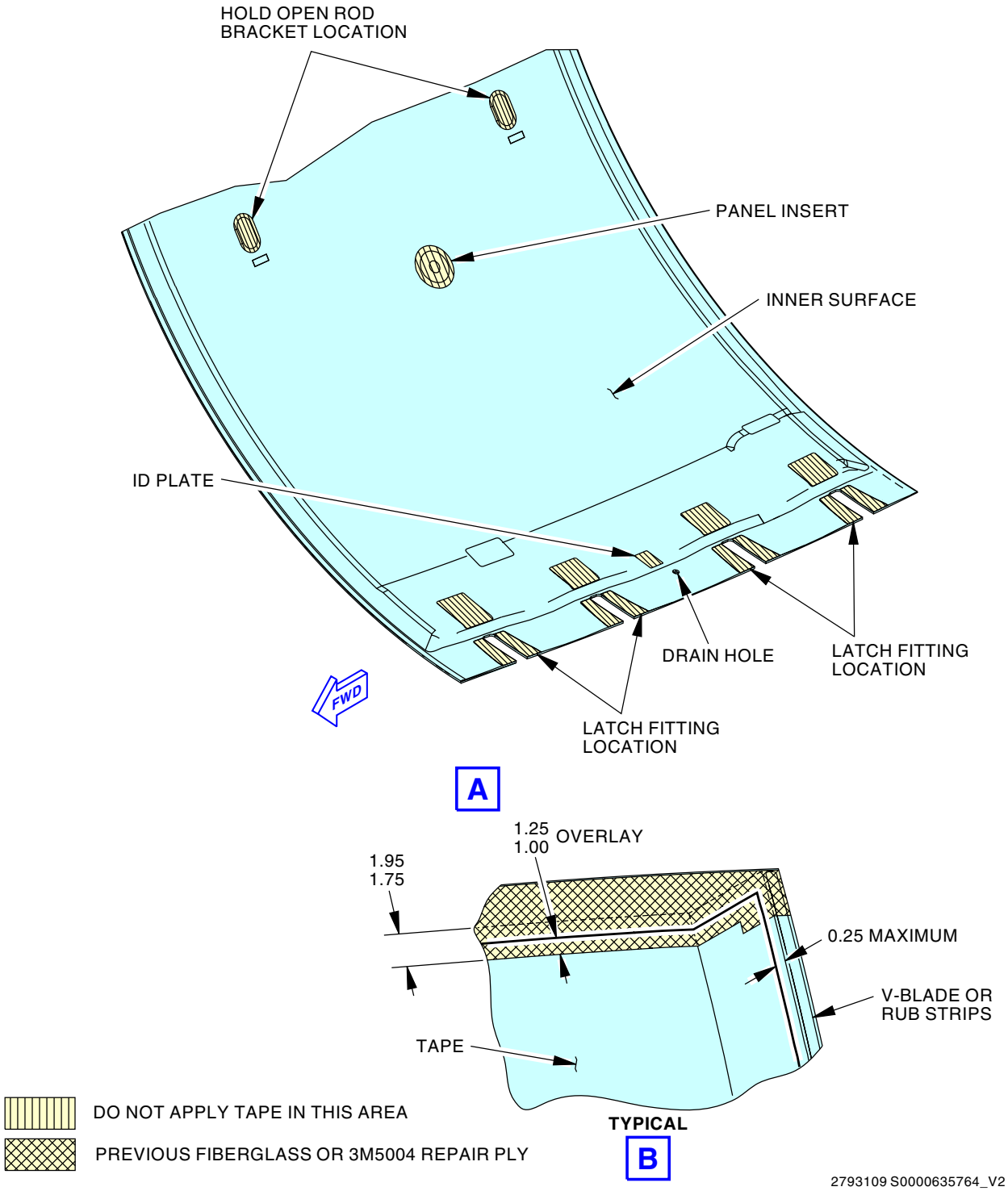

Fan Cowl Bag Side - 3M 5004 Inner Surface Tape Application
Figure 805/71-11-04-990-821-H00 (Sheet 4 of 4)

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ARO ALL

TASK 71-11-04-820-801-H00

5. Trimming of 3M 5004 Tape

(Figure 806)

A. General

(1) This task contains the procedure to trim the 3M 5004 tape, G51237.

B. Tools/Equipment

Reference	Description
STD-3949	Scalpel - X-ACTO Knife
STD-4118	Straightedge
STD-7049	Marker

C. Consumable Materials

Reference	Description	Specification
B50073	Alcohol - Isopropyl	ASTM D 770
G51237	Tape - 3M 5004 Paint Replacement Tape	

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-820-002-H00

(1) Use a marker, STD-7049 to make a trimline on the 3M 5004 tape, G51237.

(2) Peel back 3M 5004 tape, G51237.

(3) Put the straightedge, STD-4118 on the adhesive side of the tape with the lower edge aligned with the trimline (See Figure 806).

(4) Operate the X-ACTO knife scalpel, STD-3949 along the lower edge of the straightedge, STD-4118 and cut through the entire length of the 3M 5004 tape, G51237.

(a) If necessary, use finger pressure to apply the tape edge.

(5) Remove remaining marks on the 3M 5004 tape, G51237 with a wipe soaked with alcohol, B50073.

(6) Remove adhesive that remains on the fan cowl.

——— END OF TASK ———

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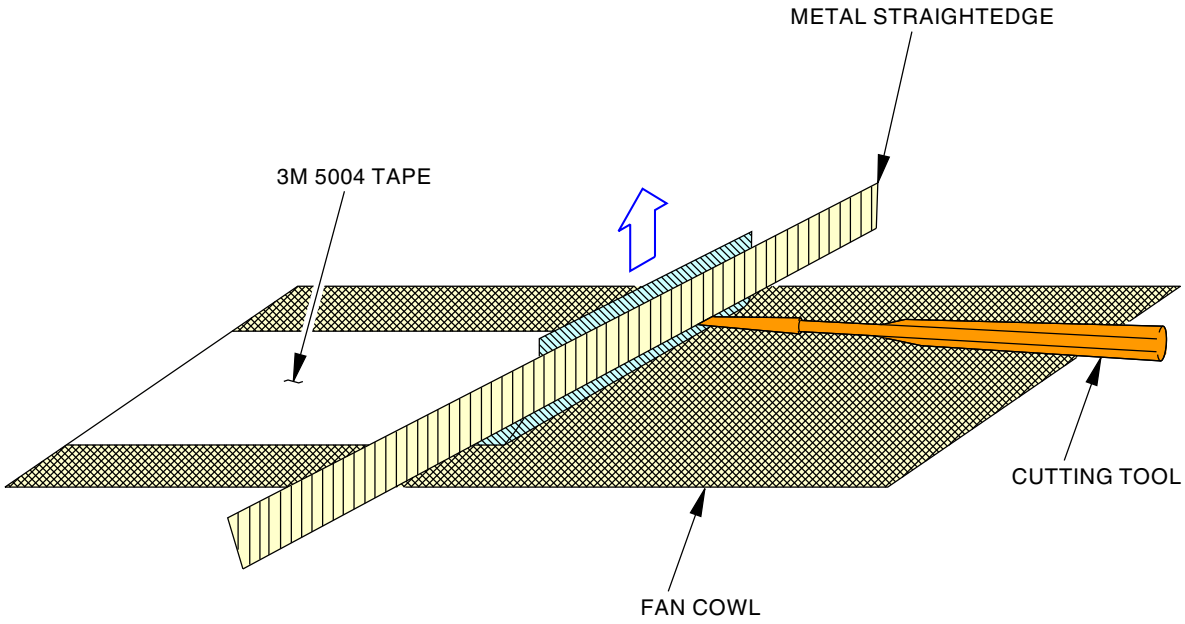

2791541 S0000634795_V1

Trimming of 3M 5004 Tape
Figure 806/71-11-04-990-819-H00

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TASK 71-11-04-390-803-H00

6. Edge Finish Application

(Figure 807)

A. General

(1) This task includes the application of edge finish on 3M 5004 tape, G51237.

B. Tools/Equipment

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

Reference	Description
COM-14122	Squeegee, Tape Applicator (Composites) Part #: PA1-B Supplier: 28112

C. Consumable Materials

Reference	Description	Specification
A50326	Adhesive - Modified Epoxy For General Purpose Use	BMS5-92 Type I Class 4
B50073	Alcohol - Isopropyl	ASTM D 770
G51237	Tape - 3M 5004 Paint Replacement Tape	
G51487	Tape - Masking, Specialty High Temperature - 3M 5501A	
G51488	Tape - Masking, Pressure Sensitive - PG777	

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Procedure

SUBTASK 71-11-04-390-003-H00

(1) Apply edge finish:

NOTE: Edge finish is needed at all seams, splices, and edges of 3M 5004 tape, G51237. Edge sealant goes on top of 3M 5004 tape, G51237.

(a) Apply strips of 3M 5501A tape, G51487 or PG777 tape, G51488, 0.25 ±0.10 in. (6.35 ±2.54 mm) parallel to each side of 3M 5004 tape, G51237 to be finished.

(b) Apply small strips of 3M 5501A tape, G51487 or PG777 tape, G51488 perpendicular to each end of the 3M 5501A tape, G51487 or PG777 tape, G51488 strips applied in (a) to form an enclosed area.

(c) Apply adhesive, A50326 along the edge of the 3M 5004 tape, G51237, within the taped off area (See Figure 807).

(d) Place squeegee, COM-14122 at one end of the taped off area, such that the edge of the squeegee, COM-14122 rests on the parallel 3M 5501A tape, G51487 or PG777 tape, G51488 strips.

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(e) Hold squeegee, COM-14122 at 45° angle and move it along the length of the taped off area.

NOTE: Use even pressure to level out the sealant to a consistent thickness.

1) Repeat (e) until sealant is smooth and continuous with no visible gaps or discontinuities.

a) If gaps are present or signs of discontinuities are shown, then repeat steps (c) through to (e).

(f) Remove tape strips:

1) Lift one edge of the tape and pull at a 45° angle outward from the applied sealant area.

2) Pull tape strips by keeping continuous tension to avoid getting excess sealant on adjacent surfaces.

a) If necessary, use a wipe soaked in alcohol, B50073 to remove any excess sealant on adjacent surfaces.

(g) When application of 3M 5004 tape, G51237 and sealant is complete, cure the fan cowl for 30 minutes at room temperature.

NOTE: It is recommended, but not necessary to wait for 24 hours for complete cure.

——— END OF TASK ———

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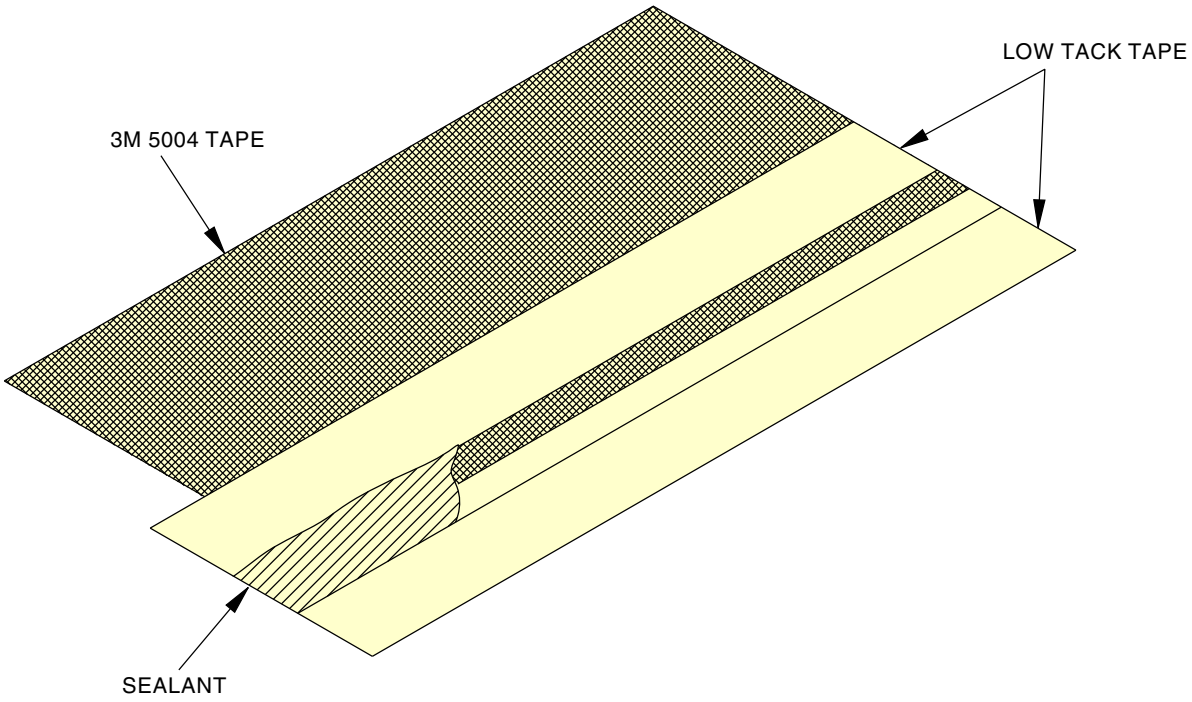

2791543 S0000634802_V1

Edge Finish Application
Figure 807/71-11-04-990-818-H00

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TASK 71-11-04-820-802-H00

7. Mylar/Film Template

(Figure 808)

A. General

(1) This task includes the procedure for the use of mylar sheet, G00111 templates to aid the application of 3M 5004 tape, G51237.

B. Consumable Materials

Reference	Description	Specification
G00111	Sheet - Mylar	
G51237	Tape - 3M 5004 Paint Replacement Tape	

C. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

D. Procedure

SUBTASK 71-11-04-820-003-H00

NOTE: It is recommended to create mylar sheet, G00111 templates for making consistent shapes or any other high contour areas, for 3M 5004 tape, G51237 application.

(1) For keeper/latch fitting assembly locations, create mylar sheet, G00111 template to aid in high contour areas (See Figure 808 sheet 2 as an example).

(2) For areas with inserts, washers and clickbonds, put mylar sheet, G00111 above components (See Figure 808 sheet 3 as an example).

(a) Identify on mylar sheet, G00111 where centers of components are.

1) Permitted to cut hole smaller than component's diameter to position the mylar sheet, G00111.

(b) When the mylar sheet, G00111 is applied to the surface, attach the sheet by taping the edges.

(c) Trace components diameter to make a trim line.

(d) Remove the mylar sheet, G00111 from the surface.

(e) Cut and remove trim line on mylar sheet, G00111.

(f) Use mylar sheet, G00111 template to cut holes in 3M 5004 tape, G51237.

1) Keep a 0.00 in. (0.00 mm) - 0.25 in. (6.35 mm) clearance between the 3M 5004 tape, G51237 and components.

END OF TASK

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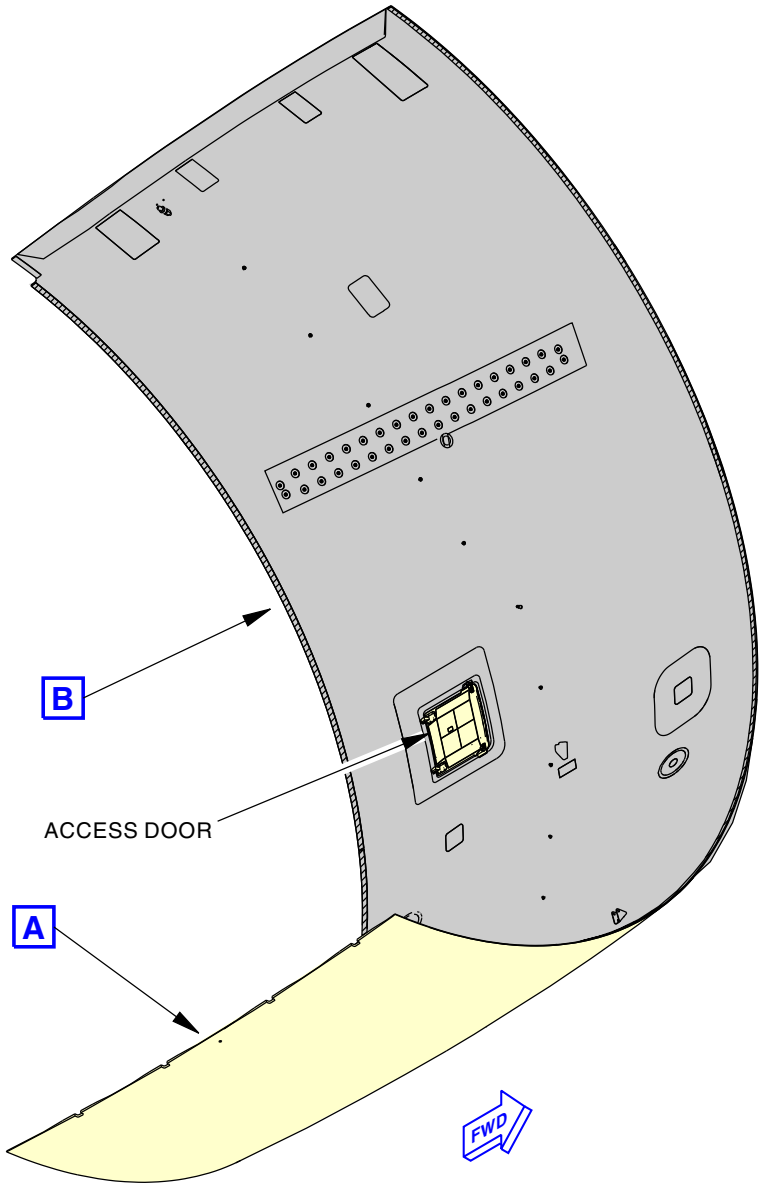

LEFT FAN COWL
(LEFT SIDE SHOWN, RIGHT SIDE IS ALMOST THE SAME)

2791531 S0000634792_V1

Mylar/Film Template
Figure 808/71-11-04-990-817-H00 (Sheet 1 of 3)

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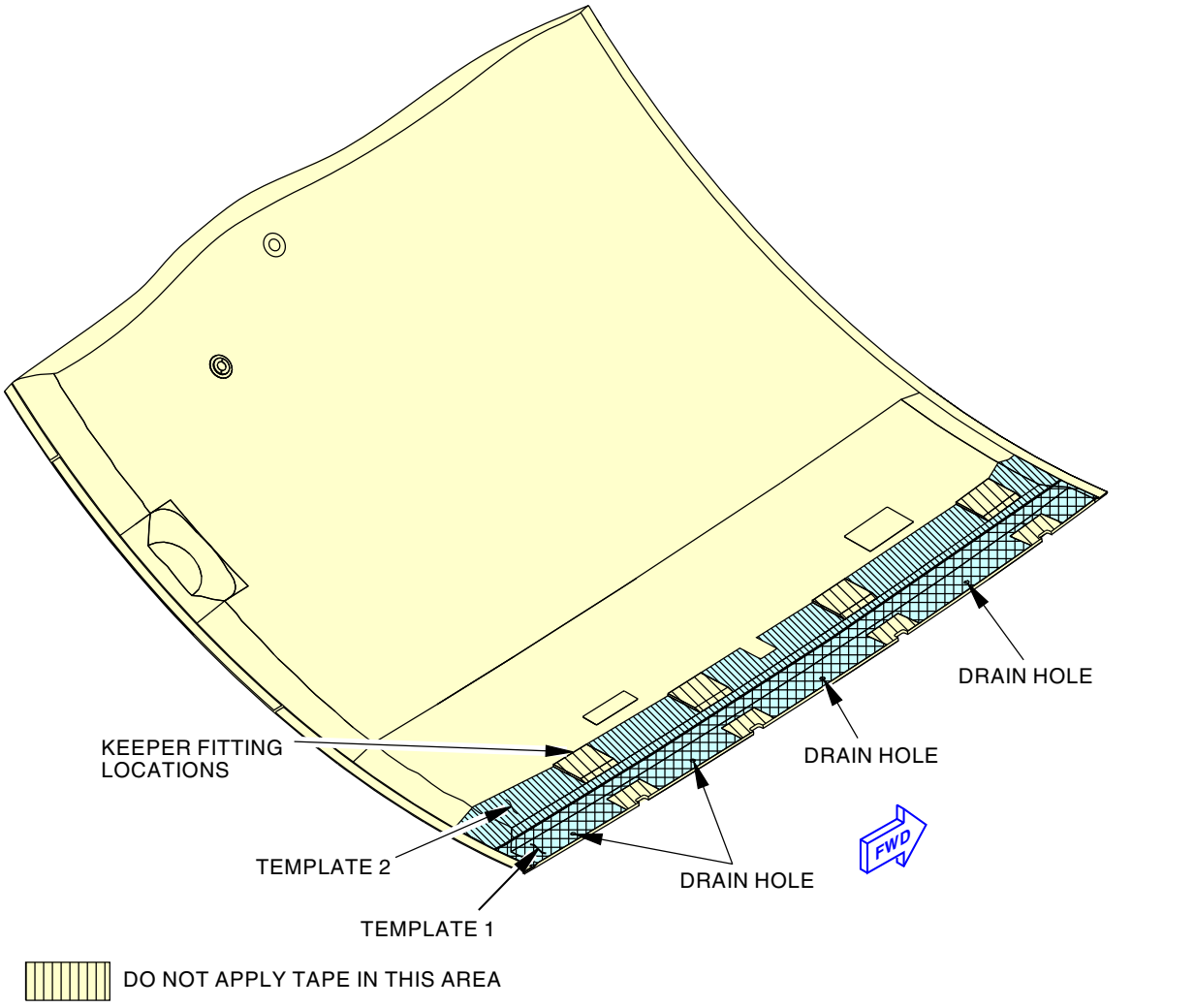

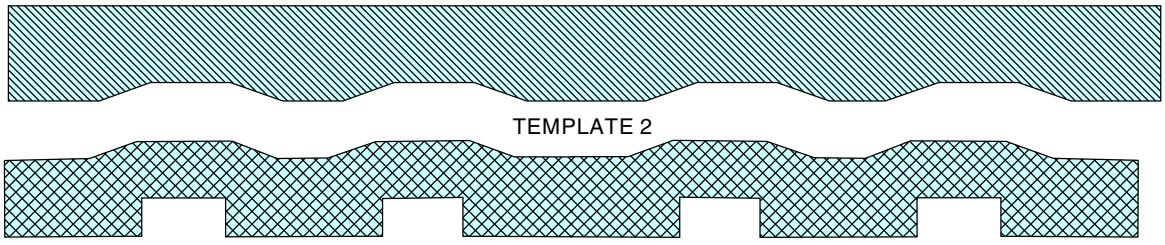

TEMPLATE 1
(LATCH FITTING)

A

2791533 S0000634793_V1

Mylar/Film Template
Figure 808/71-11-04-990-817-H00 (Sheet 2 of 3)

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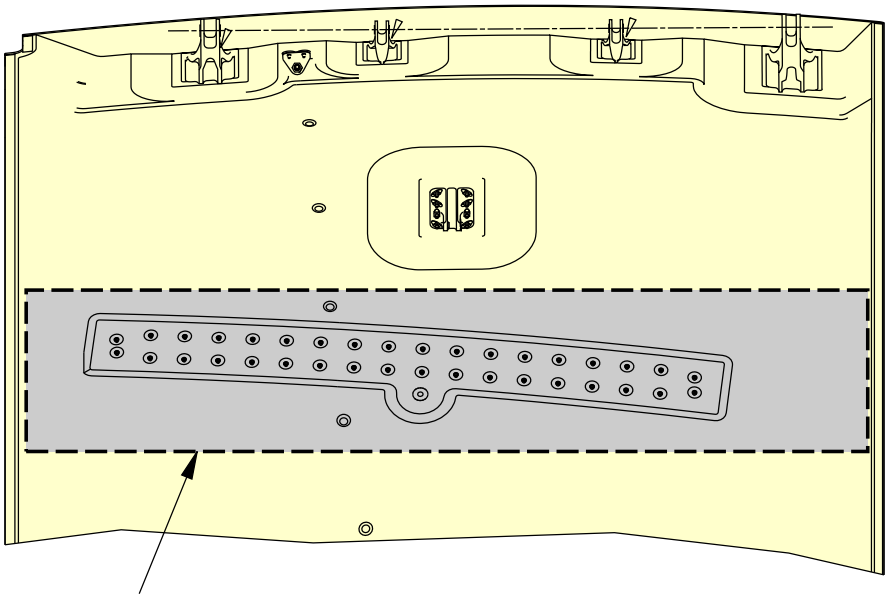
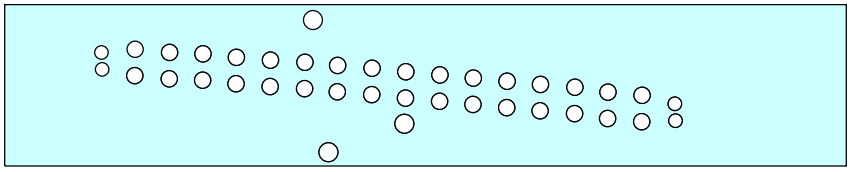


LEFT FAN COWL
(LEFT SIDE SHOWN, RIGHT SIDE IS ALMOST THE SAME)

B



TEMPLATE 3

C

2791536 S0000634794_V1

Mylar/Film Template
Figure 808/71-11-04-990-817-H00 (Sheet 3 of 3)

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FAN COWL LATCHES - REMOVAL/INSTALLATION

1. General

A. This procedure has four tasks:

(1) A removal of the fan cowl latches

(2) An installation of the fan cowl latches

(3) A removal of the fan cowl latch keepers

(4) An installation of the fan cowl latch keepers.

TASK 71-11-05-000-801-H01

2. Fan Cowl Latches Removal

A. General

(1) The fan cowl latches are installed on the latch fittings at four locations (6:00 o'clock position) on the right fan cowl panel.

(2) There are two types of the fan cowl latches (referred to as the latch) that are installed on the latch fittings.

(3) You must open the right fan cowl panel to remove the latches.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Location Zones

Zone	Area
414	Right Fan Cowl - Left Engine
424	Right Fan Cowl - Right Engine

D. Access Panels

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
424AR	Right Fan Cowl Panel, Right Engine

E. Prepare for the Removal

SUBTASK 71-11-05-868-001-H01

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-05-040-001-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-05-010-001-H01

(3) For the right fan cowl panel on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

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(a) Open the applicable access panels:

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Fan Cowl Latches Removal

SUBTASK 71-11-05-020-001-H01

(1) Remove the latch [1] from the No.1 latch fitting as follows:

(a) Remove the pin [6] from the bolt [2].

(b) Remove the nut [5], washer [4], bushings [37], washer [3], and the bolt [2] that attach the latch [1] to the latch fitting assembly.

(c) Remove the latch [1] from the latch fitting.

SUBTASK 71-11-05-020-002-H01

(2) Remove the applicable latch [7] from the No. 2, 3 or No. 4 latch fitting as follows:

(a) Remove the pin [12]from the bolt [8].

(b) Remove the nut [11], washer [10], bushings [38], washer [9], and the bolt [8] that attach the latch [7] to the latch fitting assembly.

(c) Remove the latch [7] from the latch fitting.

——— END OF TASK ———

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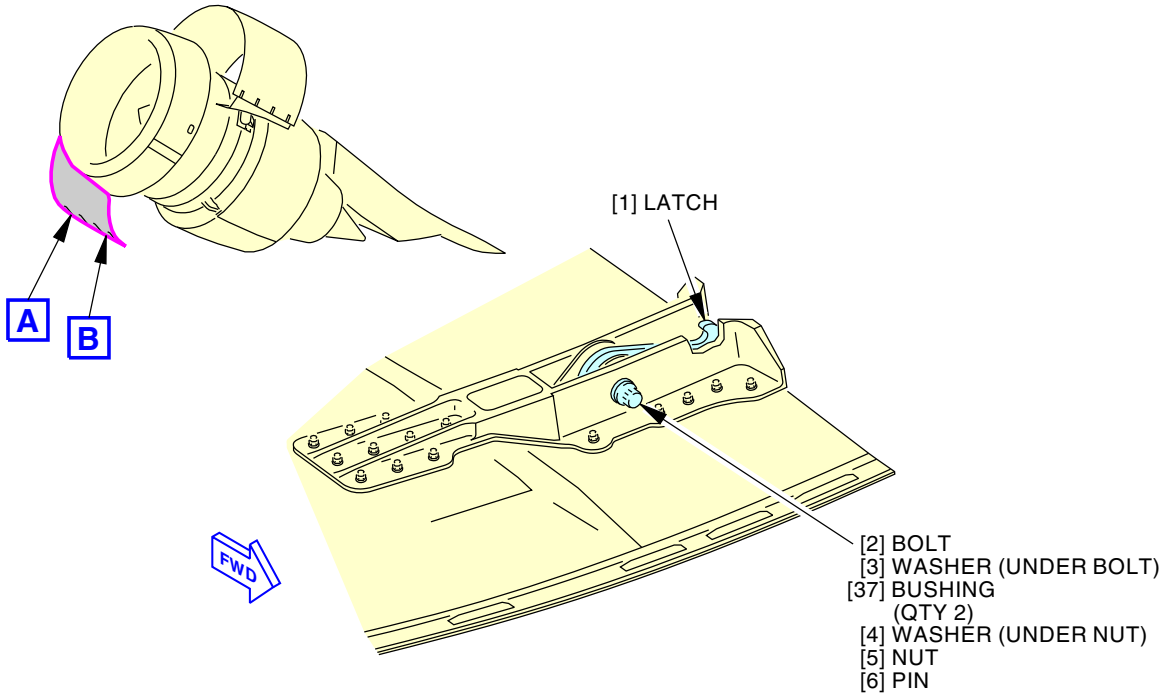
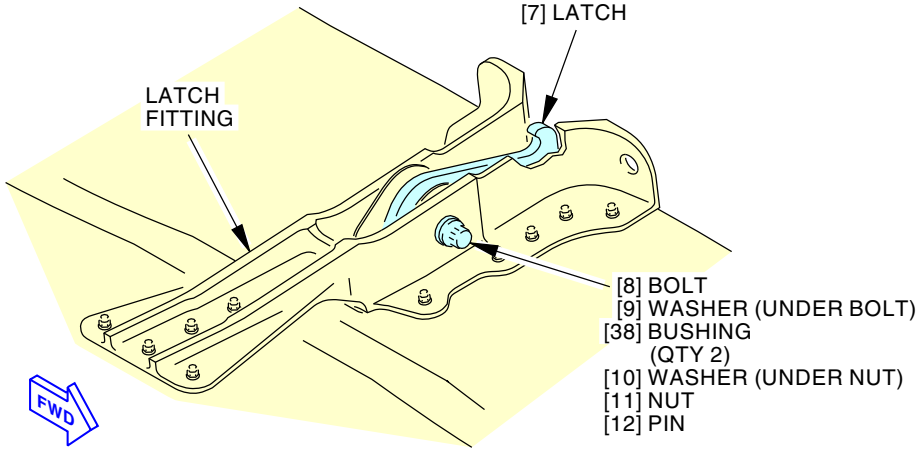


LATCH FITTING NO. 1

A



LATCH FITTING NO. 2, 3, AND 4

B

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Fan Cowl Latches Installation
Figure 401/71-11-05-990-801-H01

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TASK 71-11-05-400-801-H01

3. Fan Cowl Latches Installation

A. General

(1) You must do an adjustment of the fan cowl latches (referred to as the latches) after you install the latches.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)

C. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Latch	71-11-05-01B-205	ARO ALL
7	Latch	71-11-05-01B-207	ARO ALL

E. Location Zones

Zone	Area
414	Right Fan Cowl - Left Engine
424	Right Fan Cowl - Right Engine

F. Access Panels

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
424AR	Right Fan Cowl Panel, Right Engine

G. Fan Cowl Latches Installation

SUBTASK 71-11-05-410-001-H01

(1) Install the applicable latch [1] from the No. 1 latch fitting as follows:

(a) Put the latch [1] in its position on the latch fitting.

(b) Align the bolt hole with the latch bushing holes on the latch fitting.

(c) Install the bolt [2], the washer [3], bushings [37], washer [4], and the nut [5] that attach the latch [1]to the latch fitting.

NOTE: The washer [3] is installed under the bolt. The washer [4] is installed under the nut.

1) Tighten the bolt [2] to 60-90 pound-inches (6.8-10.2 Newton-meters).

2) Install the pin [6] on the bolt [2].

3) Apply approximately 0.06 inch thick of the sealant, A00247 on the washer [4], and the nut [5].

SUBTASK 71-11-05-420-001-H01

(2) Install the applicable latch [7] from the No. 2, 3, or No. 4 latch fitting as follows:

(a) Put the latch [7] in its position on the latch fitting.

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(b) Align the bolt hole with the latch bushing holes on the latch fitting.

(c) Install the bolt [8], the washer [9], bushings [38], washer [10], and the nut [11] that attach the latch [7] to the latch fitting.

NOTE: The washer [9] is installed under the bolt. The washer [10] is installed under the nut.

1) Tighten the bolt [8] to 60-90 pound-inches (6.8-10.2 Newton-meters).

2) Install the pin [12] on the bolt [8].

3) Apply approximately 0.06 inch thick of the sealant, A00247 on the washer [10], and the nut [11].

SUBTASK 71-11-05-410-002-H01

CAUTION

MAKE SURE THE LATCHES ARE ADJUSTED CORRECTLY. THE FAN COWL PANELS COULD MOVE BECAUSE OF ENGINE OPERATION OR HEAT EXPANSION. IF THE LATCHES ARE NOT ADJUSTED CORRECTLY, IT CAN CAUSE DAMAGE TO THE FAN COWL PANELS OR THE ENGINE.

(3) For the latches on the fan cowl panel, Fan Cowl Latch Clearance Adjustment, TASK 71-11-05-800-801-H01.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-05-410-003-H01

(1) For the right fan cowl panel, Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close the applicable access panels:

Number	Name/Location
414AR	Right Fan Cowl Panel, Left Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-440-001-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-11-05-000-802-H01

4. Fan Cowl Latch Keeper Removal

A. General

(1) There are two types of the fan cowl latch keepers (referred to as the latch keepers) that are installed on the keeper fittings at four locations (6:00 o'clock position) on the left fan cowl panel.

(2) You must open the left fan cowl panel to remove the latch keeper.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

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C. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine

D. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

E. Prepare for the Removal

SUBTASK 71-11-05-868-002-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-05-040-002-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-05-010-002-H01

(3) For the left fan cowl panel on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

(a) Open the applicable access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

F. Fan Cowl Latch Keeper Removal

SUBTASK 71-11-05-020-003-H01

(1) Remove the latch keeper [13] from the No. 1 keeper fitting as follows:

(a) For position 1 numbered from front to back, remove the latch keeper [13] from the keeper fitting:

1) Remove the lockwire [24] from the jamnut [23] of the latch keeper [13].

2) Remove the jamnut [23], nut [22], filler [21] that attach the latch keeper [13] to the keeper fitting.

3) Remove the latch keeper [13], bushing [16], washer [15], and jamnut [14] from the keeper fitting.

(2) Remove the applicable latch keeper [30] from the applicable No. 2, 3 or No. 4 keeper fitting:

(a) Remove the bolts [31], washers [32], washers [36], and the nuts [35] that attach the latch keeper [30] and the anti-rotation device [33] to the keeper fitting.

(b) Remove the remaining bolts [34], washers [32], washers [36], and the nuts [35] that attach the latch keeper [30] to the keeper fitting.

(c) Remove the latch keeper [30] from the keeper fitting.

(3) If it is necessary, remove the shim [17] and the shear pin [28] from the applicable latch keeper [30] or latch keeper [13]:

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(a) Remove the bolt [18], washer [20], and the nut [19] from the shim [17].

(b) Remove the shim [27], washer [26], and the nut [25] from the shear pin [28].

——— END OF TASK ———

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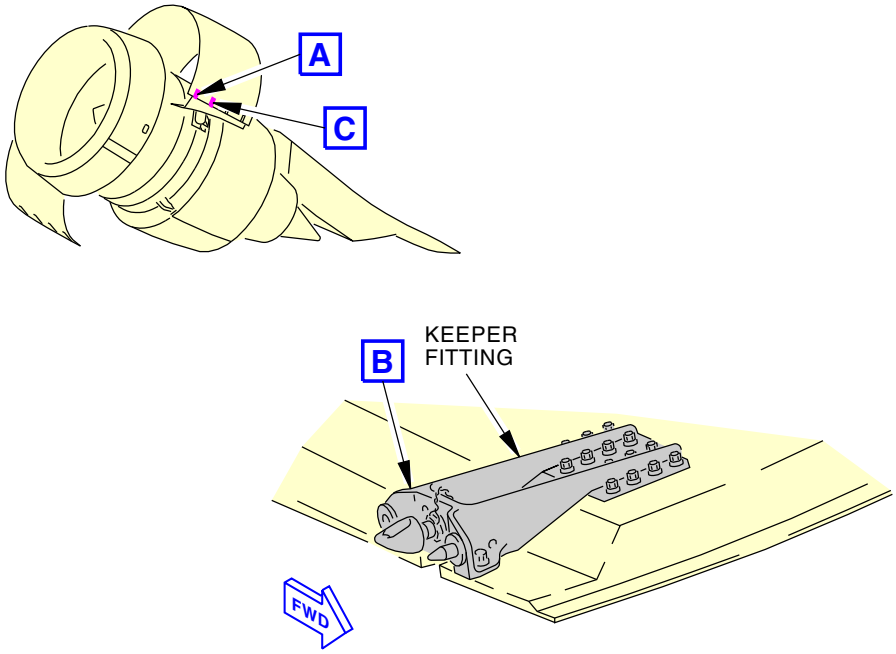

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Fan Cowl Latch Keepers Installation
Figure 402/71-11-05-990-802-H01 (Sheet 1 of 2)

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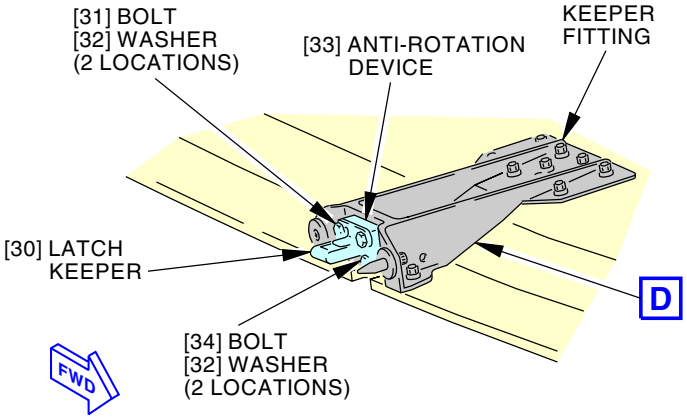
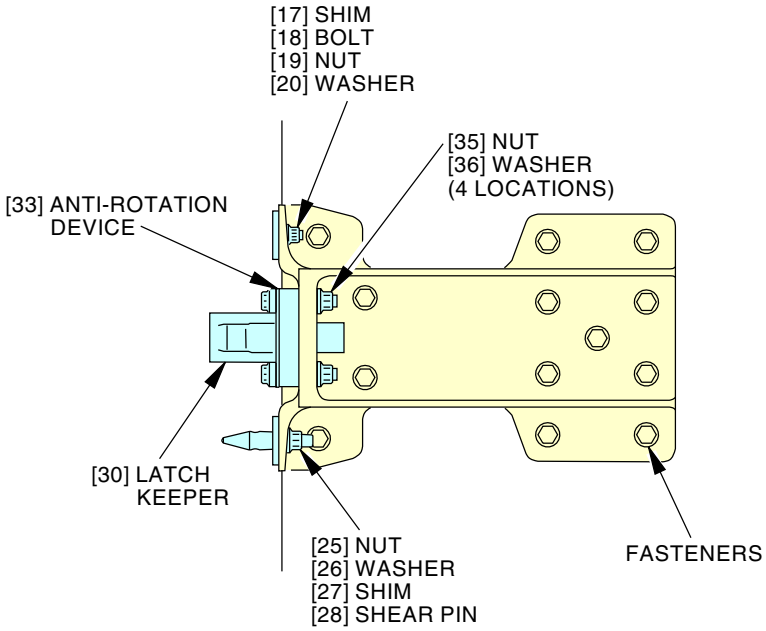


KEEPER FITTING NO. 2, 3, AND 4

C



KEEPER FITTING NO. 2, 3, AND 4

D

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Fan Cowl Latch Keepers Installation
Figure 402/71-11-05-990-802-H01 (Sheet 2 of 2)

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TASK 71-11-05-400-802-H01

5. Fan Cowl Latch Keeper Installation

A. General

(1) If necessary, you need to do the adjustment of the fan cowl latch keepers (referred to as the latch keepers) after you install the latch keeper.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-11-05-800-801-H01	Fan Cowl Latch Clearance Adjustment (P/B 501)

C. Consumable Materials

Reference	Description	Specification
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
13	Latch keeper	71-11-35-01-315	ARO ALL
		71-11-51-12-130	ARO ALL
21	Filler	71-11-35-01-300	ARO ALL
30	Latch keeper	71-11-35-01-280	ARO ALL
		71-11-51-12-135	ARO ALL

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine

F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

G. Latch Keeper Installation

SUBTASK 71-11-05-420-002-H01

(1) Install the applicable latch keeper [13] on the No. 1 latch keeper fitting as follows:

(a) It is necessary to remove 0.003 lamination under the jamnut [14] to achieve the correct gap at the fan cowl split line.

(b) Put the latch keeper [13] on the keeper fitting:

1) Put the latch keeper [13] with the jamnut [14], washer [15], bushing [16] in its position on the keeper fitting.

2) Install the filler [21], nut [22], and jamnut [23] that attach the latch keeper [13] to the keeper fitting.

3) Tighten the jamnut [14], nut [22] and jamnut [23] to 420-540 pound-inches (47.5-61.0 Newton-meters).

4) Install the lockwire [24] (MS20995C32 lockwire, G01048) from the jamnut [14] to the jamnut [23].

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SUBTASK 71-11-05-420-003-H01

(2) Install the applicable latch keeper [30] on the No. 2, 3, or No. 4 latch keeper fitting as follows:

(a) Put the latch keeper [30] on the applicable keeper fitting:

1) Put the latch keeper [30] and the anti-rotation device [33] in their positions on the keeper fitting.

2) Install the bolts [31], washers [32], washers [36], and the nuts [35] that attach the latch keeper [30] to the keeper fitting.

3) Install the remaining bolts [34], washers [32], washers [36], and the nuts [35] that attach the latch keeper [30] to the keeper fitting.

4) Tighten the bolts [31] and bolts [34] to 60-100 pound-inches (6.8-11.3 Newton-meters).

(3) If it is necessary, install shim [17] and shear pin [28] on the applicable latch keeper [30] or latch keeper [13]:

(a) It is necessary to remove 0.003 lamination under the shim [17] and shim [27] to achieve the correct gap at the fan cowl split line.

(b) Install the bolt [18], washer [20], and the nut [19] on the shim [17].

1) Tighten the nut [19].

(c) Install the shim [27], washer [26], and the nut [25] on the shear pin [28].

1) Tighten the nut [25] to 65-100 pound-inches (7.3-11.3 Newton-meters).

SUBTASK 71-11-05-410-004-H01

CAUTION

MAKE SURE THE LATCH KEEPERS ARE ADJUSTED CORRECTLY. THE FAN COWL PANELS COULD MOVE BECAUSE OF ENGINE OPERATION OR HEAT EXPANSION. IF THE LATCH KEEPERS ARE NOT ADJUSTED CORRECTLY, IT CAN CAUSE DAMAGE TO THE FAN COWL PANELS OR THE ENGINE.

(4) For the applicable latch keeper [30] or latch keeper [13] on the fan cowl panel, Fan Cowl Latch Clearance Adjustment, TASK 71-11-05-800-801-H01.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-05-410-005-H01

(1) For the left fan cowl panel, Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close the applicable access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-440-002-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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FAN COWL LATCHES - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) A clearance adjustment for the fan cowl latches.

TASK 71-11-05-800-801-H01

2. Fan Cowl Latch Clearance Adjustment

(Figure 501)

A. General

(1) You must adjust the fan cowl latches or the latch keepers to the correct limits if you find the fan cowl panels are not in the aerodynamic smoothness.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-371	Gauge - Feeler, 0.0 to 0.5 in (0.0 to 12.7 mm), Readable to 1/1000 in (.025 mm)
STD-755	Scale - Spring, Push/Pull Type, 0 to 150lbs (0 to 68kg) Capacity
STD-996	Wrench - Hexagonal, Long Shaft, 7/64 in

D. Consumable Materials

Reference	Description	Specification
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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G. Fan Cowl Latch Clearance Adjustment

SUBTASK 71-11-05-868-003-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-05-040-003-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-05-010-003-H01

(3) For the left and right fan cowl panels on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-869-001-H01

(4) Make sure the shims on the latch keepers are not damaged or missing.

(a) If the shims on the latch keepers are damaged or missing, do these steps:

1) Remove the bolt (or shear pin), washer, and the nut that attach the shim to the latch keeper.
2) Remove the damaged shim(s) and discard.
3) Add new shim stock (0.003 in. (0.076 mm) laminations) to the shim.
4) Apply primer, C00259 to the shim mating surfaces.
5) Install the shim on the latch keeper with the bolt (or shear pin), washer, and nut.

NOTE: Make sure the solid face of the shim is visible. You can change the grip length (± 2 sizes) of bolt to fit the shim thickness.

SUBTASK 71-11-05-410-006-H01

(5) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-820-001-H01

(6) Do a test for the latch handle:

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CAUTION DO NOT USE MORE THAN 100 POUNDS FORCE ON THE LATCH HANDLE. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH, LATCH KEEPER, OR THE FAN COWL PANEL.

(a) Apply a force of 40 lbf (178 N) to 60 lbf (267 N) with hand pressure and a spring scale, STD-755 on the end of the latch handle to close it.

(b) Make sure the scale force is measured between 0.25 in. (6.35 mm) to 1.00 in. (25.40 mm) from the end of the handle.

(c) If the force is not in the limits, do these steps:

1) Open the latch handle to release the tension on the latch keeper.

2) For latch positions 2, 3 and 4 (numbered front to back), adjust the latch tension as follows:

a) Insert the 7/64 in hexagonal long shaft wrench, STD-996 into the adjustment star through the notch in the panel edge.

b) Move the 7/64 in hexagonal long shaft wrench, STD-996 aft to increase the latch tension or forward to decrease the latch tension.

3) For latch position 1 (numbered front to back), adjust the latch tension as follows:

a) If installed, remove the lockwire from the nuts on the latch keeper.

b) Loosen the nuts.

c) Adjust the latch keeper nuts to increase or decrease the latch tension.

d) If the latch tension is satisfactory, tighten the nuts to 420 in-lb (47 N·m) to 540 in-lb (61 N·m).

e) Install the MS20995C32 lockwire, G01048 on the nuts.

SUBTASK 71-11-05-820-002-H01

(7) Measure and record the gap at the fan cowl split line at each of the latch locations.

SUBTASK 71-11-05-869-002-H01

(8) With a 0.0 to 0.5 in (0.0 to 12.7 mm) feeler gauge, STD-371, measure and record the gap (if found) between each shim (8 locations) and the mating surface on the opposite fan cowl panel.

SUBTASK 71-11-05-010-004-H01

(9) If the gaps are not in the limits that follow, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-820-003-H01

(10) If the gap at the fan cowl split line is not 0.240 ± 0.060 inch (6.10 ± 1.52 mm), remove or add 0.003 in. (0.076 mm) laminations as it is necessary to get the correct gap.

(a) Make sure to apply primer, C00259 to the shim mating surfaces.

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SUBTASK 71-11-05-820-004-H01

(11) If the gap between the shim and the opposite fan cowl panel is equal to or greater than 0.003 in. (0.076 mm), add shim stock (0.003 in. (0.076 mm) laminations) at each shim location equal to the 0.0 to 0.5 in (0.0 to 12.7 mm) feeler gauge, STD-371 measurement.

(a) Make sure to apply a primer, C00259 to the shim mating surfaces.

SUBTASK 71-11-05-410-007-H01

(12) If opened, do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-05-869-003-H01

(13) Repeat all the steps above until the latch force, the gap between the shims and fan cowl panel, and the gap at the fan cowl split line are in the limits.

SUBTASK 71-11-05-440-003-H01

(14) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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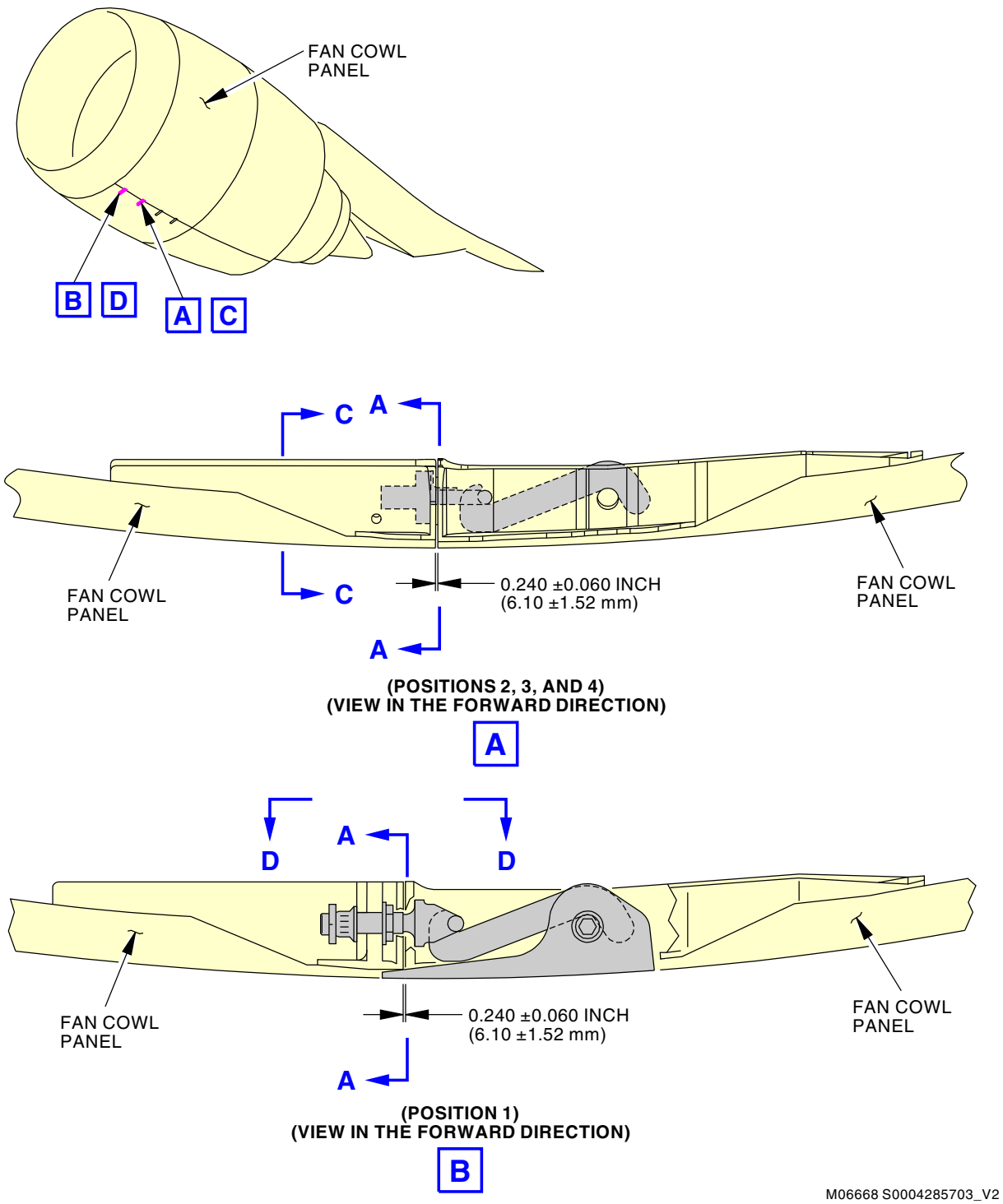

Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-H01 (Sheet 1 of 3)

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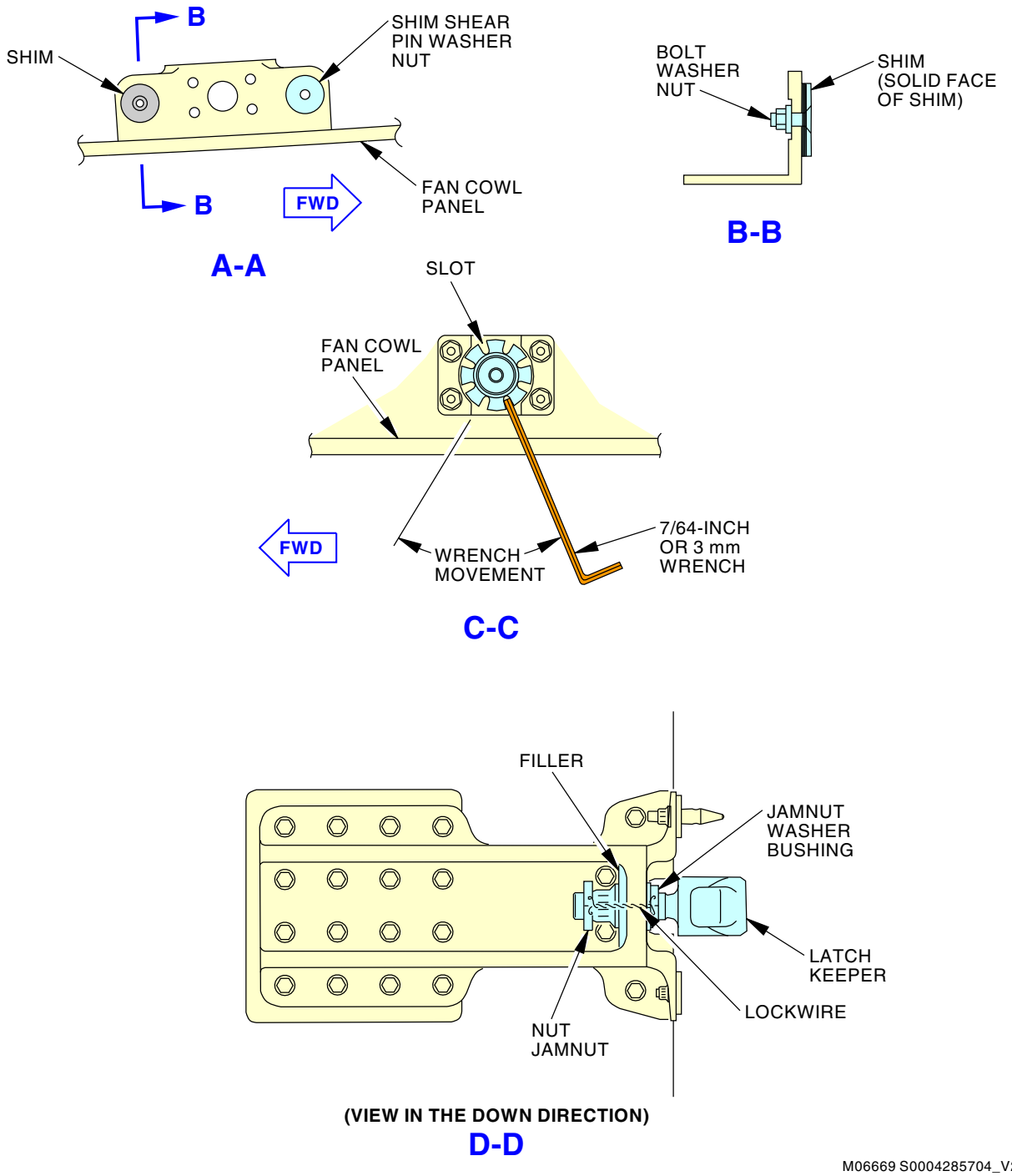

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Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-H01 (Sheet 2 of 3)

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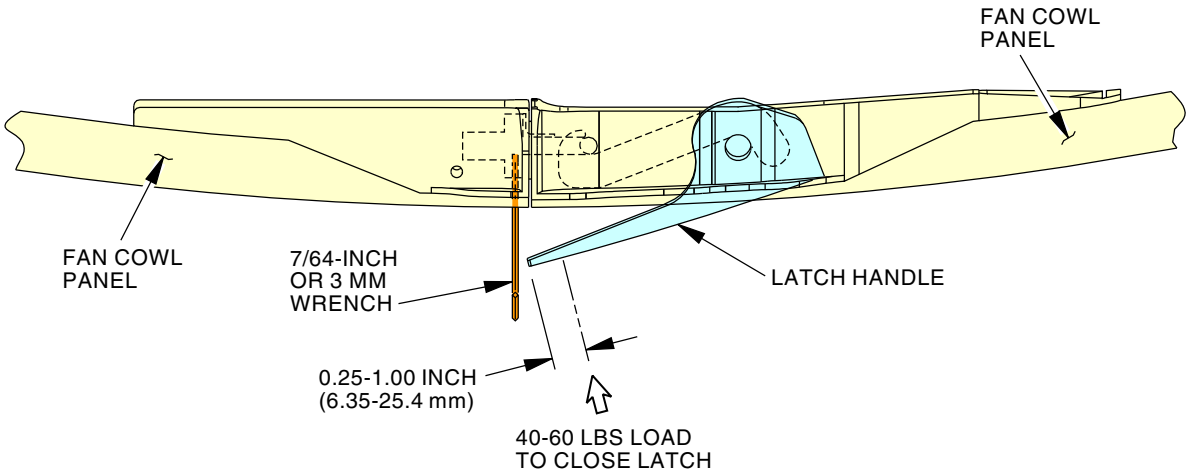
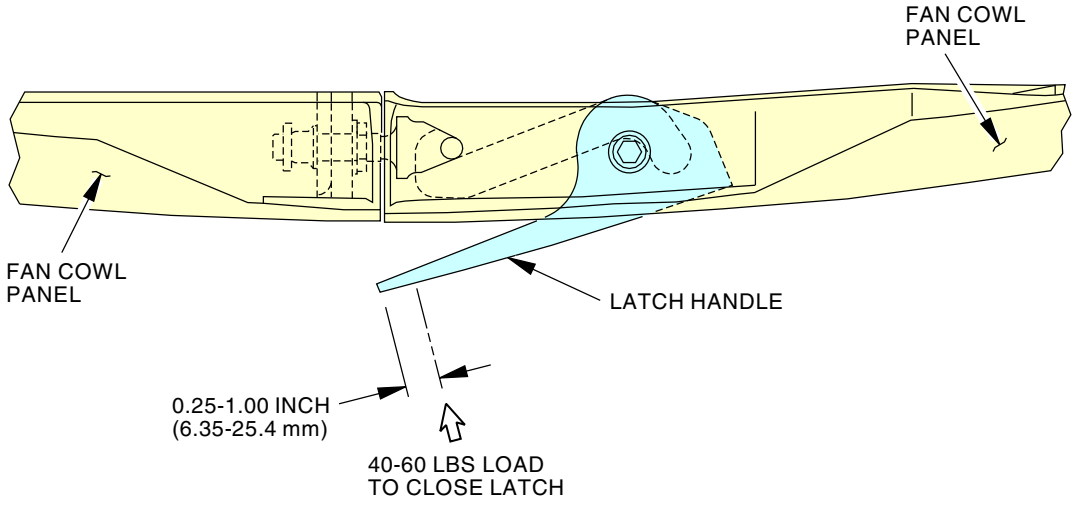


(POSITIONS 2, 3, AND 4)
(VIEW IN THE FORWARD DIRECTION)

C



(POSITION 1)
(VIEW IN THE FORWARD DIRECTION)

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Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-H01 (Sheet 3 of 3)

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OIL TANK ACCESS DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the oil tank access door

(2) An installation of the oil tank access door.

TASK 71-11-10-000-801-H01

2. Oil Tank Access Door Removal

A. General

(1) The oil tank access door (referred to as the access door) is installed on the left fan cowl panel at the 9:00 o'clock position.

(2) The access doors are identified as follows:

(a) L Engine = 413BL and

(b) R Engine = 423BL.

B. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

C. Oil Tank Access Door Removal

SUBTASK 71-11-10-010-001-H01

(1) Open the access door [1] on the left fan cowl panel:

(a) Push on the top part of each latch to release the latch.

(b) Pull the latches to the open position from the rub plate of the fan cowl.

(c) Put the access door [1] in the fully open position.

SUBTASK 71-11-10-869-001-H01

(2) Hold the access door [1] tightly.

SUBTASK 71-11-10-030-001-H01

(3) Remove the nuts [4], washers [3], and the bolts [2] that attach the hinge fitting [11] to the access door [1].

SUBTASK 71-11-10-020-001-H01

(4) Remove the access door [1] from the fan cowl panel.

(a) Remove the shim [14] and roll pins [13] from each hinge fitting [11].

(b) Remove the hinge fitting [11], washer [5] and washer [12] from the bracket.

——— END OF TASK ———

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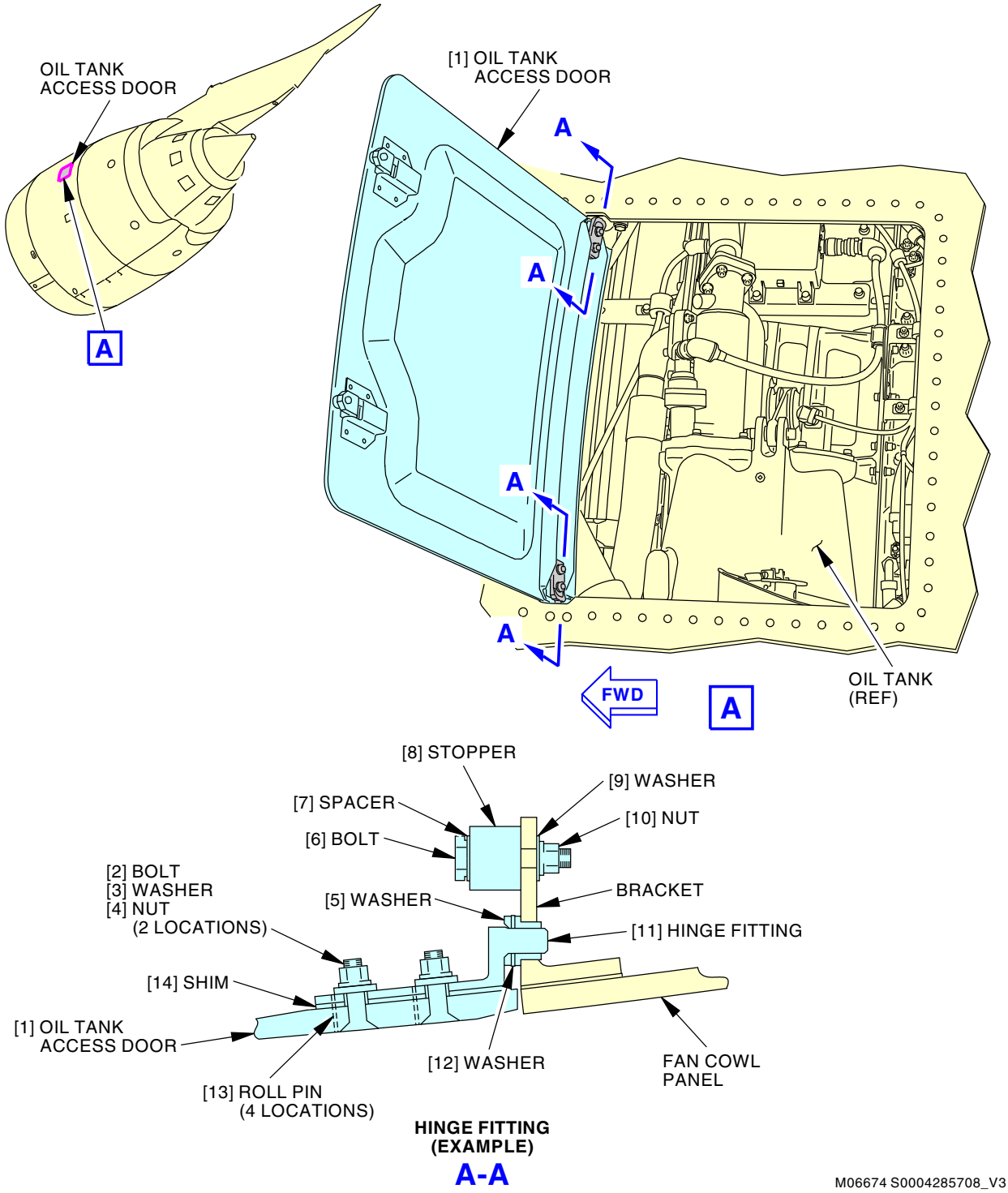

Oil Tank Access Door Installation
Figure 401/71-11-10-990-801-H01

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TASK 71-11-10-400-801-H01

3. Oil Tank Access Door Installation

A. General

(1) The oil tank access door (referred to as the access door) is installed on the left fan cowl panel at the 9:00 o'clock position.

B. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS5-26)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	71-11-10-07B-055	ARO ALL

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Oil Tank Access Door Installation

SUBTASK 71-11-10-410-004-H01

(1) Install the washer [5] and washer [12] on the lower hinge fitting [11].

SUBTASK 71-11-10-410-001-H01

(2) Put the access door [1] in its opening position on the fan cowl panel.

SUBTASK 71-11-10-420-001-H01

(3) Install the washer [5] and washer [12] on the upper hinge fitting [11].

SUBTASK 71-11-10-869-002-H01

(4) Put the hinge fitting [11] with the washer [5] and washer [12] into the upper and lower brackets of the fan cowl panel.

(a) Align the hinge fitting [11] holes and the shim [14] holes to the bolt holes on the access door [1].

NOTE: It is acceptable to peel laminations from the hinge fitting shim or added the shim to achieve proper alignment of the access door.

(b) Lubricate the bolts [2] shank with sealant, A00436.

(c) Install the bolts [2], the washers [3], and the nuts [4] to attach the hinge fitting [11] to the access door [1].

NOTE: Do not tighten the bolts at this time.

(d) Close and open the access door [1] to check the clearance and alignment to the fan cowl panel.

(e) If it is necessary, adjust the hinge fitting [11] to achieve proper alignment and aerodynamic fair.

NOTE: It is acceptable to peel laminations from the hinge fitting shim or added the shim to achieve proper alignment of the access door.

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(f) If a new access door [1] is used, drill shim [14] and access door [1] from two opposite holes in each hinge fitting [11]

(g) Lubricate the roll pins [13] with primer, C00259.

(h) Install the roll pins [13] to make sure the hinge fitting [11] align correctly.

(i) Tighten the nuts [4] to 20-25 pound-inches (2.3-2.8 Newton-meters).

SUBTASK 71-11-10-820-001-H01

(5) If necessary, adjust the access door [1] on the bolt [6], spacer [7], washer [9], and nut [10] of the stopper [8].

SUBTASK 71-11-10-211-001-H01

(6) Make sure the latch force within the limits of 18-20 pounds (80-89 Newtons) at the clamping surface when the latch is fully locked.

SUBTASK 71-11-10-410-003-H01

(7) Close the access door [1]:

(a) Make sure the latches are in the fully open position.

(b) Put the access door [1] in the fully closed position.

(c) Push the top part of the latch level with the surface of the access door [1].

——— END OF TASK ———

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HOLD-OPEN RODS - MAINTENANCE PRACTICES

1. General

A. This procedure has four tasks:

(1) A removal of the hold-open rods

(2) An installation of the hold-open rods

(3) An examination of the hold-open rods

(4) The fan cowl hold-open rods detailed inspection

(5) Clean the hold-open rods.

TASK 71-11-11-000-801-H01

2. Hold-Open Rods Removal

(Figure 201 or Figure 202 and Figure 201 or Figure 202)

A. General

(1) Each fan cowl panel has two telescoping hold-open rods. The fan cowl hold-open rods (referred to as F/C hold-open rods) are stowed in the vertical position on the fan cowl panel when the fan cowl panel is closed.

(2) The left and right thrust reversers on the engine each have one telescoping hold-open rod. The thrust reverser hold-open rod (referred to as T/R hold-open rod) is installed the thrust reverser lower bracket assembly and on the fan case bracket assembly.

(3) The removal procedure of the left side or the right side F/C or T/R hold-open rods are the same.

(4) You must open the fan cowl panel to remove the hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

D. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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E. Prepare for the Removal

SUBTASK 71-11-11-869-001-H01

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-11-040-001-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-11-010-001-H01

(3) For the applicable fan cowl panel on the applicable engine, do this task: Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Fan Cowl Hold-Open Rods Removal

SUBTASK 71-11-11-020-001-H01

(1) Remove the applicable F/C hold-open rod [1]:

(a) Remove the nut [3] and the washer [4] that attach the F/C hold-open rod [1] to the lower bracket fitting on the fan cowl panel.

(b) Disconnect the quick-release pin [2] from the F/C hold-open rod [1] and the bracket assembly on the fan case.

(c) Remove the F/C hold-open rod [1] from the fan cowl panel.

G. Thrust Reverser Hold-Open Rod Removal

SUBTASK 71-11-11-020-002-H01

(1) Remove the applicable T/R hold-open rod [21]:

(a) Remove the bolt [23], washer [24], washer [26] and the retainer nut [27] that attach the T/R hold-open rod [21] to the thrust reverser lower bracket assembly.

(b) Disconnect the quick disconnect pin [22] from the fan case bracket assembly.

(c) Remove the T/R hold-open rod [21] from the thrust reverser.

END OF TASK

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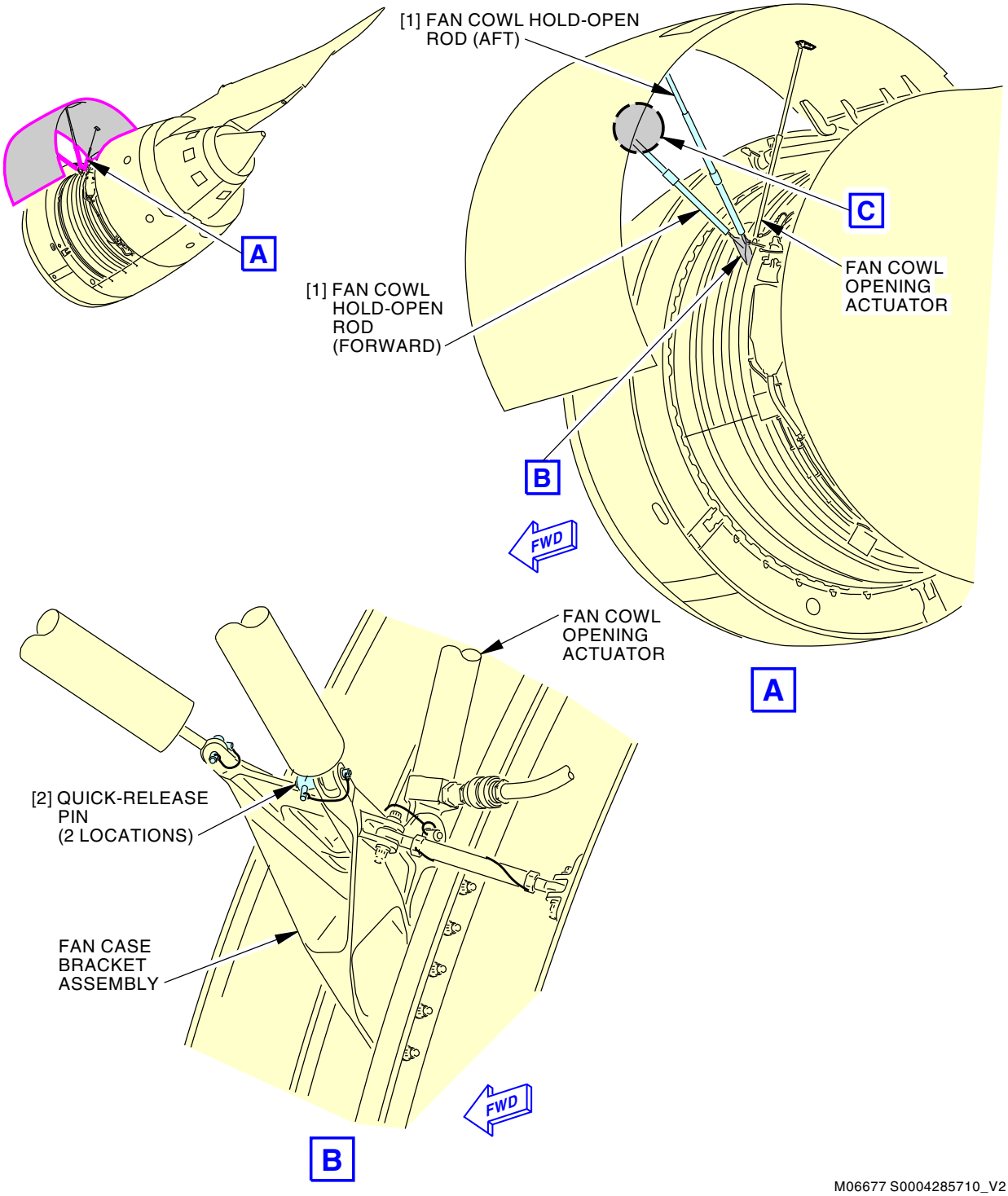

Fan Cowl Hold-Open Rods Installation
Figure 201/71-11-11-990-801-H01 (Sheet 1 of 2)

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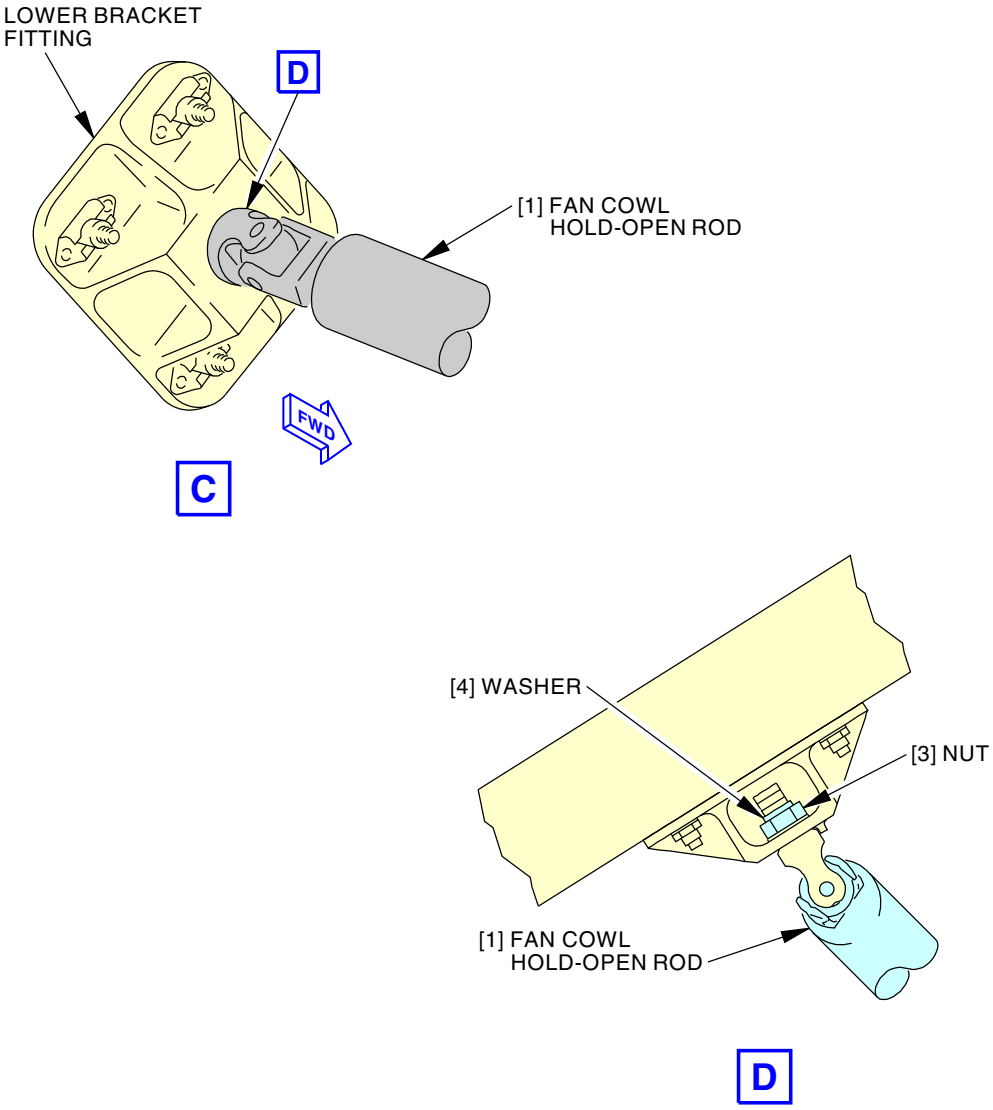

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Fan Cowl Hold-Open Rods Installation
Figure 201/71-11-11-990-801-H01 (Sheet 2 of 2)

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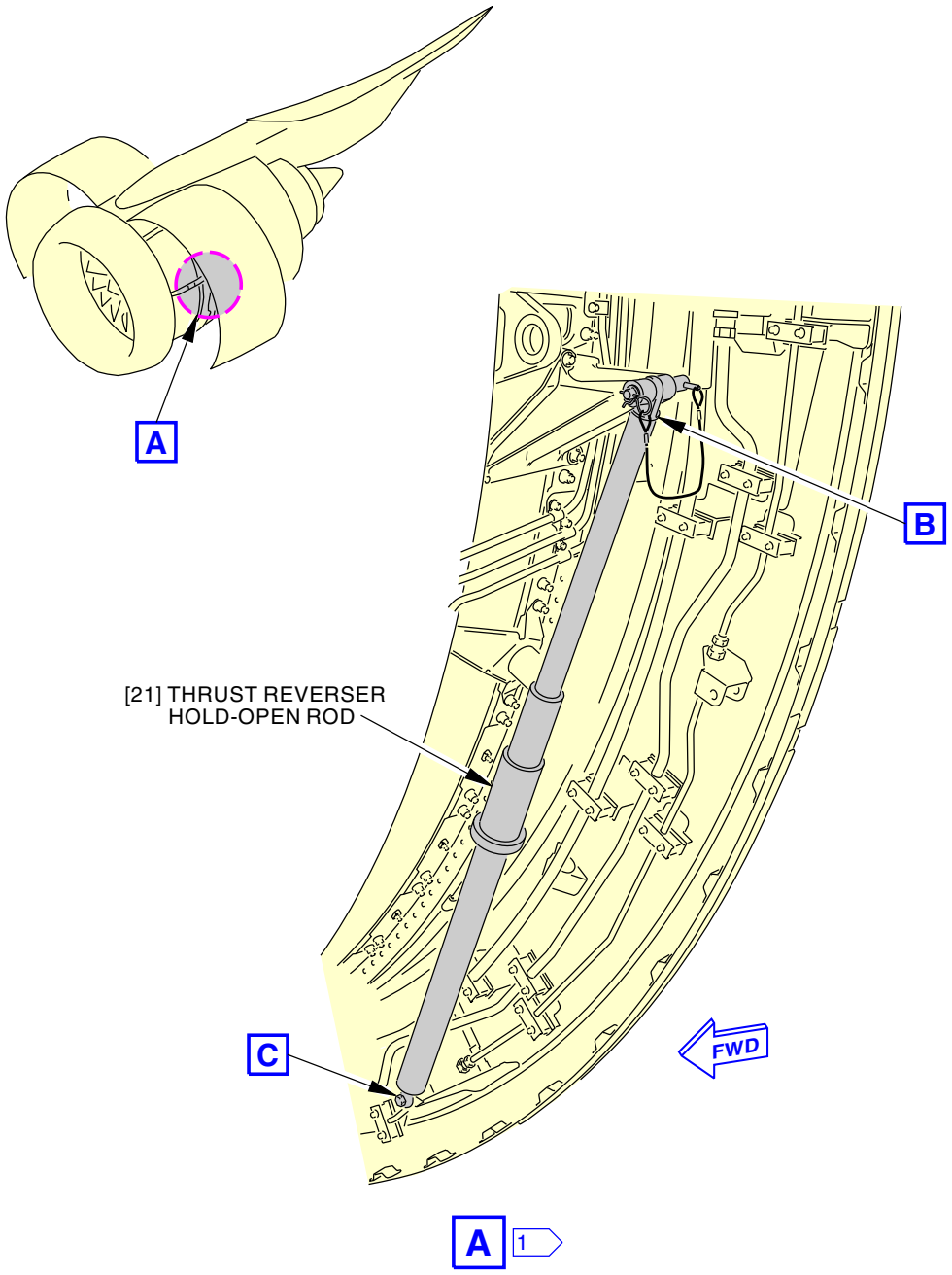

1 LEFT AND RIGHT THRUST REVERSER HOLD-OPEN ROD INSTALLATION ARE THE SAME

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Thrust Reverser Hold-Open Rods Installation
Figure 202/71-11-11-990-802-H01 (Sheet 1 of 2)

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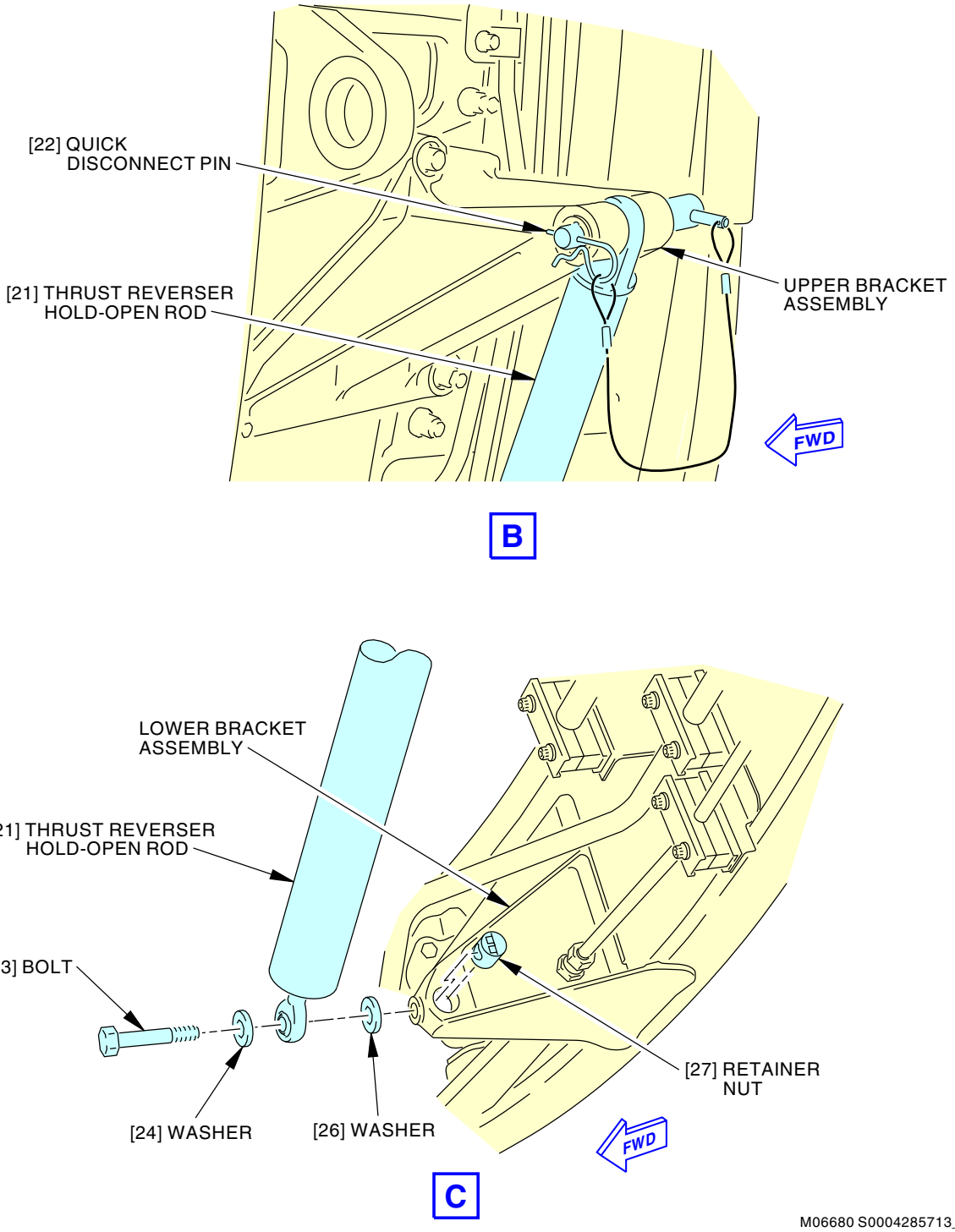

Thrust Reverser Hold-Open Rods Installation
Figure 202/71-11-11-990-802-H01 (Sheet 2 of 2)

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TASK 71-11-11-400-801-H01

3. Hold-Open Rods Installation

(Figure 201 or Figure 202 and Figure 201 or Figure 202)

A. General

(1) The forward fan cowl hold-open rod is interchangeable with the aft fan cowl hold-open rod.

(2) The installation procedure of the hold-open rod on the left side and the right side is the same.

(3) You must open the fan cowl panel to install the hold-open rods.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	F/C hold-open rod	71-11-11-01B-040	ARO ALL
21	T/R hold-open rod	78-31-51-56B-040	ARO ALL

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Fan Cowl Hold-Open Rods Installation

SUBTASK 71-11-11-420-001-H01

(1) Install the applicable F/C hold-open rod [1]:

(a) Connect the F/C hold open rod [1] end to the fan case bracket assembly.

1) Align the F/C hold open rod [1] end with the bracket bushings.

2) Install the quick-release pin [2].

(b) Connect the other F/C hold open rod [1] end to the lower fan cowl bracket fitting.

1) Put the other F/C hold open rod [1] end in its position on the lower fan cowl bracket fitting.

2) Install the washer [4] and the nut [3].

3) Tighten the nut [3] to 160-240 pound-inches (18.1-27.1 Newton-meters).

G. Thrust Reverser Hold-Open Rod Installation

SUBTASK 71-11-11-420-002-H01

(1) Install the applicable T/R hold-open rod [21]:

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(a) Connect the T/R hold-open rod [21] end to the engine fan case bracket assembly.

1) Align the T/R hold-open rod [21] end with the bracket bushings.

2) Install the quick disconnect pin [22].

(b) Connect the other T/R hold-open rod [21] end to the lower thrust reverser bracket assembly.

1) Put the other T/R hold-open rod [21] end in its position on the lower thrust reverser bracket assembly.

2) Install the bolt [23], washer [24], washer [26], and the retainer nut [27].

3) Tighten the bolt [23] to 370-690 pound-inches (41.8-78.0 Newton-meters).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-410-001-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-11-440-001-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-11-11-200-801-H01

4. Hold-Open Rods Examination

(Figure 201 or Figure 202 and Figure 201 or Figure 202)

A. General

(1) This task is a visual examination of the hold-open rod (F/C or T/R) and brackets for contamination and damage.

(2) You must open the fan cowl panels to do the examination of the hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

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D. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

E. Prepare for the Examination

SUBTASK 71-11-11-869-002-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-11-040-002-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-11-010-002-H01

(3) For the applicable fan cowl panel on the applicable engine, (TASK 71-11-04-010-814-H00).

(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Hold-Open Rods Examination

SUBTASK 71-11-11-210-001-H01

(1) Visually examine the applicable F/C hold-open rod [1] and T/R hold-open rod [21] for damage:

(a) Make sure there are no cracks in the F/C hold-open rod [1] and T/R hold-open rod [21] ends.

(b) Extend the F/C hold-open rod [1] and T/R hold-open rod [21] to make sure they operate smoothly:

1) For the applicable F/C hold-open rod [1], disconnect the quick-release pin [2] at the bracket assembly on the fan case.

2) For the applicable T/R hold-open rod [21], disconnect the quick disconnect pin [22] at the engine fan case bracket assembly.

3) Manually extend and retract the hold-open rod, which should operate smoothly.

(c) Make sure there is no contamination on the F/C hold-open rod [1] and T/R hold-open rod [21].

(d) If there is contamination on the F/C hold-open rod [1] and T/R hold-open rod [21], clean the hold-open rod (refer to the task that follows).

SUBTASK 71-11-11-210-002-H01

(2) Visually examine the bracket assemblies for damage.

(a) Make sure there is no crack in the fan case bracket fittings and bushings.

(b) Make sure there is no crack in the thrust reverser bracket assemblies and bushings.

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(c) Make sure there is no corrosion on the brackets and the fittings.

SUBTASK 71-11-11-420-003-H01

(3) Install the applicable F/C hold-open rod [1]:

(a) Connect the applicable F/C hold-open rod [1] end to the fan case bracket assembly.

(b) Align the F/C hold-open rod [1] end with the bracket bushings.

(c) Install the quick-release pin [2].

SUBTASK 71-11-11-420-004-H01

(4) Install the applicable T/R hold-open rod [21]:

(a) Connect the T/R hold-open rod [21] end to the engine fan case bracket assembly.

(b) Align the T/R hold-open rod [21] end with the bracket bushings.

(c) Install the quick disconnect pin [22].

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-410-002-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-11-440-002-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-11-11-200-802-H00

5. Fan Cowl Hold-Open Rods Detailed Inspection

(Figure 201 or Figure 202 and Figure 201 or Figure 202)

A. General

(1) This task is a detailed examination of the hold-open rod (F/C) and brackets for worn area.

(2) You must open the fan cowl panels to do the examination of the hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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D. Prepare for the Examination

SUBTASK 71-11-11-869-004-H00

CAUTION

RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-11-869-005-H00

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-11-010-004-H00

(3) For the applicable fan cowl panels on the applicable engine, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

E. Hold-Open Rods Detailed Inspection

SUBTASK 71-11-11-210-003-H00

(1) Do this task: Hold-Open Rods Examination, TASK 71-11-11-200-801-H01.

SUBTASK 71-11-11-210-004-H00

(2) Examine the F/C hold-open rod [1] bracket for worn parts.

(a) If the internal diameter of the lug on the bracket have a range of 0.375 - 0.449 inch (9.525 - 11.405 mm), do the inspection every 3000 flight hours.

(b) If the internal diameter of the lug on the bracket have a range of 0.450 - 0.500 inch (11.430 - 12.700 mm), do the inspection every 1500 flight hours.

NOTE: The center of the enlarged hole is in the same position as the original hole.

NOTE: An oversized bushing must be used to replace the original bushing. The inner diameter and material of the oversized bushing must be the same as the original bushing

END OF TASK

TASK 71-11-11-100-801-H01

6. Clean the Hold-Open Rods

(Figure 201 or Figure 202 and Figure 201 or Figure 202)

A. General

(1) This task gives a procedure to clean the hold-open rods (F/C or T/R) with a solvent.

(2) You must open the fan cowl panels to clean the hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)

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(Continued)

Reference	Title
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Consumable Materials

Reference	Description	Specification
B00090	Solvent - Inhibited Trichloroethane 1,1,1	MIL-T-81533
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

E. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

F. Prepare for the Cleaning

SUBTASK 71-11-11-869-003-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-11-11-040-003-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-11-11-010-003-H01

(3) For the applicable fan cowl panel on the applicable engine, do this task: Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

G. Procedure

SUBTASK 71-11-11-160-001-H01

(1) Clean the applicable F/C hold-open rod [1] or T/R hold-open rod [21]:

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(a) Make sure the F/C hold-open rod [1] or T/R hold-open rod [21] is fully extended.

WARNING

DO NOT GET THE SOLVENT IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENT. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE SOLVENT. KEEP THE SOLVENT AWAY FROM THE SPARKS, FRAME, AND HEAT. THE SOLVENT IS A POISONOUS AND FLAMMABLE LIQUID WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Apply a large quantity of the solvent, B00090 to the F/C hold-open rod [1] or T/R hold-open rod [21].

(c) Extend and retract the F/C hold-open rod [1] or T/R hold-open rod [21] to flush the dirt, oil, or grease.

(d) Clean the bracket assemblies and the fittings.

(e) Dry the F/C hold-open rod [1] or T/R hold-open rod [21], the brackets, and the fittings with a clean dry, cotton wiper, G00034.

(f) Extend and retract the F/C hold-open rod [1] or T/R hold-open rod [21] to make sure it operates smoothly.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-410-003-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-11-440-003-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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FAN COWL SUPPORT BEAM ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the fan cowl support beam assembly

(2) A installation of the fan cowl support beam assembly.

TASK 71-11-12-000-801-H01

2. Fan Cowl Support Beam Assembly Removal

A. General

(1) The fan cowl support beam assembly is installed above the engine fan case on the fan case mounted brackets.

(2) You must remove the applicable No. 1 forward fairing and the fan cowl panels to get access to the fan cowl support beam assembly.

B. References

Reference	Title
54-52-01-000-802-001	Fan Cowl Support Beam Fairings Removal (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-11-04-000-805-H01	Fan Cowl Panels Removal (P/B 401)
71-12-04-000-801-H01	PDOS Pump Removal (P/B 401)
71-12-04-400-801-H01	PDOS Pump Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
SPL-2071	Sling - Equipment, Fan Cowl Support Beam (GE90, GE90-115B & PW) Part #: J71015-28 Supplier: 81205 Opt Part #: J71015-18 Supplier: 81205
STD-246	Crane - Lift, 2000 lb (907 kg) capacity, 30 ft (9.1 m) height
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

Reference	Description	Specification
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

Number	Name/Location
431BT	PDOS Pump Access Door
441BT	PDOS Pump Access Door

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G. Prepare for the Removal

SUBTASK 71-11-12-865-001-H01

(1) For the left engine; open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-11-12-865-002-H01

(2) For the right engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-11-12-020-001-H01

(3) For the left and right fan cowl panels, do this task: Fan Cowl Panels Removal, TASK 71-11-04-000-805-H01.

SUBTASK 71-11-12-020-002-H01

(4) Remove the No. 1 forward fairing (TASK 54-52-01-000-802-001):

(a) Remove the applicable access panels:

Number	Name/Location
431BT	PDOS Pump Access Door
441BT	PDOS Pump Access Door

H. Fan Cowl Support Beam Assembly Removal

SUBTASK 71-11-12-030-001-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(1) Disconnect the left T/R hydraulic cowl opening flexhose [12] and the right T/R hydraulic cowl opening flexhose [14] from the quick disconnects (2 locations) of the thrust reverser PDOS: Figure 401 or Figure 402

(a) Put the protective cap on the quick disconnects and the flexhose fittings.

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SUBTASK 71-11-12-030-002-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(2) Use teflon-jawed pliers, STD-664 to disconnect the electrical connector [1], electrical connector [2], electrical connector [3], and the electrical connector [4] from the forward side disconnect of the fan cowl support beam assembly (TASK 70-00-01-400-807-H01).

(a) Put the protective caps on the electrical connector [1], electrical connector [2], electrical connector [3], and the electrical connector [4], and the receptacles.

(b) Remove the bolts [11] and bolts [17] that attach the electrical connector harnesses to the fan cowl support beam assembly.

(c) Put the tags on the wire harnesses to identify their positions for the installation.

SUBTASK 71-11-12-030-003-H01

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(3) Use teflon-jawed pliers, STD-664 to disconnect the electrical connector [5] and the electrical connector [6] (TASK 70-00-01-400-807-H01):

(a) Disconnect the electrical connector [5] and the electrical connector [6] from the PDOS pump.

(b) Install the protective caps on the electrical connector [5] and the electrical connector [6] and the receptacles.

SUBTASK 71-11-12-030-004-H01

(4) Disconnect the PDOS bonding jumper [16] from the fan case engine bracket:

(a) Remove the bolt [21], washer [22], and the nut [23] from the PDOS bonding jumper [16].

(b) Make sure the PDOS bonding jumper [16] is free from the fan case.

SUBTASK 71-11-12-030-005-H01

(5) Put the protective caps on the static pressure ports, and on the fan cowl static pressure hose [8] and the fan cowl static pressure hose [15] at the fan cowl panels.

NOTE: The static pressure hoses were disconnected from the static pressure ports when you removed the fan cowl panels:

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SUBTASK 71-11-12-030-006-H01

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION

PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(6) Disconnect the fan cowl hydraulic flexhose [9], fan cowl hydraulic flexhose [10], fan cowl hydraulic flexhose [18], and the fan cowl hydraulic flexhose [20] from the PDOS hydraulic tube fittings (left and right of the fan case) under the fan cowl support beam assembly:

(a) Put the protective caps on the fan cowl hydraulic flexhose [9], fan cowl hydraulic flexhose [10], fan cowl hydraulic flexhose [18], and the fan cowl hydraulic flexhose [20] and the flexhose fittings.

(b) Put the tags on the hydraulic flexhoses to identify their positions for the installation.

SUBTASK 71-11-12-030-007-H01

(7) Disconnect the fan case ECS bleed hose [13] and the fan case ECS bleed hose [19] from the hydraulic tube fittings (left and aft of the fan cowl support beam assembly):

(a) Put the protective caps on the fan case ECS bleed hose [13] and the fan case ECS bleed hose [19] and the flexhose fittings.

(b) Put the tags on the hydraulic flexhoses to identify their positions for the installation.

SUBTASK 71-11-12-020-003-H01

(8) Remove the fan cowl support beam assembly [62]:

(a) Attach the fan cowl support beam sling, SPL-2071 on the fan cowl hinges with the sling pins.

(b) Put the fan cowl support beam sling, SPL-2071 at the center of the fan cowl support beam assembly [62].

(c) Align the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 on top of the hoist attach point.

(d) Attach the fan cowl support beam sling, SPL-2071 to the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 at the hoist attach point.

(e) Lift the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 slowly and stop when the fan cowl support beam sling, SPL-2071 is no longer loose.

NOTE: Do not put the support beam sling in tension.

(f) Disconnect the forward diagonal link [30]:

1) Remove the bolt [35], washer [34], bushing [33], washer [32], and the nut [31] that attach the forward diagonal link [30] to the forward flange bracket.

2) Secure the forward diagonal link [30] to the forward side of the fan cowl support beam assembly [62] with Scotch Flatback Masking Tape 250, G00270.

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(g) Disconnect the forward fan cowl support beam assembly [62] from the forward flange brackets.

1) Remove the bolts [24], washers [25], bushings [26], washers [27], and the nuts [28], that attach the forward fan cowl support beam assembly [62] to the forward flange bracket.

(h) Disconnect the aft diagonal link [36]:

1) Remove the bolt [42], washer [43], bushing [44], washer [45], and the nut [46] that attach the aft diagonal link [36] to the hoist support fitting.

2) Secure the aft diagonal link [36] to the aft side of the fan cowl support beam assembly [62] with Scotch Flatback Masking Tape 250, G00270.

(i) Disconnect the aft fan cowl support beam assembly [62] from the aft fan cowl support beam brackets.

1) Remove the bolt [40], anti-rotation clip [41], and the nut [38] that attach the aft left side of the fan cowl support beam assembly [62] to the left bracket.

2) Remove the bolt [40], anti-rotation clip [39], , and the nut [38] that attach the aft right side of the fan cowl support beam assembly [62] to the right bracket.

(j) Make sure the fan cowl support beam assembly [62] is completely free from all hoses, electrical components, and tubings.

(k) Lift the fan cowl support beam assembly [62] slowly away from the engine.

SUBTASK 71-11-12-869-001-H01

(9) If you will install a new fan cowl support beam assembly [62], move the PDOS pump to the replacement. These are the tasks: PDOS Pump Removal, TASK 71-12-04-000-801-H01 and PDOS Pump Installation, TASK 71-12-04-400-801-H01.

——— END OF TASK ———

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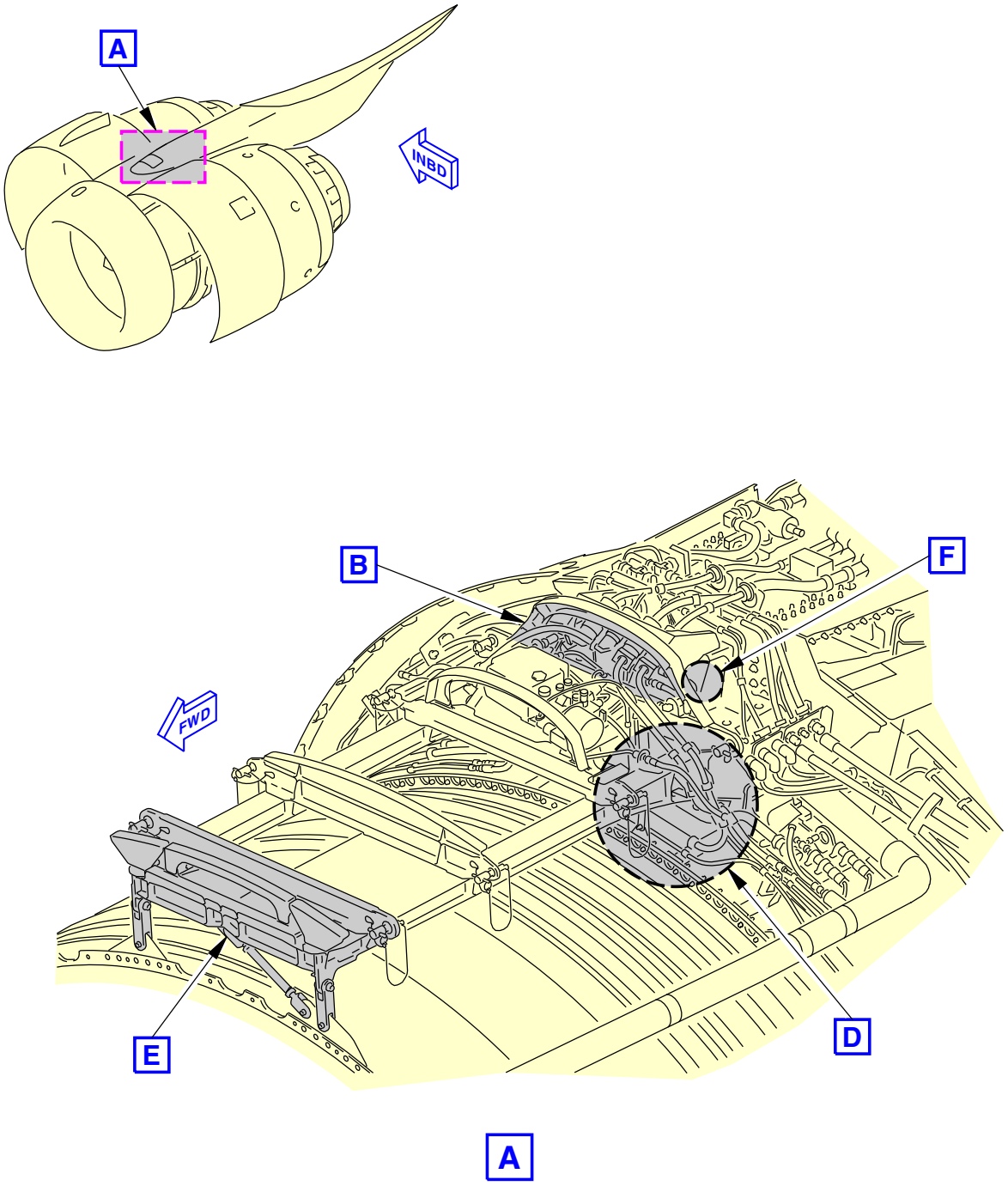

M06681 S0004285714_V2

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 1 of 6)

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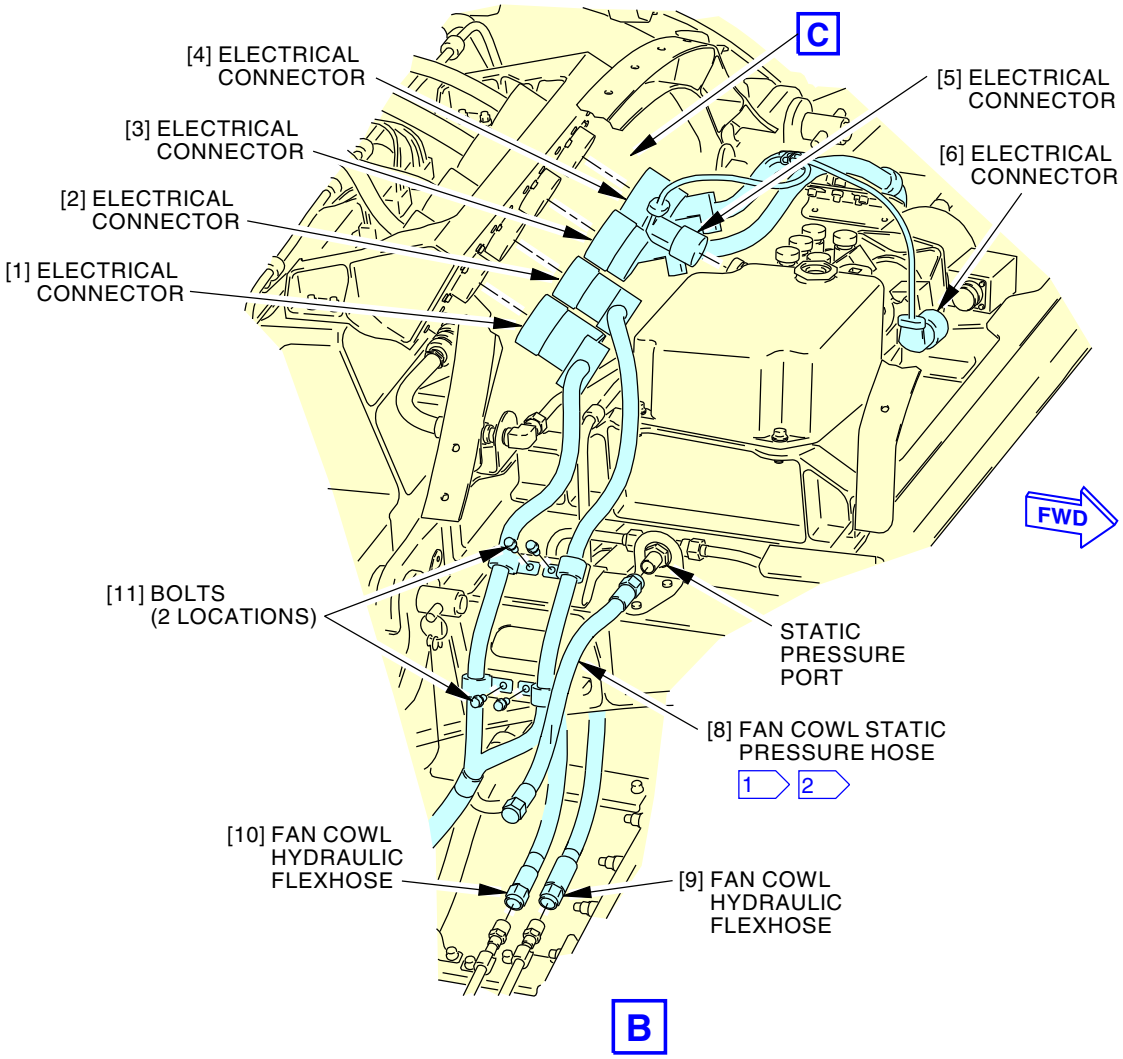

ITEM	ENGINE	STRUT (LEFT)	STRUT (RIGHT)
1	D71323P	D71123J	D71223J
2	D71321P	D71121J	D71221J
3	D71319P	D71119J	D71219J
4	D71317P	D71117J	D71217J

1 LEFT AND RIGHT INSTALLATIONS ARE THE SAME
2 DISCONNECTED WHEN FAN COWL PANELS ARE REMOVED

M06682 S0004285715_V2

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 2 of 6)

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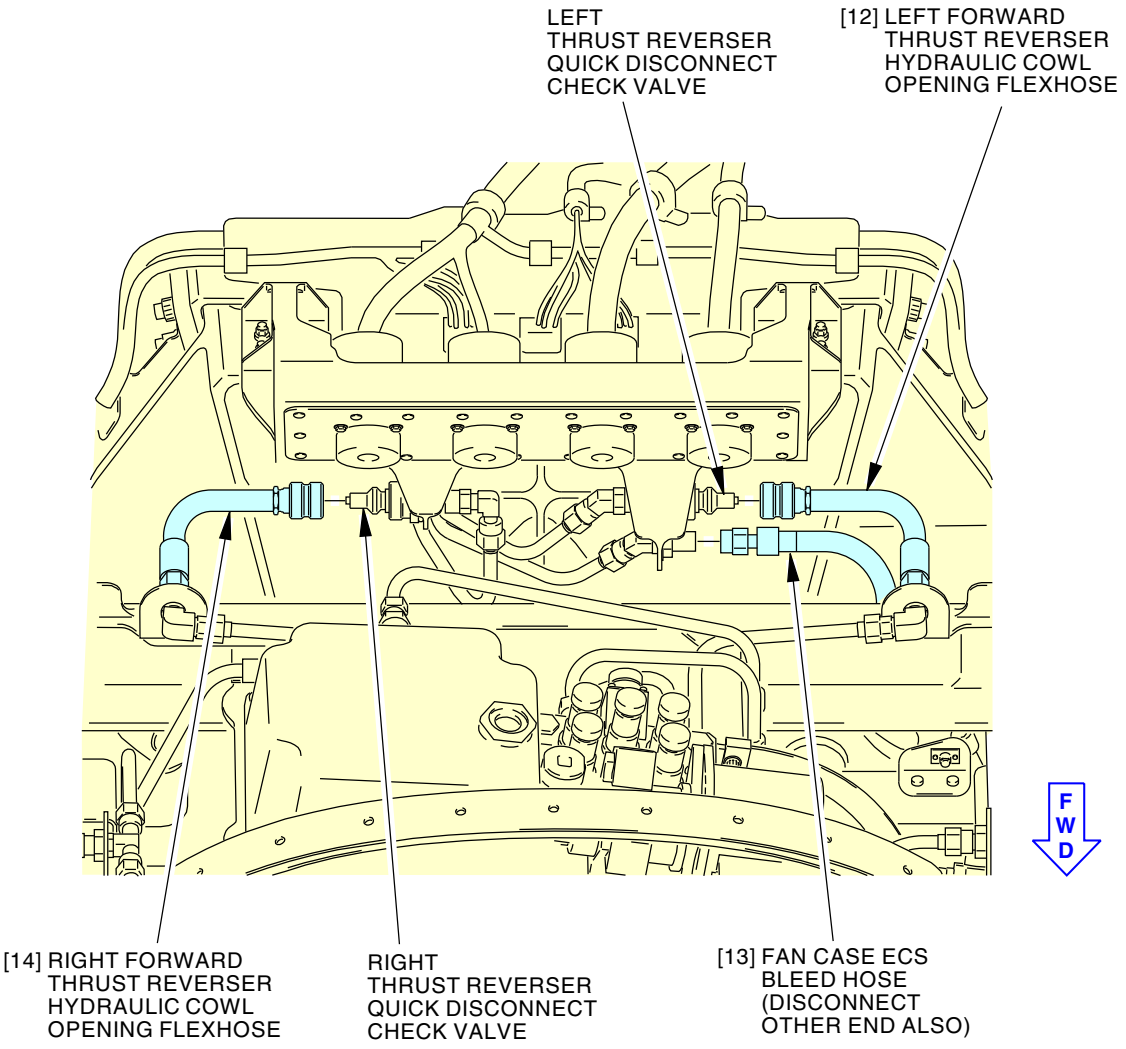

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 3 of 6)

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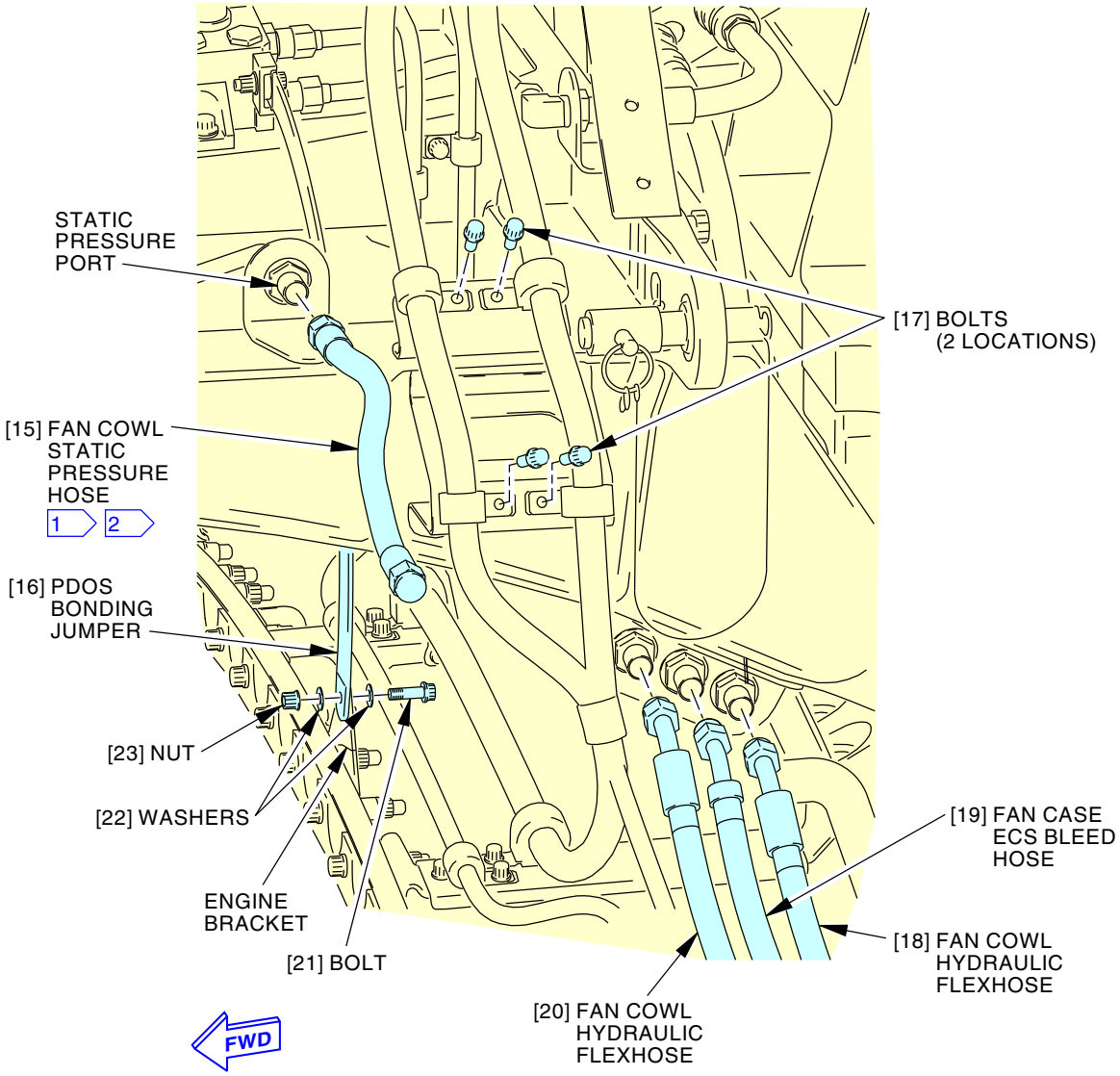

M06684 S0004285717_V2

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 4 of 6)

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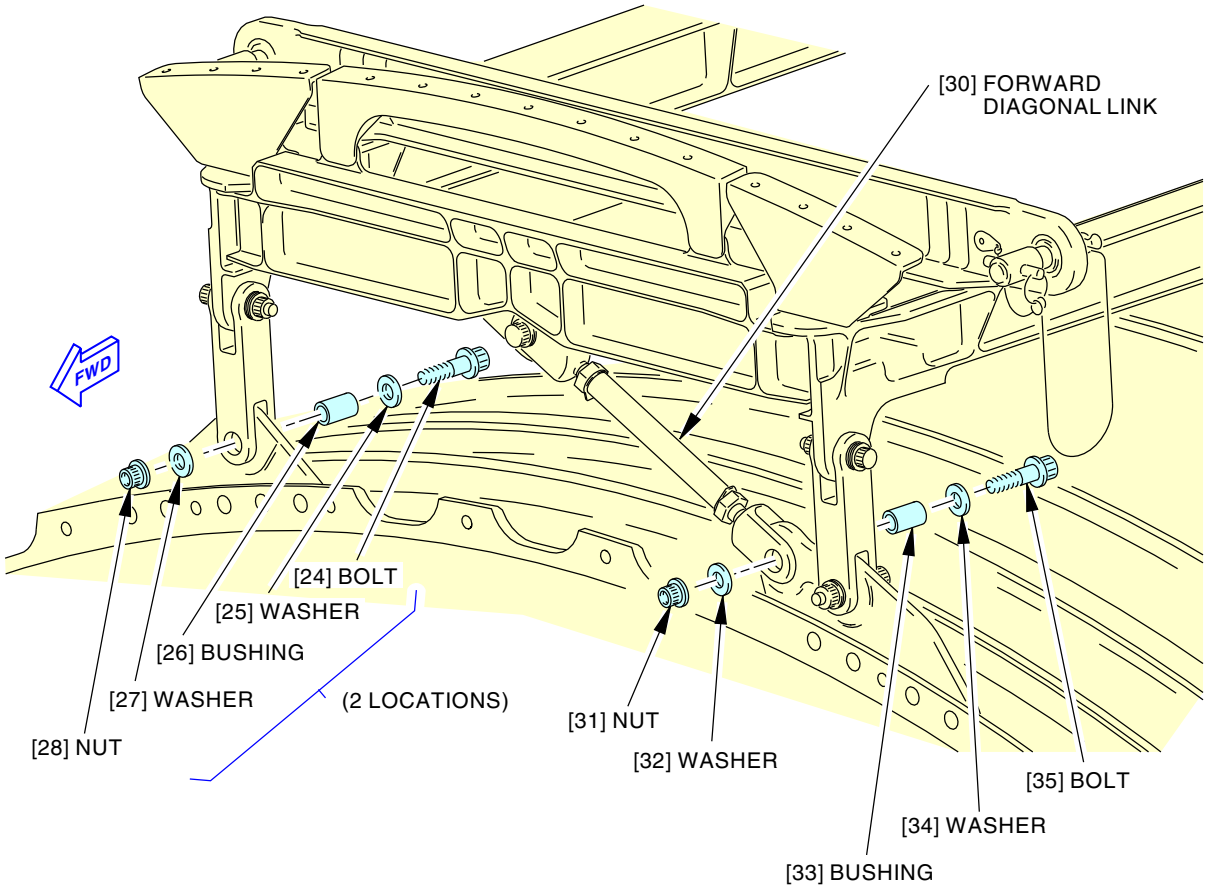

M06685 S0004285718_V3

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 5 of 6)

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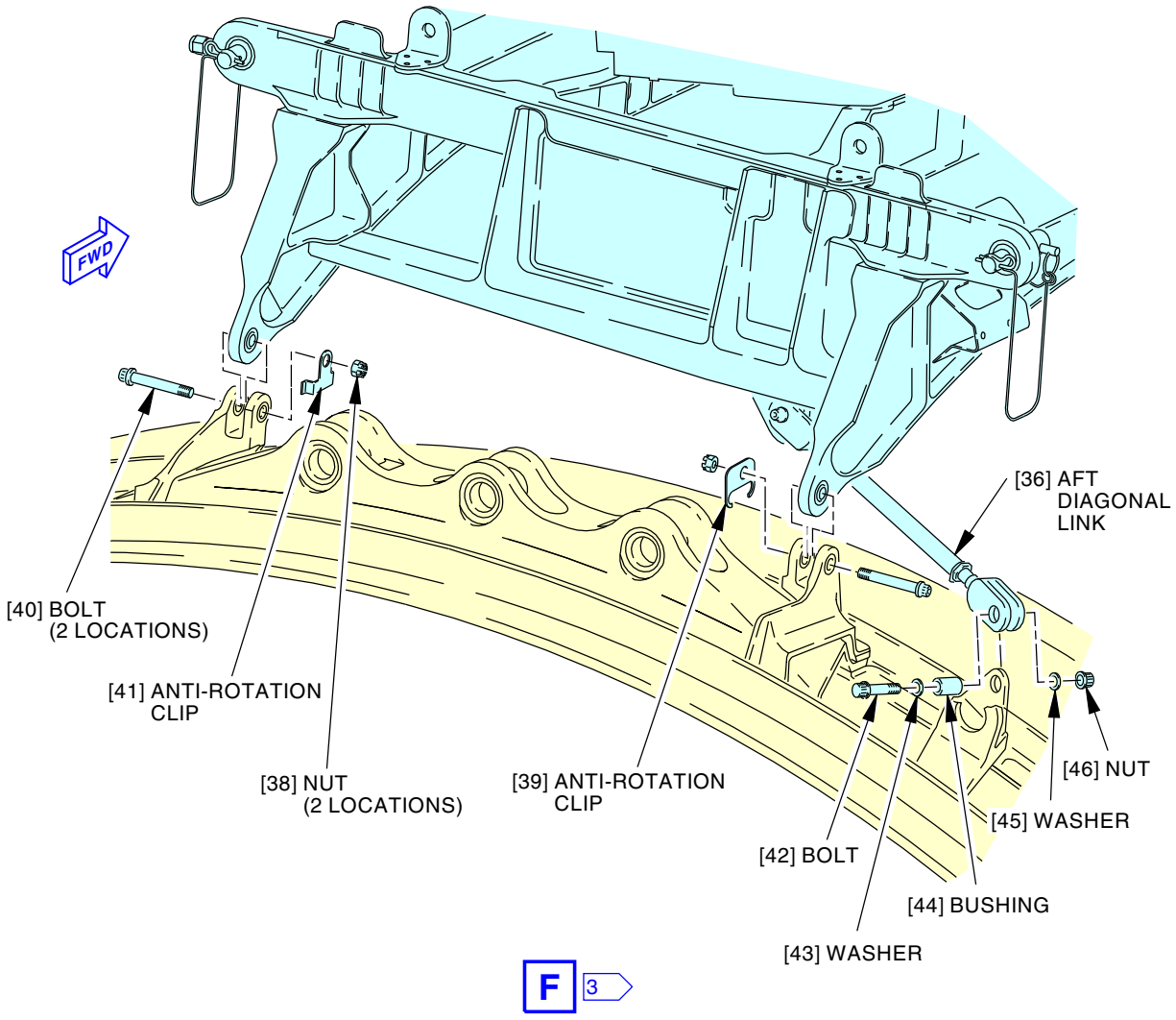

3 FORWARD LOWER ENGINE MOUNT IS NOT SHOWN

M06686 S0004285719_V2

Fan Cowl Support Beam Assembly Installation
Figure 401/71-11-12-990-801-H01 (Sheet 6 of 6)

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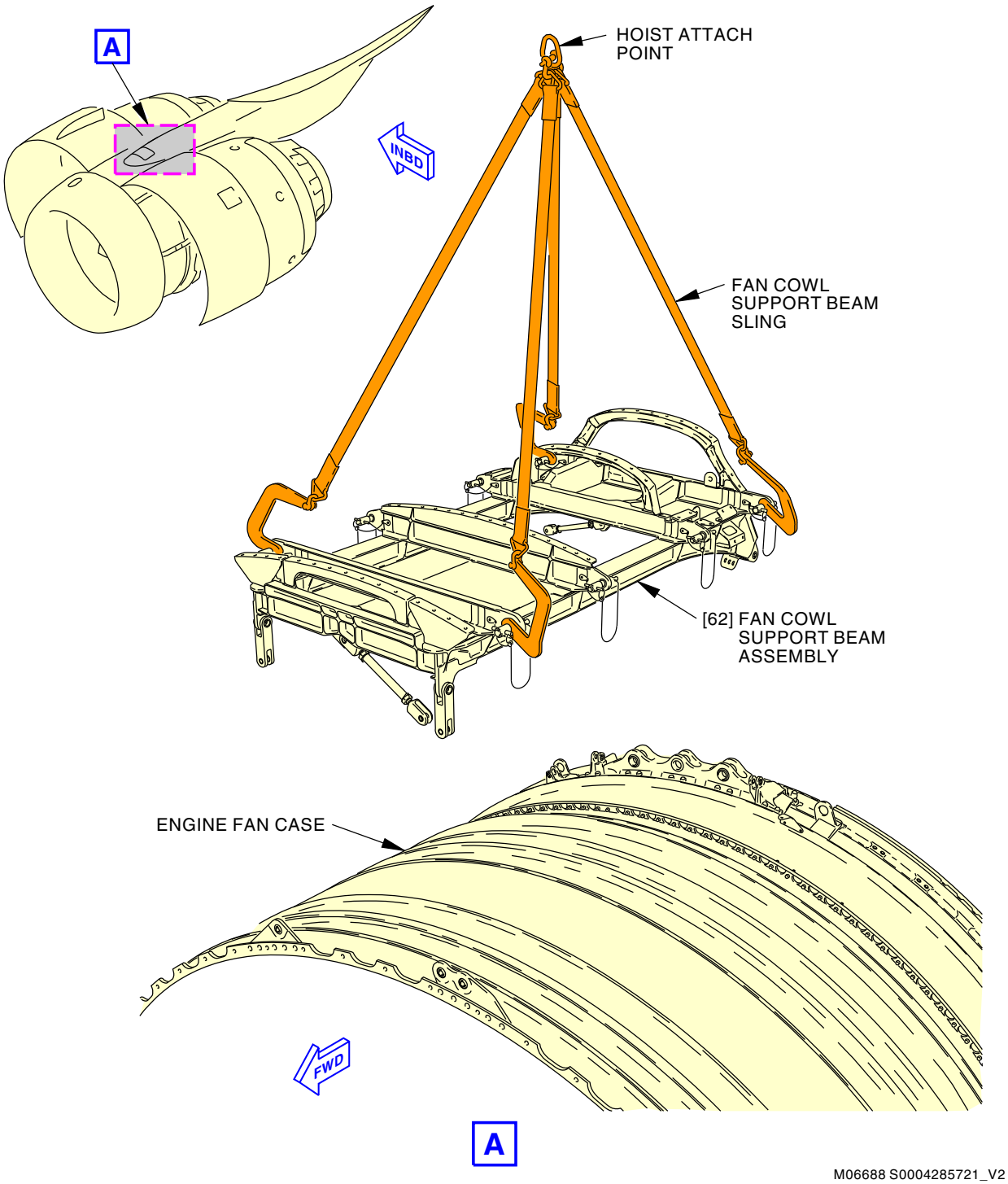

Fan Cowl Support Beam Sling Installation
Figure 402/71-11-12-990-802-H01

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TASK 71-11-12-400-801-H01

3. Fan Cowl Support Beam Assembly Installation

A. General

(1) The fan cowl support beam assembly is installed on the fan case brackets.

(2) You must do these steps after you install the fan cowl support beam assembly:

(a) Cycle the thrust reversers for the leak check on the PDOS system.

(b) Cycle the fan cowl panels for the leak check on the PDOS system.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
26-11-00-710-801	Engine Fire Detection Operational Test (P/B 501)
54-52-01-400-802-001	Fan Cowl Support Beam Fairings Installation (P/B 401)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-00-700-802-H01	Test No. 2 - Dry Motor leak Check (P/B 501)
71-00-00-700-815-H01	Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test) (P/B 501)
71-11-04-400-805-H01	Fan Cowl Panels Installation (P/B 401)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meters - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
SPL-2071	Sling - Equipment, Fan Cowl Support Beam (GE90, GE90-115B & PW) Part #: J71015-28 Supplier: 81205 Opt Part #: J71015-18 Supplier: 81205
STD-246	Crane - Lift, 2000 lb (907 kg) capacity, 30 ft (9.1 m) height
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

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

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(Continued)

Reference	Description	Specification
D00633	Grease - Aircraft General Purpose	BMS3-33

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
62	Fan cowl support beam assembly	11-25-03-07-005	ARO ALL
		71-11-12-01-003	ARO ALL

F. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

G. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine
431BT	PDOS Pump Access Door
441BT	PDOS Pump Access Door

H. Procedure

SUBTASK 71-11-12-420-001-H01

(1) Install the fan cowl support beam assembly [62]:

(a) Attach the fan cowl support beam sling, SPL-2071 to the fan cowl hinges with the sling pins.

(b) Put the fan cowl support beam sling, SPL-2071 at the center of the fan cowl support beam assembly [62].

(c) Align the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 on top of the hoist attach point.

(d) Attach the fan cowl support beam sling, SPL-2071 to the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 at the hoist attach point.

(e) Lift the fan cowl support beam sling, SPL-2071 slowly to the top of the engine fan case.

(f) Align the fan cowl support beam assembly [62] with the fan case brackets.

(g) Connect the forward fan cowl support beam assembly [62] to the forward flange brackets.

1) Lubricate the bolts [24] and nuts [28] with grease, D00633.

2) Install the bolts [24], washers [25], bushings [26], washers [27], and the nuts [28] that attach the forward fan cowl support beam assembly [62] to the forward flange brackets.

NOTE: Do not tighten the fasteners.

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(h) Connect the aft fan cowl support beam assembly [62] to the aft fan cowl support beam brackets.

1) Lubricate the bolts [40] and nuts [38] with grease, D00633.

2) Install the bolt [40], anti-rotation clip [41], and the nut [38] that attach the aft left side of the fan cowl support beam assembly [62] to the aft fan cowl support beam bracket.

NOTE: Do not tighten the fasteners.

3) Install the bolt [40], anti-rotation clip [39], and the nut [38] that attach the aft right side of the fan cowl support beam assembly [62] to the fan cowl aft support beam bracket.

NOTE: Do not tighten the fasteners.

(i) Connect the forward diagonal link [30]:

1) Lubricate the bolt [35] with grease, D00633.

2) Install the bolt [35], washer [34], bushing [33], washer [32], and the nut [31] that attach the forward diagonal link [30] to the forward flange bracket.

NOTE: You can adjust the jam nut on the forward diagonal link.

(j) Connect the aft diagonal link [36]:

1) Lubricate the bolt [42] with grease, D00633.

2) Install the bolt [42], washer [43], bushing [44], washer [45], and the nut [46] that attach the aft diagonal link [36] to the hoist support fitting.

NOTE: You can adjust the jam nut on the aft diagonal link.

(k) Make sure the clearance is within 0.100±0.0150 inch (2.54±0.380 mm), between the lug and the clevis fitting on the aft right fan cowl support beam bracket.

(l) Tighten the bolt [42] on the aft diagonal link [36] (TASK 70-51-00-910-801-H01).

1) Make sure the rod ends have a minimum engagement in the barrel of the link assembly.

NOTE: You can look through the inspection holes on the link assembly.

2) Tighten the rod jam nut(s) on the aft diagonal link [36].

3) Lockwire the rod jam nut(s) (TASK 70-41-00-910-803-H00).

(m) Tighten the bolt [35] on the forward diagonal link [30] (TASK 70-51-00-910-801-H01).

1) Make sure the rod ends have a minimum engagement in the barrel of the link assembly.

NOTE: You can look through the inspection holes on the link assembly.

2) Tighten the rod jam nut(s) on the forward diagonal link [30].

3) Lockwire the rod jam nut(s) (TASK 70-41-00-910-803-H00).

(n) Tighten the bolts [40] on the left and right sides of the aft fan cowl support beam brackets (TASK 70-51-00-910-801-H01).

(o) Tighten the bolts [24] on the left and right sides of the forward flange brackets (TASK 70-51-00-910-801-H01).

(p) Disconnect the fan cowl support beam sling, SPL-2071 from the fan cowl hinges.

(q) Lift the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 with the fan cowl support beam sling, SPL-2071 attached slowly away from the engine.

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(r) Remove the fan cowl support beam sling, SPL-2071 from the 2000 lb (907 kg) capacity, 30 ft (9.1 m) height lift crane, STD-246 at the hoist attach point.

SUBTASK 71-11-12-430-001-H01

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(2) Connect the fan cowl hydraulic flexhose [9], fan cowl hydraulic flexhose [10], fan cowl hydraulic flexhose [18], and the fan cowl hydraulic flexhose [20] to the PDOS hydraulic tube fittings (left and right of the fan case) under the fan cowl support beam assembly:

(a) Remove the protective caps from the fan cowl hydraulic flexhose [9], the fan cowl hydraulic flexhose [10], the fan cowl hydraulic flexhose [18], the fan cowl hydraulic flexhose [20], and the flexhose fittings.

(b) Connect the fan cowl hydraulic flexhose [9], the fan cowl hydraulic flexhose [10], the fan cowl hydraulic flexhose [18], and the fan cowl hydraulic flexhose [20] to the PDOS hydraulic tube fittings.

SUBTASK 71-11-12-430-007-H01

(3) Connect the fan case ECS bleed hose [13] and the fan case ECS bleed hose [19] to the hydraulic tube fittings (left and aft of the fan cowl support beam assembly):

(a) Remove the protective caps from the fan case ECS bleed hose [13], the fan case ECS bleed hose [19], and the flexhose fittings.

(b) Connect the fan case ECS bleed hose [13] and the fan case ECS bleed hose [19] to the hydraulic tube fittings.

SUBTASK 71-11-12-430-002-H01

(4) Remove the protective caps from the static pressure ports, and from the fan cowl static pressure hose [8], and the fan cowl static pressure hose [15] at the fan cowl panels.

(a) Make sure that you connect the fan cowl static pressure hose [8] and the fan cowl static pressure hose [15] to the static pressure ports when you install the fan cowl panels.

SUBTASK 71-11-12-430-003-H01

(5) Connect the PDOS bonding jumper [16] to the fan case engine bracket:

(a) Install the PDOS bonding jumper [16] to the fan case engine bracket with the bolt [21], washer [22], and the nut [23].

(b) Use a intrinsically safe approved bonding meter, COM-1550 to make sure the bonding resistance between the bolt head and the basic structure is less than or equal to 0.0008 ohm.

SUBTASK 71-11-12-430-004-H01

CAUTION

MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

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(CAUTION PRECEDES)

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(6) Use teflon-jawed pliers, STD-664 to connect the electrical connector [5] and the electrical connector [6] (TASK 70-00-01-400-807-H01):

(a) Remove the protective caps on the electrical connector [5] and the electrical connector [6] and the receptacles.

(b) Connect the electrical connector [5] and the electrical connector [6] to the PDOS pump.

SUBTASK 71-11-12-430-005-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(7) Connect the left T/R hydraulic cowl opening flexhose [12] and the right T/R hydraulic cowl opening flexhose [14] to the quick disconnects (2 locations) of the thrust reverser PDOS:

(a) Remove the protective caps from the left T/R hydraulic cowl opening flexhose [12] and the right T/R hydraulic cowl opening flexhose [14] and from the hydraulic quick disconnect fittings.

(b) Connect the left T/R hydraulic cowl opening flexhose [12] and the right T/R hydraulic cowl opening flexhose [14] to the hydraulic quick disconnect ports.

SUBTASK 71-11-12-430-006-H01

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(8) Use teflon-jawed pliers, STD-664 to connect the electrical connector [1], electrical connector [2], electrical connector [3], and the electrical connector [4] to the forward side disconnect of the fan cowl support beam assembly (TASK 70-00-01-400-807-H01).

(a) Remove the protective caps from the electrical connector [1], electrical connector [2], electrical connector [3], and the electrical connector [4], and the receptacles.

(b) Connect the electrical connector [1], electrical connector [2], electrical connector [3], and the electrical connector [4] to the forward side disconnect.

1) Remove the tags from the wire harnesses.

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(c) Install the bolts [11] and bolts [17] that attach the electrical connector harness to the fan cowl support beam assembly.

I. Fan Cowl Support Beam Assembly Post-Installation Test

SUBTASK 71-11-12-865-003-H01

(1) For the left engine; Remove the safety tags and close this circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-11-12-865-004-H01

(2) For the right engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-11-12-010-001-H01

(3) Do this task: Fan Cowl Panels Installation, TASK 71-11-04-400-805-H01.

(a) Put the fan cowl panels in the completely open position.

SUBTASK 71-11-12-870-001-H01

CAUTION

IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(4) Cycle the thrust reversers a minimum of three times to bleed the air out of the thrust reverser PDOS system.

(a) Use the thrust reverser PDOS switches to cycle the thrust reversers.

SUBTASK 71-11-12-410-001-H01

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00

(a) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-11-12-870-003-H01

CAUTION

MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

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(CAUTION PRECEDES)

CAUTION

IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(6) Cycle the fan cowl panels a minimum of three times to bleed the air out of the fan cowl PDOS system.

(a) Use the fan cowl PDOS switches to cycle the fan cowl panels.

SUBTASK 71-11-12-212-001-H01

(7) Do a visual check for leakage on the PDOS system.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-12-410-004-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-11-12-610-001-H01

CAUTION

MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(2) Do a check of the oil level in the PDOS pump and fill with oil, D00071 or oil, D00068 if the oil level is low (TASK 12-12-02-610-803-004).

SUBTASK 71-11-12-410-003-H01

(3) Install the No. 1 forward fairing (TASK 54-52-01-400-802-001):

(a) Install the applicable access panels:

Number	Name/Location
431BT	PDOS Pump Access Door
441BT	PDOS Pump Access Door

K. Fan Cowl Support Beam Assembly Installation Test

SUBTASK 71-11-12-710-002-H00

(1) Do this task: Test No. 16 - Engine Electronic Control (EEC) Test (MAT Initiated Test), TASK 71-00-00-700-815-H01.

SUBTASK 71-11-12-710-003-H00

(2) Do this task: Test No. 2 - Dry Motor leak Check, TASK 71-00-00-700-802-H01.

SUBTASK 71-11-12-710-006-H00

(3) Do this task: Engine Fire Detection Operational Test, TASK 26-11-00-710-801.

END OF TASK

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FAN COWL OPENING ACTUATORS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the fan cowl opening actuators

(2) An installation of the fan cowl opening actuators.

TASK 71-12-01-000-801-H01

2. Fan Cowl Opening Actuators Removal

(Figure 401)

A. General

(1) Each fan cowl panel has one fan cowl opening actuator (referred to as a fan cowl actuator) which is installed between the fan cowl panel and the engine bridge bracket.

(2) The self-contained AC electric PDOS pump delivers hydraulic pressure to the fan cowl actuator.

(3) You must open the fan cowl panels to remove the fan cowl actuators.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine

D. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

E. Prepare for the Removal

SUBTASK 71-12-01-869-001-H01

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(1) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

SUBTASK 71-12-01-040-003-H01

(2) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

SUBTASK 71-12-01-010-001-H01

(3) For the applicable fan cowl panel on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

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(a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-12-01-410-001-H01

WARNING MAKE SURE THAT THE HOLD-OPEN RODS FOR THE FAN COWL PANELS ARE ENGAGED BEFORE YOU REMOVE THE FAN COWL OPENING ACTUATORS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONNEL AND DAMAGE TO THE FAN COWL PANELS CAN OCCUR.

(4) Make sure the fan cowl hold-open rods are locked in their extended position.

F. Fan Cowl Opening Actuators Removal

SUBTASK 71-12-01-870-001-H01

(1) Push the fan cowl PDOS DOWN switch for 30 seconds to bleed off the pressure in the applicable fan cowl actuator [1].

SUBTASK 71-12-01-030-001-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(2) Disconnect the applicable PDOS hydraulic hose [2] from the applicable fan cowl actuator [1].

(a) Install the protective caps on the PDOS hydraulic hose [2] and on the fan cowl actuator fitting [3].

SUBTASK 71-12-01-030-002-H01

(3) Disconnect the quick-release pin [5] that attaches the fan cowl actuator [1] to the fan case bracket assembly.

SUBTASK 71-12-01-020-001-H01

(4) Remove the bolt [8], washer [9], bushing [10], washer [11], and the nut [12] that attach the fan cowl actuator [1] to the fan cowl support bracket.

(a) Remove the fan cowl actuator [1] from the fan cowl support bracket.

END OF TASK

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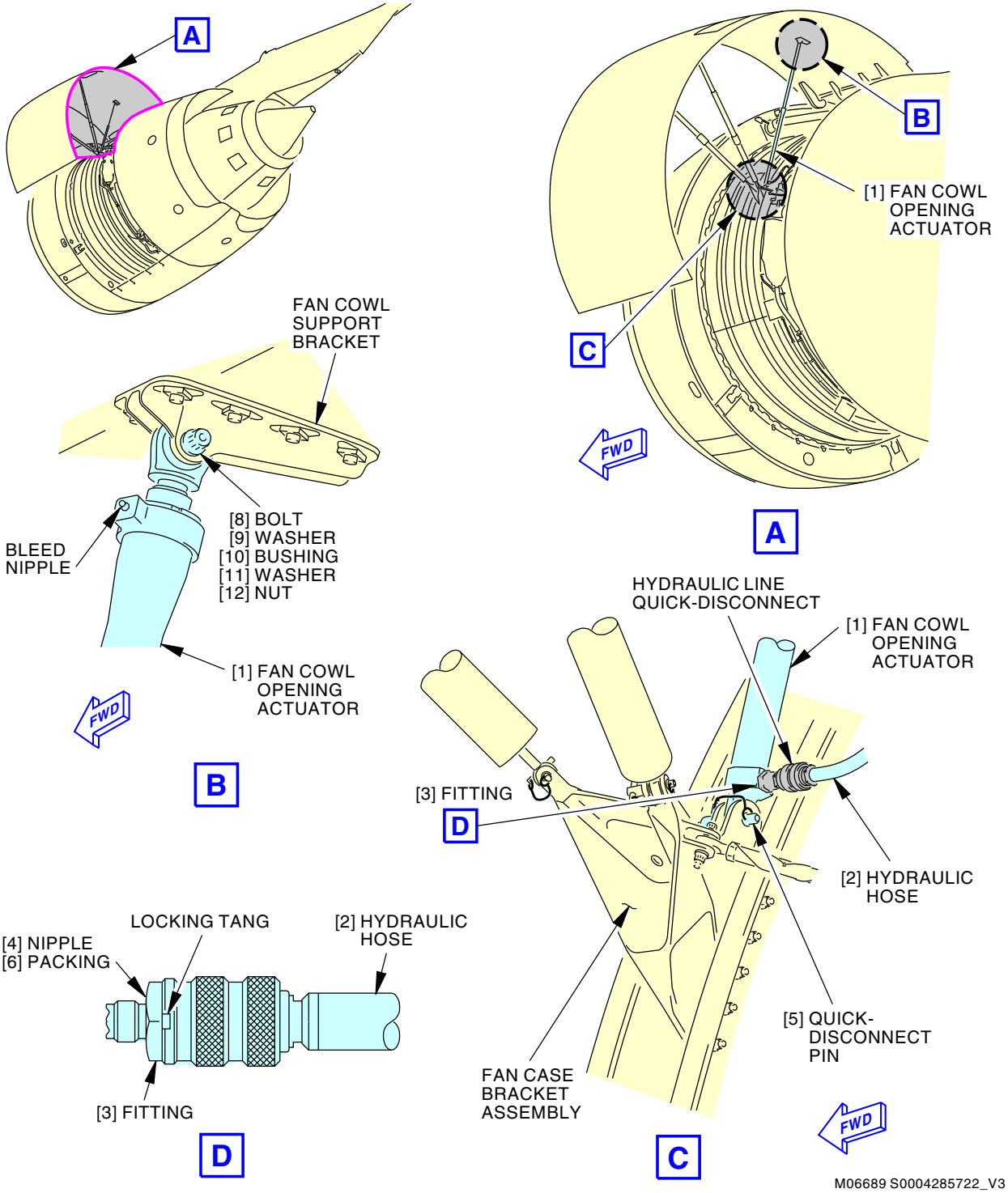

Fan Cowl Opening Actuator Installation
Figure 401/71-12-01-990-801-H01

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TASK 71-12-01-400-801-H01

3. Fan Cowl Opening Actuators Installation

(Figure 401)

A. General

(1) The left fan cowl opening actuator (referred to as a fan cowl actuator) is interchangeable with the right fan cowl actuator.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-11327	Tube - Clear, Plastic

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3
G00834	Cloth - Lint-free Cotton	
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl actuator	71-12-01-02A-050	ARO ALL

F. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine

G. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

H. Fan Cowl Opening Actuators Installation

SUBTASK 71-12-01-420-001-H01

(1) Put the fan cowl actuator [1] in its position on the applicable fan cowl support bracket fitting.

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(a) Install the bolt [8], washer [9], bushing [10], washer [11], and the nut [12].

(b) Tighten the nut [12] to 870-1300 pound-inches (98.3-146.9 Newton-meters).

SUBTASK 71-12-01-430-001-H01

(2) Connect the other end of the fan cowl actuator [1] to the fan case bracket assembly:

(a) Align the fan cowl actuator [1] end with the bracket bushings.

(b) Install the quick-release pin [5].

SUBTASK 71-12-01-430-002-H01

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(3) Connect the PDOS hydraulic hose [2] to the fan cowl actuator fitting [3]:

(a) If the nipple [4] and packing [6] are not installed, install the nipple [4] and packing [6] on the fan cowl actuator fitting [3].

1) Tighten the nipple [4] to 133-147 pound-inches (15.0-16.6 Newton-meters).

2) Lockwire the fan cowl actuator fitting [3] with MS20995C32 lockwire, G01048.

(b) Make sure the locking tang is engaged completely in the fitting groove.

(c) Remove the protective caps on the PDOS hydraulic hose [2] and on the fan cowl actuatorfitting [3].

(d) Connect the PDOS hydraulic hose [2] to the fan cowl actuator fitting [3].

SUBTASK 71-12-01-870-002-H00

(4) Do the fan cowl PDOS bleed procedure to remove air from the fan cowl actuator [1].

I. Fan Cowl PDOS Bleeding Procedure

SUBTASK 71-12-01-410-003-H00

(1) Make sure that the fan cowl is opened (TASK 71-11-04-010-814-H00).

(a) Make sure that the fan cowl is resting on the hold open rods.

SUBTASK 71-12-01-870-003-H00

(2) Do these steps to remove air from the PDOS system.

WARNING

DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. CLEAN BARE SKIN FULLY AFTER YOU USE THIS MATERIAL. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

CAUTION

MAKE SURE THAT YOU PREPARE TO CATCH THE FLUID. SPILLED FLUID CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE AND EQUIPMENT.

(a) Do these steps to open the bleed nipple on the fan cowl actuator [1].

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1) Remove the lockwire at the bleed nipple.
2) Attach a clear tube, STD-11327, to the bleed nipple of the fan cowl actuator [1].
   a) Push a clear tube, STD-11327 end into the bleed nipple.
3) Put the other end of the clear tube, STD-11327 into a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under the PDOS hose at the end closest to the fan cowl actuator [1].
4) Push and turn the pump control button with a screwdriver to the Open position for the applicable fan cowl actuator [1].

   NOTE: The control button pattern is shown on the pump instruction decal located on top of the reservoir.
5) Turn the bleed nipple valve counter-clockwise by one turn.
6) Use an air drive wrench to turn the manual drive at the pump until no air bubbles are in the oil flow out of the bleed nipple.
   a) Make sure that no bubbles are in the oil flow out of the actuator bleed nipple.
7) Turn the pump control button with a screwdriver to the Close (normal) position.
8) Remove the clear tube, STD-11327, from the bleed nipple (port).
9) Tighten the bleed nipple on the fan cowl actuator [1] to 8.9 inch-pounds (1.01 Newton-meters).
10) Install the lockwire to the bleed nipple (TASK 70-41-00-910-803-H00).
11) If it is necessary, use a lint-free cloth, G00834, to clean spilled oil.
12) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.
   a) Make sure that the fan cowl opens and closes smoothly.
13) Do a check of the PDOS pump oil level.

CAUTION DO NOT FILL THE PDOS PUMP UNLESS THE FAN COWL PANELS AND THRUSTS REVERSERS ARE IN THE FULLY CLOSED POSITION. YOU WILL ADD TOO MUCH FLUID IF THEY ARE OPEN.

   a) If the oil level is low in the PDOS pump, fill the PDOS pump with oil, D00071 or oil, D00068 (TASK 12-12-02-610-803-004).

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-01-410-002-H01

(1) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.
   (a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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SUBTASK 71-12-01-610-001-H01

CAUTION

MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(2) Do a check of the oil level in the PDOS pump and fill with oil, D00071 or oil, D00068 if the oil level is low (TASK 12-12-02-610-803-004).

SUBTASK 71-12-01-440-001-H01

(3) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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THRUST REVERSER COWL OPENING ACTUATORS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the thrust reverser cowl opening actuators

(2) An installation of the thrust reverser cowl opening actuators.

TASK 71-12-02-000-804-H00

2. Thrust Reverser Cowl Opening Actuators Removal

A. General

(1) This task is the removal procedure for the thrust reverser cowl opening actuators.

(2) You must open the fan cowl panels and the thrust reversers to remove the T/R actuators.

(3) Each thrust reverser half has one thrust reverser cowl opening actuator (referred to as the actuator) which is installed between the strut and the thrust reverser.

(4) The self contained AC electric PDOS pump delivers hydraulic pressure to the T/R actuators.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-304	Equipment - Sling, GE90 Fan Thrust Reverser Part #: J78004-123 Supplier: 81205 Opt Part #: J78004-89 Supplier: 81205
STD-469	Hoist - Lever, 2000 lb (907 kg) capacity
STD-589	Mat - Protective Cover

D. Consumable Materials

Reference	Description	Specification
A50464	Tape - Vinyl, Adhesive Coated	BMS5-179
G02129	Tape - 223S (use until stock depleted)	

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine
416	Right Thrust Reverser - Left Engine
423	Left Fan Cowl - Right Engine

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(Continued)

Zone	Area
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine
426	Right Thrust Reverser - Right Engine

F. Access Panels

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

G. Prepare for the Removal

SUBTASK 71-12-02-010-006-H00

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

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SUBTASK 71-12-02-400-001-H00

(2) For the inboard thrust reverser, install a protective cover mat, STD-589 on the leading edge of the wing.

NOTE: The chain hoist, strap and the upper sling assembly will be near the wing leading edge when the thrust reverser is removed or installed. These parts of the sling assembly can interfere or collide with the leading edge. The protective cover mat should be a continuous piece, cover a minimum length of 7 ft (2134 mm) of the leading edge and should wrap around the leading edge a minimum of 2 ft (610 mm). A carpet or heavy canvas fabric or rubber mat could be used.

(a) Install the protective cover mat with adhesive Nitto 223S Tape, G02129, tape, A50464 or equivalent local product.

SUBTASK 71-12-02-490-001-H01

WARNING

THRUST REVERSERS WITH ONE OR TWO HOLD-OPEN RODS, YOU MUST USE THE SLING AS A BACK-UP SAFETY DEVICE. A FAILURE OF A HOLD-OPEN ROD WILL LET THE THRUST REVERSER FALL. EVEN ON THRUST REVERSERS WITH TWO HOLD-OPEN RODS, THE AFT HOLD-OPEN CANNOT HOLD THE WEIGHT OF THE THRUST REVERSER, THE FORWARD HOLD-OPEN ROD CAN HOLD IT TEMPORARILY. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(3) Attach the lower sling assembly of the GE90 fan thrust reverser sling equipment, SPL-304 with the bolts [21] and washers [22] to the thrust reverser at the latch beam attach fitting.

(a) Attach a 2000 lb (907 kg) capacity lever hoist, STD-469 to the sling assembly.

(b) Operate the 2000 lb (907 kg) capacity lever hoist, STD-469 until the sling assembly is in tension.

SUBTASK 71-12-02-420-001-H01

WARNING

MAKE SURE THAT THE HOLD-OPEN ROD FOR THE THRUST REVERSER IS ENGAGED BEFORE YOU REMOVE THE THRUST REVERSER OPENING ACTUATOR. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONNEL AND DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(4) Make sure the thrust reverser hold-open rod is installed and locked in the extended position.

SUBTASK 71-12-02-864-001-H00

(5) Push the thrust reverser PDOS DOWN switch for 30 seconds to bleed off the pressure in the actuator [1].

SUBTASK 71-12-02-865-002-H00

(6) Open the circuit breakers for the applicable engine and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	6	C78301	L ENG COWL DR MOT
F	9	C78302	R ENG COWL DR MOT

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H. Thrust Reverser Cowl Opening Actuators Removal

SUBTASK 71-12-02-030-001-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(1) Disconnect the PDOS hydraulic hose [7] from the actuator [1] (Figure 401 or Figure 402).

(a) Install the protective caps on the hydraulic hose [7] and on the actuator fitting.

SUBTASK 71-12-02-010-002-H01

(2) Remove the bolt [2], washer [3], bushing [4], washer [5], and the nut [6] that attach the applicable actuator [1] to the strut support bracket.

(a) Disconnect the actuator [1] from the strut support bracket.

SUBTASK 71-12-02-010-003-H01

(3) Remove the bolt [2], washer [3], bushing [4], washer [5], and the nut [6] that attach the applicable actuator [1] to the thrust reverser bracket assembly.

(a) Disconnect the actuator [1] from the thrust reverser bracket assembly.

SUBTASK 71-12-02-010-004-H01

(4) Remove the actuator [1] from the engine.

END OF TASK

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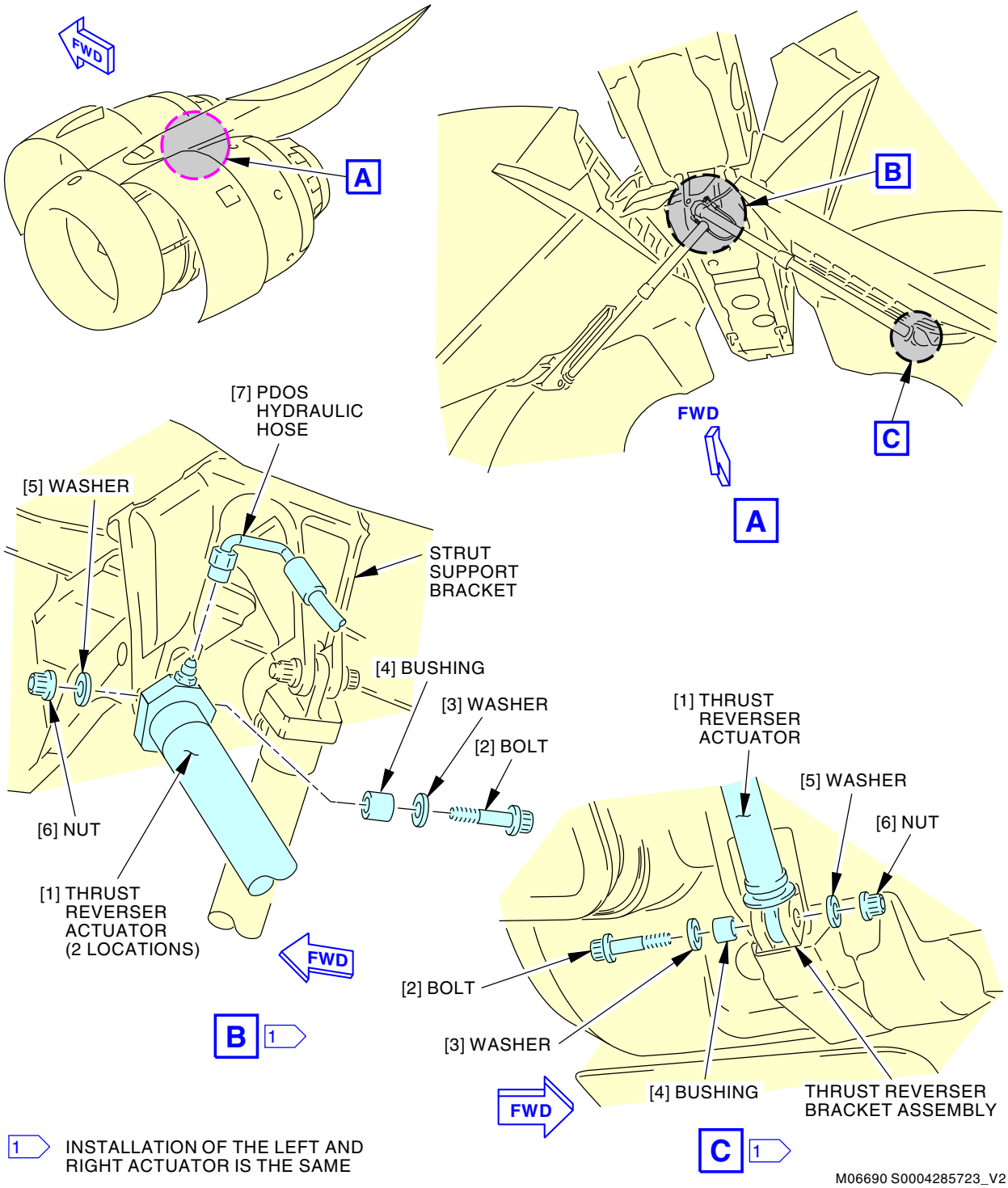

Thrust Reverser Cowl Opening Actuator Installation
Figure 401/71-12-02-990-801-H01

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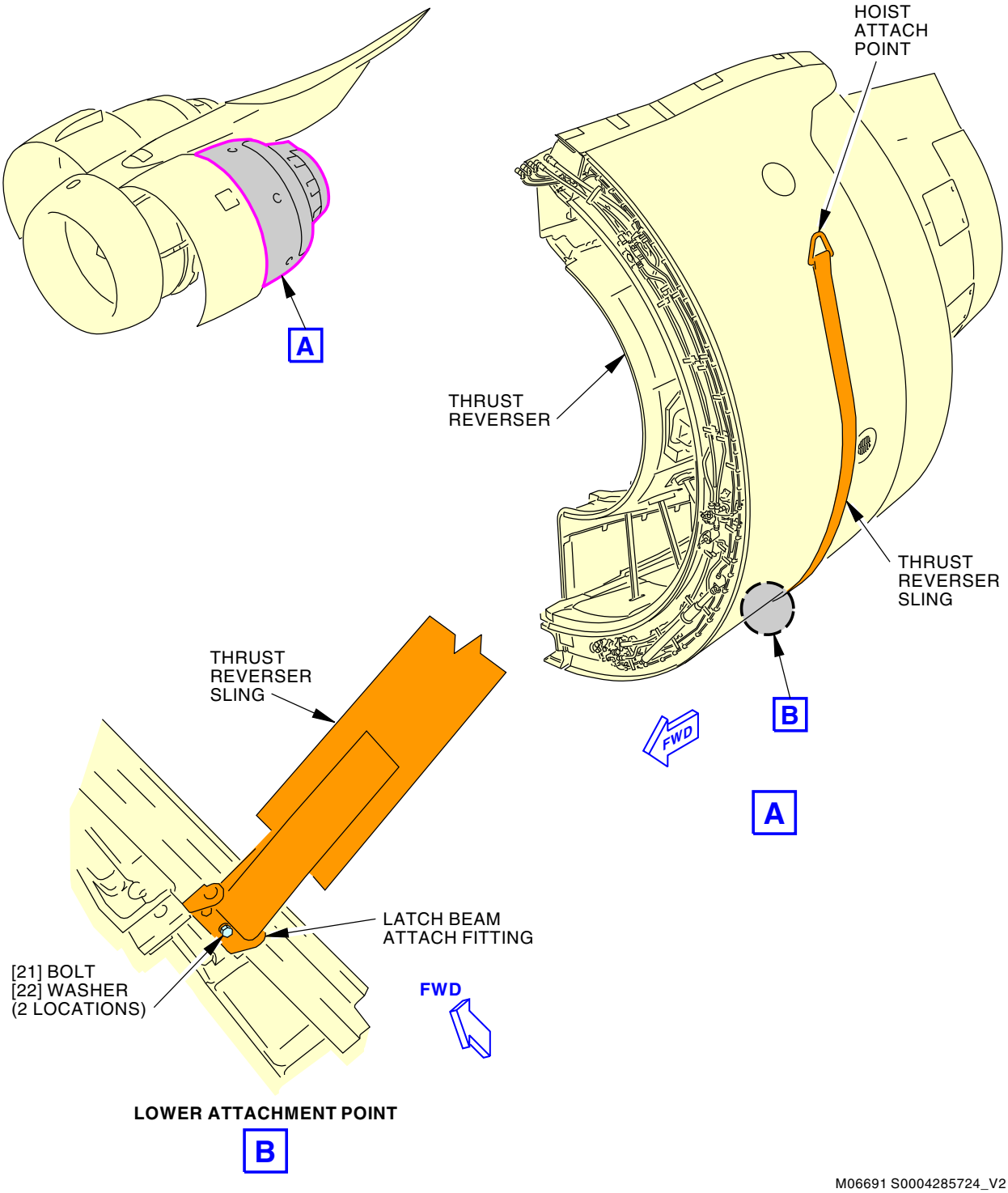

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Thrust Reverser Sling Installation
Figure 402/71-12-02-990-802-H01

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TASK 71-12-02-400-804-H00

3. Thrust Reverser Cowl Opening Actuators Installation

A. General

(1) This task is the installation procedure for the thrust reverser cowl opening actuators.

(2) The left thrust reverser cowl opening actuator (referred to as the actuator) is interchangeable with the right thrust reverser cowl opening actuator.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-304	Equipment - Sling, GE90 Fan Thrust Reverser Part #: J78004-123 Supplier: 81205 Opt Part #: J78004-89 Supplier: 81205
STD-469	Hoist - Lever, 2000 lb (907 kg) capacity
STD-589	Mat - Protective Cover

D. Consumable Materials

Reference	Description	Specification
A50464	Tape - Vinyl, Adhesive Coated	BMS5-179
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3
D00633	Grease - Aircraft General Purpose	BMS3-33
G02129	Tape - 223S (use until stock depleted)	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Actuator	71-12-02-01-035	ARO ALL

F. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine
416	Right Thrust Reverser - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine

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(Continued)

Zone	Area
426	Right Thrust Reverser - Right Engine

G. Access Panels

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

H. Thrust Reverser Cowl Opening Actuators Installation

SUBTASK 71-12-02-490-003-H00

(1) For the inboard PDOS actuator, make sure that a protective cover mat, STD-589 is installed on the leading edge of the wing with Nitto 223S Tape, G02129 or tape, A50464.

SUBTASK 71-12-02-410-001-H01

(2) Put the applicable actuator [1] in its position on the strut support bracket (Figure 401 or Figure 402).

(a) Align the actuator [1] end with the strut support bracket holes.

(b) Apply the grease, D00633, to the shank of the bolt [2].

NOTE: Do no put the grease, D00633, on the bolt threads.

(c) Install the bolt [2], washer [3], bushing [4], washer [5], and the nut [6].

NOTE: Install the countersunk side of the washer toward head of the bolt.

(d) Tighten the nut [6] to 558-592 pound-inches (63.0-66.9 newton-meters).

SUBTASK 71-12-02-420-002-H01

(3) Put the actuator [1] end to the thrust reverser bracket assembly.

(a) Align the actuator [1] end with the bracket assembly holes.

(b) Apply the grease, D00633, to the shank of the bolt [2].

NOTE: Do not put the grease, D00633 on the bolt threads.

(c) Install bolt [2], washer [3], bushing [4], washer [5], and the nut [6].

NOTE: Install the countersunk side of the washer toward head of the bolt.

(d) Tighten the nut [6] to 480-790 pound-inches (54.2-89.3 Newton-meters).

SUBTASK 71-12-02-430-001-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

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(CAUTION PRECEDES)

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(4) Connect the PDOS hydraulic hose [7] to the actuator hydraulic fitting.

(a) Tighten the PDOS hydraulic hose fitting.

SUBTASK 71-12-02-090-001-H01

(5) Remove the lower sling assembly of the GE90 fan thrust reverser sling equipment, SPL-304 from the latch beam attach fitting of the thrust reverser.

(a) Operate the 2000 lb (907 kg) capacity lever hoist, STD-469 to loosen the sling assembly.

(b) Remove the bolts [21] and washers [22] from the latch beam attach fitting.

(c) Remove the 2000 lb (907 kg) capacity lever hoist, STD-469 from the sling assembly.

(d) Remove the sling assembly from the thrust reverser.

I. Thrust Reverser Cowl Opening Actuator Test

SUBTASK 71-12-02-865-001-H00

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

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	6	C78301	L ENG COWL DR MOT
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-12-02-870-002-H01

CAUTION

IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(2) Cycle the thrust reversers a minimum of three times to bleed the air out of the thrust reverser PDOS system.

(a) Use the thrust reverser PDOS switches to cycle the thrust reversers.

(b) Make sure there are no oil leaks in the PDOS system.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-02-410-003-H01

WARNING

DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

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1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-12-02-090-002-H00

(2) remove the protective cover mat, STD-589 that is installed on the leading edge of the wing with Nitto 223S Tape, G02129 or tape, A50464.

SUBTASK 71-12-02-612-001-H01

CAUTION MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(3) If the oil level is low in the PDOS pump, fill the PDOS pump with oil, D00071 or oil, D00068.

(a) Do this task: Fill the PDOS Pump with Oil, TASK 12-12-02-610-803-004.

——— END OF TASK ———

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HYDRAULIC COWL OPENING FLEXHOSES - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the hydraulic cowl opening flexhoses

(2) An installation of the hydraulic cowl opening flexhoses.

TASK 71-12-03-000-801-H01

2. Hydraulic Cowl Opening Flexhoses Removal

A. General

(1) There are four sets of hydraulic cowl opening flexhoses. Two sets are for the fan cowl panels. The other sets are for the thrust reversers.

(2) The fan cowl hydraulic flexhoses (referred to as F/C hydraulic hoses) are installed at two locations. The upper F/C hydraulic hoses are installed between the PDOS tube fittings (left or right) at the fan cowl support beam. The lower F/C hydraulic hoses are installed between the PDOS tube fitting to the fan cowl opening actuator fitting (left or right) at the fan case bridge bracket.

(3) The thrust reverser hydraulic flexhoses (referred to as T/R hydraulic hoses) are installed at two locations. The forward T/R hydraulic hoses are installed between the PDOS tube fittings and the forward mount disconnects. The aft T/R hydraulic hoses are installed between the PDOS tube fittings and the T/R cowl opening actuator fittings at the thrust reverser brackets (left or right).

(4) You must open fan cowl panel and/or the thrust reverser to remove the hydraulic hoses.

(5) On the forward T/R hydraulic hoses, you need to use the fall arrest lifeline procedure or other safety equipment to do this task.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

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D. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine
416	Right Thrust Reverser - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine
426	Right Thrust Reverser - Right Engine
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

E. Access Panels

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

F. Prepare for the Removal

SUBTASK 71-12-03-010-007-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

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Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-12-03-490-001-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(2) For the forward T/R hydraulic hoses, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-03-010-009-H01

(3) Remove the applicable PDOS access door [1] from the forward fairing: (Figure 401 (Sheet 1))

(a) Remove the bolts [2] (17 locations) that attach the PDOS access door [1] to the strut fairing.

(b) Place the protective mat, STD-585 on the forward fairing.

(c) Remove the PDOS access door [1] and let the PDOS access door [1] hang with the lanyard.

1) Make sure that you do not scratch the paint from the strut or the fairings.

G. Hydraulic Cowl Opening Flexhoses Removal

SUBTASK 71-12-03-020-001-H01

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(1) Remove the applicable F/C hydraulic hose (upper left) [11] and the F/C hydraulic hose (upper right) [12] (Figure 401 or Figure 402).

NOTE: The left and right F/C hydraulic hose removal is the same.

(a) Push the applicable fan cowl PDOS DOWN switch to permit the weight of the fan cowl panel to rest on the hold-open rods.

NOTE: This will release oil pressure from the F/C PDOS system.

(b) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12].

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(c) Disconnect the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12] from the tube fittings.

(d) Install the protective caps on the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12], and the F/C PDOS tube fittings.

(e) Remove the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12] from the fan case.

(f) If you remove the F/C hydraulic hose (lower) [15], do these steps:

NOTE: The left and right F/C hose removal is the same.

1) Push the applicable fan cowl PDOS DOWN switch to permit the weight of the fan cowl panel to rest on the hold-open rods.

NOTE: This will release oil pressure from the F/C PDOS system.

2) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the PDOS oil from the F/C hydraulic hose (lower) [15].

3) Disconnect the F/C hydraulic hose (lower) [15] from the F/C PDOS tube fitting.

4) Disconnect the F/C hydraulic hose (lower) [15] from the F/C PDOS actuator.

a) Disconnect the F/C hydraulic hose (lower) [15] at the lower end quick disconnect of the F/C PDOS actuator.

<1> Catch the oil from the F/C PDOS actuator and the F/C hydraulic hose (lower) [15] with 1 U.S.-gal (3.81 l) oil resistant container, STD-203

NOTE: Make sure the nipple and the packing are installed on the F/C PDOS actuator fitting.

5) Install the protective caps on the F/C hydraulic hose (lower) [15], F/C PDOS tube fitting, and the F/C PDOS actuator fitting.

6) Remove the F/C hydraulic hose (lower) [15] from the fan case.

SUBTASK 71-12-03-020-002-H00

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION

PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(2) Remove the applicable right forward T/R hydraulic hose [16] and the left forward T/R hydraulic hose [17] (Figure 401 or Figure 402).

(a) Push the applicable thrust reverser PDOS DOWN switch to permit the weight of the thrust reverser to rest on the hold-open rod.

NOTE: This will release oil pressure from the T/R PDOS system.

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(b) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the PDOS oil from the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17].

(c) Disconnect the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] from the T/R PDOS quick disconnect check valve.

(d) Disconnect the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] from the T/R PDOS tube fitting.

(e) Install the protective caps on the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17], the T/R PDOS tube fitting, and the T/R PDOS quick disconnect check valve.

(f) Remove the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] from the engine.

SUBTASK 71-12-03-020-003-H00

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION PUT CAPS ON THE HYDRAULIC HOSE AND FITTING. CONTAMINATION OF THE HYDRAULIC HOSE AND LEAKAGE OF THE PDOS OIL CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(3) Remove the applicable the aft left T/R hydraulic hose [18], and the aft right T/R hydraulic hose [19] ().

(a) Push the applicable thrust reverser PDOS DOWN switch to permit the weight of the thrust reverser to rest on the hold-open rod.

NOTE: This will release partial oil pressure from the T/R PDOS system.

(b) Disconnect the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] from the T/R PDOS quick disconnect check valve to release oil pressure.

(c) Install the protective caps on the T/R PDOS quick disconnect check valve and the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17].

(d) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 to catch the PDOS oil from the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19].

(e) Disconnect the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19] from the T/R PDOS tube fitting and the T/R PDOS actuator fitting.

(f) Install the protective caps on the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19], the T/R PDOS tube fittings, and the T/R PDOS actuator fitting.

(g) Remove the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19] from the engine.

END OF TASK

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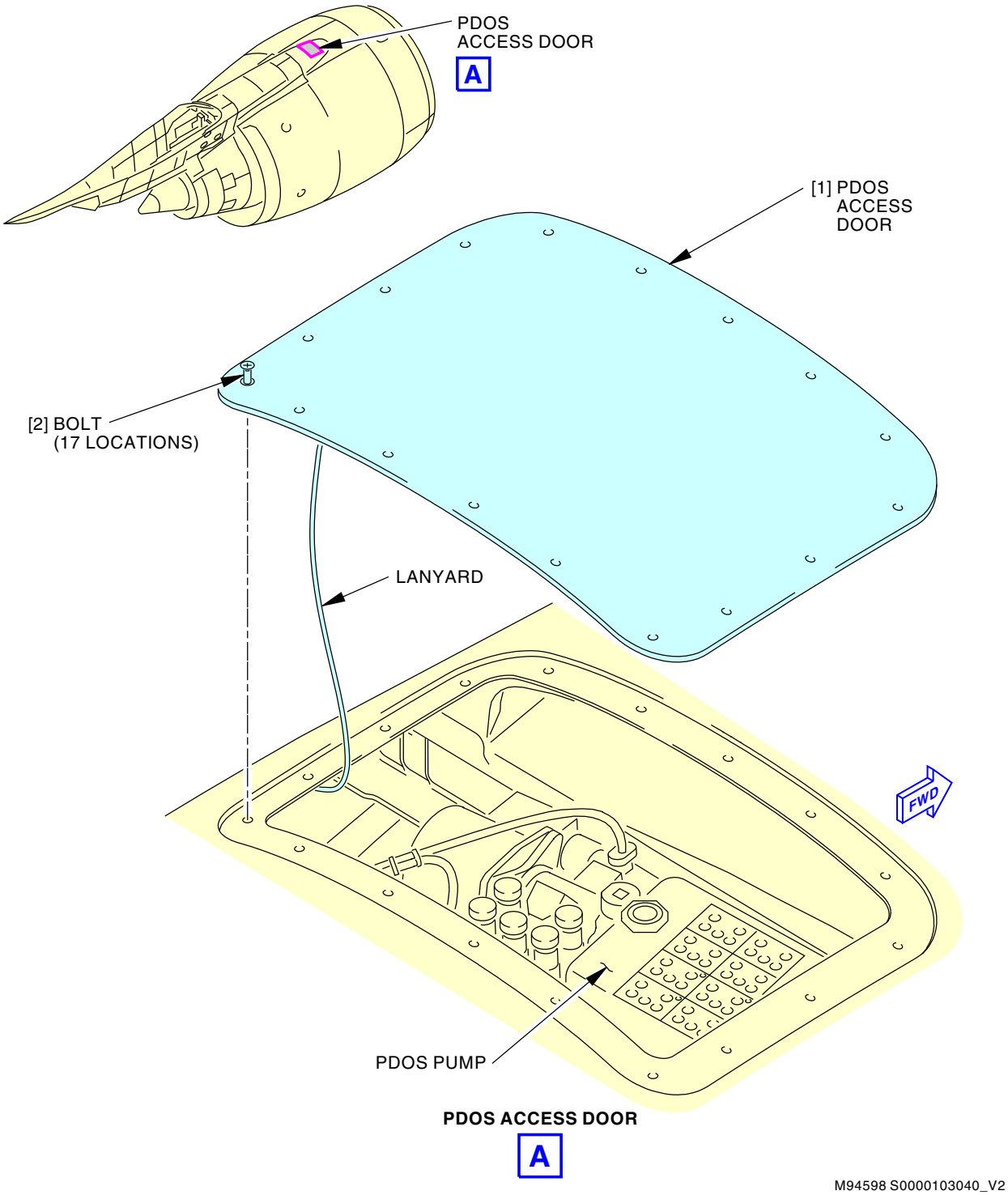

PDOS Access Door Installation
Figure 401/71-12-03-990-801-H01

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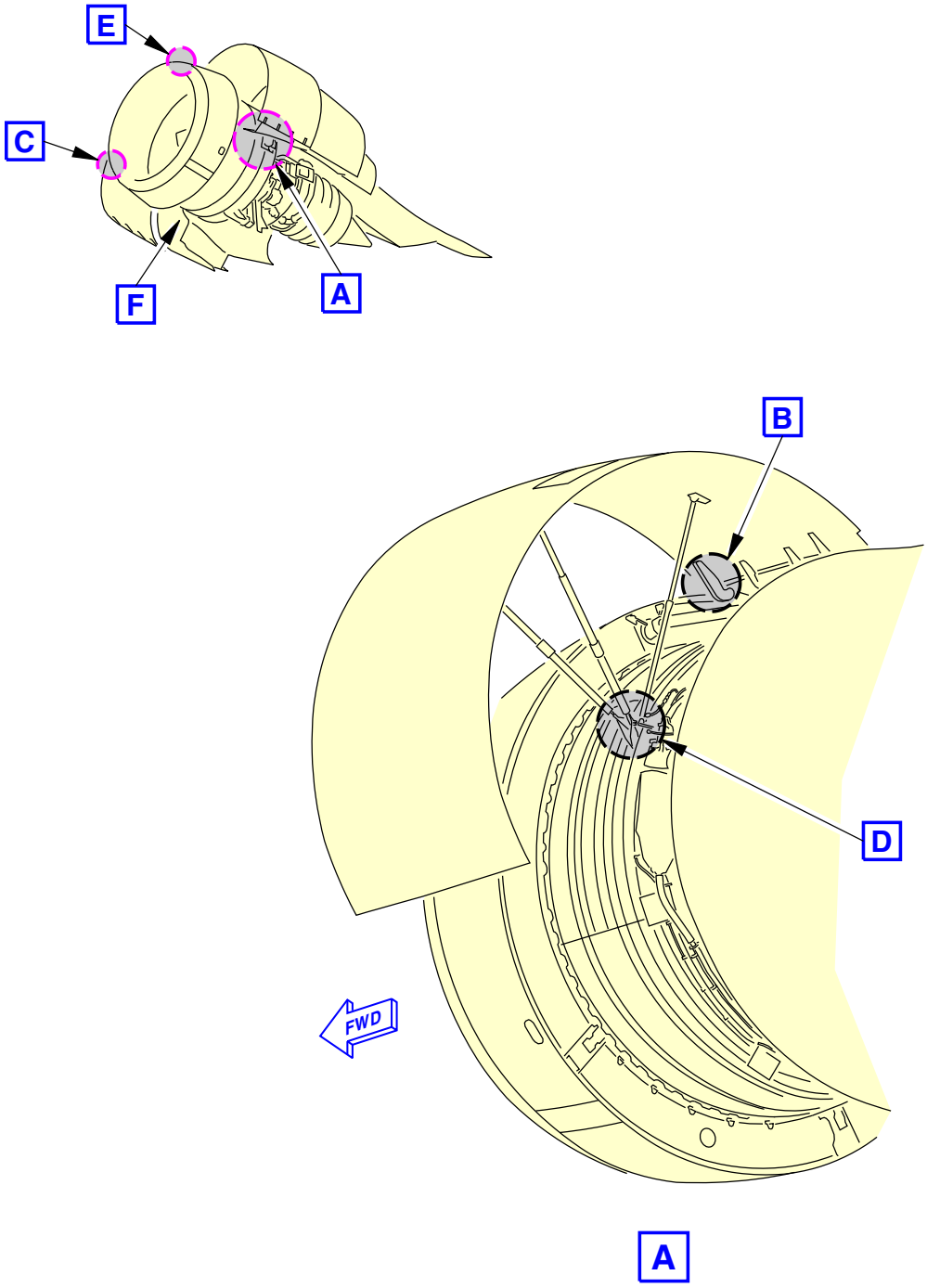

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Hydraulic Cowl Opening Flexhoses Installation
Figure 402/71-12-03-990-802-H01 (Sheet 1 of 3)

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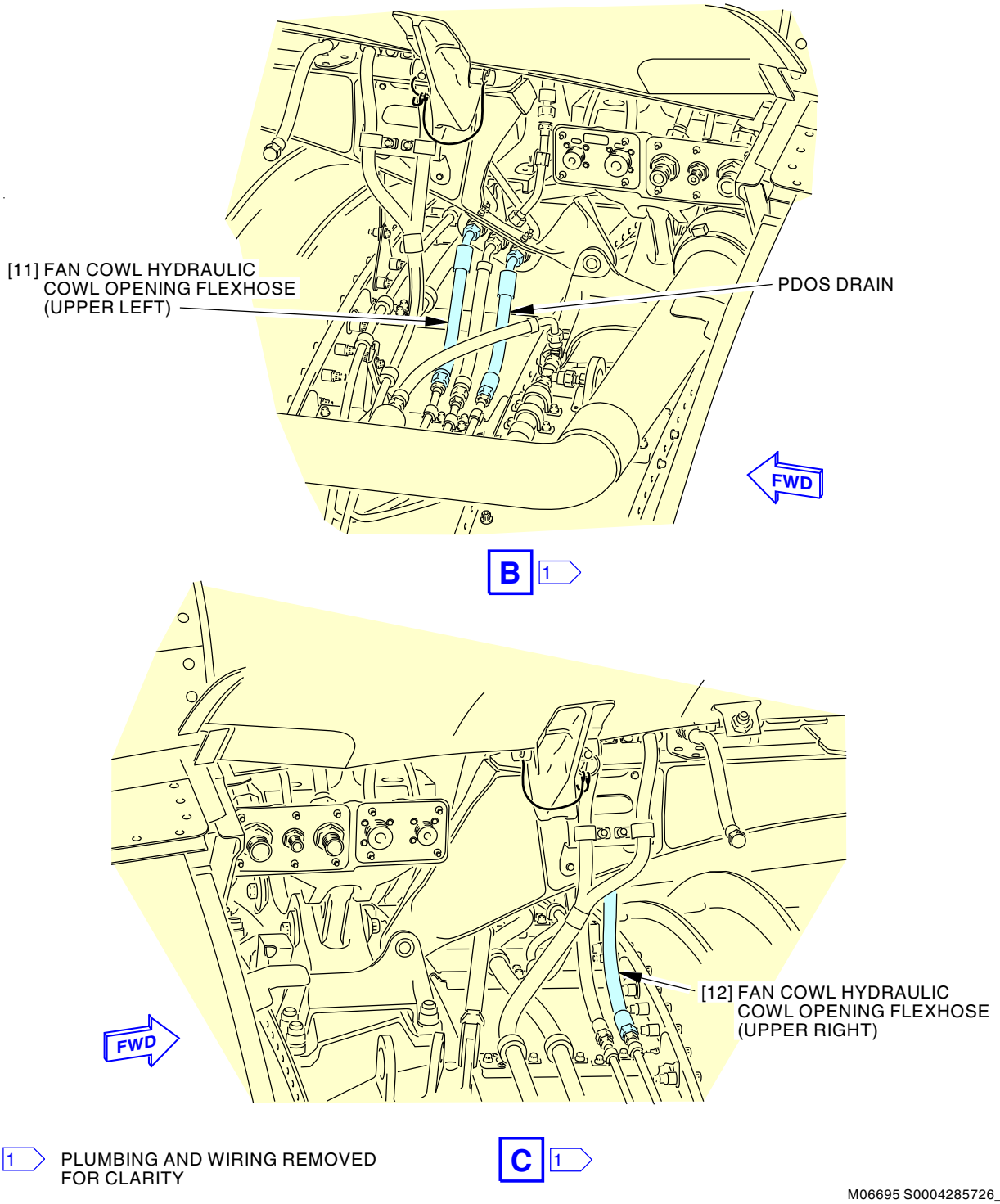

Hydraulic Cowl Opening Flexhoses Installation
Figure 402/71-12-03-990-802-H01 (Sheet 2 of 3)

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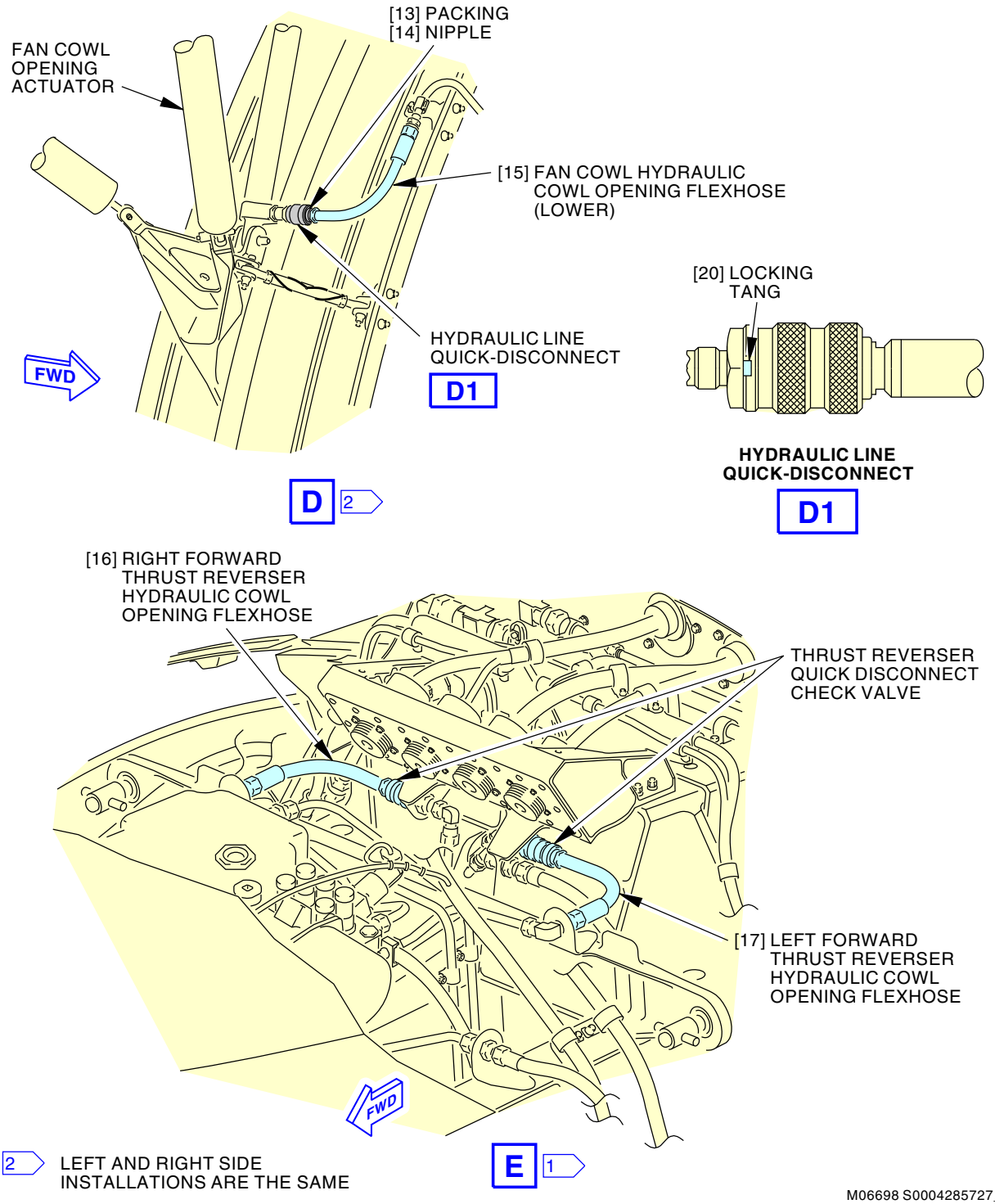

Hydraulic Cowl Opening Flexhoses Installation
Figure 402/71-12-03-990-802-H01 (Sheet 3 of 3)

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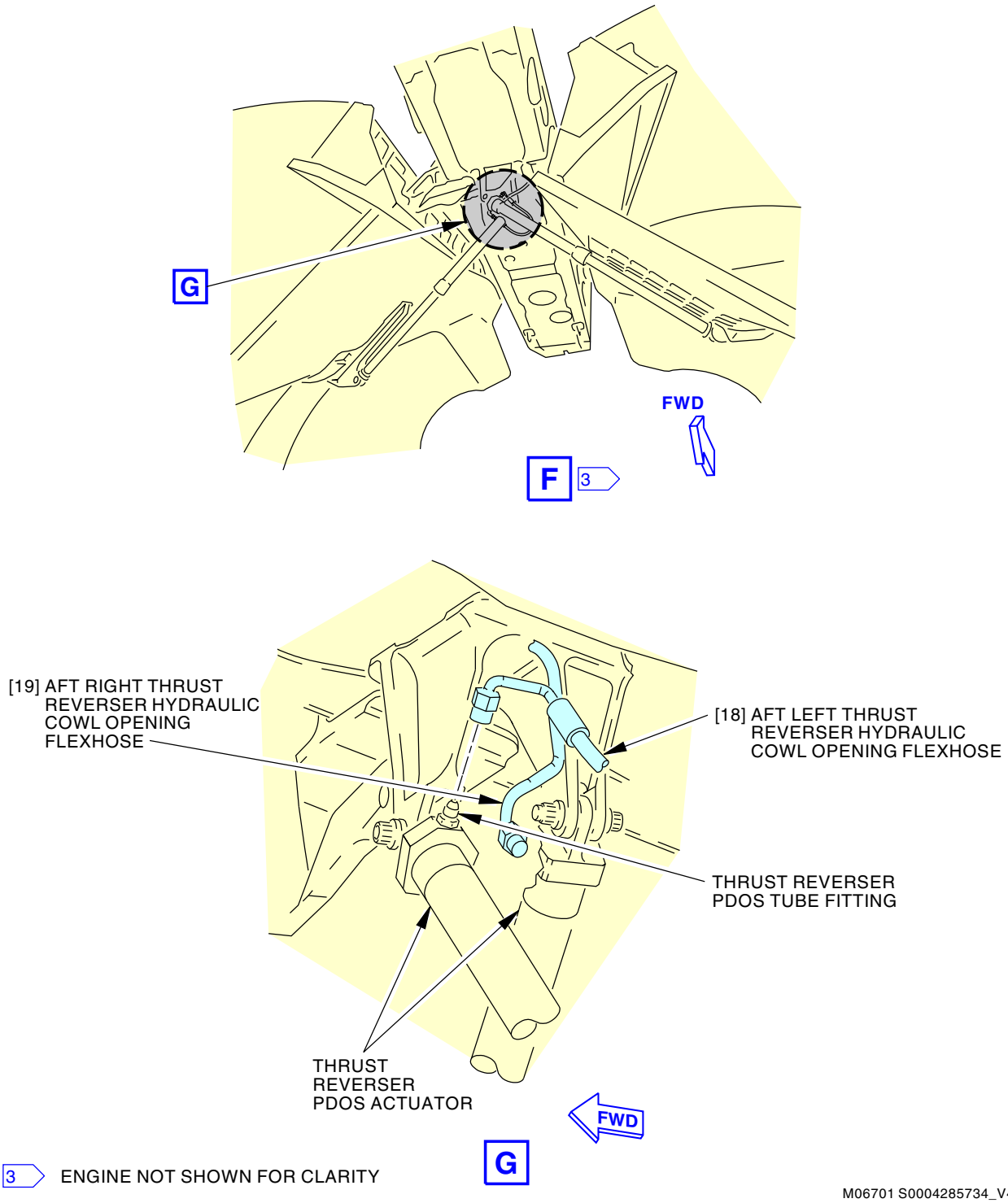

Thrust Reverser Cowl Opening Actuator Flexhose Installation
Figure 403/71-12-03-990-805-H00

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TASK 71-12-03-400-801-H01

3. Hydraulic Cowl Opening Flexhoses Installation

A. General

(1) There are four sets of hydraulic cowl opening flexhoses. Two sets are for the fan cowl panels. The other sets are for the thrust reversers.

(2) The fan cowl hydraulic flexhoses (referred to as F/C hydraulic hoses) are installed at two locations. The upper F/C hydraulic hoses are installed between the PDOS tube fittings (left or right) at the fan cowl support beam. The lower F/C hydraulic hoses are installed between the PDOS tube fitting to the fan cowl opening actuator fitting (left or right) at the fan case bridge bracket.

(3) The thrust reverser hydraulic flexhoses (referred to as T/R hydraulic hoses) are installed at two locations. The forward T/R hydraulic hoses are installed between the PDOS tube fittings and the forward mount disconnects. The aft T/R hydraulic hoses are installed between the PDOS tube fittings and the T/R cowl opening actuator fittings at the thrust reverser brackets (left or right).

(4) On the forward T/R hydraulic hoses, you need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(5) Cycle the fan cowl panels and thrust reversers until PDOS operates smoothly.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-802-H01	Close the Thrust Reverser (Power Method) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
11	F/C hydraulic hose (upper left)	71-12-52-02B-014	ARO ALL
		71-12-52-02B-015	ARO ALL
		71-12-52-02B-020	ARO ALL
12	F/C hydraulic hose (upper right)	71-12-52-02B-012	ARO ALL
		71-12-52-02B-015	ARO ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
12 (cont.)		71-12-52-02B-020	ARO ALL
15	F/C hydraulic hose (lower)	71-12-52-02B-020	ARO ALL
16	Right forward T/R hydraulic hose	71-12-52-02B-015	ARO ALL
		71-12-52-02B-020	ARO ALL
17	Left forward T/R hydraulic hose	71-12-52-02B-015	ARO ALL
		71-12-52-02B-020	ARO ALL
18	Aft left T/R hydraulic hose	71-12-52-01A-525	ARO ALL
19	Aft right T/R hydraulic hose	71-12-52-01A-530	ARO ALL

E. Location Zones

Zone	Area
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine
416	Right Thrust Reverser - Left Engine
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine
426	Right Thrust Reverser - Right Engine
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

F. Access Panels

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

G. Hydraulic Cowl Opening Flexhoses Installation

SUBTASK 71-12-03-490-002-H01

WARNING

USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(1) For the forward T/R hydraulic hoses, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

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SUBTASK 71-12-03-420-003-H00

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION

MAKE SURE THAT THE FLEXIBLE HOSE AND TUBE HAVE SUFFICIENT CLEARANCE FROM THE ADJACENT COMPONENTS. IF THE FLEXIBLE HOSE OR TUBE RUB ON THE COMPONENTS, DAMAGE TO THEM CAN OCCUR.

CAUTION

DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(2) To install the applicable aft left T/R hydraulic hose [18] and the aft right T/R hydraulic hose [19], do the steps that follows:

NOTE: The left and right T/R hydraulic hoses installation is the same.

(a) Make sure that you have the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19].

(b) Make sure that you have the correct aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19].

(c) Remove the protective caps from the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19], and the T/R PDOS actuator fitting.

(d) Connect the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19] to the T/R PDOS actuator fitting.

(e) Connect the other end of the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19] to the T/R PDOS tube fitting.

(f) Remove the protective caps from the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] and the T/R PDOS quick disconnect check valve.

(g) Connect the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] to the quick disconnect check valve.

(h) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 from the aft left T/R hydraulic hose [18] or the aft right T/R hydraulic hose [19].

SUBTASK 71-12-03-420-001-H00

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION

MAKE SURE THAT THE FLEXIBLE HOSE AND TUBE HAVE SUFFICIENT CLEARANCE FROM THE ADJACENT COMPONENTS. IF THE FLEXIBLE HOSE OR TUBE RUB ON THE COMPONENTS, DAMAGE TO THEM CAN OCCUR.

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(CAUTION PRECEDES)

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(3) To install the applicable left forward T/R hydraulic hose [17] and the right forward T/R hydraulic hose [16], do the steps that follow:

NOTE: The left and right T/R hydraulic hoses installation is the same.

(a) Make sure that you have the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17].

(b) Make sure that you have the correct right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17].

(c) Remove the protective caps from the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17], the T/R PDOS tube fitting, and the T/R PDOS quick disconnect check valve.

(d) Connect the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] to the T/R PDOS tube fitting.

(e) Connect the other end of the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17] to the quick disconnect check valve.

1) Make sure the locking tang [20] is engaged completely in the fitting groove.

(f) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 from the right forward T/R hydraulic hose [16] or the left forward T/R hydraulic hose [17].

SUBTASK 71-12-03-420-002-H00

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE AND A FAILURE OF THE POWER DOOR OPENING SYSTEM (PDOS) IF YOU DO NOT OBEY THESE INSTRUCTIONS.

CAUTION MAKE SURE THAT THE FLEXIBLE HOSE AND TUBE HAVE SUFFICIENT CLEARANCE FROM THE ADJACENT COMPONENTS. IF THE FLEXIBLE HOSE OR TUBE RUB ON THE COMPONENTS, DAMAGE TO THEM CAN OCCUR.

CAUTION DO NOT LET PDOS OIL LEAKAGE COLLECT. IF YOU DO NOT CLEAN THE AREA, DAMAGE CAN OCCUR FROM THE PDOS OIL.

(4) To install the applicable F/C hydraulic hose (upper left) [11], the F/C hydraulic hose (upper right) [12], the F/C hydraulic hose (lower) [15], do the steps that follows:

(a) If you install the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12], do these steps:

NOTE: The left and right F/C hydraulic hoses installation is the same.

1) Make sure that you have the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12].

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2) Remove the protective caps from the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12], and the F/C PDOS tube fittings.

3) Connect the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12] to the F/C PDOS tube fittings.

4) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 from the F/C hydraulic hose (upper left) [11] or the F/C hydraulic hose (upper right) [12].

(b) If you install the F/C hydraulic hose (lower) [15], do these steps:

NOTE: The left and right F/C hydraulic hoses installation is the same.

1) Make sure that you have the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 under the F/C hydraulic hose (lower) [15].

2) Remove the protective caps from the F/C hydraulic hose (lower) [15], F/C PDOS actuator fitting, and the F/C PDOS tube fitting.

3) Connect the F/C PDOS actuator as follows:

a) Align the F/C PDOS actuator in the fan case bracket assembly.

b) Make sure the nipple [14] and the packing [13] are installed on the F/C PDOS actuator fitting.

c) Connect the F/C hydraulic hose (lower) [15] to the lower end quick disconnect of the F/C PDOS actuator.

<1> Make sure the locking tang [20] is engaged completely in the fitting groove.

NOTE: If it is necessary, use PDOS switch to extend or retract the fan cowl PDOS actuator for the alignment. Do not extend the fan cowl PDOS actuator unless the PDOS hydraulic hose is connected to prevent air from being drawn into the actuator.

4) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203 from the F/C hydraulic hose (lower) [15].

H. Hydraulic Cowl Opening Flexhoses Test

SUBTASK 71-12-03-870-001-H01

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(1) If you removed an T/R hydraulic hose, cycle the thrust reversers a minimum of three times to bleed the air out of the thrust reverser PDOS system.

(a) Use the thrust reverser PDOS switches to cycle the thrust reversers.

SUBTASK 71-12-03-210-001-H01

(2) Do a visual check for leakage from the PDOS system.

SUBTASK 71-12-03-410-001-H01

(3) Do this task to close the thrust reverser: Close the Thrust Reverser (Power Method), TASK 78-31-00-410-802-H01.

(a) Close the thrust reversers:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine

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(Continued)

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

SUBTASK 71-12-03-870-002-H01

CAUTION MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(4) If you removed a F/C hydraulic hose, cycle the fan cowl panels a minimum of three times to bleed the air out of the fan cowl PDOS system.

(a) Use the fan cowl PDOS switches to cycle the fan cowl panels.

SUBTASK 71-12-03-210-002-H01

(5) Do a visual check for leakage from the PDOS system.

SUBTASK 71-12-03-410-008-H01

(6) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-12-03-410-003-H01

(7) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

SUBTASK 71-12-03-440-002-H01

(8) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-03-010-003-H01

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(1) Do this task: Fill the PDOS Pump with Oil, TASK 12-12-02-610-803-004.

SUBTASK 71-12-03-410-010-H01

(2) Install the applicable PDOS access door [1] on the forward fairing.

(a) Install the bolts [2] (17 locations) that attach the PDOS access door [1] to the strut fairing.

(b) Remove the protective mat, STD-585 from the forward fairing.

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SUBTASK 71-12-03-090-001-H01

(3) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

——— END OF TASK ———

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HYDRAULIC COWL OPENING FLEXHOSES - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) An inspection of the hydraulic cowl opening flexhoses.

TASK 71-12-03-200-801-H01

2. Hydraulic Cowl Opening Flexhose Inspection

A. General

(1) There are four sets of hydraulic cowl opening flexhoses. Two are for the fan cowl panels. The other two are for the thrust reversers.

(2) On the forward T/R hydraulic hoses, it is necessary to use the fall arrest lifeline procedure or other safety equipment to do this task.

(3) The hydraulic cowl opening flexhose inspection includes this check:

(a) Visually examine the hydraulic cowl opening flexhoses (referred to as hydraulic flexhoses) for damage.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
71-12-03-000-801-H01	Hydraulic Cowl Opening Flexhoses Removal (P/B 401)
71-12-03-400-801-H01	Hydraulic Cowl Opening Flexhoses Installation (P/B 401)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205

D. Location Zones

Zone	Area
411	Engine, Left
413	Left Fan Cowl - Left Engine
414	Right Fan Cowl - Left Engine
415	Left Thrust Reverser - Left Engine

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(Continued)

Zone	Area
416	Right Thrust Reverser - Left Engine
421	Engine, Right
423	Left Fan Cowl - Right Engine
424	Right Fan Cowl - Right Engine
425	Left Thrust Reverser - Right Engine
426	Right Thrust Reverser - Right Engine
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

E. Access Panels

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

F. Prepare for the Inspection

SUBTASK 71-12-03-010-006-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

G. Hydraulic Cowl Opening Flexhoses Inspection

SUBTASK 71-12-03-490-004-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(1) For the forward T/R hydraulic hoses, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-03-010-008-H01

(2) Remove the applicable PDOS access door from the forward fairing (Figure 602 (Sheet 3)):

(a) Remove the bolts [2] (17 locations) that attach the PDOS access door [1] to the strut fairing.

(b) Place the protective mat on the forward fairing.

(c) Remove the PDOS access door [1] and let the PDOS access door [1] hang with the lanyard.

1) Make sure that you do not scratch the paint from the strut or the fairings.

SUBTASK 71-12-03-212-001-H01

(3) Visually examine the hydraulic flexhoses for damage:

(a) Signs of PDOS oil leakage.

1) Make sure the hydraulic flexhose fitting and connections are tight.

2) If the hydraulic flexhoses show signs of PDOS oil leaks after you tightened the fittings, replace the hydraulic flexhoses.

a) Do this task: Hydraulic Cowl Opening Flexhoses Removal, TASK 71-12-03-000-801-H01.

b) Do this task:Hydraulic Cowl Opening Flexhoses Installation, TASK 71-12-03-400-801-H01.

(b) Contamination on the hydraulic flexhose.

1) Clean the hydraulic flexhose if a contaminant is found.

(c) Cracks on the hydraulic flexhoses.

1) Cracks are not permitted.

(d) Fitting and thread damage on the hydraulic flexhose.

1) Fitting and thread damage are not permitted.

(e) Bends or kinks

1) No kinks or permanent bends of the hydraulic flexhose are permitted.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-03-410-007-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-12-03-410-009-H01

(2) Install the applicable PDOS access door [1] on the forward fairing.

(a) Install the bolts [2] (17 locations) that attach the PDOS access door [1] to the strut fairing.

(b) Remove the protective mat from the forward fairing.

SUBTASK 71-12-03-090-002-H01

(3) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

——— END OF TASK ———

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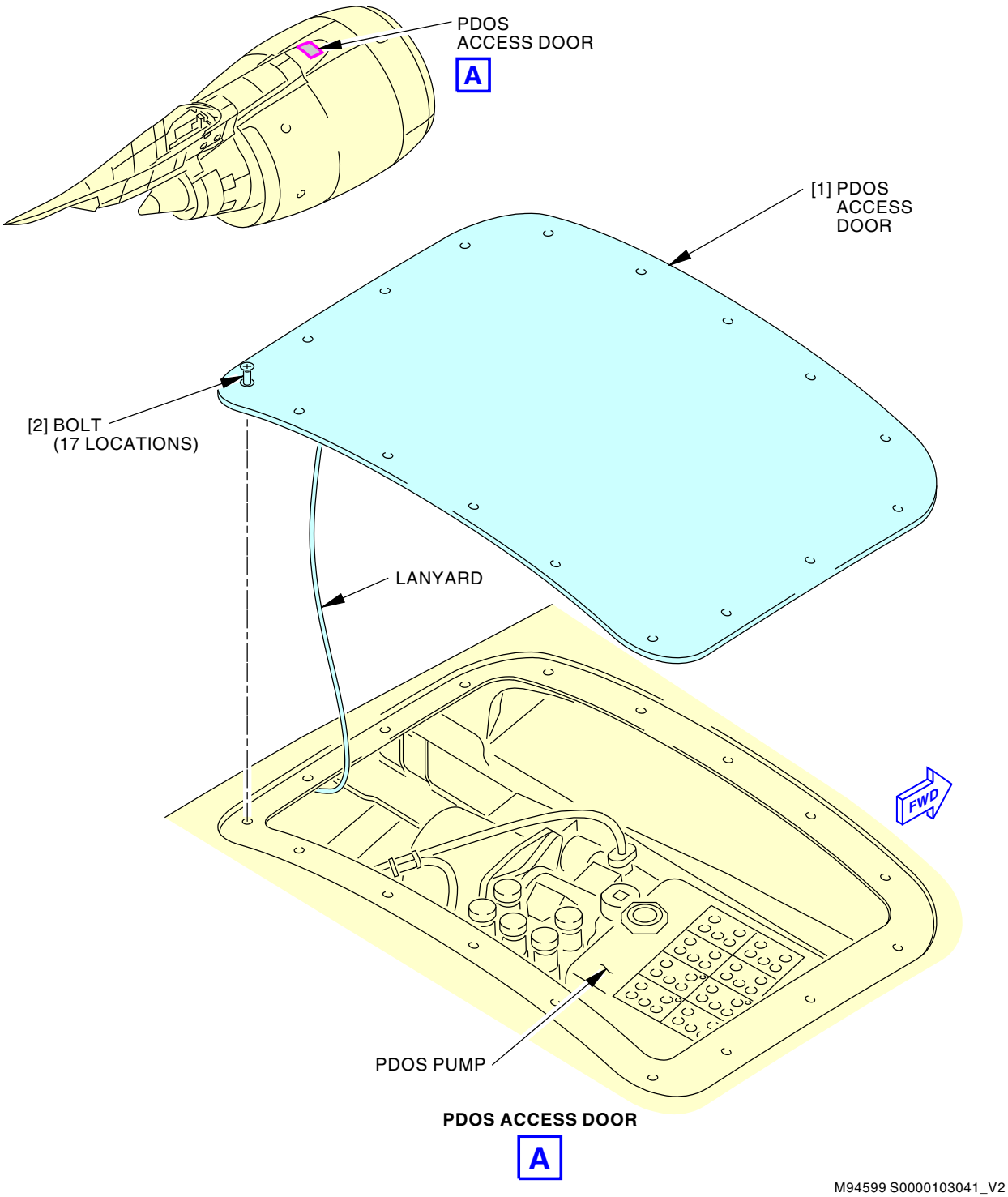

PDOS Access Door Installation
Figure 601/71-12-03-990-803-H01

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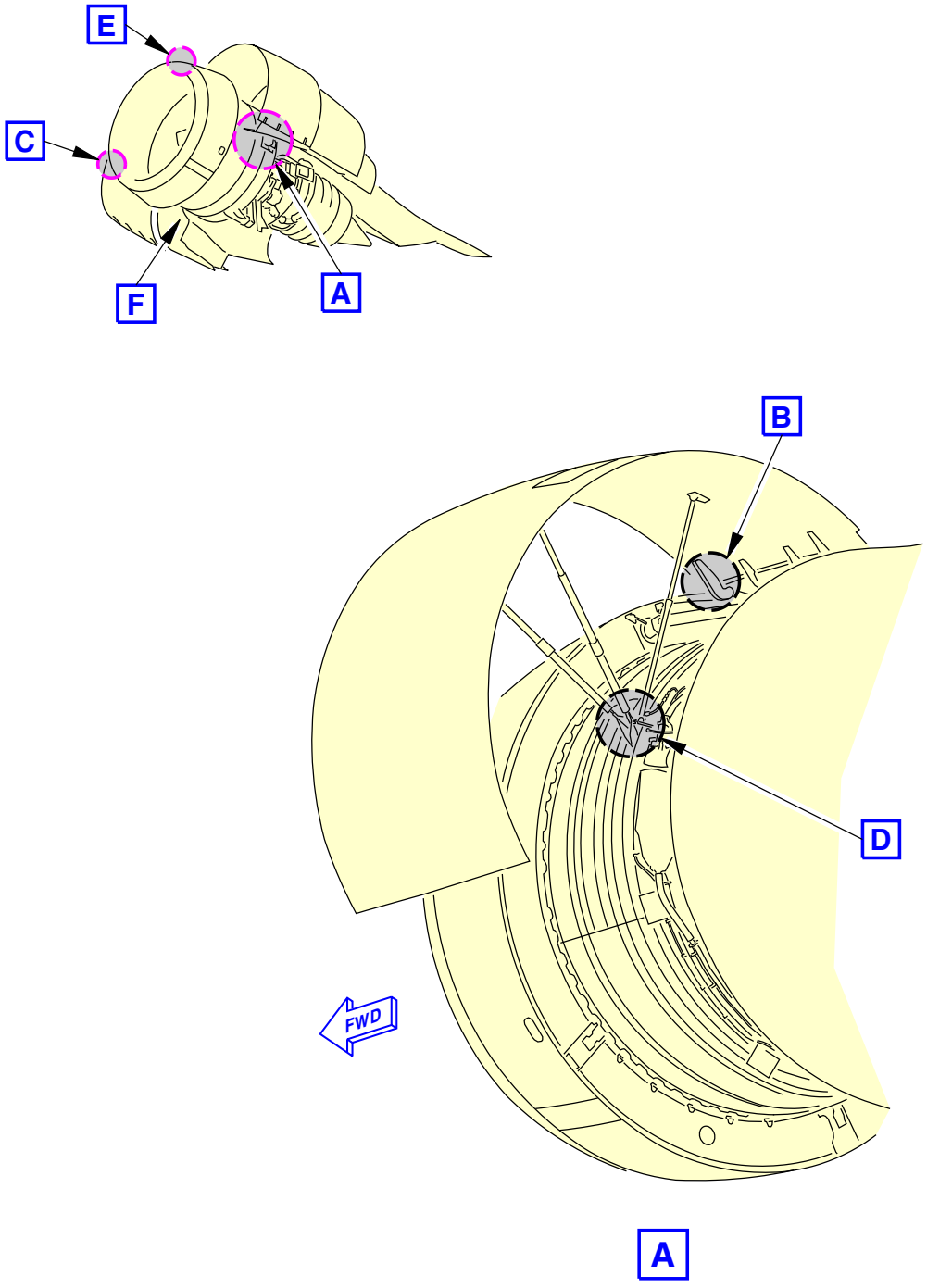

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Hydraulic Cowl Opening Flexhoses Inspection
Figure 602/71-12-03-990-804-H01 (Sheet 1 of 3)

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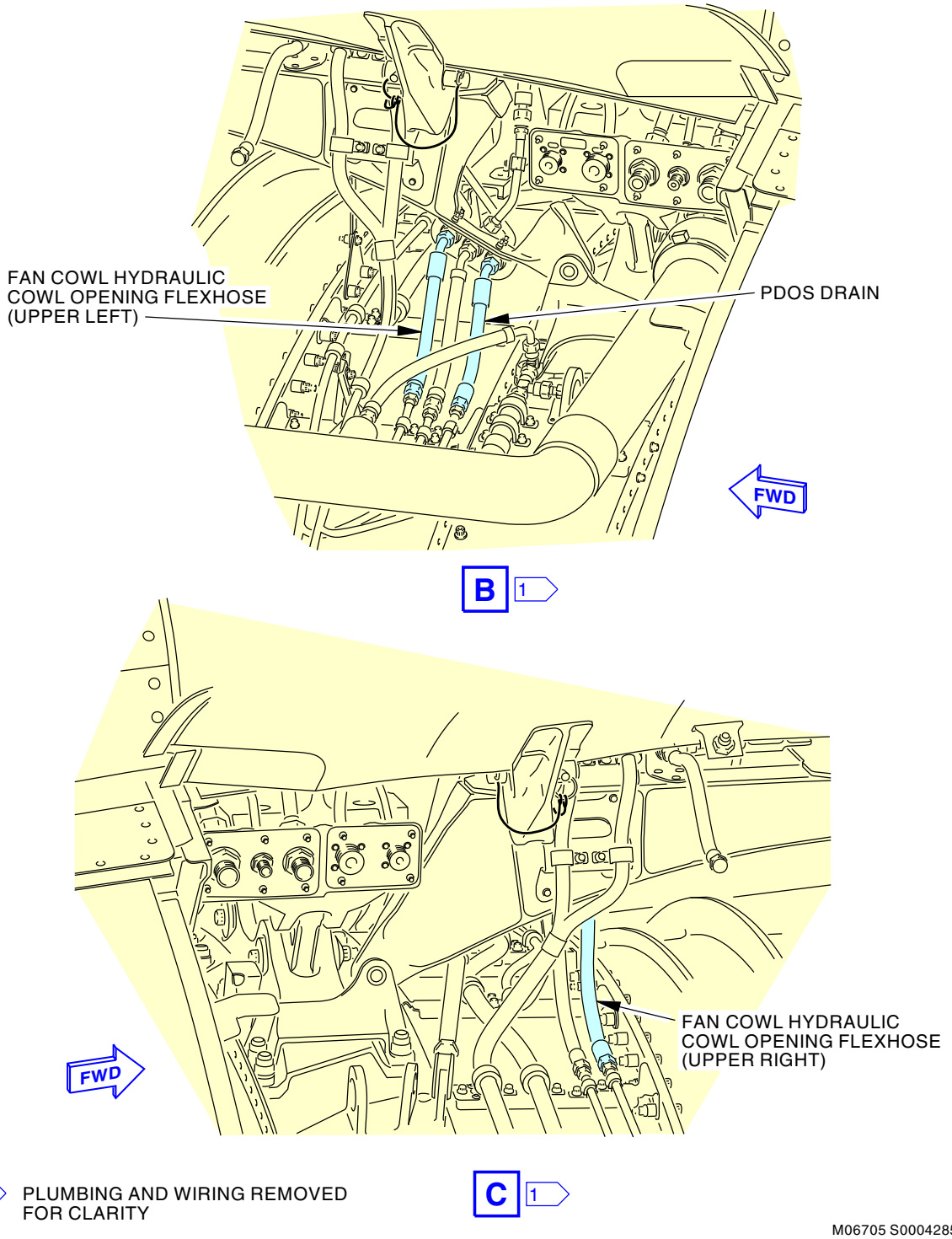

1 PLUMBING AND WIRING REMOVED FOR CLARITY

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Hydraulic Cowl Opening Flexhoses Inspection
Figure 602/71-12-03-990-804-H01 (Sheet 2 of 3)

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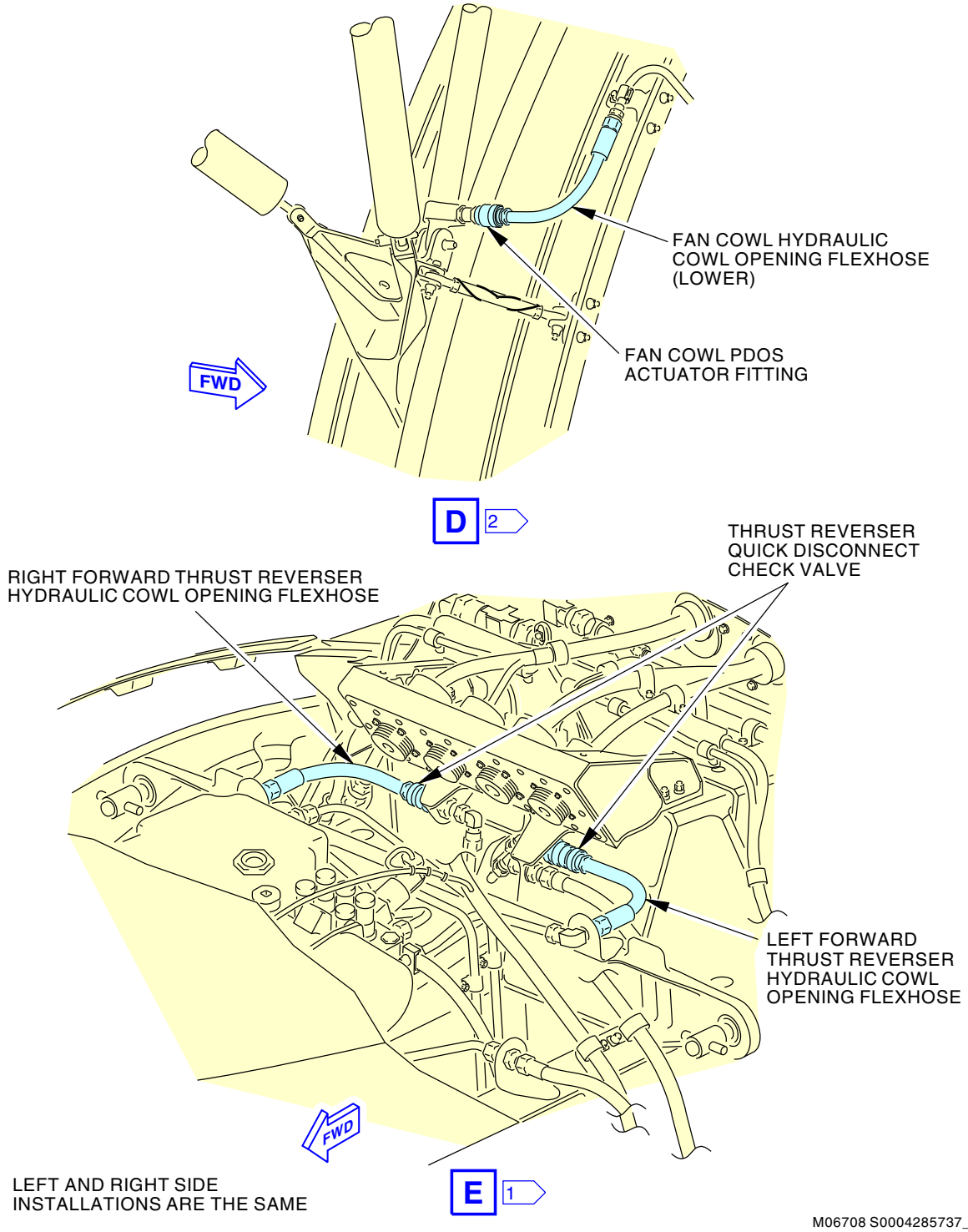

Hydraulic Cowl Opening Flexhoses Inspection
Figure 602/71-12-03-990-804-H01 (Sheet 3 of 3)

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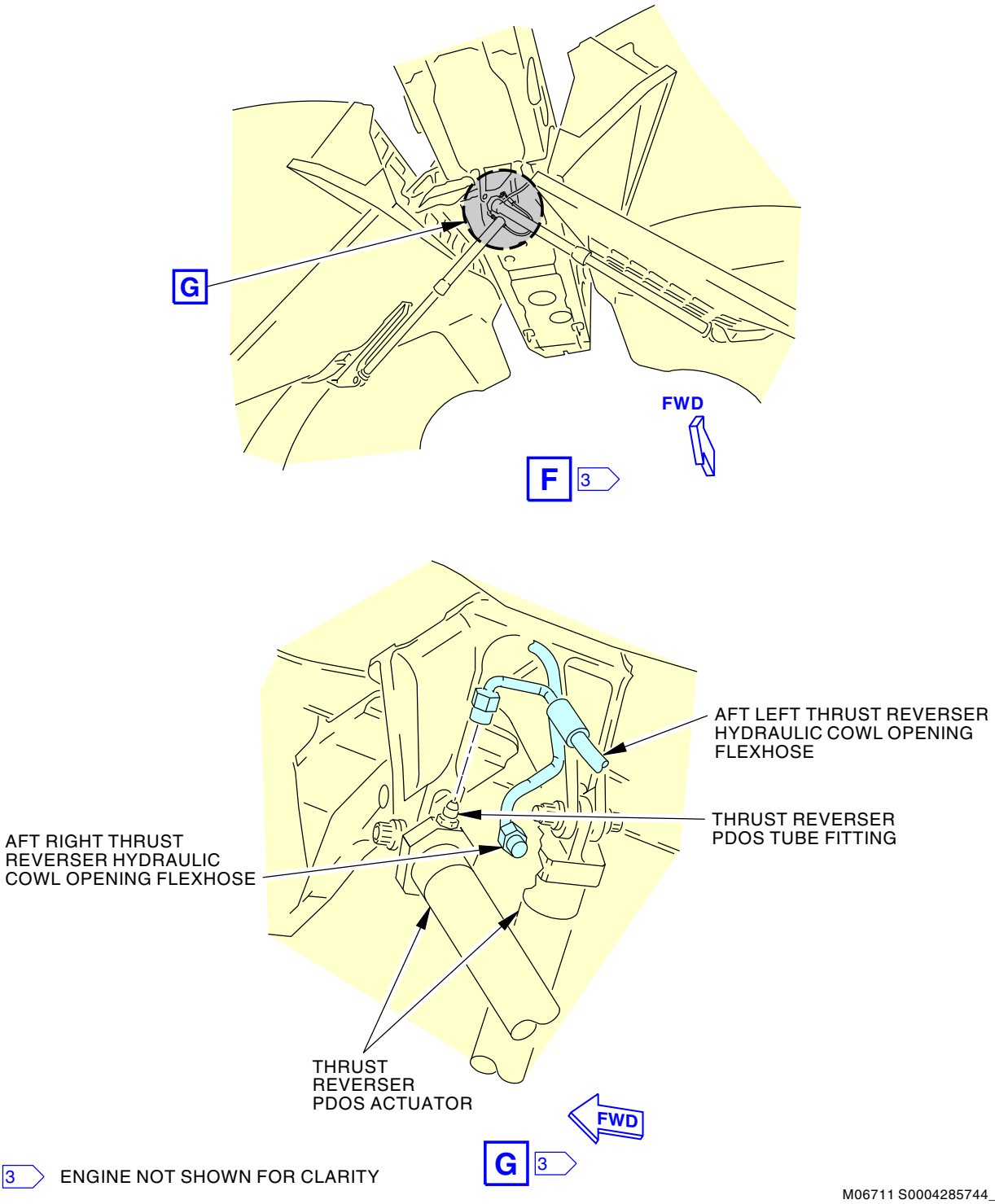

Thrust Reverser Cowl Opening Actuator Flexhose Inspection
Figure 603/71-12-03-990-806-H00

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PDOS PUMP - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the PDOS pump

(2) An installation of the PDOS pump.

TASK 71-12-04-000-801-H01

2. PDOS Pump Removal

A. General

(1) The PDOS (power door opening system) pump is installed on the brackets of the fan cowl support assembly. The fan cowl support assembly is on the forward side of the strut. You must remove the PDOS access door from the strut to get access to the PDOS pump.

(2) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

B. References

Reference	Title
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Location Zones

Zone	Area
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

E. Access Panels

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

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F. Prepare for the Removal

SUBTASK 71-12-04-410-001-H01

WARNING

DO NOT REMOVE THE PDOS PUMP WITH A THRUST REVERSER IN THE OPEN POSITION. FOR SAFETY, THERE MUST BE TWO HOLD-OPEN DEVICES IN POSITION. (ON THRUST REVERSERS WITH TWO HOLD-OPEN RODS, A SINGLE ROD CANNOT HOLD THE WEIGHT OF A THRUST REVERSER.) A FAILURE OF A HOLD-OPEN ROD WILL PERMIT THE THRUST REVERSER TO FAIL. THIS COULD POSSIBLE CAUSE SERIOUS INJURY OR DAMAGE TO EQUIPMENT.

(1) Make sure the thrust reversers are closed (TASK 78-31-00-410-816-H00).

(a) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-12-04-300-001-H01

WARNING

USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(2) Use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-04-020-001-H01

(3) Remove the applicable PDOS access door [1] from the forward fairing (Figure 401 (Sheet 1)):

(a) Remove the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Place the protective mat, STD-585 on the forward fairing.

(c) Remove the PDOS access door [1] and let the PDOS access door [1] hang with the lanyard.

1) Make sure that you do not scratch the paint from the strut or the fairings.

SUBTASK 71-12-04-865-001-H01

(4) For the left engine; Open this circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-12-04-865-002-H01

(5) For the right engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

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G. PDOS Pump Removal

SUBTASK 71-12-04-030-001-H01

CAUTION

MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(1) Use teflon-jawed pliers, STD-664 to disconnect the electrical connector [3] and electrical connector [8](TASK 70-00-01-400-807-H01):

(a) Disconnect the electrical connector [3] and electrical connector [8] from the PDOS pump [4].

(b) Install the protective caps on the electrical connector [3] and electrical connector [8] and the receptacles.

SUBTASK 71-12-04-030-002-H01

CAUTION

DO NOT LET PDOS OIL LEAKAGE REMAIN ON THE COMPONENTS. DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Disconnect the five hydraulic tube fittings [7]:

(a) Disconnect the five hydraulic tube fittings [7] from the top of the PDOS pump [4].

(b) Install the protective caps on the hydraulic tube fittings [7] and the fittings.

SUBTASK 71-12-04-030-003-H01

(3) Disconnect the bonding jumper [11] from the PDOS pump [4]:

(a) Remove the bolt [9], washer [10], bracket [12], washer [13], and the nut [14] from the bonding jumper [11].

SUBTASK 71-12-04-020-002-H01

(4) Remove the PDOS pump [4]:

(a) Remove the bolts [5] and washers [6] (3 locations) that attach the PDOS pump [4] to the brackets of the fan cowl support assembly.

(b) Remove the PDOS pump [4].

END OF TASK

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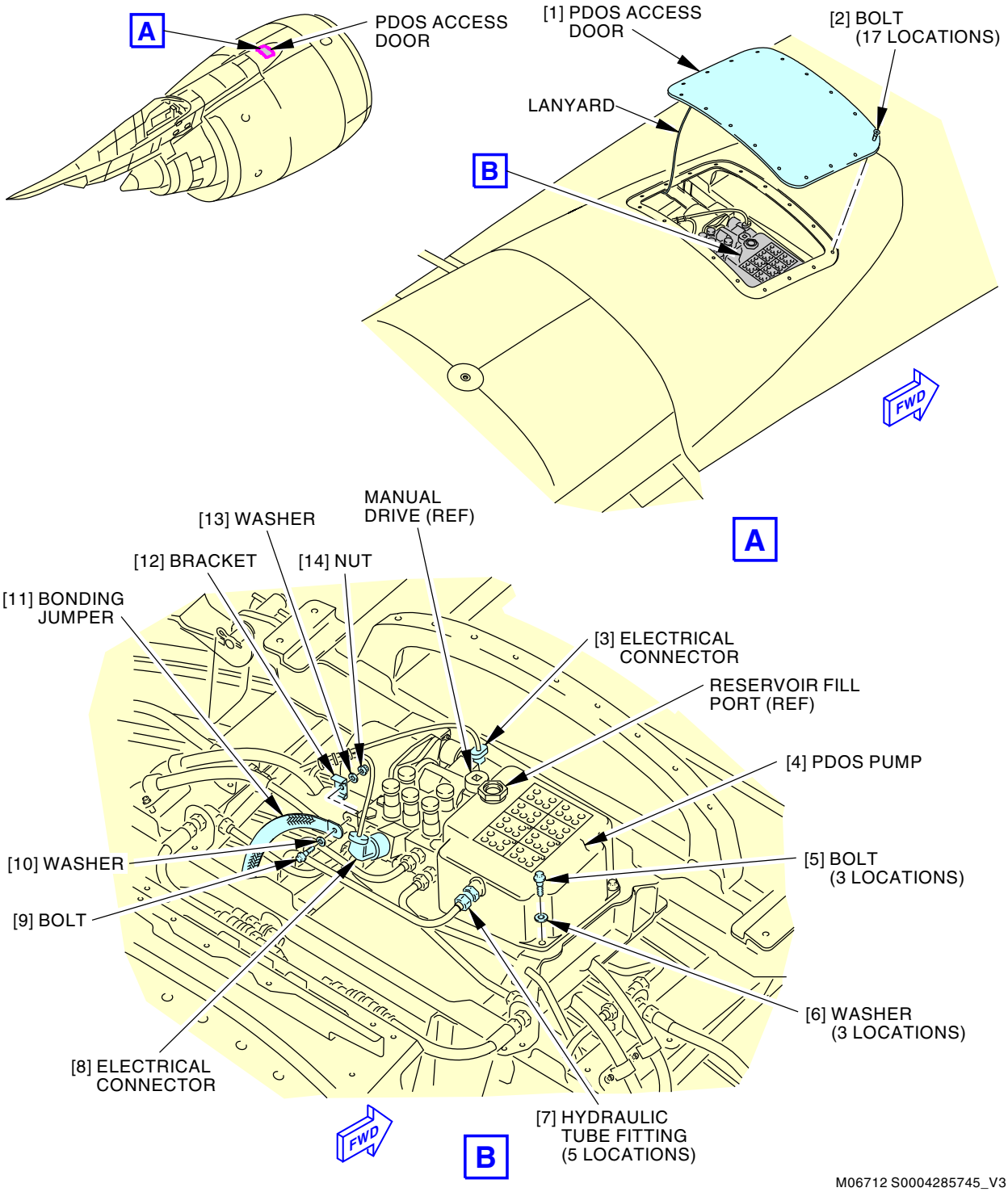

PDOS Pump Installation
Figure 401/71-12-04-990-801-H01

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TASK 71-12-04-400-801-H01

3. PDOS Pump Installation

A. General

(1) To install the PDOS pump, you must do these steps:

(a) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(b) Install the applicable PDOS pump.

(c) Fill the PDOS pump with the PDOS oil.

(d) Do the deactivation procedure for the thrust reverser.

(e) Cycle the thrust reversers.

(f) Cycle the fan cowl panels.

(g) Do a visual check on the PDOS pump for leakage.

(h) Do the activation procedure for the thrust reverser.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-1550	Bonding Meters - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: T477W Supplier: 01014 Opt Part #: M1B Supplier: 3AD17
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205

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(Continued)

Reference	Description
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Consumable Materials

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

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	PDOS pump	71-12-04-03C-050	ARO 001-004

F. Location Zones

Zone	Area
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

G. Access Panels

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

H. PDOS Pump Installation

SUBTASK 71-12-04-300-002-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(1) If it is not already done, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-04-420-001-H01

(2) Install the PDOS pump [4] on the brackets of the fan cowl support assembly.

(a) Align the PDOS pump [4] bolt holes with the bracket bolt holes.

(b) Install the bolts [5] and washers [6] (3 locations) that attach the PDOS pump [4] to the brackets.

(c) Tighten the bolts [5].

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SUBTASK 71-12-04-430-001-H01

CAUTION: DO NOT LET PDOS OIL LEAKAGE REMAIN ON THE COMPONENTS. DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Connect the five hydraulic tube fittings [7]:

(a) Remove the protective caps on the hydraulic tube fittings [7] and the fittings.

(b) Connect the five hydraulic tube fittings [7] to the top of the PDOS pump [4].

SUBTASK 71-12-04-420-002-H01

(4) Install the bolt [9], washer [10], bracket [12], washer [13], and the nut [14] to connect the bonding jumper [11] to the PDOS pump [4].

NOTE: Install the bonding jumper on the forward side of the bracket and make sure it contacts to the unfinished area of the bracket.

(a) With an intrinsically safe approved bonding meter, COM-1550, make sure the bonding resistance between the bolt head and the basic structure is less than or equal to 0.0008 ohm.

SUBTASK 71-12-04-430-002-H01

CAUTION: MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION: USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(5) Use teflon-jawed pliers, STD-664 to connect the electrical connector [3] and electrical connector [8](TASK 70-00-01-400-807-H01):

(a) Remove the protective caps on the electrical connector [3] and electrical connector [8] and the receptacles.

(b) Connect the electrical connector [3] and electrical connector [8] to the PDOS pump [4].

SUBTASK 71-12-04-612-001-H01

CAUTION: MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(6) Fill the PDOS pump [4] with oil, D00071 or oil, D00068 TASK 12-12-02-610-803-004.

I. PDOS Pump Test

SUBTASK 71-12-04-860-003-H01

(1) For the left engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

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SUBTASK 71-12-04-860-004-H01

(2) For the right engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-12-04-010-002-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-12-04-870-001-H01

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(4) Cycle the thrust reversers a minimum of three times to bleed the air out of the thrust reverser PDOS system.

(a) Use the thrust reverser PDOS switches to cycle the thrust reversers.

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SUBTASK 71-12-04-410-005-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-12-04-870-003-H01

CAUTION MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(6) Cycle the fan cowl panels a minimum of three times to bleed the air out of the fan cowl PDOS system.

(a) Use the fan cowl PDOS switches to cycle the fan cowl panels.

SUBTASK 71-12-04-212-001-H01

(7) Do a visual check for leakage on the PDOS pump.

SUBTASK 71-12-04-410-006-H01

(8) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

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(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-12-04-410-003-H01

(9) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00

SUBTASK 71-12-04-440-001-H01

(10) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-04-612-002-H01

CAUTION MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(1) Do a check of the oil level in the PDOS pump and fill with oil, D00071 or oil, D00068 if the oil level is low (TASK 12-12-02-610-803-004).

SUBTASK 71-12-04-410-004-H01

(2) Install the PDOS access door [1] on the forward fairing:

(a) Install the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Remove the protective mat, STD-585 from the forward fairing.

SUBTASK 71-12-04-090-002-H01

(3) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

END OF TASK

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PDOS PUMP FILTER ELEMENT - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the PDOS pump filter element

(2) An installation of the PDOS pump filter element.

TASK 71-12-05-000-801-H01

2. PDOS Pump Filter Element Removal

A. General

(1) This task is the removal procedure for the PDOS Pump Filter Element.

(2) The PDOS pump filter element is installed on the PDOS pump.

(3) You need a bolt (1/4 inch) to remove the PDOS filter element.

(4) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(5) You must remove the PDOS access door from the strut to get access to the PDOS filter element.

B. References

Reference	Title
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Location Zones

Zone	Area
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

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F. Prepare for the Removal

SUBTASK 71-12-05-300-001-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(1) Use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-05-010-004-H01

(2) Remove the applicable PDOS access door [1] from the forward fairing:

(a) Remove the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Place the protective mat, STD-585 on the forward fairing.

(c) Remove the PDOS access door [1] and let the PDOS access door [1] hang with the lanyard.

1) Make sure that you do not scratch the paint from the strut or the fairings.

SUBTASK 71-12-05-860-001-H01

(3) For the left engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-12-05-860-002-H01

(4) For the right engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

G. PDOS Pump Filter Element Removal

SUBTASK 71-12-05-020-001-H01

(1) Remove the PDOS filter element [5] from the PDOS pump housing: (Figure 401)

CAUTION DO NOT LET PDOS OIL LEAK LEAK ON THE STRUT OR OTHER COMPONENTS. IF LEAKAGE OCCURS, CLEAN THE AREA IMMEDIATELY. DAMAGE CAN OCCUR FROM THE PDOS OIL.

(a) Use a cotton wiper, G00034 to catch the PDOS oil from the PDOS filter element [5].

(b) Remove the lockwire from the high pressure filter plug [4].

(c) Remove the high pressure filter plug [4] from the housing.

(d) Install a bolt (0.250-20 UNC-3A thread form) on the visible surface of the PDOS filter element [5].

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CAUTION

IF PDOS OIL FALLS ON THE EQUIPMENT, MAKE SURE YOU CLEAN UP THE PDOS OIL. DAMAGE TO SOME EQUIPMENT COULD OCCUR.

(e) Pull and remove the PDOS filter element [5] with the 0.250-20 UNC-3A threaded bolt.

(f) Remove and discard the backup rings [6], packing [7], and the packing [3].

(g) Install the protective cap on the housing port.

END OF TASK

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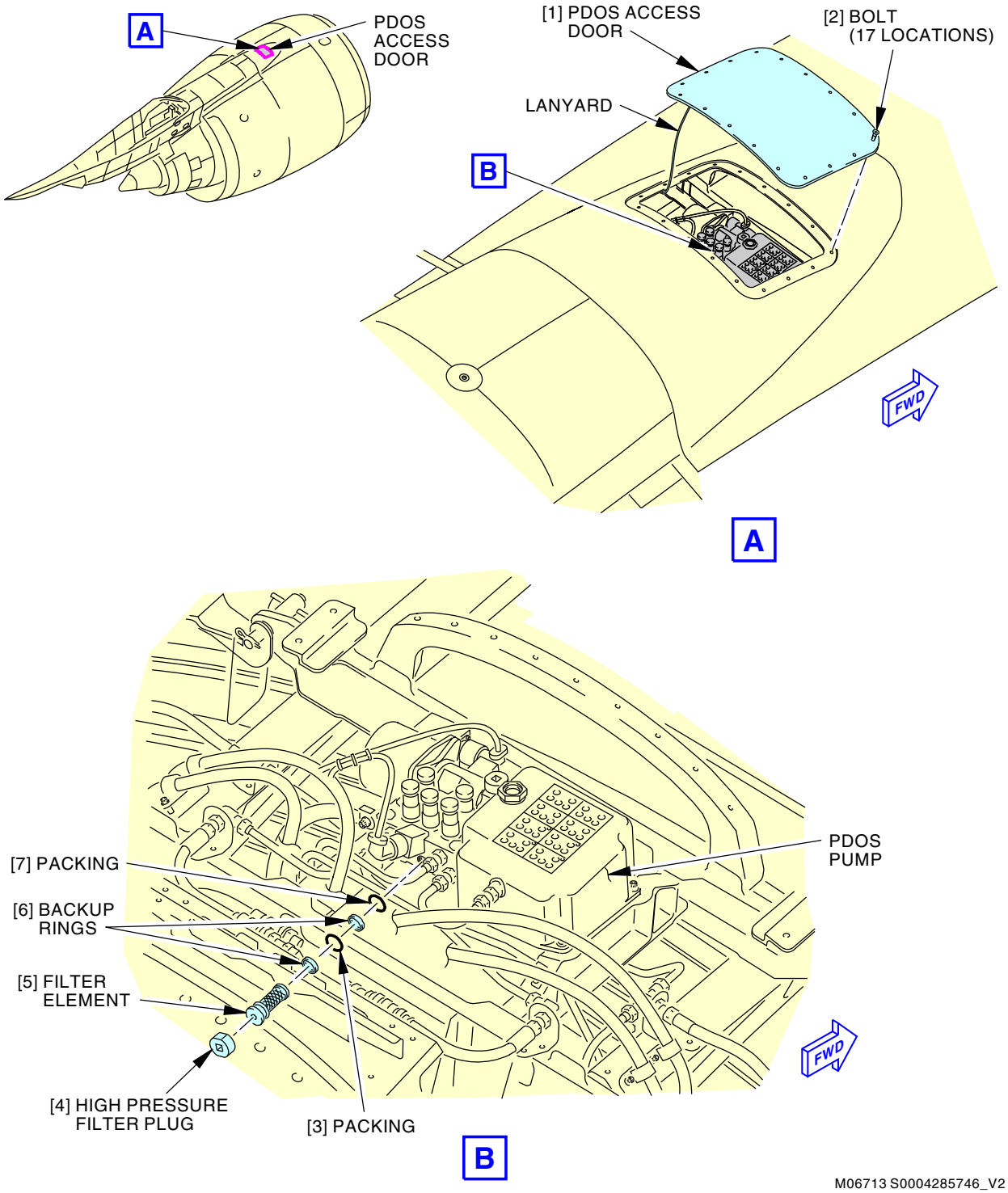

PDOS Pump Filter Element Installation
Figure 401/71-12-05-990-801-H01

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TASK 71-12-05-400-801-H01

3. PDOS Pump Filter Element Installation

A. General

(1) This task is the installation procedure for the PDOS Pump Filter Element Installation.

(2) To install the PDOS filter element, you must do these steps:

(a) You need to use the fall arrest lifeline procedure or other safety equipment to do this task.

(b) Install the applicable PDOS filter element.

(c) Fill the PDOS pump with the PDOS oil.

(d) Make sure the fan cowl panels and the thrust reversers operate smoothly.

(e) Do a visual check on the PDOS pump for leakage.

B. References

Reference	Title
12-12-02-610-803-004	Fill the PDOS Pump with Oil (P/B 301)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-00-910-804-001	Fall Arrest Lifeline Procedure (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-8818	Equipment - Personnel, Engine Strut Shock Absorbing Lanyard Part #: J20006-24 Supplier: 81205
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00068	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-23699 Class STD (Standard)
D00071	Oil - Aircraft Turbine Engine, Synthetic Base	MIL-PRF-7808 Grade 3
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Packing	71-12-04-03C-105	ARO 001-004
5	Filter element	71-12-04-03C-095	ARO 001-004
6	Backup ring	71-12-04-03C-075	ARO 001-004
7	Packing	71-12-04-03C-100	ARO 001-004

F. Location Zones

Zone	Area
431	Forward Strut Fairing - Left Nacelle Strut
441	Forward Strut Fairing - Right Nacelle Strut

G. Access Panels

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

H. PDOS Pump Filter Element Installation

SUBTASK 71-12-05-300-002-H01

WARNING USE THE FALL ARREST LIFELINE PROCEDURE IF YOU DO NOT USE OTHER SAFETY EQUIPMENT. IF YOU USE THE SAFETY EQUIPMENT OR PROCEDURES INCORRECTLY, IT CAN CAUSE INJURY OR KILL YOU.

(1) If it is not already done, use the engine strut shock absorbing lanyard personnel equipment, SPL-8818 when you work on or above the engine (TASK 54-52-00-910-804-001).

SUBTASK 71-12-05-420-001-H01

(2) Install a new PDOS filter element [5]:

(a) Remove the protective cap from the PDOS housing.

(b) Install the two new backup rings [6] and a new packing [3] on the PDOS filter element [5].

(c) Install a new packing [7] on the PDOS filter element [5].

(d) Install the PDOS filter element [5] in the PDOS housing groove.

(e) Install the high pressure filter plug [4] on the housing groove.

1) Tighten the high pressure filter plug [4] to 110-140 pound-inches (12.3-15.8 Newton-meters).

(f) Install the MS20995C32 lockwire, G01048 on the high pressure filter plug [4] (TASK 70-41-00-910-803-H00).

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SUBTASK 71-12-05-610-001-H01

CAUTION: MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(3) Fill the PDOS pump with the oil, D00071 or oil, D00068 (Fill the PDOS Pump with Oil AMM TASK 12-12-02-xxx-xxx).

I. PDOS Pump Filter Element Test

SUBTASK 71-12-05-865-001-H01

(1) For the left engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-12-05-865-002-H01

(2) For the right engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-12-05-010-003-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine

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(Continued)

Number	Name/Location
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-12-05-870-001-H01

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED. AN OVERFILL CONDITION COULD OCCUR.

(4) Cycle the thrust reversers a minimum of three times to bleed the air out of the thrust reverser PDOS system.

(a) Use the thrust reverser PDOS switches to cycle the thrust reversers.

SUBTASK 71-12-05-410-004-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-12-05-870-002-H01

CAUTION MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

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(CAUTION PRECEDES)

CAUTION

IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(6) Cycle the fan cowl panels a minimum of three times to bleed the air out of the fan cowl PDOS system.

(a) Use the fan cowl PDOS switches to cycle the fan cowl panels.

SUBTASK 71-12-05-210-001-H01

(7) Do a visual check for leakage on the PDOS pump.

SUBTASK 71-12-05-410-005-H01

(8) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

SUBTASK 71-12-05-410-003-H01

(9) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00

SUBTASK 71-12-05-440-004-H01

(10) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-05-612-001-H01

CAUTION

MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE CLOSED BEFORE YOU FILL THE PDOS PUMP OR AN OVERFILL CONDITION COULD OCCUR.

(1) Do a check of the oil level in the PDOS pump and fill with oil, D00071 or oil, D00068 if the oil level is low (TASK 12-12-02-610-803-004).

SUBTASK 71-12-05-410-006-H01

(2) Install the PDOS access door [1] on the forward fairing:

(a) Install the bolts [2] that attach the PDOS access door [1] to the strut fairing.

(b) Remove the protective mat, STD-585 from the forward fairing.

SUBTASK 71-12-05-090-001-H01

(3) Remove the engine strut shock absorbing lanyard personnel equipment, SPL-8818 (TASK 54-52-00-910-804-001).

END OF TASK

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ACTUATION AND CONTROL SWITCHES - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the actuation and control switches

(2) An installation of the actuation and control switches.

TASK 71-12-06-000-801-H01

2. Actuation and Control Switches Removal

A. General

(1) The actuation and control switches (referred to as PDOS switches) are installed on the inlet cowl at the 4:00 and 8:00 o'clock position.

(2) The left PDOS switches control the opening and closing of the left fan cowl panel and the left thrust reverser. The right PDOS switches control the opening and closing of the right fan cowl panel and the right thrust reverser.

(3) You must open the fan cowl panels to get access to the thrust reverser PDOS switches. The removal and installation steps of the thrust reverser PDOS switches are the same as the fan cowl PDOS switches.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Location Zones

Zone	Area
412	Inlet Cowl - Left Engine
422	Inlet Cowl - Right Engine

E. Access Panels

Number	Name/Location
412EL	Left Power Door Opening System Panel, Left Engine
412ER	Right Power Door Opening System Panel, Left Engine
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
422EL	Left Power Door Opening System Panel, Right Engine
422ER	Right Power Door Opening System Panel, Right Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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F. Prepare for the Removal

SUBTASK 71-12-06-865-001-H01

(1) For the left engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-12-06-865-002-H01

(2) For the right engine; Open these circuit breakers and install safety tags:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

G. Actuation and Control Switches Removal

SUBTASK 71-12-06-020-001-H01

(1) Remove the fan cowl PDOS switch [1] from the engine (Figure 401):

(a) Remove the applicable fan cowl PDOS switch panel [6] from the inlet cowl:

1) Remove these access panels:

Number	Name/Location
412EL	Left Power Door Opening System Panel, Left Engine
412ER	Right Power Door Opening System Panel, Left Engine
422EL	Left Power Door Opening System Panel, Right Engine
422ER	Right Power Door Opening System Panel, Right Engine

2) Remove the bolts [2] (6 locations) that attach the fan cowl PDOS switch panel [6] to the inlet cowl.

(b) Remove the bolts [3] and washers [4] (4 locations) that attach the PDOS switch [1] to the fan cowl PDOS switch panel [6].

(c) Pull the PDOS switch [1] forward to access the electrical connector [5] at the rear of the PDOS switch [1].

(d) Remove the bolt [7], washer [8], and the nut [9] that attach the clamp [10] of the electrical connector [5] wire to the PDOS switch [1].

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(e) Use teflon-jawed pliers, STD-664 to disconnect the electrical connector [5] from the PDOS switch [1] (TASK 70-00-01-400-807-H01).

(f) Install the protective caps on the electrical connector [5] and the receptacle.

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SUBTASK 71-12-06-020-002-H01

(2) Remove the thrust reverser PDOS switch [1] from the engine:

CAUTION RETRACT THE LEADING EDGE SLATS AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF THE LEADING EDGE SLATS ARE NOT RETRACTED, THE FAN COWL PANELS WILL HIT THEM AND CAUSE DAMAGE.

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) For the applicable fan cowl panel on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

1) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(d) Remove the bolts [3] and washers [4](3 locations) that attach the PDOS switch [1] to the bracket.

CAUTION MAKE SURE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU DISCONNECT THEM. CONTAMINATION OF ELECTRICAL CONNECTORS CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(e) Use teflon-jawed pliers, STD-664 to disconnect the electrical connector [11] from the (TASK 70-00-01-400-807-H01).

(f) Install the protective caps on the electrical connector [11] and the receptacle.

——— END OF TASK ———

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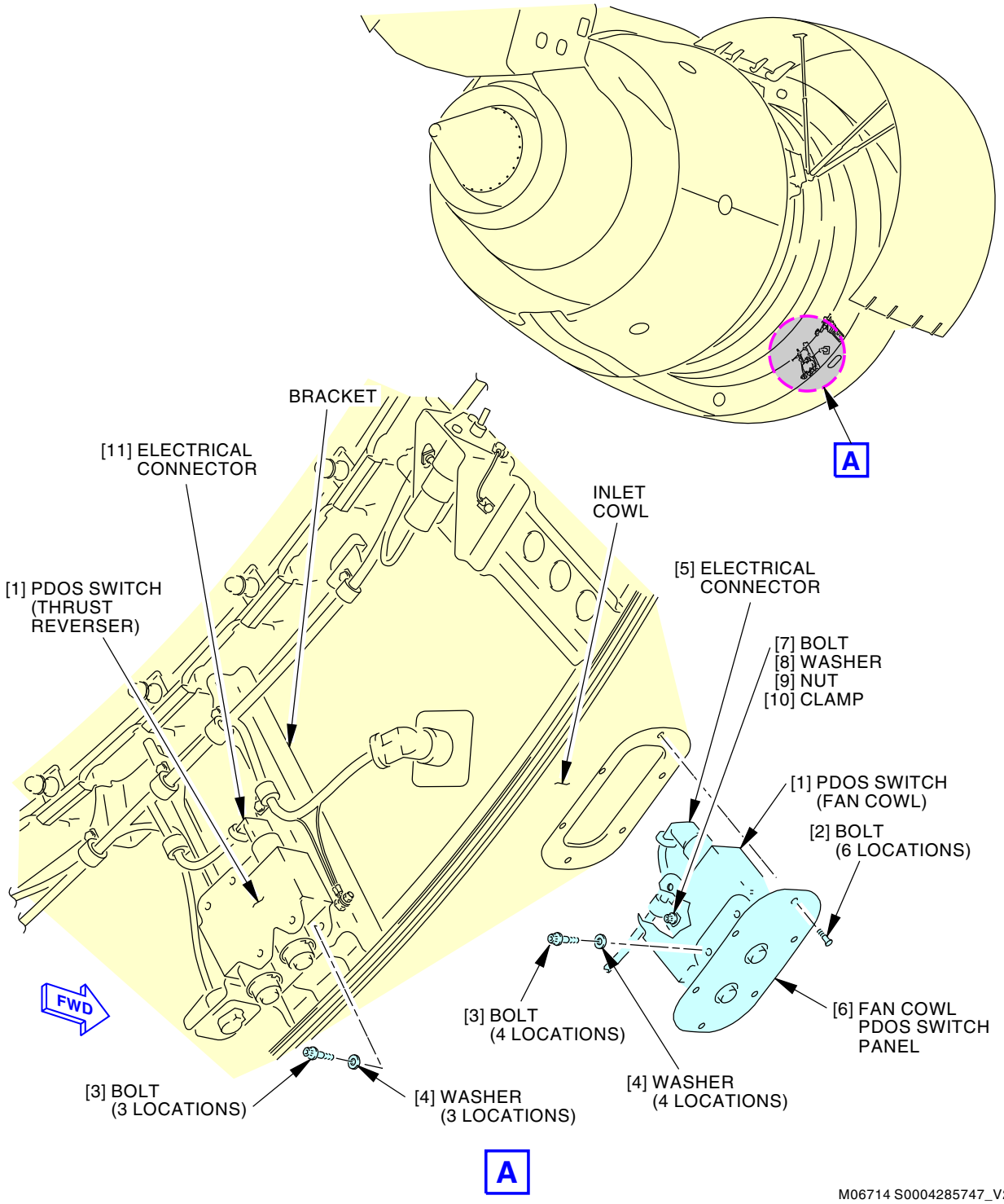

Actuation and Control Switches Installation
Figure 401/71-12-06-990-801-H01

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TASK 71-12-06-400-801-H01

3. Actuation and Control Switches Installation

A. General

(1) To install the PDOS switch, you must do these steps:

(a) Install the applicable PDOS switch.

(b) Do the deactivation procedure for the thrust reverser.

(c) Cycle the thrust reversers.

(d) Cycle the fan cowl panels.

(e) Do the activation procedure for the thrust reverser.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
70-00-01-400-807-H01	Electrical Connector - Disconnect and Connect (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	PDOS switch	71-12-06-06-600	ARO ALL
		71-12-06-06-602	ARO ALL
		71-12-06-06-760	ARO ALL
		71-12-06-06-765	ARO ALL

E. Location Zones

Zone	Area
412	Inlet Cowl - Left Engine
422	Inlet Cowl - Right Engine

F. Access Panels

Number	Name/Location
412EL	Left Power Door Opening System Panel, Left Engine
412ER	Right Power Door Opening System Panel, Left Engine
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
422EL	Left Power Door Opening System Panel, Right Engine
422ER	Right Power Door Opening System Panel, Right Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

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G. Actuation and Control Switches Installation

SUBTASK 71-12-06-420-001-H01

(1) Install the PDOS switch [1] for the thrust reverser:

(a) Remove the protective caps from the electrical connector [11] and the receptacle.

(b) Align the bolt holes of the PDOS switch [1] with the bolt holes of the bracket.

(c) Install the bolts [3] and washers [4] (3 locations) that attach the PDOS switch [1] to the bracket.

(d) Tighten the bolts [3] to the 90-125 pound-inches (10.2-14.1 Newton-meters).

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(e) Use teflon-jawed pliers, STD-664 to connect the electrical connector [11] to the the switch receptacle (TASK 70-00-01-400-807-H01).

SUBTASK 71-12-06-420-002-H01

(2) Install the PDOS switch [1] for the fan cowl panel:

(a) Remove the protective caps from the electrical connector [5] and the receptacle.

(b) Align the bolt holes of the PDOS switch [1] with the bolt holes on the sides of the applicable fan cowl PDOS switch panel [6].

(c) Install the bolts [3] and washers [4] (4 locations) that attach the PDOS switch [1] to the fan cowl PDOS switch panel [6].

(d) Tighten the bolts [3] to the 90-125 pound-inches (10.2-14.1 Newton-meters).

CAUTION MAKE SURE THE ELECTRICAL CONNECTORS ARE CLEAN WHEN YOU CONNECT THEM. THE CONTAMINATION OF THE ELECTRICAL CONNECTOR CAN CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION USE TEFLON-JAWED PLIERS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(e) Use teflon-jawed pliers, STD-664 to connect the electrical connector [5] to the the switch receptacle (TASK 70-00-01-400-807-H01).

(f) Install the bolt [7], washer [8], clamp [10], and the nut [9] that attach the electrical connector [5] wire to the PDOS switch [1].

(g) Put the PDOS switch [1] in its position and align the bolt holes of the fan cowl PDOS switch panel [6] with the inlet cowl bolt holes.

(h) Install the fan cowl PDOS switch panel [6] on the inlet cowl.

1) These are the applicable fan cowl PDOS switch panels:

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a) Install these applicable access panels:

Number	Name/Location
412EL	Left Power Door Opening System Panel, Left Engine
412ER	Right Power Door Opening System Panel, Left Engine
422EL	Left Power Door Opening System Panel, Right Engine
422ER	Right Power Door Opening System Panel, Right Engine

2) Install the bolts [2] (6 locations) that attach the fan cowl PDOS switch panel [6] to the inlet cowl.

H. Actuation and Control Switches Test

SUBTASK 71-12-06-865-003-H01

(1) For the left engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	12	C78613	L ENG COWL DR MOT CTRL
F	6	C78301	L ENG COWL DR MOT

SUBTASK 71-12-06-865-004-H01

(2) For the right engine; Remove the safety tags and close these circuit breakers:

Ground Service/Handling Power Panel, P320

Row	Col	Number	Name
D	13	C78614	R ENG COWL DOOR MOTOR CONTROL
F	9	C78302	R ENG COWL DR MOT

SUBTASK 71-12-06-040-001-H01

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

(3) Do this task" Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00

SUBTASK 71-12-06-870-001-H01

CAUTION MAKE SURE THE THRUST REVERSERS ARE COMPLETELY CLOSED BEFORE YOU CYCLE THE FAN COWL PANELS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO FAN COWL PANELS AND THRUST REVERSERS CAN OCCUR.

CAUTION IF YOU MUST ADD PDOS OIL TO THE PDOS PUMP, MAKE SURE THE FAN COWL PANELS AND THRUST REVERSERS ARE COMPLETELY CLOSED OR AN OVERFILL CONDITION COULD OCCUR.

(4) If you replaced the PDOS switch for the fan cowl panel, cycle the applicable fan cowl panel.

(a) Use the fan cowl PDOS switch to cycle the fan cowl panel.

SUBTASK 71-12-06-870-002-H01

(5) If you replaced the PDOS switch for the thrust reverser, do these steps:

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

(a) Do these tasks in sequence to safely open the applicable thrust reverser on the applicable engine:

1) For the left and right fan cowl panels on the applicable engine, Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

a) Open these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(b) Cycle the thrust reverser.

1) Use the thrust reverser PDOS switch to cycle the thrust reverser.

SUBTASK 71-12-06-410-003-H01

(6) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(a) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-06-440-002-H01

(1) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00

SUBTASK 71-12-06-440-003-H01

(2) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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ENGINE MOUNTS - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has three tasks:

(1) An inspection of the engine mounts.

(2) An inspection of the forward mount to the fan case attachment features.

(3) An inspection of the aft engine mount bushing.

TASK 71-21-00-200-809-H00

2. Engine Mounts Inspection

A. General

(1) This task is the inspection procedure for the Engine Mounts.

(2) You must remove the No. 1 forward fairing and open the fan cowl panels to get access to the forward engine mount.

(3) You must open the thrust reversers to get access to the aft engine mount.

(4) The engine mounts inspection includes these checks.

(a) Do a visual check of the forward engine mount for damage.

(b) Do a visual check of the aft lower engine mount for damage.

(c) Do a visual check of the thrust links for damage.

(d) Do a visual check of the self-locking nuts and cotter pins for damage.

1) The self-locking nuts and cotter pins for the forward connection of the thrust links to the lugs on the fan hub frame.

2) The self-locking nuts and cotter pins of the thrust links to the aft lower engine mount.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
54-52-01-000-802-001	Fan Cowl Support Beam Fairings Removal (P/B 401)
54-52-01-400-802-001	Fan Cowl Support Beam Fairings Installation (P/B 401)
70-43-42-300-801-H01	Blending Procedures (P/B 201)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Engine Mounts Inspection

SUBTASK 71-21-00-010-001-H01

(1) Remove the applicable No. 1 forward fairing (TASK 54-52-01-000-802-001).

SUBTASK 71-21-00-010-002-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

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SUBTASK 71-21-00-212-001-H01

(3) Do a detailed visual check of the forward lower engine mount for damage:

(a) Cracks

1) No cracks are permitted.

(b) Nicks, Dents, or Scratches

1) Nicks are not permitted.

2) Dents are not permitted.

3) Scratches are not permitted.

(c) Fretting, Pickup, or High Metal

1) Fretting, pickup, or high metal is permitted to a maximum of 0.003 inch (0.080 mm) in depth after removal of high metal.

(d) Discoloration, Corrosion, or Sign of Worn Areas

1) None is permitted.

(e) Machining transition lines or steps on the top mating surface

1) Machining transition lines or steps on the top mating surface are permitted if they are less than 0.0015 inch (0.0380 mm) high.

SUBTASK 71-21-00-220-006-H00

(4) Examine the forward engine mount yoke forward lugs for the conditions that follow (Figure 602):

(a) Right outer bushing migration

1) A maximum gap of 0.132 in. (3.353 mm) measured from the bushing flange to the mating clevis lug surface is permitted.

NOTE: It is recommended to seat the bushings again or replace them at the next engine removal. The bushing can only be seated again after you do a visual inspection and make sure that it is serviceable. If not, it must be replaced.

a) Seat the bushings again as follows:

<1> Use wooden blocks and G-clamp to seat the bushing again. Refer to Figure 603. If necessary, chill the bushing with dry ice and heat the platform lug with the heat gun before you seat the bushing again.

(b) Left outer bushing migration

1) A maximum gap of 0.090 in. (2.286 mm) measured from the bushing flange to the mating clevis lug surface is permitted.

NOTE: It is recommended to seat the bushings again or replace them at the next engine removal. The bushing can only be seated again after you do a visual inspection and make sure that it is serviceable. If not, it must be replaced.

a) Seat the bushings again as follows:

<1> Use wooden blocks and G-clamp to seat the bushing again. Refer to Figure 603. If necessary, chill the bushing with dry ice and heat the platform lug with the heat gun before you seat the bushing again.

SUBTASK 71-21-00-220-007-H00

(5) Examine the forward engine mount platform forward lugs for the conditions that follow (Figure 602):

(a) Right outer bushing migration

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1) A maximum gap of 0.074 in. (1.880 mm) measured from the bushing flange to the mating clevis lug surface is permitted.

NOTE: It is recommended to seat the bushings again or replace them at the next engine removal. The bushing can only be seated again after you do a visual inspection and make sure that it is serviceable. If not, it must be replaced.

a) Seat the bushings again as follows:

<1> Use wooden blocks and G-clamp to seat the bushing again. Refer to Figure 603. If necessary, chill the bushing with dry ice and heat the platform lug with the heat gun before you seat the bushing again.

(b) Left outer bushing migration

1) A maximum gap of 0.088 in. (2.235 mm) measured from the bushing flange to the mating clevis lug surface is permitted.

NOTE: It is recommended to seat the bushings again or replace them at the next engine removal. The bushing can only be seated again after you do a visual inspection and make sure that it is serviceable. If not, it must be replaced.

a) Seat the bushings again as follows:

<1> Use wooden blocks and G-clamp to seat the bushing again. Refer to Figure 603. If necessary, chill the bushing with dry ice and heat the platform lug with the heat gun before you seat the bushing again.

SUBTASK 71-21-00-220-001-H01

(6) Do a detailed visual check of the aft lower engine mount for damage:

(a) Cracks

1) No cracks are permitted.

(b) Nicks, Dents, or Scratches

1) Nicks are not permitted.

2) Dents are not permitted.

3) Scratches are not permitted.

(c) Fretting, Pickup, or High Metal

1) Fretting, pickup, or high metal is permitted to a maximum of 0.003 inch (0.080 mm) in depth after removal of high metal.

(d) Discoloration, Corrosion, or Sign of Worn Areas

1) None is permitted.

SUBTASK 71-21-00-210-001-H01

(7) Examine the engine mount joint bolt or nut heads for damage.

(a) Particles on the bolt or nut heads

1) Any amount is permitted.

NOTE: You can possibly find particles that look like corrosion or oxidation of the parent material of the joint bolts/nuts. This is not corrosion, but a secondary effect caused by thermal deterioration of the lubricant.

(b) Scratches on the bolt shank

1) Scratches are permitted to a maximum of 0.002 inch (0.050 mm) deep.

SUBTASK 71-21-00-220-002-H01

(8) Do a detailed visual check of the thrust link tube for damage:

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(a) Cracks:

1) No cracks are permitted.

(b) Nicks, Dents, or Scratches:

1) Nicks in a 4.40 in. (111.8 mm) area from tube ends are permitted to a maximum of 0.015 in. (0.38 mm) in depth and 0.25 in. (6.4 mm) in length after removal of high metal.

2) Nicks in a 4.40 in. (111.8 mm) area from tube ends are repairable to a maximum 0.030 in. (0.76 mm) in depth and 1.00 in. (25.4 mm) in length.

a) Blend to remove the defect. Do this Task Blending Procedures, TASK 70-43-42-300-801-H01.

3) Nicks in all other areas are permitted to a maximum of 0.007 in. (0.18 mm) in depth and 0.25 in. (6.4 mm) in length after removal of high metal.

4) Nicks in all other areas are repairable to a maximum of 0.015 in. (0.38 mm) in depth and 0.25 in. (6.4 mm) in length.

a) Blend to remove the defect. Do this Task Blending Procedures, TASK 70-43-42-300-801-H01.

5) Scratches in a 4.40 in. (111.8 mm) area from tube ends are permitted to a maximum of 0.005 in. (0.13 mm) and any length in depth after removal of high metal.

6) Scratches in a 4.40 in. (111.8 mm) area from tube ends are repairable to a maximum 0.015 in. (0.38 mm) in depth and any length.

a) Blend to remove the defect. Do this Task Blending Procedures, TASK 70-43-42-300-801-H01.

7) Scratches in all other areas are permitted to a maximum of 0.004 in. (0.10 mm) in depth after removal of high metal.

8) Scratches in all other areas are repairable to a maximum of 0.015 in. (0.38 mm) in depth.

a) Blend to remove the defect. Do this Task Blending Procedures, TASK 70-43-42-300-801-H01.

9) If any damage is found, refer to the applicable ESM for damage limits, otherwise please contact GE.

(c) Fretting to the thrust link tube:

1) Fretting is not permitted unless it is repairable within the parameters below:

a) Any amount of fretting is repairable, if a minimum wall thickness of 0.071 inch (1.81 mm) is kept after repair.

b) Blend to remove the defect with a 100:1 length to depth ratio. Do this task: Blending Procedures, TASK 70-43-42-300-801-H01.

2) If the fretting to the thrust link tube is beyond the repairable parameter, then the engine will need to be replaced. Do this task: Power Plant Removal, TASK 71-00-02-000-811-H00.

SUBTASK 71-21-00-230-001-H01

(9) Do a visual check of the thrust link bolts, and self-locking nuts and cotter pins for damage (Figure 601).

(a) Do a visual check of the bolts, self-locking nuts, and cotter pins for the forward connection of the thrust links.

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(b) Do a visual check of the bolts, self-locking nuts, and cotter pins for the aft connection of the thrust links (connected to the aft lower engine mount).

SUBTASK 71-21-00-410-001-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

SUBTASK 71-21-00-440-001-H01

(11) Install the applicable No. 1 forward fairing. Do this task: Fan Cowl Support Beam Fairings Installation, TASK 54-52-01-400-802-001.

END OF TASK

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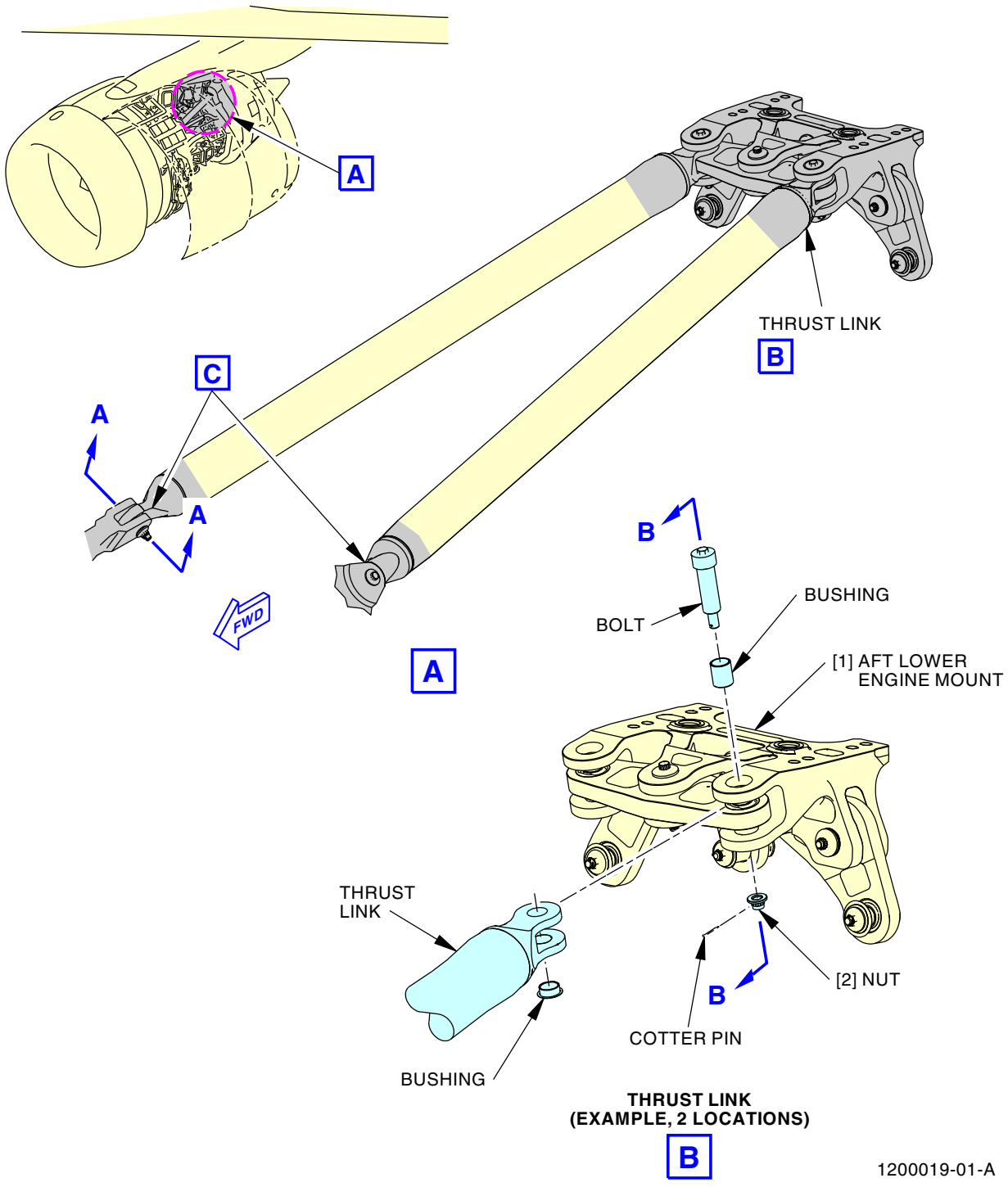

Thrust Link Inspection
Figure 601/71-21-00-990-801-H01 (Sheet 1 of 2)

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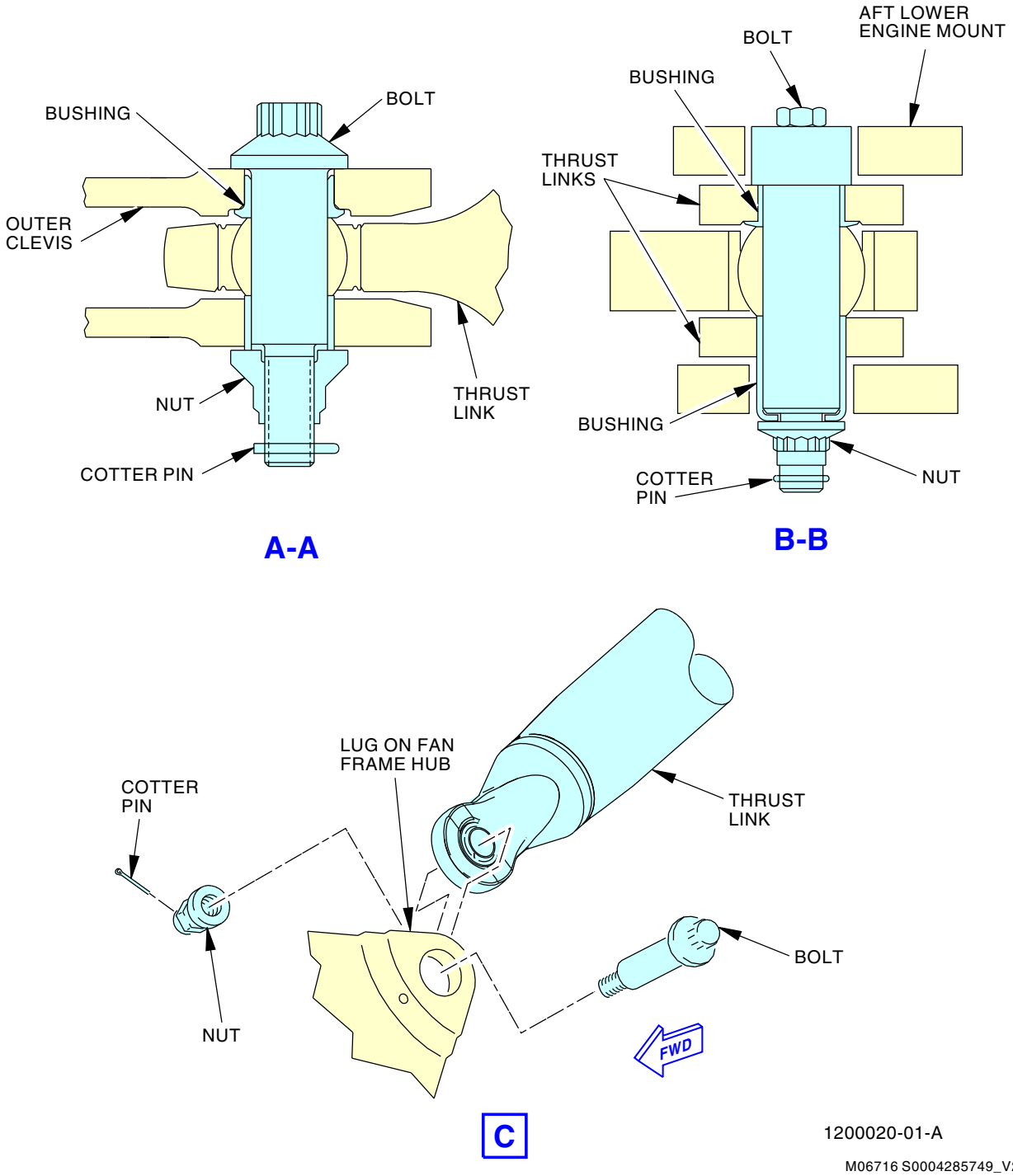

Thrust Link Inspection
Figure 601/71-21-00-990-801-H01 (Sheet 2 of 2)

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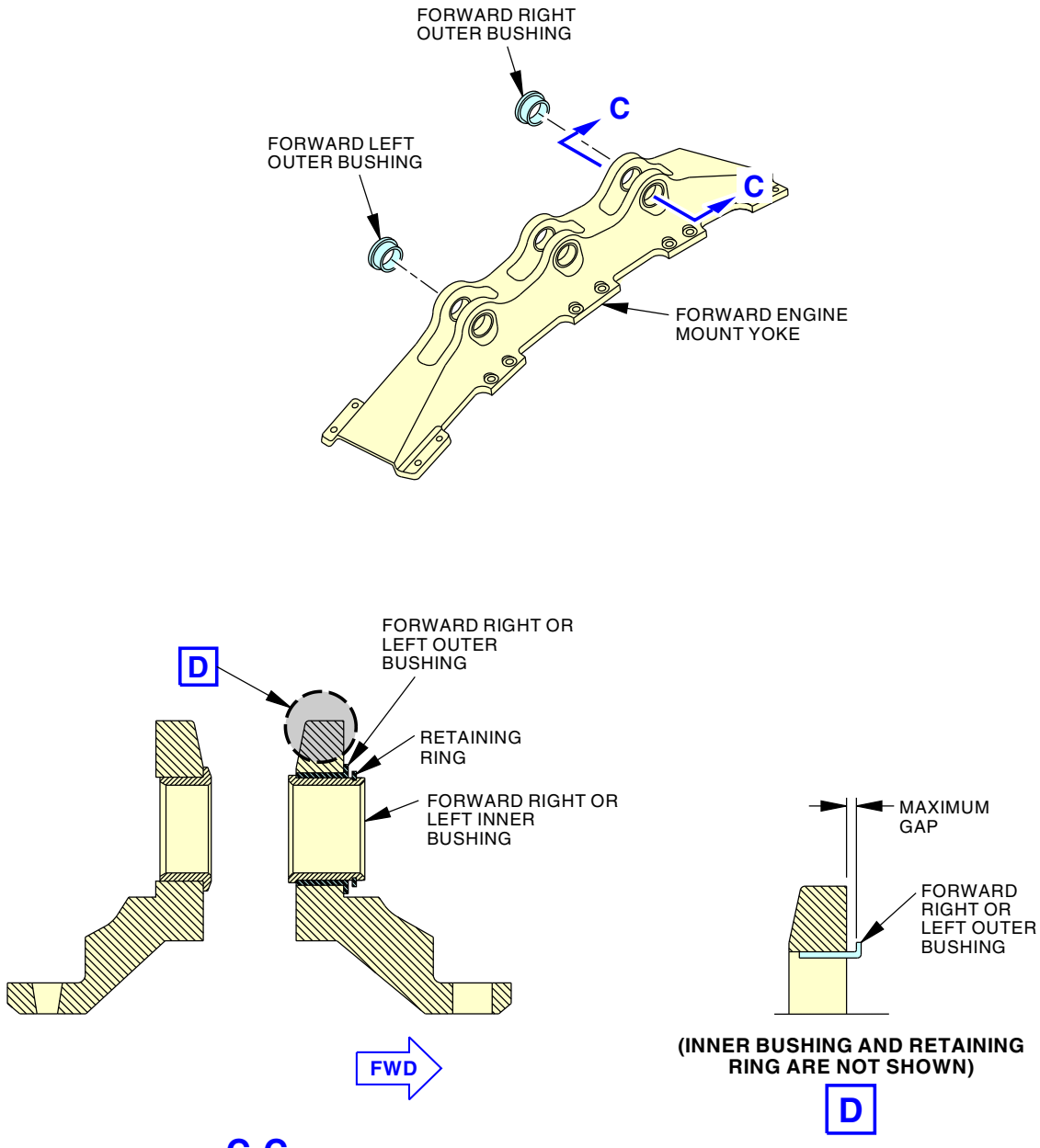

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Forward Mount Inspection
Figure 602/71-21-00-990-806-H00 (Sheet 1 of 2)

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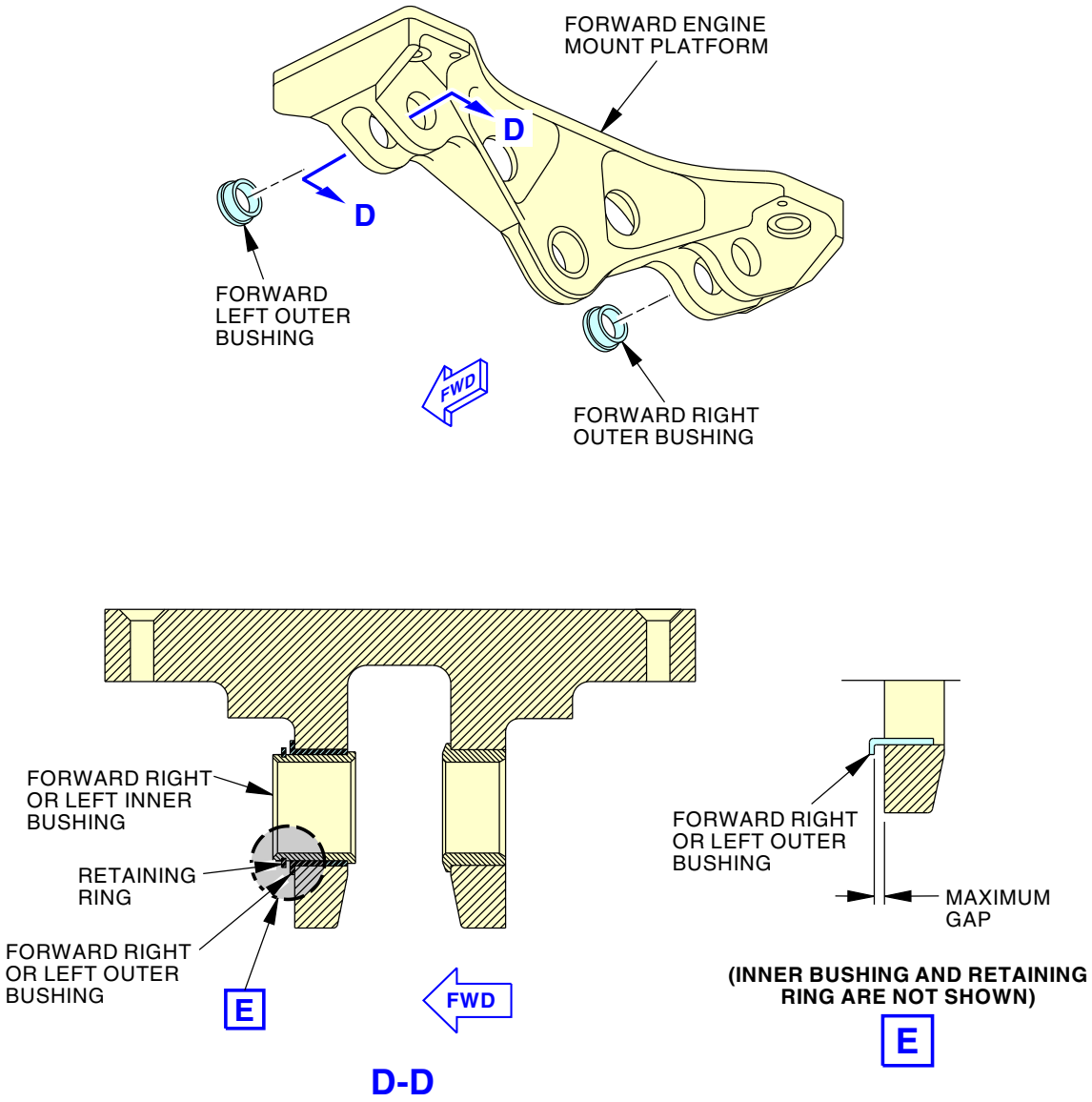

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Forward Mount Inspection
Figure 602/71-21-00-990-806-H00 (Sheet 2 of 2)

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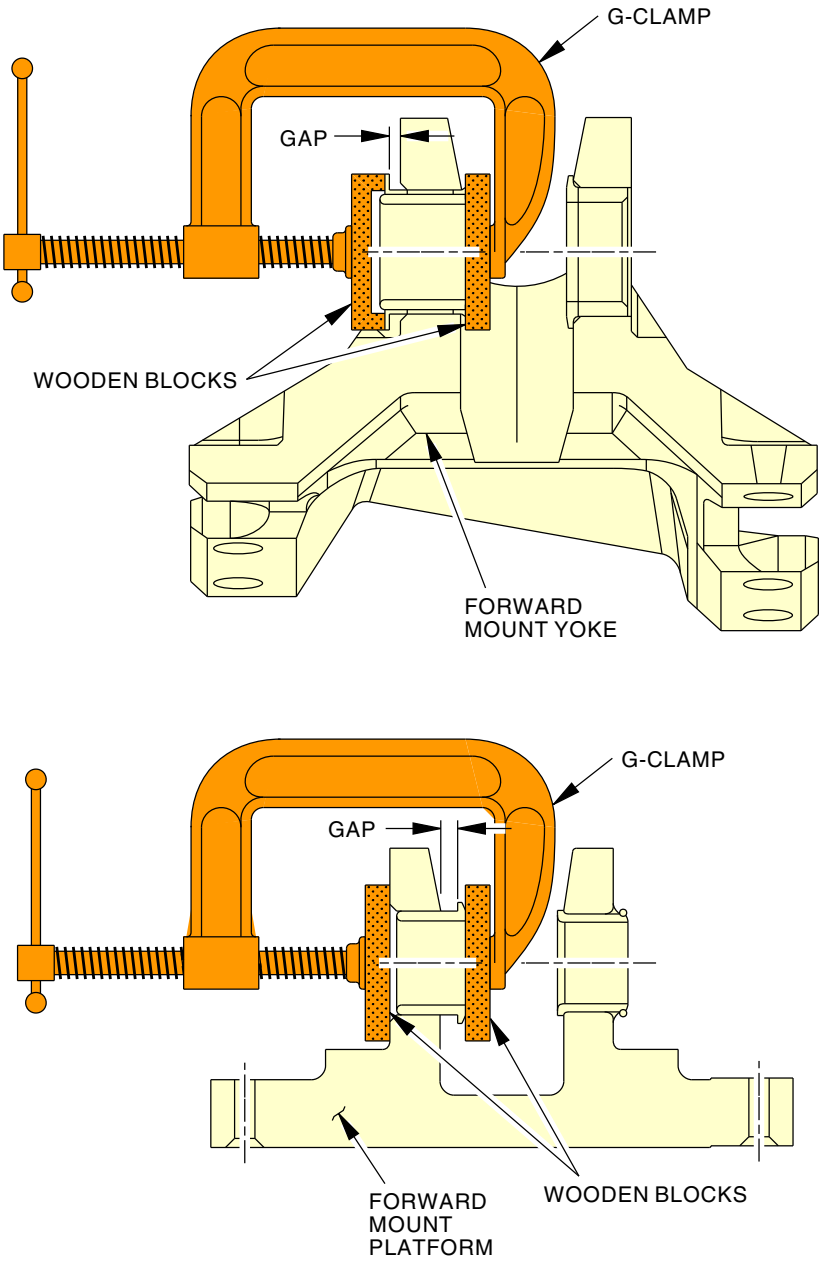

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Forward Mount Bushings Re-seating
Figure 603/71-21-00-990-807-H00

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TASK 71-21-00-200-802-H01

3. Forward Mount to Fan Case Attachment Features (Scheduled Maintenance Requirement) Inspection

(Figure 604)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task is the scheduled maintenance inspection procedure of the forward mount to fan case attachment features.

(2) This procedure is used to examine the fan case attachment features on the engine forward mount.

B. References

Reference	Title
71-21-01-400-802-H01	Forward Lower Engine Mount Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Forward Mount to Fan Case Attachment Features Inspection

SUBTASK 71-21-00-220-004-H01

(1) Examine the forward mount brackets to the fan case attachment feature for damage:

(a) Cracks in the aft fan case skin that go out from the bracket bolt holes

1) No cracks are permitted.

(b) Cracks in all other attachment areas of the brackets to the aft fan case attachment

1) No cracks are permitted.

(c) Cracks in the brackets that attach the fan cowl support beams to the forward mount attachment

1) No cracks are permitted.

SUBTASK 71-21-00-200-001-H00

(2) Examine the forward engine mount yoke for damage:

(a) Bolts and nuts that are loose

1) Tighten the nuts (TASK 71-21-01-400-802-H01).

2) If the nut fails to tighten, replace the bolt and nut (TASK 71-21-01-400-802-H01).

(b) Bolts, washers, and nuts that are missing

1) Bolts, washers, or nuts that are missing are not permitted.

(c) Discoloration, corrosion, or signs of worn areas

1) None is permitted.

(d) Cracks in the attachment brackets

1) No cracks are permitted.

(e) Nicks, Dents, or Scratches in the attachment brackets

1) Three are permitted for each 4.0 square inches (25.8 square cm) to a maximum of 0.030 inch (0.76 mm) deep.

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2) Scratches can be no more than 1.0 inch (25.4 mm) in length.

——— END OF TASK ———

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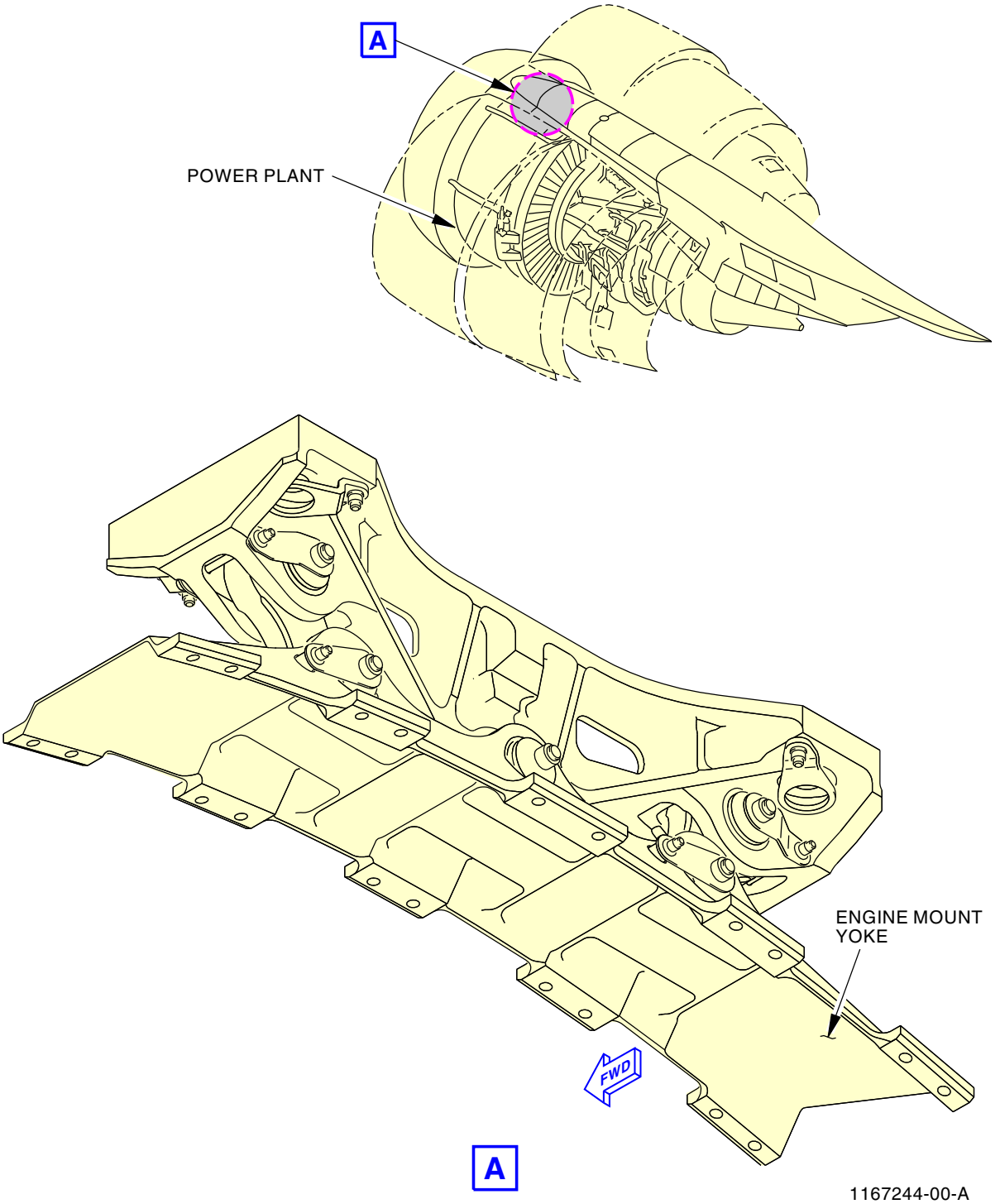

Forward Mount to Fan Case Attachment Features Inspection
Figure 604/71-21-00-990-803-H00

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TASK 71-21-00-200-803-H01

4. Aft Engine Mount Bushing Inspection

A. General

(1) This task is the inspection procedure for the aft engine mount bushing.

(2) The task is for engine off-wing usage.

B. Tools/Equipment

Reference	Description
STD-442	Gun - Heat, 180 F (82 C) Maximum Output Temperature

C. Consumable Materials

Reference	Description	Specification
G00829	Ice - Dry	

D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Aft Engine Mount Bushing Inspection

SUBTASK 71-21-00-220-005-H01

(1) Examine the bushings on the top surface of the aft engine mount.

(a) Gap between the bushing flange and the mount upper surface:

1) Gap is permitted if it is less than 0.045 inch (1.14 mm).

2) If the gap is more than the limit above, install the bushing again with a rawhide mallet or a plastic hammer. If necessary, chill the bushing bore with dry ice, G00829, or heat the mount with a 180 F (82 C) maximum output temperature heat gun, STD-442 before you install the bushing.

NOTE: Light taps will not help to retract the bushing into the mount. Hit the bushing with the sufficient force of a mallet.

——— END OF TASK ———

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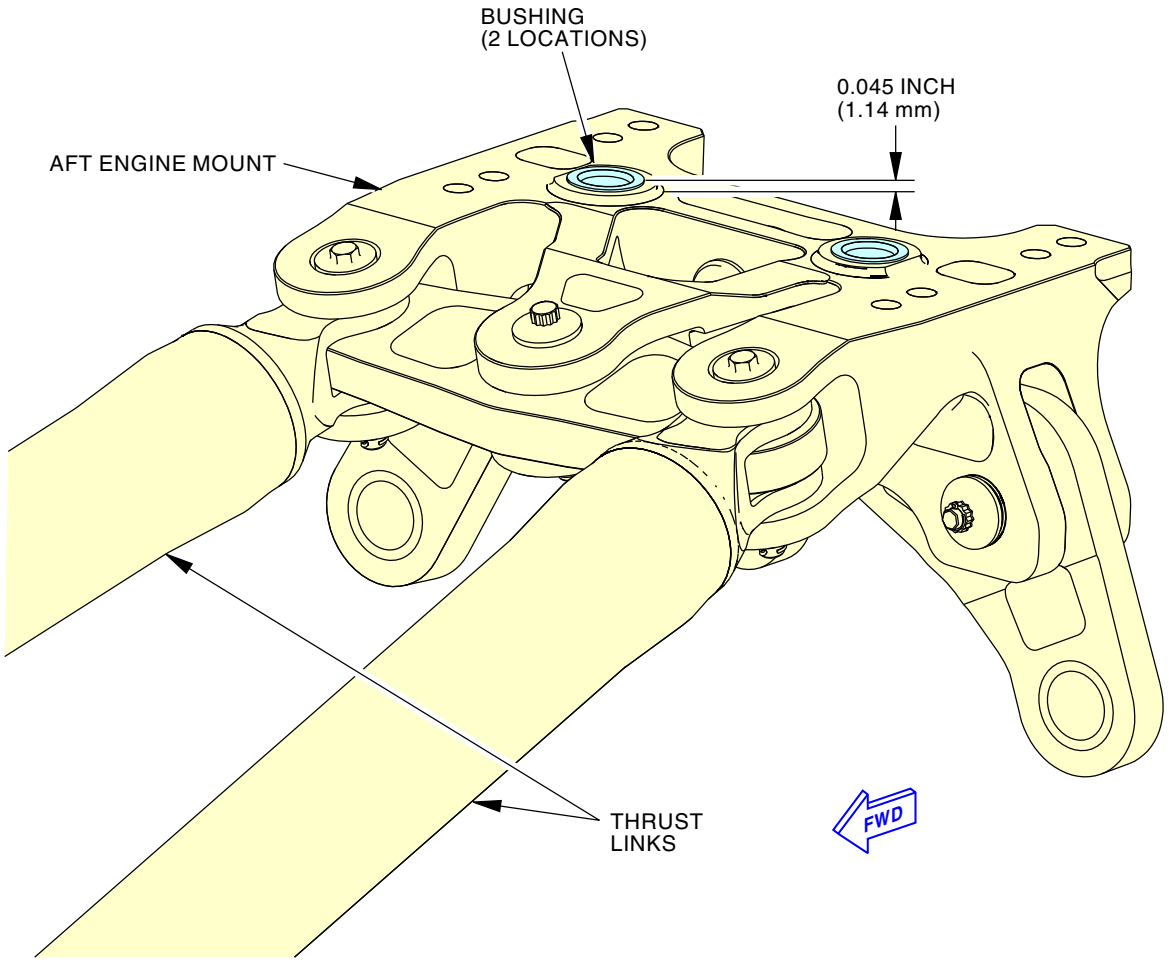

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Aft Engine Mount Bushing Inspection
Figure 605/71-21-00-990-802-H01

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FORWARD LOWER ENGINE MOUNT - REMOVAL/INSTALLATION

1. General

A. This procedure has four tasks

(1) A removal of the forward lower engine mount assembly

(2) Disassembly of the forward lower engine mount platform and links from the engine mount yoke

(3) Assembly of the forward lower engine mount platform and links to the engine mount yoke

(4) An installation of the forward lower engine mount assembly.

TASK 71-21-01-000-801-H01

2. Forward Lower Engine Mount Removal

A. General

(1) This task is the removal procedure for the forward lower engine mount.

(2) The forward lower engine mount (referred to as the engine mount) is installed at the 12:00 o'clock position on the aft fan case.

(3) To remove the engine mount, you must do these steps:

(a) Remove the power plant from the strut.

(b) Remove the engine mount from the aft fan case.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

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E. Prepare for the Removal

SUBTASK 71-21-01-010-001-H02

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

F. Forward Lower Engine Mount Removal

SUBTASK 71-21-01-020-001-H01

(1) Remove the power plant [1] from the strut. To remove the power plant, do this task:Power Plant Removal, TASK 71-00-02-000-811-H00.

SUBTASK 71-21-01-020-002-H01

(2) Remove the engine mount [2] (Figure 401):

(a) Remove the six bolts [6], washers [5], and the nuts [4] that attach the fan cowl support beam bracket [3] and the bracket [10] to the engine mount [2].

(b) Remove the bolts [20], the anti-rotation clip [19] and the anti-rotation clip [16], nuts [18], and the pins [17] that attach the fan cowl support beams to the fan cowl support beam bracket [3] and the bracket [10].

(c) Remove the bolt [15], the washer [14], the bushing [13], the washer [12], and the nut [11] that attach the aft diagonal link [21] to the hoist support fitting.

(d) Remove the fan cowl support beam bracket [3] and the bracket [10].

(e) Remove the remaining bolts [9], the washers [8], and the nuts [7] from the engine mount [2].

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(f) Remove the engine mount [2] from the aft fan case.

NOTE: It could be necessary to lift the fan cowl support beam to get access to the engine mount.

——— END OF TASK ———

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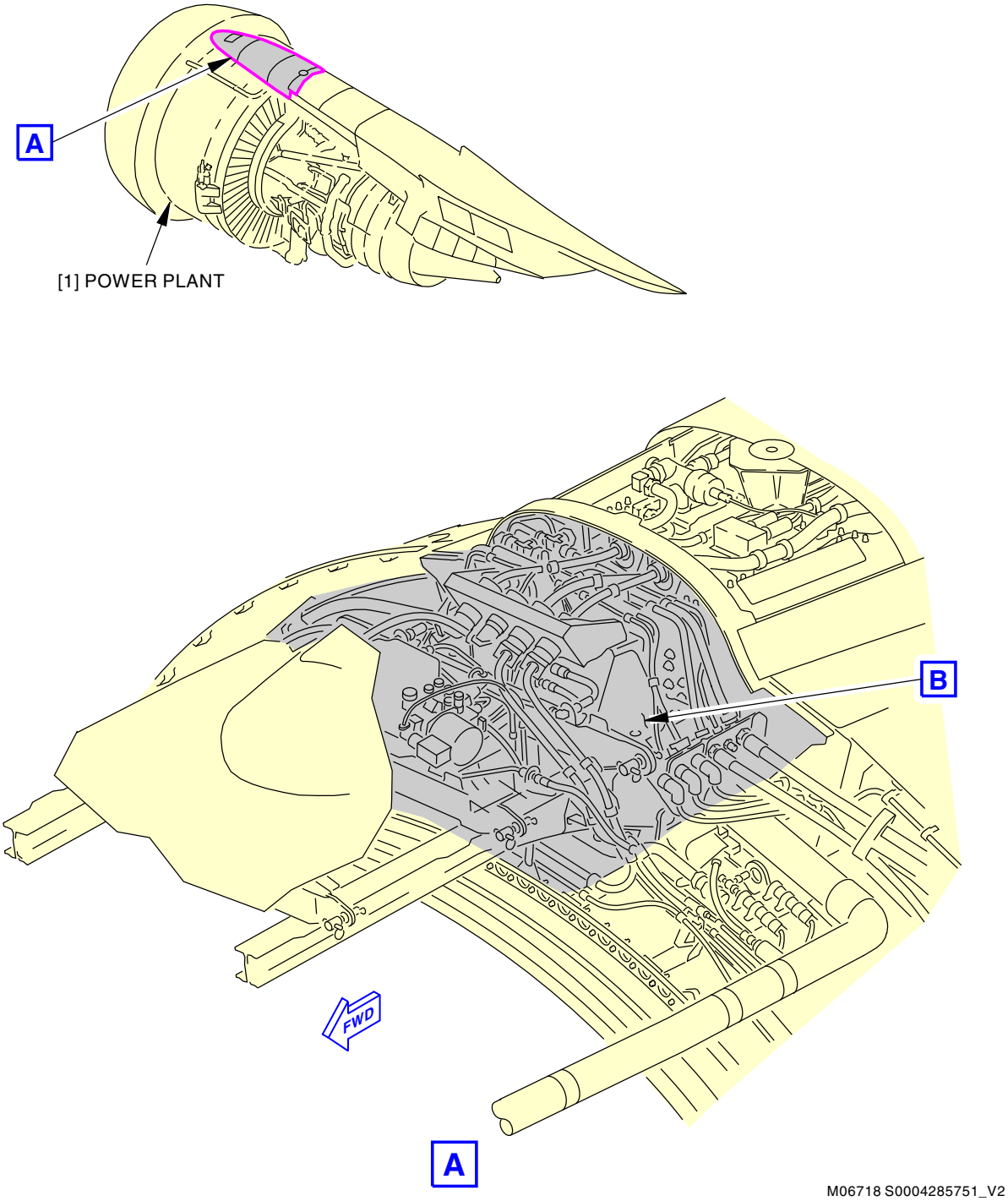

Forward Lower Engine Mount Installation
Figure 401/71-21-01-990-803-H01 (Sheet 1 of 4)

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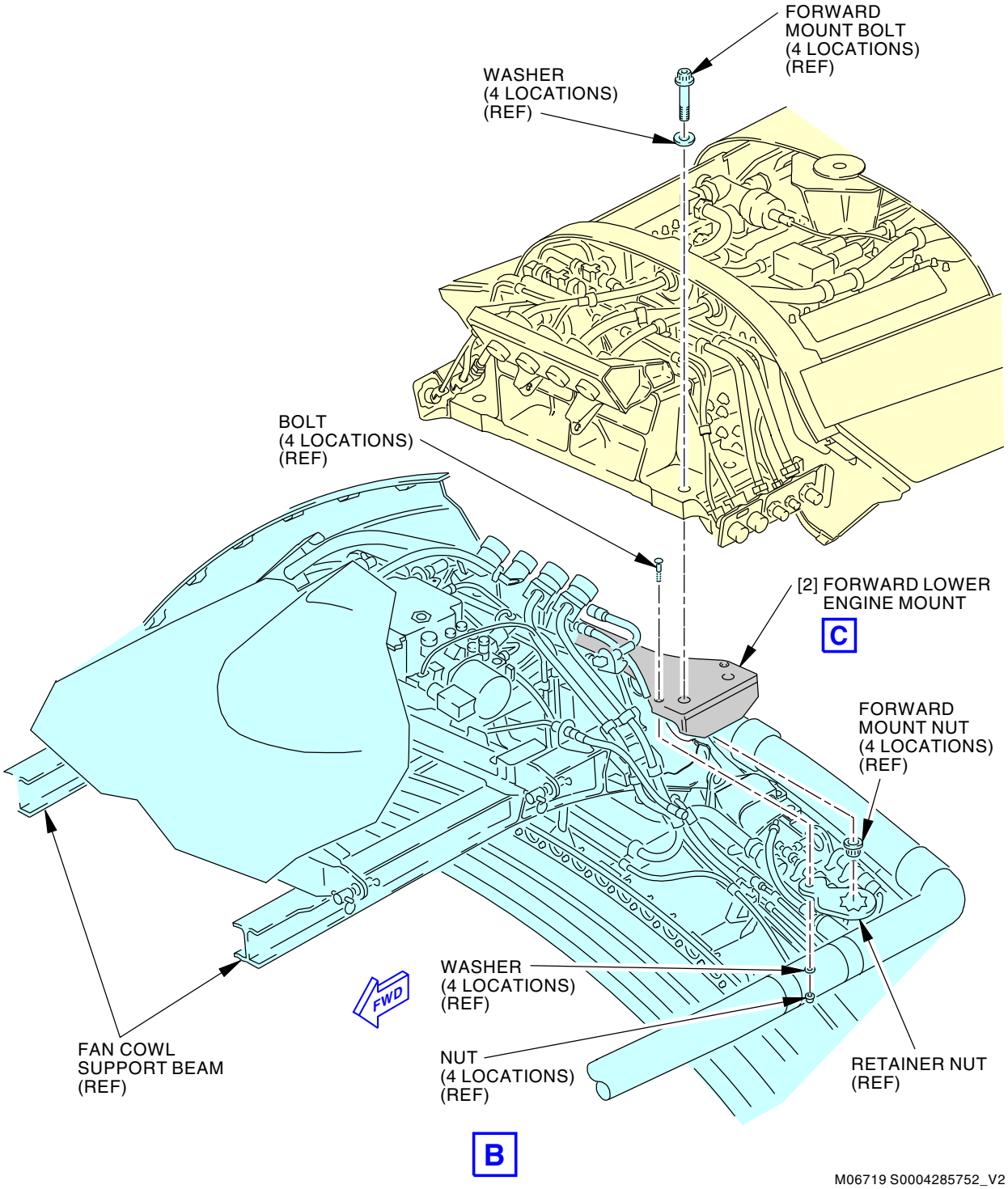

Forward Lower Engine Mount Installation
Figure 401/71-21-01-990-803-H01 (Sheet 2 of 4)

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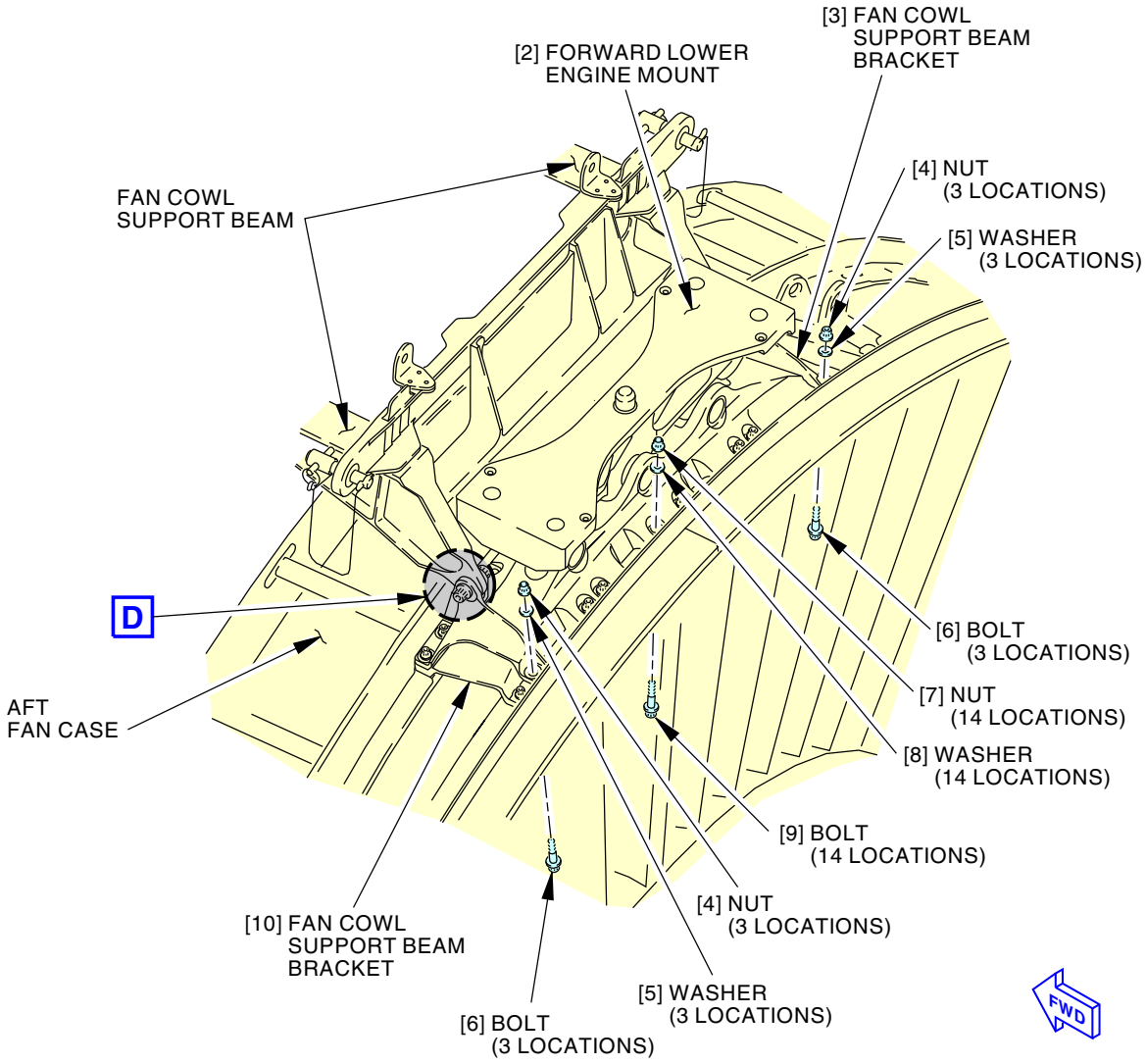

FORWARD LOWER ENGINE MOUNT

C

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Forward Lower Engine Mount Installation
Figure 401/71-21-01-990-803-H01 (Sheet 3 of 4)

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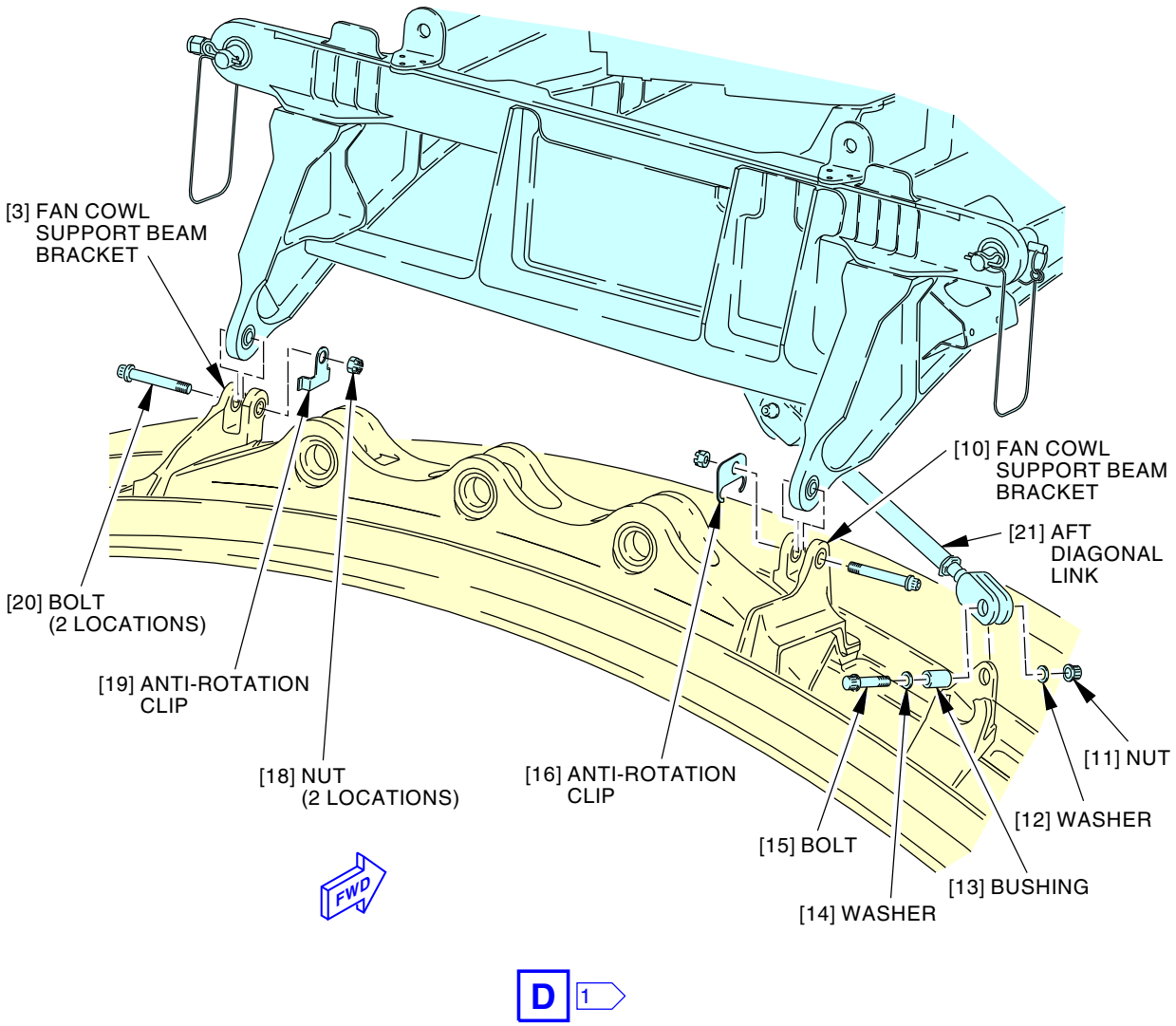

1 DO NOT REMOVE THE FAN COWL SUPPORT BEAM. LIFT THE FAN COWL SUPPORT BEAM SLIGHTLY TO ACCESS FOR THE ENGINE MOUNT REMOVAL.

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Forward Lower Engine Mount Installation
Figure 401/71-21-01-990-803-H01 (Sheet 4 of 4)

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TASK 71-21-01-000-802-H01

3. Forward Lower Engine Mount Platform (on the Engine Mount Yoke) Removal

A. General

(1) This task is the removal procedure for the forward lower engine mount platform from the lower engine mount yoke.

(2) The forward lower engine mount (referred to as the engine mount) is installed at the 12:00 o'clock position on the aft fan case.

(3) To remove the engine mount platform, you must remove engine mount assembly from the engine.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-00-02-000-811-H00	Power Plant Removal (P/B 401)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Prepare for the Removal

SUBTASK 71-21-01-010-002-H02

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

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(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

F. Forward Lower Engine Mount Platform Removal

SUBTASK 71-21-01-020-003-H01

(1) Remove the power plant [1] from the strut Power Plant Removal, TASK 71-00-02-000-811-H00.

SUBTASK 71-21-01-020-004-H01

(2) Remove the engine mount platform and links from the yoke (Figure 402):

(a) Remove the cotter pins [41], nuts [42], and bolts [38] that attach the mount links [46] to the outer holes of the engine mount yoke [43].

NOTE: Keep the bushing [39] installed on the engine mount yoke [43].

(b) Remove the cotter pin [52], nut [51], and bolt [48] that attach the mount platform [34] to the engine mount yoke [43].

NOTE: Keep the bushing [49] and [50] installed on the engine mount yoke [43].

(c) Remove the engine mount platform [34] and mount links [46] from the engine mount yoke [43].

NOTE: It is necessary to lift the LB support beams to get access for the removal.

——— END OF TASK ———

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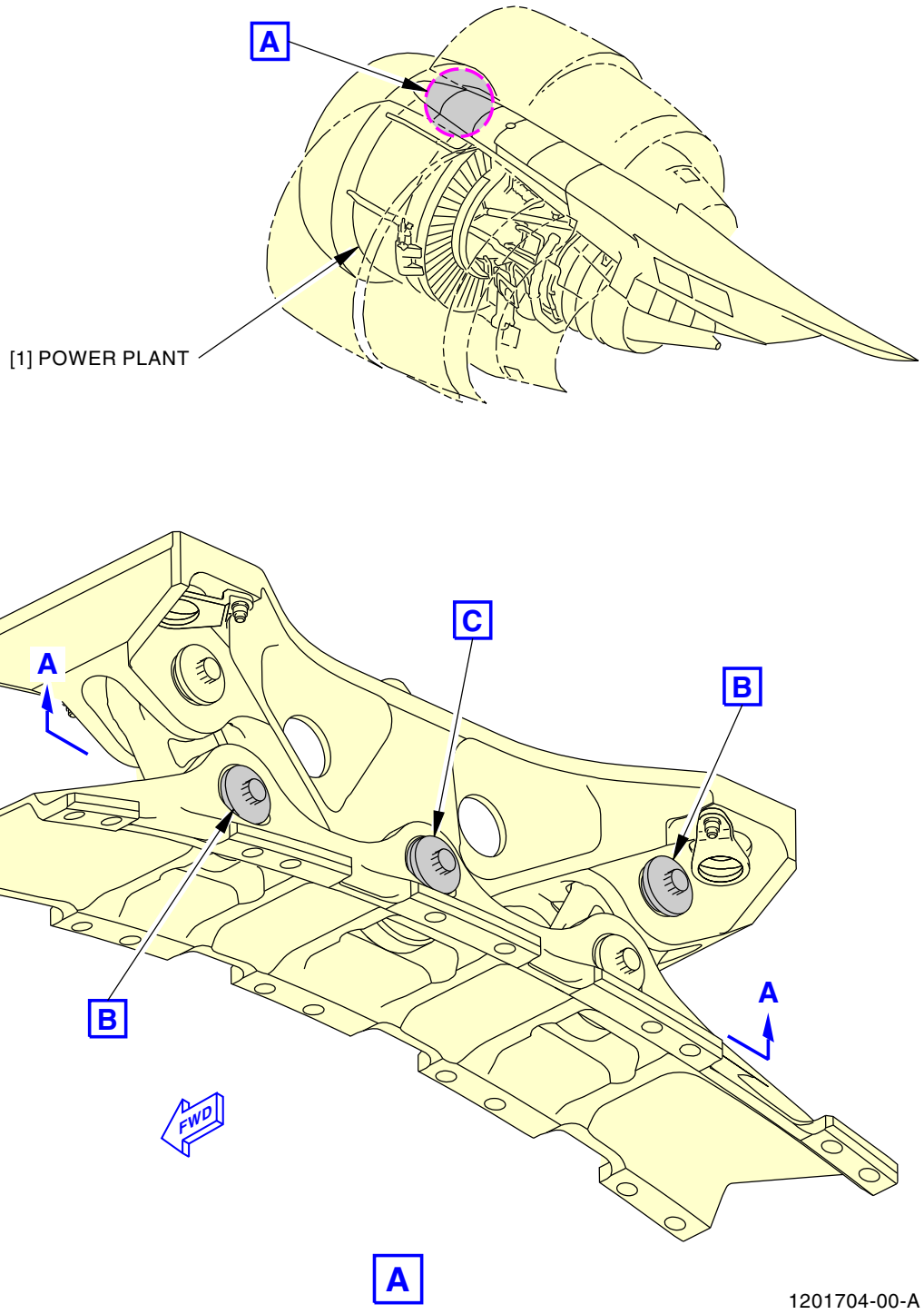

Forward Lower Engine Mount Platform
Figure 402/71-21-01-990-802-H01 (Sheet 1 of 4)

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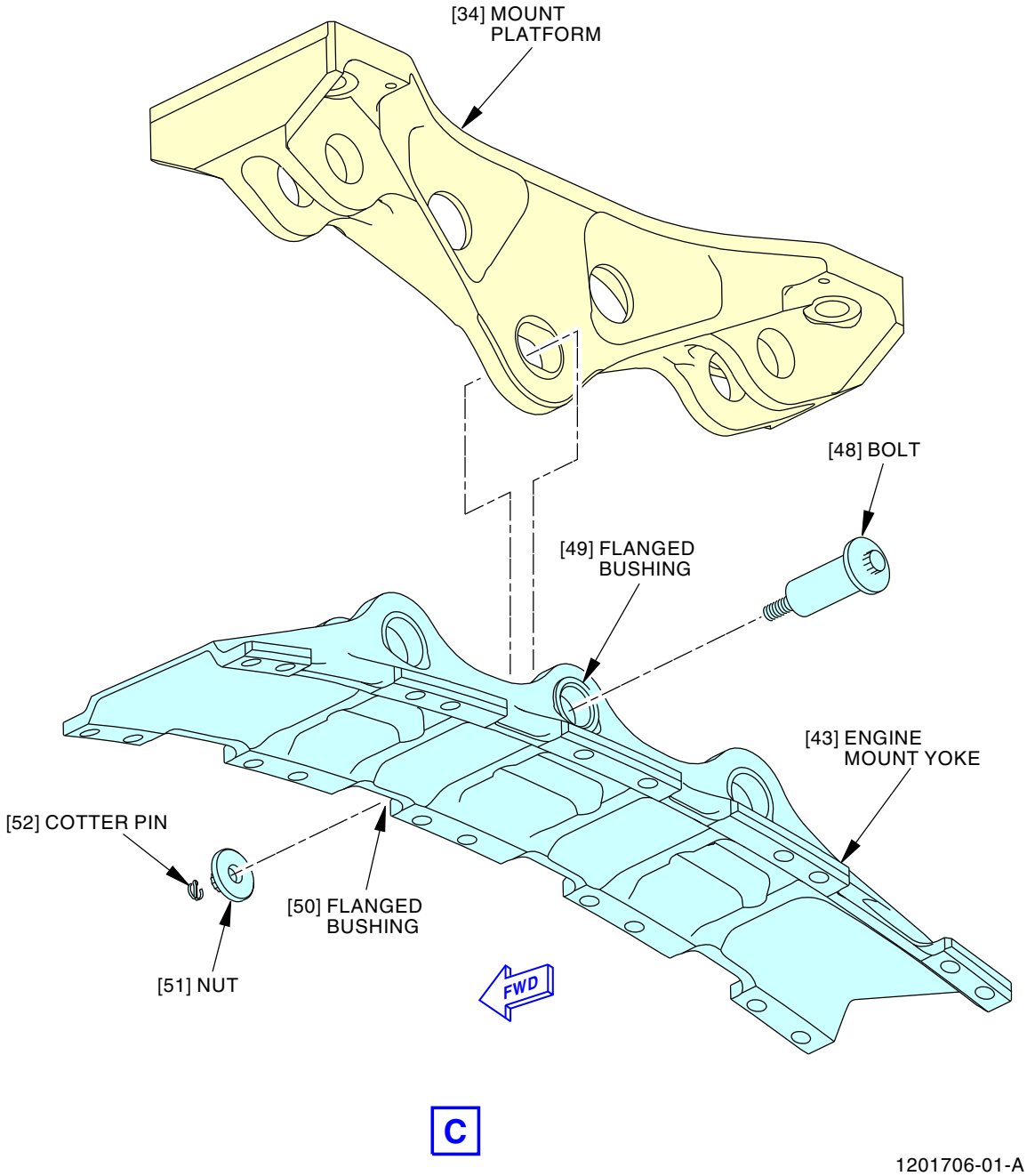

Forward Lower Engine Mount Platform
Figure 402/71-21-01-990-802-H01 (Sheet 2 of 4)

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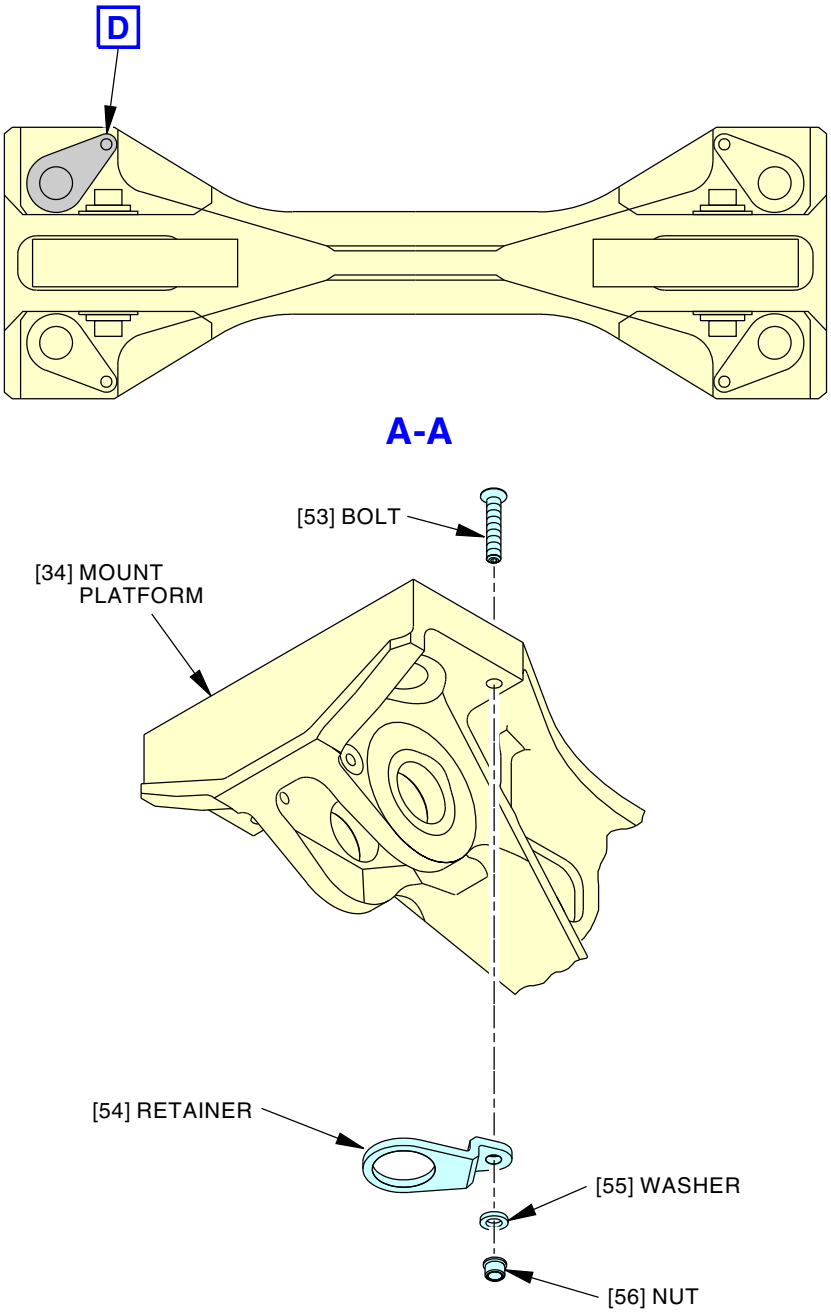

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Forward Lower Engine Mount Platform
Figure 402/71-21-01-990-802-H01 (Sheet 3 of 4)

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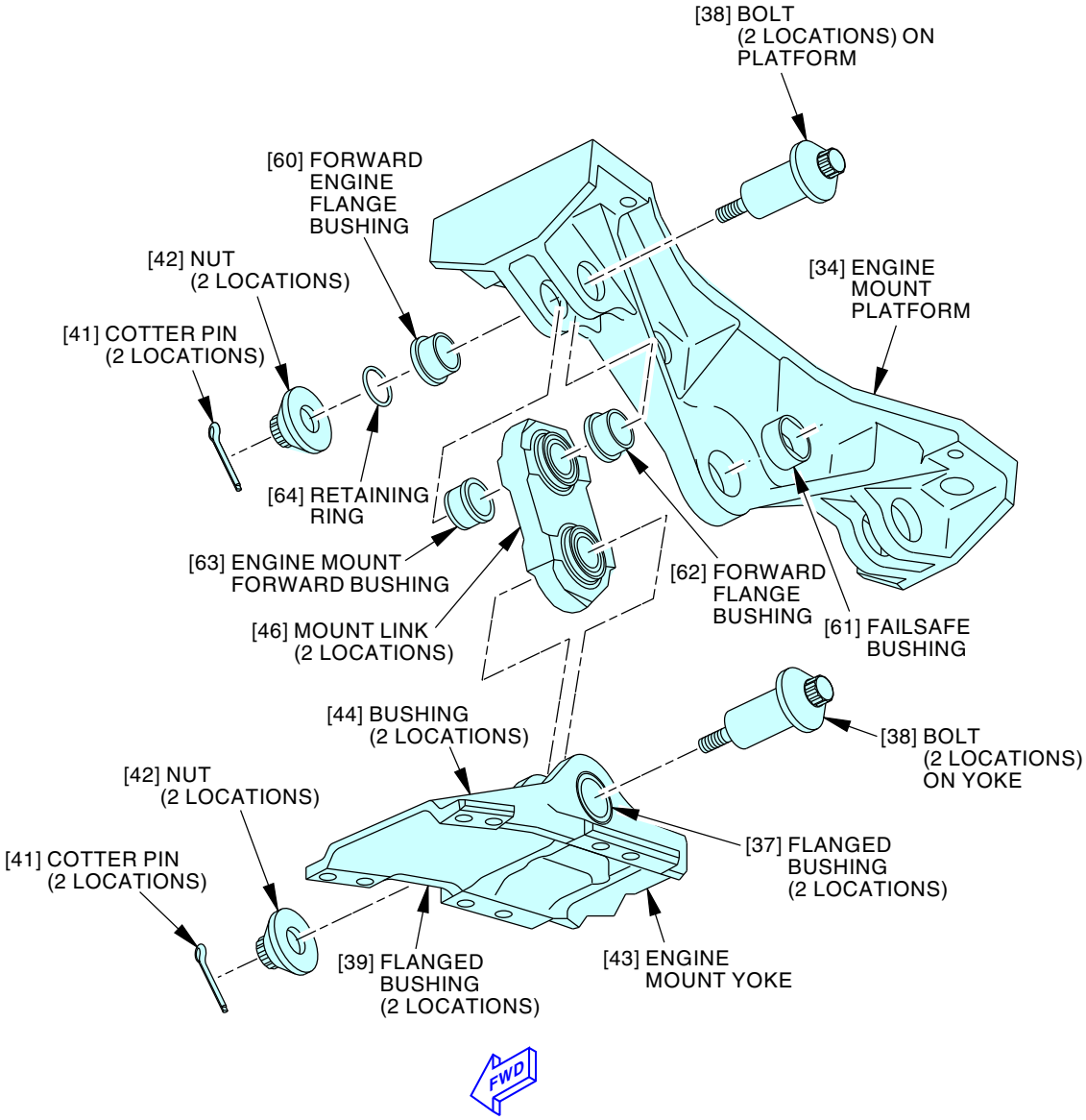

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Forward Lower Engine Mount Platform
Figure 402/71-21-01-990-802-H01 (Sheet 4 of 4)

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TASK 71-21-01-400-801-H01

4. Forward Lower Engine Mount Platform (on the Engine Mount Yoke) installation

A. General

(1) This task is the assembly procedure for the forward lower engine mount platform/link assembly to the forward lower engine mount yoke. Also included is instructions for the attachment of the links to the platform.

NOTE: Correct shipment of the forward mount from repair shops may make removal of the links from the platform necessary. Instructions are given to install the links to the platform for this reason.

(2) The forward lower engine mount (referred to as the engine mount) is installed at the 12:00 o'clock position on the aft fan case.

(3) Before assembly, make sure that these parts are installed in the outboard clevis holes (Qty. 8) of both the forward mount platform and the forward mount yoke. Refer to Figure 402.

- Engine mount forward bushings [63]
- Forward engine flanged bushings [60]
- Forward flanged bushings [62]
- Retaining rings [64]

Also -

- Fail safe bushing (center hole on platform) [61].

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Consumable Materials

Reference	Description	Specification
D00634 [C02-060]	Compound - Antiseize, Lithium-Based - Never-Seize Regular Grade	

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
34	Mount platform	72-00-51-52-140	ARO ALL
43	Engine mount yoke	72-24-03-03-175	ARO ALL

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

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

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(Continued)

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

G. Forward Lower Engine Mount Platform Installation

SUBTASK 71-21-01-420-007-H00

(1) If necessary, install the mount links [46] to forward engine mount platform [34] as follows: Figure 402.

(a) Apply the Never-Seize Regular Grade compound, D00634 [C02-060] to the hardware as follows:

1) The inner diameter of the flanged bushings [62] and flanged bushings [63] in the left and right holes of the engine mount platform [34].

2) The inner diameter of the bearings in the mount links [46].

NOTE: The heads of the bolt [38] on the mount platform must be on the rear side of the mount platform.

(b) Install the ends of the mount links [46] to the outer mount holes of the mount platform [34] with the bolts [38], and nuts [42].

1) Tighten the nuts [42] to 200 in-lb (22.6 N·m)-230 in-lb (26.0 N·m).

2) Install the cotter pins [41].

SUBTASK 71-21-01-420-001-H01

(2) Install the mount links [46] and the forward engine mount platform [34] to the engine mount yoke [43] as follows (Figure 402):

NOTE: The front of the platform is marked with "FWD" on the top left (AFT) corner. The mount must be installed with this side facing forward.

(a) Apply the Never-Seize Regular Grade compound, D00634 [C02-060] to the hardware as follows:

1) The inner diameter of the flanged bushings [37] and flanged bushings [39] in the left and right holes of the engine mount yoke [43].

2) The inner diameter of the bearings in the mount links [46].

3) The flanged bushing [49] and flanged bushing [50] in the center hole of the engine mount yoke [43].

NOTE: The heads of the bolts [35] on the mount platform must be on the rear side of the mount platform.

(b) Align the mount platform [34] into position on the engine mount yoke [43] with the bolt heads to the rear.

(c) Install the ends of the mount links [46] to the outer mount holes of the engine mount yoke [43] with the bolts [38], and nuts [42].

NOTE: The heads of the bolts [38] must be on the rear side of the mount platform.

1) Tighten the nuts [42] to 200-230 pound-inches (22.6-26.0 Newton-meters).

2) Install the cotter pins [41].

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(d) Install the bolt [48] and nut [51].

NOTE: The head of the bolt [48] must be on the rear side of the mount platform [34].

1) Tighten the nut [51] to 200-230 pound-inches (22.6-26.0 Newton-meters).

2) Install the cotter pin [52].

(e) Install the bolts [53] through the top of the forward engine mount platform [34].

(f) Apply the Never-Seize Regular Grade compound, D00634 [C02-060] to the mating surfaces of the retainers [54].

(g) Align the retainers [54] to the engine mount bolt holes and the bolts [53] under the lower surface of the mount platform [34].

(h) Install the washers [55] and nuts [56] to the bolts [53] that attach the retainers [54] to the lower surface of the mount platform [34].

(i) Tighten the nuts [56] to 55-70 pound-inches (6.3-7.9 Newton-meters).

SUBTASK 71-21-01-420-002-H01

(3) If it is necessary, install the forward lower engine mount to the power plant [1].

H. Put the Airplane Back to its Usual Condition.

SUBTASK 71-21-01-410-001-H02

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

END OF TASK

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TASK 71-21-01-400-802-H01

5. Forward Lower Engine Mount Installation

A. General

(1) This task is the installation procedure for the forward lower engine mount.

(2) The forward lower engine mount (referred to as the engine mount) is installed at the 12:00 o'clock position on the aft fan case.

(3) Install the engine mount to the aft fan case.

(4) After the installation of the engine mount, install the power plant to the strut.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
70-41-00-910-803-H00	Lockwire Installation (P/B 201)
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-02-400-811-H00	Power Plant Installation (P/B 401)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Consumable Materials

Reference	Description	Specification
C00941 [C03-001]	Primer - Zinc Chromate	TT-P-1757, Type 1 or 2, Class C or Class N, AMS 3110 Color Y
D00633	Grease - Aircraft General Purpose	BMS3-33
D50043 [C02-058]	Compound - Antiseize, Acheson GP460 (For Threaded Fasteners 0.250 Inches Diameter Or Larger, C02-079 Is An Alternative)	GE A50TF201 Class A

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Engine mount	72-00-51-52-140	ARO ALL

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

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

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G. Forward Lower Engine Mount Installation

SUBTASK 71-21-01-420-004-H01

(1) Install the engine mount [2] (Figure 401):

(a) Align the engine mount [2] with the aft fan case bolt holes.

(b) Attach the engine mount [2] to the aft fan case.

(c) Apply Acheson GP460 compound, D50043 [C02-058] to the threads of the nuts [4] and the nuts [7], and the bolts [6] and the bolts [9].

(d) Apply primer, C00941 [C03-001] to the washers [5] and washers [8], and shank and face of all bolts [6] and the bolts [9].

(e) Put the fan cowl support beam bracket [3] and the bracket [10] that attach the fan cowl support beams on the top forward outer holes of the engine mount [2].

1) Align the fan cowl support beam bracket [3] and the bracket [10] bolt holes with the engine mount [2] bolt holes.

2) Install the six bolts [6], washers [5], and the nuts [4] that attach the fan cowl support beam bracket [3] and the bracket [10] to the engine mount [2].

3) Tighten the nuts [4] to 145-155 pound-feet (197 -210 Newton-meters).

(f) Install the remaining bolts [9], the washers [8], and the nuts [7] on the engine mount [2].

1) Tighten the nuts [7] to 145-155 pound-feet (197 -210 Newton-meters).

(g) Connect the fan cowl support beams to the fan cowl support beam bracket [3] and the bracket [10]:

1) Lubricate the bolts [20], the bolt [15], the nuts [18], and the nut [11] with grease, D00633.

2) Install the bolts [20], the anti-rotation clip [16], nuts [18], and the pins [17] that attach the fan cowl support beams to the fan cowl support beam bracket [10].

NOTE: Do not tighten the fasteners.

3) Install the bolts [20], the anti-rotation clip [19], nuts [18], and the pins [17] that attach the fan cowl support beams to the fan cowl support beam bracket [3].

NOTE: Do not tighten the fasteners.

4) Install the bolt [15], the washer [14], the bushing [13], the washer [12], and the nut [11] that attach the aft diagonal link [21] to the hoist support fitting.

NOTE: You can adjust the jam nut on the aft diagonal link.

a) Lubricate the bolt [15] with grease, D00633.

5) Make sure the clearance is between 0.100±0.0150 inch (2.54±0.380 mm) between the lug and the clevis fitting on the fan cowl support beam bracket [3] and the bracket [10].

6) Tighten the bolt [15] on the aft diagonal link [21] (TASK 70-51-00-910-801-H01).

a) Make sure the rod ends have a minimum engagement in the barrel of the link assembly.

NOTE: You can look through the inspection holes on the link assembly.

b) Tighten the rod jam nut on the aft diagonal link [21].

c) Lockwire the rod jam nut (TASK 70-41-00-910-803-H00).

7) Tighten the bolts [20] on the left and right sides of the aft fan cowl support beam bracket [3] and the bracket [10] (TASK 70-51-00-910-801-H01).

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SUBTASK 71-21-01-420-005-H01

(2) Install the power plant [1] on the strut Power Plant Installation, TASK 71-00-02-400-811-H00.

H. Put the Airplane Back to its Usual Condition.

SUBTASK 71-21-01-410-002-H02

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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FORWARD ENGINE MOUNT YOKE - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) An inspection of the forward engine mount yoke.

TASK 71-21-01-200-801-H01

2. Forward Engine Mount Yoke Inspection

A. General

(1) This task is the inspection procedure for the forward engine mount yoke.

(2) This task is used when the engine is off-wing and when the forward engine mount platform and links are removed from the forward engine mount yoke.

B. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

C. Forward Engine Mount Yoke Inspection

SUBTASK 71-21-01-220-001-H01

(1) Examine the forward engine mount yoke:

(a) Cracks:

1) Cracks are not permitted.

(b) Nicks and scratches in the clevis hole bores and edges:

1) Nicks and scratches are permitted if:

a) They are less than 0.001 inch (0.03 mm) in depth.

b) There must be no intersection of scratches.

(c) Nicks in all areas:

1) Nicks are permitted if:

a) There are less than 0.015 inch (0.380 mm) in depth and 0.250 inch (6.40 mm) in length.

b) There is no sharp edge.

c) There must be a minimum separation of 0.350 inch (8.90 mm) between nicks.

(d) Scratches in all areas:

1) Scratches are permitted if:

a) There are less than 0.005 inch (0.130 mm) in depth.

b) There is no intersection of scratches.

(e) High metal on the mating surface:

1) Remove the high metal.

SUBTASK 71-21-01-220-002-H01

(2) Examine the clevis bushing ID's for the left clevis bushing [1], center clevis bushing [2] and right clevis bushing [3] in the forward engine mount yoke:

(a) Wear in the center clevis bushing [2] ID:

1) Wear is permitted if the inner diameter is less than 1.3760 inch (34.950 mm).

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(b) Wear in the left clevis bushing [1] ID and right clevis bushing [3] ID:

1) Wear is permitted if the inner diameter is less than 1.2510 inch (31.775 mm).

(c) Nicks in the clevis bushing ID of the left clevis bushing [1], center clevis bushing [2] and right clevis bushing [3]:

1) Nicks are permitted if:

a) There are less than 0.015 inch (0.380 mm) in depth and 0.350 inch (8.90 mm) in length after removal of high metal.

b) There is no sharp edge.

(d) Scratches in the clevis bushing ID of the left clevis bushing [1], center clevis bushing [2] and right clevis bushing [3]:

1) Scratches are permitted if:

a) There are less than 0.001 inch (0.025 mm) in depth after removal of high metal.

b) There is no sharp edge.

END OF TASK

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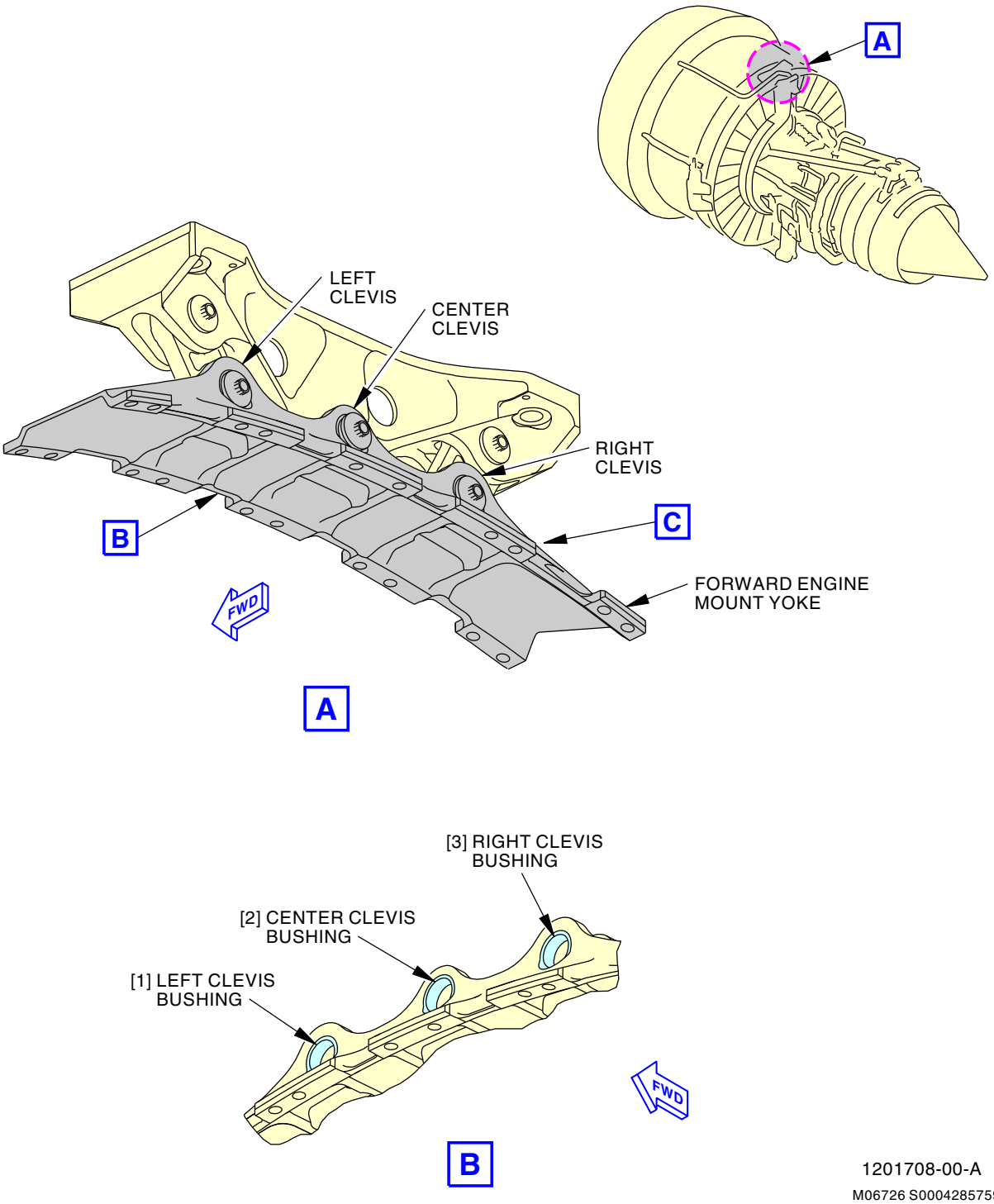

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Forward Engine Mount Yoke Inspection
Figure 601/71-21-01-990-804-H01 (Sheet 1 of 2)

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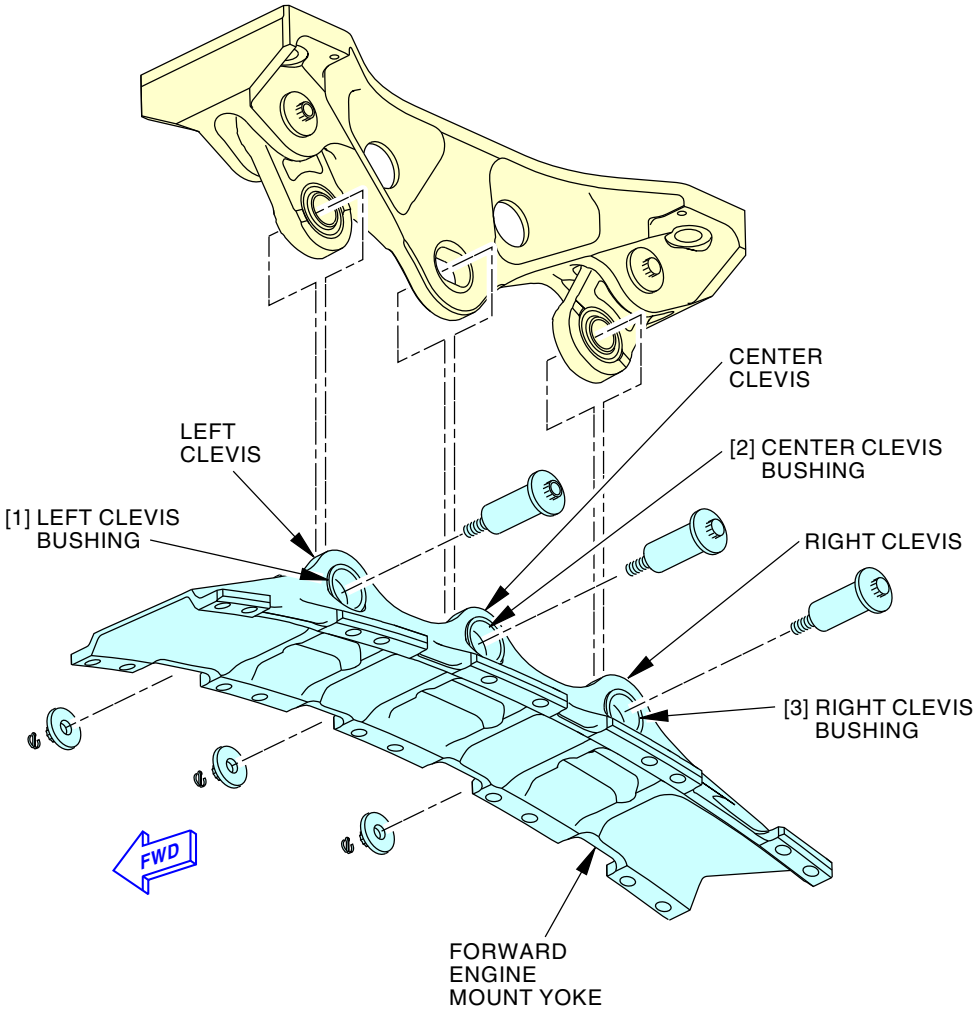

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Forward Engine Mount Yoke Inspection
Figure 601/71-21-01-990-804-H01 (Sheet 2 of 2)

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ENGINE MOUNT BOLTS AND NUTS - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) An inspection of the engine mount bolts and nuts.

TASK 71-21-03-200-801-H01

2. Engine Mount Bolts and Nuts Inspection

(Figure 601)

A. General

(1) This task is to examine the forward and aft engine mount bolts and nuts with the fluorescent penetrant inspection (all industry standard procedures) for damage. This is task applies during an engine removal.

(2) The forward and aft engine mount bolts and nuts are removed before the inspection.

(3) The inspection of the forward and aft engine mount bolts and nuts are the same.

(4) There is one method that can be used for the inspection:

NOTE: You must use the fluorescent penetrant inspection. The visible dye penetrant inspection does not have enough sensitivity to properly inspect the bolts.

(a) A procedure based on the AMS 2644 Type 1 (Fluorescent Dye) Specification Method.

(5) This task is intended to supplement manufacturers' instructions for the application of dye penetrant, and is not intended to replace them.

(6) Make sure you are certified and trained to do the procedure. Only a person with the approved training can do this procedure and give the correct condition of the parts.

B. Tools/Equipment

Reference	Description
STD-1273	Lamp - Portable, Ultraviolet (1000 watt/sq cm at target)

C. Consumable Materials

Reference	Description	Specification
B00074	Solvent - Degreasing	MIL-PRF-680 (Supersedes P-D-680)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G02036	Penetrant - Zyglo ZL-27A Fluorescent Post Emulsifiable Penetrant	AMS2644 Type I (Level 3 - High Sensitivity)
G02490	Solvent - Spotcheck SKC-S Cleaner/Remover	AMS 2644 Class 2
G50856	Emulsifier - Zyglo ZE-4B Penetrant Emulsifier (Lipophilic Emulsifier)	AMS 2644
G50857	Emulsifier - Zyglo ZR-10B Penetrant Emulsifier (Hydrophilic Remover)	AMS 2644
G50858	Developer - Zyglo ZP-4B Dry Powder Developer	AMS 2644
G50859	Developer - Zyglo ZP-9F Non-Aqueous Developer	AMS 2644
G50860	Developer - Zyglo ZP-14A Aqueous Soluble Developer	AMS 2644

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D. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

E. Engine Mount Bolts and Nuts Fluorescent Dye Penetrant Inspection

SUBTASK 71-21-03-230-002-H00

(1) Do the steps that follow to prepare the engine mount bolt [1] or engine mount bolt [6] for fluorescent dye penetrant inspection:

(a) Examine the bolts for damage:

1) Corrosion, scratches, or nicks are not permitted.

2) No cracks are permitted.

3) Signs of worn areas are not permitted.

(b) Use a solvent, B00074 to clean the bolt of dirt, oil and grease.

(c) Use forced air to dry the bolt.

(d) Apply Spotcheck SKC-S solvent cleaner, G02490 to the bolt and then dry.

SUBTASK 71-21-03-200-002-H00

(2) Examine the nut retainer [8] and retainer plate [10] as follows:

(a) No cracks are permitted.

(b) Signs of worn areas are not permitted.

(c) Nut retainer and retainer plate that are loose.

1) Tighten the nut.

2) If the nut fails to tighten, replace the nut.

(d) Nut retainer and retainer plate that are missing are not permitted.

SUBTASK 71-21-03-230-003-H00

(3) Do the steps that follow to apply the fluorescent dye penetrant to the engine mount bolt [1] or engine mount bolt [6]:

(a) Apply the Zyglo ZL-27A penetrant, G02036 on the bolt.

(b) Let the dye penetrant set for approximately 10 minutes.

(c) Clean the bolt or with the clean water for 30-45 seconds.

(d) Dry the bolt or with the forced air.

SUBTASK 71-21-03-230-004-H00

(4) Use one of the emulsifiers that follow to remove excessive fluorescent dye penetrant from the engine mount bolt [1] or engine mount bolt [6]:

(a) LIPOPHILIC EMULSIFIER METHOD; Apply the Zyglo ZE-4B emulsifier, G50856 to the bolt as follows:

1) Allow the Zyglo ZE-4B emulsifier, G50856 to dwell on the bolt for 2-4 minutes.

2) Clean the bolt with clean water for 2-3 minutes to remove the Zyglo ZE-4B emulsifier, G50856.

3) Use forced air or a clean dry cotton wiper, G00034 to dry the bolt.

(b) HYDROPHILIC EMULSIFIER METHOD; Apply the Zyglo ZR-10B emulsifier, G50857 to the bolt as follows:

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1) Clean the bolt with clean water for 2-3 minutes to remove the Zyglo ZL-27A penetrant, G02036.
2) Apply the Zyglo ZR-10B emulsifier, G50857 to the bolt.
3) Clean the bolt with clean water for 2-3 minutes to remove the Zyglo ZR-10B emulsifier, G50857.
4) Use forced air or a clean dry cotton wiper, G00034 to dry the bolt.

SUBTASK 71-21-03-230-005-H00

(5) Do the steps that follow to apply the one of the fluorescent dye developers on the engine mount bolt [1] or engine mount bolt [6]:
   (a) Apply one of the fluorescent dye developers that follow:
      1) Zyglo ZP-4B developer, G50858
      2) Zyglo ZP-9F developer, G50859
      3) Zyglo ZP-14A developer, G50860.
   (b) Use the portable ultraviolet lamp, STD-1273 to examine the bolt for crack conditions.
      1) If you find a crack on the bolt, then the bolt is not serviceable.
      2) If you do not find a crack on the bolt, clean the bolt with clean water for 2-3 minutes.
         a) Use forced air or a clean dry cotton wiper, G00034 to dry the bolt.

SUBTASK 71-21-03-230-006-H00

(6) Do the steps that follow to prepare the engine mount nut [3] or engine mount nut [9] for fluorescent dye penetrant inspection:
   (a) Examine the nut or for damage:

      NOTE: For the forward engine mount nuts [3], you must remove the fasteners and the retainers to get access to the nuts [3]. For the aft engine mount nuts [9], you must remove the nut retainers [8] and the retainer plate [10] to get access to the nut [9].

   (b) Use a solvent, B00074 to clean the nut of dirt, oil and grease.
   (c) Use forced air to dry the nut.
   (d) Apply Spotcheck SKC-S solvent cleaner, G02490 to the nut then dry.
   (e) Examine the nylon locking inserts, if present on the nut, for damage conditions.
      1) If you find damage on the nylon locking inserts, the nut is not serviceable.

SUBTASK 71-21-03-200-001-H00

(7) Examine the retainer as follows:
   (a) No cracks are permitted.
   (b) Signs of worn areas are not permitted.
   (c) Retainer that is loose.
      1) Tighten the nut.
      2) If the nut fails to tighten, replace the nut.
   (d) Retainer that is missing is not permitted.

SUBTASK 71-21-03-230-007-H00

(8) Do the steps that follow to apply the fluorescent dye penetrant to the engine mount nut [3] or engine mount nut [9]:
   (a) Apply the Zyglo ZL-27A penetrant, G02036 on the nut.

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(b) Let the dye penetrant set for approximately 10 minutes.

(c) Clean the nut with the clean water for 30-45 seconds.

(d) Dry the nut with the forced air.

SUBTASK 71-21-03-230-008-H00

(9) Use one of the emulsifiers that follow to remove excessive fluorescent dye penetrant from the engine mount nut [3] or engine mount nut [9]:

(a) LIPOPHILIC EMULSIFIER METHOD; Apply the Zyglo ZE-4B emulsifier, G50856 to the nut as follows:

1) Allow the Zyglo ZE-4B emulsifier, G50856 to dwell on the nut for 2-4 minutes.

2) Clean the nut with clean water for 2-3 minutes to remove the Zyglo ZE-4B emulsifier, G50856.

3) Use forced air or a clean dry cotton wiper, G00034 to dry the nut.

(b) HYDROPHILIC EMULSIFIER METHOD; Apply the Zyglo ZR-10B emulsifier, G50857 to the nut as follows:

1) Clean the nut with clean water for 2-3 minutes to remove the Zyglo ZL-27A penetrant, G02036.

2) Apply the Zyglo ZR-10B emulsifier, G50857 to the nut.

3) Clean the nut with clean water for 2-3 minutes to remove the Zyglo ZR-10B emulsifier, G50857.

4) Use forced air or a clean dry cotton wiper, G00034 to dry the nut.

SUBTASK 71-21-03-230-009-H00

(10) Do the steps that follow to apply the fluorescent dye developer to the engine mount nut [3] or engine mount nut [9]:

(a) Apply one of the fluorescent dye developers that follow:

1) Zyglo ZP-4B developer, G50858

2) Zyglo ZP-9F developer, G50859

3) Zyglo ZP-14A developer, G50860.

(b) Use the portable ultraviolet lamp, STD-1273 to examine the nut for crack conditions.

1) If you find crack on the nut, then the nut is not serviceable.

2) If you do not find crack on the nut, clean the nut with clean water for 2-3 minutes.

a) Use forced air or a clean dry cotton wiper, G00034 to dry the nut.

——— END OF TASK ———

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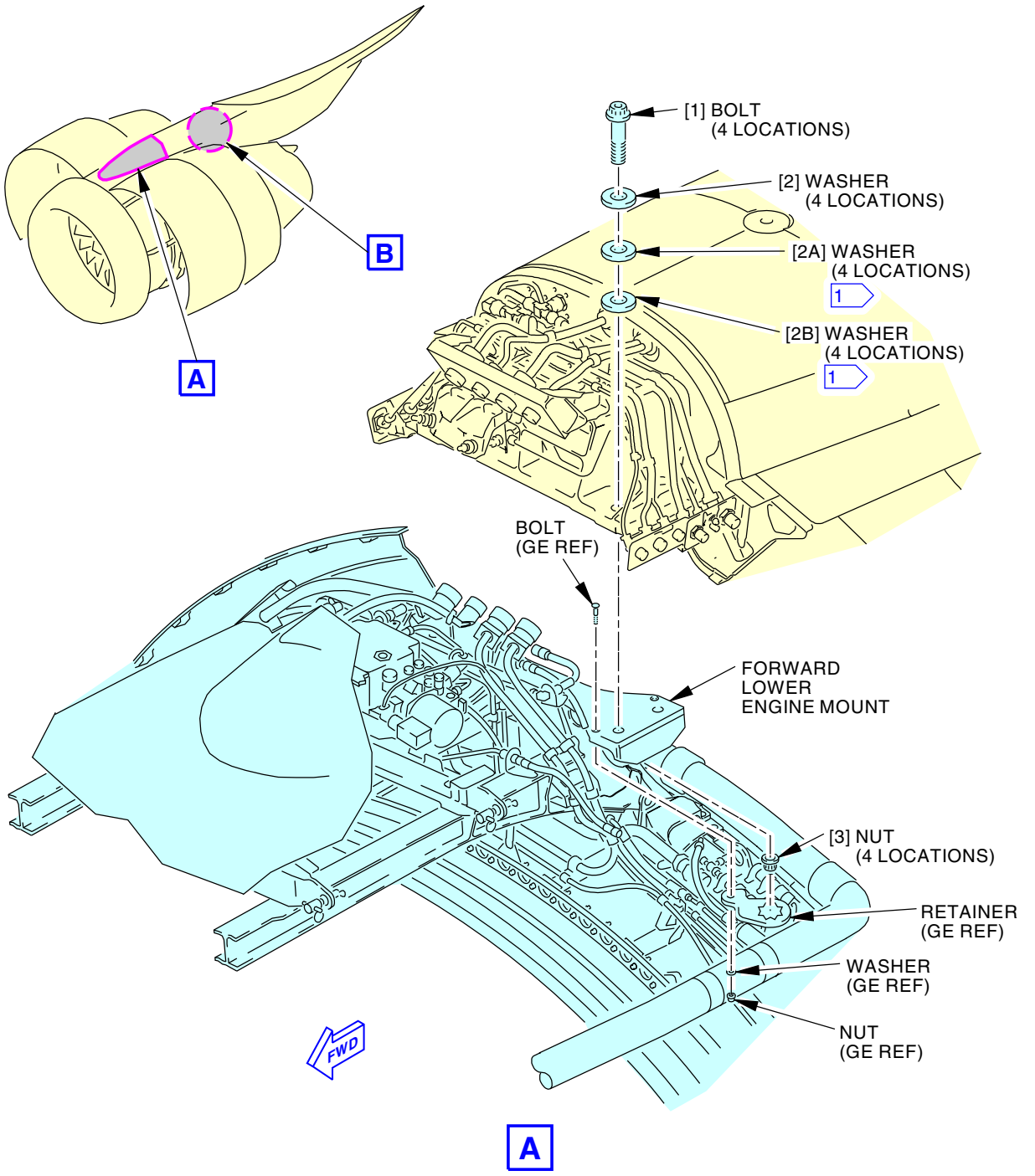

1 ENGINE WITH ADDITIONAL WASHERS REQUIREMENT

M06728 S0004285761_V4

Engine Mount Bolts and Nuts Inspection
Figure 601/71-21-03-990-801-H01 (Sheet 1 of 2)

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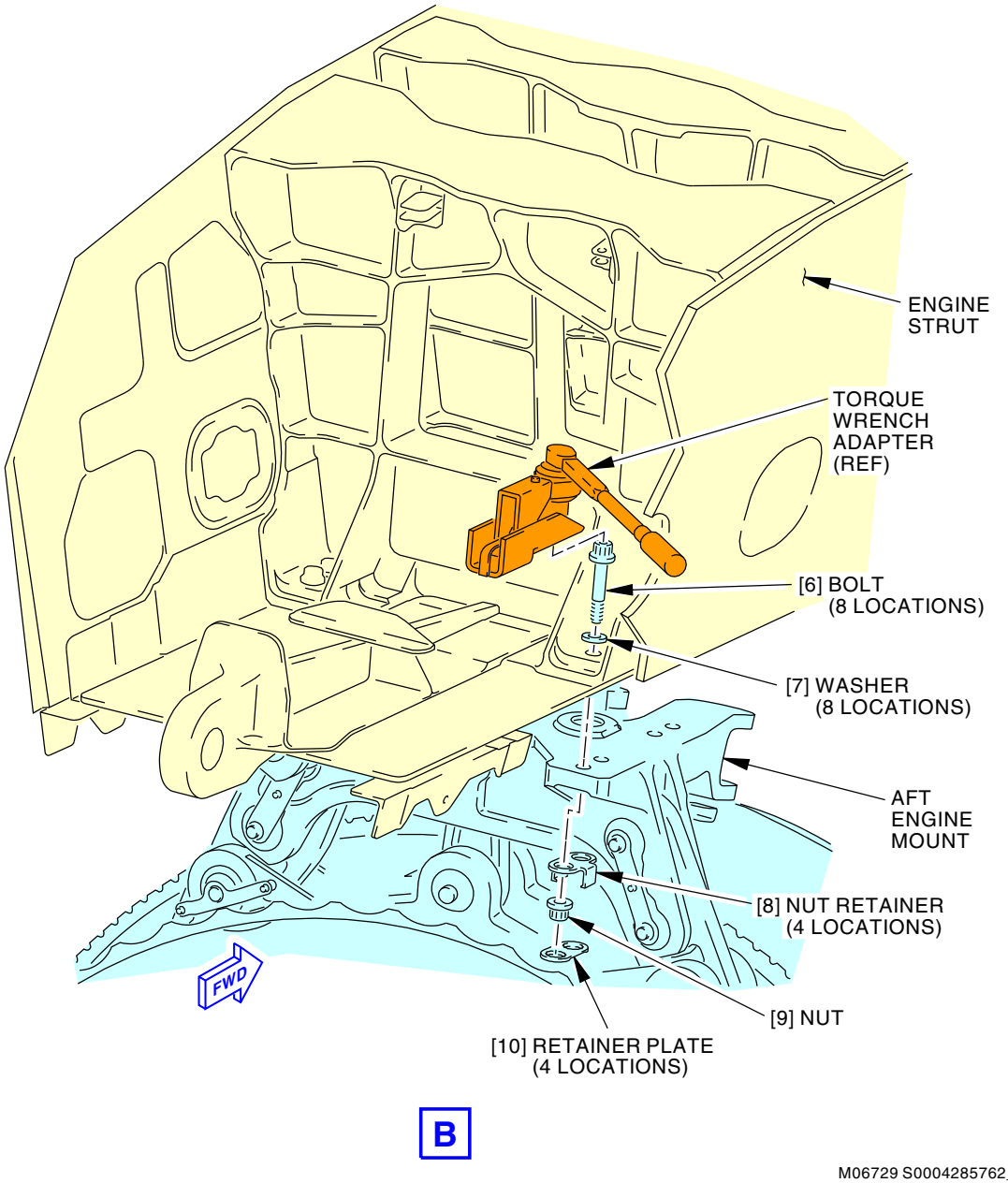

Engine Mount Bolts and Nuts Inspection
Figure 601/71-21-03-990-801-H01 (Sheet 2 of 2)

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ENGINE VENTS AND DRAINS - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Examine the engine vents and drains for leakage.

TASK 71-71-00-700-801-H01

2. Engine Vents and Drains Examination

(Figure 601, Figure 602, Figure 603, Figure 604, Figure 605, Figure 606)

A. General

(1) This task provides the instructions on how to examine the engine vents and drains for leakage.

(2) This task contains data to estimate the condition of Line Replaceable Units (LRU) when you look at the rate of leakage that goes through the engine vent and drain system.

(3) You must open the left and right thrust reversers to gain access to the drain module.

(4) You can operate the engine at idle to isolate any fuel leaks from the drain mast or any oil leaks from the overboard sump.

(5) You can run the engine at part power to isolate and monitor specific accessory gearbox seals for oil leakage or you can plug the drain lines for a maximum of 25 cycles.

(6) The typical areas that oil exits the oil system are:

(a) Drain mast

(b) Overboard sump drains

(c) Center vent tube

(d) Internally (not visible from the engine exterior).

(7) Oil consumption per the AMM is calculated as a rolling average rate of total amount of oil serviced divided by total amount of engine operating time. Refer to TASK 71-00-00-800-802-H01 for oil consumption limit.

(8) In very cold weather (outside air temperature less than -4°F (-20°C)), leaks from the drain can occur on an engine that does not operate or during engine start. These leaks are not unusual and should stop after the engine operates at idle power for 5 minutes.

NOTE: An idle run of 5 minutes or holding the engine at idle speed after the engine start for 5 minutes can confirm the cause of the leak.

(9) Leaks from the drain can occur on an engine that has not operated recently or has been recently installed. These leaks are not unusual and will stop after the engine operates at idle for 5 minutes.

NOTE: An idle run of 5 minutes or holding the engine at idle speed after the engine start for 5 minutes can confirm the cause of the leak.

(10) The leakage limits apply to engines that are not operated and engines that are operated at all power settings.

B. References

Reference	Title
12-13-07-200-801	Backup Generator Oil Level Check (P/B 301)
12-22-07-200-803	IDG Oil Level Check (P/B 301)
24-11-00-700-803	IDG Oil System Static Leak Check (P/B 201)
24-11-01-000-801-001	IDG Removal (P/B 401)

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(Continued)

Reference	Title
24-11-01-400-801-001	IDG Installation (P/B 401)
24-11-06-000-801	IDG Fuel/Oil Heat Exchanger Removal (P/B 401)
24-11-06-400-801	IDG Fuel/Oil Heat Exchanger Installation (P/B 401)
24-25-00-700-802	Backup Generator Oil System Static Leak Check (P/B 201)
24-25-01-000-804-001	Backup Generator Removal (P/B 401)
24-25-01-400-804-001	Backup Generator Installation (P/B 401)
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
29-11-05-000-801-002	Engine-Driven Pump (EDP) Removal (P/B 401)
29-11-05-400-801-002	Engine-Driven Pump (EDP) Installation (P/B 401)
70-51-00-910-801-H01	Instruction for Torque (P/B 201)
71-00-00-700-803-H01	Test No. 3 - Standard Wet Motor Leak Check (P/B 501)
71-00-00-700-804-H01	Test No. 5 - Idle Leak Check (P/B 501)
71-00-00-700-805-H01	Test No. 6 - Part-Power Leak Check (P/B 501)
71-00-00-700-822-H00	Test No. 21 - High-Power Leak Check (P/B 501)
71-00-00-800-802-H01	Engine Operation Limits (P/B 201)
71-00-00-800-837-H00	Usual Engine Stop (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
72-64-01-020-801-H01	Accessory Gearbox Sealol Face Seal Removal (P/B 401)
72-64-01-420-801-H01	Accessory Gearbox Sealol Face Seal Installation (P/B 401)
73-11-01-000-801-H01	Main Fuel Pump Removal (P/B 401)
73-11-01-400-801-H01	Main Fuel Pump Installation (P/B 401)
73-21-14-000-801-H01	Hydromechanical Unit Removal (P/B 401)
73-21-14-400-801-H01	Hydromechanical Unit Installation (P/B 401)
75-24-04-000-801-H01	High Pressure Turbine Active Clearance Control (HPTACC) Valve Removal (P/B 401)
75-24-04-400-801-H01	High Pressure Turbine Active Clearance Control (HPTACC) Valve Installation (P/B 401)
75-31-02-000-802-H01	Left Variable Stator Vane (VSV) Actuator Removal (P/B 401)
75-31-02-000-803-H01	Right Variable Stator Vane (VSV) Actuator Removal (P/B 401)
75-31-02-400-802-H01	Left Variable Stator Vane (VSV) Actuator Installation (P/B 401)
75-31-02-400-803-H01	Right Variable Stator Vane (VSV) Actuator Installation (P/B 401)
75-32-01-000-801-H01	Left Variable Bypass Valve (VBV) Actuator Removal (P/B 401)
75-32-01-400-801-H01	Left Variable Bypass Valve (VBV) Actuator Installation (P/B 401)
75-32-02-000-801-H01	Right Variable Bypass Valve (VBV) Actuator Removal (P/B 401)
75-32-02-400-801-H01	Right Variable Bypass Valve (VBV) Actuator Installation (P/B 401)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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C. Tools/Equipment

Reference	Description
STD-92	Bag - Plastic, Water Proof
STD-194	Container - 1 Quart (1 Liter), Calibrated
STD-205	Container - Oil Resistant, 5 U.S.-Gal (19 l)
STD-475	Hose - Oil Resistant
STD-6668	Fitting - Plug, Flared Tube End (AS5168-06)
STD-13732	Cap - Nozzle Pressure AN929-6J (Size 6, Finish Type J)

D. Consumable Materials

Reference	Description	Specification
G51382	Tape - Lacing, Teflon (C10-227)	

E. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

F. Access Panels

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

G. Prepare for the Engine Vents and Drains Examination

SUBTASK 71-71-00-010-001-H01

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

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

(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine

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(Continued)

Number	Name/Location
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

H. Engine Vents and Drains Examination (Other than Drain Mast) with Leakage Limits and the Corrective Action

SUBTASK 71-71-00-790-001-H01

(1) Visually examine the oil tank scupper drain hose for sign of the oil leakage as follows:

(a) Liquid type:

1) Oil leakage.

(b) Permitted leakage:

1) Oil flow from the oil tank servicing only.

(c) Corrective action:

1) Make sure that the oil tank cap is installed correctly.

2) Prevent oil spills when you service the oil tank.

SUBTASK 71-71-00-790-022-H00

(2) Visually examine the backup generator over temperature case drain for oil leakage.

(a) Liquid type:

1) Oil leakage.

(b) Permitted leakage:

1) None permitted.

(c) Corrective action:

1) Replace the backup generator (TASK 24-25-01-000-804-001 and TASK 24-25-01-400-804-001).

SUBTASK 71-71-00-790-023-H00

(3) Visually examine the B-sump drain for oil leakage (Refer to Figure 603).

(a) Any amount of leakage is acceptable, if:

1) Oil consumption does not exceed the recommended maximum limit (TASK 71-00-00-800-802-H01).

SUBTASK 71-71-00-790-024-H00

(4) Visually examine the C-sump drain for oil leakage (Refer to Figure 603).

(a) Any amount of leakage is acceptable, if:

1) Oil consumption does not exceed the recommended maximum limit (TASK 71-00-00-800-802-H01).

SUBTASK 71-71-00-790-025-H00

(5) Visually examine the center vent tube (CVT) for evidence of oil dripping (Refer to Figure 603).

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(a) Any amount of leakage is acceptable, if:

1) Oil consumption does not exceed the recommended maximum limit (TASK 71-00-00-800-802-H01).

SUBTASK 71-71-00-790-026-H00

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

I. Engine Vents and Drains Examination - Drain Mast

SUBTASK 71-71-00-790-036-H00

(1) Visually examine the engine drain mast for any leakage.

SUBTASK 71-71-00-790-002-H01

(2) If there is a sign of FUEL leakage, identify leakage from the drain mast (Figure 601 and Figure 602) and Drain Mast Chart (Figure 604), do the following task:

CAUTION DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO EQUIPMENT CAN OCCUR.

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

1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

2) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

(b) Put the 5 U.S.-gal (19 l) oil resistant container, STD-205 below the drain mast.

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WARNING MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

WARNING MAKE SURE ALL PERSONS ARE CLEAR OF THE AREAS NEAR THE ENGINE FAN AIR INLET. THIS WILL PREVENT DEATH OR INJURY TO PERSONS.

(c) Do an idle leak check (TASK 71-00-00-700-804-H01).

1) Record the time of the engine start.

(d) Let the engine become stable at minimum idle.

(e) Monitor the drain mast for drops of fuel.

(f) If you see fuel leakage, identify the drain mast port location and record the number of drops.

(g) Stop the engine (TASK 71-00-00-800-837-H00).

(h) Record the time of the engine shutdown.

(i) Calculate the total engine operation time.

(j) Find the permitted leakage rate for the amount of fuel leak and the total time of the engine operation (Refer to Drain Mast - Leakage Limits and the Corrective Action and Drain Mast Chart/Figure 604).

(k) If the leakage rate exceeds the permitted limits, do the corrective action (Refer to Drain Mast - Leakage Limits and the Corrective Action and Drain Mast Chart/Figure 604).

(3) If there is a sign of oil leakage, identify leakage from the drain mast (Figure 601 and Figure 602), and Drain Mast Chart (Figure 604). To find the seal leakage from the accessory gearbox hydraulic pump (EDP), MFP, Backup Generator, IDG and the HMU drives, you can carry out Part power leak check or High power leak check or you can plug the drain lines and return to service for a maximum of 25 cycles, as follows:

(a) If you do a part power leak check or high power leak check, do these steps:

1) Do this task: Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00.

2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00.

3) Disconnect the applicable accessory gearbox drive pad drain line.

4) Attach an oil resistant hose, STD-475 to the drain line port of the accessory gearbox drive pad.

5) Put a plastic bag, STD-92 on the oil resistant hose, STD-475 and tighten it with a plastic tie.

6) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

7) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

WARNING MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

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(WARNING PRECEDES)

WARNING MAKE SURE ALL PERSONS ARE CLEAR OF THE AREAS NEAR THE ENGINE FAN AIR INLET. THIS WILL PREVENT DEATH OR INJURY TO PERSONS.

8) Do the part power leak check (TASK 71-00-00-700-805-H01) or do the high power leak check (TASK 71-00-00-700-822-H00).
   a) Record the time of the engine start.
9) Let the engine become stable at part power or high power.
10) Stop the engine (TASK 71-00-00-800-837-H00).
11) Record the time of the engine shutdown.
12) Calculate the total engine operation time.
13) Open the fan cowl panels and then the thrust reversers again.
14) Remove the plastic bag, STD-92 from the oil resistant hose, STD-475.
15) Put the collected oil from the plastic bag, STD-92 into the 1 Quart (1 l) calibrated container, STD-194.
16) Find the permitted leakage rate from the amount of oil collected and the total time of the engine operation (Refer to Drain Mast - Leakage Limits and the Corrective Action and Drain Mast Chart/Figure 604).
17) If the leakage rate exceeds the permitted limits, do the corrective actions (Refer to Drain Mast - Leakage Limits and the Corrective Action and Drain Mast Chart/Figure 604).
18) Remove the oil resistant hose, STD-475 from the drain line port.
19) Connect the drain line to the accessory gearbox.
   a) Tighten the tube B-nut (TASK 70-51-00-910-801-H01).
20) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.
21) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

(b) If you plug the LRU drain lines for a maximum of 25 cycles, do the steps that follow (Figure 605):

NOTE: You must disconnect the drain line from the drain mast, plug or cap the drain mast and drain line.

1) Under this procedure we can plug the following Accessory Gear Box (AGB) drains lines.
   a) Main Fuel Pump drain line.
   b) Hydraulic Pump drain line.
   c) Hydro-Mechanical Unit (HMU) drain line.
   d) Integrated Drive Generator (IDG) drain line.
      <1> Look at the IDG oil level to make sure that the leakage is not from the IDG (IDG Oil Level Check, TASK 12-22-07-200-803).
   e) Backup generator drain line.
      <1> Put a cap on and plug in the backup generator (BUG) AGB pad drain line at either one location.

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<2> Make sure the over temperature case drain line is not capped or plugged (Figure 606).

NOTE: Do not plug the BUG over temperature case drain.

<a> Do a check on the BUG oil level to make sure that the leakage is not from the BUG (Backup Generator Oil Level Check, TASK 12-13-07-200-801).

<b> Make sure the oil level indication on the EICAS maintenance page (ELEC) shows NORMAL.

ARO ALL POST SB 777-GE100-72-0694

<3> Replace the backup generator carbon seal and mating ring after operation with the drain line capped (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

NOTE: You can do a borescope inspection of the BUG AGB drain line to find service bulletin compliance. If you examine the color of the BUG carbon seal, this will prevent removal of the backup generator.

- If the carbon seal is black or purple, it is post GE90-100 SB72-0694.
- If the carbon seal is yellow or gold, it is pre GE90-100 SB72-0694.

ARO ALL POST SB 777-GE100-72-0741

<4> Replace the IDG carbon seal and mating ring after operation with the drain line capped (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

NOTE: You can do a borescope inspection of the IDG AGB drain line to find service bulletin compliance. If you examine the color of the IDG carbon seal, this will prevent removal of the backup generator.

- If the carbon seal is black or purple, it is post GE90-100 SB72-0741.
- If the carbon seal is yellow or gold, it is pre GE90-100 SB72-0741.

ARO ALL

2) After you put a cap on the drain line at the drain mast, the loose end of the drain line should be tied as follows:

NOTE: Make sure the loose end of the drain line does not touch the closed thrust reverser cowl.

a) The loose end of the drain line must be tied to the nearest rigid line or bracket on the engine with lacing tape, G51382 or equivalent tape.

b) Tie the drain line in original bend direction to avoid stress on the line.

3) Plug all above AGB drain lines with plug fitting, STD-6668 and nozzle pressure cap, STD-13732.

4) Operate the engine and monitor engine oil consumption.

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5) If oil consumption reduces, isolate the drain line and do an inspection of each for collection of oil and disposition according to the corrective actions (Refer to Drain Mast - Leakage Limits and the Corrective Action and Drain Mast Chart/Figure 604).

NOTE: A leaking mating ring can show accumulated oil. It is possible that a leaking carbon seal does not because of delta pressure changes.

6) If no accumulated oil is found but a decrease in oil consumption was identified, isolate the leak in the drain line by removing one cap at a time and continue in operation.

CAUTION

DO NOT LET THE TAPE MATERIAL FALL INSIDE THE DRAIN LINE. BLOCKAGE OF THE DRAIN LINE CAN OCCUR.

7) After you connect the drain line, fully remove the lacing tape, G51382 from drain line.

J. Drain Mast - Leakage Limits and the Corrective Action

NOTE: You can use a smell check to identify and separate the oil or fuel.

SUBTASK 71-71-00-790-027-H00

(1) Examine the variable stator vane / variable bleed valve (VSV/VBV) actuator drain for fuel leakage.

(a) Leak limits:

1) Leakage less than or equal to 125 cc/hr (50 drop/min) is permitted.

2) Leakage less than or equal to 375 cc/hr (150 drop/min) can be corrected in 5 or less flight cycles.

3) Leakage more than 375 cc/hr (150 drop/min) must be corrected.

(b) Corrective action:

1) Look for a loose or damaged VSV actuator tube B-nut.

a) If the VSV actuator tube B-nut is loose, tighten the tube B-nut (TASK 70-51-00-910-801-H01).

b) If the VSV actuator tube is damaged, replace the VSV actuator tube.

2) Look for a loose or damaged VBV actuator tube B-nut.

a) If the VBV actuator tube B-nut is loose, tighten the tube B-nut (TASK 70-51-00-910-801-H01).

b) If the VBV actuator tube is damaged, replace the VBV actuator tube.

3) Replace the applicable VSV actuator if the tube B-nut is not loose or damaged:

a) Replace the left VSV actuator (TASK 75-31-02-000-802-H01 and TASK 75-31-02-400-802-H01).

b) Replace the right VSV actuator (TASK 75-31-02-000-803-H01 and TASK 75-31-02-400-803-H01).

4) Carry out the Standard Wet Motor Leak Check (TASK 71-00-00-700-803-H01) and check for sign of fuel leakage from VSV/VBV drain line.

5) If the leak continues, replace the applicable VBV actuator:

a) Replace the left VBV actuator (TASK 75-32-01-000-801-H01 and TASK 75-32-01-400-801-H01).

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b) Replace the right VBV actuator (TASK 75-32-02-000-801-H01 and TASK 75-32-02-400-801-H01).

SUBTASK 71-71-00-790-028-H00

(2) Examine the high pressure turbine active clearance control (HPTACC) valve drain for fuel leakage.

(a) Leak limits:

1) Leakage less than or equal to 75 cc/hr (30 drop/min) is permitted.

2) Leakage less than or equal to 250 cc/hr (100 drop/min) can be corrected in 5 or less flight cycles.

3) Leakage more than 250 cc/hr (100 drop/min) must be corrected.

(b) Corrective action:

1) Look for a loose or damaged HPTACC valve tube B-nut.

a) If the HPTACC valve tube B-nut is loose, tighten the tube B-nut (TASK 70-51-00-910-801-H01).

b) If the HPTACC valve tube is damaged, replace the HPTACC valve tube.

2) Replace the HPTACC valve if the tube B-nut is not loose or damaged (TASK 75-24-04-000-801-H01 and TASK 75-24-04-400-801-H01).

SUBTASK 71-71-00-790-029-H00

(3) Examine the main fuel pump (MFP) accessory gearbox drive pad drain for fuel leakage.

(a) Leak limits:

1) Leakage less than or equal to 250 cc/hr (100 drop/min) is permitted.

2) Leakage less than or equal to 500 cc/hr (200 drop/min) can be corrected in 5 or less flight cycles.

3) Leakage more than 500 cc/hr (200 drop/min) must be corrected.

(b) Corrective action:

1) Replace the MFP (TASK 73-11-01-000-801-H01 and TASK 73-11-01-400-801-H01).

SUBTASK 71-71-00-790-030-H00

(4) Examine the main fuel pump (MFP) accessory gearbox drive pad drain for oil leakage.

(a) Permitted leakage:

1) 7 cc/hr (2 drops/minute).

(b) Corrective action:

1) Replace the MFP accessory gearbox drive pad seal and mating ring (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

SUBTASK 71-71-00-790-031-H00

(5) Examine the Hydromechanical (HMU) accessory gearbox drive pad drain for fuel leakage.

(a) Leak limits:

1) Leakage less than or equal to 250 cc/hr (100 drop/min) is permitted.

2) Leakage less than or equal to 500 cc/hr (200 drop/min) can be corrected in 5 or less flight cycles.

3) Leakage more than 500 cc/hr (200 drop/min) must be corrected.

(b) Corrective action:

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1) Replace the HMU (TASK 73-21-14-000-801-H01 and TASK 73-21-14-400-801-H01).

SUBTASK 71-71-00-790-032-H00

(6) Examine the Hydromechanical (HMU) accessory gearbox drive pad drain for oil leakage.

(a) Permitted leakage:

1) 7 cc/hr (2 drops/minute).

(b) Corrective action:

1) Replace the HMU accessory gearbox drive pad seal and mating ring (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

SUBTASK 71-71-00-790-033-H00

(7) Examine the backup generator seal and accessory gearbox seal pad drain for oil leakage.

(a) Permitted oil leakage from backup generator seal:

1) 2 cc/hr (0.6 drops/minute).

(b) Permitted oil leakage from accessory gearbox seal:

1) 7 cc/hr (2 drops/minute).

(c) Corrective action:

1) Do the pressure check on the backup generator (TASK 24-25-00-700-802).

a) If the leakage increases, replace the backup generator (TASK 24-25-01-000-804-001 and TASK 24-25-01-400-804-001).

2) If the leakage did not increase, replace the backup generator accessory gearbox drive pad seal and mating ring if the leakage is more than the permitted limit (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

ARO ALL POST SB 777-GE100-72-0694

3) Replace the backup generator carbon seal and mating ring after operation with the drain line capped (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

NOTE: You can do a borescope inspection of the BUG AGB drain line to find service bulletin compliance. If you examine the color of the BUG carbon seal, this will prevent removal of the backup generator.

- If the carbon seal is black or purple, it is post GE90-100 SB72-0694.
- If the carbon seal is yellow or gold, it is pre GE90-100 SB72-0694.

ARO ALL

SUBTASK 71-71-00-790-037-H00

(8) Examine the integrated drive generator (IDG) drive pad and accessory gearbox seal pad drain for oil leakage.

(a) Permitted oil leakage from IDG seal:

1) 2 cc/hr (0.6 drops/minute).

(b) Permitted oil leakage from accessory gearbox seal:

1) 15 cc/hr (5 drops/minute).

(c) Corrective action:

1) Do the pressure check on the IDG (IDG Oil System Static Leak Check, TASK 24-11-00-700-803).

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a) If the leakage increases, replace the IDG (IDG Removal, TASK 24-11-01-000-801-001 and IDG Installation, TASK 24-11-01-400-801-001).

b) If you find fuel leakage on the IDG system, replace the IDG fuel/oil heat exchanger (TASK 24-11-06-000-801 and TASK 24-11-06-400-801).

c) Flush the IDG system with oil.

2) If the leakage did not increase, replace the IDG accessory gearbox drive pad seal and seal ring if the leakage is more than the permitted limit (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

ARO ALL POST SB 777-GE100-72-0741

3) Replace the IDG carbon seal and mating ring after operation with the drain line capped (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

NOTE: You can do a borescope inspection of the IDG AGB drain line to find service bulletin compliance. If you examine the color of the IDG carbon seal, this will prevent removal of the backup generator.

- If the carbon seal is black or purple, it is post GE90-100 SB72-0741.
- If the carbon seal is yellow or gold, it is pre GE90-100 SB72-0741.

ARO ALL

SUBTASK 71-71-00-790-034-H00

(9) Examine the engine driven pump (EDP) accessory gearbox drive pad drain for oil leakage.

(a) Permitted leakage:

1) 7 cc/hr (2 drops/minute).

(b) Corrective action:

1) Replace the EDP accessory gearbox drive pad seal and mating ring (TASK 72-64-01-020-801-H01 and TASK 72-64-01-420-801-H01).

SUBTASK 71-71-00-790-035-H00

(10) Examine the engine driven pump (EDP) seal drain for hydraulic fluid leakage.

(a) Permitted leakage:

1) 5 cc/hr (2 drops/minute).

(b) Corrective action:

1) Replace the engine driven pump (EDP) (TASK 29-11-05-000-801-002 and TASK 29-11-05-400-801-002).

——— END OF TASK ———

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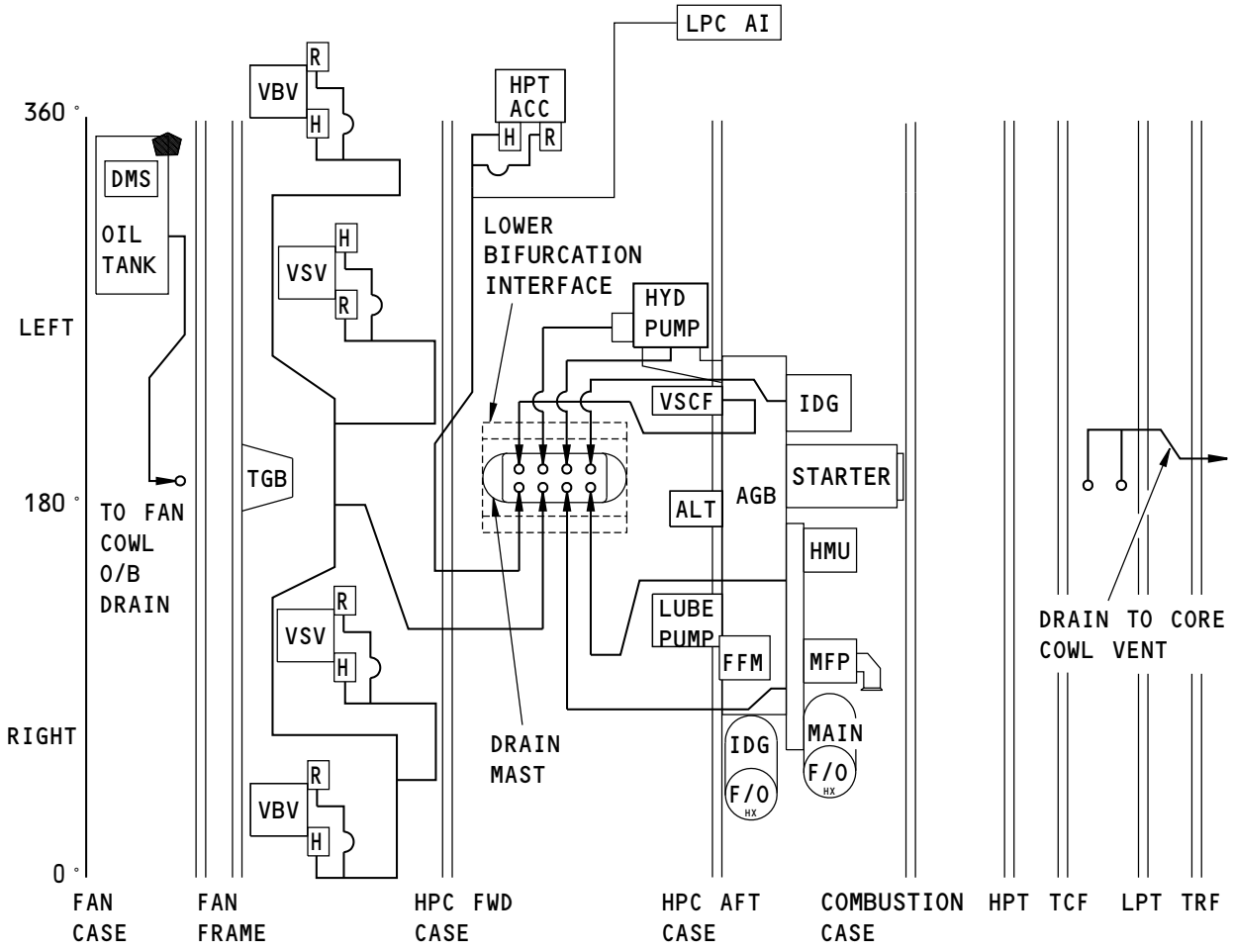

1228884-00-A
M06730 S0004285763_V3

Engine Vents and Drains Schematic
Figure 601/71-71-00-990-801-H01

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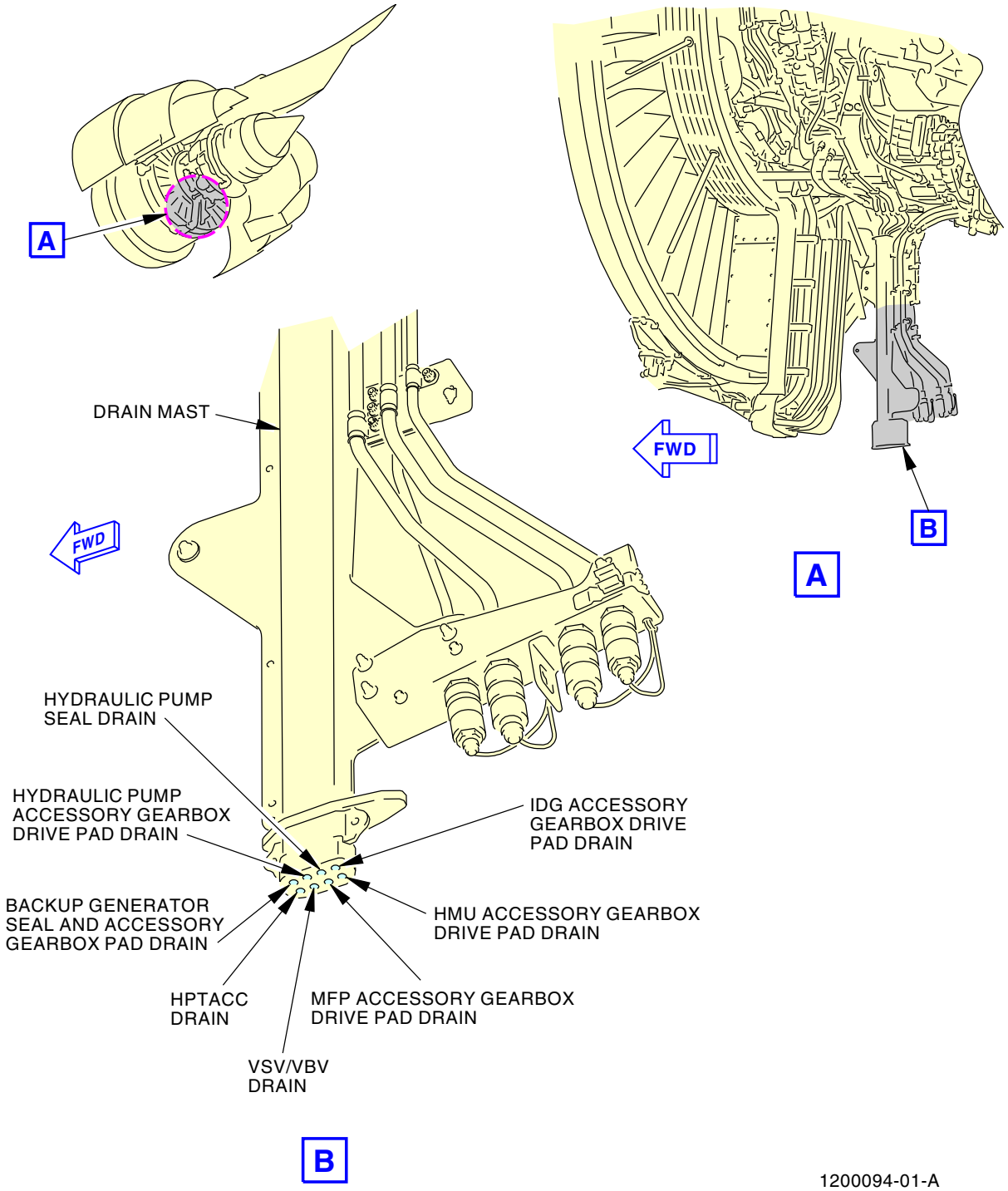

1200094-01-A

M06731 S0004285764_V5

Engine Vents and Drains Inspection
Figure 602/71-71-00-990-802-H01

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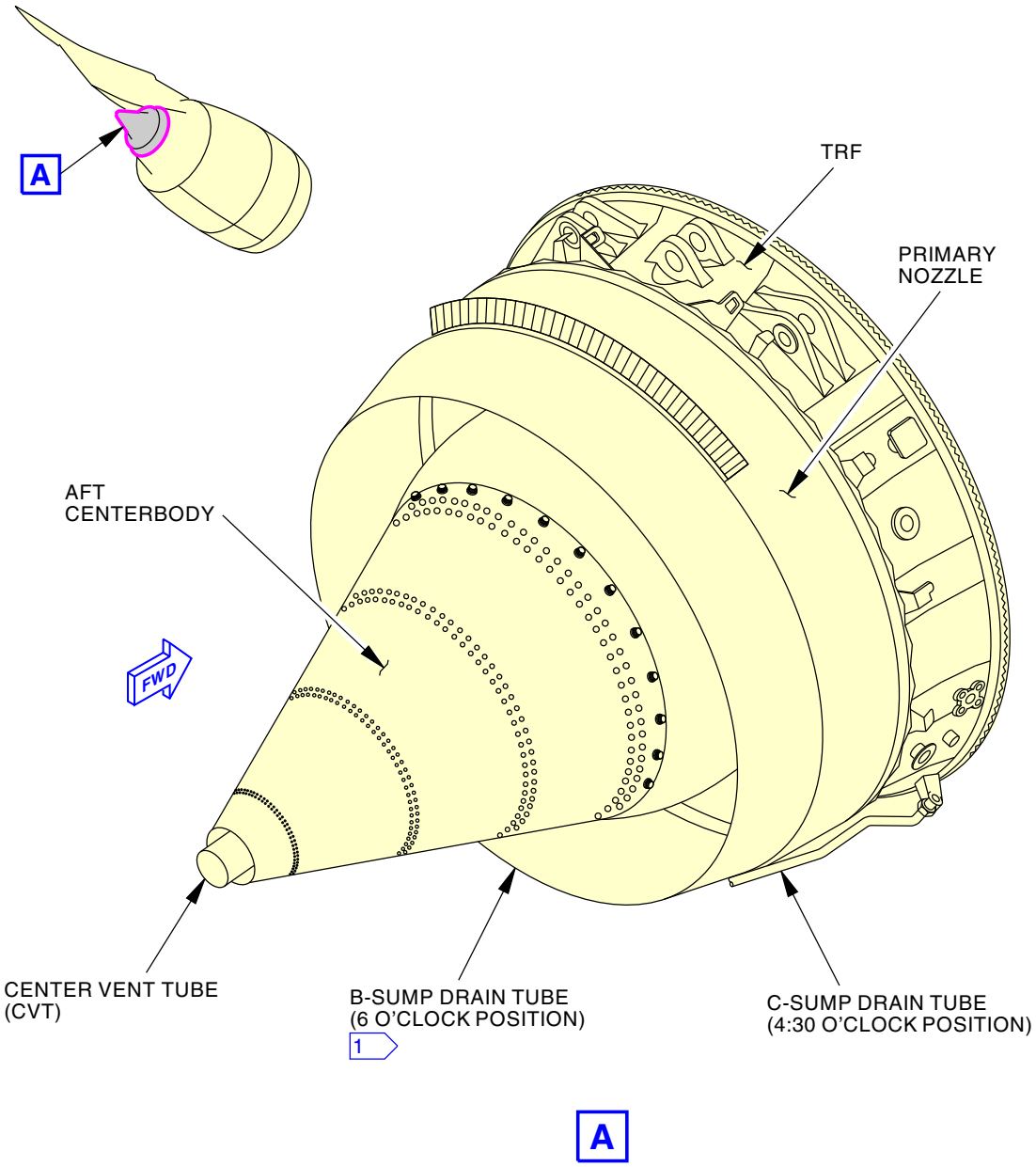

1 NOT SHOWN IN THIS FIGURE - IT IS UNDERNEATH PRIMARY NOZZLE.

5021904-00
2438481 S0000565362_V2

Center Vent Tube (CVT), B-Sump and C-Sump Drain Location
Figure 603/71-71-00-990-803-H00

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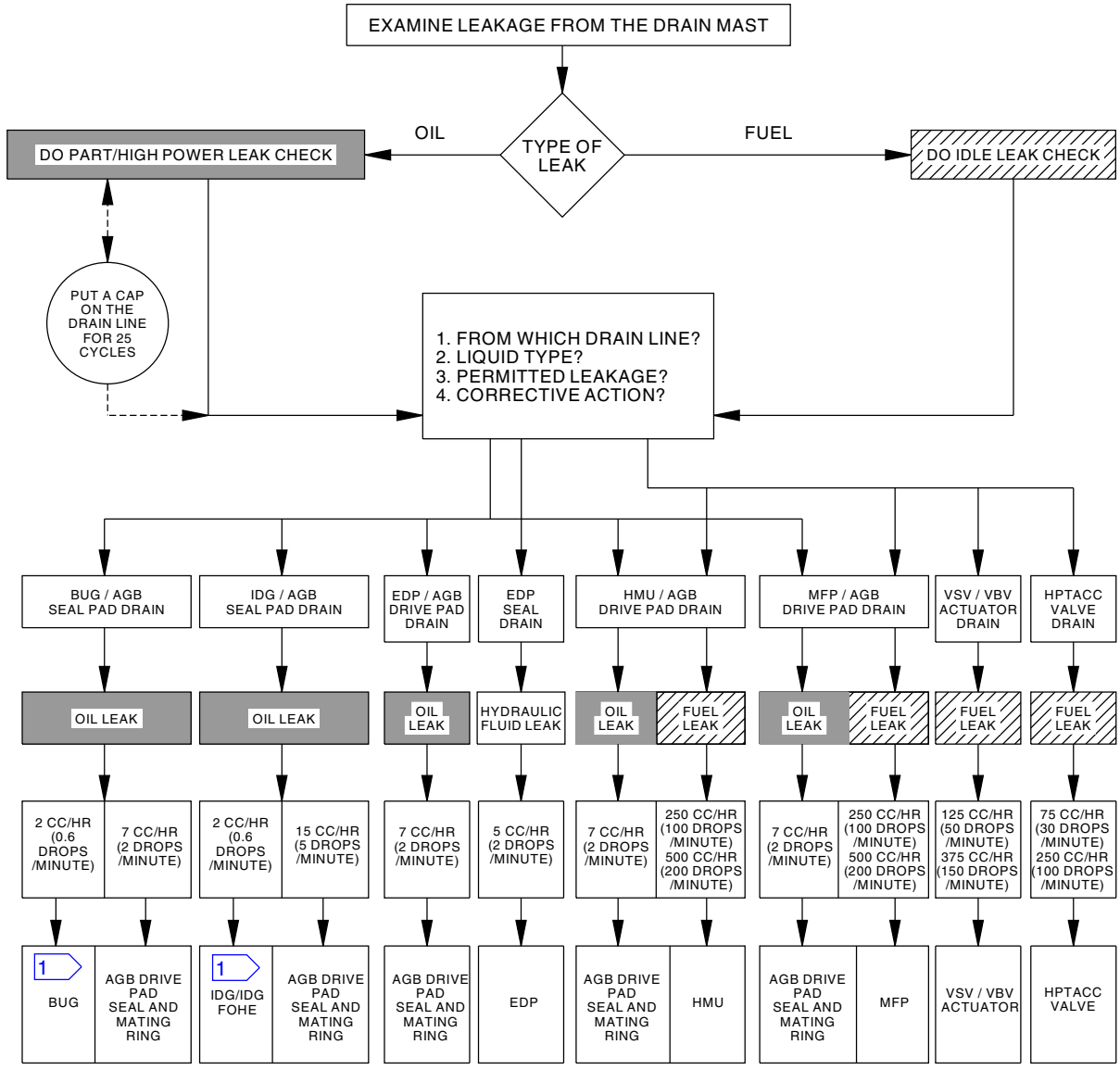

LEGEND:

OIL

FUEL

1 IF THE LEAKAGE INCREASES DURING PRESSURE CHECK

5021905-00

2438313 S0000565363_V4

Drain Mast Chart
Figure 604/71-71-00-990-804-H00

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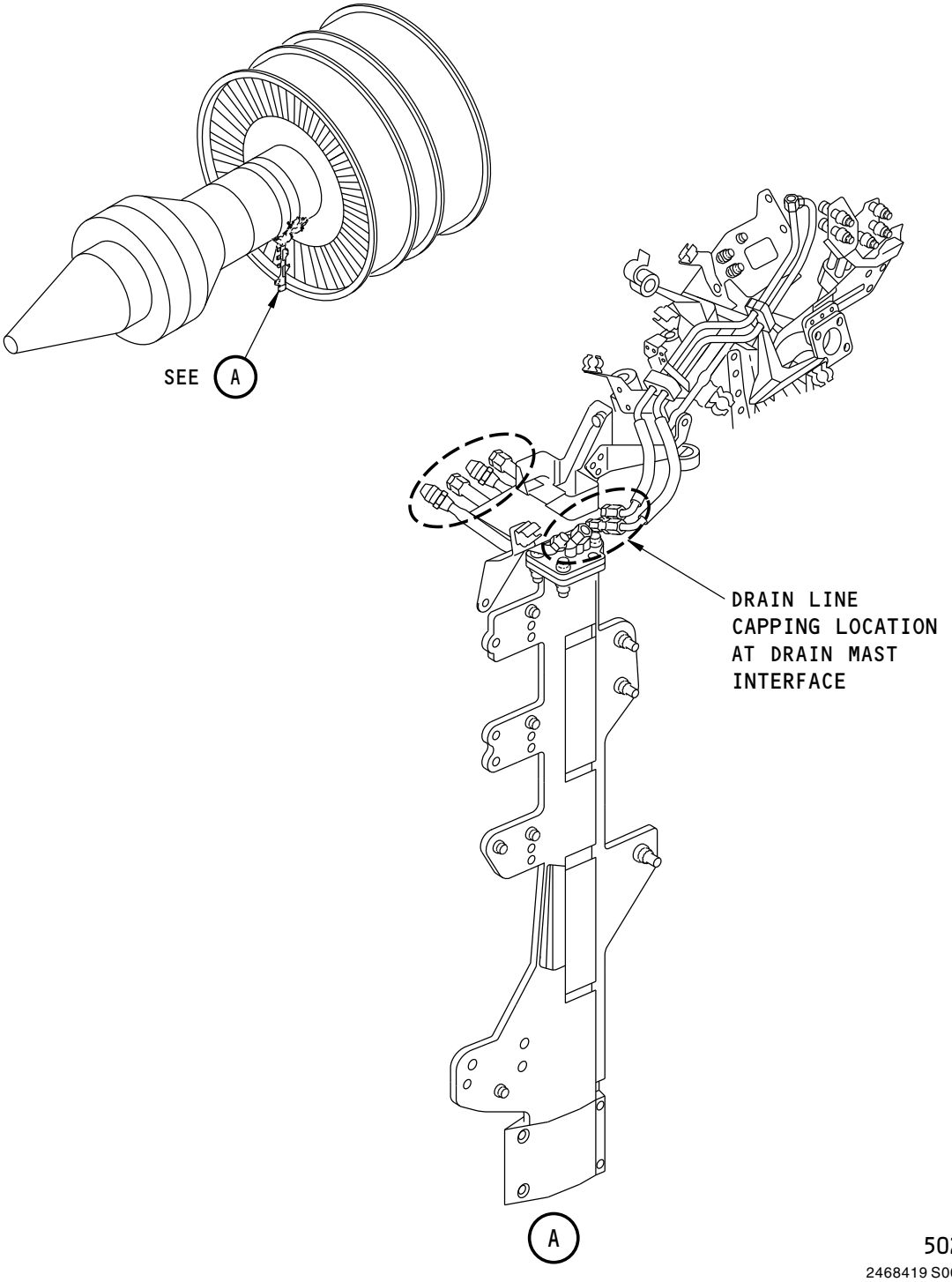

Drain Line Capping Location at Drain Mast Interface
Figure 605/71-71-00-990-805-H00

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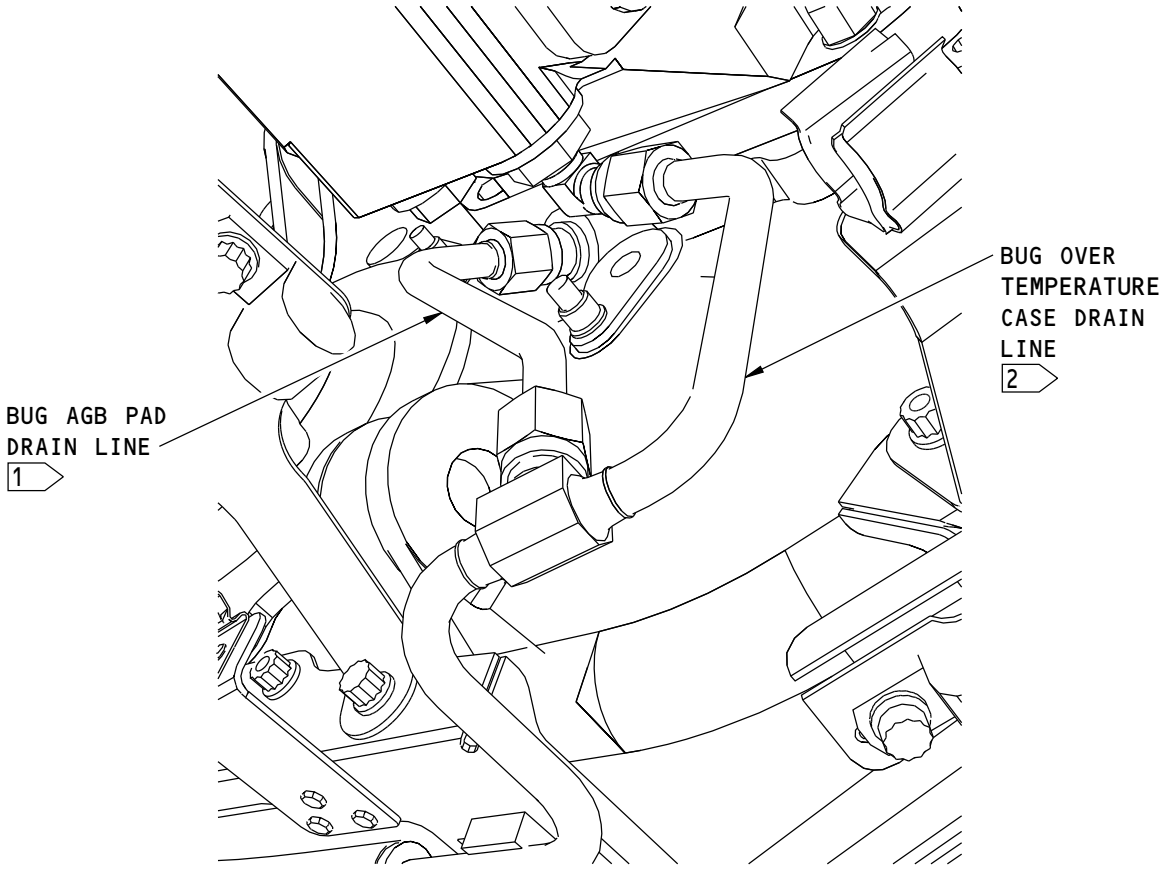

1 CAP THE BUG AGB PAD DRAIN LINE AT EITHER ONE OR THE LOCATIONS.

2 DO NOT CAP THE BUG OVER TEMPERATURE CASE DRAIN LINE.

5027962-00
2483078 S0000583638_V1

BUG AGB pad Drain Line Capping & Plugging
Figure 606/71-71-00-990-806-H00

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ENGINE ACCESSORY DRAIN TUBES - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) An inspection of the engine accessory drain tubes that are attached to the drain mast.

TASK 71-71-01-200-801-H01

2. Engine Accessory Drain Tubes Inspection

A. General

(1) Examine the engine accessory drain tubes for damage.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Slat - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Slat Reactivation (P/B 201)
27-81-00-860-805	Retract the Leading Edge Slats (P/B 201)
71-11-04-010-814-H00	Open the Fan Cowl Panel (Selection) (P/B 201)
71-11-04-410-814-H00	Close the Fan Cowl Panel (Selection) (P/B 201)
78-31-00-010-816-H00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-806-H00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-410-816-H00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-805-H00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Location Zones

Zone	Area
411	Engine, Left
421	Engine, Right

D. Access Panels

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

E. Engine Accessory Drain Tubes Inspection

SUBTASK 71-71-01-010-001-H01

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

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

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(a) Do this task: Retract the Leading Edge Slats, TASK 27-81-00-860-805.

(b) Do this task: Leading Edge Slat - Deactivation, TASK 27-81-00-040-801.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-806-H00.

(d) For the left and right fan cowl panels, do this task:

Open the Fan Cowl Panel (Selection), TASK 71-11-04-010-814-H00

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(e) For the left and right thrust reversers, do this task:

Open the Thrust Reverser (Selection), TASK 78-31-00-010-816-H00

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

SUBTASK 71-71-01-220-001-H01

(2) Examine the engine accessory drain tubes for damage:

(a) Coating

1) There is no limit to the amount of missing coating if the metal braid is not damaged.

SUBTASK 71-71-01-220-002-H01

(3) Do a visual check of the hose assembly fire sleeve for damage:

(a) Missing rubber material is permitted with this condition:

1) The missing rubber is less than 0.15 sq-in (96.7 sq-mm) and the parent braid does not show through.

(b) Cracks are not permitted.

SUBTASK 71-71-01-410-001-H01

WARNING DO ALL OF THE SPECIFIED TASKS IN THE CORRECT SEQUENCE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-410-816-H00.

1) Close these access panels:

Number	Name/Location
415AL	Left Thrust Reverser, Left Engine
416AR	Right Thrust Reverser, Left Engine
425AL	Left Thrust Reverser, Right Engine
426AR	Right Thrust Reverser, Right Engine

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(b) Do this task: Close the Fan Cowl Panel (Selection), TASK 71-11-04-410-814-H00.

1) Close these access panels:

Number	Name/Location
413AL	Left Fan Cowl Panel, Left Engine
414AR	Right Fan Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
424AR	Right Fan Cowl Panel, Right Engine

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-805-H00.

(d) Do this task: Leading Edge Slat Reactivation, TASK 27-81-00-440-801.

——— END OF TASK ———

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