B757 MANUAL SUPPLEMENT - ATP 3510
SECTION 1 CHAPTER 71
CONTROL PAGE - ISSUE 9

A. File the attached Temporary Revision/Alerts in the Manual Supplement in ATA Chapter/Section/Subject/Page sequence

B. File this Control Page in front of the Chapter TRs/Alerts.

C. The following list shows active TRs/Alerts together with TRs/Alerts added by this control page.

Chapter Section Subject	Page		TR/Alert No.
71-00-02	453	Alert	71-682
71-00-02	454		71-670
71-00-02	479	Alert	71-683
71-00-02	480		71-671
71-00-02	480H		71-686
71-00-03	201	* Boe	71-1002
71-11-01	604		71-653

D. Remove and Destroy the following TRs/Alerts:

* Indicates TRs/Alerts issued with this control page

MAINTENANCE MANUAL

TEMPORARY REVISION No. 71-670

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 71-00-02 Page 454

REASON FOR REVISION

To correct the run down torque figure.

ACTION

TASK 71-00-02-404-003-R00
4. Power Plant Installation - Bootstrap Method

D. Prepare to Install the Power Plant

Ignore existing steps (7) and (8) and read the following

(7) Make a check of the self-locking torque of the barrel nuts on the forward engine mount as follows:
(a) Make sure that the torque is not less than 70 pound-inches.
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

(8) Do a check of the self-locking torque of the barrel nuts on the aft engine mount as follows:
(a) Do a check that the specified torque is not less than 50 pound-inches.
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

TEMPORARY REVISION No. 71-671

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 71-00-02 Page 480

REASON FOR REVISION

To correct the run down torque figure.

ACTION

TASK 71-00-02-404-004-R00
6. Power Plant Installation - Single Point Sling Method

D. Prepare for the Installation of the Power Plant

Ignore existing steps (4) and (5) and read the following

(4) Make a check of the self-locking torque of the barrel nuts on the forward engine mount as follows:
(a) Make sure that the torque is not less than 70 pound-inches.
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

(5) Do a check of the self-locking torque of the barrel nuts on the aft engine mount as follows:
(a) Do a check that the specified torque is not less than 50 pound-inches.
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

757 MAINTENANCE MANUAL

ALERT No. 71-682

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 71-00-02 Page 453

REASON FOR REVISION

Rolls Royce Mandatory Non Modification SB RB211-72-C930 highlights a possible misalignment condition being introduced with the radial drive shaft and/or bearing being replaced, which may result in the bearing cage lapping against the bearing inner race and loss of drive. Also SB RB211-72-D176 places restrictions on radial drive steady bearings.
In order to control the mandatory requirement at engine installation Powerplant Engineering require confirmation that no aircraft will be fitted with two engines applicable to these SB's.

ACTION

TASK 71-00-02-404-003-R00
4. Power Plant Installation - Bootstrap Method

D. Prepare to Install the Power Plant

Do the following MANDATORY requirement

Prior to engine installation ensure the aircraft complies with all current mandatory requirements as laid out in SB RB211-72-C930 and SB RB211-72-D176 by contacting Powerplant Engineering directly or Maintrol. You can contact Maintrol on (00) 44 20 513 0886.

757 MAINTENANCE MANUAL

ALERT No. 71-683

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 71-00-02 Page 479

REASON FOR REVISION

Rolls Royce Mandatory Non Modification SB RB211-72-C930 highlights a possible misalignment condition being introduced with the radial drive shaft and/or bearing being replaced, which may result in the bearing cage lapping against the bearing inner race and loss of drive. Also SB RB211-72-D176 places restrictions on radial drive steady bearings.
In order to control the mandatory requirement at engine installation Powerplant Engineering require confirmation that no aircraft will be fitted with two engines applicable to these SB's.

ACTION

TASK 71-00-02-404-004-R00
6. Power Plant Installation - Single Point Sling Method

D. Prepare to Install the Power Plant

Do the following MANDATORY requirement

Prior to engine installation ensure the aircraft complies with all current mandatory requirements as laid out in SB RB211-72-C930 and SB RB211-72-D176 by contacting Powerplant Engineering directly or Maintrol. You can contact Maintrol on (00) 44 20 513 0886.

757 MAINTENANCE MANUAL

TEMPORARY REVISION No. 71-686

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 71-00-02 Page 480H

REASON FOR REVISION

To include/clarify the installation of the EDP supply hose.

ACTION

TASK 71-00-02-844-119-R00
7. Put the Airplane Back To Its Usual Condition

E. Put the Airplane Back To Its Usual Condition

Ignore existing step (10) and read the following

(10) Do these steps to connect the hydraulic lines (Fig. 406).
(a) Remove the caps from the inlet hose for the hydraulic supply and the mating connector.
(b) Fill the hydraulic supply line for the engine with hydraulic fluid and connect the supply inlet hose.

NOTE: Some fluid leakage can occur when the caps are removed.

(c) RB211-535E4 ENGINES
1) Loosen the hydraulic supply hose saddle clamp and pull the hose towards the strut to reduce slack in the hose.

NOTE: A minimum clearance of 0.50 inches between the supply hose and the fan cowl forward hinge cover is required.

(d) Remove the caps from the case drain hose of the hydraulic pump and its mating connector and connect the line.
(e) Remove the caps from the outlet hose for the hydraulic pressure and its mating connector and connect the line.

Ignore existing step (26) and read the following

(26) Install the fan cowl panels (AMM 71-11-04/401).
(a) RB211-535E4 ENGINES - right hand fan cowl panel only
Check there is a clearance of at least 0.50 inches between the EDP hydraulic supply hose and the RH fan cowl panel forward hinge cover when the cowl is closed.

NOTE: Temporarily affix plasticine to the RH fan cowl panel forward hinge cover and close the fan cowl to check the clearance.

Originator: I.HODGES
Reference: 6352
Workbook: GL 71-1

POWER PLANT - MAINTENANCE PRACTICES
(CLEANING, PRESERVATION AND DEPRESERVATION)

TEMPORARY REVISION 71-1002

FILING INSTRUCTIONS

This temporary revision applies only to the AMM document D633N132. For the printed manual, file this temporary revision adjacent to the page(s) affected.

For the microfilm manual, file this temporary revision in sequence by ATA number. Mark the microfilm cartridge to indicate that it has been changed by temporary revision(s).

This temporary revision will be incorporated in the revision dated Jan 28/02.

Revision reason: Added new cleaning procedures to apply after the usage of aircraft/ground fire extinguishers.

This temporary revision furnishes an advance copy of the enclosed page(s) which supersede any previously issued page(s). The information thereon is to be used until this revision is either incorporated or rescinded.

At the end of this TR there is a TR Status Report for document D633N132.

REVISED LIST OF EFFECTIVE PAGES FOR THIS DOCUMENT

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
* 201	NOV 05/01	R01.1	* 222	NOV 05/01	R01.101			
* 202	MAY 28/01	R01	* 223	NOV 05/01	R01.101			
* 203	MAY 28/01	R01	* 224	NOV 05/01	R01.101			
* 204	NOV 05/01	R01.1	* 225	NOV 05/01	R01.101			
* 205	NOV 05/01	R01.1	* 226	NOV 05/01	R01.101			
* 206	NOV 05/01	R01.1	* 227	NOV 05/01	R01.101			
* 207	NOV 05/01	R01.1	* 228	NOV 05/01	R01.101			
* 208	NOV 05/01	R01.1	* 229	NOV 05/01	R01.101			
* 209	NOV 05/01	R01.101	* 230	NOV 05/01	R01.101			
* 210	NOV 05/01	R01.101	* 231	NOV 05/01	R01.101			
* 211	NOV 05/01	R01.101	* 232	NOV 05/01	R01.101			
* 212	NOV 05/01	R01.101	* 233	NOV 05/01	R01.101			
* 213	NOV 05/01	R01.101	* 234	NOV 05/01	R01.101			
* 214	NOV 05/01	R01.101	* 235	NOV 05/01	R01.101			
* 215	NOV 05/01	R01.101	* 236	NOV 05/01	R01.101			
* 216	NOV 05/01	R01.101						
* 217	NOV 05/01	R01.101						
* 218	NOV 05/01	R01.101						
* 219	NOV 05/01	R01.101						
* 220	NOV 05/01	R01.101						
* 221	NOV 05/01	R01.101						

* INDICATES PAGE INCLUDED IN THIS TEMPORARY REVISION.

POWER PLANT - MAINTENANCE PRACTICES (CLEANING, PRESERVATION AND DEPRESERVATION)

1. General
   A. This procedure has six tasks. The first task cleans the engine. The second task is for the engine component protection. The third task preserves the engine. The fourth task depreserves the engine. The fifth task examines and repairs the MVP bag. The sixth task inhibits the engine fuel system.
   B. Engines, Q.E.C. units, and propulsion systems which are to be put in storage or removed from wing must have protection from unwanted materials and the air. Before they are put in storage, they must be cleaned externally, all the corrosion must be removed, and the exposed metal must have protection. For long-term storage, you must do the inhibition process to the fuel system.
   C. All openings in the engine must be sealed from unwanted materials. You must do the inhibition process to the engine to prevent corrosion, and put vapour phase inhibitor (V.P.I.) paper in the air intake and exhaust. The unit is then put in a moisture vapour proof (M.V.P.) bag with the correct amount of desiccant.
   D. The protective treatment can be different for depending whether the units are installed or non-installed, and the climatic conditions under which they are stored. The minimum storage requirements are given in Fig. 201. It is recommended that the engines and Q.E.C. units are put in a M.V.P. bag whenever possible, even when the storage time is less than 6 months.

TASK 71-00-03-102-001-R00

2. Clean the Engine, Q.E.C. Unit, or the Propulsion System
   A. Consumable Materials
      (1) White spirit
          British Spec - B.S.245
          OMat No. - 103
      (2) Stoddard solvent
          American Spec - A.S.T.M. D484-52
          OMat No. - 1/5
      (3) Engine cleaning solution
          British Spec - MC58
          OMat No. - 176

	CONDITION	ANTICIPATED PERIOD	PRESERVE MAIN LINE BEARINGS	FIT COVERS AND BLANKS	INSERT VPI/CHC PAPER	INHIBIT FUEL SYSTEM	INSTALL DESICCANT	PACK IN MVP BAG (POWER PLANT MUST BE REMOVED)
OUTSIDE	ARID (FOR EXAMPLE, DESERT CLIMATE)	UP TO 30 DAYS	*	*				
		31 DAYS TO 3 MONTHS	*	*		+		
		OVER 3 MONTHS	*	*		*		
	NON-ARID CLIMATE	UP TO 30 DAYS	*	*	*		*	
		31 DAYS TO 3 MONTHS	*	*	*	+	*	
		OVER 3 MONTHS	*	*	*	*	*	*
INSIDE	CONSTANT TEMPERATURE AND HUMIDITY (AIR CONDITIONED ENVIRONMENT)	UP TO 30 DAYS	*					
		31 DAYS TO 3 MONTHS	*			*		
		OVER 3 MONTHS	*			*		
	NON-AIR CONDITIONED ENVIRONMENT	UP TO 30 DAYS	*	*	*		*	
		31 DAYS TO 3 MONTHS	*	*	*	*	*	
		OVER 3 MONTHS	*	*	*	*	*	*

INSTALLED POWER PLANT OR NON-INSTALLED ENGINES OR Q.E.C. UNITS

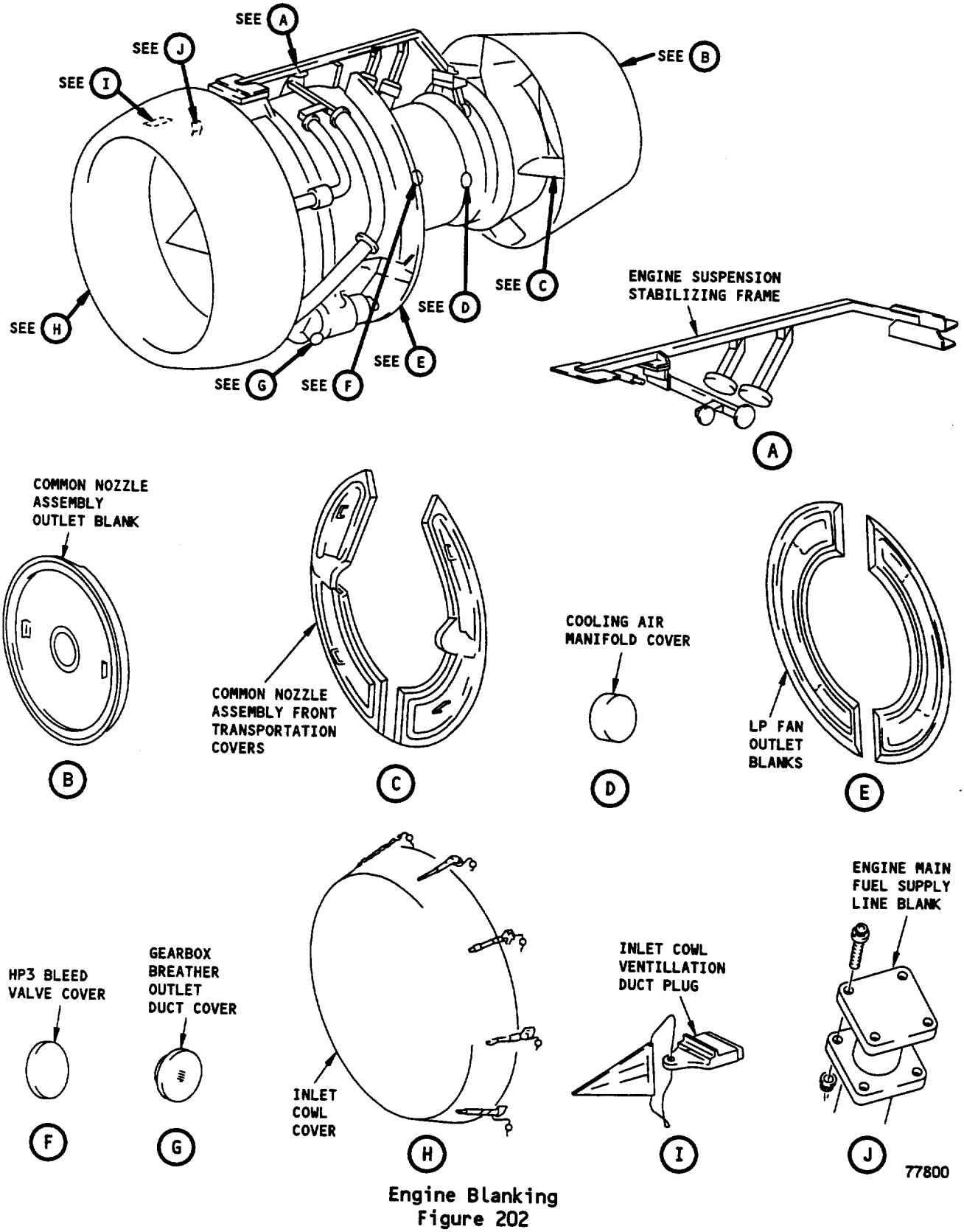
+ AS AN ALTERNATIVE TO INHIBITING THE FUEL SYSTEM THE ENGINE MAY BE GROUND RUN FOR 5 MINUTES AT IDLE EVERY 31 DAYS (AMM 71-00-00/201).

NOTE: 1. REFER TO VENDOR COMPONENT MAINTENANCE MANUALS FOR UNIT STORAGE LIE

2. PRESERVATION OF THE ENGINE MAINLINE BEARINGA AND GEARBOX SHOULD BE DONE FOR ALL PERIODS OF STORAGE OR BEFORE THE ENGINE IS REMOVED.

C8383

Storage Requirements
Figure 201



Engine Blanking
Figure 202

196175

B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

C. Clean the Engine, Q.E.C. Unit or Propulsion System Before You Do the Preservation Procedure. (AMM 72-30-00/701)

S 112-002-R00
(1) Clean the engine, the Q.E.C. unit or the propulsion system externally with the cleaning solution.
(a) Make sure the cleaning solution does not accumulate in the engine air inlet or in the openings.

S 212-003-R00
(2) Examine all the painted parts for chipped enamel and corrosion.
(a) If you find corrosion, remove and paint the component.
1) Refer to the task: "Engine Component Protection".

TASK 71-00-03-112-056-R00

3. Clean the Power Plant after the Engine Fire Extinguisher(s) Were Used

A. General
(1) This task gives the steps to clean the power plant after the engine fire extinguisher(s) were used. This task has these steps.
(a) Clean the power plant.
(b) Replace the engine fire extinguisher bottle(s) and discharge cartridge squib(s).
(c) Do a visual inspection of the engine extinguisher feed tubes and the discharge nozzle outlets.

B. Equipment
(1) Gloves - Rubber protective
(2) Shields - Eye
(3) Cloth - Clean, dry, with no lint

C. References
(1) AMM 26-21-01/401, Engine Fire Extinguisher Bottle
(2) AMM 26-21-04/401, Engine Fire Extinguisher Discharge Cartridge (Squib)

(3) AMM 71-11-04/201, Engine Fan Cowl Panel

D. Access

(1) Location Zones

410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panel

413AL Left Engine Fan Cowl Panel (LH)
413AR Left Engine Fan Cowl Panel (RH)
423AL Right Engine Fan Cowl Panel (LH)
423AR Right Engine Fan Cowl Panel (RH)

E. Procedure

S 112-057-R00

WARNING: DO NOT BREATHE THE GAS FROM THE FIRE EXTINGUISHER AGENT, AND DO NOT LET THE AGENT TOUCH YOUR SKIN. HAVE A GOOD FLOW OF AIR AT THE POSITION WHERE THE AGENT WAS USED. BE CAREFUL WHEN YOU OPEN THE HINGED COWLS. THE AGENT IS DANGEROUS AFTER YOU USE IT.

(1) Clean the power plant.

NOTE: The agent can collect in the inner surface of the fan cowls.

(a) Use the protective rubber gloves and the eye shields to keep the agent off the hands and out of the eyes.
(b) Open the left and right fan cowl panels to drain the small pockets of fluid (AMM 71-11-04/201).
(c) For a minimum of 30 minutes, let the agent become gas, remove the fluid with a clean dry cloth with no lint.
(d) If the ambient temperature is too low for the agent to become gas, remove the fluid with a clean dry cloth with no lint.
(e) Discard the cloth after use.

S 422-058-R00

(2) Replace the engine fire extinguisher bottle(s) and discharge cartridges (squib(s)) (AMM 26-21-01/401 and AMM 26-21-04/401).

S 212-059-R00

(3) Do a visual inspection of the feed tubes for the engine fire extinguisher(s) and discharge nozzle outlets.
(a) Make the necessary repairs.

TASK 71-00-03-112-060-R00

4. Clean the Power Plant after the Ground Fire Extinguisher(s) Were Used

A. General

(1) This task is to clean the power plant after you use the ground fire extinguisher(s) that follow:
(a) The carbon dioxide type of fire extinguisher

(b) The dry power type of fire extinguisher

NOTE: This includes the inspection of the fixed inlet guide vanes and the L.P. turbine third-stage rotor blades.

(c) The vaporized chemical type of fire extinguisher
(d) The foam type of fire extinguisher

B. Equipment
(1) Gloves - Rubber protective
(2) Shields - Eye
(3) Cloth - Clean, dry, with no lint

C. References
(1) AMM 26-21-01/401, Engine Fire Extinguisher Bottle
(2) AMM 26-21-04/401, Engine Fire Extinguisher Discharge Cartridge (Squib)
(3) AMM 71-11-04/201, Engine Fan Cowl Panel

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panel
413AL Left Engine Fan Cowl Panel (LH)
413AR Left Engine Fan Cowl Panel (RH)
423AL Right Engine Fan Cowl Panel (LH)
423AR Right Engine Fan Cowl Panel (RH)

E. Procedure

S 112-061-R00
(1) Clean the power plant after you use the carbon dioxide type of fire extinguisher.
(a) It is not necessary to clean the engine after you use the carbon dioxide type of fire extinguisher.
(b) Carbon dioxide gas cannot cause a chemical reaction or corrosion.
(c) The gas will not cause damage to the engine and will go away into the air.

S 112-062-R00

(2) Clean the power plant after you use the dry powder type of fire extinguisher.

NOTE: When you use a dry powder type of fire extinguisher, the powder can go into the gas generator. If the powder goes into the gas generator, the items that follow can occur:

The dry powder can become a glass type material on the high temperature components. This can cause a turbine to not be balanced.

The dry powder can mix with the engine oil to become sludge.

(a) Do an inspection of these items:
1) Do a visual inspection of the inlet guide vanes for particles of dry powder.
a) If you find particles of dry powder, remove the engine (AMM 71-00-02/401).
2) Do a visual inspection of the L.P. Turbine third-stage rotor blades and the exhaust mixer duct for a glass type material.
3) If you find a glass type material on these components, remove the engine (AMM 71-00-02/401).
4) If you find no powder went into the gas generator, do the subsequent step.

(b) Remove all the dry powder from the power plant external surfaces with a suction cleaner.

S 112-063-R00

WARNING: DO NOT BREATHE THE GAS FROM THE FIRE EXTINGUISHER AGENT, AND DO NOT LET THE AGENT TOUCH YOUR SKIN. HAVE A GOOD FLOW OF AIR AT THE POSITION WHERE THE AGENT WAS USED. BE CAREFUL WHEN YOU OPEN THE FAN COWL PANELS. THE AGENT IS DANGEROUS.

(3) Clean the power plant after you have use of a vaporized chemical type of fire extinguisher.

NOTE: Most of the vaporized chemical type of fire extinguishers // will not cause corrosion to the metals on the power plant. The vaporized chemical agent will cause damage to the rubber and the plastics. If the agent touches the high temperature components, the agent will change and cause corrosion. The agent can collect in the inner surface of the fan cowl panels.

(a) Use the protective rubber gloves and the eye shields to keep the agent off your hands and out of your eyes.

(b) Open the left and right fan cowl panels to drain the small pockets of fluid (AMM 71-11-04/201).
(c) For a minimum of 30 minutes, let the agent become a gas and go into the air.
(d) If the agent went into the gas generator, dry motor the engine to blow out the agent (AMM 71-00-00/201).
(e) If you can start the engine and the agent went into the gas generator, do as follows:
1) Start the engine (AMM 71-00-00/201).
2) Operate the engine at ground (low) idle for a minimum of 5 minutes to stop the corrosion.
3) Stop the engine (AMM 71-00-00/201).

S 112-064-R00
(4) Clean the power plant after you have used a foam type of fire extinguisher.
(a) When you use a foam type of fire extinguisher, it can cause corrosion on the power plant.
(b) To stop the corrosion, remove the foam before it becomes a solid.

NOTE: The foam that is not removed will become sludge, which is the color of cream. On a hot surface, the foam becomes hard.

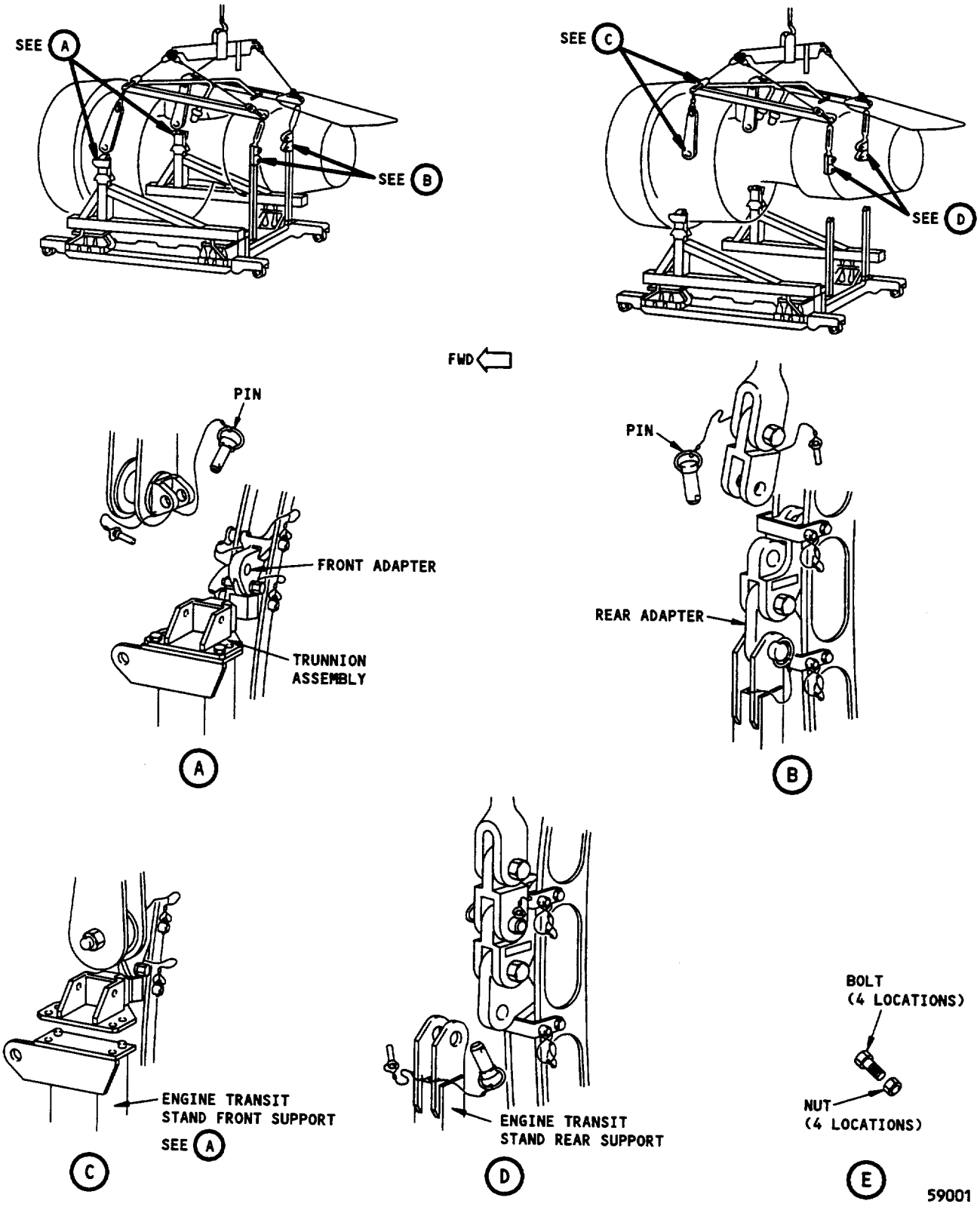
(c) Use clean water to remove the foam that you find on the external surfaces.
1) Continue until all the water that drains from the engine contain no foam.
(d) If the agent went into the gas generator, remove the engine (AMM 71-00-02/401).

TASK 71-00-03-302-006-R00
5. Engine Component Protection
A. References
(1) AMM 70-42-12/201, Local Surface Protection
B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

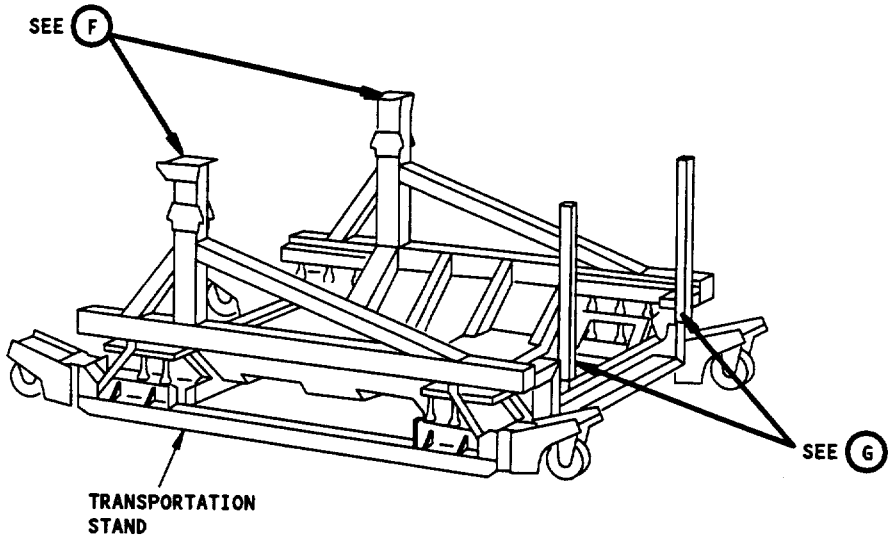
C. Paint the Engine Components.

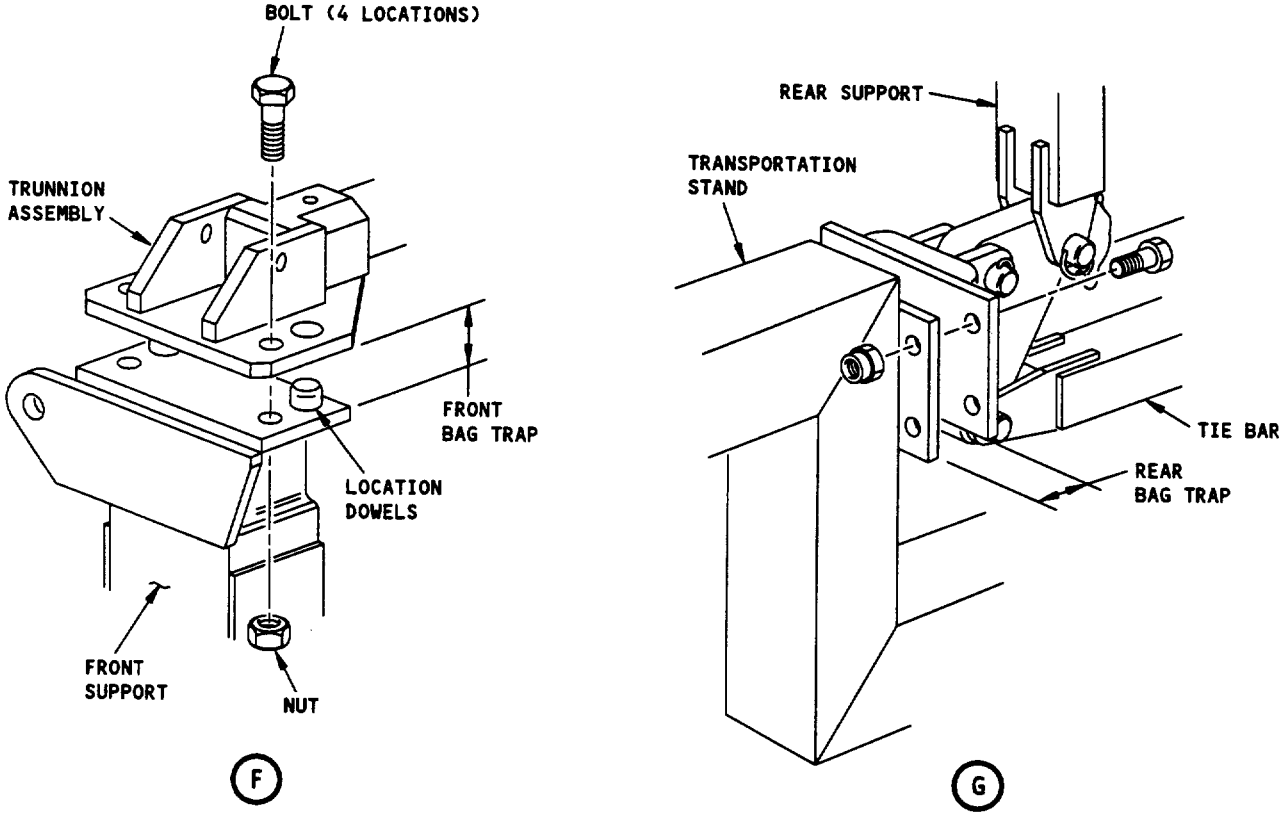
S 372-007-R00
(1) If you must paint the aluminum or steel casings, and the magnesium components, refer to Local Surface Protection - Maintenance Practices (AMM 70-42-12/201).

TASK 71-00-03-602-008-R00
6. Engine Preservation
A. General

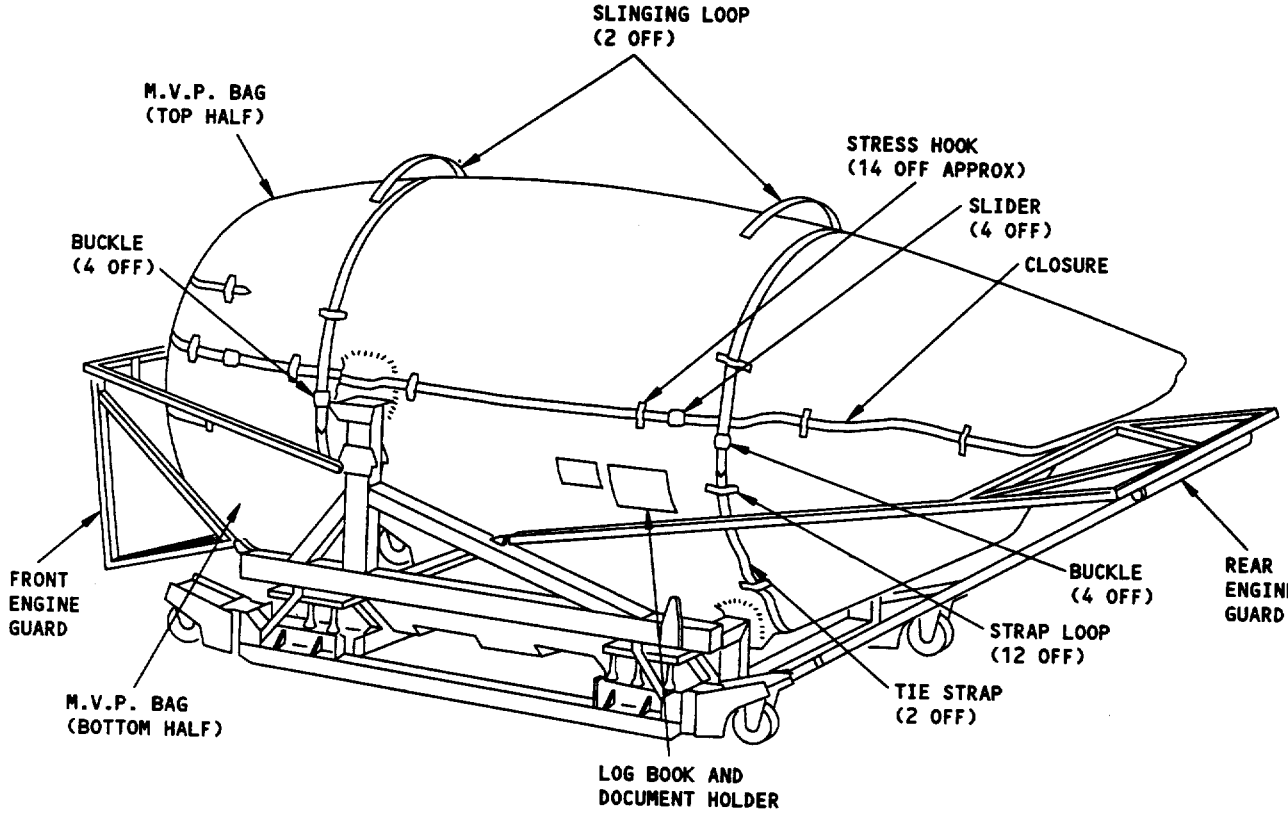


M.V.P. Bag Installation
Figure 203 (Sheet 1)



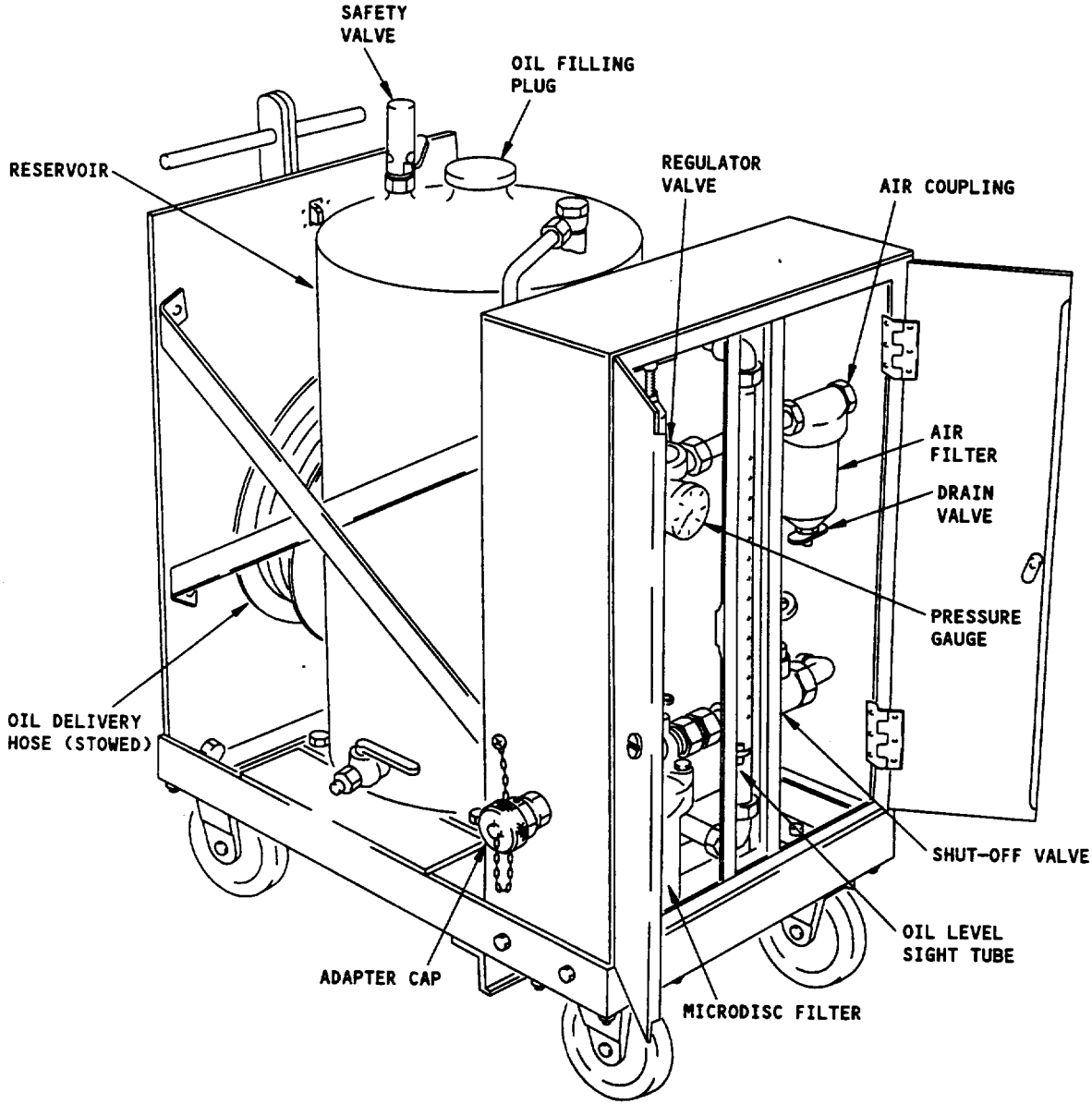


M.V.P. Bag Installation
Figure 203 (Sheet 2)



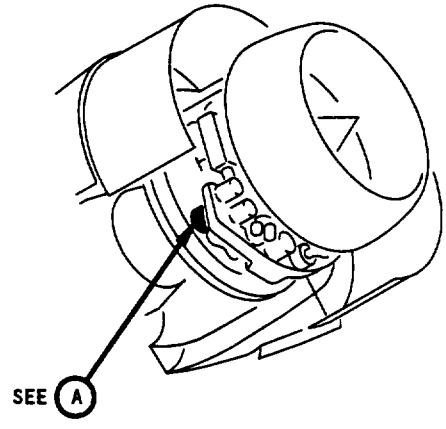
59019

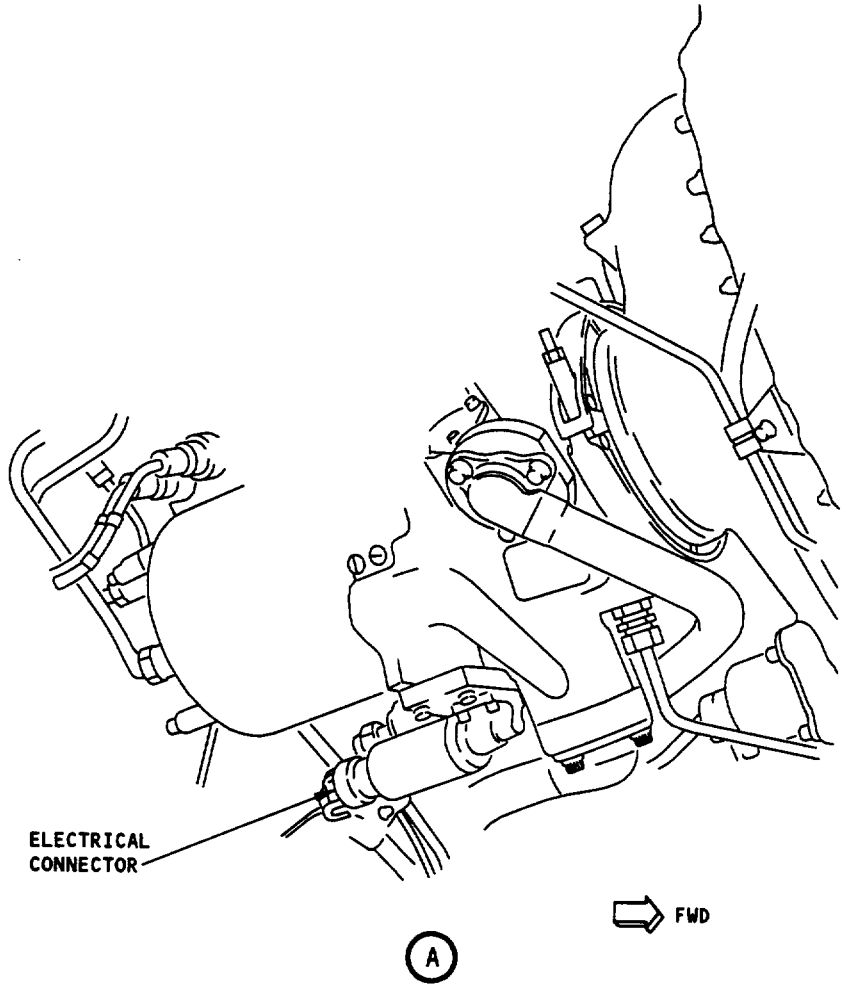
M.V.P. Bag - Installed Position
Figure 204



23470A

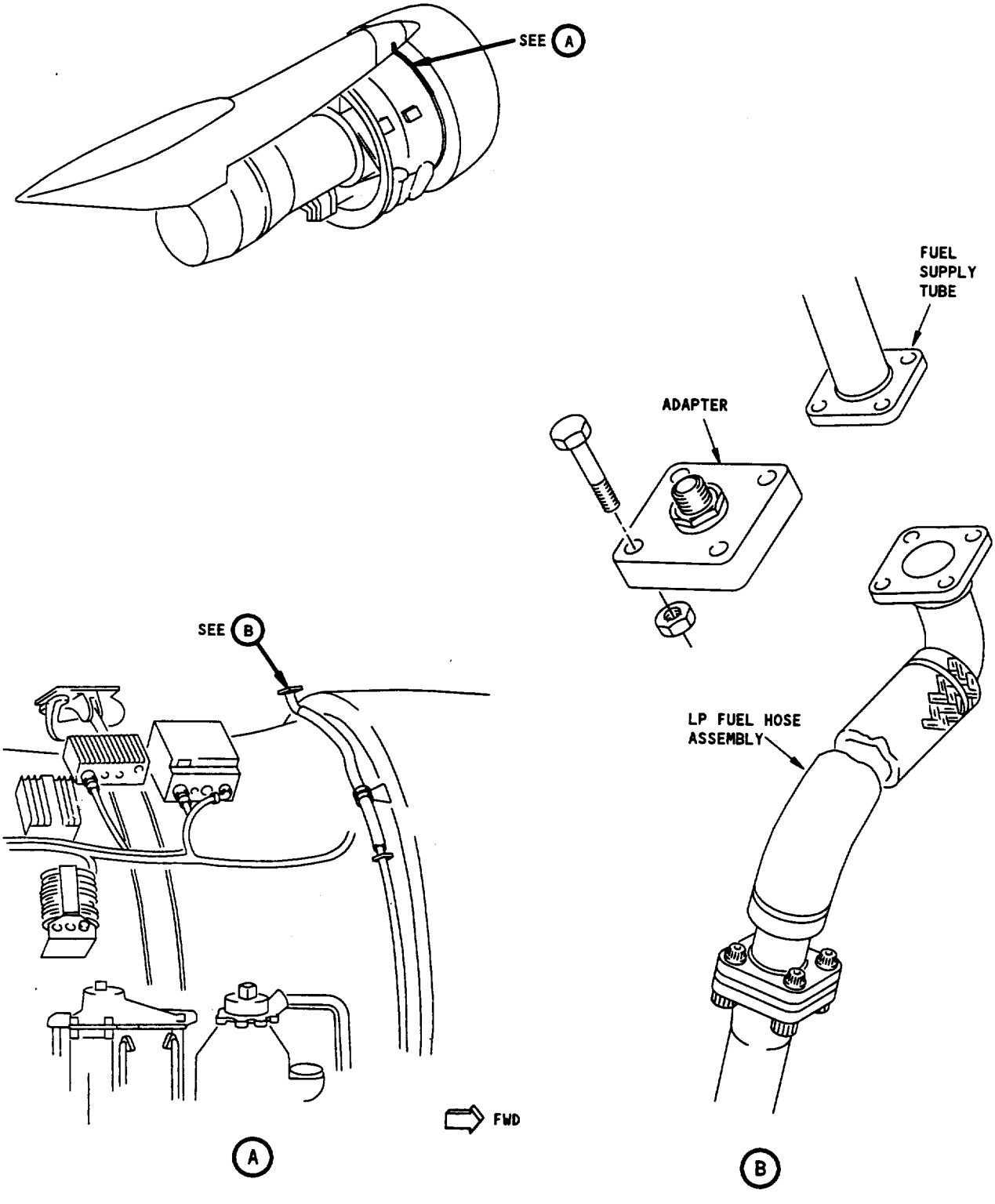
Inhibiting Rig
Figure 205



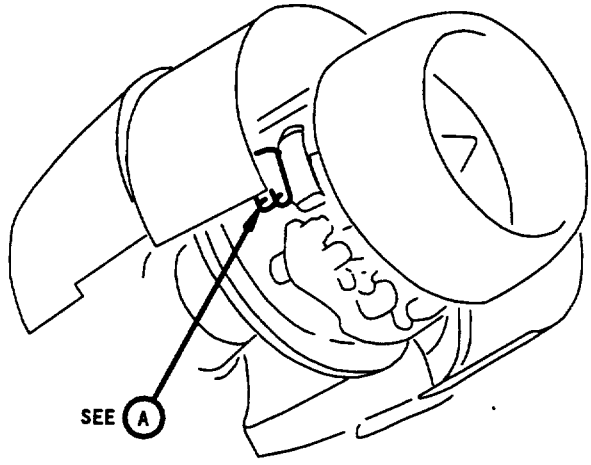


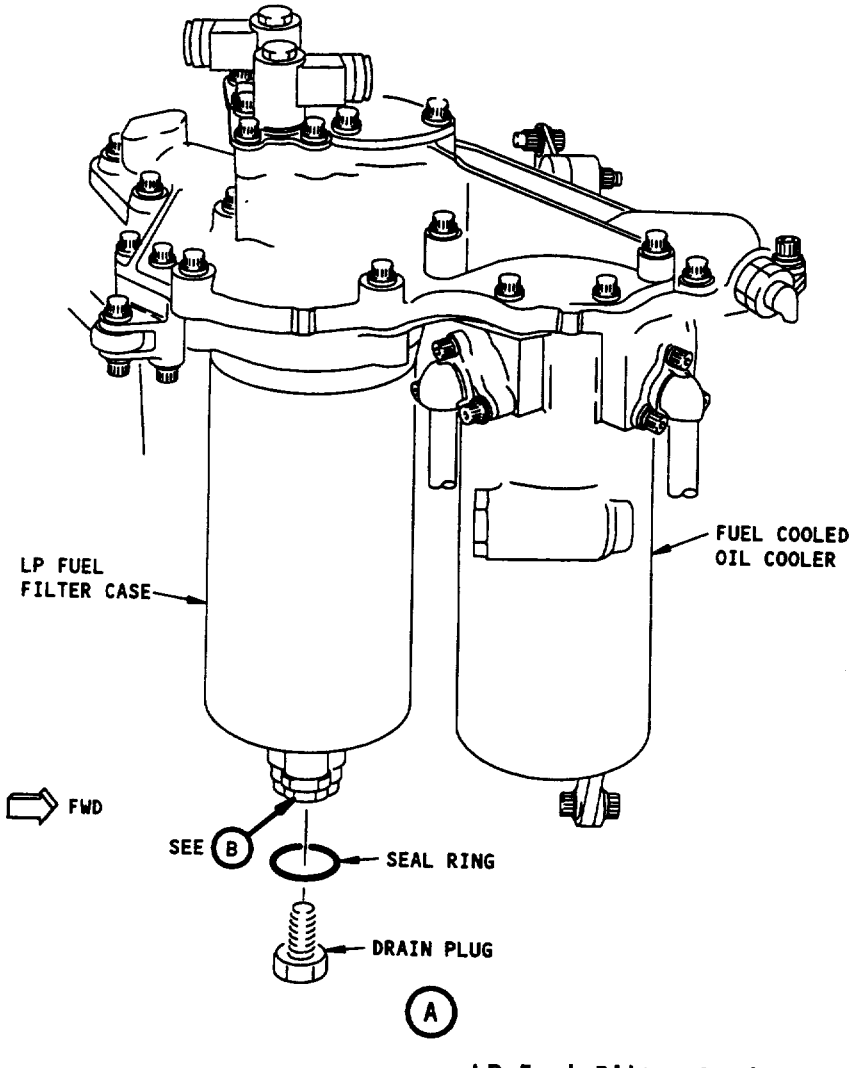
67149A

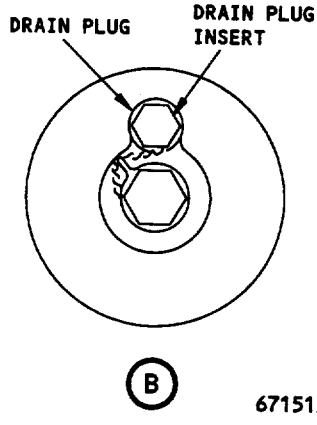
Minimum Flow Reset Solenoid
Figure 206



LP Fuel System Disconnect
Figure 207

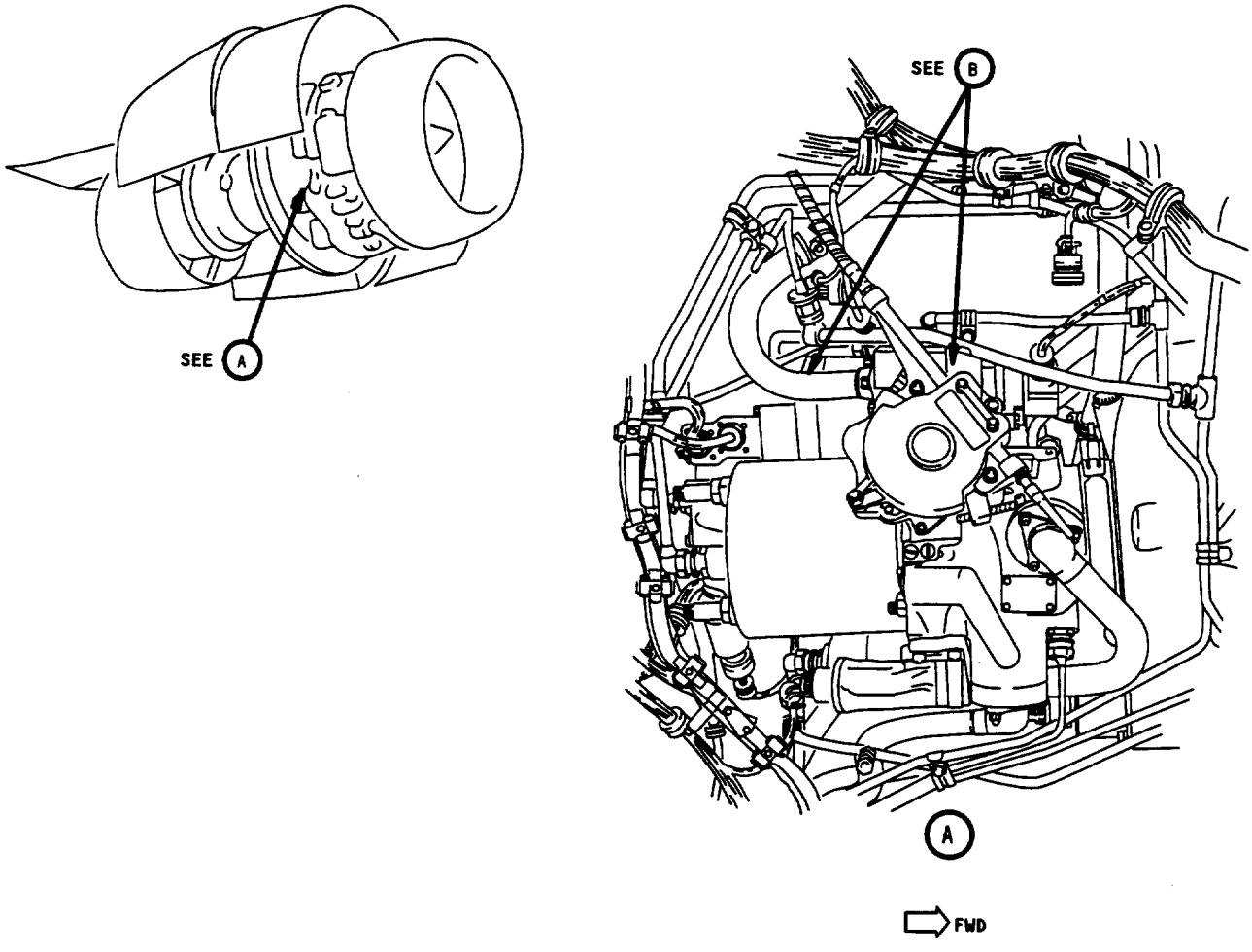






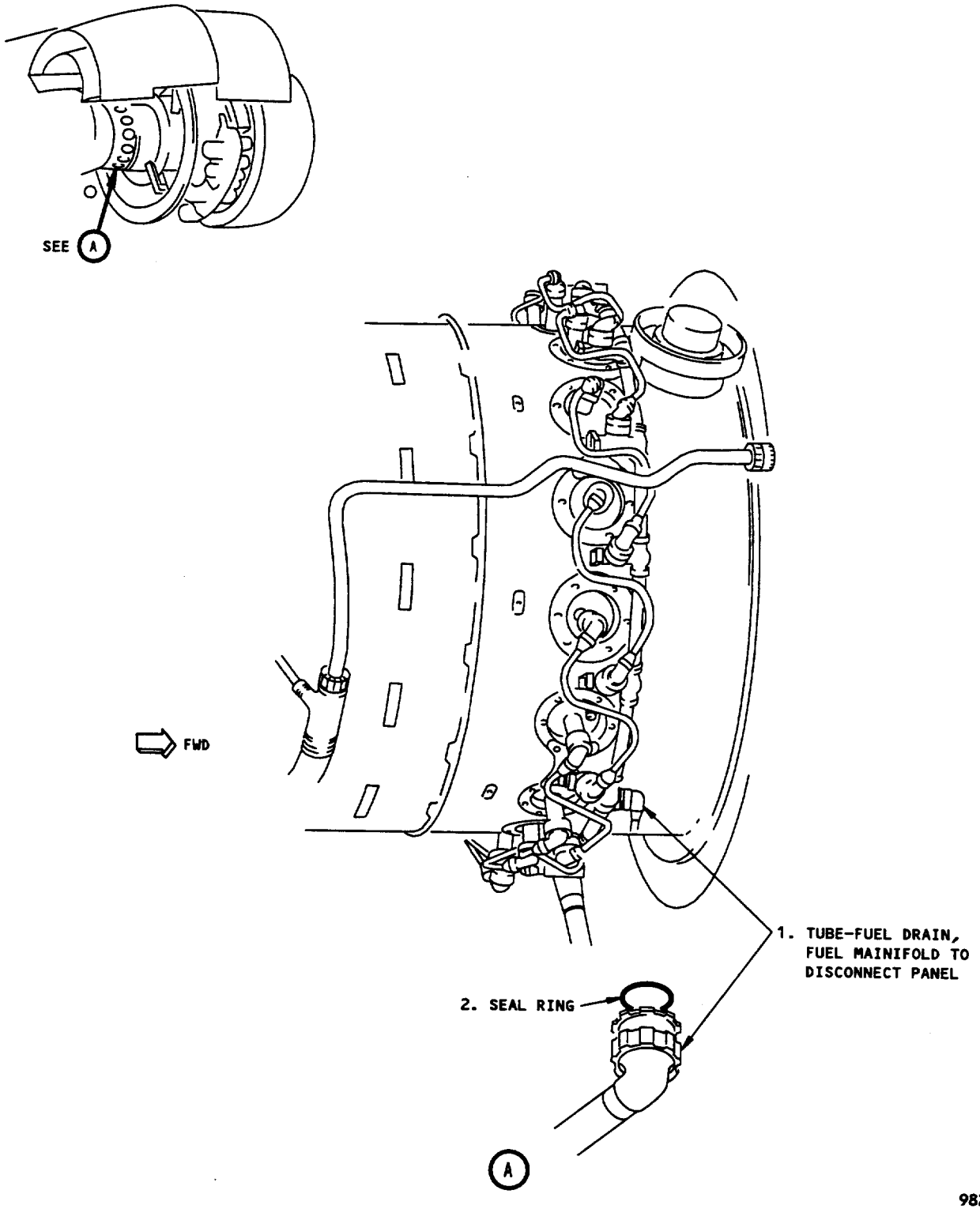
67151A

LP Fuel Filter Drain
Figure 208



98210

Fuel Flow Governor - Dummy Pressurizing and Drain Valve Installation
Figure 209



Fuel Drain Tube - Fuel Manifold to Disconnect Installation
Figure 210

CAUTION: YOU MUST OBEY THE ROLLS-ROYCE STORAGE PROCEDURES. IF YOU DO NOT OBEY THE PROCEDURES, CORROSION OF THE CORE ENGINE, FUEL SYSTEM AND OIL SYSTEM CAN OCCUR.

(1) If an engine, a Q.E.C. unit, or a propulsion system is to be put in storage, refer to Fig. 201 and 202 for the procedure.
(2) Before you preserve the engine, you must clean the engine externally and put protection on the components if it is necessary.
   (a) Refer to these tasks:
      1) Clean the Engine, Q.E.C. Unit, or the Propulsion System.
      2) Engine Component Protection.
(3) Minimum storage requirements are given in Fig. 201. It is recommended that units are put in a M.V.P. bag when possible, even when the storage period is less than 6 months.

B. Equipment
   (1) Covers and Blankets

Frame - Engine Suspension Stabilizing	CP30414/1
Cover - Inlet Cowl	LJ34924
Cover - HP 3 Bleed Valve	LK87390
Cover - Cooling Air Manifold	UL10187
Cover - Gearbox Breather Outlet Duct	LJ29883
Cover - LP Fan Case, Left Hand Rear	UL16382
Cover - LP Fan Case, Right Hand Rear	UL16383
Cover - Common Nozzle Assembly Left Hand Front	UL16377
Cover - Common Nozzle Assembly Right Hand Front	UL16378
Cover - Common Nozzle Assembly Rear	UL16357
Blank - LP Fuel Tube	LK84268
Plug - Inlet Cowl Ventilation Duct	LJ34935

(2) Hardware

M.V.P. Bag - Full Engine	CP27612
Transportation Stand Base Assembly Cradle Assembly	 CP30503/2 CP30501/4
Tow bar	CP30500
Wheel Assembly (use with CP30503/2 or CP30501/4)	CP30499
Engine/Stand Lifting Sling	CP30712
Freight Guard - Front, For Engines Without Inlet Cowl	CP30504/2
Freight Guard - Front, For Engines With Inlet Cowl	CP30513
Freight Guard - Rear, For Engines Without Common Nozzle Assembly	CP30514
Freight Guard - Rear With Common Nozzle Assembly	CP30520/1
Jack Fit - With casters removed use with	CP30501 or CP30503

C. Consumable Materials

(1) V.P.I. Impregnated Paper
British Spec - V.P.I. No.260
American Spec - UU-P00270
OMat No. - 1221

(2) P.V.C. self adhesive tape
OMat No. - 1228
(3) Grease resistant paper
British Spec - DEF.1316
OMat No. - 1226
(4) Dessicant and humidity indicator
British Spec - BS.2540
OMat No. - 1208

D. References
(1) AMM 70-51-00/201, Torque Tightening Technique
(2) AMM 79-00-00/701, Oil System

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Put Dessicant in the Engine if it is Kept On-wing for Storage

S 622-047-R00

(1) Use the correct quantity of dessicant for the storage time:

NOTE: The quantities of dessicant are calculated to give the maximum protection from moisture for the storage time given. It will not usually be necessary to open any engine covers or blanks and look for moisture during this time.

It is not necessary to install dessicant or the VPI/CHC paper in engines which are kept in dry conditions (in the desert or in air-conditioned hangar).

It is not necessary to install engine covers or blanks on engines which are kept in an air conditioned hangar.

(a) For up to 30 days, use 132 lb (60 kg).
(b) For up to 3 months, use 264 lb (120 kg).

S 622-048-R00

(2) Divide the correct quantity of dessicant equally and place it in these locations:
  (a) The nose cowl.
  (b) The rear of the fan case (in the cold stream duct).
  (c) The exhaust case.

G. Install the Blanks on the Engine, Q.E.C. Units, and Propulsion Systems.

S 532-011-R00

(1) Before you install the LP compressor case front cover or the nose cowl cover, install the V.P.I. paper on the LP compressor rotor.
  (a) The sheets must be slightly crumpled to hold them in position, with the coated side to the compressor.

S 532-012-R00

(2) Before you install the LP fan exhaust cover, install the V.P.I. paper on the rear of the LP compressor outlet guide vanes.
  (a) Install the coated side of the paper to the outlet guide vanes.

S 532-009-R00

(3) Install the applicable blanks (caps) on all the openings of the engine (Fig. 202).
  (a) Install the grease resistant paper with P.V.C. self-adhesive tape at the openings where blanks are not available.

S 532-010-R00

(4) If there are any disconnected harness connectors, install blanks.
  (a) Attach the harness connectors to the adjacent structure to prevent damage to the connector.

S 622-046-R00

(5) Do the preservation procedure for the main line bearings and gearbox (AMM 79-00-00/701).

H. Install a M.V.P. Bag on an Engine (Fig. 201, 203 and 204)

S 862-013-R00

(1) Make sure the engine or Q.E.C. unit has been cleaned.
  (a) Refer to the step: "Clean the Engine, Q.E.C. Unit or Propulsion System Before You Do the Prevervation Procedure".

S 862-014-R00

(2) Make sure the blanks are installed on the engine openings.
  (a) Refer to the step: "Install the Blanks on the Engine, Q.E.C. Units and Propulsion Systems".

S 862-015-R00

(3) If the engine or Q.E.C. unit is to be put in storage or the time in-transit is more than 30 days, do these steps:
  (a) You must inhibit the fuel system.
    1) Refer to the task: "Inhibit the Engine Fuel System".

(b) Do the storage requirement steps in Fig. 201.

S 532-016-R00

(4) Install the M.V.P. bag on the engine.
  (a) Open the M.V.P. bag into its two parts.
  (b) Make sure the M.V.P. bag is clean and does not have punctures and tears.
    1) If you find damage, do the task: "Examine and Repair the M.V.P. Bag".
  (c) Use the hoist to lift the sling into position on the engine.
  (d) Attach the sling to the engine.
  (e) Remove the parts that hold the engine to the transportation stand at the front positions.
  (f) Release the pins that hold the rear support to the engine.
  (g) Lift the engine out of the transportation stand.
  (h) Remove the nuts and the bolts that hold the rear support to the transportation stand.
  (i) Remove the rear support with the tie bar from the transportation stand.
  (j) Put the lower half of M.V.P. bag in the transportation stand.
  (k) Make sure the location dowels on the front support are correctly installed through the M.V.P. bag trap.
  (l) Install the rear support with the tie bar on the transportation stand.
    1) Make sure the M.V.P. bag is trapped correctly between the rear supports of the transportation stand.
    2) Install and tighten the nuts and bolts to attach the rear support to the transportation stand (AMM 70-51-00/201).
  (m) Put the necessary amount of the dessicant in the lower half of the M.V.P. bag.
    1) The amount of dessicant that is necessary can be found on an instruction card behind a clear view window in the M.V.P. bag.
  (n) Make sure the rear supports are at the up position.
  (o) Lower the engine into the transportation stand.
  (p) Make sure the M.V.P. bag is correctly trapped between the trunnion assembly and the front support.
  (q) Install and tighten the nuts and bolts (AMM 70-51-00/201).
  (r) Move the rear supports into the attach points on the engine.
    1) Install the pins and the locking pins.
  (s) Remove the sling from the engine.
  (t) Lift the sling from the engine.
  (u) Remove the sling from hoist.
  (v) Attach the hoist to the upper half of the M.V.P. bag.
  (w) Lower the bag on the engine.
  (x) Remove the hoist from the bag.
  (y) Attach the bottom-half of the M.V.P. bag to the top-half with the stress hooks.

(z) Attach the bottom-half of the M.V.P. bag to the top-half with the interlocking closure and sliders.

NOTE: You must start the first few inches of the interlocking closure by hand. The sliders, then clipped over and you apply a steady pull along the joint so that the force is near parallel as possible to the closure.

(aa) Feed the straps through strap loops then take-up slack in tie straps and secure with buckles.

(ab) Install the front freight guard and the rear freight guard if it is necessary.

I. Examine the Engine and the Bag During the Storage.

S 552-017-R00

(1) Make sure the humidity indicator shows 'safe' (blue color) at the these intervals:
   (a) At 24 hours after desiccation or receipt of the engine or the Q.E.C. unit.
   (b) One week after desiccation or receipt of the engine or the Q.E.C. unit.
   (c) Each month during the time the engine is in storage.

S 552-018-R00

(2) If the humidity indicator shows 'unsafe' (changed color from blue to lilac or pink), do these steps:
   (a) Open the M.V.P. bag.
   (b) Examine the engine or Q.E.C. unit for corrosion.
      1) If you find corrosion, you must do the task: "Engine Component Protection".

NOTE: Use a warm air blower to put dry air through the engine to dry the engine.

   (c) Examine the M.V.P. bag for damage.
      1) If you find damage, repair the bag.
         a) Refer to the task: "Examine and Repair the M.V.P. Bag".
   (d) Put dry desiccant in the bottom half of the M.V.P. bag.

NOTE: Bandoliers of used desiccant can be dried and used again. To dry the desiccant, heat the dessicant for one hour at 150 degrees C.

(e) Put new humidity indicator paper in the pocket of the M.V.P. bag.
(f) Seal the M.V.P. bag.

S 552-019-R00
(3) If the M.V.P. bag is opened, dry desiccant must be put into the bag before the M.V.P. bag is sealed again.

S 632-051-R00
(4) Remove all of the dessicant, V.P.I./C.H.C. paper and adhesive tape before you put the engine into service again.

TASK 71-00-03-602-052-R00

7. Engine Depreservation

A. References
(1) AMM 71-00-00/501, Power Plant

B. Remove the M.V.P. bag.

S 632-022-R00
(1) Remove the M.V.P. bag from the engine (Fig. 204).
(a) Release the tie straps from the buckles and pull the straps through the strap loops.
(b) Remove the sliders.
(c) Bend sides of the interlocking closure, between the M.V.P. bag bottom-half and top-half, through 90 degreees to release the closure.
(d) Release the stress hooks.
(e) Attach a sling to the loops on the M.V.P. bag.
(f) Use a hoist to remove the top half of the M.V.P. bag from the engine or the Q.E.C. unit.
(g) Remove the desiccant from the bottom of the M.V.P. bag.

NOTE: It is recommended that the bottom of the M.V.P. bag remains in position on the multi-purpose stand. Remove the M.V.P. bag from the stand when the engine or Q.E.C. unit is lifted from the multi-purpose stand.

S 542-020-R00

(2) When a basic engine is converted to a Q.E.C. unit or immediately before the installation of the Q.E.C. unit, remove the applicable blanks and V.P.I. paper from the engine or Q.E.C. unit.

S 632-021-R00

(3) The depreservation of the engine fuel system will be done during Test No.1 (AMM 71-00-00/501).

TASK 71-00-03-502-045-R00

8. Examine and Repair the M.V.P. Bag

A. Equipment

(1) Repair Kit - M.V.P. bag,
CP.15306, Rolls-Royce

B. Consumable Materials

(1) Fluorescent penetrant remover (Detergent)
British Spec - Lissapol 'N'
OMat No. - 621

(2) Adhesive tape, Black waterproof
British Spec - Isatape 160
OMat No. - 285

(3) French chalk
British Spec - DTD.527
OMat No. - 1225

C. Examine the M.V.P. Bag before it is put into storage.

S 212-023-R00

(1) Fully examine the bag for damage or contamination from fluids or dirt.

(a) Wash the bag with detergent to remove the contamination or the dirt.

(b) You must fully dry the bag.

(c) If damage is found, repair the bag.

S 552-024-R00

(2) If the bag is put into storage, fold the bag carefully and put the bag in a clean, dry place.

D. Repair the M.V.P. bag.

S 212-025-R00

(1) Examine the bag for tears or punctures.
   (a) Fractures to the interlocking closures are not permitted.
   (b) You can repair the puncture if the diameter is not more than one inch.
   (c) You can repair the tear, if the length of the tear is not more than 3.0 inches (76.2 mm.) in two directions.
   (d) There is no limit to the number of patches that can be applied, but two patches cannot overlap.

S 352-026-R00

(2) Do a permanent repair to the areas not adjacent to the seams.
   (a) Get the materials in the repair kit CP.15306.
   (b) Cut two patches that are large enough to overlap the damaged area by 1.50in. (38.1 mm.) all round.
   (c) Clean the area around the damage and one side of each patch with detergent.
      1) Let the patch and the area on the bag become dry.
   (d) Apply a thin layer of adhesive to the cleaned side of the patches and the mating area of the bag.
      1) Let the adhesive dry for 15 minutes.
   (e) Put the first patch on the outside of the bag, over the damaged area, and press firmly together on a flat surface.

      NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly when touched.

   (f) Put the second patch on the inside of the bag, over the damaged area, and press firmly together on a flat surface.

      NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly on touch.

(g) Apply the French chalk on the inside and the outside of the bag adjacent to the repair area.

S 352-027-R00

(3) Do a permanent repair to the areas adjacent to the seams.
(a) Get the materials contained in the repair kit CP.15306.
(b) Cut away part of the raised seam, on the inside of the bag, that is adjacent to the damage.
(c) Cut two patches that are large enough to overlap the damaged area by 1.50in. (38.1 mm.) all round.
(d) Cut two slots in the inner patch to accept the raised seam that has not been cut away.
(e) Clean the area around the damage and one side of each patch with the detergent.
1) Let the damage area and the patch become dry.
(f) Apply a thin layer of adhesive to the cleaned side of the patches and the mating area of the bag.
1) Let the adhesive dry for 15 minutes.
(g) Put the first patch on the outside of the bag, over the damaged area, and press firmly together on a flat surface.

NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly when touched.

(h) Put the second patch on the inside of the bag, over the damaged area, and press firmly together on a flat surface.

NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly on touch.

(i) Apply the French chalk on the inside and the outside of the bag adjacent to the repair area.

S 352-028-R00

(4) If the repair kit CP.15306 is not available, this temporary repair is permitted.
(a) Clean the inside and the outside areas to be repaired with the detergent.

(b) Let the repair area dry completely.
(c) Overlap strips of 2.0in. (50.8 mm.) wide adhesive tape over the tear or puncture, on the inside and the outside of the bag.

S 352-029-R00

(5) The temporary repair to the M.V.P. bag must be removed and replaced with a permanent repair as soon as possible.

TASK 71-00-03-602-030-R00

9. Inhibit the Engine Fuel System

A. General

(1) Perform fuel system inhibiting as specified in Fig. 201. The fuel system inhibiting procedure is performed with the engine installed on the airplane as the engine must achieve a minimum speed of 15% N3.

B. Equipment

(1) Engine is installed on the wing.
(a) Inhibiting Rig - Rolls-Royce 1702198, 29001H, or 3409702
(b) Adapter - Rolls-Royce HU31811 (Replaces HU29623)
(c) Clean container - minimum capacity
5 U.S. gallons
4 Imperial gallons
18 Liters

(2) Engine is not installed on the wing.
(a) Turning Tool - HP System (via starter motor mounting pad) Rolls-Royce E2J54584
(b) Turning Tool - HP System (through H.S. gearbox breather) Rolls-Royce E2J52189
(c) Drain Valve - Dummy FFG Pressurizing and Drain Valve, Rolls-Royce HU30645/1

(d) Wrench - Burner Rail Nuts, Rolls-Royce UT818
(e) Clean container - Minimum Capacity:
5 U.S. Gallons
4 Imperial Gallons
18 Liters

C. Consumable Materials
(1) Lockwire
British Spec - DTD.189A, 22 SWG
American Spec - 21 AWG
OMat No. - 238

(2) Mineral Oil
American Spec - MIL-L-6081C
OMat No. - 1024A, 1024C, 1024D
(3) Dry, compressed - minimum pressure 60 psig air supply

D. References
(1) AMM 70-02-01/201, Identification, Lubrication and Fitting of Rubber Seal Rings
(2) AMM 70-12-04/201, Locking Techniques For Threaded Parts
(3) AMM 70-50-02/201, Connection of Electrical Plugs
(4) AMM 70-51-00/201, Torque Tightening Technique
(5) AMM 71-00-00/201, Power Plant
(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 72-00-00/201, Rotate HP System
(8) AMM 73-21-15/401, Fuel Flow Governor Solenoid Valves

E. Access
(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)

F. Inhibit the Fuel System with the Engine Installed on the Wing.

S 942-031-R00

(1) Prepare the Inhibiting Rig (Fig. 205)

WARNING: DO NOT APPLY AIR PRESSURE MORE THAN 50 PSIG TO THE RIG OR IT COULD CAUSE THE FRACTURE OF THE AIR FILTER BOWL. INJURY TO THE RIG OPERATOR COULD OCCUR.

(a) Remove the adapter cap from the oil outlet.
(b) Attach the oil delivery hose to the oil outlet.
(c) Turn the handle on the microdisc filter to clear the filter element.
(d) Depress the safety valve lever to make sure the air pressure in the reservoir is zero.
(e) Remove the oil filling plug.
(f) Fill the reservoir with inhibiting fluid until the sight tube shows 9.6 U.S. gallons (8 Imperial gallons or 36.4 litres).
(g) Install the oil filling plug.
(h) Close the regulator valve.
(i) Connect the external air supply to the air coupling.
(j) Unscrew the drain valve to drain the air filter.
1) When clear, close the drain valve.
(k) Adjust the regulator valve until the pressure gage shows 50 psig.
(l) Open the shutoff valve to flush the hose.
1) When the hose is free from contamination, close the valve.
(m) Disconnect the external air supply from the air coupling.

S 862-032-R00

(2) Prepare the Engine for Inhibiting the Fuel System.
(a) For the left engine, open these circuit breakers or the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags.
1) 6E1, FUEL VALVES L SPAR
(b) For the right engine, open these circuit breakers on the main power distribition panel, P6, and attach DO-NOT-CLOSE tags.
1) 6E2, FUEL VALVES R SPAR

(c) For the left engine, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags.
1) 11D7, ENGINES STBY IGNITION LEFT 1
2) 11D8, ENGINES STBY IGNITION LEFT 2
3) 11L1, LEFT ENGINE IGN 1

(d) For the right engine, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags.
1) 11D9, ENGINES STBY IGNITION RIGHT 1
2) 11D10, ENGINES STBY IGNITION RIGHT 2
3) 11L28, RIGHT ENGINE IGN 1

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(e) Open the left fan cowl panel (AMM 71-11-04/201).
(f) Disconnect the electrical connector from the minimum flow reset solenoid on the fuel flow governor (Fig. 206) (AMM 70-50-02/201).
1) Install a warning streamer.
(g) Disconnect the LP fuel hose assembly at the engine/airplane interface (Fig. 207).
(h) Install the adapter on the LP fuel hose.
(i) Remove the fuel from the LP fuel filter.
1) Put a container below the LP fuel filter.
2) Remove the drain plug from the LP fuel filter case (Fig. 208).
a) When you remove the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
b) Discard the old seal ring from the drain plug.
3) Let the fuel drain.
4) Lubricate and install the new seal ring for the drain plug (Ref 70-02-01).

5) Install and tighten the drain plug to 250 pound-inches (28.2 Newton-meters) (AMM 70-51-00/201).
   a) When you install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
6) Install lockwire on the drain plug (AMM 70-12-04/201).

(j) Put a container below the drain outlet of the turbine section.
(k) Connect the inhibiting rig to the adapter (Fig. 207).
(l) Connect the external air supply to the air coupling (Fig. 205).
(m) Open the rig shut-off valve (Fig. 205).

S 622-033-R00

(3) Inhibit the fuel system with the engine installed on the wing.
(a) Make sure the pressure gage on the inhibiting rig shows 50 psi (Fig. 205).
   1) If the pressure is not correct, adjust the pressure.
(b) Remove the fuel from the engine.
   1) Do the procedure to dry motor the engine (AMM 71-00-00/201).
      a) Dry motor the engine at a speed between 15% and 30% N3.
   2) Move the FUEL CONTROL switch to the RUN position.
   3) Dry motor the engine for 2 minutes.
   4) Stop the dry motor procedure (AMM 71-00-00/201).
      a) Do not use the starter again until the N3 speed is zero.
   5) Dry motor the engine for 2 minutes more (AMM 71-00-00/201).
   6) Move the FUEL CONTROL switch to the CUTOFF position.
   7) Stop the dry motor procedure (AMM 71-00-00/201).
(c) Examine the inhibiting fluid that has come from the turbine section drain.
   1) Make sure that the inhibiting fluid does not have fuel in it.
   2) If the inhibiting fluid has fuel in it, do the steps to remove the fuel from the engine again.

      NOTE: If you must dry motor the engine again, you must follow the starter operation limits (AMM 71-00-00/201).

S 862-034-R00

(4) Put the airplane back to the usual condition.
  (a) Close the regulator valve (Fig. 205).
  (b) Close the rig shut-off valve (Fig. 205).
  (c) Depress the safety valve lever to make sure the air pressure in reservoir is zero (Fig. 205).
  (d) Disconnect the external air supply from the air coupling (Fig. 205).
  (e) Disconnect the inhibiting rig from the adapter (Fig. 207).
  (f) Connect the LP fuel hose to airplane fuel system (Fig. 207).
  (g) Connect the electrical connector to the minimum flow reset solenoid on the fuel flow governor (Fig. 206) (AMM 70-50-02/201).
    1) Remove the warning streamer.
  (h) For the left engine, remove the DO-NOT-CLOSE tags and close this circuit breaker on the main power distribution panel, P6.
    1) 6E1, FUEL VALVES L SPAR
  (i) For the right engine, remove the DO-NOT-CLOSE tags and close this circuit breaker on the main power distribution panel, P6.
    1) 6E2, FUEL VALVES R SPAR
  (j) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11.
    1) 11D7, ENGINES STBY IGNITION LEFT 1
    2) 11D8, ENGINES STBY IGNITION LEFT 2
    3) 11L1, LEFT ENGINE IGN 1
  (k) For the right engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11.
    1) 11D9, ENGINES STBY IGNITION RIGHT 1
    2) 11D10, ENGINES STBY IGNITION RIGHT 2
    3) 11L28, RIGHT ENGINE IGN 1

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

  (l) Close the left fan cowl panel (AMM 71-11-04/201).

G. Inhibit the fuel system with the engine not installed on the wing.

S 682-035-R00

(1) Remove the fuel from the LP fuel filter.
  (a) Put a container below the LP fuel filter.
  (b) Remove the drain plug from the LP fuel filter case (Fig. 208).
    1) When you remove or install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
    2) Discard the old seal ring from the drain plug.
  (c) Let the fuel drain.
  (d) Lubricate and install the new seal ring on the drain plug (AMM 70-02-01/201).
  (e) Install and tighten the drain plug to 250 pound-inches (28.2 Newton-meters) (AMM 70-51-00/201).
    1) When you install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
  (f) Install lockwire on the drain plug (AMM 70-12-04/201).

S 032-036-R00

(2) Remove the fuel flow governor (FFG) pressurizing and drain valve and switch assembly from the FFG (AMM 73-21-15/401).

S 492-037-R00

(3) Install the dummy FFG pressurizing and drain valve (1) on the FFG (Fig. 209).
  (a) Make sure the mating faces are clean and are not damaged.
  (b) Install the new seal ring (4) below the valve assembly (Ref 70-02-01).
  (c) Put the dummy valve on the FFG.
  (d) Install the nuts (2) and washers (3).
    1) Tighten the nuts to 35-45 pound-inches (4.0-5.0 Nm) (Ref 70-51-00).
  (e) Install a new seal ring (5) to the tube (7)(AMM 70-02-01/201).
    1) Install the bolts (6) and tighten (AMM 70-51-00/201).

S 622-038-R00

(4) Remove the fuel from the engine.
  (a) Put a clean container below the fuel drain tube (1) (Fig. 210).
  (b) Disconnect the fuel drain tube (1) from the drain union of the fuel manifold (Fig. 210).
  (c) Fill the LP fuel hose with the inhibiting fluid (Fig. 207).
  (d) Manually turn the HP engine system with the turning tool (AMM 72-00-00/201).
    1) Examine the inhibiting fluid that comes out of the drain union on the fuel manifold.
    2) You must turn the HP engine system until the inhibiting fluid does not have fuel in it.
    3) You must keep the LP fuel hose full of inhibiting fluid during the time you turn the HP engine system.

S 432-039-R00

(5) Connect the fuel drain tube to the drain union on the fuel manifold (Fig. 210).
  (a) Discard the old seal ring (2) on the fuel drain tube.
  (b) Install a new seal ring on the fuel drain tube (AMM 70-02-01/201).
  (c) Connect the fuel drain tube (1) to the drain union (AMM 70-51-00/201).
    1) Install lockwire on the tube (AMM 70-12-04/201).

S 092-040-R00

(6) Remove the dummy FFG valve (Fig. 209).
  (a) Remove the bolts (6) that hold the tube (7).
  (b) Remove the nuts (2) and washers (3) to disconnect the dummy FFG valve.
  (c) Remove dummy FFG valve (1).

S 432-041-R00

(7) Install the FFG Pressurizing and Drain valve and switch assembly (AMM 73-21-15/401).

S 532-042-R00

(8) Install the blank to the LP fuel tube (Fig. 202).

S 632-054-R00

(9) Remove all of the dessicant, V.P.I./C.H.C. paper and adhesive tape before you put the engine into service again.

TEMPORARY REVISION STATUS REPORT FOR DOCUMENT D633N132

THIS LIST CONTAINS ALL TRs WITH TR DATES AFTER JAN 28/01. THIS LIST CREATED AT 2001/10/29.19:49:56 UTC

TR NUMBER	TR DATE	DATE INCORPORATED	SUBJECT
12-1001	JUL 18/01	SEP 28/01	12-21-09
27-1002	FEB 02/01	# 27-1003	27-62-00
27-1003	MAR 07/01	MAY 28/01	27-62-00
32-1002	OCT 05/01	* ACTIVE	32-35-00
35-1001	JAN 29/01	MAY 28/01	35-21-04
71-1002	NOV 05/01	* ACTIVE	71-00-03
72-1002	JUL 20/01	SEP 28/01	72-00-00

TR NUMBER	TR DATE	DATE INCORPORATED	SUBJECT

* INDICATES TR WAS ACTIVE AT THE TIME OF THIS REPORT;
REMOVE IT WHEN YOU RECEIVE THE REGULAR REVISION DATED JAN 28/02.
\# INDICATES TR WAS SUPERSEDED BY THE TR LISTED.

757 MAINTENANCE MANUAL

TEMPORARY REVISION No. 71-653

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA) AND COMPLIES WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED. CAA DESIGN APPROVAL No. DAI/8566/78.

G Litchfield For CHIEF ENGINEER QUALITY

Manual Reference 71-11-01 Page 604

REASON FOR REVISION

To include additional inspection requirements.

ACTION

F. Inlet Cowl Check

Ref step (4)

Do the following additional checks

E4 ENGINES ONLY (nose cowl serial numbers 9001-9124 inclusive only).

(d) Examine the nose cowl inner barrel acoustic lining for any of the following. Record all findings on a feedback sheet (see figure overleaf for a typical example) and return sheet to Propulsion Engineering H3, TBA, LHR.
   1) Areas of discoloration.
   2) Surface irregularities, profile changes and bulges. Do a tap test to confirm defects as required.
   3) Disbond. Apply pressure with fingers and thumb in a tactile search pattern and check the entire surface of all three panels for disbond. Panels should resist pressure and feel firm, any sponginess or irregularities encountered should also be tap tested.

      NOTE: A crackling noise may be heard as the honeycomb flexes, this is not necessarily an indication of damage.

(e) Acceptance Standards.
   1) Localised defects do not exceed 6 inches (152.4mm) axially by 6 inches (152.4mm) circumferentially.
   2) There is 6 inches (152.4mm) axial separation between adjacent areas.
   3) There is 12 inches (304.8mm) circumferential separation between adjacent areas.
   4) A single circumferential band of damage is allowable provided it does not exceed 3 inches (76.2mm) in width

anywhere on the panel except within 3 inches (76.2mm) of the trailing edge. A 1 inch (25.4mm) band of damage is permitted at the trailing edge. A circumferential band of damage must be separated from other areas of damage by 12 inches (304.8mm) axially. Two bands of damage on a panel are only allowable if one is at the forward edge and one at the aft edge.

5) Acceptable damage is to be reinspected every 30 hours. Outside of these limitations call Propulsion Engineering or Maintrol.

FAX TO: 44-181-759-1250

OPERATOR **NOSE COWL S/N**

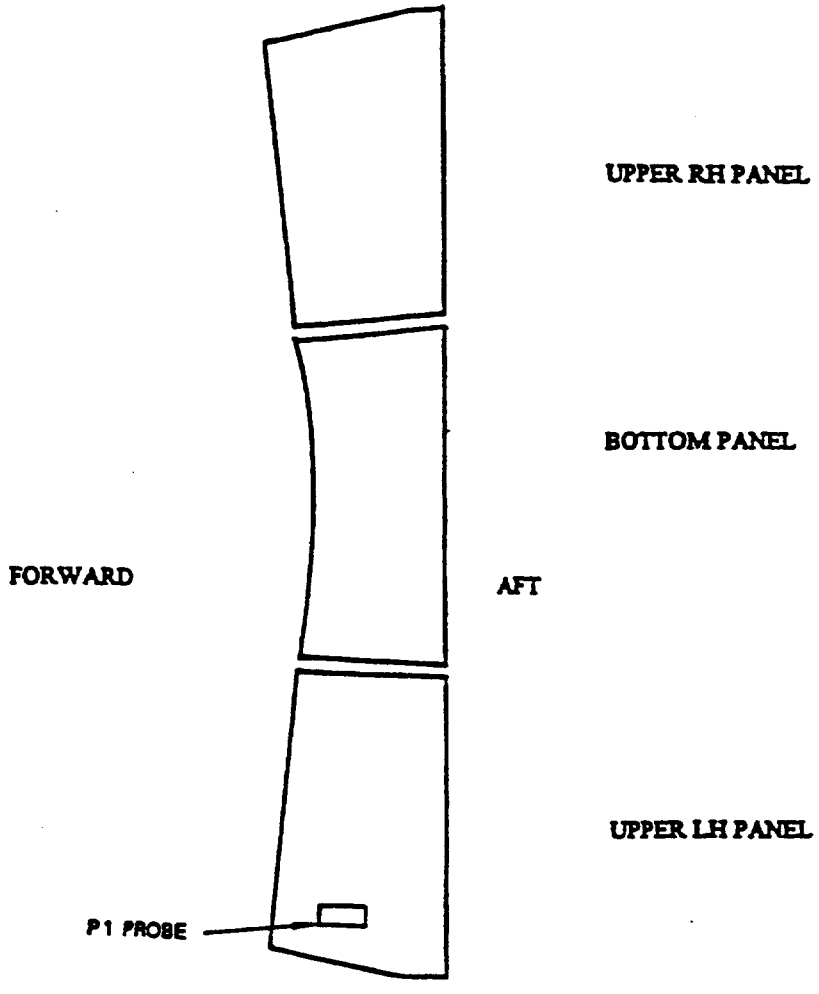
AIRCRAFT REG

ENGINE S/N & POSITION

DATE OF INSPECTION

N/C HOURS & CYCLES SINCE NEW

PLAN VIEW OF NOSE COWL ACOUSTIC LINER (UNWRAPPED)



Nose Cowl Inspection Proforma

GPA Group plc

PAGE	DATE	CODE
CHAPTER 71 TAB		
POWER PLANT		
EFFECTIVE PAGES SEE LAST PAGE OF LIST FOR NUMBER OF PAGES		
71-CONTENTS		
1	MAY 28/07	RGUI
2	MAY 28/07	RGUI
3	MAY 20/08	RGUI
4	MAY 20/08	RGUI
5	MAY 20/08	RGUI
6	MAY 20/08	RGUI
71-00-00		
1	SEP 28/99	R01
2	DEC 15/85	R03
3	MAR 20/93	R02
4	MAY 28/01	R01
5	MAY 28/01	R01
6	MAY 28/01	R01
7	MAY 28/01	R01
8	MAY 28/01	R01
9	MAY 28/01	R01
10	MAY 28/01	R01
11	JAN 28/06	R01
12	MAY 28/01	R01
13	JAN 28/00	R19
14	JAN 28/00	R01
15	JAN 28/00	R01
16	JAN 28/00	R03
17	JAN 28/00	R01
18	JAN 28/00	R04
19	JAN 28/00	R03
20	JAN 28/00	R03
21	JAN 28/00	R03
22	BLANK	
71-00-00		
201	SEP 28/00	R01
202	JAN 28/02	R01
203	MAY 20/08	R01
204	SEP 28/99	R01
205	SEP 28/01	R01
206	MAY 20/08	R01
207	MAY 28/07	R01
208	MAY 28/07	R01
209	MAY 28/07	R01
210	MAY 20/08	R01
211	MAY 28/07	R01
212	MAY 28/07	R01
213	MAY 28/07	R01
214	MAY 28/07	R01
215	MAY 28/07	R01
216	MAY 28/07	R01

PAGE	DATE	CODE
71-00-00		CONT.
217	MAY 28/07	R01
218	MAY 28/07	R01
219	MAY 28/07	R01
220	MAY 28/07	R02
221	MAY 28/07	R02
222	MAY 28/07	R02
223	MAY 28/07	R03
224	MAY 28/07	R03
225	MAY 28/07	R03
226	MAY 28/07	R03
227	MAY 28/07	R03
228	MAY 28/07	R03
229	MAY 28/07	R03
230	MAY 28/07	R03
231	MAY 28/07	R03
232	MAY 28/07	R03
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263	MAY 28/07	R03
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266	MAY 28/07	R03
267	MAY 28/07	R02
268	MAY 28/07	R03
269	MAY 28/07	R03
270	MAY 28/07	R03
271	MAY 28/07	R03
272	MAY 28/07	R03
273	MAY 28/07	R03
274	MAY 28/07	R03

PAGE	DATE	CODE
71-00-00		CONT.
275	MAY 28/07	R03
276	MAY 28/07	R03
277	MAY 28/07	R03
278	MAY 28/07	R03
279	MAY 28/07	R03
280	MAY 28/07	R03
280A	MAY 28/07	R03
280B	MAY 28/07	R03
280C	MAY 28/07	R03
280D	MAY 28/07	R03
280E	MAY 28/07	R03
280F	MAY 28/07	R03
280G	MAY 28/07	R03
280H	MAY 28/07	R03
280I	MAY 28/07	R03
280J	MAY 28/07	R03
280K	MAY 28/07	R03
280L	MAY 28/07	R03
280M	MAY 28/07	R03
280N	MAY 28/07	R03
280O	MAY 28/07	R03
280P	MAY 28/07	R03
280Q	MAY 28/07	R03
280R	MAY 28/07	R03
280S	MAY 28/07	R03
280T	MAY 28/07	R03
280U	MAY 28/07	R03
280V	MAY 28/07	R03
280W	MAY 28/07	R03
280X	MAY 28/07	R03
280Y	MAY 28/07	R03
280Z	MAY 28/07	R03
281	MAY 28/07	R03
282	MAY 28/07	R03
282A	MAY 28/07	R03
282B	MAY 28/07	R04
282C	MAY 28/07	R03
282D	MAY 28/07	R02
71-00-00		
501	SEP 20/98	R01A
502	SEP 28/01	R01A
503	SEP 28/01	R01A
504	SEP 28/01	R01A
505	SEP 28/01	R01A
506	MAY 20/08	R01A
507	MAY 28/07	R01A
508	MAY 28/07	R01A
509	MAY 28/07	R01A
510	MAY 28/07	R01A
511	MAY 28/07	R01A
512	MAY 28/07	R01A
513	MAY 28/07	R01A
514	MAY 28/07	R01A
515	MAY 28/07	R01A
516	MAY 28/07	R01A
517	MAY 28/07	R01A
518	MAY 28/07	R01A

GPA Group plc

PAGE	DATE	CODE
71-00-00		CONT.
519	MAY 28/07	R02A
520	MAY 28/07	R02A
521	MAY 28/07	R01A
522	MAY 28/07	R01A
523	MAY 28/07	R01A
524	MAY 28/07	R01A
525	MAY 28/07	R01A
526	MAY 28/07	R01A
527	MAY 28/07	R01A
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530	MAY 28/07	R01A
531	MAY 28/07	R01A
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533	SEP 28/07	R02A
534	MAY 28/07	R02A
535	MAY 28/07	R02A
536	MAY 28/07	R01A
537	MAY 28/07	R01A
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582B	MAY 28/07	R02A
582C	MAY 28/07	R02A
582D	MAY 28/07	R02A
582E	MAY 28/07	R01A
582F	MAY 28/07	R01A
582G	MAY 28/07	R01A
582H	MAY 28/07	R01A
582I	MAY 28/07	R01A
582J	MAY 28/07	R01A
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582M	MAY 28/07	R01A
582N	MAY 28/07	R01A
582O	MAY 28/07	R01A
582P	MAY 28/07	R02A
582Q	MAY 28/07	R02A
582R	MAY 28/07	R02A
582S	MAY 28/07	R02A
582T	MAY 28/07	R02A
582U	MAY 28/07	R02A
582V	MAY 28/07	R02A
582W	MAY 28/07	R02A
582X	MAY 28/07	R02A
582Y	MAY 28/07	R02A
582Z	MAY 28/07	R02A
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584	MAY 28/07	R02A
584A	MAY 28/07	R02A
584B	MAY 28/07	R02A
584C	MAY 28/07	R02A
584D	MAY 28/07	R02A
584E	MAY 28/07	R02A
584F	MAY 28/07	R02A
584G	MAY 28/07	R02A
584H	MAY 28/07	R02A
584I	MAY 28/07	R02A
584J	MAY 28/07	R02A
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584L	MAY 28/07	R02A
584M	MAY 28/07	R02A
584N	MAY 28/07	R02A
584O	MAY 28/07	R02A
584P	MAY 28/07	R02A
584Q	MAY 28/07	R02A
584R	MAY 28/07	R02A
584S	MAY 28/07	R02A
584T	MAY 28/07	R02A
584U	MAY 28/07	R02A
584V	MAY 28/07	R02A
584W	MAY 28/07	R02A
584X	MAY 28/07	R02A
584Y	MAY 28/07	R02A
584Z	MAY 28/07	R02A
585	MAY 28/07	R02A
586	MAY 28/07	R02A
586A	MAY 28/07	R02A
586B	MAY 28/07	R02A
586C	MAY 28/07	R02A
586D	MAY 28/07	R02A
586E	MAY 28/07	R02A
586F	MAY 28/07	R02A
586G	MAY 28/07	R02A
586H	MAY 28/07	R02A
586I	MAY 28/07	R02A
586J	MAY 28/07	R02A
586K	MAY 28/07	R02A
586L	MAY 28/07	R02A
586M	MAY 28/07	R02A
586N	MAY 28/07	R02A
586O	MAY 28/07	R02A
586P	MAY 28/07	R02A
586Q	MAY 28/07	R02A
586R	MAY 28/07	R02A
586S	MAY 28/07	R02A
586T	MAY 28/07	R02A
586U	MAY 28/07	R02A
586V	MAY 28/07	R02A
586W	MAY 28/07	R02A
586X	MAY 28/07	R02A
586Y	MAY 28/07	R02A
586Z	MAY 28/07	R02A
587	MAY 28/07	R02A
588	MAY 28/07	R02A

GPA Group plc

PAGE	DATE	CODE
71-00-00		CONT.
588A	MAY 28/07	R02A
588B	MAY 28/07	R02A
588C	MAY 28/07	R02A
588D	MAY 28/07	R02A
588E	MAY 28/07	R02A
588F	MAY 28/07	R02A
588G	MAY 28/07	R02A
588H	MAY 28/07	R02A
588I	MAY 28/07	R02A
588J	MAY 28/07	R02A
588K	MAY 28/07	R02A
588L	MAY 28/07	R02A
588M	MAY 28/07	R02A
588N	MAY 28/07	R02A
588O	MAY 28/07	R02A
588P	MAY 28/07	R02A
588Q	MAY 28/07	R02A
588R	MAY 28/07	R02A
588S	MAY 28/07	R02A
588T	MAY 28/07	R02A
588U	MAY 28/07	R02A
588V	MAY 28/07	R02A
588W	MAY 28/07	R02A
588X	MAY 28/07	R02A
588Y	MAY 28/07	R02A
588Z	MAY 28/07	R02A
589	MAY 28/07	R02A
590	MAY 28/07	R02A
590A	MAY 28/07	R02A
590B	MAY 28/07	R02A
590C	SEP 28/07	R02A
590D	MAY 28/07	R02A
590E	MAY 28/07	R02A
590F	MAY 28/07	R02A
590G	MAY 28/07	R02A
590H	MAY 28/07	R02A
590I	MAY 28/07	R02A
590J	MAY 28/07	R02A
590K	MAY 28/07	R02A
590L	MAY 28/07	R02A
590M	MAY 28/07	R02A
590N	MAY 28/07	R02A
590O	MAY 28/07	R02A
590P	MAY 28/07	R02A
590Q	MAY 28/07	R02A
590R	MAY 28/07	R02A
590S	MAY 28/07	R02A
590T	MAY 28/07	R02A
590U	MAY 28/07	R02A
590V	MAY 28/07	R02A
590W	MAY 28/07	R02A
590X	MAY 28/07	R01A
71-00-00		
601	SEP 28/06	R01
602	JAN 28/00	R01
603	SEP 28/99	R01
604	MAY 20/08	R01
605	MAY 20/08	R01
606	JAN 28/00	R01
607	JAN 28/00	R01
608	JAN 28/00	R01
609	MAY 28/07	R01
610	MAY 28/07	R01
611	SEP 20/08	R01
612	BLANK	
71-00-02		
R 401	JAN 20/09	R01.101
R 402	JAN 20/09	R01.101
R 403	JAN 20/09	R01.101
404	SEP 28/05	R01
405	MAY 20/08	R01
406	SEP 28/05	R01
407	SEP 28/05	R01
408	SEP 28/05	R01
409	SEP 20/93	R03
410	SEP 28/05	R05
411	DEC 20/91	R03
412	DEC 20/91	R03
413	SEP 20/93	R04
414	DEC 20/96	R02
415	SEP 28/05	R04
416	DEC 20/91	R03
417	SEP 20/93	R04
418	JUN 20/95	R02
419	DEC 20/96	R03
420	SEP 20/93	R04
421	SEP 20/93	R04
422	SEP 20/93	R04
423	SEP 20/93	R04
424	SEP 20/93	R03
425	DEC 20/96	R03
426	SEP 28/00	R01
427	JAN 28/05	R01
428	SEP 28/04	R01
429	MAY 20/08	R01
430	MAY 20/08	R02
431	JUN 20/96	R04
432	MAY 20/08	R01
433	JAN 28/07	R01
434	JAN 28/07	R01
435	JAN 28/07	R02
436	JUN 20/96	R04
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439	JAN 28/07	R01
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441	SEP 28/00	R05
442	JUN 20/96	R03
443	JAN 28/07	R01
444	SEP 28/00	R01
445	SEP 28/00	R01
446	SEP 28/00	R01
447	SEP 28/99	R05
448	SEP 28/99	R04
449	JAN 28/05	R05
450	SEP 28/99	R04
451	SEP 28/00	R01
452	SEP 28/99	R04
453	SEP 28/00	R01
454	MAY 28/06	R02
455	MAY 28/06	R01
456	MAY 28/06	R04
457	MAY 28/06	R01
458	MAY 28/06	R03
459	SEP 28/00	R01
460	MAY 28/06	R01
461	MAY 28/06	R01
462	JAN 28/03	R01
463	JAN 28/03	R01
464	SEP 28/07	R02
465	SEP 28/07	R01
466	SEP 28/07	R01
467	JUN 20/96	R01
468	JUN 20/96	R01
469	JUN 20/96	R01
470	JUN 20/96	R01
471	JUN 20/96	R01
472	JUN 20/96	R01
473	SEP 28/07	R01
474	SEP 28/07	R01
475	SEP 28/07	R01
476	SEP 28/07	R01
477	SEP 28/07	R01
478	SEP 28/07	R01
479	SEP 28/07	R01
480	SEP 28/07	R03
480A	SEP 28/07	R03
480B	SEP 28/07	R06
480C	SEP 28/07	R05
480D	SEP 28/07	R02
480E	SEP 28/07	R01
480F	SEP 28/07	R01
480G	SEP 28/07	R02
480H	SEP 28/07	R01
480I	SEP 28/07	R01
480J	SEP 28/07	R03
480K	SEP 28/07	R01
480L	SEP 28/07	R01
480M	SEP 28/07	R01
480N	SEP 28/07	R01
480O	SEP 28/07	R09
480P	SEP 28/07	R08
480Q	SEP 28/07	R08
480R	BLANK	
71-00-03		
201	JAN 28/02	R01
202	JAN 28/05	R01
203	MAY 28/01	R01
204	SEP 28/04	R01
205	SEP 28/04	R01
206	JAN 28/02	R01

GPA Group plc

PAGE	DATE	CODE
71-00-03		CONT.
207	JAN 28/02	R01
208	JAN 28/02	R01
209	JAN 28/02	R01
210	JAN 28/02	R01
211	JAN 28/02	R01
212	JAN 28/02	R01
213	JAN 28/02	R01
214	JAN 28/02	R01
215	JAN 28/02	R01
216	JAN 28/02	R01
217	JAN 28/02	R01
218	JAN 28/05	R01
219	JAN 28/05	R01
220	JAN 28/05	R01
221	JAN 28/05	R01
222	JAN 28/05	R01
223	JAN 28/02	R01
224	JAN 28/02	R01
225	JAN 28/02	R01
226	JAN 28/02	R01
227	JAN 28/02	R01
228	JAN 28/02	R01
229	JAN 28/02	R01
230	JAN 28/02	R01
231	JAN 28/02	R01
232	JAN 28/02	R01
233	JAN 28/02	R01
234	JAN 28/02	R01
235	JAN 28/02	R01
236	JAN 28/02	R01
71-00-07		
201	JAN 20/08	R01A
202	JAN 20/08	R01A
71-11-00		
1	SEP 28/01	R01
2	MAY 28/01	R01
3	MAY 28/01	R01
4	SEP 28/01	R01
5	MAY 28/01	R01
6	SEP 28/01	R01
7	MAY 28/01	R01
8	BLANK	
71-11-00		
101	SEP 20/94	R01
102	SEP 20/94	R01
71-11-00		
601	MAR 20/91	R01
602	MAR 20/91	R01
71-11-01		
401	MAR 20/94	R01
402	MAY 28/01	R01
403	MAY 28/01	R01
404	MAY 28/01	R01

PAGE	DATE	CODE
71-11-01		CONT.
405	MAY 28/01	R01
406	MAY 28/01	R01
407	MAY 28/01	R01
408	JAN 28/03	R01
409	MAY 28/01	R01
410	JAN 28/03	R01
411	JAN 28/03	R01
412	JAN 28/03	R01
413	JAN 28/03	R01
414	JAN 28/03	R01
415	JAN 28/03	R01
416	BLANK	
71-11-01		
501	SEP 28/99	R01
502	DEC 20/91	R01
503	JUN 20/95	R01
504	BLANK	
71-11-01		
601	MAY 28/01	R01
602	DEC 20/93	R01
603	SEP 28/05	R01
604	MAY 20/08	R01
605	SEP 20/90	R01
606	MAY 28/01	R01
71-11-01		
801	SEP 28/00	R01
802	DEC 20/93	R01
803	DEC 20/93	R01
804	MAY 28/01	R01
805	DEC 20/91	R01
806	DEC 20/90	R01
807	DEC 20/93	R01
808	DEC 20/93	R01
809	DEC 20/93	R02
810	DEC 20/93	R02
811	DEC 20/93	R01
812	DEC 20/93	R01
813	DEC 20/93	R01
814	DEC 20/91	R01
815	DEC 20/91	R01
816	SEP 20/94	R01
817	DEC 20/91	R01
818	DEC 20/93	R01
819	SEP 20/94	R01
820	SEP 20/94	R01
821	JUN 20/92	R01
822	DEC 20/93	R01
823	JUN 20/92	R01
824	JUN 20/92	R01
825	JUN 20/92	R01
826	JUN 20/92	R01
827	JUN 20/92	R01
828	JUN 20/92	R01
829	DEC 20/93	R01
830	JAN 28/00	R01

PAGE	DATE	CODE
71-11-01		CONT.
831	JUN 20/92	R01
832	JUN 20/92	R01
833	JUN 20/92	R01
834	BLANK	
71-11-04		
201	SEP 28/00	R01
202	SEP 20/89	R01
203	DEC 15/82	R01
204	SEP 28/00	R01
205	SEP 28/00	R03
206	SEP 28/00	R01
71-11-04		
401	SEP 20/95	R01
402	SEP 20/91	R01
403	DEC 20/89	R01
404	SEP 20/95	R01
405	SEP 20/95	R01
406	SEP 20/97	R01
407	SEP 28/05	R01
408	SEP 28/05	R01
71-11-04		
601	DEC 20/93	R01
602	MAY 28/03	R01
603	MAY 28/03	R01
604	MAY 28/03	R01
605	MAY 28/03	R01
606	MAY 28/03	R01
607	DEC 20/90	R01
608	MAY 28/03	R01
609	MAY 28/03	R01
610	MAY 28/03	R01
611	MAY 28/07	R01
612	MAY 28/03	R01
613	MAY 28/03	R01
614	MAY 28/03	R01
615	MAY 28/03	R02
616	BLANK	
71-11-04		
801	SEP 28/00	R01
802	SEP 28/00	R01
803	SEP 28/00	R01
804	JAN 28/05	R01
805	JAN 28/05	R01
806	JUN 20/96	R01
807	JUN 20/96	R01
808	JAN 28/05	R01
809	JAN 28/05	R01
810	JAN 28/05	R01
811	JAN 28/05	R01
812	JAN 28/05	R01
813	SEP 28/07	R04
814	SEP 28/07	R04
815	SEP 28/07	R04
816	SEP 28/07	R04

GPA Group plc

PAGE	DATE	CODE
71-11-04		CONT.
817	SEP 28/07	R04
818	JAN 28/05	R04
819	SEP 28/07	R04
820	SEP 28/07	R04
821	SEP 28/07	R04
822	SEP 28/07	R04
823	SEP 28/07	R05
824	SEP 28/07	R04
825	SEP 28/07	R05
826	SEP 28/07	R04
827	SEP 28/07	R04
828	SEP 28/07	R04
829	SEP 28/07	R04
830	JUN 20/90	R01
831	JUN 20/90	R01
832	JUN 20/90	R01
833	DEC 20/90	R01
834	SEP 28/07	R03
835	SEP 28/07	R03
836	SEP 28/07	R04
837	JAN 28/05	R04
838	SEP 28/07	R04
839	JUN 20/90	R01
840	JUN 20/90	R01
841	JUN 20/90	R01
842	JAN 28/05	R03
843	SEP 28/07	R03
844	SEP 28/07	R04
845	SEP 28/07	R04
846	JUN 20/90	R01
847	JUN 20/90	R01
848	MAR 20/93	R02
849	MAR 20/93	R02
850	JAN 28/05	R04
851	JAN 28/05	R04
852	JAN 28/05	R04
853	SEP 28/07	R04
854	SEP 28/07	R04
855	SEP 28/07	R04
856	JUN 20/90	R01
857	JUN 20/90	R01
858	MAR 20/93	R02
859	MAR 20/93	R02
860	SEP 28/01	R01
861	JAN 28/05	R04
862	JAN 28/05	R04
863	SEP 28/07	R05
864	SEP 28/07	R05
865	JAN 28/00	R01
866	JAN 28/00	R01
867	JAN 28/00	R01
868	JAN 28/05	R04
869	JAN 28/05	R04
870	SEP 28/07	R04
871	SEP 28/07	R04
872	JAN 28/05	R04
873	SEP 28/07	R06
874	MAY 28/07	R03

PAGE	DATE	CODE
71-11-04		CONT.
875	JAN 28/00	R01
876	SEP 28/07	R03
877	SEP 28/07	R05
878	SEP 28/07	R03
879	MAY 28/07	R03
880	SEP 28/07	R04
880A	SEP 28/07	R04
880B	JAN 28/05	R04
880C	JAN 28/05	R04
880D	SEP 28/07	R04
880E	SEP 28/07	R04
880F	JAN 28/05	R04
880G	MAY 28/07	R04
880H	SEP 28/07	R04
880I	JAN 28/05	R04
880J	SEP 28/07	R04
880K	SEP 28/07	R04
880L	SEP 28/07	R04
880M	JAN 28/05	R04
880N	JAN 28/05	R04
880O	SEP 28/07	R05
880P	SEP 28/07	R05
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880S	JAN 28/05	R04
880T	JAN 28/05	R04
880U	JAN 28/05	R04
880V	JAN 28/05	R05
880W	JAN 28/05	R05
880X	JAN 28/05	R05
880Y	JAN 28/05	R03
880Z	JAN 28/05	R03
881	JAN 28/06	R05
882	JAN 28/05	R05
882A	JAN 28/05	R05
882B	SEP 28/07	R04
882C	SEP 28/07	R05
882D	JAN 28/05	R04
882E	SEP 28/07	R04
882F	SEP 28/07	R04
882G	SEP 28/07	R04
882H	SEP 28/07	R04
882I	SEP 28/07	R04
882J	SEP 28/07	R04
882K	SEP 28/07	R04
882L	SEP 28/07	R04
882M	SEP 28/07	R04
882N	SEP 28/07	R04
882O	SEP 28/07	R04
882P	SEP 28/07	R04
882Q	SEP 28/07	R04
882R	SEP 28/07	R04
882S	SEP 28/07	R04
882T	SEP 28/07	R04
882U	SEP 28/07	R04
882V	SEP 28/07	R04
882W	SEP 28/07	R04
882X	SEP 28/07	R04

PAGE	DATE	CODE
71-11-04		CONT.
882Y	SEP 28/07	R04
882Z	SEP 28/07	R04
883	SEP 28/07	R04
884	SEP 28/07	R04
884A	SEP 28/07	R04
884B	SEP 28/07	R04
884C	SEP 28/07	R04
884D	SEP 28/07	R04
884E	JAN 28/05	R03
884F	JAN 28/05	R03
884G	SEP 28/07	R04
884H	SEP 28/07	R04
884I	JAN 28/05	R04
884J	JAN 28/05	R05
884K	SEP 28/07	R04
884L	SEP 28/07	R04
884M	JAN 28/05	R04
884N	JAN 28/05	R04
8840	JAN 28/05	R05
884P	SEP 28/07	R04
884Q	SEP 28/07	R07
884R	BLANK	
71-11-05		
501	JAN 20/98	R01
502	JUN 20/90	R01
503	MAR 20/96	R01
504	BLANK	
71-11-07		
401	MAR 20/96	R01
402	SEP 20/97	R03
403	DEC 20/90	R03
404	JUN 20/90	R03
405	MAR 20/96	R03
406	BLANK	
71-11-07		
601	SEP 28/05	R02
602	MAY 28/06	R01
71-21-00		
1	MAR 15/83	R01
2	DEC 15/86	R01
3	DEC 15/86	R01
4	DEC 15/86	R01
71-21-00		
101	SEP 20/94	R01
102	SEP 20/94	R01
71-21-01		
401	SEP 28/99	R01
402	SEP 20/90	R01
403	DEC 15/86	R01
404	JAN 28/04	R01
405	MAR 20/93	R01
406	JAN 28/06	R01

GPA Group plc

PAGE	DATE	CODE
71-21-01		
601	MAR 20/94	R01
602	DEC 15/86	R01
603	MAR 20/94	R01
604	MAR 20/97	R01
605	JAN 28/06	R01
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607	MAY 28/06	R01
608	BLANK	
71-21-02		
401	JAN 28/05	R01
402	SEP 20/90	R01
403	DEC 15/86	R01
404	JAN 28/05	R01
405	SEP 28/99	R01
406	JAN 28/05	R01
71-21-02		
601	MAR 20/94	R01
602	MAY 28/99	R01
603	MAR 20/95	R01
604	MAR 20/94	R01
605	SEP 28/07	R01
606	SEP 28/07	R01
607	SEP 28/07	R01
608	BLANK	
71-21-03		
401	SEP 20/97	R01
402	SEP 20/88	R01
403	SEP 20/88	R01
404	DEC 20/88	R01
405	MAR 20/93	R02
406	MAR 20/93	R02
407	MAR 20/96	R01
408	MAR 20/93	R02
409	MAR 20/93	R02
410	BLANK	
71-51-00		
601	MAY 28/00	R01
602	MAY 28/00	R01
603	MAY 28/00	R01
604	MAY 28/00	R01
605	MAY 28/00	R01
606	MAY 28/00	R01
607	MAY 28/00	R01
608	MAY 28/00	R01
609	MAY 28/00	R01
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71-51-00		
801	JAN 28/05	R01
802	MAR 20/91	R01

PAGE	DATE	CODE
71-51-01		
401	MAY 28/03	R01
402	MAY 28/03	R01
403	MAY 28/03	R01
404	MAY 28/03	R01
405	MAY 28/03	R01
406	MAY 28/03	R01
407	MAY 28/03	R01
408	MAY 28/03	R01
409	MAY 28/03	R01
410	MAY 28/03	R01
71-51-01		
601	MAY 28/03	R01
602	MAY 28/03	R01
603	MAY 28/03	R01
604	BLANK	
71-71-00		
1	SEP 28/01	R01
2	JAN 28/01	R01
3	JAN 28/06	R01
4	SEP 28/01	R01
5	JAN 28/01	R01
6	BLANK	
71-71-00		
101	SEP 20/94	R01
102	SEP 20/94	R01
71-71-00		
601	JUN 20/93	R01
602	JAN 28/02	R01
603	JAN 28/00	R02
604	JAN 28/01	R01
605	JAN 28/02	R02
606	JAN 28/05	R01
607	JAN 28/05	R01
608	JAN 28/03	R02
609	JAN 28/03	R01
610	JAN 28/00	R02
611	JAN 28/03	R01
612	JAN 28/03	R01
71-71-01		
401	MAR 20/91	R01
402	MAR 20/91	R01
403	MAR 20/91	R01
404	MAR 20/91	R01
405	MAR 20/91	R01
406	BLANK	
71-71-01		
601	DEC 20/94	R01
602	DEC 20/94	R01

PAGE	DATE	CODE
71-71-02		
601	DEC 20/95	R01
602	MAY 28/06	R01
603	MAY 28/05	R01
604	BLANK	
71-71-04		
201	SEP 20/95	R01
202	MAR 20/91	R01
203	SEP 20/95	R01
204	SEP 20/95	R01
205	SEP 28/99	R01
206	BLANK	
71-71-05		
401	MAR 20/94	R01
402	MAR 20/89	R01
403	MAR 20/94	R01
404	DEC 20/92	R01
405	DEC 20/92	R01
406	BLANK	

CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

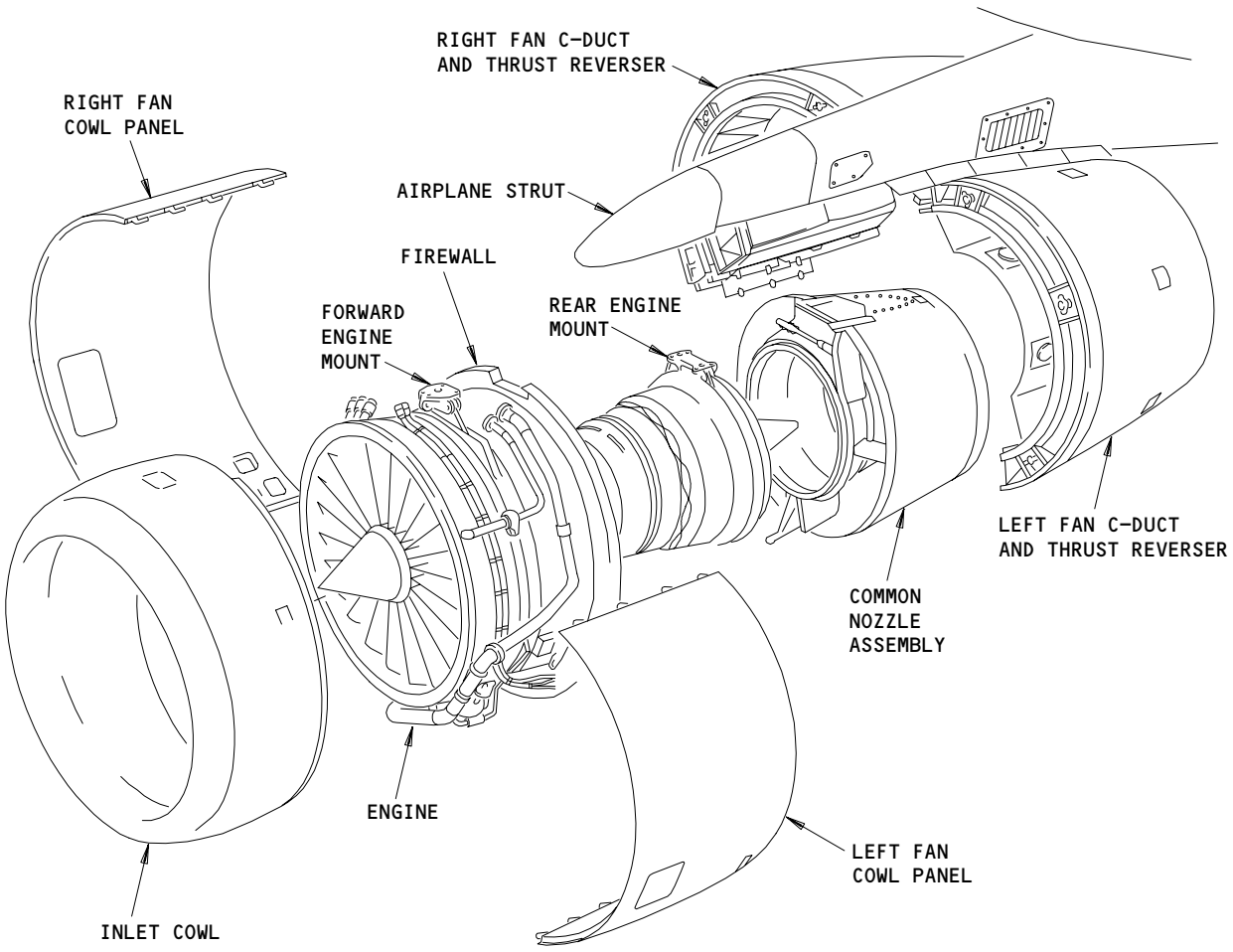
CHAPTER 71 - POWER PLANT

TABLE OF CONTENTS

POWER PLANT - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. Two RB211-535E4 engines power the 757 airplane and are suspended from wing mounted struts by two mounts (AMM 71-21-00/001) positioned in tandem along the top of each engine. The front mount transmits engine thrust, vertical and side loads to the airframe structure. The rear mount transmits vertical, side and torsional loads to the airframe structure.
   B. Each propulsion system (Fig. 1) comprises an engine (AMM 72-00-00/001), engine cowling (AMM 71-11-00/001), exhaust system (AMM 78-00-00/001) engine vents and drains system (AMM 71-71-00/001), and accessories.
   C. The engine is a high by-pass ratio, three shaft turbofan consisting of a single stage Low Pressure (LP) compressor driven by a three stage Low Pressure (LP) turbine, a six stage Intermediate Pressure (IP) compressor and a six stage High Pressure (HP) compressor each driven by a single stage Intermediate Pressure (IP) and High Pressure (HP) turbine, and an annular combustion system. Each rotating assembly is mechanically independent of the other two. For further information on the power plant, see Compressor System (AMM 72-30-00/001), Combustion System (AMM 72-40-00/001), and Turbine System (AMM 72-50-00/001).
   D. The engine has a bypass ratio of 4.1 to 1 and a pressure ratio of 28.5 to 1. It has a takeoff thrust rating of 40,100 lb at sea level.
   E. The cowling comprises a left and right fan cowl panel and an inlet cowl. The fan cowl panels protect the fan case mounted components from damage. The inlet cowl provides a smooth entry of the airstream into the engine.
   F. The exhaust system comprises a right and left fan thrust reverser C-duct (AMM 78-31-00/001) and a common nozzle exhaust collector (AMM 78-11-00/001).
   G. Each propulsion system incorporates a drain system that collects and disposes of inflammable fluids from accessory units, and from the combustion system following engine shutdown. The fluids are either ejected directly overboard through vents, or collected in a drain tank that empties automatically into the LP fuel system during engine starting.
   H. Quick engine change (Q.E.C.) unit is an engine prepared and ready for installation, complete with exhaust system, inlet cowl, accessories and systems, but less the fan cowl panels and the thrust reverser 'C' ducts.
   I. The approximate weights and dimensions of a Q.E.C. unit are given below:

Weight	Length	Diameter
9189 lbs (4168 kg)	223 in. (5664 mm)	95.0 in. (2413 mm)



69285

Propulsion System, Major Units
Figure 1

J. Engine Number Description

(1) The standard engine coverage is for the RB211-535C-37, the RB211-535E4-37, and the RB211-535E4-B-37.

(2) The engine type number is based on these designations:

(a)	RB -	General Designation
(b)	211 -	Specific engine type
(c)	535C -	Basic engine rating level
(d)	535E4 -	Engine rating variation
(e)	535E4-B -	Engine rating variation
(f)	-37 -	Shows that the engine is installed on a Boeing 757.

(3) Changes to the standard engine have been made to meet the needs of the individual operators. These changes are shown by the addition of a slash number to the standard engine number.

(4) The slash number does not show on the engine data plate. Subsequent changes to the slash number are shown in Service Bulletin (SB) modifications.

(5) This list shows the Rolls-Royce Service Bulletins used to change the standard engines to the specific (slash number) build standard:

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535C-37/10	73-6056 80-B009	Introduces Speed and Temperature Limiter in place of Engine Supervisory Controller Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535C-37/11	26-6734 73-6352 80-B009	Introduces Graviner Fire Detection System Introduces ESC Intermediate Junction Box Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/10	73-6056 80-B009	Introduces Speed and Temp Limiter in place of Engine Supervisory Controller Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/11	26-7205 73-6352 80-B009	Introduces Graviner Fire Detection System Introduces ESC Intermediate Junction Box Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/12	73-6352 80-B009	Introduces ESC Intermediate Junction Box Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/14	26-7205 73-6352 78-8921 80-B009	Introduces Graviner Fire Detection System Introduces ESC Intermediate Junction Box Introduces Thrust Reverser Override Switch Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/15	26-8875 72-8824 73-6352 80-8972	Systron Donner Firewire Terminal Stud Con. Introduces Screw-in Magnetic Chip Detectors Introduces ESC Intermediate Junction Box Introduces Allied Signal (Garrett) Starter

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-37/16	26-7205	Introduces Graviner Fire Detection System
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	73-6352	Introduces ESC Intermediate Junction Box
	80-B009	Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/17	26-7205	Introduces Graviner Fire Detection System
	73-6056	Introduces Speed and Temp Limiter in place of Engine Supervisory Controller
	80-B009	Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/19	24-9280	Electrical Power - IDG Cooling - Variable Power
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	73-6352	Introduces ESC Intermediate Junction Box
	80-B009	Introduces an extension on the oil fill port for the Hamilton Standard Pneumatic Starter
RB211-535E4-37/20	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	73-6352	Introduces ESC Intermediate Junction Box
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	80-9813	Introduces Hamilton Standard Starter (PW standard)

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-37/23	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	73-6352	Introduces ESC Intermediate Junction Box
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	80-9813	Introduces Hamilton Standard Starter (PW standard)
RB211-535E4-37/24	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	73-6352	Introduces ESC Intermediate Junction Box
RB211-535E4-37/25	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	72-C230	Introduces Revised HP System incorporating an improved combustor
	73-6352	Introduces ESC Intermediate Junction Box
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
	80-9813	Introduces Hamilton Standard Starter (PW standard)

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-37/39	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-C230	Introduces Revised HP System incorporating an improved combustor
	73-6352	Introduces ESC Intermediate Junction Box
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
RB211-535E4-37/43	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	72-C230	Introduces Revised HP System incorporating an improved combustor
	73-6352	Introduces ESC Intermediate Junction Box
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
	80-9813	Introduces Hamilton Standard Starter (PW standard)

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-37/44	24-9280	Electrical Power - IDG Cooling Variable Air Supply
	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-C230	Introduces Revised HP System incorporating an improved combustor
	73-6352	Introduces ESC Intermediate Junction Box
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
RB211-535E4-B-37/15	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	80-8972	Introduces Allied Signal (Garrett) Starter
RB211-535E4-B-37/19	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
RB211-535E4-B-37/20	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	80-9813	Introduces Hamilton Standard Starter (PW standard)

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-B-37/21	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	80-9813	Introduces Hamilton Standard Starter (PW standard)
RB211-535E4-B-37/25	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-B090	Nose Cone Spinner With Rotational Hazard Scroll
	72-C230	Introduces Revised HP System incorporating an improved combustor
	72-C547	Airborne Vibration Monitor - Introduces Once-Per-Rev Signal
	73-9830	Introduces the Fuel Flowmeter type 8TJ124GGN3
	73-B041	Fuel Flow Governor With Fluoro-Carbon Seal Rings Throughout
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
	80-9813	Introduces Hamilton Standard Starter (PW standard)
RB211-535E4-B-37/35	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-C230	Introduces Revised HP System incorporating an improved combustor
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
	80-8972	Introduces Allied Signal (Garrett) Starter

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION
RB211-535E4-B-37/39	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-C230	Introduces Revised HP System incorporating an improved combustor
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
RB211-535E4-B-37/41	26-8875	Systron Donner Firewire Terminal Stud Con.
	72-8824	Introduces Screw-in Magnetic Chip Detectors
	72-C230	Introduces Revised HP System incorporating an improved combustor
	75-C796	HP and IP Bleed - Introduces Revised IP6.2 Bleed Valve Solenoid and (P30) Control Valve for High Altitude Handling
	75-C823	Air Flow Control - Introduces Transient Pressure Unit to Provision for future revision to HP system
	75-C824	Air Flow Control - Introduces IP and HP Bleed Controller to Provision for future revision to HP system
	80-9813	Introduces Hamilton Standard Starter (PW standard)
RB211-535E4-C-37	26-8875	Systron Donner Firewire Terminal Stud Con.
	24-9280	Integrated Drive Generator (IDG) Cooling-Variable Air Supply
	80-9813	Introduces Hamilton Standard Starter (Pand W-Standard)
	73-9830	Introduces Fuel Flowmeter Type8TJ124GGN3
	73-B041	Fuel Flow Govenor with Flourcarbon Sealing Rings Throughout
	72-B090	Nose Cone Spinner with Rotational Hazard Scroll

STANDARD ENGINE and SLASH NUMBER	RR SB	SERVICE BULLETIN DESCRIPTION

(6) Engine to Airplane Interchangeability - Identified by a letter suffix to the slash number varient.
   (a) The Rolls-Royce Service Bulletin (SB) modifications listed below affect the engine to airplane interchangeability.
   (b) When the Service Bulletin is incorporated, the engine mark number is to have a letter suffix written on the engine slip plate.
   (c) For example: The RB211-535E4-37/10 changes to the RB211-535E4-37/10A when RR SB 73-7897 has been included.

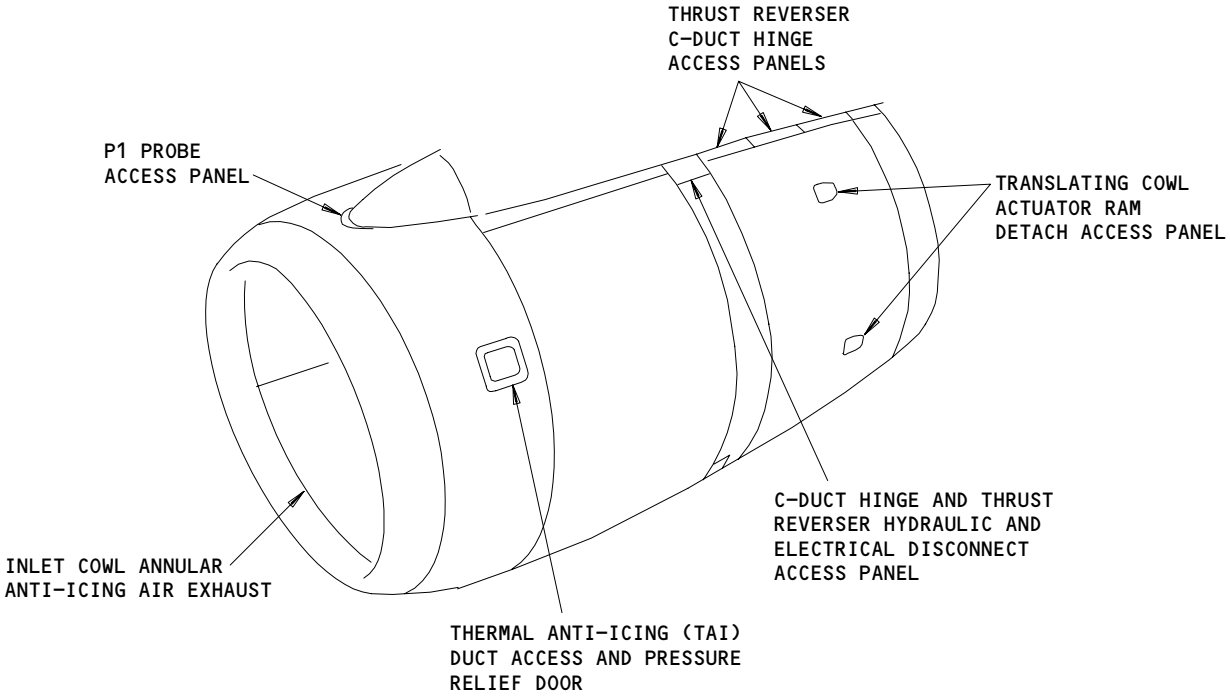
NOTE: There can only be one suffix letter applicable to the mark number at any one time. Although it is not specified as such in the Service Bulletin, the suffix letter should always move on to the latest letter. This is defined by whatever Service Bulletin has been included. In this example, when SB 72-C547 is included, it should change from B to D.

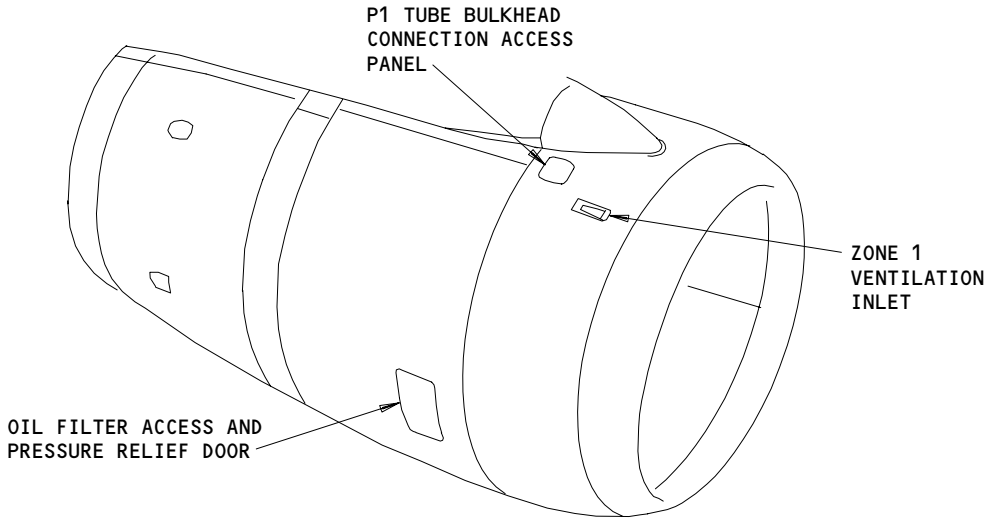
ENGINE MARK NUMBER	ROLLS-ROYCE SERVICE BULLETIN NUMBER						
	73-7897	71-7759	78-8145	71-7936 71-7854	71-8093	72-C547	72-C230
535C-37 BASIC	-	A	C	B	-	-	-
535C-37/10	-	-	B	A	-	-	-
535C-37/11	-	A	C	B	-	-	-

535E4-37 BASIC	–	–	–	A	B	D	E
535E4-37/10	A	–	–	B	C	D	E
535E4-37/11	–	–	–	A	B	D	E
535E4-37/12	–	–	–	A	B	D	E
535E4-37/14	–	–	–	A	B	D	E
535E4-37/16	–	–	–	–	B	D	E
535E4-37/17	–	–	–	–	B	D	E
535E4-37/19	–	–	–	–	B	D	E
535E4-34/20	–	–	–	–	B	D	E
535E4-34/23	–	–	–	–	B	D	E
535E4-34/24	–	–	–	–	B	D	E
535E4-34/25	–	–	–	–	–	–	E
535E4-34/39	–	–	–	–	–	–	E
535E4-37/43	–	–	–	–	–	–	E
535E4-37/44	–	–	–	–	–	–	E
535E4-B-37 BASIC	–	–	–	A	B	D	E
535E4-B-37/15	–	–	–	A	B	D	E
535E4-B-37/20	–	–	–	–	B	D	E
535E4-B-37/21	–	–	–	–	B	D	E
535E4-B-37/25	–	–	–	–	–	–	E
535E4-B-37/35	–	–	–	–	–	–	E
535E4-B-37/39	–	–	–	–	–	–	E
535E4-B-37/41	–	–	–	–	–	–	E

(7) Applicable basic engine/slash number standard.
(a) GPA Ltd. - RB211-535E4-37/11
(8) Engine intermix instructions are released in specific Boeing and Rolls-Royce service bulletins which are subject to regulatory review and approval. If the airline has made arrangments for engine intermix modifications, use the intermix instructions to intermix engines with different type and slash numbers.

2. Component Details
A. Each side of the engine has various access doors and panels which give access to engine components and serve as pressure relief doors.
B. The left side of the engine has the following access doors and panels (Fig. 2):
(1) Anti-icing duct and pressure relief door gives access to the inlet cowl anti-ice duct and serves as a pressure relief door for the anti-ice system.
(2) Four strut access and pressure relief doors and panels. They give access to the various areas in the strut, pressure relief for anti-ice and starter ducts and air exhaust for the pre-coolers.
(3) Three translating cowl actuator access panels which give access to the aft end of the actuator for removal.
(4) Thrust reverser manual deploy access panels allow access to the controls to manually deploy the thrust reverser.
(5) IDG oil fill and indicator access panel allows access to IDG for servicing.
(6) Starter air valve access panel gives access to air valve to verify if air valve is operating.
(7) Engine oil breather outlet duct vent vents the gearbox overboard.
(8) Zone 4 cooling air pressure relief doors vent cooling air out of zone 4.
C. The right side of the engine has the following access doors and panels (Fig. 2):
(1) Engine oil tank filler access and pressure relief door allows oil tank servicing and pressure relief if the anti-ice or starter duct fails.
(2) Zone 1 cooling air outlet.





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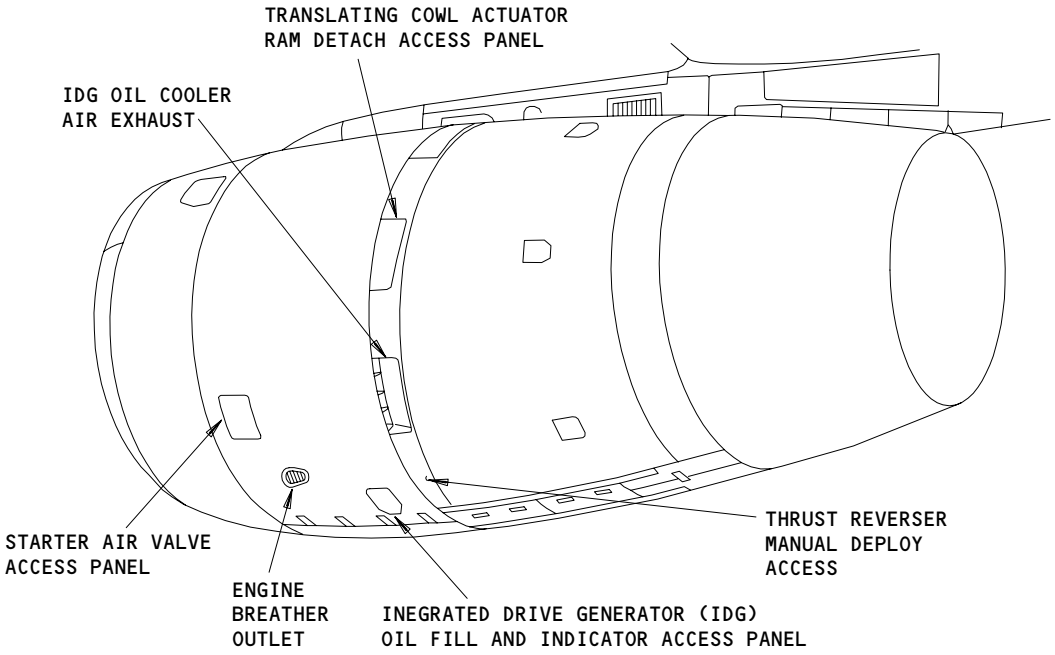
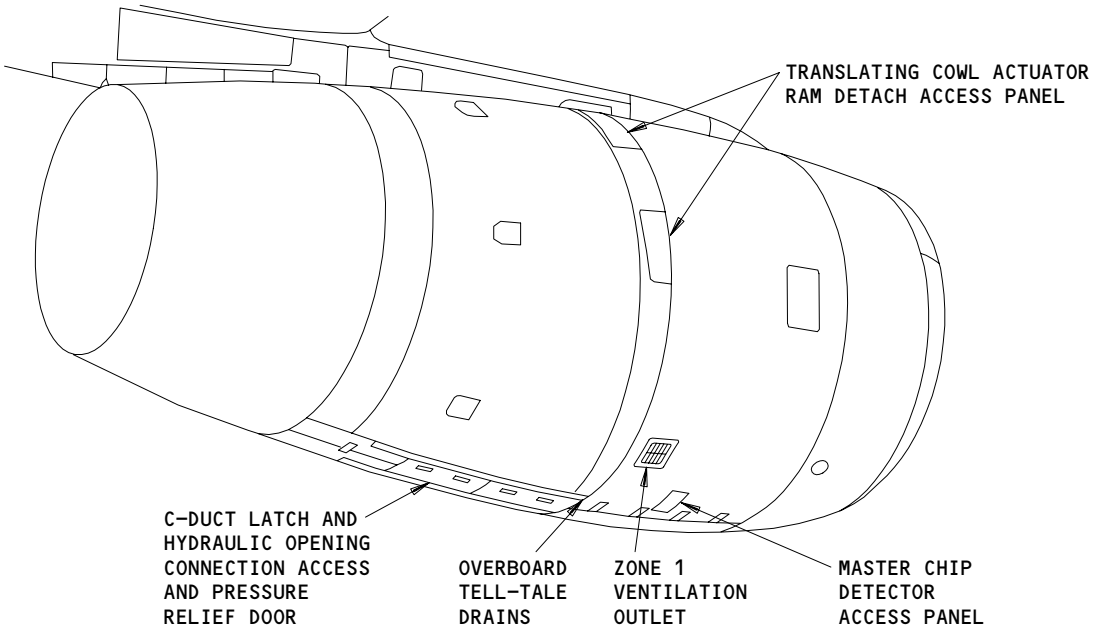
Propulsion System Panels and Apertures
Figure 2 (Sheet 1)





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Propulsion System Panels and Apertures
Figure 2 (Sheet 2)

(3) Master chip detector access panel allows access to the magnetic chip detectors for inspection and removal.
(4) C-duct latch and hydraulic opening connection access and pressure relief door allows access to connect hydraulic pump to C-duct opening actuators and covers latches for C-duct.
(5) Zone 4 cooling air pressure relief doors vents cooling air out of zone 4.
(6) Three translating cowl actuator access panels which gives access to the aft end of the actuator for removal.

D. Access to the following items can be gained by opening the fan cowl panels (Fig. 3):
(1) Two ignition exciters (AMM 74-11-00/001) and accompanying wiring and igniters (Fig. 4, 5).
(2) A low pressure pneumatic starter (Fig. 4) is fitted to each propulsion system. The starter drive is geared through the high-speed (HS) external gearbox to the HP compressor shaft. Air for starting can be either an external supply, air from the aircraft APU or by cross-feeding air from an engine that is running (AMM 80-11-00/001).
(3) An integrated drive generator (IDG) assembly (Fig. 4) and hydraulic pump (Fig. 6) are fitted to the HS external gearbox of each propulsion system. The IDG provides the electrical power (AMM 24-11-00/001) for the propulsion system and aircraft services. The hydraulic pump supplies the hydraulic power (AMM 29-11-00/001) for aircraft and thrust reverser services.
(4) The engine oil system (AMM 79-00-00/001) components (Fig. 6); oil tank, oil filters, fuel/oil coolers, L.P. and H.P. fuel pumps, fuel drains tank and various other oil related items.
(5) The engine indicating system (AMM 77-00-00/001) components; AVM transmitters, EPR transmitter, and N3 tachometer transmitter.

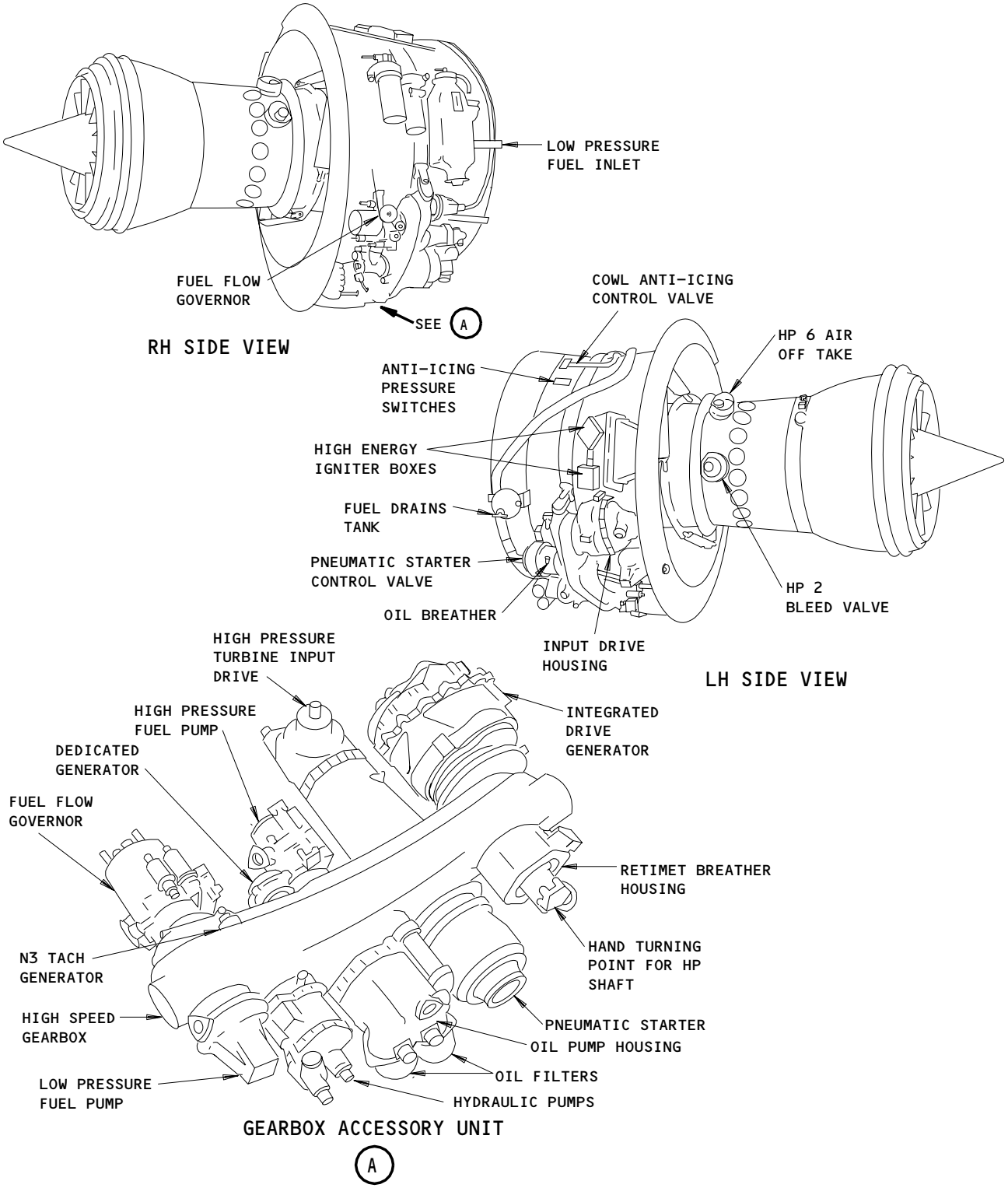
E. Engine control and selection of reverse thrust is accomplished from the flight compartment through a thrust lever and reverse thrust select lever (AMM 76-11-00/001) connected to the fuel system (AMM 73-00-00/001) and the thrust reverser system (AMM 78-31-00/001).

F. The engine inlet of each propulsion system is anti-iced by a self-contained system (AMM 30-21-00/001) fed with hot bleed air from the IP compressor. Bleed air from the HP and IP compressor systems is used for other propulsion system and aircraft services (AMM 75-00-00/001).

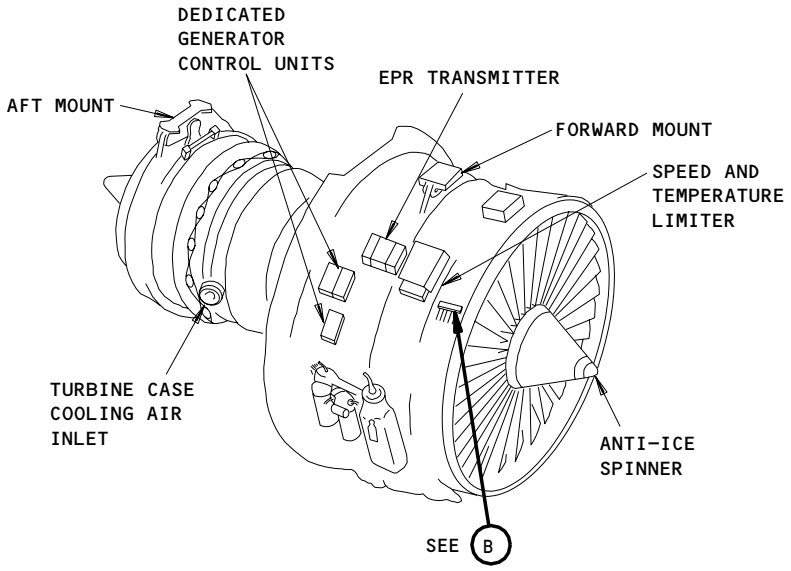
G. To minimize under-cowl temperatures and prevent the accumulation of inflammable vapors each propulsion system is divided into four ventilated zones (AMM 75-21-00/001). The accessory compartment, Zone 1, is ventilated by ram air when the aircraft is airborne and the remaining zones are ventilated by LP compressor delivery air.

H. Firewalls, fireseals, flame break-out shields and structures made from fire resistant metals localize the zones and isolate the engine from the remainder of the aircraft in the event of fires.

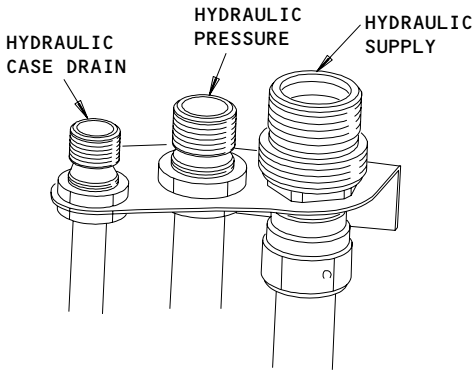
I. A fire detection system (AMM 26-11-00/001) provides a visual and an audible warning in the flight compartment in the event of a fire condition around the engine. A fire extinguishing system comprising two hermatically sealed containers, located in the aircraft, supply an extinguishing agent to distribution nozzles mounted in the pylon floor.



Engine Components
Figure 3 (Sheet 1)



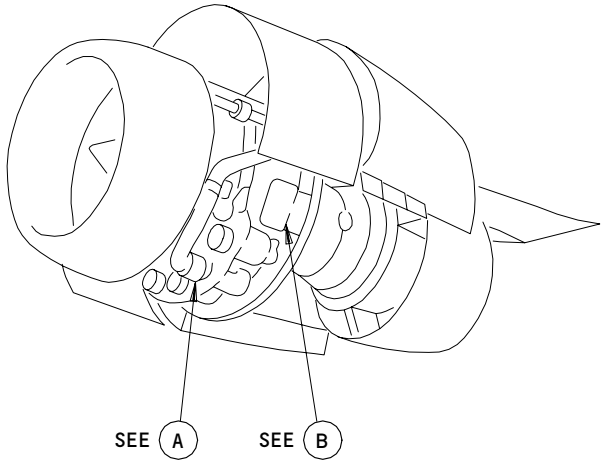
RH SIDE VIEW (UPPER)

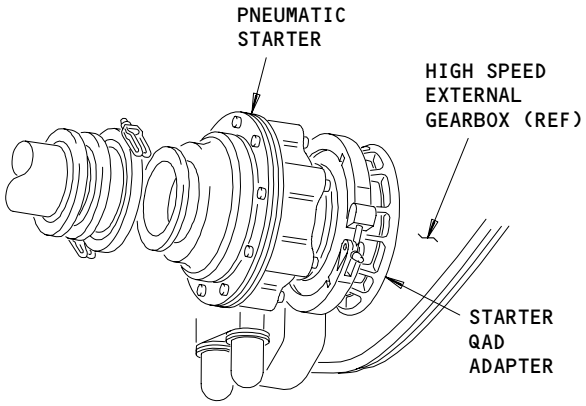


PLUMBING INTERFACE CONNECTORS

B

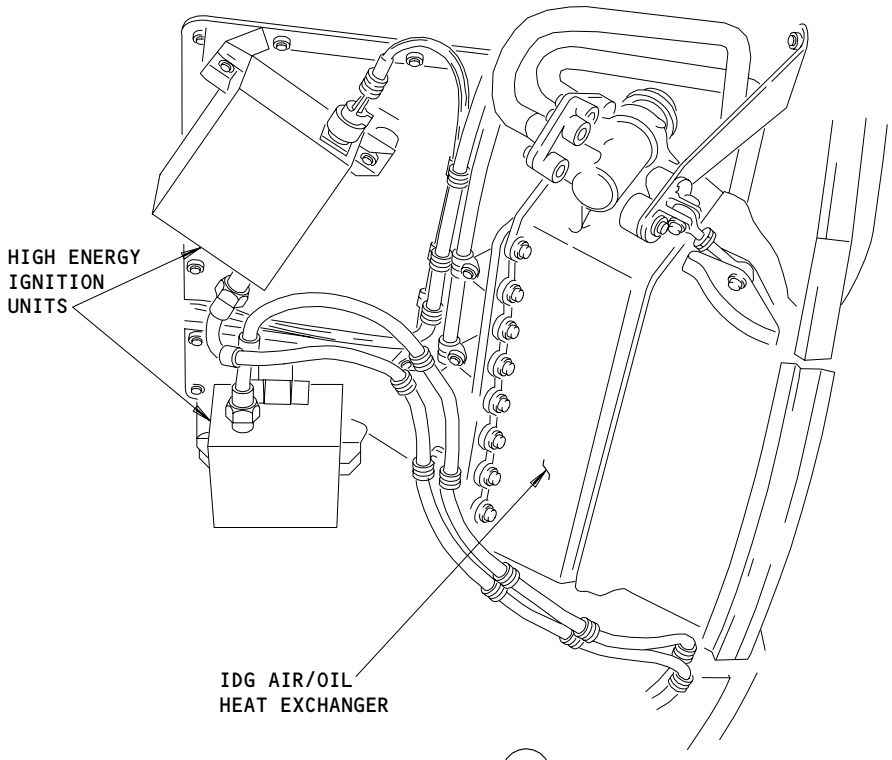
Engine Components
Figure 3 (Sheet 2)





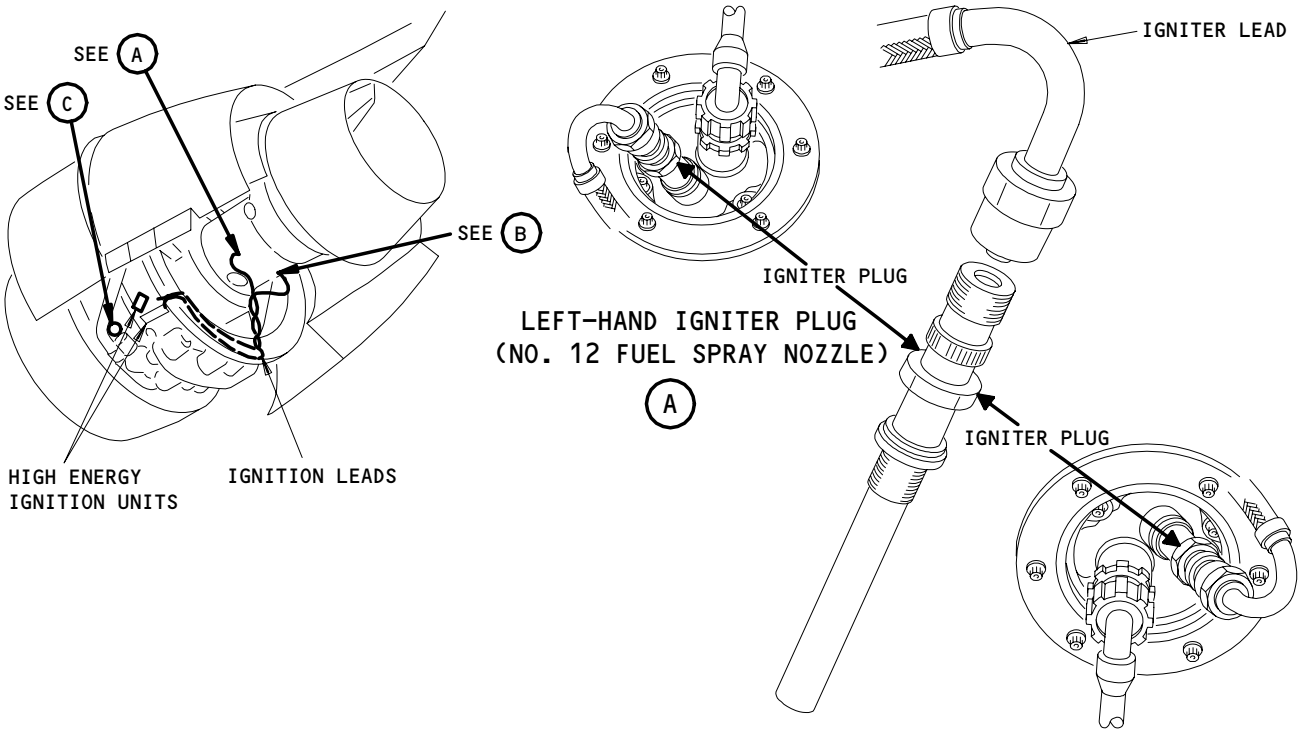
PNEUMATIC STARTER

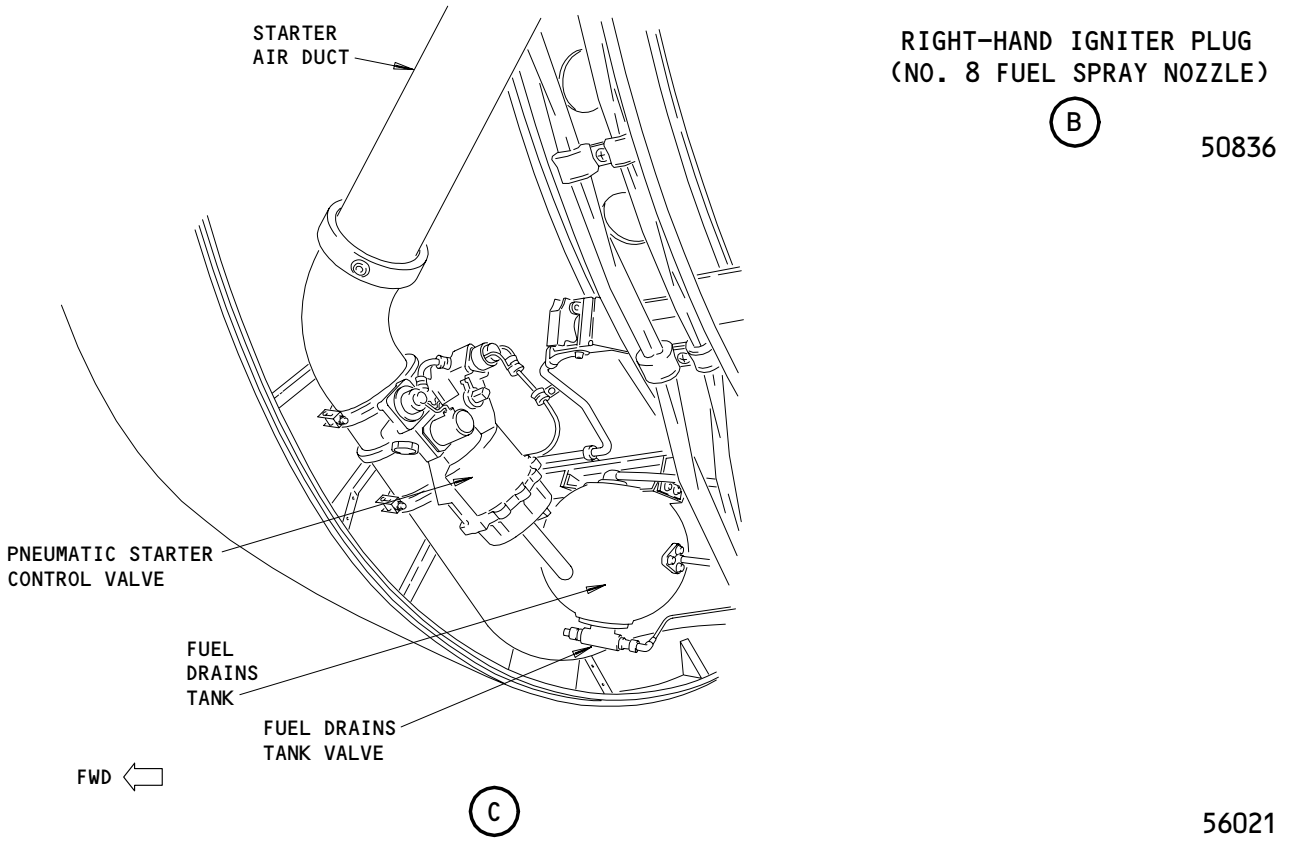
A



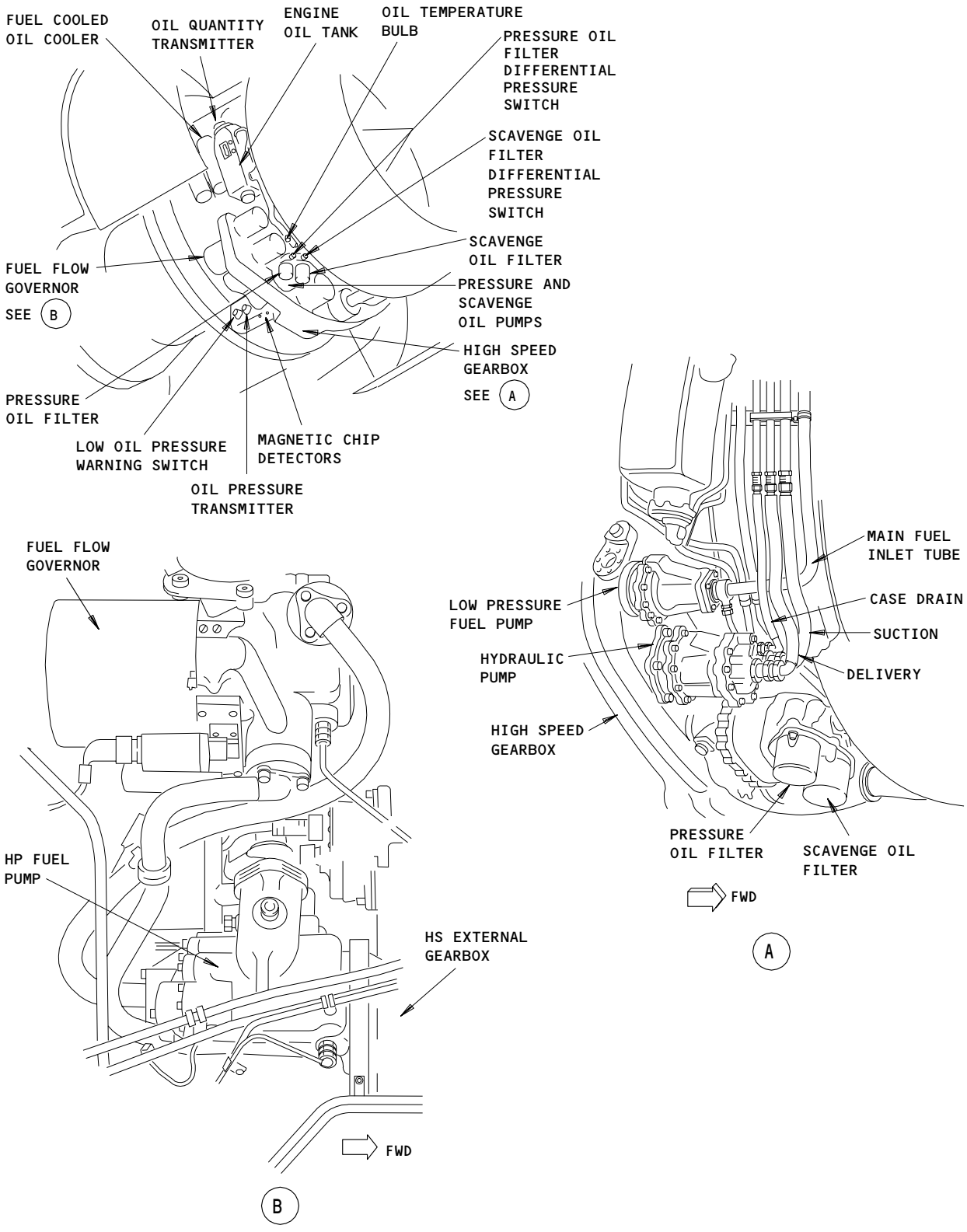
B

Engine Components – Pneumatic Starter,
Ignition System and Integrated Drive Generator
Figure 4





Engine Components – Ignition System, Starting System, and Fuel System
Figure 5



Engine Components – Oil System, Hydraulic Pump, and Fuel System
Figure 6

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POWER PLANT - MAINTENANCE PRACTICES (OPERATION PROCEDURES)

1. General
   A. This procedure has the data that follows:
      (1) Prevent airplane movement during engine operation at high power.
      (2) Safety precautions to operate the engine on the ground.
      (3) Operation limits for the power plant.
      (4) Engine operation on the ground - general procedures
      (5) Power plant operation (start and shutdown)
      (6) Power plant operation (dry and wet motor engine)
      (7) Power plant operation (cold weather)
   B. Engine safety precautions includes data for:
      (1) Dangerous areas around the air inlet at minimum idle/high idle power, breakaway power, and takeoff power.
      (2) Dangerous areas around the engine exhaust at minimum idle/high idle power, breakaway power and takeoff power.
      (3) Dangerous noise areas around the engine.
      (4) Dangerous areas from reverse thrust at minimum idle power.
      (5) Engine cool down after engine operation, engine ignition, and fuel and lubrication oils.
   C. Operation limits for the power plant includes data for:
      (1) Rotor speed, exhaust gas temperature, and time limit table.
      (2) The yellow line and red line EICAS engine limits for the EGT overtemperature conditions, and the N1, N2 and N3 overspeed conditions.
      (3) Vibration guidelines, oil consumption limits, oil pressure limits, and oil temperature limits.
   D. Engine operation on the ground general practices has data you should know before the engine is operated.
      (1) Preparation for engine operation, wind direction, starter operation, leakage, ignition use, engine operation during ice conditions, and compressor surge.
      (2) Thrust lever movements, engine cowl and thrust reverser limits, seized low pressure rotor, and engine fire.
      (3) When the fan cowls and thrust reverser cowls are open, the engine's fire extinguishing systems are not effective. Ground fire extinguishing equipment should be available.
   E. Usual power plant operation to start the engine and shutdown the engine.

F. Motor operation is the procedure to turn the engine with the starter, but with no ignition.
   (1) It can be done in the dry condition (no fuel supplied to the engine) or the wet condition (fuel supplied to the engine) as necessary.
G. Cold weather power plant operation is the procedure to operate the engine during the conditions of snow, ice, and at temperatures that water will freeze.
H. Engine parameter indications will be displayed on the Engine Indication and Crew Alerting System (EICAS) display in the flight compartment.

NOTE: If the EICAS lower display is blank, press the ENGINE switch on pilot's display select panel located on the forward electronics panel P9 to activate lower display. Pressing the ENGINE switch a second time will return the EICAS display to normal operational mode.

TASK 71-00-00-842-002-R00

2. Prevent the Movement of the Airplane During Engine Operation At High Power

A. General
   (1) For maintenance, engine operation at high power can be necessary.
      (a) One engine can be operated at 1.0 - 1.2 EPR and the other engine can be operated at TAKEOFF power, or,
      (b) The two engines can be operated at TAKEOFF power.
   (2) With only the parking brakes on and chocks installed at the main landing gear wheels, engine operation at high thrust can move the airplane.
      (a) The airplane will go over the wheel chocks.
      (b) The airplane will move in a skid until the thrust is decreased.

NOTE: A skid is a sideways or forward movement on the ground with the wheels stopped, and is not controlled.

B. Procedure

S 842-003-R00

(1) When you operate only one engine at high power, make sure that a pneumatic source (operate the other engine at 1.0 - 1.2 EPR, or operate the APU) is available to motor the engine if there is a compressor surge (stall) or a fire in the gaspath.

S 842-004-R00

(2) When you operate one or two engines at high power, do these steps to prevent the movement of the airplane.

(a) Make sure the airplane weight is the correct minimum gross weight to prevent the movement of the airplane.

1) The airplane must contain a minimum fuel load or other loads in the normal center of gravity range of the airplane.

2) Use the table to find the minimum fuel load or the minimum gross weight of the airplane that is necessary.

a) The minimum gross weight from the table is the recommend value for the engine operation at high power.

b) The minimum gross weight of the airplane is the weight of the airplane and can include the weight of consumables, fuel not used, oil, oxygen, and other loads on the airplane.

3) If you do not know the weight of the airplane, use the minimum fuel load from the table.

a) The minimum fuel load is calculated by subtraction of the airplane test weight from the minimum gross weight.

b) The airplane test weight is based on the manufacturing empty weight and these standard and operational items: the installed cabin interior, fuel not used, oil, oxygen, escape slides, fixed galley structure, 65% of the removable galley structure and a two person crew.

(b) Examine the ramp area around and below the nose gear and the main landing gear.

1) Make sure the ramp area and the tires are clean and free of contamination and possible FOD (Foreign Object Damage).

2) Standing water, frost, ice, snow, oil, grease, sand or other contaminations are not permitted on the pavement and under the wheels.

NOTE: A wet ramp surface is permitted.

3) The concrete pavement under the airplane can be moist.

(c) Apply the parking brake.

1) Make sure the amber light for the parking brake is ON.

(d) Make sure the nose gear is centered in the straight-forward direction.
(e) Make sure the ground locks are installed on the nose gear and the main landing gear.
(f) Install the chocks 6 to 12 inches (15 to 30 cm) in front and aft of the nose gear and all the main landing gear tires.

S 942-243-R00

CAUTION: DO NOT OPERATE THE AIRPLANE HYDRAULIC SYSTEMS UNLESS THERE IS A SUFFICIENT QUANTITY OF FUEL IN THE MAIN TANKS. THE FUEL REMOVES THE HEAT FROM THE HEAT EXCHANGERS OF THE HYDRAULIC SYSTEMS. THE HYDRAULIC SYSTEMS COULD BECOME TOO HOT.

(3) Make sure there is a minimum of 600 gallons or 4020 pounds (1827 Kilograms) of fuel in each of the main tanks for the hydraulic systems heat exchangers.
(a) Put the fuel in the tanks if it is necessary (AMM 12-11-01/301 or AMM 12-11-02/301).

S 842-237-R00

(4) Operate the part power stop to limit the engine power to an intermediate level.
(a) Push the tee-head of the part power stop to put a limit on the thrust control input.

CAUTION: THE PART POWER STOP MUST BE DISCONNECTED BEFORE THE ENGINE IS PUT BACK IN USE. THE ENGINE PERFORMANCE WILL DECREASE IF THE PART POWER STOP IS NOT DISCONNECTED.

(b) Push on the underside of the part power stop tee-head to disconnect the part power stop.

RB211-535E4 ENGINES *[1]			
1st Engine Power	2nd Engine Power	Minimum Fuel Load *[3]	Minimum Gross Weight
94 DEGREE PART POWER TRIM EPR	1.2 EPR	8,040 LBS *[4] (3,650 KG)	129,000 LBS (58,600 KG)
TAKEOFF	1.0 to 1.2 EPR *[2]	31,000 LBS (14,100 KG)	154,000 LBS (69,900 KG)
TAKEOFF	TAKEOFF	70,000 LBS (31,800 KG)	193,000 LBS (87,600 KG)

*[1] Takeoff power is the minimum rated thrust EPR for a certain outside air temperature and pressure altitude (AMM 71-00-00/501).
The 94 degree part power trim EPR is the intermediate power setting on the fuel flow governor with the part power stop up. Refer to Test 9 of AMM 71-00-00/501.

*[2] When one engine is operated at takeoff power:
- the other engine can be shutdown if the APU is operated or
- the other engine can be operated at less than 1.2 EPR.
The APU or the other engine will give an air source to motor the engine if a compressor surge (stall) or a fire in the engine gaspath occurs.

*[3] The minimum fuel load amounts that are necessary for engine operation at high power are calculated from an expected airplane test weight of 123,000 pounds (55,800 KG).

*[4] Minimum fuel load to cover the hydraulic system heat exchangers in the main fuel tanks.

TASK 71-00-00-842-001-R00

3. Safety Precautions to Operate the Engine on the Ground

A. General

(1) The operation of jet engine airplanes make safety precautions necessary to prevent injury to persons and damage to the airplane and equipment.

(a) Persons around the airplane must stay away from the engine's air inlet because of the suction of air into the inlet.
(b) These persons must stay away from the turbine exhaust nozzle where hot, high speed gases are directed rearward.
(c) The high speed of the fan exhaust at high thrust is also sufficient to cause serious injury.
(d) When the thrust reverser is in the reverse thrust position, the fan exhaust is directed forward while the turbine exhaust is directed rearward.

(2) The general safety conditions which are necessary to prevent accidents and injury follow.

B. Equipment
(1) Sound level meter, CEL-254/K1.
(2) Cup-type, earmuff, hearing protection

C. Air Inlet (Fig. 201, 202 and 203)

S 992-074-R00

(1) The figures 201 - 203 show the air inlet areas near the power plants which can contain dangerous air conditions.
(a) You must stay away from these areas when the engine operates.
(b) Make sure that persons that do not know of the dangerous air conditions near the engine cannot go in these areas.

S 992-235-R00

WARNING: ALL PERSONS MUST STAY OUT OF THE DANGEROUS AREAS THAT ARE FORWARD OF THE POWER PLANT. ALL PERSONS MUST STAY AWAY FROM THE ENGINE SAFETY BARRIER WHEN THE ENGINE IS OPERATED. DURING THE ENGINE OPERATION, THERE IS SUFFICIENT SUCTION AT THE AIR INLET TO PULL A PERSON INTO THE INLET. A FATAL INJURY COULD OCCUR.

CAUTION: THE SUCTION NEAR THE INLET CAN PULL IN HATS, GLASSES, LOOSE CLOTHING AND WIPE RAGS FROM YOUR POCKETS. ALL LOOSE OBJECTS MUST BE REMOVED BEFORE YOU WORK AROUND THE ENGINE.

(2) When the engine operates, it makes a low air pressure area in the inlet.
(a) This low pressure area causes a large quantity of air to move from the forward side of the inlet cowl and go into the engine.
(b) The air which is near the inlet moves at a much higher velocity than air which is farther from the inlet.
(c) The quantity of the engine suction does not increase slowly and continuously when you go near the inlet.

(d) The suction is small until you get near the inlet, where the suction increases suddenly.
(e) The engine suction can pull small objects into the engine easier than it can pull large objects.

S 992-076-R00

(3) Before you operate the engine, do these steps:
(a) Make sure there are no tools, unwanted materials or objects in the air inlet.
(b) Make sure the area 40 feet to each side and 60 feet forward of the power plant is clean.
(c) Make sure the ground which is forward of the engine is strong and solid.
(d) Make sure the suction of the engine will not pull the particles on the ground in the engine.
(e) Make sure that persons with loose objects (such as hats, eyeglasses, loose clothing, or rags) do not go in this area.
(f) When an engine is operated, use an engine inlet guard.
1) This will prevent persons from being pulled into the inlet because of air suction from the engine.

D. Engine Exhaust (Fig. 201, 202, 203).

S 992-077-R00

WARNING: ALL PERSONS MUST STAY OUT OF THE DANGEROUS AREAS THAT ARE AFT OF THE POWER PLANT. DURING THE ENGINE OPERATION, THERE ARE HOT GASSES AND HIGH SPEED AIR WHICH CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) The figures 201 - 203 show the exhaust areas near the power plants which can contain dangerous air conditions.
(a) Stay away from these areas when the engine operates.
(b) Make sure that persons that do not know of the dangerous air conditions near the engine cannot go in these areas.

S 992-078-R00

(2) When the engine operates, a large quantity of air comes out of the aft end of the engine.
(a) This air moves at a high speed and is hot.
(b) This air can contain contamination which was pulled in the engine by the inlet suction.
(c) This air can also contain gases from the fuel that has burned or fuel which has not burned.

S 992-079-R00

(3) At high power, the fan and turbine exhaust can blow loose dirt, stones, sand and other unwanted materials a distance of 300 feet.
(a) The airplane must be parked at an area where injury to persons or damage to equipment or other airplanes can be prevented.

(b) A blast fence must be used if the engines are operated with no sufficient space to decrease the fan and turbine exhaust thrust to zero.

S 992-080-R00

(4) High temperature exhaust can be found 300 feet from the exhaust nozzle with the correct wind conditions.
   (a) The exhaust temperature near the engine is sufficient to melt bituminous (asphalt) pavement.
   (b) Concrete pavement is recommended for areas where the engine is operated.

S 992-081-R00

(5) When an engine is started, fuel that has collected in the turbine exhaust sleeve can ignite.
   (a) Long flames are blown out of the exhaust nozzle.
   (b) All flammable materials must be kept clear of the exhaust nozzle.

S 992-082-R00

(6) There are gases in the exhaust that are dangerous to you.
   (a) Tests have shown that the amount of carbon monoxide in the exhaust is small.
   (b) There are other gases in the exhaust that smell bad and can cause injury to your eyes and lungs.
   (c) You must stay away from small spaces where these gases can collect.

E. Engine Cool Down

S 992-083-R00

(1) After engine operation, make sure the turbine exhaust sleeve and plug have cooled before maintenance is done in these areas.

S 992-084-R00

(2) The other parts of the engine can be worked on with no danger of burn.

F. Engine Noise (Fig. 204)

S 992-085-R00

WARNING: YOU MUST USE EAR PROTECTION WHEN THE ENGINE OPERATES. THE ENGINES MAKE SUFFICIENT NOISE TO CAUSE DAMAGE TO YOUR EARS.

(1) The engines make sufficient noise to cause damage to your ears.
   (a) If you listen to the full amount of the engine noise, you can temporarily cause your ears to become less sensitive to sound.
   (b) If you listen to the engine noise for a long time, you can become permanently deaf.

S 992-086-R00

(2) When you are near an engine that operates, always use ear protection to decrease the quantity of sound energy which reaches your ears.
   (a) A cup-type, earmuff, hearing protection is recommended.

S 862-271-R00

WARNING: YOU MUST WEAR EAR PROTECTION EQUIPMENT WHILE YOU DO THE WORK IN THE NOISE HAZARD AREAS OF THE ENGINE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO YOUR EARS.

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.

(3) The sound from jet engines usually causes temporary, or permanent, damage to your ears.
   (a) Noise can have an unwanted effect on your ears. It may cause your sense of balance to decrease.
   (b) If you listen to high quantities of noise for a short time, you can cause temporary damage to your ears. Your ears can become less sensitive to hear sound.
   (c) If you listen to high quantities of noise for a long time, you can cause permanent damage to your ears. You can not hear sound.
   (d) If you listen to very high quantities of noise for a short time, you can cause permanent damage to your ears. You can not hear sound.

S 862-273-R00

(4) There are two graphs, the noise time limits and one engine operation noise contours.
   (a) The noise contour graphs are guidelines for the amount of noise that is made by the engine at two defined power settings for the standard conditions shown in the graph.

(b) When the data from the noise contour graphs are used with the noise time limit chart, this shows the need for hearing protection for certain conditions.
(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) (Fig. 204).
(d) For one engine operation, the noise contours are given for low power thrust and takeoff thrust (Fig. 204A).

NOTE: Fig. 204A also gives the values for the noise from the operation of more than one engine.

(e) To find the quantity of noise energy, use a sound level meter, CEL-254/K1.
(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 limits graph.
(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 exposure dosimeter.

G. Engine Ignition

S 992-087-R00

WARNING: THE ENGINE IGNITION SYSTEM IS AN ELECTRICAL SYSTEM WITH HIGH ENERGY. YOU MUST BE CAREFUL TO PREVENT ELECTRICAL SHOCK. INJURY OR DEATH CAN OCCUR TO YOU. DO NOT DO MAINTENANCE ON THE IGNITION SYSTEM WHEN YOU OPERATE THE ENGINE.

OPEN THE CIRCUIT BREAKERS FOR THE IGNITION SYSTEM TO DEACTIVATE THE IGNITION SYSTEM. MANUALLY GROUND THE EXCITER TERMINAL TO DISCHARGE THE CURRENT.

THE IGNITER PLUGS WITH SPECIAL IDENTIFICATION HAVE FIRING TIPS WHICH CONTAIN BERYLLIUM OXIDE. DO NOT BREATHE, EAT, OR TOUCH THE BERYLLIUM OXIDE DUST. INJURY FROM THIS DUST CAN OCCUR TO YOU. OBEY THE INSTRUCTIONS GIVEN IN THE IGNITION SYSTEM PROCEDURES.

(1) You must observe the precautions when you work on the engine ignition system.

H. Engine Fuel and Lubrication Oils

S 992-088-R00

(1) All the fuels, lubrication oils, and hydraulic fluids will make your skin dry.
(a) Do not let these fluids touch your skin.

TASK 71-00-00-992-005-R00

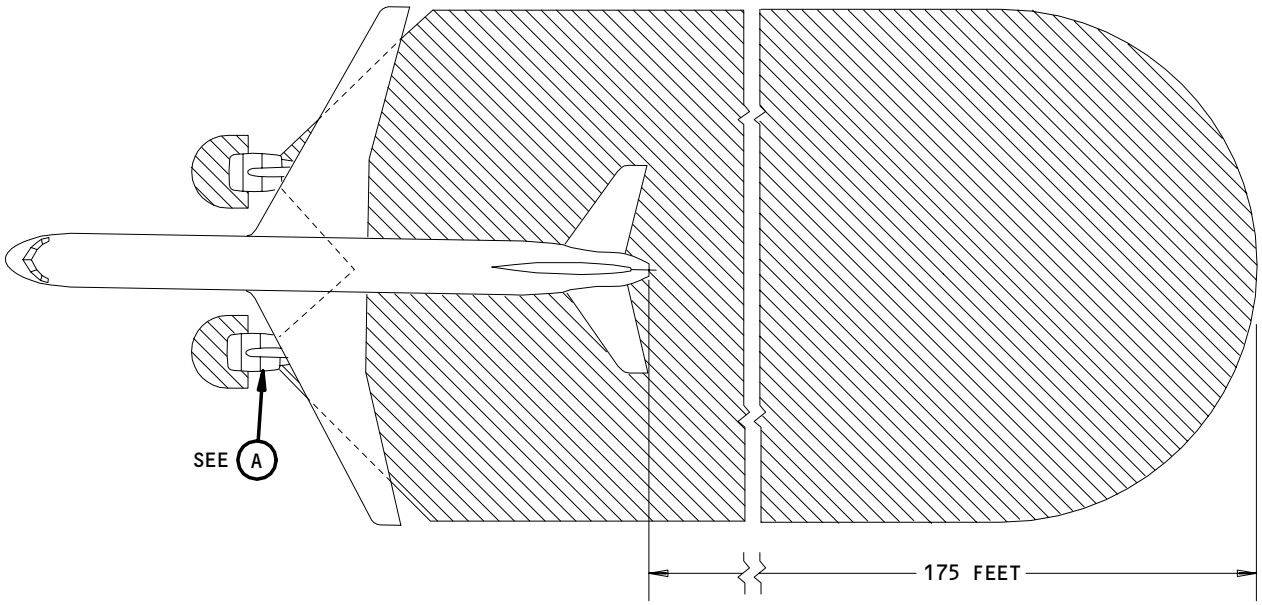
4. Power Plant Operation Limits

A. Engine Operation Limits

S 992-090-R00

CAUTION: LIMIT THE ENGINE THRUST TO 1.2 EPR WHEN THE AMBIENT AIR TEMPERATURE IS 110°F OR MORE.

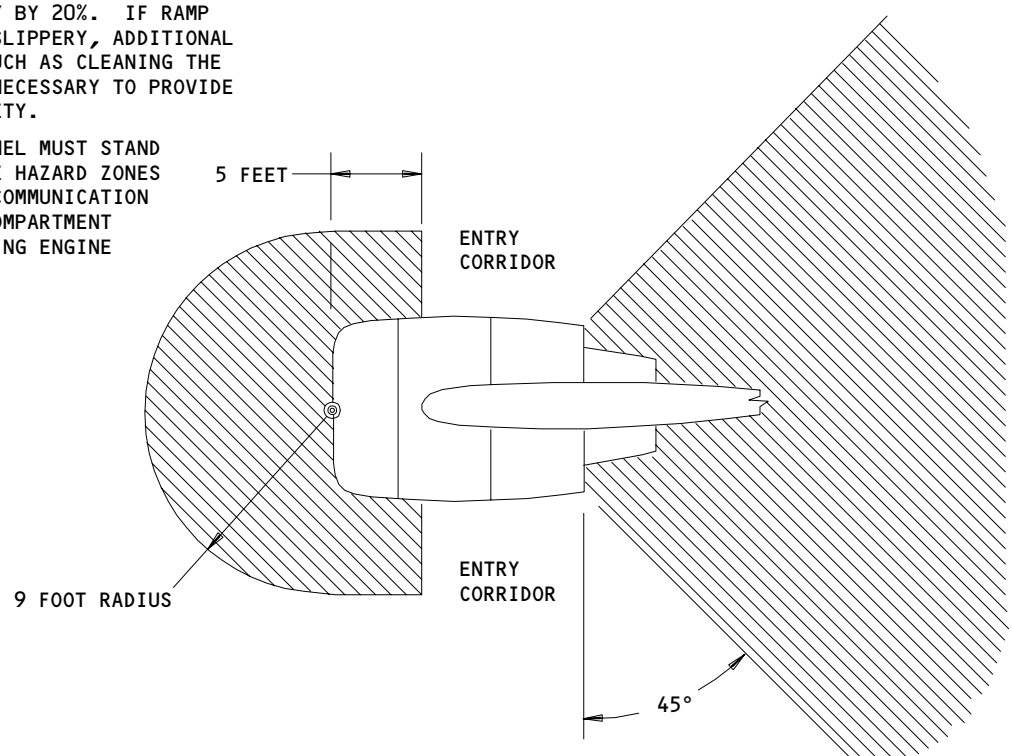
(1) The recommended engine operation conditions and limits are in the table that follows:



EXHAUST HAZARD AREA – MINIMUM IDLE/HIGH IDLE

WARNING: IF SURFACE WIND IS REPORTED GREATER THAN 25 KNOTS, INCREASE DISTANCE OF INLET BOUNDARY BY 20%. IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

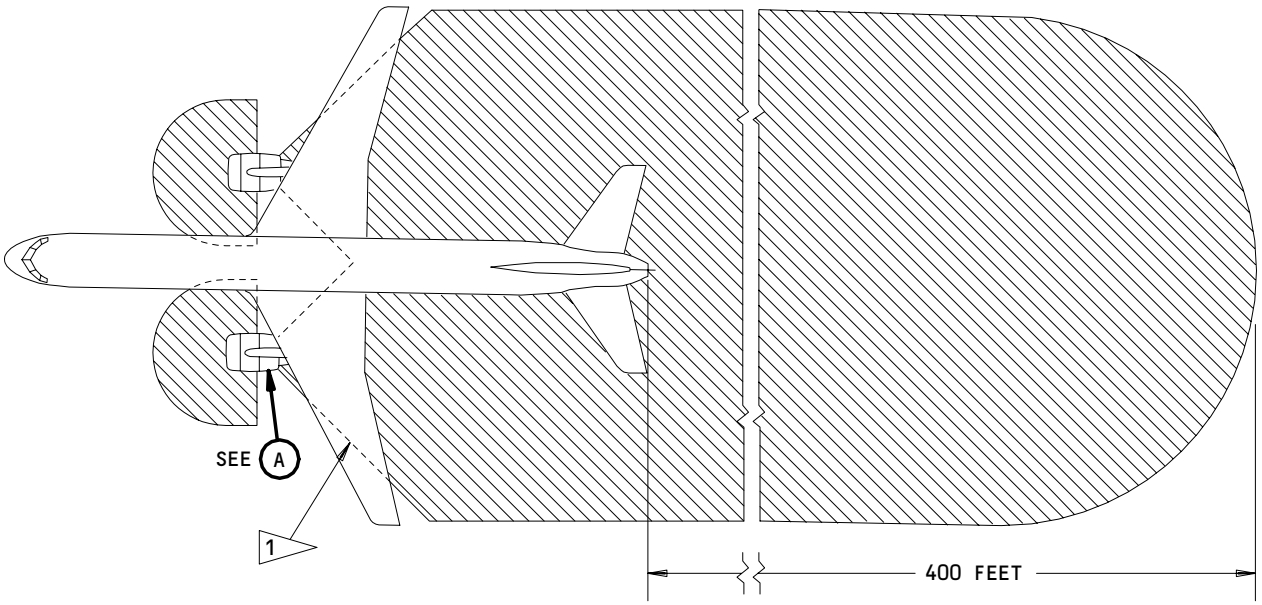
GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.



INLET HAZARD AREA – MINIMUM IDLE/HIGH IDLE

A

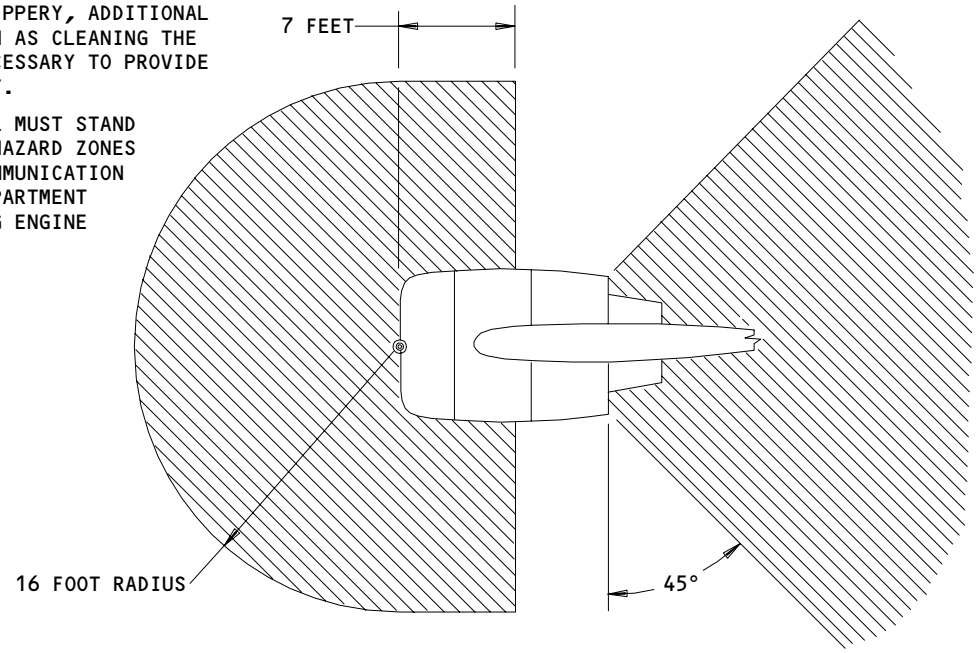
Minimum Idle/ High Idle Power Hazard Area
Figure 201



EXHAUST HAZARD AREA – BREAKAWAY POWER, BOTH ENGINES OPERATING

WARNING: IF SURFACE WIND IS REPORTED GREATER THAN 25 KNOTS, INCREASE DISTANCE OF INLET BOUNDARY BY 20%. IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.

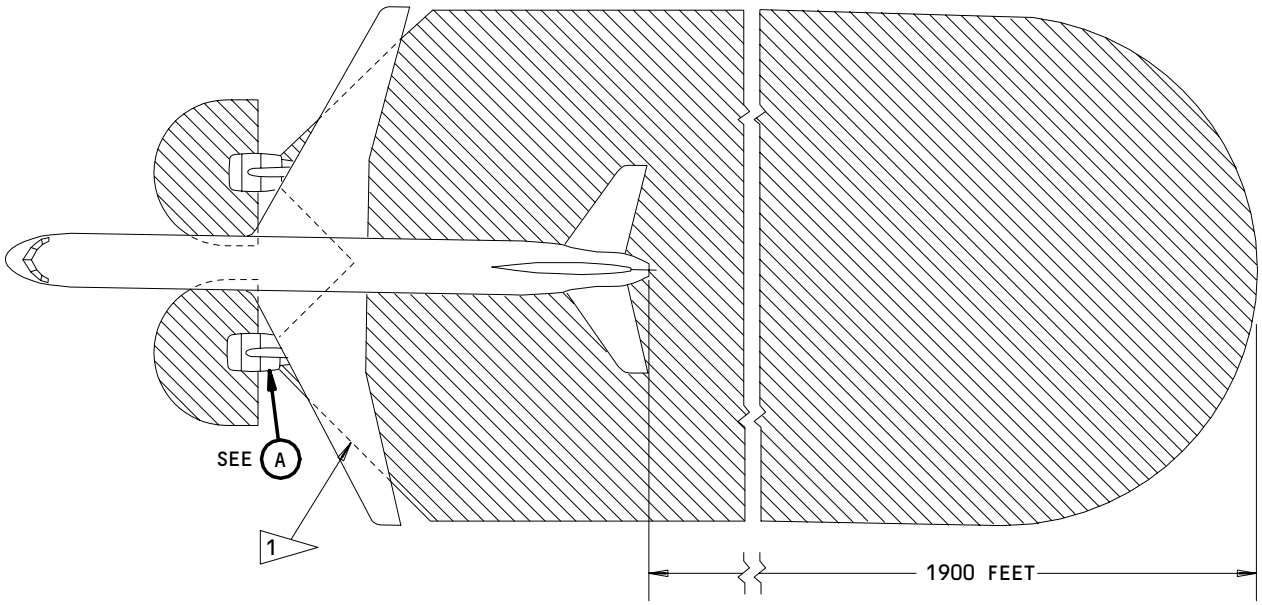


INLET HAZARD AREA – BREAKAWAY POWER

A

1 DOTTED LINE INDICATES HAZARD AREA BOUNDRY FOR SINGLE ENGINE OPERATION

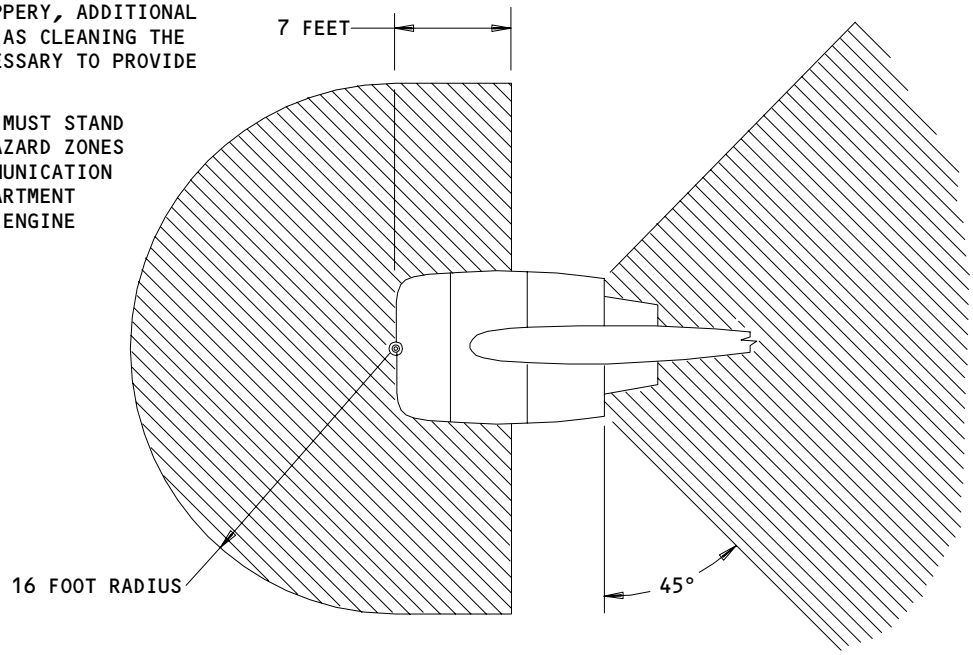
Breakaway Power – Hazard Area
Figure 201A



EXHAUST HAZARD AREA – TAKEOFF POWER, BOTH ENGINES OPERATING

WARNING: IF SURFACE WIND IS REPORTED GREATER THAN 25 KNOTS, INCREASE DISTANCE OF INLET BOUNDARY BY 20%. IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.

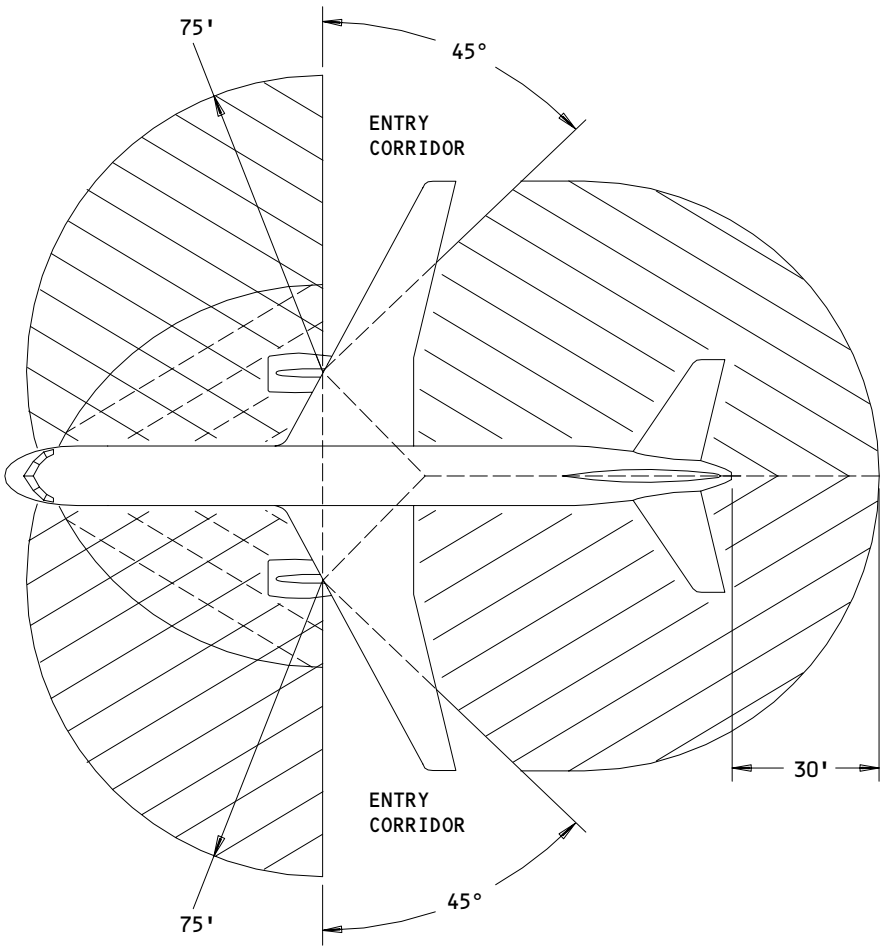


INLET HAZARD AREA – TAKEOFF POWER

A

1 DOTTED LINE INDICATES HAZARD AREA BOUNDRY FOR SINGLE ENGINE OPERATION

Takeoff Power – Hazard Area
Figure 202

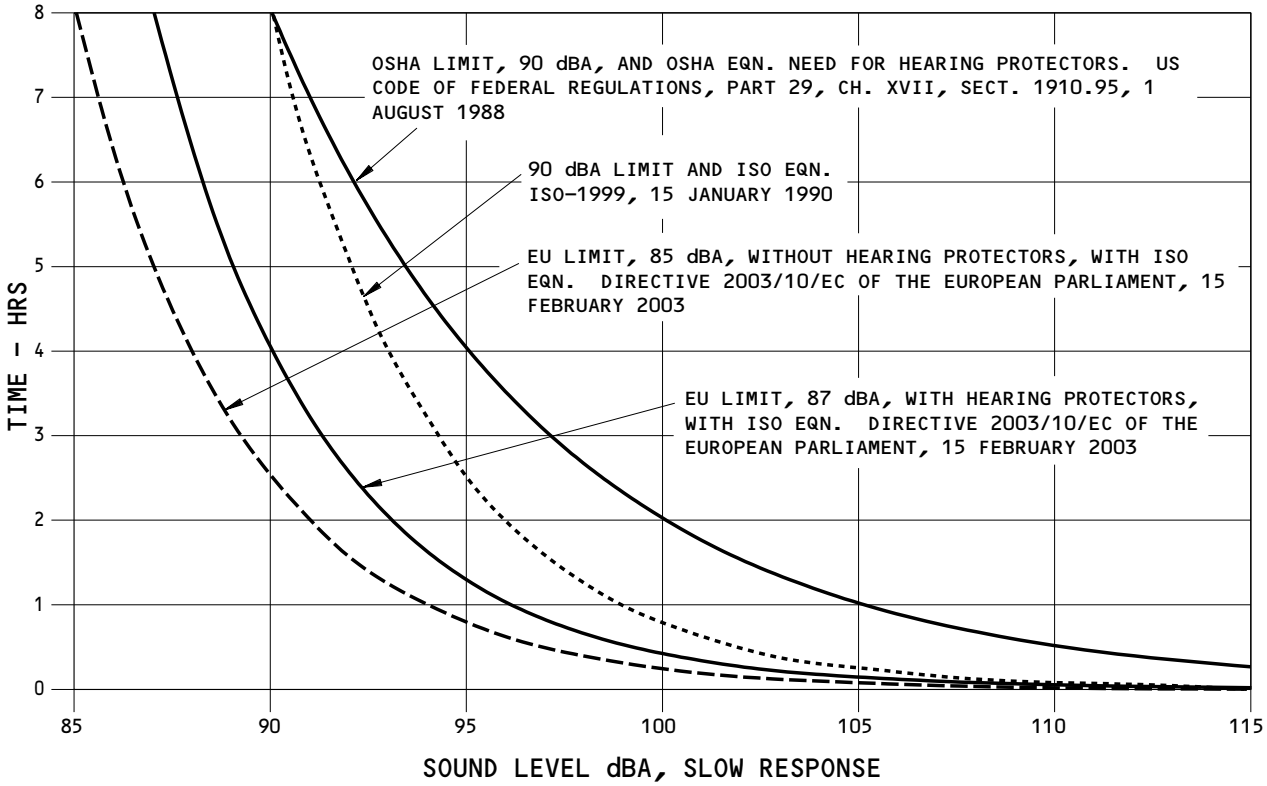


WARNING: IF RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO PROVIDE PERSONNEL SAFETY.

GROUND PERSONNEL MUST STAND CLEAR OF THESE HAZARD ZONES AND MAINTAIN COMMUNICATION WITH FLIGHT COMPARTMENT PERSONNEL DURING ENGINE RUNNING.

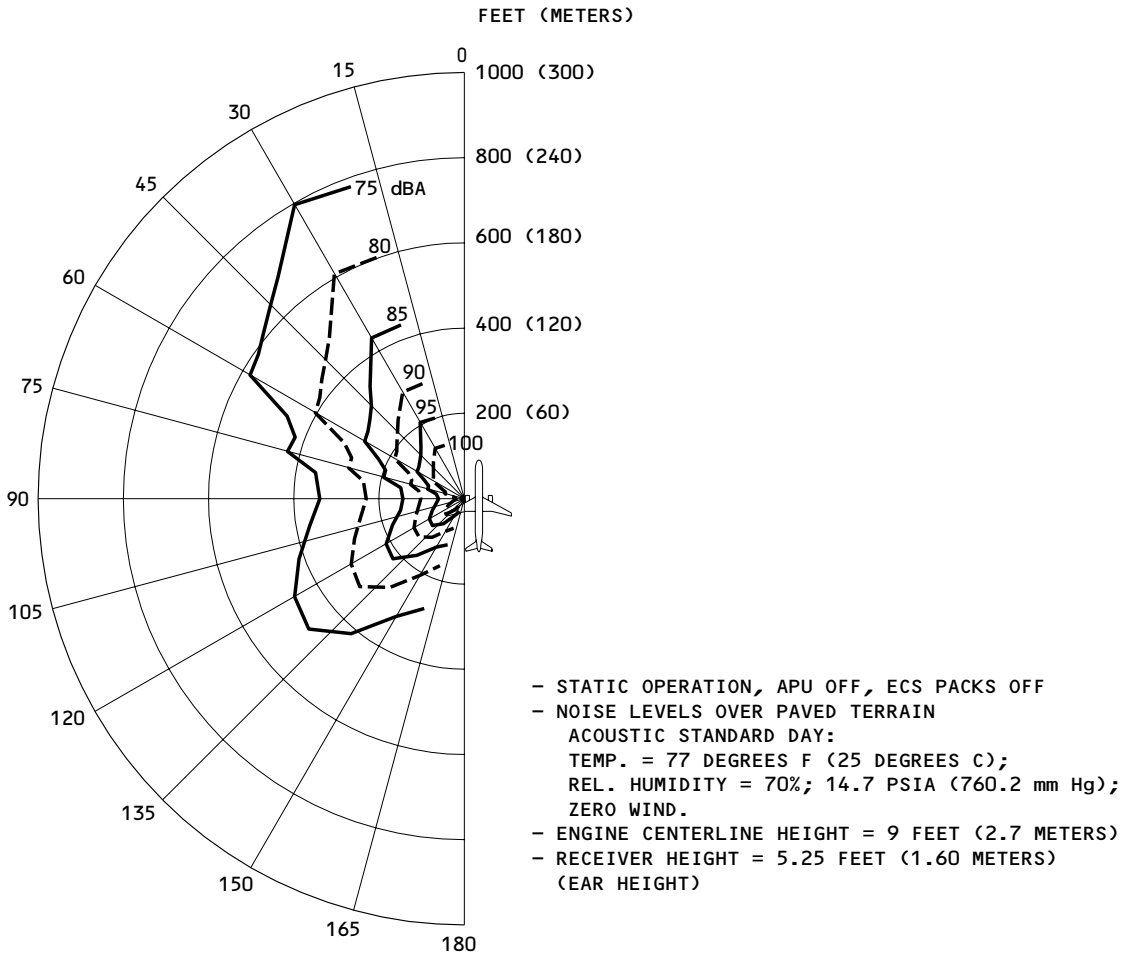
NOTE: FOR MAINTENANCE, ENGINE OPERATION IN REVERSE THRUST IS LIMITED TO MINIMUM IDLE POWER.

Reverse Thrust Minimum Idle Power - Hazard Area
Figure 203



Noise Time Limit
Figure 204

SINGLE ENGINE OPERATING AT: LOW POWER THRUST
(ADD 3 dBA FOR TWO ENGINES OPERATING OR ADD 6 dBA FOR FOUR ENGINES OPERATING) (7,442 LBS; N1C = 2,259 RPM)



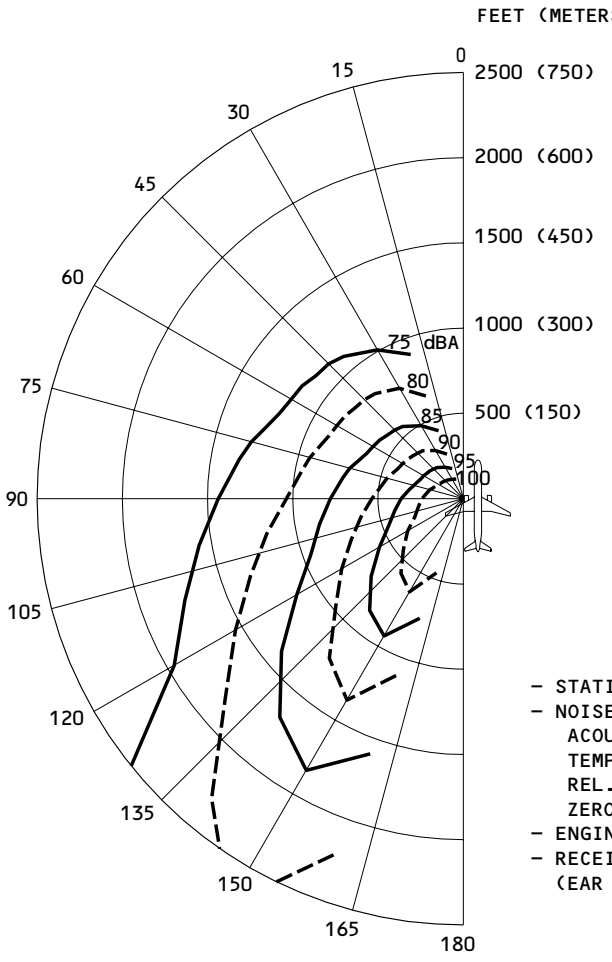
ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE.
NON–IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE. BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

RB211–535E4 GROUND RUN–UP dBA NOISE CONTOURS

N1C2259_DBA

Engine Noise Contours
Figure 204A (Sheet 1)

SINGLE ENGINE OPERATING AT: TAKEOFF THRUST
(ADD 3 dBA FOR TWO ENGINES OPERATING OR ADD 6 dBA FOR FOUR ENGINES OPERATING) (41,164 LBS; N1C = 4,589 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.

RB211-535E4B GROUND RUN-UP dBA NOISE CONTOURS

N1C4589_DBA

Engine Noise Contours
Figure 204A (Sheet 2)

SPEED, TEMPERATURE, AND TIME LIMIT TABLE 1					
OPERATION CONDITION	*[1] N1%	*[2] N2%	*[3] N3%	MAXIMUM EGT	TIME LIMIT
Ground Start	---	---	---	570°C	Momentary
Low Idle	19.8 min	---	---	---	Unrestricted
Max. Continuous	108.4	98.0	95.8	795°C	Unrestricted
Max. Takeoff	108.8	100.3	99.0	850°C	5 minutes
Max. Reverse	84.3	---	---	---	40 seconds
Max. Overspeed	110.0	101.3	100.2	---	20 seconds
Max. Overtemp	---	---	---	870°C	20 seconds

*[1] 100% N1 = 4500 LP RPM
*[2] 100% N2 = 7000 IP RPM
*[3] 100% N3 = 10611 HP RPM

S 992-092-R00

(2) The definitions of thrust are found by positioning the thrust lever to a specific N1% speed.
- (a) TAKEOFF
  - 1) This is the maximum thrust that can be used and not overboost the engine.
    - a) This thrust can be used for a maximum of 5 minutes.
    - b) This thrust is to be used only for takeoff.
- (b) MAXIMUM CONTINUOUS
  - 1) This is the maximum thrust that can be used continuously.
- (c) MAXIMUM CLIMB
  - 1) This is the maximum thrust permitted for normal climb operation.
- (d) MAXIMUM CRUISE
  - 1) This is the maximum thrust permitted for normal cruise operation.
- (e) IDLE
  - 1) This is not a specific thrust, but a thrust lever position.
    - a) When the thrust lever is moved rearward to the idle stop in the control stand, this is the idle position.

2) The minimum thrust applicable for operation on the ground (minimum idle) or in flight (approach idle) is automatically set by the idle reset solenoid on the fuel flow governor.
   a) The operation of the idle reset solenoid is controlled by the air/ground relay, nose gear position, cowl anti-ice operation, and the position of the wing flaps (AMM 73-21-00/001).

B. Limits for the N1, N2, N3 Rotor Speed.

S 992-093-R00

(1) The recommended N1/N2/N3 speed limits are shown in the Engine Operation Limits Table.

S 992-094-R00

(2) You cannot operate the engine more than the rotor speeds shown for the time limits that are given.

S 992-095-R00

(3) If you operate the engine over the rotor speed limits or the time limits shown on the Limits Table, the EICAS will make a record on the EICAS ENG EXCD page.
   (a) The EICAS will make a record of the rotor speed and the amount of time N1/N2/N3 was more than the rotor speed limit.
   (b) The EICAS will make a record of the time the engine operates over the limit 20 seconds after the exceedance starts for the low values of the red line conditions.

S 992-096-R00

(4) These records are shown as yellow line or red line conditions.

(a) Yellow line - The EICAS will make a record if:

- N1 is equal to or more than 108.4%, or
- N2 is equal to or more than 98.0%, or
- N3 is equal to or more than 95.8%.

(b) Red line - The EICAS will make a record if:

- N1 is equal to or more than 110.0%, or
- N1 is equal to or more than 108.8% for more than 20 seconds, or

- N2 is equal to or more than 101.3%, or
- N2 is equal to or more than 100.3% for more than 20 seconds, or

- N3 is equal to or more than 100.2%, or
- N3 is equal to or more than 99.0% for more than 20 seconds.

S 992-097-R00

(5) If you operate the engine over the recommended N1/N2/N3 rotor speed limits, this is an overspeed condition.

NOTE: If the engine has more than two overspeed conditions between engine overhauls, report all incidents to Rolls-Royce plc. Rolls-Royce will then recommend to the operator which procedure to follow.

(a) Do the N1, N2, OR N3 ROTOR SPEED WAS MORE THAN THE LIMIT procedure (FIM 71-05-00/101).

1) If the rotor speed and the EGT were more than the limits during the engine operation on the ground and in flight, you can find if the engine must be replaced.

a) These combined overtemperature and overspeed charts are used with the fault isolation procedure:

- FIM 71-05-00/101 Fig. 117: Combined Overtemperature (Above 50% N3) and N1 Overspeed
- FIM 71-05-00/101 Fig. 118: Combined Overtemperature (Above 50% N3) and N2 Overspeed
- FIM 71-05-00/101 Fig. 119: Combined Overtemperature (Above 50% N3) and N3 Overspeed

(b) Overspeed inspections are necessary if the rotor speeds are more than the limits.
1) The overspeed charts are used with the fault isolation procedure:

— FIM 71-05-00/101 Fig. 122: N1 Overspeed
— FIM 71-05-00/101 Fig. 123: N2 Overspeed
— FIM 71-05-00/101 Fig. 124: N3 Overspeed

S 992-242-R00

(6) Overspeed EICAS Anomolies

CAUTION: BEFORE AN ENGINE IS REMOVED BECAUSE OF AN OVERSPEED INDICATION, YOU MUST MAKE A CHECK OF THE ENGINE TACHOMETER SYSTEM FOR CORRECT OPERATION (AMM 77-12-00/501) AND MAKE A CHECK OF THE ENG EXCD AND PERF/APU PAGES FOR THE TWO EICAS COMPUTERS.

(a) Make a check for the EICAS status message 'EICAS DISAGREE' and the EICAS maintenance message 'EICAS BITE'.

NOTE: These messages will be shown if there is an engine parameter disagreement between the two EICAS computers for more than 60 seconds.

1) If these EICAS messages are present, do the EICAS BITE procedure (FIM 31-41-00/101).

NOTE: The EICAS BITE procedure will find if there is an internal EICAS problem.

(b) Make a check of the ENG/EXCD page and the PERF/APU page for the left and right EICAS computers.
1) Push the ENG/EXCD button on the EICAS maintenance panel.
2) Turn the EICAS computer switch from the AUTO position to the L position for the left EICAS computer.
3) Make a record of the N1, N2, and N3 exceedance values on the left EICAS computer.
4) Turn the EICAS switch from the L position to the R position for the right EICAS computer.
5) Compare the exceedance values; the N1, N2, N3 exceedance values should not change.
a) If there is a difference in exceedance values, do the EICAS BITE procedure (FIM 31-41-00/101).

6) Make a check of the PERF/APU page for engine parameters that are not normal, which would prove an engine exceedance occured.
7) If the rotor speed exceedance values are not the same on the ENG/EXCD page or the PERF/APU page for the left and right EICAS computer, this is an EICAS anomoly.

NOTE: If there is an EICAS anomoly, there is no way to find which recorded engine performance data is correct. The relationship of other engine parameters (i.e. EGT, EPR, other rotor speeds) in an overspeed condition depends on the condition of the engine and the position in the flight envelope at the time the anomoly was recorded.

a) Use the Overspeed Exceedance Charts to find the maintenance action for the engine.

(c) If the EICAS BITE procedure does not show a problem, you must do a check of the rotor speed circuits.
1) For the N1 rotor, do the N1 Indication Problem On EICAS (FIM 77-12-00/101, Fig. 108).
2) For the N2 rotor, do the N2 Indication Reads Zero/Fluctuates (FIM 77-12-00/101).
3) For the N3 rotor, do the N3 Indication Problem On EICAS (FIM 77-12-00/101).
(d) Turn the EICAS computer switch to the AUTO position.
(e) After the cause of the overspeed condition is found and made correct, erase ENG EXCD auto event page from the EICAS memory.

C. Exhaust Gas Temperature (EGT) Limits

S 992-099-R00
(1) The recommended EGT limits are shown in the Engine Operation Limits Table.

S 992-100-R00
(2) You cannot operate the engine more than the EGT limits shown for the time limits that are given.

S 992-101-R00
(3) If you operate the engine more than the EGT or time limits, the EICAS will make a record on the ENG EXCD page.
(a) The EICAS will make a record of the EGT and the amount of time the EGT was more than the EGT limit.

S 992-102-R00
(4) These records are shown as yellow line or red line conditions.
(a) Yellow line - EICAS will make a record if:

the engine operates at more than idle power, and the EGT is equal to or more than 795°C.

(b) Red line - EICAS will make a record if:

- the engine operates at less than idle power (during an engine start), and the EGT is equal to or more than 570°C, or
- the engine operates at more than idle power, and the EGT is equal to or more than 870°C, or
- the engine operates at more than idle power, and the EGT is equal to or more than 850°C for more than 20 seconds.

S 992-103-R00

(5) If you operate the engine more than the recommended EGT limit at less than idle power, this is an overtemperature condition.

NOTE: Engine operation at less than idle power occurs when the engine was started on the ground or started during the flight.

If the engine has more than two overtemperature conditions between engine overhauls, report all incidents to Rolls-Royce plc. Rolls-Royce will then recommend to the operator which procedure to follow.

(a) Do the ENG HAD A HOT START procedure (FIM 71-05-00/101).

1) Overtemperature inspections are necessary if the EGT was more than the limits.

a) This overtemperature chart is used with the fault isolation procedure:

FIM 71-05-00/101 Fig. 120: Overtemperature (Starting and Relighting)

S 992-104-R00

(6) If you operate the engine more than the recommended EGT limit at more than idle power, this is an overtemperature condition.

NOTE: Engine operation at more than idle power occurs usually when the engine is operated on the ground or during the flight.

If the engine has more than two overtemperature conditions between engine overhauls, report all incidents to Rolls-Royce plc. Rolls-Royce will then recommend to the operator which procedure to follow.

(a) Do the ENG EGT WAS MORE THAN THE LIMIT procedure (FIM 71-05-00/101).

1) If the rotor speed and the EGT were more than the limits during the engine operation on the ground and in flight, you can find if the engine should be replaced.

a) These combined overtemperature and overspeed charts are used with the fault isolation procedure:

- FIM 71-05-00/101 Fig. 117: Combined Overtemperature (Above 50% N3) and N1 Overspeed
- FIM 71-05-00/101 Fig. 118: Combined Overtemperature (Above 50% N3) and N2 Overspeed
- FIM 71-05-00/101 Fig. 119: Combined Overtemperature (Above 50% N3) and N3 Overspeed

2) Overtemperature inspections are necessary if the EGT was more than the limits during the engine operation on the ground and in flight.

a) This overtemperature chart is used with the fault isolation procedure:

FIM 71-05-00/101 Fig. 121: Overtemperature (Above 50% N3)

S 992-105-R00

CAUTION: BEFORE AN ENGINE IS REMOVED BECAUSE OF AN OVERSPEED INDICATION, YOU MUST MAKE A CHECK OF THE ENGINE TACHOMETER SYSTEM FOR CORRECT OPERATION (AMM 77-12-00/501).

(7) After the cause of the overspeed condition is found and made correct, erase ENG EXCD auto event page from the EICAS memory.

D. Engine Vibration Limits

S 992-106-R00

CAUTION: THE ENGINE VIBRATION MUST BE MONITORED DURING ALL ENGINE OPERATIONS ON THE GROUND. DO THE SHUTDOWN OF THE ENGINE IF THE VIBRATION VALUES ARE MORE THAN THE LIMITS.

(1) The engine vibration must be monitored during all engine operations on the ground.
   (a) If the vibration values are more than the limits, the engine must be shutdown.
   (b) The cause of the vibration must be found and made correct.

S 992-109-R00

(2) Maximum vibration limit:
   - N1: 2.5 units
   - N2: 2.5 units
   - N3: 2.5 units
   - BB: 2.5 units

E. Oil Consumption Limits

S 992-112-R00

(1) The cause of a sudden increase in oil consumption or a continuous increase in oil consumption must be found and corrected.

OIL CONSUMPTION LIMITS *[1]	
Maximum oil consumption	0.275 U.S. gallons per hour (2.2 U.S. pints per hour) (1.05 liters per hour)
White EICAS low oil quantity limit	5 U.S. Quarts

*[1] Any calculation of the Oil Consumption Limits must be done with reference to FIM 79-31-00/101.

F. Oil Pressure Limits

S 992-114-R00

(1) Minimum oil pressure that is necessary before takeoff:

NOTE: The oil pressure limits change linearly with the N3 rotor speed between the conditions that are listed.

(a) At 50% N3: 25 psi
(b) At 70% N3: 35 psi
(c) At 93% N3: 40 psi

S 992-115-R00

(2) Red EICAS low oil pressure limit: 18 psi

S 922-270-R00

(3) There is no maximum oil pressure limit, but the EICAS oil pressure indication will display a maximum oil pressure of 100 psi.

NOTE: Transient oil pressure indications of 100 psi do occur at high power, for example during takeoff and climb. They can also occur during cruise. If high oil pressure continues to occur during cruise or at low power, examine the engine trend monitoring data for a sign of continuous increase in oil pressure, which can be an indication of a blocked oil line.

G. Oil Temperature Limits

S 992-239-R00

(1) Oil temperature limits for engine operation follows:

RB211-535E4 ENGINES	
Minimum oil temperature to start the engine	-40°C (-40°F)
Minimum oil temperature before the forward thrust lever can be moved forward after the engine is started	0°C (32°F)
Maximum oil temperature	170°C (338°F)

H. Fuel Temperature Limits

S 992-240-R00

(1) Fuel temperature limits for engine operation follows:

Maximum fuel temperature at the inlet of the engine low pressure fuel pump	49°C (120.2°F)
Minimum fuel temperature at the inlet to the engine low pressure fuel pump	-54°C (-65.2°F)

TASK 71-00-00-992-006-R00

5. Engine Operation on the Ground - General Procedures

A. References

(1) AMM 26-21-00/001, Engine Fire Extinguishing
(2) AMM 31-41-00/001, EICAS
(3) AMM 71-00-00/501, Power Plant
(4) AMM 71-00-00/601, Power Plant
(5) AMM 71-71-00/601, Engine Vents and Drains
(6) AMM 77-41-00/001, Standby Engine Indication
(7) AMM 72-00-61/401, High Speed External Gearbox Module
(8) AMM 79-00-00/601, Oil
(9) AMM 80-11-00/001, Engine Start System

B. Prepare to Operate the Engine.

S 992-007-R00

(1) You must know the general data that follows before you operate the engine.
  (a) Engine operation on the ground for maintenance should be kept to a minimum.
    1) Do not make fast changes to the engine condition during the engine operation.
    2) When possible, make a record of all the engine parameter values at the same time to prevent engine operation for large amounts of time.
  (b) Make sure that unwanted materials and equipment do not go into an engine when the engine is operated.

    NOTE: This will cause damage to the engine or change the engine performance.

  (c) Make sure the persons that work near the engine know the dangerous areas for different engine power conditions (Fig. 201, 201A, 202 and 203).
  (d) If the engine is operated at high power, go to the procedure to Prevent Airplane Movement During Engine Operation At High Power.
    1) Find the airplane minimum gross weight that is necessary to operate the engine at high power.
  (e) Point the airplane into the wind.
    1) Move the airplane to an area that is away from other airplanes and buildings.

2) Make sure the area behind the engine exhausts are clear of persons and equipment.

(f) Engage the airplane brakes and make sure the wheel chocks are put in position.

(g) Examine the ground around the airplane engines.

1) Look at the ground on each side of the engine for 40 feet and 60 feet forward from the rear of the engine.

2) Make sure that all the unwanted materials on the ground are removed.

3) Make sure the surface of the ground is not broken.

(h) Put all the ground equipment outside the dangerous areas around the engine.

1) Make sure that no unauthorized persons or vehicles can go into the dangerous areas.

(i) Make sure the fire extinguisher equipment is close to the engine with persons to operate it.

1) Make sure the fire extinguisher equipment and persons are not in the dangerous areas around the engine (Fig. 201, 201A, 202 and 203).

(j) Remove the covers on the air intake and the exhaust, and all other covers from the engine.

(k) Make sure there are no unwanted materials or equipment in the engine air intake and exhaust.

(l) Make sure the persons that work near the engine do not wear loose clothes.

(m) The fan cowl panels must be closed during the usual engine operation.

(n) The fan cowl panels can be in the open position during engine operation with these conditions.

1) Specified engine tests with engine operation at minimum idle power.

2) When a check is made for fuel and oil leakage.

3) When adjustments are made to the engine.

(o) Quick movement of the forward thrust levers is not recommended.

1) Quick thrust lever movement causes quick temperature changes which can cause decreased engine life.

2) You can move the forward thrust levers quickly only during the acceleration and deceleration tests.

C. Problems Which Occur During Engine Starts

S 992-008-R00

(1) A satisfactory start of the engine is given as follows.

(a) The fuel ignites correctly.

(b) The engine speed will increase to the minimum idle speed in 30 seconds after you move the FUEL CONTROL switch from OFF to RUN.

S 992-009-R00

(2) These are the names which identify the problems you can have when you try to start the engine:

(a) Aborted Start.

1) A start where the start procedure is stopped before the start is completed.

(b) Hung start.

1) A start where the fuel ignites satisfactorily but the engine speed does not increase satisfactorily.

2) If you do not prevent the hung start, the EGT will increase and the hung start will become a hot start.

(c) Hot Start.

1) A start where the EGT goes higher than the EGT limits.

D. Wind Direction During Engine Operation.

S 992-010-R00

(1) Tailwinds, crosswinds or gusty conditions can cause engine instability during ground operation.

(a) The recommended wind direction data for engine operation is shown in Figure 205.

(b) During the start of the engine, and at idle or low power, tail winds can cause high EGT values.

(c) When the engine is operated at more than 90% N1 speeds, with tailwinds, crosswinds or gusty conditions, the engine can experience a fan tip stall.

1) The start of a fan tip stall during stable engine operation can be identified by these conditions.

a) The N1 speed increases quickly.

b) The airplane vibration increases.

c) You can hear a blowtorch sound that continuously starts and stops.

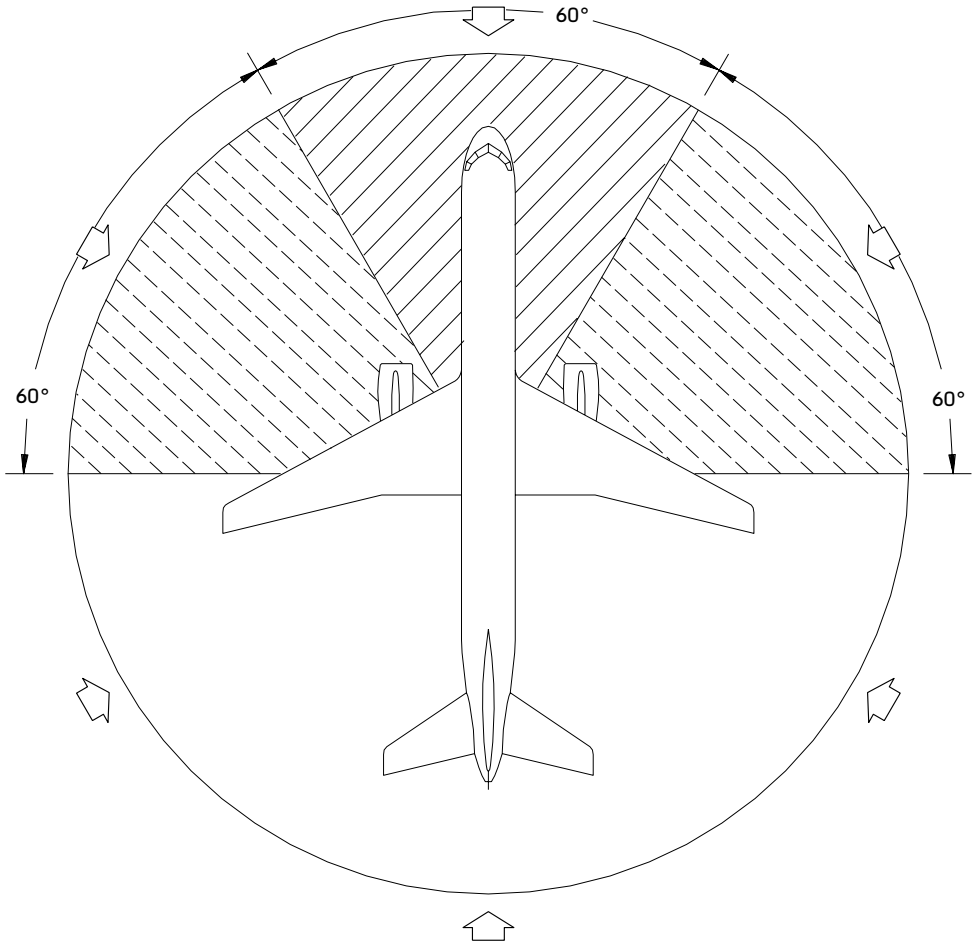
(d) To prevent fan tip stall at N1 speeds of 90%, you must move the thrust lever rearward in 1 to 2 seconds.

NOTE: When a fan tip stall is about to occur or has occurred, quick movement of the thrust lever rearward will almost always permit recovery from the stall.

E. Flight Compartment Control Panels (Fig. 206)

S 992-011-R00

(1) Before you operate the engine, you must know the other systems that can affect the start and operation of the engine, and give you information about the operation of the engine.



RELATIVE WIND

PREFERRED (25 KNOTS MAXIMUM WIND VELOCITY)

ACCEPTABLE (15 KNOTS MAXIMUM WIND VELOCITY)

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

WIND VELOCITY STATED IS FOR STEADY WIND CONDITIONS. REDUCE MAXIMUM WIND LIMITS BY 5 KNOTS FOR GUSTY WIND CONDITIONS OR UNTIL EPR/N_1 BECOMES STABLE.

STOP ENGINE RUN-UP IF EPR AND/OR N_1 BECOMES UNSTABLE OR IF INLET SOUND CHARACTERISTIC SUDDENLY CHANGES (A BLOW TORCH TYPE SOUND INDICATES INLET SEPARATION). REDUCE THRUST TO IDLE AND CHECK RELATIVE WIND DIRECTION AND VELOCITY. SHUT DOWN ENGINE AND REPOSITION AIRPLANE IF REQUIRED BEFORE COMPLETING RUN-UP

APU CAN BE OPERATED DURING ENGINE RUN-UP

Preferred Relative Wind Direction During Engine Maintenance Runs
Figure 205

S 992-012-R00

(2) The engine indication and crew alert system (EICAS) will give you data about the engine operation and alert messages which can warn you about problems with the engine (AMM 31-41-00/001).
   (a) The EICAS display select panel below the upper and lower EICAS screens controls the EICAS displays you will use for the operation of the engine.
      1) The DISPLAY ENGINE switch gives you the complete engine display.
         a) The EICAS engine display gives the N1, N2, N3 rotor speed, EPR, EGT, oil temperature, oil quantity, and oil pressure, vibration, and fuel flow.
      2) The THRUST REF SET controls permits you to set the reference EPR and the EPR target bug for each engine for the engine tests.
      3) The EVENT RECORD switch will make a record of EICAS data when you do the engine tests for maintenance.
   (b) The EICAS maintenance panel on the P61 panel controls different maintenance format displays.
      1) The engine exceedance page (ENG EXCD) gives the engine parameter limits were exceeded and the amount of time the engine was operated above the limits.
         a) The data from the ENG EXCD page is used with the fault isolation procedures.
      2) The performance/APU page (PERF/APU) shows engine performance data on the upper EICAS screen and auxiliary power unit (APU) data on the lower EICAS screen.

S 992-013-R00

(3) The standby engine indicator (SEI) on the P1 panel gives you EPR, EGT, N1 and N3 rotor speed if the EICAS does not operate or AC power is not availiable (EPR not displayed on EICAS) (AMM 77-41-00/001).
   (a) The engine can be started with the SEI, but if the EICAS alert messages are not availiable, you will not have warning for all problems.

S 992-014-R00

(4) The engine start control panel in the center of the P5 overhead panel has the ignitor switch and the L ENG START and R ENG START switches (AMM 80-11-00/001).
   (a) The fuel control panel is aft of the thrust levers on the control stand.
   (b) The L FUEL CONTROL and the R FUEL CONTROL switches for the engine and spar fuel valves and the disagree lights for these valves are on this panel.

S 992-015-R00

(5) The engine fire control panel is aft of the fuel control panel and has the left and right engine fire handles (AMM 26-21-00/001).

S 992-016-R00

(6) The bleed air control panel on the right side P5 panel has the BLEED AIR L ENG and the BLEED AIR R ENG switches, the APU VALVE switch and the ISOLATION VALVE switch (AMM 36-11-04/401).
   (a) You will monitor the duct pressure (psi) during the engine start with the pneumatic duct pressure indicator on this panel.
   (b) It is necessary on some engine tests to close the pressure regulating and shutoff valve for an engine with the ENG BLEED AIR switch.

S 992-017-R00

(7) The fuel management control panel on the center of the P5 panel has the FWD, CENTER, and AFT FUEL (BOOST) PUMP switches (AMM 28-22-00/001).

S 992-018-R00

(8) The air conditioning control panel on the right side P5 panel has the L PACK and the R PACK switches.

S 992-019-R00

(9) The wing and engine anti-ice control panel on the center of the P5 panel has the WING ANTI-ICE, the L ENG ANTI-ICE and the R ENG ANTI-ICE switches (AMM 30-21-00/001).

S 992-020-R00

(10) The electrical systems control panel on the left side of the P5 panel has the L GEN CONT and the R GEN CONT switches (AMM 24-22-00/001).
   (a) It is necessary on some engine tests to remove the electrical load on the IDG with the GEN CONT switch.

F. Starter Operation

S 992-021-R00

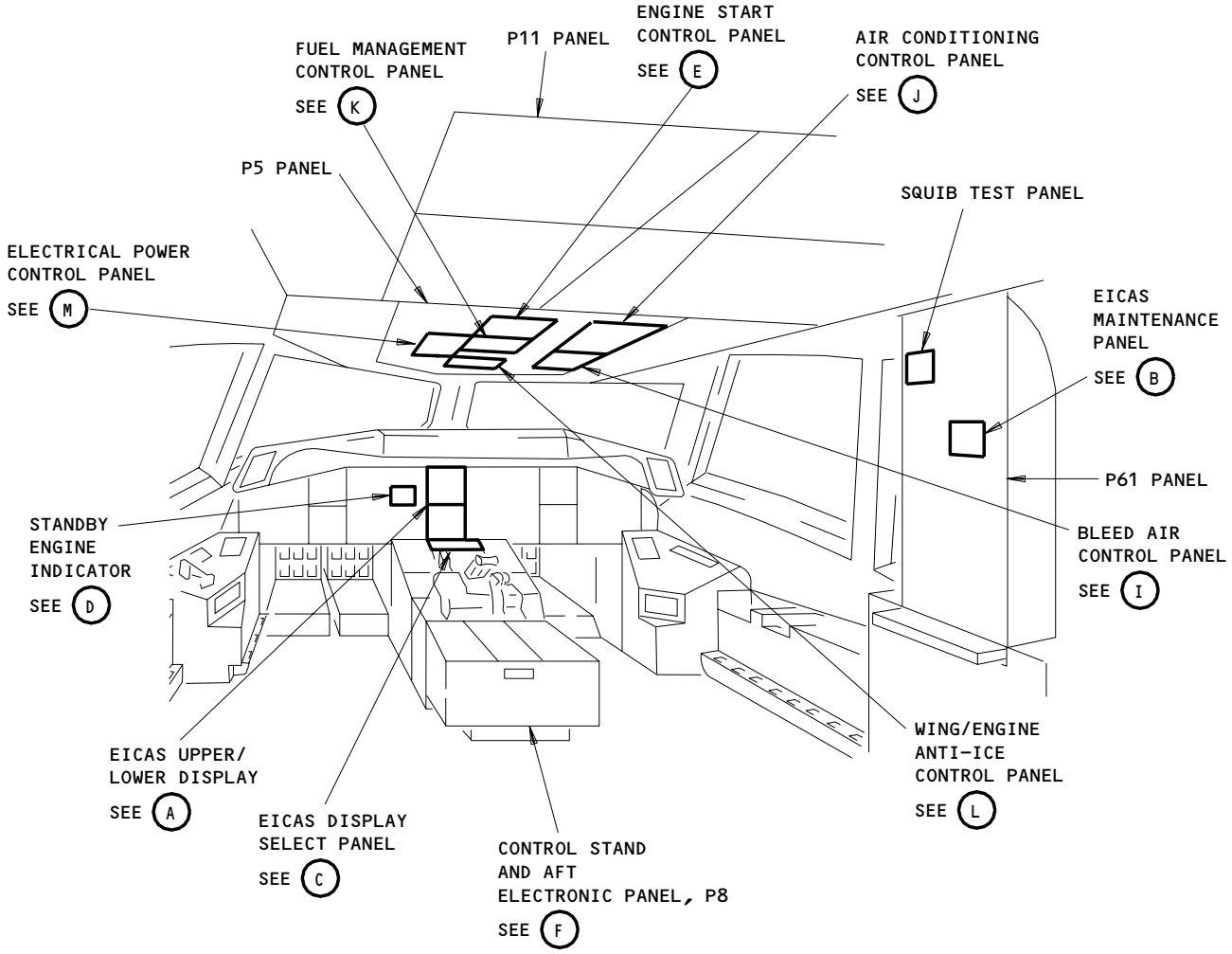
(1) Each engine starter is supplied with low pressure air to start and motor the engine.

S 992-022-R00

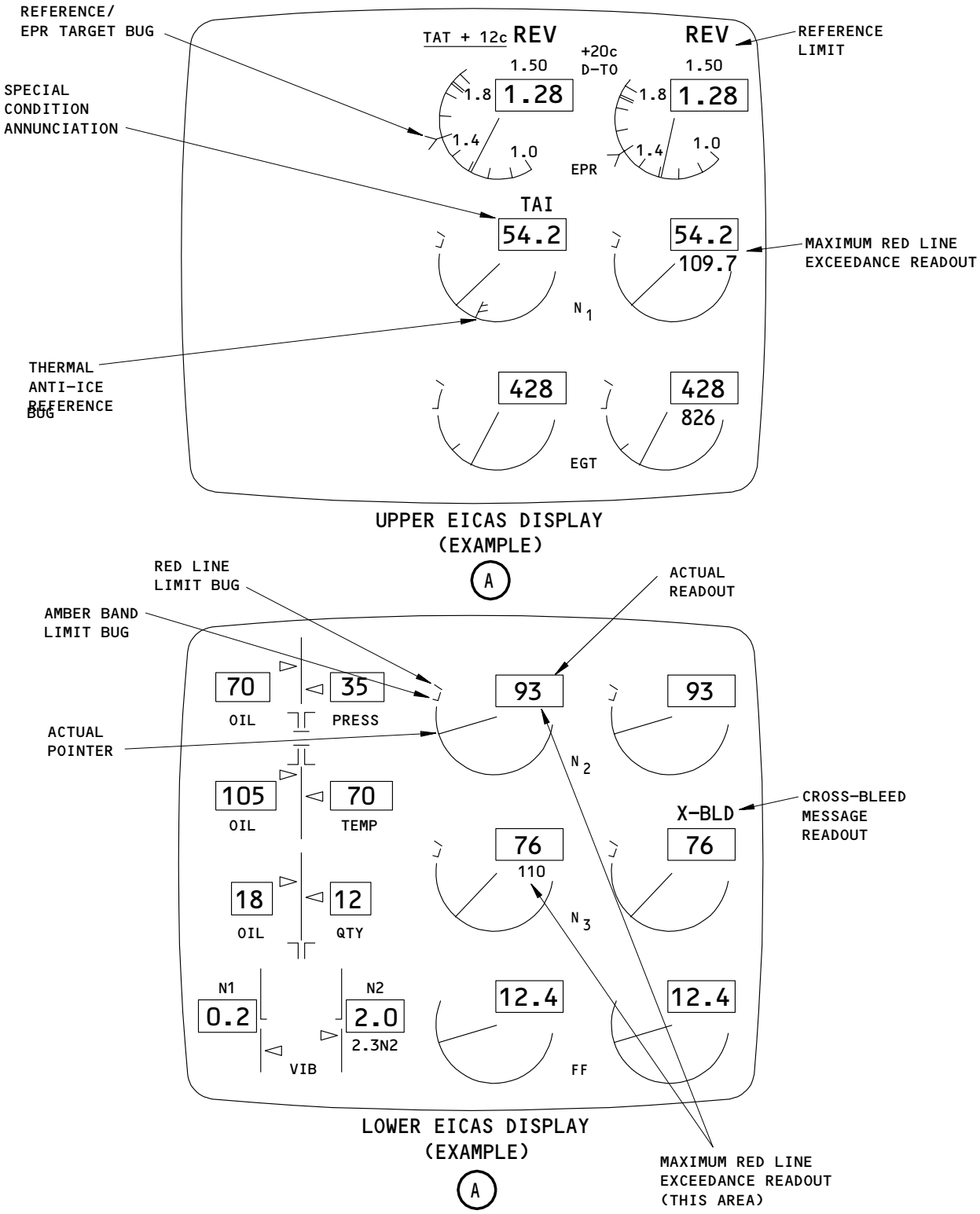
(2) The low pressure air is supplied through the airplane pneumatic system from three sources:
   (a) An engine that is in operation.
   (b) Ground vehicles with low pressure air supply units.
   (c) The airplane auxiliary power unit (APU).

S 992-023-R00

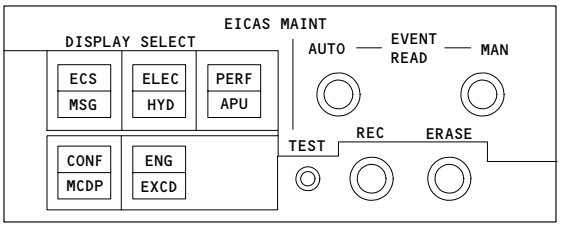
(3) Usual starter operation.
   (a) The starter can be operated continuously for not more than 2 minutes.
      1) If the engine start is not completed, do not use the starter again until the N3 rotor speed decreases to zero.



Flight Compartment Control Panels
Figure 206 (Sheet 1)

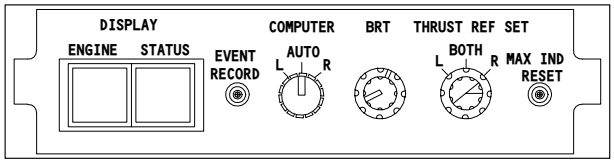


Flight Compartment Control Panels
Figure 206 (Sheet 2)



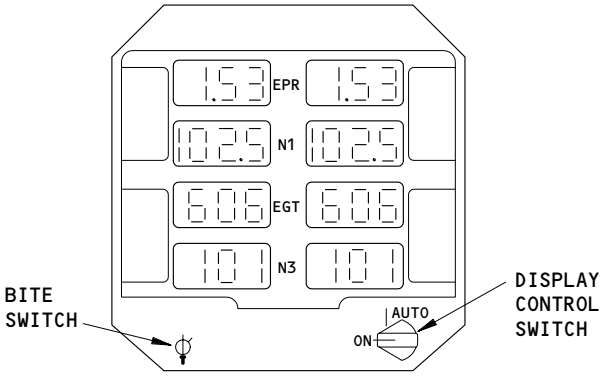
EICAS MAINTENANCE PANEL
(EXAMPLE)

B



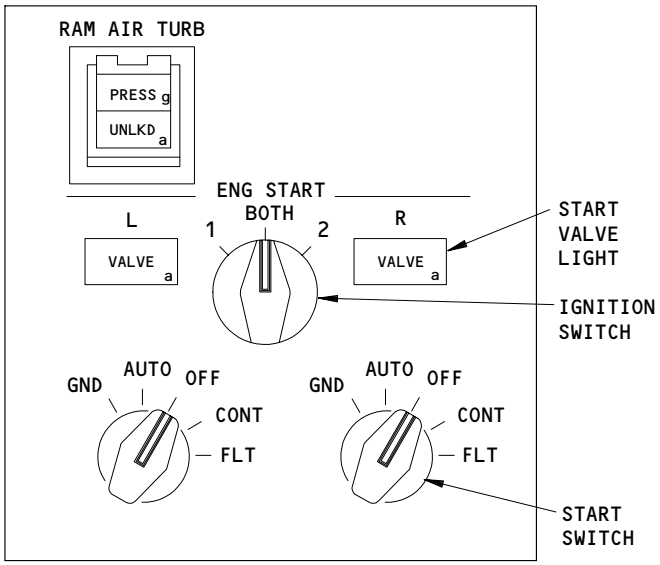
EICAS DISPLAY SELECT PANEL
(EXAMPLE)

C



STANDBY ENGINE INDICATOR
(EXAMPLE)

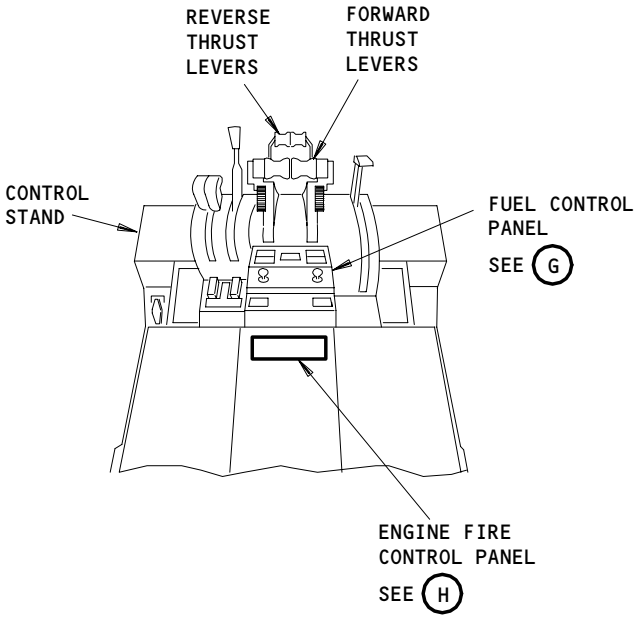
D



ENGINE START CONTROL PANEL
(EXAMPLE)

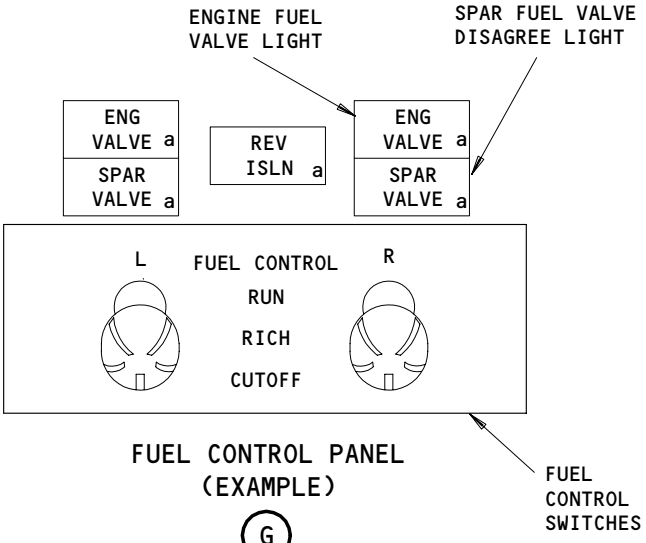
E

Flight Compartment Control Panels
Figure 206 (Sheet 3)



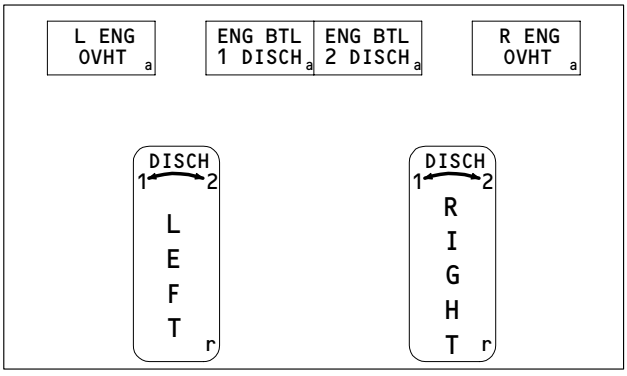
CONTROL STAND

F



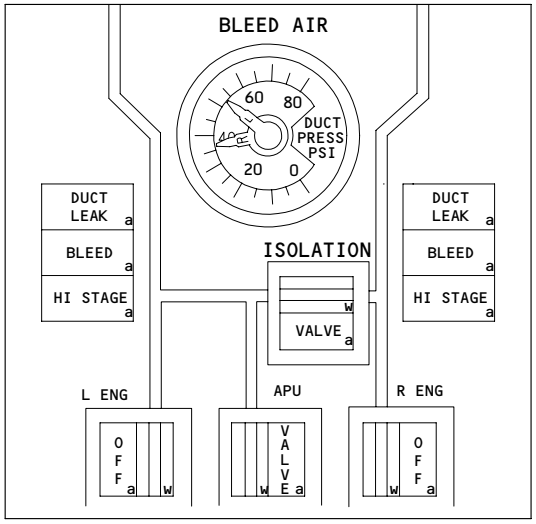
FUEL CONTROL PANEL (EXAMPLE)

G



ENGINE FIRE CONTROL PANEL (EXAMPLE)

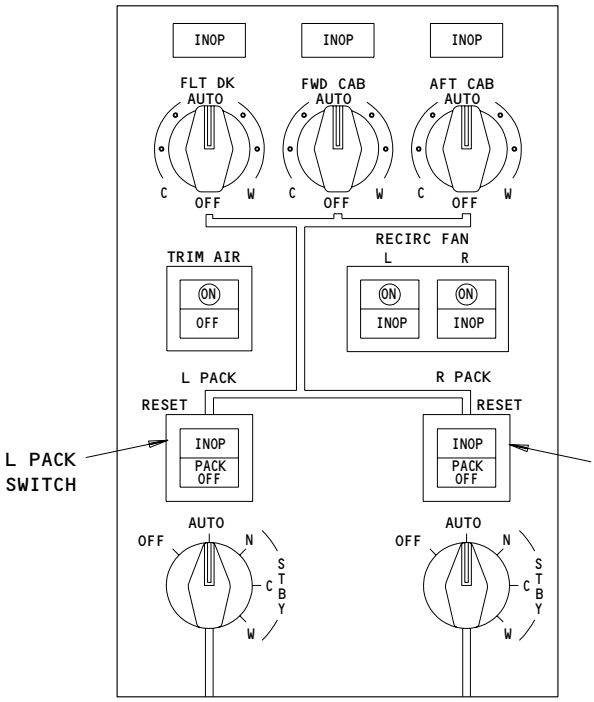
H



BLEED AIR CONTROL PANEL (EXAMPLE)

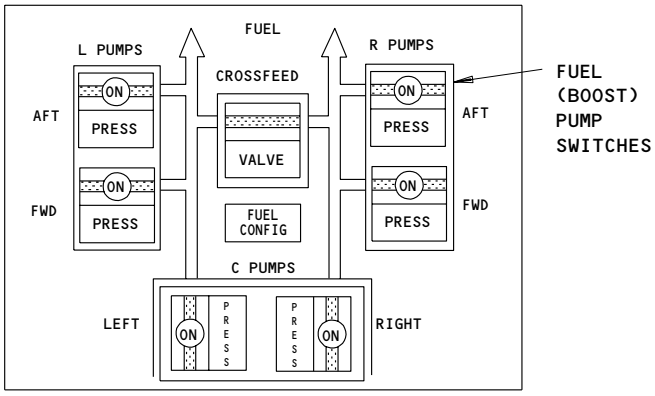
I

Flight Compartment Control Panels
Figure 206 (Sheet 4)



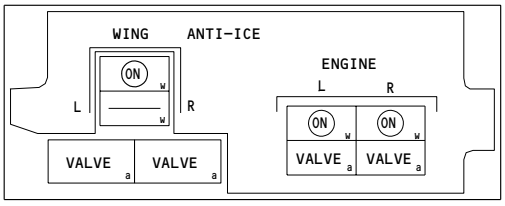
AIR CONDITIONING CONTROL PANEL
(EXAMPLE)

J



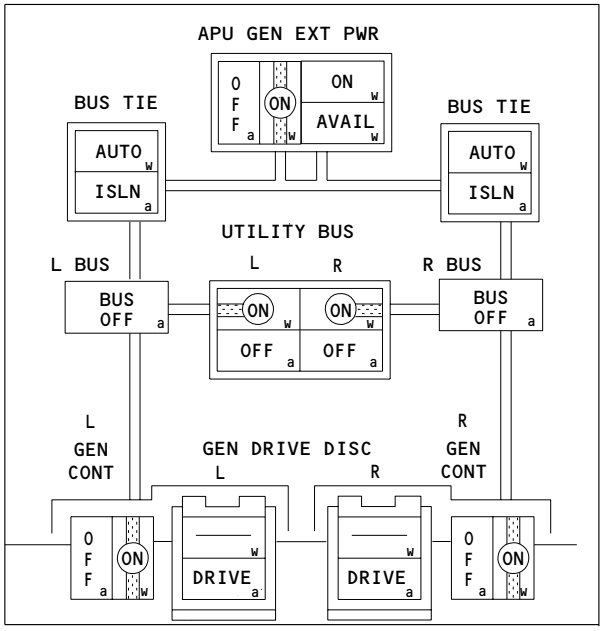
FUEL MANAGEMENT CONTROL PANEL
(EXAMPLE)

K



WING AND ENGINE ANTI-ICE CONTROL PANEL
(EXAMPLE)

L



ELECTRICAL SYSTEMS CONTROL PANEL
(EXAMPLE)

M

Flight Compartment Control Panels
Figure 206 (Sheet 5)

(b) A second continuous starter operation for not more than 2 minutes is permitted.
1) If the second engine start is not completed, do not use the starter again until the N3 rotor speed decreases to zero.
(c) A third continuous starter operation for not more than 2 minutes is permitted.
1) If the engine start is not completed, let the starter become cool for 15 minutes before it is used again.

S 992-024-R00
(4) Extended starter operation.
(a) For extended operation, continuous starter operation for not more than 4 minutes is permitted.
1) Let the starter become cool for 15 minutes before it is used again.

S 992-245-R00
(5) Limits to Engage the Starter.
(a) If the starter was operated, engage the starter again after the N3 speed decreases to zero.

NOTE: This will minimize damage and worn parts.

(b) During usual conditions, the starter can be engaged again with the N3 speed not more than 10%.
(c) During emergency conditions, the maximum N3 speed that the starter can be engaged again is 34% N3.
(d) The starter can be engaged again only in an emergency to avoid a fire or to keep the EGT in the limits.
1) If it is necessary to engage the starter again with the N3 speed more than 30%, do the procedure for Starter Motor Inspection.

S 992-025-R00
(6) Starter Motor Inspection.
(a) If starter motor was engaged again with the N3 speed more than 30%, examine the components that follow for metal particles (AMM 79-00-00/601).
1) the pressure and scavenge oil filters elements.
2) the master magnetic chip detector.
3) the high speed external gearbox magnetic chip detector.
4) the high speed input bevel housing magnetic chip detector.
(b) If the metal particles that are found indicate internal damage, replace the high speed external gearbox (AMM 72-00-61/401).
(c) If the metal particles that are found do not indicate internal damage or no particles are found, examine the pressure and scavenge oil filter elements and the magnetic chip detectors after 25 hours of operation.

S 992-026-R00

(7) Starter control valve lights

(a) There are amber L VALVE and R VALVE start valve lights adjacent to the ENG START switches on the pilots overhead panel P5.

(b) During a usual engine start, the lights come on and then go off as its start valve opens. Then the lights come on and go off as its start valve closes.

(c) An amber start valve light that stays on indicates a defective valve.

G. Leakage Limits

S 992-027-R00

(1) The permitted leakage from the engine vents and drains during the engine operation and after the engine is shutdown is given in Engine Vents and Drains - Inspection/Check (AMM 71-71-00/601).

S 992-028-R00

(2) Fuel leakage under the engine cowls is not permitted.

(a) When the engine is started, fuel leakage under the engine cowls can be seen in daylight and artificial light.

1) The fuel leakage can be seen as a fog-like spray from the bottom of the aft edge of the turbine exhaust sleeve.

(b) Monitor the aft edge of the turbine exhaust sleeve for fuel leakage when the engine is started.

1) If fuel leakage is seen, stop the procedure to start the engine or do the procedure to shutdown the engine.

2) Do not start or operate the engine until the cause of the fuel leakage is found and corrected.

H. Ignition Use

S 992-029-R00

(1) Use of the Igniters

(a) The igniters can be used with no limits during the procedure to start the engine.

(b) If a single igniter is used to start the engine, first use the No. 1 ignition system, then use the No. 2 ignition system.

(c) Continuous use of the igniters are not necessary when the engine is operated on the ground for maintenance.

S 992-030-R00

(2) Ground starts are done automatically with the 10-JOULE system.

S 992-031-R00

(3) Before the engine goes to the minimum idle (approximately 50% N3), a signal from the Dedicated Generator Speed Switch will:

(a) Turn the ignition system OFF or,

(b) Turn the ignition system to the 4-JOULE level for normal use with these conditions:

1) At takeoff with the START switch in the AUTO position

2) The wing flaps are not in the UP position.

S 992-032-R00
(4) The engine start switch has five positions: GND-AUTO-OFF-CONT-FLT.

S 992-033-R00
(5) Ignition is provided at the four positions as follows:
(a) GND
1) High energy ignition is supplied for the usual engine ground starts or in-flight starter assisted relight.
2) The switch is latched by a relay and is released automatically to the AUTO position at the end of the start cycle.
3) If the START switch is moved to AUTO or OFF position, the start cycle will be stopped.
(b) AUTO
1) This position arms the system to supply low energy ignition to the igniters.
2) This will occur when the engine anti-ice is turned ON, or if the wing flaps are not in the UP position.
(c) CONT
1) This position supplies low energy ignition continuously.
(d) FLT
1) This position supplies high energy ignition to the igniters.

S 992-034-R00
(6) A start disagreement relay provides an illuminated valve indication if the position of the engine start valve is not the same as the start switch position.
(a) An indication is also displayed on EICAS.

I. Static Electricity Light Which Comes From The Engine Nose Cone

S 992-035-R00
(1) When the engine operates in air which is dry, a static electrical charge or light can come from the nose cone of the engine.

S 992-036-R00
(2) The nose cone can get an electrical charge when it turns in dry air.

S 992-037-R00
(3) When this electrical charge suddenly comes out of the nose cone and goes in the air, the air can give light.

S 992-038-R00
(4) This does not cause damage to the engine and you can ignore this condition.

J. Use of the Engine Anti-Ice System

S 992-039-R00

(1) When the temperature is low and the air contains water, the water in the air can freeze on the inlet cowl.
   (a) This ice can cause the airflow through the inlet cowl to become not stable.
   (b) The ice can also break from the inlet cowl and cause damage to the engine.

S 992-040-R00

(2) Use the engine anti-ice system to make sure the water in the air does not freeze on the inlet cowl.
   (a) When you push the L (R) ENG ANTI-ICE switch on the overhead panel P-5, hot air will flow through the forward part of the inlet cowl.
   (b) When the ENG ANTI-ICE switch is in the ON position, the water in the air cannot freeze on the inlet cowl.

S 992-041-R00

(3) The water in the air can freeze on the inlet cowl when the temperature of the air is more than 0°C (32°F).
   (a) This can occur because the pressure and the temperature of the air changes when it goes through the inlet cowl.

S 992-042-R00

(4) To make sure the water will not freeze on the inlet cowl, push the L (R) ENG ANTI-ICE switch to the ON position when one of these conditions occur:
   (a) The engine can pull in water, rain, snow, and hail when it operates and the air temperature is less than 10°C (50°F).
   (b) You cannot see for more than 1000 m (3300 ft) because of the water in the air (fog) and the air temperature is less than 10°C (50°F).

S 992-043-R00

(5) If there are cold weather conditions, do these steps to start the engine:

   NOTE: The engine anti-ice system gets air from the same duct as the engine starter. If the engine anti-ice system is ON when you try to start the engine, the starter will not have sufficent air pressure to satisfactorily start the engine.

   (a) Make sure the L (R) ENG ANTI-ICE switch is in the OFF position when you start the engine.
   (b) When the engine speed increases to the idle speed, immediately push the L (R) ENG ANTI-ICE switch to the ON position.

S 992-044-R00

(6) To correctly do a test of the engine, you cannot use the engine anti-ice system during some of the power plant tests (AMM 71-00-00/501).
  (a) If you can, do these tests when it is not necessary to use the engine anti-ice system.
  (b) If it is necessary to use the engine anti-ice system during these tests, do these steps:
    1) Use the engine anti-ice system during most of the engine operation.
    2) Only when it is necessary to make a record of an engine indication, push the ENG ANTI-ICE switch to the OFF position.
      a) Make the record of the engine indication during this time.
    3) In less than 60 seconds after you push the ENG ANTI-ICE switch to the OFF position, push the ENG ANTI-ICE switch to the ON position.
    4) Make sure that ice has not collected on the inlet cowl before you push the ENG ANTI-ICE switch to the OFF position again.

S 992-045-R00

(7) Do not use the engine anti-ice system if the outside air temperature (OAT) is 80°F (27°C) or more.

K. Engine Operation During Ice Conditions

S 992-046-R00

(1) Engine performance tests should not be done during ice conditions.

S 992-047-R00

(2) Ice conditions are defined as follows:
  (a) Outside air temperature (O.A.T.) is less than 10°C (50°F).
  (b) Visible moisture can be seen.

NOTE: Visible moisture is defined as clouds or fog with less than one mile visibility, rain, snow, sleet, or ice crystals, or; water, ice or snow on the ground.

L. Compressor Surge

S 992-048-R00

(1) Compressor surge (or stall) can occur during middle to high power engine operation in bad wind conditions or after a bleed valve failure.
  (a) Bad wind conditions are crosswinds, or tailwinds, or sudden, fast and strong winds that change direction.
  (b) Engine operation in these conditions is not recommended.

S 992-049-R00

(2) A compressor surge is defined with these conditions.
  (a) The start of a compressor surge (or stall) is a roar sound.
  (b) This is a sudden increase of air noise as separation occurs over the engine inlet lip.
  (c) A sudden change in EPR occurs.
  (d) A sudden increase of EGT with a rumble or bang sound can occur if the surge is permitted to continue.
  (e) If a roar sound from the engine inlet is heard, decrease power immediately.

    NOTE: This is a condition that is not stable.

S 992-050-R00

(3) If a compressor surge occurs, do the steps that follow:

    CAUTION: DO NOT MOVE THE THRUST LEVER FORWARD DURING A COMPRESSOR SURGE. ENGINE DESTRUCTION CAN OCCUR. ALWAYS MOVE THE THRUST LEVER REARWARD.

  (a) Immediately move the thrust lever rearward (1 to 2 seconds) to idle power.
  (b) Monitor the EGT.
    1) The EGT and the fuel flow should decrease.
    2) If the surge continues and the EGT increases, do these steps.
      a) Move the fuel control switch to the CUTOFF position.
      b) Monitor the N3 speed and stop when the N3 speed decreases to zero.
      c) Do the procedure to dry motor the engine until the EGT is below 100°C.
  (c) Let engine operation become stable at idle power.
  (d) Make a check for the dedicated generator and engine bleed valve failure messages on EICAS.
  (e) Make a check of the wind conditions.
  (f) If there are good wind conditions and no EICAS messages, move the thrust lever forward slowly to find if the compressor surge occurs again.
  (g) Make a check that N3 speed follows the thrust lever movements.
  (h) If the compressor surge does not occur again, continue with the engine operation.
  (i) If the surge occurs again, do these steps:
    1) Decrease the power immediately.

2) Let the engine operate at idle power for 5 minutes.
3) Do the procedure to do the engine shutdown.
4) Find the cause of the compressor surge and and correct it.

S 992-051-R00

CAUTION: BE VERY CAREFUL WHEN YOU CONTINUE TO OPERATE AN ENGINE THAT HAS HAD A BAD STALL OR FREQUENTLY STARTS TO STALL. TOO MANY STALLS CAN DAMAGE THE COMPRESSOR BLADES, VANES AND CASES.

IF THE EGT INCREASES QUICKLY WHEN THE THRUST LEVER IS SLOWLY MOVED FORWARD, OR
IF THE EGT IS HIGH, OR
IF THE ENGINE VIBRATION INCREASES,
THE ENGINE SHOULD BE SHUT DOWN.

(4) A compressor stall can cause decreased compressor rotor blade fatigue life and blade failure.

S 992-052-R00

CAUTION: IF YOU HEAR A BANG SOUND AT THE ENGINE INLET OR FLAME FROM THE EXHAUST OCCURS, THIS IS A HARD STALL. DO THE ENGINE SURGE INSPECTION PROCEDURE (AMM 71-00-00/601).

(5) After a stall has occurred, do the Inspection Following Engine Surge procedure (AMM 71-00-00/601).

M. Thrust Lever Movements

S 992-053-R00

(1) Thrust lever movements should be slow, accurate and smooth when possible.
(a) A 6 to 10 second thrust lever movement between the idle and takeoff (T.O.) EPR is a usual operation during the acceleration and deceleration of the engine.

S 992-054-R00

(2) Quick movement of the thrust lever is permitted but should not be done for usual conditions.
   (a) This causes high EGT and quick temperature changes that can decrease engine life.

S 992-055-R00

(3) When the engine is operated with the EEC supervisory function OFF, set the engine power below the takeoff thrust EPR by approximately 0.01 - 0.02 EPR at first.

NOTE: This will keep engine overboost to a minimum.

S 992-056-R00

(4) When the engine is operated with the EEC supervisory function ON, takeoff thrust will be set at the full throttle position at the pilot's control stand.

N. Engine Cowl Limits

S 992-058-R00

(1) Engine operation is usually permitted with all fan cowl panels and the thrust reverser halves installed and/or closed.

S 992-059-R00

(2) Engine operation with the fan cowl panels open is permitted during the tests from the Power Plant - Test Reference Table (AMM 71-00-00/501) with these conditions:
   (a) All engine operation is in forward thrust.
   (b) The thrust levers are set at minimum idle power.
   (c) The applicable test must specify engine operation with the fan cowl panels open.

O. Thrust Reverser Limits

S 992-060-R00

(1) The engines may not be operated in reverse thrust without all cascade vane segments installed in the thrust reverser.

S 992-061-R00

(2) For maintenance, engine operation in reverse thrust is limited to minimum idle power.

S 992-062-R00

(3) Thrust reverser operation during engine operation must be in the limits that follow to prevent overheat conditions of the thrust reverser.
   (a) Maximum N1 speed in reverse thrust (static) - 40%.
   (b) Maximum time in reverse thrust (static) - 5 minutes

P. Seized Low Pressure (N1) Rotor

S 992-063-R00

(1) During the procedure to start the engine, make sure the ground person monitors the low pressure compressor (or fan).

S 992-064-R00

(2) If the ground person does not report that the low pressure compressor (N1) turns before 30% N3, or within 30 seconds after the start switch is moved to the GND position, do the steps that follow:
   (a) Immediately move the fuel control switch to the CUTOFF position.
   (b) Continue to motor the engine for a minimum of 30 seconds or until the EGT decreases to a value less than 100°C.
   (c) Monitor the N3 speed.
   (d) When the N3 speed is zero, do the procedure to start the engine.
   (e) Tell the ground person to monitor the low pressure compressor (N1).
   (f) If low pressure compressor does not turn by 30% N3, do the procedure to do the engine shutdown.
   (g) Find the cause of the problem that the low pressure compressor (N1) does not turn.

Q. Engine Fire

S 992-065-R00

WARNING: AIRPLANE FIRE EXTINGUISHER MATERIALS ARE POISONOUS TO YOU. DO NOT BREATH THE EXTINGUISHER GAS. DO NOT LET THE EXTINGUISHER MATERIAL TOUCH YOUR SKIN.

(1) After the airplane or ground fire extinguisher systems are used, you must make the engine clean.
   (a) If carbon dioxide is used, you do not have to make the engine clean.

NOTE: Carbon dioxide is an inert gas which will not cause corrosion. Carbon dioxide has no effect on the engine that would cause damage.

S 992-066-R00

(2) To help stop an engine fire and prevent injury to fire fighters, do the procedure to do the engine shutdown for all other engines.

S 992-067-R00

(3) When the fire switch handle is pulled up, these things will happen to the systems that interface with the engine.
   (a) The audible fire bell stops.
   (b) Hydraulic pressure is removed from the engine driven hydraulic pump.
   (c) The shutoff valve for the engine hydraulic pump closes and removes the hydraulic fluid supply.
   (d) The electrical circuit for the Integral Drive Generator (IDG) opens after a 6 to 8 second time delay.
   (e) The spar fuel valve closes to stop the fuel supply from the wing tanks.
   (f) The engine fuel shutoff valve closes in the fuel flow governor.
   (g) The fire extinguisher circuit for the engine is armed.
   (h) The electrical power for the control system of the thrust reverser is removed.
      1) The isolation valve of the thrust reverser will close or stay closed.
   (i) If the left fire handle is pulled up, the APU air supply valve and the left air supply PRSOV will close.

      NOTE: The pressure regulating and shutoff valve is known as the PRSOV. The auxilary power unit is known as the APU.

      1) The APU cannot be used to motor the engine.
      2) Ground carts can supply low pressure air to motor the engine.
   (j) If the right fire handle is pulled up, the right air supply PRSOV will close.
      1) Ground carts can supply low pressure air to motor the engine.

S 992-068-R00

(4) Engine fire/severe damage procedure.

CAUTION: DO NOT START THE ENGINE AGAIN AFTER AN ENGINE FIRE. FIND THE CAUSE OF THE FIRE AND CORRECT IT.

(a) If an engine fire is reported by a ground person, immediately do the steps that follow:
  1) Immediately move the thrust levers to the idle power position.
  2) Move the fuel control switches to the CUTOFF position.
  3) Pull up and turn the applicable engine fire handle clockwise to fire a fire bottle.
  4) Turn the engine fire handle counterclockwise to fire the last fire bottle if necessary.

S 992-069-R00

(5) Internal Engine Fire During Engine Shutdown.

CAUTION: IF THE LEFT FIRE HANDLE IS PULLED UP, THE AIR SUPPLY FROM THE APU WILL BE STOPPED AND YOU CANNOT USE THE APU TO MOTOR EITHER ENGINE TO DECREASE THE EGT.

(a) You can have an internal engine fire when the engine is shutdown if the conditions that follow occur:
  1) The EGT does not decrease after the fuel control switch is moved to the CUTOFF position; the EGT increases to 550°C.
  2) An internal engine fire is reported by a ground person.

(b) If you have an internal engine fire, do the steps that follow:
  1) Make sure the fuel control switch is in the CUTOFF position.
  2) Move the engine start switch to the GND position to engage the starter.
    a) Ignore the starter limits under these conditions.

NOTE: The starter can be engaged up to a maximum speed of 34% N3. If the starter is engaged at a speed more than 10% N3, you must record and report the starter was engaged and the amount of time the starter was used at speeds more than 10% N3.

3) Dry motor the engine until the fire is extinguished.

S 992-070-R00

(6) Internal Engine Fire - Engine Is Not Operated.

(a) If an internal engine fire is reported, do the steps that follow:

1) Make sure the fuel control switch is in the CUTOFF position.
2) If pneumatic air is supplied to the airplane, move the engine start switch to the GND position to engage the starter.
3) Dry motor the engine to extinguish the fire.

(b) If the fire cannot be extinguished with the dry motor procedure, use the ground fire extinguisher equipment.

NOTE: Use carbon dioxide fire extinguisher equipment if possible. The engine does not have to be cleaned if carbon dioxide is used.

S 992-071-R00

(7) External Engine Fire.

(a) Extinguish external engine fires with the airplane fire extinguisher system or use the ground fire extinguisher equipment.

(b) If an external engine fire is supplied by a large fuel leak in the strut, dry motor the engine to supply air to cool the engine.

1) Continue to dry motor the engine until the ground fire extinguisher equipment can be used.

(c) External engine fire with the cowls closed.

1) Immediately shutdown the engine.
   a) Move the thrust levers to the idle power position.
   b) Move the fuel control switches to the CUTOFF position.
2) Pull up and turn the applicable engine fire handle clockwise to fire a fire bottle.
3) Turn the engine fire handle counterclockwise to fire the last fire bottle if necessary.
4) If the airplane fire extinguisher systems do not extinguish the fire, use the ground fire extinguisher equipment.

(d) External engine fire with the cowls open or removed.

1) Immediately shutdown the engine.
   a) Move the thrust levers to the idle power position.
   b) Move the fuel control switches to the CUTOFF position.
2) Use the ground fire extinguishers or the fire department equipment to extinguish the fire.

NOTE: The fire extinguisher system on the airplane will not have an effect on the fire with the cowls open.

R. Engine Overheat and Turbine Overheat Warnings

S 992-072-R00

(1) If there is an engine overheat or a turbine overheat condition, these visual warning lights will come on.
   (a) The red lights of the master caution and aural warning systems will flash at the glareshield.
   (b) A red message at top of the upper EICAS CRT at pilot's center instrument panel P2 will occur.
   (c) The red lights in the fire handle and fuel control switch knob will come on for the applicable engine.

S 992-073-R00

CAUTION: DO NOT START THE ENGINE AGAIN. FIND THE CAUSE OF THE OVERHEAT MESSAGE AND REPAIR THE PROBLEM.

(2) You must immmediately do these steps if there are red fire messages and aural warnings:
   (a) Move the forward thrust levers rearward to the idle power position.
   (b) Move the fuel control switch to the CUTOFF position.
   (c) Pull the applicable engine fire handle.
   (d) If fire handle light stays on, turn the handle clockwise to fire a fire bottle.
      1) Make sure the fire bottle light comes on.
   (e) If fire warning stays on for more than 30 seconds, turn the fire handle counterclockwise to fire the last fire bottle.
      1) Make sure the fire bottle light comes on.
   (f) Monitor the EGT indication on the EICAS and let the engine speed decrease.
   (g) Monitor the EICAS to find if the fire warning was caused by an ENGINE OVERHEAT or TURBINE OVERHEAT condition.
   (h) Examine the overheat source and find the cause.
      1) Replace the engine if there are no faults in both sources.

TASK 71-00-00-862-117-R00

6. Power Plant Operation During Normal Weather

A. General

(1) This procedure gives the instructions to operate the engine during normal weather conditions. This procedure can be used to make a check of the engine operation or related systems when engine operation is necessary.

(2) The engine can be started with air from the auxilary power unit (APU), or low pressure air supplied from ground carts. Cross-bleed air from an engine that has been started can be used.

(3) During cold weather, it is necessary to apply heat to release the engine components and systems that are frozen with ice.
Do the procedure for cold weather operation with this procedure.

(4) The airflow caused by the engine operation will move unwanted objects into the engine. It is important that the power plant (engine compartment and inlet cowl) and the work area is clean before you operate the engine.

(5) To prevent corrosion in the compressor stages and damage to the fan, it is recommended that covers are installed over the engine inlet and exhaust when possible. When there are low temperatures and water that can freeze or there is sufficient wind to turn the engine, it is important to install covers over the engine inlet and exhaust immediately.

(6) When records are made of the engine indications, write down the values from the analog gauge pointers during transient operation and the digital gauges during stable operation.

(7) A single igniter or both igniters can be used to start the engine. It is recommended that one igniter is used to start the engine. If the engine is started with the first igniter, the next start of the engine must be made with the second igniter. Use the ignition selector switch at pilot's overhead panel.

(8) An ENG VALVE and SPAR VALVE amber light at pilot's control stand will come on and go off as the fuel control switch is moved to the RICH or RUN position. These lights will come on and go off when the fuel control switch is moved to the CUTOFF position during normal operation.

(9) The L ENG START VALVE and R ENG START VALVE lights are on the pilot's overhead panel. These lights come on and go off as the start valve opens or closes during normal operation. These lights will stay on if the valve position is not the same as the start switch position. An amber L or R ENG START EICAS message will be shown if start valve position is not the same as start switch position for more than five (5) seconds.

(10) Start switch is magnetically held in GND position until released electrically to AUTO at approximately 47% N3 speed or until manually turned to either AUTO or OFF.
(11) It is permitted to try to start the engine 3 times. If engine does not start after the third time, dry motor the engine for 2 minutes, and then shutdown the engine. Do not operate the starter more than the limits.
(12) Low air pressure to the starter can cause slow N3 rotor speed acceleration and a hung start.
(13) Engine starts with slow N3 rotor speed acceleration from lightup to idle power, with a low EGT (lean fuel schedule), can be continued if the starter is operated in the limits.
(14) ENGINES POST-RR-SB 72-C230;
RB211-535E4 series engines with Phase 5 combustors can sound differently (rumble) when the engine starts and at engine idle. This condition occurs in very cold weather. This condition is fully satisfactory, and there is no problem related to this noise (rumble).

B. Equipment
(1) Service interphone equipment
(2) Engine inlet cover
(3) Engine exhaust covers (fan and turbine)
(4) Engine inlet guard - A71042-2

C. References
(1) AMM 09-21-00/201, Taxiing
(2) AMM 10-11-01/201, Normal Parking
(3) AMM 12-11-01/301, Fuel Tank Pressure Fueling
(4) AMM 12-11-02/301, Fuel Tank Overwing Fueling
(5) AMM 12-12-01/301, Hydraulic Systems
(6) AMM 12-13-01/301, Engine Oil Replenishing
(7) AMM 12-13-02/301, Engine Starter (Add Oil)
(8) AMM 12-13-03/301, Integrated Drive Generator
(9) AMM 23-41-00/001, Service Interphone System
(10) AMM 24-22-00/201, Electrical Power - Control
(11) AMM 29-11-00/201, Hydraulic Systems
(12) AMM 31-25-00/001, Clocks

(13) AMM 32-00-20/201, Landing Gear Downlocks
(14) AMM 36-00-00/201, Pneumatic - General
(15) AMM 54-52-01/601, Strut Fairings
(16) AMM 71-00-00/501, Power Plant
(17) AMM 71-11-04/201, Fan Cowl Panels
(18) FIM 75-32-00/101, Compressor Bleed Control System
(19) AMM 78-31-00/201, Thrust Reverser System

D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right
413/423 Fan Cowl Panel Left
414/424 Fan Cowl Panel Right
415/425 Thrust Reverser Left
416/426 Thrust Reverser Right

E. Prepare to Operate the Engine.

S 862-246-R00

WARNING: READ THE SAFETY PRECAUTIONS AND THE ENGINE OPERATION PARAGRAPHS BEFORE YOU OPERATE THE ENGINE. IF YOU DO NOT OBEY THE PRECAUTIONS GIVEN IN THESE PARAGRAPHS, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT OR INJURY TO PERSONS.

(1) Make sure you know the data to operate the engine.
(a) Read these paragraphs for the data to operate the engine.
1) Safety Precautions to Operate the Engine.
2) Engine Operation on the Ground - General Procedures.

S 942-119-R00
(2) If you operate the engines to taxi the airplane, read the procedure to taxi the airplane (AMM 09-21-00/201).

S 942-120-R00
(3) Move the airplane until the nose of the airplane points into the wind.

S 942-121-R00
(4) Make sure the airplane is parked in an area that does not have oil, grease, water, ice or snow on the ground (AMM 10-11-01/201).

S 942-122-R00
(5) Install the downlocks for the landing gear (AMM 32-00-20/201).

S 942-123-R00

CAUTION: MAKE SURE THAT THE WHEEL CHOCKS ARE INSTALLED FOR ALL ENGINE OPERATIONS. WHEN BOTH ENGINES ARE OPERATED AT TAKEOFF POWER, THE AIRPLANE CAN MOVE FORWARD WITH FULL BRAKE PRESSURE APPLIED IF THE CHOCKS ARE NOT INSTALLED.

(6) Put wheel chocks forward and aft on all wheels of the main gear trucks and the nose gear.

S 942-124-R00

CAUTION: OBEY THE INSTRUCTIONS TO PREVENT AIRPLANE MOVEMENT AT HIGH POWER. MAKE SURE THAT THE MINIMUM GROSS WEIGHT, THE NOSE GEAR POSITION, AND THE GROUND/TIRE SURFACE REQUIREMENTS ARE CORRECT. THE AIRPLANE CAN SKID DURING ENGINE OPERATION AT HIGH POWER.

(7) For engine operation at high power, do the procedure to Prevent Airplane Movement During Engine Operation At High Power.

NOTE: The minimum gross weight, nose gear position, and ground/tire surface requirements must be correct.

S 942-125-R00

(8) Do these steps for each engine to be operated:
  (a) Remove the covers over the engine inlet and exhaust.
  (b) Put an inlet guard at the engine inlet if it is necessary.
    1) Make sure the inlet guard cannot be moved from the inlet position.
  (c) Make a check around these areas of the engine for tools and unwanted objects.
    1) The air inlet.
    2) The fan exhaust.
    3) The turbine exhaust.
    4) The leading edge of the wing over the engine.
    5) The ground around and below the engine.

S 942-126-R00

CAUTION: DO NOT OPERATE THE AIRPLANE HYDRAULIC SYSTEMS UNLESS THERE IS A SUFFICIENT QUANTITY OF FUEL IN THE MAIN TANKS. THE FUEL REMOVES THE HEAT FROM THE HEAT EXCHANGERS OF THE HYDRAULIC SYSTEMS. THE HYDRAULIC SYSTEMS COULD BECOME TOO HOT.

(9) Make sure the fuel tanks have a sufficient quantity of fuel and the tank sumps are free of water.

NOTE: A minimum of 600 gallons or 4020 pounds (1827 Kilograms) of fuel in each of the main tanks is necessary for the heat exchangers.

(a) Put the fuel in the tanks if it is necessary (AMM 12-11-01/301 or 12-11-02/301).

S 942-127-R00

(10) Make a check of the quantity of hydraulic fluid in the hydraulic fluid reservoir.

(a) Put the hydraulic fluid in the reservoir if it is necessary (AMM 12-12-01/301).

S 942-128-R00

WARNING: STOP FOR A MINIMUM OF TEN MINUTES AFTER THE ENGINE IS SHUTDOWN BEFORE YOU REMOVE THE OIL TANK FILLER CAP. LET THE OIL TANK PRESSURE DECREASE OR HOT OIL CAN COME OUT OF THE TANK AND CAUSE BAD BURNS.

CAUTION: DO NOT FILL THE OIL TANK TO MORE THAN THE SPECIFIED QUANTITY. IF ENGINE HAS BEEN MOTORED WITHOUT SUBSEQUENT OPERATION FOR SCAVENGING, OIL LEVEL WILL BE APPROXIMATELY TWO QUARTS LOW.

(11) Make a check of the quantity of oil in the oil tank on the engine.

(a) Put oil in the oil tank if it is necessary (AMM 12-13-01/301).

S 942-129-R00
(12) Make a check of the oil quantity in the integral drive generator (IDG).

NOTE: The IDG has a sufficient quantity of oil if the sight gage for the oil level is fully dark.

(a) Put oil in the IDG if it is necessary (AMM 12-13-03/301).

S 942-130-R00
(13) Make sure the forward fairing of the strut is hooked and latched (AMM 54-52-01/401).

S 942-131-R00
(14) Make sure the thrust reverser is closed and latched (AMM 78-31-00/201).

S 942-132-R00
(15) Make sure the fan cowl panels are closed and latched (AMM 71-11-04/201).

NOTE: The panels can be open during engine operation for the conditions specified in the paragraph for Engine Cowl Limits.

S 942-247-R00
(16) Make sure that you remove the pitot probe cover, the angle of attack probe cover, and the engine pitot probe covers.

NOTE: The probe heaters can be damaged if the covers are not removed before you supply electrical power.

S 942-133-R00
(17) Make sure the person in the flight compartment (that operates the engine) can speak with the person on the ground (that monitors the engine).
(a) Use the flight interphone system.

S 862-134-R00
(18) Make sure these switches are in the correct position:
(a) Push the L(R) Engine Fire handles on the aft electronic control panel P8, in.
(b) Put the L(R) FUEL CONTROL switches on the fuel control panel on the control stand to the CUTOFF position.
(c) Put the L and R ENG START switches on the start control panel on the overhead panel P5 to the OFF position.

S 862-135-R00
(19) Supply the electrical power (AMM 24-22-00/201).

S 862-136-R00

(20) Supply the pneumatic power (AMM 36-00-00/201).

NOTE: The engine can be started with air from the auxilary power unit (APU), low pressure air from three standard ground carts or two super ground carts, or air from the other engine.

(a) If cross-bleed air from the first engine is used to start the second engine, do these steps.
  1) Start the first engine and operate it at minimum idle power.
  2) When you are ready to start the second engine, increase the power on the first engine until you get 65-75% N3 speed.

     NOTE: Duct pressure will be more than 45 psi - no load.

  3) After the second engine gets to 50% N3 speed, and there are no problems, decrease power to minimum idle on the first engine.

(b) If the engine is started with the APU or 2 to 3 ground carts, monitor the bleed air duct pressure.
  1) This pressure must be approximately 30-35 psi.

S 862-137-R00

CAUTION: SUPPLY HYDRAULIC POWER FROM THE LEFT SYSTEM TO OPERATE THE NOSE GEAR STEERING DURING THE ENGINE OPERATION.

SUPPLY HYDRAULIC POWER FROM THE RIGHT SYSTEM TO OPERATE THE AIRPLANE BRAKES DURING THE ENGINE OPERATION.

(21) Supply the hydraulic power (AMM 29-11-00/201).

S 862-138-R00

(22) Put the parking brake ON.

S 862-139-R00

(23) Prepare a check sheet to make a record of the engine data during the start of the engine and the engine operations.

S 862-140-R00

(24) Use the trim tables, and find engine EPR targets for the outside air temperature (OAT) and the ambient air pressure (AMM 71-00-00/501).

S 862-141-R00
(25) Make sure the EEC switch/light is in ON position.

S 862-143-R00
(26) Make sure the forward thrust levers are in the idle position.

S 862-144-R00
(27) Make sure the reverse thrust levers are in the forward and down position.

S 862-145-R00
(28) On the pilot's overhead panel P5, make sure these switches are in the correct position:
(a) The L PACK and the R PACK valve switches on the Air Conditioning Control Panel: PACK OFF

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(b) Continuously monitor the fuel quantity and the low pressure light indication for the applicable main fuel tank.
1) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
(c) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: ON

(d) The WING ANTI-ICE switch on the Wing and Engine Anti-Ice Control Panel: OFF

(e) The L ENG ANTI-ICE and the the R ENG ANTI-ICE switches on the Wing and Engine Anti-Ice Control Panel: OFF

S 862-146-R00
(29) Make sure these switches on the Bleed Air Control Panel are in the correct position.

NOTE: This panel is on the overhead panel P5.

(a) If the engine is started with air from the two super ground service carts or three standard ground service carts:
1) The ISOLATION VALVE switch: OPEN

2) The APU VALVE switch: CLOSED

3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

(b) If the engine is started with air from the APU:
1) The ISOLATION VALVE switch: OPEN

2) The APU VALVE switch: OPEN

3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

(c) If an engine is started with cross-bleed air from the other engine:
1) The ISOLATION VALVE switch: OPEN

2) The APU VALVE switch: CLOSED

3) The BLEED AIR valve switch for the engine that supplies the cross-bleed air: OPEN

4) The BLEED AIR valve switch for the engine to be started: CLOSED

S 042-261-R00

WARNING: MAKE SURE YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM BEFORE YOU RUN THE ENGINE. IF YOU DO NOT, YOU CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND DAMAGE TO EQUIPMENT.

(30) Open the following circuit breakers on the P11 Overhead Panel, and attach a DO-NOT-CLOSE tag:
(a) 11F2, WX RADAR or WX RADAR LEFT

(b) 11F27, WX RADAR RIGHT (if installed)

S 862-147-R00

(31) If the engine is to be operated at high power, open these circuit breakers on the overhead panel P11 to turn off the Aural Warning Speakers.
(a) 11B16, AURAL WARN SPKR LEFT
(b) 11H35, AURAL WARN SPKR RIGHT

S 712-148-R00

(32) Do a test of the fire protection system
(a) Push the TEST switch on the SQUIB TEST panel on pilots' right sidewall panel P61.
1) Make sure the TEST lights come on.
(b) Make sure the DISCH lights are off.
(c) Push the ENG/APU/CARGO FIRE OVHT TEST switch on aft electronics panel P8.
1) Make sure that the FAIL light does not come on.
(d) Make sure that all the fire indications come on during the test.

S 862-149-R00

CAUTION: BEFORE THE ENGINE IS OPERATED FOR TESTS, THE FLIGHT RECORDER CIRCUIT BREAKERS CAN BE OPENED TO PREVENT THE ERASURE OF DATA, OR THE CIRCUIT BREAKERS MAY REMAIN CLOSED TO RECORD THE DATA DURING AN ENGINE RUN. IF THE CIRCUIT BREAKERS REMAIN CLOSED, THE PREVIOUSLY RECORDED DATA WILL BE OVERWRITTEN.

(33) Open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11J7, FLIGHT RECORDER AC
(b) 11J8, FLIGHT RECORDER DC

S 862-150-R00

(34) Make sure these circuit breakers on the overhead panel P11 are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER IND
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER IND
(e) 11J31, EICAS DISPL SW
(f) 11J32, EICAS PILOTS DSP

S 862-151-R00

(35) For the left engine, make sure these circuit breakers on the overhead panel P11 are closed:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11D19, ENGINES START CONT LEFT
(d) 11L1, LEFT ENGINE IGN 1

S 862-152-R00

(36) For the right engine, make sure these circuit breakers on the overhead panel P11 are closed:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11D20, ENGINE START CONT RIGHT
(d) 11L28, RIGHT ENGINE IGN 1

S 862-153-R00

(37) Make sure the two low fuel pressure lights are not on.

S 862-154-R00

(38) Push the ENGINE and STATUS switches at EICAS control panel until the full engine display is on the upper and the lower EICAS displays at the pilot's P2 panel.

S 862-155-R00

(39) Set the elapsed time on the instrument panel clock to zero (AMM 31-25-00/001).

F. Operate the Engine.

S 862-156-R00

(1) Start the engine.
(a) Tell the person on the ground that the procedure to start the engine begins.
(b) If you use cross-bleed air to start the second engine, move the thrust levers forward until the first engine operates at 65 - 70% N3 speed.
(c) Turn the ignition switch to the necessary position.

NOTE: A single igniter or two igniters can be used to start the engine. It is recommended that one igniter is used to start the engine. If the engine is started with the first igniter, the next start of the engine must be made with the second igniter.

1) Put the ignition switch to 1 or 2 to start the engine with a single igniter.
2) Put the switch to BOTH to start the engine with two igniters.

CAUTION: MAKE SURE THAT THE START SWITCH DOES NOT MOVE FROM THE GND POSITION UNTIL THE N3 SPEED IS 47%. A HOT START CAN OCCUR AND DAMAGE THE ENGINE.

DO NOT OPERATE THE STARTER MORE THAN THE LIMITS. DAMAGE TO THE STARTER COULD OCCUR.

(d) Push in and turn the applicable ENGINE START switch to the GND position.
  1) The VALVE light for the engine start valve will come on.
  2) The DUCT PRESSURE indicator on the panel P5 will show an immediate decrease then a partial increase of air pressure (30-psi minimum).
  3) The VALVE light for the engine start valve will go out.
    a) If the engine start valve did not open, the VALVE light will not go out and EICAS will show the message (L,R) ENGINE STARTER.

CAUTION: IF THE N3 SPEED SUDDENLY OR SLOWLY DECREASES DURING THE START OF THE ENGINE, PREVENT DAMAGE TO THE STARTER. IMMEDIATELY MOVE THE ENGINE START SWITCH TO THE OFF POSITION AND IF IT IS NECESSARY, MOVE THE FUEL CONTROL SWITCH TO THE CUTOFF POSITION.

(e) Monitor the N3 rotor speed.
  1) If the N3 rotor does not turn in 10 seconds, turn the ENGINE START switch to the OFF position.
  2) If the N3 rotor speed suddenly or slowly decreases, turn the ENGINE START switch to the OFF position.

    NOTE: If the start switch is not turned to the off position, the starter will crash engage and will be damaged.

    a) Monitor the duct pressure gage on the bleed air control panel for air pressure that changes.
    b) After the engine stops, examine the pneumatic start system and the pneumatic air sources for problems.

(f) Prepare to start the clock on the instrument panel when you move the FUEL CONTROL switch.

(g) When the N3 rotor speed is 25% or stabilises at maximum motoring, and the N2 is 10% or stabilizes at maximum motoring, put the FUEL CONTROL switch to the correct position for the EGT conditions that follow:

NOTE: Do not use the RICH position after lightup or on a warm engine.

1) If the EGT is 0°C, move the FUEL CONTROL switch to the RICH position.
2) If the EGT is more than 0°C and less than 100°C, move the FUEL CONTROL switch to the RUN position.
3) If the EGT is more than 100°C, do these steps:
   a) Dry motor the engine until the EGT is less than 100°C.
   b) Put the FUEL CONTROL switch to the RUN position.

(h) Monitor the N3 speed and the EGT for a hung start or a hot start problem.
1) A hung start can occur if the engine lightup occurs, the EGT begins to increase, and the N3 speed does not increase.
2) A hung start can become a hot start.
3) A hot start can occur if the EGT quickly increases to more than 570°C.

CAUTION: IF THE ENGINE DOES NOT LIGHTUP IN 20 SECONDS AFTER YOU MOVE THE FUEL CONTROL SWITCH TO THE RUN OR RICH POSITION, OR

IF THE FUEL SUPPLY OR THE IGNITION IS ACCIDENTALLY STOPPED, OR

IF THE ENGINE LIGHTUP IS IMMEDIATE AFTER THE FUEL CONTROL SWITCH IS MOVED TO THE RUN POSITION,

MOVE THE FUEL CONTROL SWITCH TO THE CUTOFF POSITION AND MOTOR THE ENGINE TO REMOVE THE COLLECTED FUEL FOG OR UNTIL THE ENGINE FLAMES OUT.

(i) Do these steps if the engine does not lightup in 20 seconds, the fuel supply or ignition is stopped, or the engine lightup is immediate.
1) If the engine lightup was immediate:
   a) Immediately move the FUEL CONTROL switch to the CUTOFF position.
   b) Make sure the ENG VALVE light for the fuel control on the control stand comes on and goes off.
   c) Continue to motor the engine until the engine flames out.

d) Move the START switch to the OFF position when the engine is at a satisfactory condition (EGT is less than 100°C).
e) When the N3 speed is zero, examine the engine for the cause of the immediate lightup.

2) If the fuel or the ignition was stopped:
a) Immediately move the FUEL CONTROL switch to the CUTOFF position.
b) Make sure the ENG VALVE light on the control stand comes on and goes off.
c) Continue to motor the engine for 30 seconds minimum.
d) Move the START switch to the OFF position, when the EGT is less than 100°C.
e) Try to start the engine again after the N3 speed goes to zero.

3) If the engine does not lightup in 20 seconds:
a) Immediately move the FUEL CONTROL switch to the CUTOFF position.
b) Make sure the ENG VALVE light on the control stand comes on and goes off.
c) Continue to motor the engine for 30 seconds minimum before you try to start the engine again.
d) When you try to start the engine again, turn the igniter switch to the BOTH position.
e) Move the FUEL CONTROL switch to the RUN position (or the RICH position with the EGT at 0°C for the RB211-535E4 engines).
f) If the engine will not lightup again in 30 seconds, move the FUEL CONTROL switch to the CUTOFF position.
g) Continue to motor the engine for 30 seconds minimum.
h) Move the START switch to the OFF position, when the EGT is less than 100°C.
i) When the N3 speed is zero, examine the engine for the cause of the lightup problem.

CAUTION: A HOT START (EGT IS 570°C OR MORE) CAN OCCUR IF:
- THE INDICATED FUEL FLOW IS MORE THAN 0.8-1.0 PPH X 1000 (0.4-0.5 KPH X 1000) BEFORE LIGHTUP, OR
- THE FUEL CONTROL SWITCH IS MOVED TO RUN/RICH BEFORE 25% N3, OR
- DUCT PRESSURE IS BELOW 30 PSI (N3 ROTOR SPEED IS LESS THAN 25%).

IF THE EGT QUICKLY GOES THROUGH 500°C:
- IMMEDIATELY PUT THE FUEL CONTROL SWITCH TO CUTOFF,
- MAKE SURE THE ENG VALVE LIGHT COMES ON MOMENTARILY AS THE ENG VALVE CLOSES, AND
- CONTINUE TO MOTOR THE ENGINE FOR 30 SECONDS MINIMUM.

START THE ENGINE AGAIN AFTER THE N3 ROTOR SPEED GOES TO 0% N3.

A HUNG START CAN OCCUR IF LIGHTUP OCCURS FOLLOWED BY:
- UNUSUALLY SLOW ACCELERATION, AND
- N3 ROTOR SPEED BECOMES STABLE BELOW IDLE.

IF A HUNG START OCCURS, MAKE A RECORD OF THE STARTER AIR PRESSURE, THE FUEL FLOW, THE N3 SPEED, AND THE EGT.

IF FUEL FLOW INDICATION BEFORE LIGHTUP WAS BELOW 450 PPH (205 KPH) OR IF THE N3 ROTOR SPEED WAS BELOW 25%, A SUCCESSFUL START IS NOT LIKELY WITHOUT CORRECTIVE ACTION.

CAUTION: IN CASE OF AN ENGINE 'JET-PIPE' FIRE:
- IMMEDIATELY PUT THE FUEL CONTROL SWITCH TO CUTOFF.

- IF THE STARTER IS ENGAGED, CONTINUE MOTORING THE ENGINE.

- IF THE STARTER IS NOT ENGAGED, PUT THE ENGINE START SELECTOR SWITCH TO GND AT OR BELOW 30% N3.

- CONTINUE MOTORING THE ENGINE TO EXTINGUISH THE FIRE.

- BEFORE ATTEMPTING ANOTHER ENGINE START, DETERMINE THE CAUSE OF THE ENGINE FIRE AND CORRECT THE FAULT.

(j) Monitor the N1, N2, and N3 rotor speed, the EGT, the FF (fuel flow), and the oil pressure as the engine lights up and accelerates to idle power.

NOTE: Usual engine lightup occurs in 10 seconds after the FUEL CONTROL switch is moved to the RUN position. The N1, N2, and N3 rotor speed, the FF (fuel flow), and the OIL PRESS should be monitored immediately after lightup to find if the engine accelerates satisfactorily. The EGT must be monitored to make sure the EGT does not increase to more than the limits during the start and during the usual operation.

1) After lightup, the EGT will increase immediately.

CAUTION: IF THE N1 ROTOR DOES NOT TURN BEFORE 30% N3 OR WITHIN 30 SECONDS AFTER THE START SWITCH IS MOVED TO THE GND POSITION, IMMEDIATELY MOVE THE FUEL CONTROL SWITCH TO THE CUTOFF POSITION AND MONITOR THE ENGINE VALVE LIGHT.

2) Monitor the increase of the N1, N2, and N3 rotor speeds.
   a) The N1 speed indication must start before 30% N3 or within 30 seconds after the start switch is moved to the GND position.
3) If the N1 rotor does not turn, do these steps:
   a) Move the FUEL CONTROL switch to the CUTOFF position.
   b) When the N3 speed is zero, immediately start the engine again and monitor the N1 rotor.
   c) If the N1 rotor does not turn before 30% N3 or within 30 seconds after the start switch is moved to the GND position, shutdown the engine.
   d) Examine the engine for the cause of the rotor problem.
4) The oil pressure indication will start 30 seconds after the engine begins to turn and the pressure will increase.
5) The Engine Low Oil Pressure Warning Light will go out at 15-25 psi with pressure that increases.
6) The OIL FILTER bypass warning message will go out at 24 psi minimum with pressure that decreases.
7) The FF (Fuel Flow) will be 0.5-0.6 PPH X 1000 (0.2-0.3 KPH X 1000) at lightup.

NOTE: If cold day enrichment is used, add 0.1 PPH X 1000 (0.5 KPH X 1000) to the fuel flow. If the fuel flow is more than 1.1-1.3 PPH X 1000 (0.5-0.6 KPH X 1000), you must prepare for a possible hot start.

CAUTION: DO NOT LET THE EGT INCREASE TO MORE THAN 570°C FOR MORE THAN 2 SECONDS. STOP THE PROCEDURE TO START THE ENGINE IF THE EGT IS MORE THAN 570°C FOR MORE THAN 2 SECONDS.

8) The EGT must not be more than 570°C.
9) Push the ELEC/HYD switch on the EICAS maintenance panel and look for a small IDG RISE indication.

NOTE: A small IDG RISE indication shows the system that cools the IDG oil does operate.

(k) Make sure the ENGINE START switch moves to AUTO when the N3 speed gets to 47%.

NOTE: When the ENGINE START switch moves to the AUTO position, pneumatic duct pressure will suddenly increase.

1) The starter VALVE light will come on and then go out, when the start valve closes.
2) If the engine start valve does not close at 47% N3:
   a) The VALVE light will stay on.
   b) The EICAS will show the message (L,R) STARTER CUTOUT.
   c) You must close the valve that is the pneumatic supply to this engine or stop the ground carts.

(l) Let the engine accelerate to idle.

NOTE: The amount of time the engine takes to accelerate, from the movement of the FUEL CONTROL switch to the engine operation at minimum idle, will change with the duct pressure. If a hung start occurs, stop the procedure to start the engine, and find the cause for no acceleration.

(m) Make sure the bleed valves close.
1) Carefully monitor the EGT for a decrease of approximately 30°C.

NOTE: This should occur approximately 40 seconds after the engine gets to idle power provided thrust lever is not moved.

ENGINES POST RR SB 75-7984;
The LH and RH HP3 bleed valves will close.

ENGINES PRE RR SB 75-7984;
The HP2 and LH HP3 bleed valves will close.

2) Make a record of the decrease in EGT.

3) If there is no indication that the bleed valves have closed, do these steps:
   a) Shutdown the engine.
   b) Do the BVCU BITE procedure (FIM 75-32-00/101).

(n) If cross-bleed air from the first engine was used, move the forward thrust lever for the first engine rearward to minimum idle power.

(o) Let the engine operation become stable at minimum idle and make a check for the approximate indications specified.

NOTE: These values are for reference only and must not be used as acceptance limits.

CAUTION: N1 ROTOR SPEED INDICATON MUST START BEFORE 30% N3 OR LESS THAN 30 SECONDS AFTER THE START SWITCH IS MOVED TO THE GND POSITION. IF THERE IS NO N1 SPEED INDICATION BY 30% N3 OR 30 SECONDS AFTER THE START SWITCH IS MOVED TO THE GND POSITION, STOP THE PROCEDURE TO START THE ENGINE. MOVE THE FUEL CONTROL SWITCH TO CUTOFF AND DO THE PROCEDURE FOR A SEIZED LOW PRESSURE TURBINE ROTOR.

DO NOT OPERATE THE ENGINE AT MORE THAN THE MINIMUM IDLE LIMITS UNTIL YOU KNOW THE N1 SPEED AND ENGINE OPERATION IS CORRECT.

1) Rotor Speed:
   - N3: 55.0%
   - N2: 31.0%
   - N1: 21.0%

   a) N1 rotor speed indication must start before 30% N3 or less than 30 seconds after the start switch is moved to the GND position.
   b) If the N1 rotor does not turn by 30% N3 or less than 30 seconds after the start switch is moved to the GND position, immediately move the fuel control switch to CUTOFF and do the procedure for a seized low pressure rotor.
2) EGT: 300°C
3) FF (Fuel Flow): Approximately 1200 PPH (545.5 KPH).

   NOTE: EICAS will show 1.2 PPH X 1000 (0.5 KPH X 1000).

4) OIL QTY: Approximately 20 U.S. quarts (5 gallons)
5) OIL TEMP: 40° - 65°C
6) OIL PRESS
   a) Engine: 35 - 75 psi
   b) OIL FILTER bypass warning message not illuminated
7) FUEL TEMP: +15°C

8) VIB (Engine Vibration)

NOTE: The indication for the N1, N2, and N3 rotors are usually shown. If the tachometer signal is not received, only the broadband indication will be shown.

a) N1, N2: 0.1 - 0.3 units
b) N3: 0.5 units
c) Broadband: 0.7 units

(p) Make sure the applicable BLEED air valve light is off on the overhead panel P5.

(q) Push the ELEC HYD switch on the EICAS maintenance panel and make a check of the system hydraulic pressure.
1) The hydraulic pressure will become stable between 2800 and 3200 psi.

(r) If cross-bleed air is used to start the second engine, move the thrust levers rearward until the first engine operates at minimum idle.

(s) Remove the pneumatic power if it is not necessary (AMM 36-00-00/201).
1) If the engine was started with the ground carts, disconnect the air supply from the ground carts when the started engine is at minimum idle power.

(t) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

(u) Make sure these switches on the Bleed Air Control Panel are in the correct position.

NOTE: This panel is on the overhead panel P5.

1) The ISOLATION VALVE switch: CLOSED
2) The APU VALVE switch: CLOSED
3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: OPEN as necessary

S 862-157-R00

(2) Manually Start the Engine.

WARNING: THE MANUAL OVERRIDE OF THE STARTER CONTROL VALVE IS IN THE DANGEROUS AREA OF THE AIR INLET OF THE ENGINE. YOU MUST BE AS FAR AFT AS POSSIBLE AND OPERATE THE MANUAL OVERRIDE. YOU CAN LET YOUR ARM ENTER THE DANGEROUS AREA BUT YOUR BODY MUST THE OUT OF THE DANGEROUS AREA.

WARNING: WHEN YOU MANUALLY OPERATE THE STARTER CONTROL VALVE, YOU MUST WEAR COVERS ON YOUR HANDS AND ARMS. THE HEAT AND AIR FLOW FROM THE STARTER CONTROL VALVE CAN CAUSE INJURY TO PERSONS.

CAUTION: IF THE STARTER CONTROL VALVE IS NOT CLOSED WHEN THE N3 SPEED INDICATION IS 50%, THE STARTER CAN BE DAMAGED.

(a) Push Button Method (Primary Method)

NOTE: If there is an electrical problem, manually push the manual override button to open the ball valve. This will let air go to the large piston and close the vent. The valve will open.

1) Open the access door in left panel of the fan cowl to get access to the starter control valve.
2) Make sure the person that operates the engine in the flight compartment can speak with the person at the engine.
   a) Use the flight interphone system.
3) Do the usual procedure to start the engine except:
   a) When the START switch for engine with the bad starter control valve is put to the GND position, tell the person on the ground to push and hold the manual override button.
   b) When the engine gets to 50% N3 speed, tell the person on the ground to release the manual override button.
   c) Monitor the START switch.
   d) Make sure START switch moves to the AUTO position.

(b) Butterfly Valve Method (Secondary Method)

NOTE: If there is an electrical problem, the valve can be manually opened with a wrench on the butterfly valve shaft.

1) Get a 1/2 inch deep socket with 1/2 inch drive ratchet.
2) Make sure the person that operates the engine in the flight compartment can speak with the person at the engine.
   a) Use the flight interphone system.
3) Supply pneumatic power (AMM 36-00-00/201).

4) Open the access door in the left panel of the fan cowl to get access to the starter control valve.
5) When the duct pressure is 40-45 psi, put the socket on the butterfly valve shaft and turn the shaft to fully open the valve.
6) When the engine gets to 47% N3 speed, release the butterfly shaft to close the starter control valve.
7) Close the access door in the fan cowl panel.

(c) Make sure these switches on the Bleed Air Control Panel are in the correct position.

NOTE: This panel is on the overhead panel P5.

1) The ISOLATION VALVE switch: CLOSED
2) The APU VALVE switch: CLOSED
3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: OPEN as necessary

S 862-158-R00

(3) Operate the Engine.

CAUTION: SOME ENGINE HARDWARE OR SYSTEM FAILURES CAN CAUSE THE ENGINE TO RUNDOWN WHEN IN OPERATION AT LOW IDLE OR DURING ACCELERATION FROM LOW IDLE. IF AN ENGINE RUNDOWN OCCURS, AND THE FUEL CONTROL SWITCH IS NOT QUICKLY PUT IN CUTOFF POSITION, AN ENGINE OVERTEMPERATURE (EGT EXCEEDANCE) MAY OCCUR THAT CAN CAUSE DAMAGE TO THE ENGINE.

(a) To prevent an EGT Exceedance when operating at low idle or during initial acceleration from low idle, periodically monitor engine N3 speed and EGT.
1) If N3 is below low idle (below 48.5% N3) and that EGT is above the subidle limit (above 570 degrees Celsius), place the fuel control switch in the CUTOFF position.

(b) Taxi the airplane if it is necessary (AMM 09-21-00/201) or,

(c) Do the engine tests that are necessary (AMM 71-00-00/501).

S 862-159-R00

(4) Shutdown the Engine.
(a) Usual procedure to shutdown the engine.
1) Move the forward thrust lever rearward to the idle position.

CAUTION: DO NOT SHUTDOWN THE ENGINE UNTIL THE ENGINE HOT SECTION BECOMES STABLE AT AN EQUAL TEMPERATURE. OPERATE THE ENGINE AT MINIMUM IDLE TO COOL THE ENGINE HOT SECTION. THE TURBINE COULD BECOME SEIZED.

2) Operate the engine at minimum idle power to let the hot section temperature become stable.
   a) If the engine was operated at more than approach idle, operate the engine for 2 minutes at or near minimum idle power.
   b) If the engine was not operated at more than approach idle, operate the engine for one minute at minimum idle power.

CAUTION: DO NOT SHUTDOWN THE ENGINE WITHOUT PNEUMATIC POWER TO MOTOR THE ENGINE IF THERE IS AN INTERNAL ENGINE FIRE. DAMAGE TO ENGINE COULD OCCUR.

3) Supply the pneumatic power (AMM 36-00-00/201).

CAUTION: BE PREPARED TO TURN THE START SWITCH TO THE GND POSITION TO MOTOR THE ENGINE IF THERE IS A FIRE. FIRE DAMAGE TO THE ENGINE CAN BE DECREASED.

4) Make sure the engine bleed air valve lights are off.
5) Make sure the ISOLATION VALVE switch is in the open position.
6) Move the FUEL CONTROL switch to the CUTOFF position.

CAUTION: IF THE N3, EGT, AND THE FUEL FLOW INDICATIONS DO NOT IMMEDIATELY DECREASE, THE CAUSE OF THE SLOW SHUTDOWN MUST BE FOUND. THIS CAUSE MUST BE CORRECTED BEFORE THE ENGINE IS STARTED AGAIN. THE ENGINE COULD BE DAMAGED WHEN IT IS STARTED AGAIN.

7) Make sure the N3, EGT and fuel flow indications immediately decrease.
8) Make sure the ENG VALVE and SPAR VALVE lights on the control stand come on and go off.

   NOTE: The ENG VALVE and SPAR VALVE lights show that the fuel shutoff valve in the fuel flow governor and wing spar valve have closed.

9) Make sure the engine does not bind, rub, or scrape as it decreases speed.

NOTE: The rotors will decrease speed in a small amount of time. The approximate time to get to a speed of 5% for each of the rotors are:

- N1: 45 seconds
- N2: 30 seconds
- N3: 15 seconds

10) Make sure the EICAS message "L(R) ENG SHUTDOWN" is shown.

NOTE: An engine shutdown must show the EICAS message L(R) ENG SHUTDOWN. The EICAS computers will show this message if the engine fuel valve moved to the CUTOFF position when commanded by movement of the fuel control switch to the CUTOFF position or if the fire handle is pulled up. The EICAS computers will also stop the display of false EICAS messages as the engine is shutdown.

If this message is not shown and the engine did shutdown, the EICAS computers did not get the signal that the engine fuel valve move to the CUTOFF position. Then, the EICAS computers will not stop the display of false EICAS messages. The additional false EICAS messages will be shown with the true EICAS messages.

11) Monitor the engine for an internal or a tailpipe fire.
    a) If an internal or a tailpipe fire occurs, do the procedure to shutdown the engine with an internal engine or tailpipe fire.
12) Put the L(R) FWD FUEL BOOST PUMP and the L(R) AFT FUEL BOOST PUMP switches to the OFF position.
    a) Make sure the two low fuel PRESS lights do not come on.

CAUTION: MAKE SURE THE SWITCHES FOR THE ENGINE HYDRAULIC PUMPS ARE IN THE ON POSITION. THE SOLENOIDS COULD BECOME TOO HOT IF THE SWITCHES ARE IN THE OFF POSITION.

13) Make sure the switches for the engine-driven hydraulic pump are in the ON position.

(b) Internal engine or tailpipe fire during the shutdown of the engine.
1) Put the FUEL CONTROL switch to the CUTOFF position.

NOTE: Pulling L ENG fire handle closes APU bleed valve and bleed air isolation valve. Pulling R ENG fire handle closes only the bleed air isolation valve. Once an engine fire handle is pulled, it is impossible to motor that engine using APU air.

CAUTION: STARTER FAILURE CAN OCCUR IF THE STARTER IS ENGAGED AT AN N3 ROTOR SPEED MORE THAN 30%.

2) Move the START switch to the GND position to engage the starter and motor the engine until fire is out.
   a) Ignore the starter limits under these conditions.

      NOTE: The starter can not be engaged at an N3 speed more than 34%. If the starter is engaged at an N3 speed more than 10%, make a record this has occured.

3) For the left engine, open these circuit breakers on the overhead panel P11:
   a) 11D7, ENGINES STBY IGNITION LEFT 1
   b) 11D8, ENGINES STBY IGNITION LEFT 2
   c) 11L1, LEFT ENGINE IGN 1
4) For the right engine, open these circuit breakers on the overhead panel P11:
   a) 11D9, ENGINES STBY IGNITION RIGHT 1
   b) 11D10, ENGINES STBY IGNITION RIGHT 2
   c) 11L28, RIGHT ENGINE IGN 1

CAUTION: DRY MOTOR THE ENGINE TO EXTINGUISH AN INTERNAL ENGINE FIRE OR TAILPIPE FIRE. USE A FIRE EXTINGUISHER ON THESE FIRES ONLY IF THE DRY MOTOR CANNOT CONTROL OR EXTINGUISH THE FIRE. THE ENGINE WILL BE DAMAGED IF A FIRE EXTINGUSHER IS USED.

5) Dry motor the engine to extinguish the internal or tailpipe fire.

NOTE: The hot section of the engine can be resistant to very high temperatures. Usually, if the fire is permitted to burn until the engine can be dry motored, there will be less damage to the engine. There will be more damage to the engine if a fire extinguisher is used. The materials from the fire extinguisher could cause corrosion. The engine could be damaged because the components of the engine do not become cool equally.

a) The amount of time the starter is operated to motor the engine can be more than the limits.
b) If the fire continues, extinguish the fire with ground fire extinguishers or the fire department equipment.

6) After the fire is extinguished, complete the procedure to shutdown the engine.

(c) External engine fire during the shutdown of the engine.

1) If the fan cowl panels and thrust reverser are closed, extinguish the fire with the fire extinguisher system on the airplane.
   a) If the fire continues, extinguish the fire with ground fire extinguishers or the fire department equipment.
2) If the fan cowl panels and thrust reversers are open, extinguish the fire with the ground fire extinguishers or with the fire department equipment.
   a) If an external fire is supplied by fuel leakage in the strut, dry motor the engine until the fire department equipment or the ground fire extinguishers can extinguish the fire.

NOTE: The air flow will make the engine cool.

(d) Engine overheat and turbine overheat warnings.

NOTE: Either or both conditions will bring on the master caution and aural warning systems flashing red lights at glareshield and a red message at top of the upper EICAS display at pilot's P2 panel. Both the fire handle and fuel control switch knob will illuminate red on the affected engine.

1) Immediately do these steps for a red fire message and aural warnings:
   a) Move forward thrust lever to the idle position.
   b) Move the FUEL CONTROL switch to the CUTOFF position.
   c) Pull the engine fire handle up.
   d) If the red light in the engine fire handle stays on, turn the fire handle counterclockwise to fire the first fire bottle.
   e) Make sure the ENG BTL 1 DISCH light comes on.
   f) If fire warning stays on more than 30 seconds, turn the fire handle clockwise to fire the second fire bottle.
   g) Make sure the ENG BTL 2 DISCH light comes on.
   h) Monitor the EGT indication and let the engine speed decrease.
   i) Monitor the EICAS to find if the fire warning was caused by a ENGINE OVERHEAT or TURBINE OVERHEAT condition.
2) Make the problem correct or replace the engine if both sources are not the cause of the problem.

(e) Emergency engine shutdown (Engine Fire Warning).
1) Move the forward thrust lever to the idle position.
2) Immediately put the FUEL CONTROL switch to the CUTOFF position.
3) Pull the applicable engine fire handle up.
4) Put the FWD and AFT BOOST PUMP switches to the OFF position.
5) If the red light in the engine fire handle stays on, turn the fire handle counterclockwise to fire the first fire bottle.
6) Make sure the ENG BTL 1 DISCH light comes on.
7) If fire warning stays on more than 30 seconds, turn the fire handle clockwise to fire the second fire bottle.
8) Make sure the ENG BTL 2 DISCH light comes on.
9) Monitor caution warning lights at pilot's glare shield.

G. Put the Airplane Back To It's Usual Condition.

S 862-160-R00

(1) On the pilot's overhead panel P5, make sure these switches for these systems are in the correct position:
(a) ISOLATION VALVE: OPEN

(b) The L PACK and the R PACK valve switches on the Air Conditioning Control Panel: PACK OFF

(c) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: OFF

(d) The L ENG ANTI-ICE and the the R ENG ANTI-ICE switches on the Wing and Engine Anti-Ice Control Panel: OFF

(e) The WING ANTI-ICE switch on the Wing and Engine Anti-Ice Control Panel: OFF

S 862-161-R00

(2) Examine the EICAS ENG EXCD maintenance pages for exceedances that were recorded during engine run.

S 862-162-R00

(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
(a) 11F2, WX RADAR or WX RADAR LEFT
(b) 11F27, WX RADAR RIGHT (if installed)
(c) 11B16, AURAL WARN SPKR LEFT
(d) 11H35, AURAL WARN SPKR RIGHT
(e) 11J7, FLIGHT RECORDER AC
(f) 11J8, FLIGHT RECORDER DC

S 862-163-R00

(4) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11D19, ENGINE START CONT LEFT
(d) 11L1, LEFT ENGINE IGN 1

S 862-164-R00

(5) For the right engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINE STBY IGNITION RIGHT 2
(c) 11D20, ENGINE START CONT RIGHT
(d) 11L28, RIGHT ENGINE IGN 1

S 862-165-R00

(6) Remove the pneumatic power if it is not necessary (AMM 36-00-00/201).

S 862-166-R00

(7) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

S 942-167-R00
(8) Remove the engine safety barrier from the engine inlet if it is not necessary.

TASK 71-00-00-862-168-R00

7. Power Plant Operation - Dry Motor the Engine

A. General
(1) This procedure has one task. This task is the procedure to dry motor the engine.
B. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 36-00-00/201, Pneumatic - General
C. Equipment
(1) Service interphone equipment
D. Dry Motor the Engine

S 942-169-R00
(1) Install the chocks forward and aft of the nose gear and the main landing gear tires.

S 942-170-R00
(2) Make sure the downlocks are install on the landing gear (AMM 32-00-20/201).

S 942-171-R00
(3) Remove the covers from the engine inlet and exhaust.

S 942-172-R00
(4) Examine these areas around the engine for unwanted materials.
(a) The engine air inlet.
(b) The fan and turbine exhaust.
(c) The wing leading edge immediately above the engine.
(d) The ground area around the engine.

S 862-173-R00
(5) Make sure these switches in the flight compartment are in the correct positions:
(a) The L(R) FUEL CONTROL switches on the control stand: CUTOFF
(b) The L(R) ENG START switches on the Start Control Panel: OFF

S 862-174-R00
(6) Make sure the forward thrust levers are in the idle position.

S 862-175-R00
(7) Make sure the reverse thrust levers are in the down and forward position.

S 862-176-R00
(8) On the aft electronic panel P8, make sure the fire handle is fully in.

S 862-177-R00
(9) Supply the electrical power (AMM 24-22-00/201).

S 862-178-R00
(10) Supply the pneumatic power (AMM 36-00-00/201).
  (a) Use the ground carts or the auxilary power unit (APU) to supply air to the pneumatic system.
  (b) If you motor the engine with air from the two super ground service carts or three standard ground service carts:
    1) The ISOLATION VALVE switch: OPEN

    2) The APU VALVE switch: CLOSED

    3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

  (c) If you motor the engine with air from the APU:
    1) The ISOLATION VALVE switch: OPEN

    2) The APU VALVE switch: OPEN

    3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

S 862-179-R00
(11) Put the parking brake to the ON position.
  (a) Use ELEC DEMAND PUMP in right system for pressure source.

S 862-180-R00
(12) On the overhead panel, P5, make sure these switches are in the correct position.
  (a) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: OFF

  (b) The L PACK and R PACK valve switches on the Air Conditioning Control Panel: OFF

  (c) The WING ANTI-ICE switch on the Wing and Engine Anti-ice Control panel: OFF

(d) The L ENGINE ANTI-ICE and R ENGINE ANTI-ICE switches on the Wing and Engine Anti-ice Control Panel: OFF

S 862-181-R00

(13) For the left engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 862-182-R00

(14) For the right engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

S 862-183-R00

(15) For the left engine, make sure this circuit breaker on the overhead panel P11 is closed:
(a) 11D19, ENGINE START CONT LEFT

S 862-184-R00

(16) For the right engine, make sure this circuit breaker on the overhead panel P11 is closed:
(a) 11D20, ENGINE START CONT RIGHT

S 862-185-R00

(17) Do these steps to keep the spar fuel valve open:

NOTE: The spar fuel valve must be open to supply fuel to the fuel pump on the engine. Fuel is used to decrease the temperature and lubricate this fuel pump.

When you open the spar valve circuit breaker to keep the spar valve open, you cannot close the spar valve with the fuel control switch or the fire handle. It is necessary to close the spar valve circuit breaker to get control of the spar valve again.

(a) For the left engine, make sure these circuit breakers on the main power distribution panel, P6, are closed:
1) 6C1, FUEL COND CONT L
2) 6E1, FUEL VALVES L SPAR
(b) For the right engine, make sure these circuit breakers on the main power distribution panel, P6, are closed:
1) 6C2, FUEL COND CONT R

2) 6E2, FUEL VALVES R SPAR

(c) Make sure the L and R FUEL CONTROL switch is in the CUTOFF position.

(d) Make sure the L (R) ENG VALVE and the L (R) SPAR VALVE lights are off.

(e) Move the L (R) FUEL CONTROL switch to the RUN position.

(f) Make sure the L(R) ENG VALVE light comes on and does not go off.

(g) Make sure the L(R) SPAR VALVE light comes on and goes off.

(h) For the left engine, open this circuit breaker on panel, P6, and attach a DO-NOT-CLOSE tag:
1) 6E1, FUEL VALVES L SPAR

(i) For the right engine, open this circuit breaker on panel, P6, and attach a DO-NOT-CLOSE tag:
1) 6E2, FUEL VALVES R SPAR

(j) Move the L(R) FUEL CONTROL switch to the CUTOFF position.

(k) Make sure the L(R) ENG VALVE light goes off.

NOTE: The spar fuel valve is now open and the engine fuel shutoff valve is closed.

1) The L(R) SPAR VALVE light will stay on.

S 862-186-R00

(18) Dry motor the engine.

CAUTION: DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. DAMAGE TO THE STARTER COULD OCCUR.

(a) Move the L(R) ENG START switch to the GND position.
1) Make sure the START VALVE light on the pilots' overhead panel P5 comes on and then goes off.
2) Monitor the pneumatic DUCT PRESSURE indicator on panel P5.

NOTE: The indicator will show an immediate decrease in duct pressure, then the duct pressure will increase slightly above the last value, indicating Main Engine Start (MES) mode.

(b) Make sure the N3 speed is 24 to 28%.

(c) Monitor the N1 speed and the oil pressure indication.

CAUTION: YOU MUST FIND THE CAUSE FOR THE FUEL FLOW INDICATIONS OR FUEL FOG BEFORE THE ENGINE IS STARTED AGAIN. DAMAGE TO THE ENGINE COULD OCCUR.

(d) Make sure the fuel flow indication shown on the EICAS display is zero.

(e) Make sure a fuel fog does not come out of the engine exhaust.

(f) If the fuel flow is not zero or if a fuel fog occurs, immediately do these steps:

NOTE: This will close the spar fuel valve.

1) For the left engine, close this panel P6 circuit breaker:
   a) 6E1, FUEL VALVES L SPAR
2) For the right engine, close this panel P6 circuit breaker:
   a) 6E2, FUEL VALVES R SPAR
3) Make sure the fuel flow stops in 60 seconds.
4) Continue to motor the engine for 30 seconds after the fuel flow stops.
5) Move the L(R) ENG START switch to the OFF position.
6) Find the cause for the fuel flow problem.

(g) Continue to dry motor the engine if it is necessary.

NOTE: Do not motor the engine for more than the starter time limits.

(h) Move the L(R) ENGINE START switch to the OFF position to stop the dry motor of the engine.
1) Make sure the START VALVE light comes on then goes off.

S 862-187-R00

(19) Close the engine spar valve.
(a) For the left engine, close this panel P6 circuit breaker:
1) 6E1, FUEL VALVES L SPAR
(b) For the right engine, close this panel P6 circuit breaker:
1) 6E2, FUEL VALVES R SPAR
(c) Make sure the L(R) SPAR VALVE light goes out.

E. Put the Airplane Back to Its Usual Condition

S 862-188-R00

(1) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel P11:
(a) 11D7, ENGINES STBY IGNITION LEFT 1

(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 862-189-R00
(2) For the right engine, the DO-NOT-CLOSE tag and close these circuit breakers on the overhead panel P11:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

S 862-190-R00
(3) On the overhead panel P5, make sure these switches are in the correct position.
(a) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: OFF

(b) The ISOLATION VALVE switch on the Bleed Valve Control panel: CLOSED (Flow Bar light is out)

(c) The L PACK and the R PACK valve switches on the Air Conditioning Control Panel: PACK OFF

(d) The WING ANTI-ICE switch on the Wing and Engine Anti-Ice Control Panel: OFF

(e) The L ENG ANTI-ICE and R ENG ANTI-ICE switches on the Wing and Engine Anti-Ice Control Panel: OFF

S 862-191-R00
(4) Simultaneously open both EICAS CMPTR L (11J2) and EICAS CMPTR R (11J29) circuit breakers on overhead circuit breaker panel P11. After about 3 seconds, close both EICAS CMPTR circuit breakers on panel P11.

NOTE: New caution, advisory, status, and maintenance messages are prevented (inhibited) from being displayed during engine start from the time of start valve opening until successful engine start. After engine motoring, the inhibit of EICAS messages remains until power is removed from the EICAS computers (or an engine is successfully started).

S 862-192-R00
(5) Remove the pneumatic power if it is not necessary (AMM 36-00-00/201).

S 862-193-R00
(6) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 71-00-00-862-194-R00

8. Power Plant Operation - Wet Motor the Engine

A. General
(1) This procedure has one task. This task is the procedure to wet motor the engine.

B. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 32-00-20/201, Landing Gear Downlocks
(3) AMM 36-00-00/201, Pneumatic - General

C. Equipment
(1) Service interphone equipment

D. Wet Motor the Engine

S 942-195-R00
(1) Install the chocks forward and aft of the nose gear and the main landing gear tires.

S 942-196-R00
(2) Make sure the downlocks are install on the landing gear (AMM 32-00-20/201).

S 942-197-R00
(3) Remove the covers from the engine inlet and exhaust.

S 942-198-R00
(4) Examine these areas around the engine for unwanted materials.
(a) The engine air inlet.
(b) The fan and turbine exhaust.
(c) The wing leading edge immediately above the engine.
(d) The ground area around the engine.

S 862-199-R00
(5) Make sure these switches in the flight compartment are in the correct positions:
(a) The L(R) FUEL CONTROL switches on the control stand - CUTOFF
(b) The L(R) ENG START switches on the Start Control Panel - OFF

S 862-200-R00
(6) Make sure the forward thrust levers are in the idle position.

S 862-201-R00
(7) Make sure the reverse thrust levers are in the down and forward position.

S 862-202-R00
(8) On the aft electronic panel P8, make sure the fire handle is fully in.

S 862-203-R00
(9) Supply the electrical power (AMM 24-22-00/201).

S 862-204-R00
(10) Supply the pneumatic power (AMM 36-00-00/201).
  (a) Use the ground carts or the auxilary power unit (APU) to supply air to the pneumatic system.
  (b) If you motor the engine with air from the two super ground service carts or three standard ground service carts:
    1) The ISOLATION VALVE switch: OPEN

    2) The APU VALVE switch: CLOSED

    3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

  (c) If you motor the engine with air from the APU:
    1) The ISOLATION VALVE switch: OPEN

    2) The APU VALVE switch: OPEN

    3) The BLEED AIR L ENG and the BLEED AIR R ENG valve switches: CLOSED

S 862-205-R00
(11) Put the parking brake to the ON position.
  (a) Use ELEC DEMAND PUMP in right system for pressure source.

S 862-206-R00
(12) On the overhead panel, P5, make sure these switches are in the correct position.
  (a) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: OFF

  (b) The L PACK and R PACK valve switches on the Air Conditioning Control Panel: OFF

(c) The WING ANTI-ICE switch on the Wing and Engine Anti-ice Control panel: OFF

(d) The L ENGINE ANTI-ICE and R ENGINE ANTI-ICE switches on the Wing and Engine Anti-ice Control Panel: OFF

S 862-207-R00

(13) For the left engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 862-208-R00

(14) For the right engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

S 862-209-R00

(15) For the left engine, make sure this circuit breaker on the overhead panel P11 is closed:
(a) 11D19, ENGINE START CONT LEFT

S 862-210-R00

(16) For the right engine, make sure this circuit breaker on the overhead panel P11 is closed:
(a) 11D20, ENGINE START CONT RIGHT

S 862-211-R00

(17) Do these steps to keep the spar fuel valve open:

NOTE: The spar fuel valve must be open to supply fuel to the fuel pump on the engine. Fuel is used to decrease the temperature and lubricate this fuel pump.

When you open the spar valve circuit breaker to keep the spar valve open, you cannot close the spar valve with the fuel control switch or the fire handle. It is necessary to close the spar valve circuit breaker to get control of the spar valve again.

(a) For the left engine, make sure these circuit breakers on the main power distribution panel, P6, are closed:
1) 6C1, FUEL COND CONT L

2) 6E1, FUEL VALVES L SPAR

(b) For the right engine, make sure these circuit breakers on the main power distribution panel, P6, are closed:
1) 6C2, FUEL COND CONT R
2) 6E2, FUEL VALVES R SPAR

(c) Make sure the L and R FUEL CONTROL switch is in CUTOFF position.

(d) Make sure the L (R) ENG VALVE and the L (R) SPAR VALVE lights are off.

(e) Move the L (R) FUEL CONTROL switch to the RUN position.

(f) Make sure the L(R) ENG VALVE light comes on and does not go off.

(g) Make sure the L(R) SPAR VALVE light comes on and goes off.

(h) For the left engine, open this circuit breaker on panel, P6, and attach a DO-NOT-CLOSE tag:
1) 6E1, FUEL VALVES L SPAR

(i) For the right engine, open this circuit breaker on panel, P6, and attach a DO-NOT-CLOSE tag:
1) 6E2, FUEL VALVES R SPAR

(j) Move the L(R) FUEL CONTROL switch to the CUTOFF position.

(k) Make sure the L(R) ENG VALVE light goes off.

NOTE: The spar fuel valve is now open and the engine fuel shutoff valve is closed.

1) The L(R) SPAR VALVE light will stay on.

S 862-212-R00

CAUTION: DO NOT WET MOTOR THE ENGINE IF IT IS NOT NECESSARY TO USE FUEL FOR THE TEST PROCEDURE.

(18) Wet motor the engine.

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(a) Continuously monitor the fuel quantity and the low pressure light indication for the applicable main fuel tank.
1) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

(b) Move the L(R) FWD BOOST PUMP and L(R) AFT BOOST PUMP switches to the ON position.
1) Make sure the two low PRESS warning lights go out.

CAUTION: DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. DAMAGE TO STARTER COULD OCCUR.

(c) Move the L(R) ENG START switch to the GND position.
(d) Keep the L(R) FUEL CONTROL switch in the CUTOFF position until approximately 25% N3 or maximum motoring speed.
(e) Move the L(R) FUEL CONTROL switch to the RUN position.
(f) Monitor the fuel flow and the and oil pressure for positive indication.
(g) Make sure the N1 rotor turns.
(h) Continue to wet motor the engine for approximately 30 seconds (maximum).
    1) Make sure a fuel fog comes from the turbine exhaust.
    2) If the fan cowl panels and the thrust reverser are open, make sure there is no fuel leakage from the fuel system on the engine.
(i) Move the L(R) FUEL CONTROL switch to the CUTOFF position.
(j) Continue to motor the engine for 30 seconds minimum to remove fuel that stays in the engine gaspath.

    NOTE: Do not motor the engine for more than the starter operation time limits.

(k) Move the L(R) ENGINE START switch to the OFF position to stop the dry motor of the engine.

    NOTE: Fuel will drain after the wet motor in 30 seconds minimum.

(l) Move the L(R) FWD BOOST PUMP and L(R) AFT BOOST PUMP switches to the OFF position.

S 862-213-R00

(19) Close the engine spar valve.
    (a) For the left engine, close this panel P6 circuit breaker:
        1) 6E1, FUEL VALVES L SPAR

(b) For the right engine, close this panel P6 circuit breaker:
1) 6E2, FUEL VALVES R SPAR
(c) Make sure the L(R) SPAR VALVE light goes out.

E. Put the Airplane Back to Its Usual Condition

S 862-214-R00

(1) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel P11:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 862-215-R00

(2) For the right engine, the DO-NOT-CLOSE tag and close these circuit breakers on the overhead panel P11:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

S 862-216-R00

(3) On the overhead panel P5, make sure these switches are in the correct position.
(a) The L(R) FWD FUEL (BOOST) PUMP and the L(R) AFT FUEL (BOOST) PUMP and the L(R) CENTER FUEL (BOOST) PUMP and switches (3 for each engine) on the Fuel Management Control Panel: OFF

(b) The ISOLATION VALVE switch on the Bleed Valve Control panel: CLOSED (Flow Bar light is out)

(c) The L PACK and the R PACK valve switches on the Air Conditioning Control Panel: PACK OFF

(d) The WING ANTI-ICE switch on the Wing and Engine Anti-Ice Control Panel: OFF

(e) The L ENG ANTI-ICE and R ENG ANTI-ICE switches on the Wing and Engine Anti-Ice Control Panel: OFF

S 862-217-R00

(4) Simultaneously open both EICAS CMPTR L (11J2) and EICAS CMPTR R (11J29) circuit breakers on overhead circuit breaker panel P11. After about 3 seconds, close both EICAS CMPTR circuit breakers on panel P11.

NOTE: New caution, advisory, status, and maintenance messages are prevented (inhibited) from being displayed during engine start from the time of start valve opening until successful engine start. After engine motoring, the inhibit of EICAS messages remains until power is removed from the EICAS computers (or an engine is successfully started).

S 862-218-R00

(5) Remove the pneumatic power if it is not necessary (AMM 36-00-00/201).

S 862-219-R00

(6) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 71-00-00-862-220-R00

9. Power Plant Operation During Cold Weather

A. General

(1) This procedure gives the instructions for engine operation during cold weather conditions.

(2) These instructions add the information, the techniques, and additional procedure to the normal engine operation procedure.

(3) Engine ice can occur during engine operation when there are two conditions:

(a) Outside air temperature is less than 10°C (50°F).

(b) Visible moisture can be seen.

NOTE: Visible moisture is defined as clouds or fog with less than one mile visibility, rain, snow, sleet, and ice crystals or; water, ice, or snow on the ground.

(4) During cold weather operation, you can prevent damage to the engine if you use the inlet covers and the exhaust covers.
  (a) Before the engine is started, the rotors must not be locked.
  (b) Snow and ice must not collect in the engine inlet and must be removed.
  (c) During very cold weather operations, the covers will slow the heat loss from the engine and prevent the engine oil temperature from decreasing too fast.

(5) A quantity of ice that collects in the engine inlet is one of the dangerous conditions during cold weather engine operation.
  (a) Snow blown into the engine can become ice if it melts and then freezes again.
  (b) This ice can lock the rotor blades to the stator case.
  (c) If the ice becomes a layer on the rotor blades, the engine rotors will not be balanced.

(6) Ice can collect on the engine parts (i.e. stators, guide vanes, fan blades, spinner, etc.) during the engine operation because of the large quantity of air that is moved by suction into the engine.
  (a) This condition is very dangerous when you operate the engine at high power and static conditions on the ground.
  (b) The suction decreases the air pressure which decreases the air temperature.
  (c) The ice can collect in the inlet when water droplets hit the fan blades, the guide vanes, and the spinner and become cool during evaporation.

(7) After the engine is shutdown, you must immediately install the inlet cover to prevent windblown snow or rain in the engines, and in very cold conditions, to keep the heat in engine.
  (a) You must install the common nozzle cover as soon as the engine is cool enough to prevent damage to the cover.

(8) It is recommended that the airplane is pointed into the wind when parked for a long time.

(9) During heavy snowstorms, you must always shutdown the engine in forward thrust.
  (a) This will prevent ice layers on the cascade vanes, the blocker doors, and linkages of the thrust reverser.

(10) Usually, it is not necessary to heat the engine before you start the engine. Reliable starts can be done with the normal start procedures.
  (a) You must heat the engine to free rotors locked with snow and ice.
  (b) You must remove all the ice and snow from these areas:
    1) The engine inlet panels.
    2) The fan cowl panels.
    3) The external surfaces and joints of the thrust reverser.
    4) The acoustic panels of the inlet cowl.
    5) The fan and turbine exhaust ducts.

B. Equipment
  (1) BT-400 Herman Nelson Heater, Hot Air Source
  Heater, explosion-proof, or equivalent
  (2) Hot Air Source Heater - Diesel Fueled, Portable, Duct Type
  400,000 BTUH, Model 4600-46
  Engineered Air Systems, Inc., St. Louis, MO 63132, USA
  (Alternate to Herman Nelson Heater)
  (3) YMP350 Hot Air Source Heater, or equivalent
  (A large heater/air cart truck in use in the Confederation of Independent States (CIS); has connections for three heater hoses)
  (4) Service interphone equipment
  (5) LJ34924 Engine inlet (nose cowl) cover, RB211-535E4 engines, Rolls-Royce
  (6) UL16357 Common nozzle cover, RB211-535E4 engines, Rolls-Royce

C. References
  (1) AMM 12-11-03/301, Fuel Sump Draining
  (2) AMM 12-33-01/301, Cold Weather Maintenance
  (3) AMM 29-11-00/201, Electrical Power
  (4) AMM 36-00-00/201, Pneumatic - General
  (5) AMM 72-00-00/201, Engine

D. Prepare the powerplant.

S 862-269-R00

WARNING: DO NOT GO NEAR THE INLET DURING THE OPERATION OF THE ENGINE. MONITOR THE DANGEROUS AREAS OF THE ENGINE INLET FOR ICE FROM THE NOSE LANDING GEAR AND TALK TO THE FLIGHT COMPARTMENT WITH THE INTERPHONE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Prepare for normal engine operation and add the steps that follow:

WARNING: MAKE SURE THAT YOU FOLLOW THE PROCEDURES TO TURN THE LOW PRESSURE (N1) AND THE HIGH PRESSURE (N3) ROTOR SYSTEMS. FAILURE TO FOLLOW AMM 72-00-00/201 COULD RESULT IN INJURY TO PERSONS OR DAMAGE TO THE POWER PLANT.

(a) Make sure the N1 rotor can turn freely in the clockwise direction as seen from the front (AMM 72-00-00/201).
   1) Turn the fan blades with a wooden stick or a rod that is made of another material that will not damage the fan blades.

(b) Make sure the N3 rotor can turn freely (AMM 72-00-00/201).

   NOTE: Do not do a check that the N2 rotor can turn freely. Do not use the turning tool to turn the N2 rotor. Too much force on the Intermediate Pressure (IP) comprcessor blades can cause damage to the blades.

(c) If the N1 or the N3 rotors cannot turn, or you think the N2 rotor cannot turn, do these steps to heat the engine:
   1) Install the inlet cover.
   2) Attach a heater hose to the heater.
   3) Install the heater hose in the turbine exhaust.
   4) Operate the hot air source heater to supply hot air.

      NOTE: The temperature of the hot air must not be more than 121°C (250°F).

   5) Apply hot air until the rotors turn freely.
   6) Stop the operation of the hot air source heater.
   7) Disconnect the heater hose.
   8) Install the common nozzle cover.

CAUTION: THE ENGINE INLET MUST BE COMPLETELY CLEAN OF ICE AND SNOW. THE ENGINE ANTI-ICE SYSTEM CAN MELT THE ICE AND SNOW AT THE HEATED AREA, BUT THE ICE CAN FREEZE AGAIN ON THE INLET ACOUSTIC PANELS AND ON THE ENGINE PARTS.

(d) Remove all snow and ice from the engine inlet and the acoustic panels of the inlet cowl.
(e) Install the inlet cover.
(f) Remove all snow and ice from the common nozzle.
(g) Install the common nozzle cover.
(h) If you find it is difficult to open the fan cowl panels or the thrust reverser because of the snow or ice, apply hot air to the external surfaces as necessary.
   1) Blow the melted snow or ice from the exterior joints of the fan cowl panels before the panels are opened.

(i) Drain the water from all fuel sumps in the fuel system (AMM 12-11-03/301).

NOTE: If the fuel flows freely from the drains in the tank sumps, the fuel system has no ice.

1) If there is ice in the fuel system, blow hot air from an explosion-proof hot air source (121°C or 250°F maximum) at the drain area (AMM 12-33-01/301).

E. Operate the Engine

S 862-222-R00

(1) Do the procedure to prepare the engine for normal engine operation.

S 862-244-R00

CAUTION: DO NOT OPERATE AN ENGINE, WHICH HAS BEEN AT LOW TEMPERATURES, IF THE FUEL FLOW AND OIL PRESSURE ARE LESS THAN THE NORMAL LIMITS. IMMEDIATELY SHUTDOWN THE ENGINE IF THE INDICATIONS ARE LESS THAT THE NORMAL LIMITS. EXAMINE THE ENGINE FUEL AND OIL SYSTEMS FOR ICE. IF ICE IS FOUND, THE ICE MUST BE REMOVED FROM THAT SYSTEM BEFORE THE ENGINE IS STARTED AGAIN.

IF THE AIRPLANE IS PARKED ON ICE OR PACKED SNOW, START THE ENGINES WITH THE AUXILARY POWER UNIT (APU) OR SUPPLY AIR FROM 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.

(2) Start the engine with the instructions for normal engine operation and add the steps that follows:

(a) Provide the pneumatic power from the APU or two or three ground air carts (AMM 36-00-00/201).

1) Do not use the cross bleed start procedure.

(b) If there is no drop in pressure on the DUCT PRESSURE indicator on the Pilot's overhead panel P5 during the start, examine the starter control valve for a frozen solenoid.

1) Use the manual starter valve override handle on the starter control valve during the engine start to release the valve.

2) Apply hot air from an explosion-proof air source to release the strut valve or the high pressure bleed valve (121°C or 250°F maximum).

(c) If an engine start with a single igniter causes a problem, use two igniters during the next start.

(d) If an engine accelerates slowly after lightup and a hung start could occur, do the engine shutdown.

1) Start the engine again with the procedure for normal engine operation.

(e) If the engine is slow to start, will not accelerate to idle power (hung start), do the engine shutdown and look for the cause.

CAUTION: DO NOT TURN ON THE ENGINE ANTI-ICE SYSTEM IF THE ENGINE INLET IS NOT COMPLETELY CLEAN OF ICE. THE ANTI-ICE SYSTEM CAN MELT THE ICE, BUT THE ICE CAN FREEZE AGAIN IN THE ENGINE AND ON THE INLET ACOUSTIC PANELS AT TEMPERATURES BELOW FREEZING.

(f) While the engine operates at idle power during icing conditions, turn on the engine anti-ice system.

NOTE: If the engine inlet is not completely clean of ice, do not use the engine inlet anti-ice system. At temperatures colder than freezing, the system will have enough heat to melt the ice interface at the inlet. But, the ice and water will move into the engine and freeze again on the inlet acoustic panels and the engine parts.

1) Push the applicable engine anti-ice switch to the ON position at the Wing and Engine Anti-Ice Control Panel.
   a) L ENG ANTI-ICE switch.
   b) R ENG ANTI-ICE switch.

CAUTION: IF THERE IS NO OIL PRESSURE INDICATION WHEN THE ENGINE HAS ACCELERATED TO MINIMUM IDLE OR THE OIL PRESSURE DECREASES TO ZERO DURING ENGINE OPERATION, DO THE PROCEDURE TO SHUTDOWN THE ENGINE AND FIND THE CAUSE OF THE PROBLEM.

WHEN THE ENGINE IS STARTED DURING VERY COLD CONDITIONS, THE OIL PRESSURE INDICATION CAN GO TO THE FULL PRESSURE VALUE BECAUSE OF HIGH OIL VISCOSITY. THE OIL PRESSURE WILL DECREASE AS THE OIL TEMPERATURE INCREASES. IF THE OIL PRESSURE DOES NOT DECREASE AFTER THE OIL TEMPERATURE BECOMES STABLE, DO THE PROCEDURE TO SHUTDOWN THE ENGINE AND FIND THE CAUSE OF THE PROBLEM.

(g) Operate the engine at idle power until the engine oil temperature is 0°C (32°F) to get a sufficient warmup.

S 862-224-R00

(3) Do the procedure for normal engine operation and do these steps:

NOTE: When the engine is operated during ice conditions, ice can collect on the spinner, the fan blades, and the first stage stator vanes. This ice will regularly come off and go out through the fan exhaust.

(a) If you must do the Power Plant Tests in AMM 71-00-00/501, you must turn off the engine anti-ice system.

NOTE: Good data from the power plant tests requires engine operation with no electrical load on the IDG and no bleed air off-takes.

1) Push the applicable engine anti-ice switch to the OFF position at the Wing and Engine Anti-Ice Control Panel.
a) L ENG ANTI-ICE switch.
b) R ENG ANTI-ICE switch.

WARNING: DO NOT GO NEAR THE INLET DURING THE OPERATION OF THE ENGINE. MONITOR THE DANGEROUS AREAS OF THE ENGINE INLET FOR ICE FROM THE NOSE LANDING GEAR AND TALK TO THE FLIGHT COMPARTMENT WITH THE INTERPHONE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

CAUTION: OPERATE THE ENGINE TO 60% N1 TO REMOVE THE ICE THAT COLLECTS ON THE ENGINE PARTS DURING THE ENGINE OPERATION. REMOVAL OF THE ICE WILL KEEP THE ENGINE DAMAGE TO A MINIMUM.

(b) If you have operated the engine for more than 1 hour at minimum idle power, do these steps to remove the ice from the engine.

NOTE: During ice conditions, special acceleration or operation to remove collected ice is not necessary if you operate the engine at minimum idle power for less than one hour.

1) Move the thrust levers forward to get 60% N1 for one minute maximum.

2) Move the thrust levers aft to minimum idle power.
3) If you continue to operate the engine at minimum idle power, you must do the steps to remove the collected ice every hour.

S 862-225-R00

(4) Shutdown the engine.
(a) Do the engine shutdown as described for normal engine operation.
1) Make sure the thrust reverser is retracted in the forward thrust position.

F. Put the Airplane in Its Usual Condition

S 862-226-R00

(1) Do the steps to put the airplane back to the usual condition with the procedure for normal engine operation.

S 862-227-R00

(2) Install the inlet cover.

S 862-228-R00

(3) Install the common nozzle cover when the engine is cool.

TASK 71-00-00-862-250-R00

10. RB211-535E4 Power Plant Operation During Extreme Cold Weather: Less Than -30°C (-22°F)

A. General

(1) This procedure gives the instructions for engine operation during cold weather conditions.
(2) These instrucions add the information, the techniques, and additional procedure to the normal engine operation procedure.
(3) Engine icing can occur during engine operation when there are two conditions:
(a) Outside air temperature is less than 10°C (50°F).
(b) Visible moisture can be seen.

NOTE: Visible moisture is defined as:
- clouds
- fog with less than one mile visibility
- rain, snow, sleet, and ice crystals
- water, ice, or snow on the ground.

(4) During cold weather operation, you can prevent damage to the engine if you use the inlet covers and the exhaust covers.
  (a) Before the engine is started, the rotors must not be locked.
  (b) Snow and ice must not collect in the engine inlet and must be removed.
  (c) During very cold weather operations, the covers will slow the heat loss from the engine and prevent the engine oil temperature from decreasing too fast.

(5) A quantity of ice that collects in the engine inlet is one of the dangerous conditions during cold weather engine operation.
  (a) Snow blown into the engine can become ice if it melts and then freezes again.
  (b) This ice can lock the rotor blades to the stator case.
  (c) If the ice becomes a layer on the rotor blades, the engine rotors will not be balanced.

(6) Ice can collect on the engine parts (i.e. stators, guide vanes, fan blades, spinner, etc.) during the engine operation because of the large quantity of air that is moved by suction into the engine.
  (a) This condition is dangerous when you operate the engine at high power and static conditions on the ground.
  (b) The suction decreases the air pressure which decreases the air temperature.
  (c) The ice can collect in the inlet when water droplets hit the fan blades, the guide vanes, and the spinner and become cool during evaporation.

(7) After the engine is shutdown, you must immediately install the inlet cover to prevent windblown snow or rain in the engines, and in very cold conditions, to keep the heat in the engine.
  (a) You must install the common nozzle cover as soon as the engine is cool enough to prevent damage to the cover.

(8) It is recommended that the airplane is pointed into the wind when parked for a long time.

(9) During heavy snowstorms, you must always shutdown the engine in forward thrust.
  (a) This will prevent ice layers on the cascade vanes, the blocker doors, and linkages of the thrust reverser.

(10) Usually, it is not necessary to heat the engine before you start the engine. Reliable starts can be done with the normal start procedures.
  (a) You must heat the engine to free rotors locked with snow and ice.
  (b) You must remove all the ice and snow from theses areas:
    1) The engine inlet panels.
    2) The fan cowl panels.

3) The external surfaces and joints of the thrust reverser.
4) The acoustic panels of the inlet cowl.
5) The fan and turbine exhaust ducts.

(c) You must heat the engine if the engine oil temperature is colder than -40°C (-40°F).

(11) When it is very cold, the high viscosity oil in the thrust reverser opening system can cause the thrust reverser to close very slowly or cause a hydraulic lock in a check valve in the quick disconnect.

(a) If the thrust reverser closes slowly, apply hot air to the opening actuators and tubes and at the quick disconnect for the hand pump.

(b) To clear a hydraulic lock, pump the thrust reverser open a little, then try to close it again. Continue to apply hot air to warm the opening system and to open and close the thrust reverser a little until the thrust reverser is completely closed.

(12) Additional procedures are required for very cold weather operations that are colder than -30°C (-22°F). Do the Through Flight procedure or the Cold Soak procedure for overnight or extended periods.

B. Equipment

(1) BT-400 Herman Nelson Heater, Hot Air Source Heater, explosion-proof, or equivalent heater cart source (3 required)
(2) Hot Air Source Heater - Diesel Fueled, Portable, Duct Type
400,000 BTUH, Model 4600-46
Engineered Air Systems, Inc., St. Louis, MO 63132, USA
(Alternate to Herman Nelson Heater)
(3) YMP350 Hot Air Source Heater, or equivalent
(A large heater/air cart truck in use in the Confederation of Independent States (CIS): has connections for three heater hoses)
(4) Service interphone equipment
(5) LJ34924 Engine inlet (nose cowl) cover, Rolls-Royce
(6) UL16357 Common nozzle cover, Rolls-Royce
(7) HU39026 Modified Common Nozzle Cover, Rolls-Royce

NOTE: This is a modified common nozzle cover with two 250 millimeter holes for the heater hoses.

(8) HU39024 IDG Access Door Adaptor, Rolls-Royce
(9) HU39023 Hot Nozzle Adaptor, Rolls-Royce

NOTE: This has two 200 millimeter holes for the heater hoses.

C. References

(1) AMM 12-11-03/301, Fuel Sump Draining
(2) AMM 12-33-01/301, Cold Weather Maintenance
(3) AMM 29-11-00/201, Electrical Power
(4) AMM 36-00-00/201, Pneumatic - General
(5) AMM 72-00-00/201, Engine

D. Prepare the power plant.

S 862-251-R00

(1) Prepare for normal engine operation and add the steps that follow:

WARNING: DO NOT GO NEAR THE INLET DURING THE OPERATION OF THE ENGINE. MONITOR THE DANGEROUS AREAS OF THE ENGINE INLET FOR ICE FROM THE NOSE LANDING GEAR AND TALK TO THE FLIGHT COMPARTMENT WITH THE INTERPHONE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING: MAKE SURE THAT YOU FOLLOW THE PROCEDURES TO TURN THE LOW PRESSURE (N1) AND THE HIGH PRESSURE (N3) ROTOR SYSTEMS. FAILURE TO FOLLOW AMM 72-00-00/201 COULD RESULT IN INJURY TO PERSONS OR DAMAGE TO THE POWER PLANT.

(a) Make sure the N1 rotor can turn freely in the clockwise direction as seen from the front (AMM 72-00-00/201).
1) Turn the fan blades with a wooden stick or a rod that is made of another material that will not damage the fan blades.

(b) Make sure the N3 rotor can turn freely (AMM 72-00-00/201)

NOTE: Do not do a check that the N2 rotor can turn freely. Do not use the turning tool to turn the N2 rotor. Too much force on the Intermediate Pressure (IP) compressor blades can cause damage to the blades.

(c) If the N1 or N3 rotors cannot turn, or you think that the N2 rotor cannot turn, do these steps to heat the engine:
1) Install the inlet cover.

NOTE: If the holes for the inlet cover installation pins are frozen with ice, apply hot air to melt the ice in the holes.

2) Install the modified common nozzle cover with holes for two heating hoses to the common nozzle.
3) Attach two heating hoses to the heater.
4) Install two heater hoses through the modified common nozzle cover.
5) Operate the hot air source heater to provide hot air.

NOTE: THe temperature of the hot air must not be more than 121°C or 250°F.

6) Apply hot air until the rotors turn freely.
7) Stop the operation of the hot air source heater.
8) Disconnect the heating hoses.

9) Remove the modified common nozzle cover from the common nozzle.
10) Install the common nozzle cover.

CAUTION: THE ENGINE INLET MUST BE COMPLETELY CLEAN OF ICE AND SNOW. THE ENGINE ANTI-ICE SYSTEM CAN MELT THE ICE AND SNOW AT THE HEATED AREA, BUT THE ICE CAN FREEZE AGAIN ON THE INLET ACOUSTIC PANELS AND ON THE ENGINE PARTS.

(d) Remove all snow and ice from the engine inlet and the acoustic panels of the inlet cowl.
(e) Install the inlet cover.

NOTE: If the holes for the inlet cover installation pins are frozen with ice, apply hot air to melt the ice in the holes.

(f) Remove all snow and ice from the common nozzle.
(g) Install the common nozzle cover.
(h) If you find it is difficult to open the fan cowl panels or the thrust revrser because of the snow or ice, apply hot air to the external surfaces as necessary.
1) Blow the melted snow or ice from the exterior joints of the fan cowl panels before the panels are opened.
(i) Drain the water from all fuel sumps in the fuel system (AMM 12-11-03/301).

NOTE: If the fuel flows freely from the drains in the tank sumps, the fuel system has no ice.

1) If there is ice in the fuel system, blow hot air from an explosion-proof hot air source (121°C or 250°F maximum) at the drain area (AMM 12-33-01/301).

S 862-252-R00
(2) Do the applicable steps for very cold conditions:
(a) Through Flight At Temperatures Colder Than -30°C.

NOTE: Through flight conditions are defined as follows:
- The cabin temperatures are kept warmer than 0°C (32°F) and,
- The engine oil temperatures are warmer than -40°C (-40°F), while the airplane is on the ground.

1) If the EICAS engine oil temperature indication has decreased to approximately -40°C (-40°F), do these steps:
a) Make sure that you follow the procedure for airplane cold weather maintenance (AMM 12-33-01/301).
b) Remove the inlet cover and common nozzle cover from the engines.

CAUTION: THE EICAS ENGINE OIL TEMPERATURE VALUE MUST BE WARMER THAN -40°C (-40°F) AT THE ENGINE START FOR THROUGH FLIGHTS. IF THE ENGINE OIL TEMPERATURE IS COLDER THAN -40°C (-40°F) AND YOU START THE ENGINE, DAMAGE TO THE ENGINE BEARINGS MAY OCCUR.

c) Start the engine using the cold weather procedures.

NOTE: During engine starts at cold temperatures, high oil pressure can occur, and the indicated oil quantity can decrease. As the oil temperature increases with the engine operation at idle thrust, the oil pressure will decrease and the indicated oil quantity will go to the usual condition.

A long engine start cycle can cause the oil pressure indication to decrease and the oil pressure light can come ON. This condition is permitted if the system indications go to the usual conditions when the engine operation is stable at idle thrust.

1. You must start the engine with the engine fuel control switch at the RICH position.

d) Operate the engine at idle until the oil temperature is equal to or warmer than 0°C (32°F) before you move the thrust levers forward and accelerate the engine from idle power.
   1. Cold engines must be operated at idle power or taxi power for a minimum of 5 minutes before takeoff.
   2. If you use this procedure to re-warm the engine, make sure the engine operates at idle power for a minimum of 10 minutes before the engine is shutdown.

      NOTE: Measure the 10 minutes from the time that the engine oil temperature reaches 0°C (32°F). These 10 minutes are the minimum time for the engine temperature to become stable. You can increase the time periods between engine operations to re-warm the engine if you increase the engine run time to more than 10 minutes or use a higher power level than idle power.

e) Shutdown the engine.
f) Install the inlet cover.

g) Install the common nozzle cover when the engine exhaust is cool enough to prevent damage to the cover.

(b) Return the Airplane To Service After A Cold Soak.

1) Make sure that you follow the procedure for airplane cold weather maintenance (AMM 12-33-01/301).

2) If the engine oil temperature is colder than -40° C (-40° F), do these steps:

NOTE: It is not sufficient to only warm the exterior of the engine. The engine core must be warmed to prevent engine damage. At engine oil temperatures that are colder than -40°C (-40°F), you must warm the engine bearings and the engine oil to prevent engine damage. The process to warm the engine bearings is slow. You will not prevent engine damage if you only warm the engine oil.

If the engine oil temperature is colder than -50°C (-58°F), the EICAS indication will be blank.

a) Warm the engine bearings and the engine oil with a hot air source heater.

1. Open the integrated drive generator (IDG) inspection access door.
2. Install an IDG access door adaptor in the IDG access door opening.
3. Remove the common nozzle door.
4. Install a hot nozzle adaptor in the common nozzle, on the turbine exhaust.
5. Install two heater hoses through the modified common nozzle cover holes.
6. Install the two heater hoses in the hot nozzle adaptor.
7. Install a modified common nozzle cover with two heating hoses to the common nozzle.
8. Install one heater hose to the IDG access door adaptor.
9. Operate the hot air source heater to provide hot air.

NOTE: The temperature of the hot air must not be more than 121°C (250°F).

10. Apply hot air to these engine components.

a. Apply hot air to the engine core through the turbine exhaust nozzle adaptor.

NOTE: Use Figure 207 to find the amount of time required to warm the engine.

b. Apply hot air through the IDG access door until the engine oil temperature is 0°C (32°F).
c. Continue to apply hot air for a minimum of 30 minutes after 0°C (32°F) is reached.

b) As an alternate procedure, move the airplane to a warm airplane hanger to warm the engine oil temperature to 0°C or more.

3) When the engine oil temperature is warmer than 0°C (32°F) and when the fan case and engine core bearings were warmed to 0°C (32°F) for the required amount of time, do these steps:

a) If the engine is being warmed with hot air from a heater:
1. Stop the operation of the hot air source heater.
2. Remove the modified common nozzle cover with the heating hoses from the common nozzle.
3. Disconnect the two heating hoses from the hot nozzle adaptor.
4. Remove the hot nozzle adaptor from the turbine exhaust.
5. Install the common nozzle cover.
6. Remove the IDG access door adaptor from the IDG access door opening.
7. Close the IDG access door.

b) If the airplane is in a hanger, move the airplane to the outside ramp.

c) Provide the electrical power (AMM 29-11-00/201).

d) Remove the inlet and exhaust covers from the engines.

CAUTION: THE EICAS ENGINE OIL TEMPERATURE VALUE MUST BE WARMER THAN 0°C (32°F) AT THE ENGINE START IF THE ENGINE WAS COLD SOAKED. YOU MUST WARM THE ENGINE OIL AND BEARINGS BEFORE YOU START THE ENGINE OR DAMAGE TO THE ENGINE BEARINGS CAN OCCUR.

e) Start the engine using the cold weather procedures.

NOTE: During engine starts at cold temperatures, high oil pressure can occur, and the indicated oil quantity can decrease. As the oil temperature increases with the engine operation at idle thrust, the oil pressure will decrease and the indicated oil quantity will go to the usual condition.

1. You must start the engine with the engine fuel control switch at the RICH position.

f) Operate the engine at idle power until the oil temperature is equal to or more than 0°C (32°F) before you move the thrust levers forward and accelerate the engine from idle power.
   1. Cold engines must be operated at idle power or taxi power for a minimum of 5 minutes before takeoff.
   2. If you use this procedure to re-warm the engine, make sure the engine operates at idle power for a minimum of 10 minutes before the engine is shutdown.

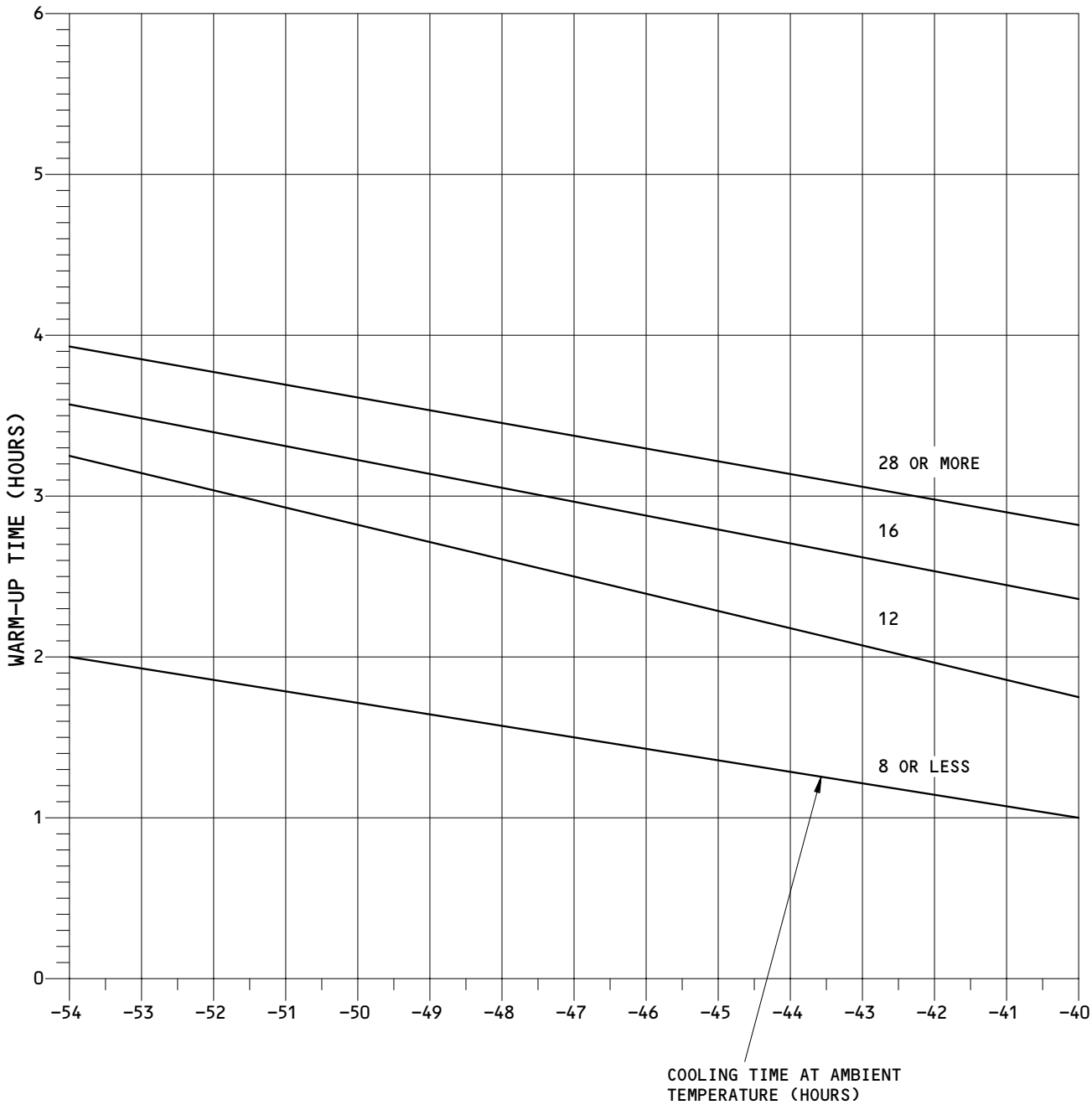
      NOTE: Measure the 10 minutes from the time that the engine oil temperature reaches 0°C (32°F). These 10 minutes are the minimum time for the engine temperature to become stable. You can increase the time periods between engine operations to re-warm the engine if you increase the engine run time to more than 10 minutes or use a higher power level than idle power.

g) Shutdown the engine.
h) Install the inlet cover.
i) Install the common nozzle cover when the engine exhaust is cool enough to prevent damage to the cover.

E. Operate the Engine

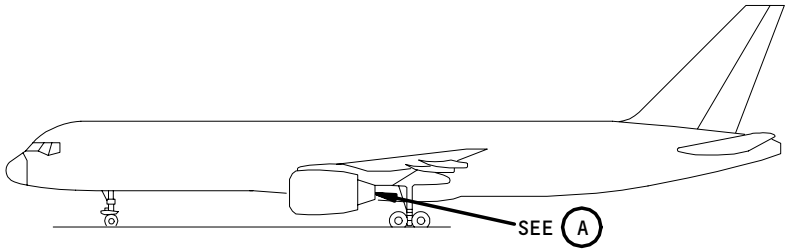
S 862-253-R00

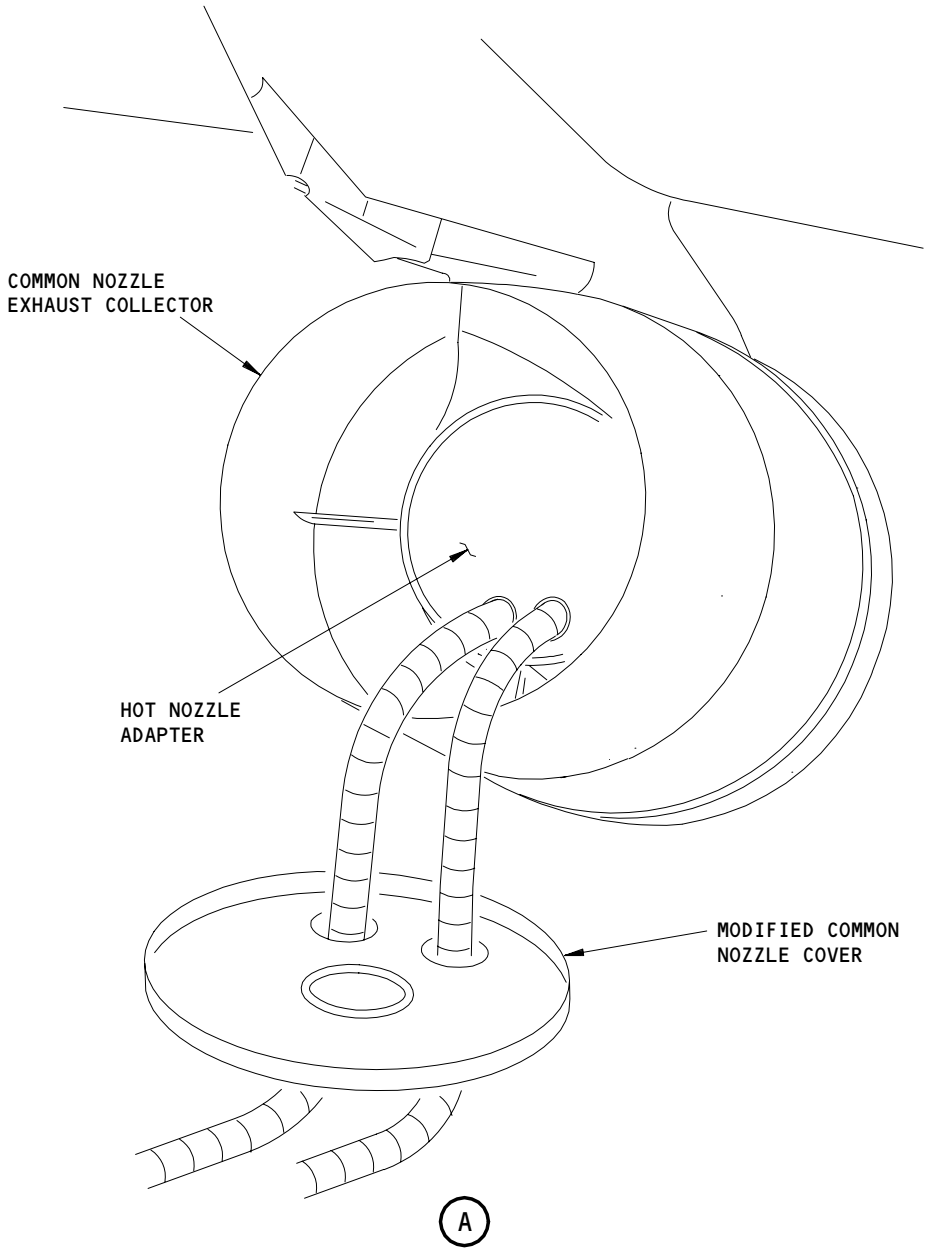
(1) Do the procedure to prepare the engine for normal engine operation.
   (a) Make sure that you follow the procedures for temperatures colder than -30°C (-22°F).
      1) Through Flight For Temperatures Colder Than -30°C (-22°F).
      2) Return Airplane To Service After Cold Soak.



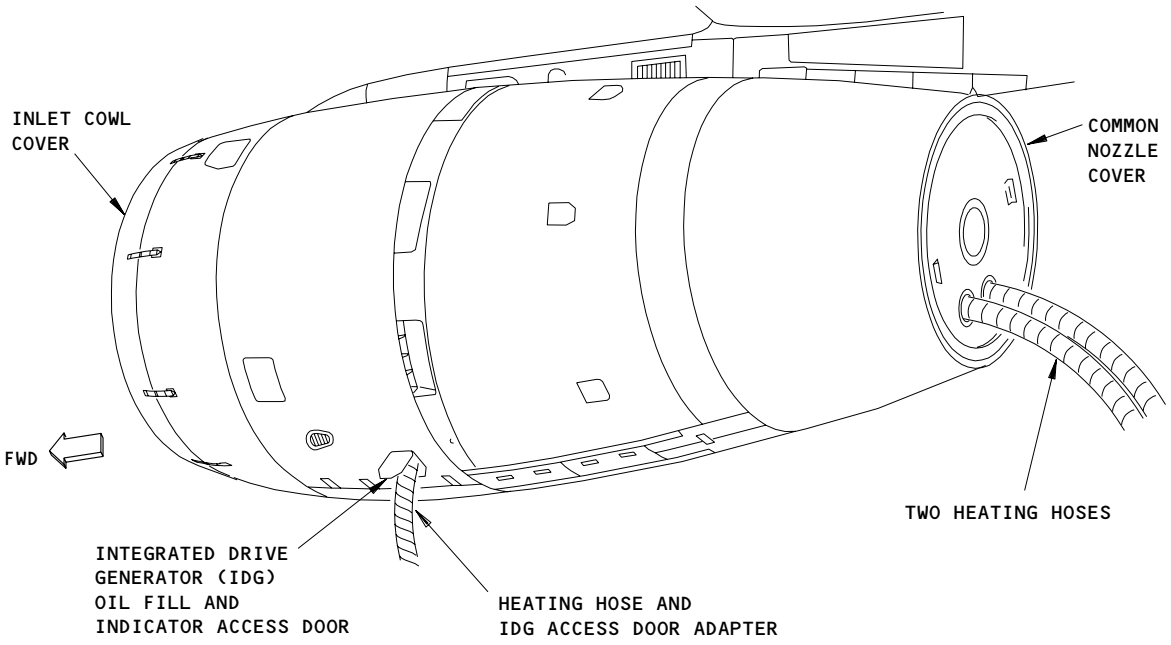
NOTE: ASSUMES ENGINE COVERS INSTALLED SOON AFTER ENGINE SHUTDOWN AND AIRPLANE PARKED IN STILL AIR CONDITIONS.

RB211-534E4 Cold Start Procedure Warm-up Times
Figure 207





RB211-535E4 Heating Hose Installaion
Figure 208 (Sheet 1)



RB211-535E4 Heating Hose Installation
Figure 208 (Sheet 2)

S 862-254-R00

CAUTION: DO NOT OPERATE AN ENGINE, WHICH HAS BEEN AT LOW TEMPERATURES, IF THE ENGINE DOES NOT ACCELERATE CORRECTLY TO IDLE POWER. IMMEDIATELY SHUTDOWN THE ENGINE IF THE INDICATIONS ARE LESS THAN THE NORMAL LIMITS.

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.

(2) Start the engine with the instructions for normal engine operation and add the steps that follow:
   (a) Start the engine with the engine fuel control switch in the RICH position.
   (b) Provide the pneumatic power from the APU or two or three ground air carts (AMM 36-00-00/201).
      1) Do not use cross bleed start procedure.
   (c) If there is no drop in pressure on the DUCT PRESSURE indicator on the Pilot's overhead panel P5 during the start, examine the starter control valve for a frozen solenoid.
      1) Use the manual starter valve override handle on the starter control valve during the engine start to release the valve.
      2) Apply hot air from an explosion-proof hot air source to release the strut valve or the high pressure bleed valve (121°C or 250°F maximum).
   (d) If an engine start with a single igniter causes a problem, use two igniters during the next start.
   (e) If an engine accelerates slowly after lightup and a hung start could occur, do the engine shutdown.
      1) Start the engine again with the procedure for normal engine operation.
   (f) If the engine is slow to start, or will not accelerate to idle power (hung start), do the engine shutdown and look for the cause.

CAUTION: DO NOT TURN ON THE ENGINE ANTI-ICE SYSTEM IF THE ENGINE INLET IS NOT COMPLETELY CLEAN OF ICE. AT TEMPERATURES COLDER THAN FREEZING, THE ANTI-ICE SYSTEM HAS SUFFICIENT HEAT TO MELT THE ICE AT THE INLET, BUT THE ICE AND WATER WILL MOVE INTO THE ENGINE AND FREEZE AGAIN ON THE INLET ACOUSTIC PANELS AND ENGINE PARTS.

(g) While the engine operates at idle power during icing conditions, turn on the engine anti-ice system.
1) Push the applicable engine anti-ice switch to the ON position at the Wing and Engine Anti-Ice Control Panel.
a) L ENG ANTI-ICE Switch.
b) R ENG ANTI-ICE Switch.

CAUTION: IF THERE IS NO OIL PRESSURE INDICATION (EICAS RED BAND) WHEN THE ENGINE HAS ACCELERATED TO MINIMUM IDLE OR THE OIL PRESSURE DECREASES TO ZERO DURING ENGINE OPERATION, DO THE PROCEDURE TO SHUTDOWN THE ENGINE AND FIND THE CAUSE OF THE PROBLEM.

WHEN THE ENGINE IS STARTED DURING VERY COLD CONDITIONS, THE OIL PRESSURE INDICATION CAN GO TO THE FULL PRESSURE VALUE BECAUSE OF HIGH OIL VISCOSITY. THE OIL PRESSURE WILL DECREASE AS THE OIL TEMPERATURE INCREASES. IF THE OIL PRESSURE DOES NOT DECREASE AFTER THE OIL TEMPERATURE BECOMES STABLE, DO THE PROCEDURE TO SHUTDOWN THE ENGINE AND FIND THE CAUSE OF THE PROBLEM.

(h) Operate the engine at idle power until the engine oil temperature is 0°C (32°F) to get a sufficient warmup.

S 862-255-R00

(3) Do the procedure for normal engine operation and do these steps:

NOTE: When the engine is operated during ice conditions, ice can collect on the spinner, the fan blades, and the first stage stator vanes. This ice will regularly come off and go out through the fan exhaust.

(a) If you must do the Power Plant Tests in AMM 71-00-00/501, you must turn off the engine anti-ice system.

NOTE: Good data from the power plant tests requires engine operation with no electrical load on the IDG and no bleed air off-takes.

1) Push the applicable engine anti-ice switch to the OFF position at the Wing and Engine Anti-Ice Control Panel.
a) L ENG ANTI-ICE switch.

b) R ENG ANTI-ICE switch.

WARNING: DO NOT GO NEAR THE INLET DURING THE OPERATION OF THE ENGINE. MONITOR THE DANGEROUS AREAS OF THE ENGINE INLET FOR ICE FROM THE NOSE LANDING GEAR AND TALK TO THE FLIGHT COMPARTMENT WITH THE INTERPHONE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: OPERATE THE ENGINE TO 60% N1 TO REMOVE THE ICE THAT COLLECTS ON THE ENGINE PARTS DURING THE ENGINE OPERATION. REMOVAL OF THE ICE WILL KEEP THE ENGINE DAMAGE TO A MINIMUM.

(b) If you have operated the engine for more than 1 hour at minimum idle power, do these steps to remove ice from the engine.

NOTE: During ice conditions, special acceleration or operation to remove collected ice is not necessary if you operate the engine at minimum idle power for less than one hour.

1) Move the thrust levers forward to get 60% N1 for one minute maximum.
2) Move the thrust levers aft to minimum idle power.
3) If you continue to operate the engine at minimum idle power, you must do these steps to remove the collected ice every hour.

S 862-256-R00

(4) Shutdown the engine.

(a) Do the engine shutdown as described for normal engine operation.

1) Make sure the thrust reverser is retracted (the forward thrust position).

F. Put the Airplane in Its Usual Condition

S 862-257-R00

(1) Do the steps to put the airplane back to the usual condition with the procedure for normal engine operation.

S 862-258-R00

(2) Install the inlet cover.

S 862-259-R00

(3) Install the common nozzle cover when engine is cool to prevent damage to the cover.

POWER PLANT - ADJUSTMENT/TEST

1. General
   A. After you replace some parts, you must do some tests to make sure that the power plant operates correctly.
   B. These are the tests which are in this section:

TEST	TITLE OF TEST	PURPOSE
1	Oil Circulation and Fuel Drains	To make sure the oil flows and the drain system operates
2	Fuel and Oil Leaks	To make sure there are no oil or fuel leaks
3	IP/HP Compressors Airflow Control	To make a check of the bleed valve system
4	Run-In	To give the best fit of the rotor path linings and seals
5	Performance	To make a check that the performance parameters are in the overhaul limits
6	Vibration Survey	To make a check that the vibration is in the limits
7, 7A	Fan Trim Balance	To correct the fan balance if the N1 vibration is between 1.2 and 2.4 units
8	Oil Consumption	Removed
9	Thrust Lever Angle/ Power Setting	To make a check of the relation between the thrust lever angle and engine power
10	Minimum Idle and Approach Idle Check	To make sure the miniumum idle and approach idle power are in the limits
11	Acceleration and Deceleration	To make sure acceleration and decceleration time are in the limits and the engine is surge free
12	Thrust Reverser	To make a check of the thrust reverser system operation and indication
13	Takeoff Power	To make a check of takeoff power
14	Not Used	Deleted
15,15A	Reverse Power	To make a check of reverse power

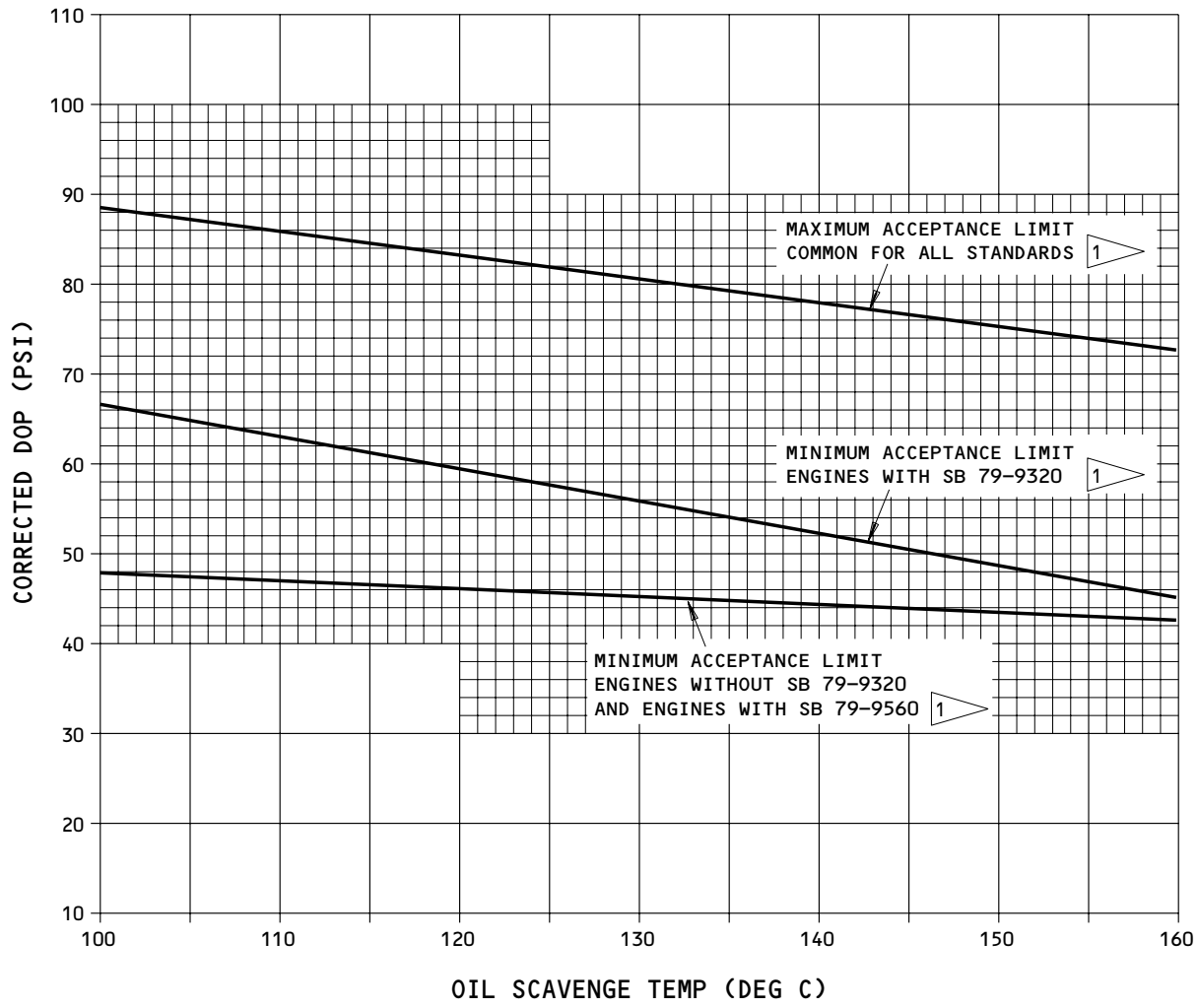
C. For engine operation at high power, refer to the Airplane Skidding Prevention for High Power Operation procedure for the necessary airplane minimum gross weight (AMM 71-00-00/201).
D. For all engine operations at Takeoff power, make sure you install wheel chocks. When both engines are operated at Takeoff power, the airplane can move with full brake pressure if the wheel chocks are not installed.
E. During the engine ground operation, the air off-takes and the engine inlet anti-ice should be in the off position.
F. If there are ice conditions, refer to the procedure to start and operate the engine in cold weather (AMM 71-00-00/201).
G. Make a record of the outside air temperature (O.A.T.) and pressure altitude immediately before the start of the test and at frequent times during the tests.

NOTE: The outside air temperature and pressure altitude can change during the test.

H. When you must do more than one test, make sure you do the tests in the sequence given in the table to prevent engine operation that is not necessary.

NOTE: If you must do the Engine Run In procedure, do that test first.

I. When you need to monitor the engine parameters during the test, set the the EICAS maintenance panel to PERF/APU.
J. During the engine operation, monitor the main engine parameters to make sure the engine does not operate more than the limits (AMM 71-00-00/201).
K. When the engine is operated at 86% N3 and above, make a check of the differential oil pressure as follows:
   (1) Let the engine operation become stable for a minimum time of 4 minutes.
   (2) Make a check that the differential oil pressure is not out of the acceptance limits (Fig. 501).
L. You can make a record of more engine parameters than the engine parameters that are necessary for the tests to use for a performance trend analysis.



CORRECTION FACTORS: ENGINES WITHOUT SB 79-9320;
CORRECTED DOP = DOP MEAS + 0.2 (T FUEL - 10)

ENGINES WITH SB 79-9320;
CORRECTED DOP = DOP MEAS + DOP FUEL + DOP SPEED
WHERE DOP FUEL = 0.1 (10 - (OAT - T FUEL)) AND DOP SPEED = 0.44 (95 - 43%)

NOTE: CHECK THE DOP ACCEPTANCE LIMITS AT
86% N3 AND ABOVE AFTER A MINIMUM TIME OF
4 MINUTES STABLE ENGINE OPERATION

OAT = OUTSIDE AIR TEMPERATURE

T FUEL = TEMPERATURE OF THE FUEL IN THE TANK

DOP = DIFERENTIAL OIL PRESSURE.

C3017A

1 IF THE DOP LIMIT IS NOT ACCEPTABLE, SEE THE HIGH/LOW OIL PRESSURE CHARTS (FIM 79-32-00)

Corrected Oil Temperature Graph
Figure 501

M. Thrust lever movements, unless specified differently in the applicable test, must be smooth and slow (a minimum of 30 seconds between idle and takeoff power).

N. Decrease of Engine Power and Stable Engine Operation Times.

(1) Unless the applicable test specifies a different decrease of engine power and a different time for stable engine operation, do the steps that follow for post run-in engines:

(a) When the engine is operated for 20 minutes and the EGT is 730°C or more for 5 minutes:

1) Move the thrust lever rearward to 1.52 EPR and let the engine operation become stable for 5 minutes.
2) Move the thrust lever rearward to 1.33 EPR and let the engine operation become stable for for 5 minutes.
3) Move the thrust lever rearward to 1.23 EPR and let the engine operation become stable for 2 minutes.
4) Move the thrust lever rearward to idle power and let the engine operation become stable for 5 minutes.

(b) When the engine speed is decreased from all other power or time conditions:

1) Move the thrust lever rearward to 1.25 EPR and let the engine operation become stable for 2 minutes.

O. Engine Oil System

(1) When the high-speed external gearbox is removed, or maintenance is done to the engine oil system, make sure the engine oil system is filled before the engine is operated (AMM 12-13-01/301).

(2) Monitor the engine oil level before and after the other tests to make a check of the amount of engine oil used.

NOTE: This section has no specific test for oil consumption. Thus, if engine oil consumption checks are necessary, the engine oil level datum must be found after the engine is operated above idle power, 5 to 30 minutes after the engine is shutdown. Make a record of the time (minutes) after the engine is shutdown and the oil level datum is found. Use this time for subsequent oil level datum checks.

(a) You can calculate the oil consumption in pints/hour from the amount of oil used and the amount of time the engine is operated.

(b) You can get the maximum permitted oil consumption from the limits given in AMM 71-00-00/201.

P. If low pressure (LP) system high vibration is monitored during the test, do Test No. 7 and the test for high vibrations.

Q. The Power Plant Test Reference Table gives the minimum tests you must do after you repair or replace the engine parts in the table. The table also gives the minimum test you must do after some engine conditions occur.

POWER PLANT TEST REFERENCE TABLE

ITEM	Test Required
BASIC ENGINE COMPONENTS	
A new or repaired engine which has been tested on a static test cell or, an engine that was installed again after it was removed for a policy reason.	1, 10, 12, 13
Engine Work Resulting in Disturbance of Engine Handling Bleed Pneumatic System	3
High vibration significant to the low pressure system observed during any test.	7
An Engine which has had the following modules or assemblies repaired or replaced and not tested on a static test cell prior to installation, perform test required.	
COMPRESSOR SECTION	
Low Pressure Compressor Blade(s)	6
NOTE: If serviceable blades are removed and subsequently installed back into their initial positions on the same engine, it is not necessary to do the Vibration Survey, Test 6.	
Low Pressure Compressor Disc and Blades	1, 6, 10
Intermediate Pressure Compressor Front Bearing Housing	1, 6
Intermediate Pressure/Low Pressure Compressor Location Bearing	1, 6

POWER PLANT TEST REFERENCE TABLE

ITEM	Test Required
BASIC ENGINE COMPONENTS	
COMBUSTION SECTION	
Combustion Liner	1, 2, 3, 6, 10
GEARBOXES	
High Speed External Gearbox	1, 2, 13
MISCELLANEOUS COMPONENTS	
Bleed System	
Bleed system work resulting in disturbance of engine handling bleed pneumatic system.	3
Bleed Valve Control Unit (BVCU) replaced for engine handling problem	3
T2 Thermocouple. After the engine is shutdown, do the procedure to interrogate the BVCU to find if the fault was fixed.	6
Dedicated Generator or Generator Stator After the engine is shutdown, do the procedure to interrogate the BVCU to find if the fault was fixed (AMM 75-32-00/201)	2
Bleed Solenoids	3 and BVCU BITE CHK
PLA Transducer	BVCU BITE CHK
Dedicated Generator Control Unit (run engine at idle power for 5 minutes)	BVCU BITE CHK
Fuel System	
Low Pressure Fuel Pump	1, 2
High Pressure Fuel Pump	1, 2
Low Pressure Fuel Filter Element	1, 2
Fuel Flow Governor	1, 2, 9, 10, 11
Fuel Flow Transmitter	1, 2
Fuel Filter Housing and Fuel Cooled Oil Cooler	1, 2

POWER PLANT TEST REFERENCE TABLE

ITEM	Test Required
BASIC ENGINE COMPONENTS	
Main Fuel Supply Line	2
Fuel Manifold	2
High Pressure Fuel Filter Element	2, 13
Transient Fuel Valve	1
Transient Fuel Pressure Unit (ETPU)	3
Fuel Flow Governor Solenoid Valves and Switches that follow:	
Pressure and Drain Switch	1, 2
Fail Fixed Solenoid	1, 2
Cold Day Enrichment Solenoid	1, 2
Idle Reset Solenoid	1, 2
Fuel Drain Tank Ejector Valve/Filter Assembly	2
Engine	
High Speed Gearbox Radial Drive Shaft	2
Oil System	
Oil Tank	1, 2
Pressure and Scavenge Oil Filter Elements	2
Pressure and Scavenge Oil Pumps	2
Oil Bypass Valve	1
IDG AIR/OIL Heat Exchanger	1, 2
Oil Pressure Transmitter	2
LP Warning Switch	2
Oil Temperature Bulb	2
Oil Filter Differential Pressure Switch	2
Oil Lines	1, 2
Magnetic Chip Detector Housing	2
Oil Quantity Transmitter	1, 2

POWER PLANT TEST REFERENCE TABLE

ITEM	Test Required
BASIC ENGINE COMPONENTS	
SPECIAL INVESTIGATIONS	
High Vibration	6
Handling Problems	3, 11
Takeoff Power Problems	13
Reverse Power Problems	15

TASK 71-00-00-825-002-R00

2. Adjustment - Fuel Flow Governor (FFG) Specific Gravity

A. Equipment

(1) Allen key - 3/32 inch (0.093 inch or 2.38 millimeters) across the flats

(2) Allen key - 4.00 millimeters across the flats

B. Access

(1) Location Zones

410 Left Engine
420 Right Engine

(2) Access Panels

414/424 Fan Cowl Panel (RH)

C. Procedure (Fig. 516)

S 035-003-R00

(1) Use the 3/32 inch (0.093 inch or 2.38 millimeters) allen key, and remove the setscrews from the cover.

S 035-004-R00
(2) Remove the cover from the fuel flow governor.

S 215-005-R00
(3) Look at the specific gravity valve that is set on the fuel flow governor (FFG).

S 825-424-R00
(4) If an adjustment is necessary, use the 0.157 inch (4.0 millimeters) allen key and adjust the FFG to the necessary fuel specific gravity.

FUEL TYPE	SPECIFIC GRAVITY
AVTUR, JP1, JP8, JET A, JET A-1	0.80
AVTAG, JP4, JET B	0.77
AVCAT, JP5	0.83

S 435-007-R00
(5) Install the cover with the setscrews.

S 435-008-R00
(6) Tighten the setscrews with the 3/32 inch (0.093 inch or 2.38 millimeters) allen key.

TEST NO. 1 - OIL CIRCULATION AND FUEL DRAINS TEST

TASK 71-00-00-715-009-R00

3. Test No. 1 - Oil Circulation and Fuel Drains Test

A. References

(1) AMM 12-13-01/301, Engine Servicing (Oil Replenishing)
(2) AMM 71-00-00/201, Power Plant
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 71-71-00/601, Engine Vents and Drains
(5) AMM 78-31-00/201, Thrust Reverser System
(6) AMM 79-11-00/301, Engine Servicing (Oil Change)
(7) AMM 79-21-03/401, Magnetic Chip Detectors

B. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right
413/423	Fan Cowl Panel Left
414/424	Fan Cowl Panel Right
415/425	Thrust Reverser Left
416/426	Thrust Reverser Right

C. Prepare to do the Oil Circulation and Fuel Drains Test.

S 615-010-R00

CAUTION: OIL MUST BE IN THE ENGINE OIL SYSTEM BEFORE THE POWER PLANT TEST IS DONE. INTERNAL DAMAGE TO THE ENGINE WILL OCCUR.

(1) If maintenance was not done to the engine oil system, do the procedure to add oil to the engine oil system (when oil is in the system) (AMM 12-13-01/301).

S 615-011-R00

(2) If maintenance was done to the engine oil system, do the steps that follow:
(a) If there is no oil in the engine oil system, do the procedure to add oil to the engine oil system (when no oil is in the system) (AMM 12-13-01/301).
(b) If you do not know if a sufficient amount of oil is in the engine oil system, do these steps in this order:
1) Do the procedure to drain the engine oil system (AMM 79-11-00/301).

TEST NO. 1 - OIL CIRCULATION AND FUEL DRAINS TEST

2) Do the procedure to add oil to the engine oil system (when no oil is in the system) (AMM 12-13-01/301).

(c) If there is a sufficient amount of oil in the engine oil system, do the test.

NOTE: The engine oil system will be filled to more than the necessary level if the engine oil tank is filled to the full mark before the first engine operation at idle power. A large amount of oil will come out of the engine breather outlet duct.

S 865-012-R00

CAUTION: N1 SPEED MUST NOT BE MORE THAN 6% WITH THE THRUST REVERSER OPEN. DAMAGE TO THE THRUST REVERSER WILL OCCUR IF THE N1 SPEED IS MORE THAN 6%.

(3) For the left engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 865-013-R00

(4) For the right engine, open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

D. Do the Test No. 1 - Oil Circulation and Fuel Drains.

S 865-014-R00

(1) Do the Power Plant Wet-Motor procedure to motor the engine (AMM 71-00-00/201).
(a) Monitor the oil pressure indication.
(b) Move the fuel control switch to the CUTOFF position for these conditions:
1) Fuel comes out of the turbine case drain outlet.
2) After a maximum time of 90 seconds.

S 865-015-R00

(2) Do the Power Plant Dry-Motor procedure for 30 seconds before you shutdown the engine (AMM 71-00-00/201).

S 795-016-R00

(3) Make sure the quantity of fuel from the drain tubes of these components is less than the limits permitted (AMM 71-71-00/601):
(a) Low pressure fuel pump.

TEST NO. 1 - OIL CIRCULATION AND FUEL DRAINS TEST

(b) High pressure fuel pump.
(c) Fuel flow governor.

S 865-017-R00
(4) Let the engine stop (N3 speed is zero).

S 015-018-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(5) Open the fan cowl panels (AMM 71-11-04/401).

S 215-410-R00
(6) Examine the magnetic chip detectors (MCD).

NOTE: If the oil system has not been disturbed, it is not necessary to examine the MCD's.

(a) Remove all the magnetic chip detectors (MCD) (AMM 79-21-03/401).
(b) Push in each MCD self-sealing valve and make sure some oil comes out of each valve.

NOTE: If the oil has flowed by the MCD, some oil will come out of the valve.

(c) Install all the magnetic chip detectors (AMM 79-21-03/401).

S 215-022-R00
(7) If the thrust reverser halves are open, examine the gas generator area for fuel and oil leakage.

S 215-023-R00
(8) If the thrust reversers are closed, examine the area where the two thrust reverser halves come together for fuel and oil leakage.

S 215-024-R00
(9) Examine the low pressure compressor case for fuel and oil leakage.

S 215-025-R00
(10) Examine the high speed external gearbox for fuel and oil leakage.

S 215-026-R00
(11) Examine the engine for these conditions and correct the problem if it is necessary:
(a) A fuel and oil leak.

TEST NO. 1 - OIL CIRCULATION AND FUEL DRAINS TEST

(b) No fuel comes from the turbine case drain tube outlet in 90 seconds after the FUEL CONTROL switch is moved to the RUN position.
(c) Too much fuel comes from the low pressure fuel pump.
(d) Too much fuel comes from the high pressure fuel pump.
(e) Too much fuel comes from the drain tubes for the fuel flow governor.
(f) Fluid comes from any other drain tube.

S 715-027-R00

(12) If maintenance was done to correct any problem, to this test again.

E. Put the airplane back to its usual condition.

S 415-028-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Close the fan cowl panels (AMM 71-11-04/401).

S 415-029-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) If the thrust reverser is open, close the thrust reverser (AMM 78-31-00/201).

S 865-030-R00

(3) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11L1, LEFT ENGINE IGN 1

S 865-031-R00

(4) For the right engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11L28, RIGHT ENGINE IGN 1

TEST NO. 2 - FUEL AND OIL LEAKS TEST

TASK 71-00-00-795-032-R00

4. Test No. 2 - Fuel and Oil Leak Test

A. General

(1) It is recommended that you do the inspection after the engine has run at more than idle. If the applicable test schedule does not include such a run, do the inspection after a run at idle.

(2) It is necessary to do an inspection for leaks for these conditions:

- When you have done work on the fuel or oil system components per the Power Plant Test Reference Table.
- If you think there is a fuel or oil leak.
- To identify the source of a fuel or oil leak.

(a) Do the inspection in the areas where you have done work.

(b) Remove the minimum number of compressor fairings to do the inspection.

(3) Do a full inspection for leaks on each engine that has been replaced.

B. Equipment

(1) Small, clean brush

C. Consumable Materials

(1) Non Aqueous Aerosol
OMat No. 617

(2) Chalk Mixture
British Spec. ARDROX 996/D2
American Spec. SKD.NF (MAGNAFLUX)

D. References

(1) AMM 12-13-01/301, Engine Servicing (Oil Replenishing)
(2) AMM 71-00-00/201, Power Plant
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 75-32-00/201, Compressor Bleed Control System
(6) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right
413/423	Fan Cowl Panel Left
414/424	Fan Cowl Panel Right
415/425	Thrust Reverser Left
416/426	Thrust Reverser Right

TEST NO. 2 - FUEL AND OIL LEAKS TEST

F. Prepare for the Fuel and Oil Leak Test.

S 615-033-R00

(1) Prepare the engine oil system.

(a) If you do this test after Test No. 1, it is not necessary to fill the engine oil tank.

NOTE: The engine oil system will be filled to more than the necessary level if the engine oil tank is filled to the full mark before the first engine operation at idle power. A large amount of oil will come out of the engine breather outlet duct.

(b) If you do not do Test No. 1 before this test, examine the engine oil level and fill the engine oil system if it is necessary (AMM 12-13-01/301).

G. Do the Test No. 2 - Fuel and Oil Leak.

S 865-034-R00

(1) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

(a) Let the engine operation become stable at idle power for five minutes then do the leak check that follows.

CAUTION: IF THE ENGINE IS TO BE RUN ABOVE IDLE POWER AND ENGINES REQUIRE RUNNING-IN AFTER REWORK BY REPAIR OR REPLACEMENT REFER TO POWER PLANT REFERENCE TABLE (AMM 71-00-00/501), THEN THE RUN-IN TEST MUST BE DONE BEFORE YOU DO THE CHECK THAT FOLLOWS. DAMAGE TO THE ROTOR PATH LININGS AND SEALS CAN OCCUR.

(b) If core mounted HP fuel system or HP fuel filter connections have been disconnected, the ground run must be done at the maximum static EPR of the day. Let the engines stabilize for two minutes then do the leak test that follows.

S 215-035-R00

(2) Monitor the oil and fuel pressures, and the vibration.

S 215-036-R00

(3) Monitor the engine for fuel and oil leaks at these areas:

NOTE: When the engine must be operated at high power before an inspection is done, go to a test where high power is necessary. There must be no leakage and the engine must operate normally (engine parameters are normal).

(a) The area where the two halves of the thrust reverser come together.

TEST NO. 2 - FUEL AND OIL LEAKS TEST

(b) The low pressure compressor case.
(c) The high speed external gearbox.

S 865-037-R00
(4) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).
(a) Let the engine stop (N3 speed is zero).

S 015-038-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(5) Open the fan cowl panels (AMM 71-11-04/201).

S 015-039-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(6) Open the thrust reverser (AMM 78-31-00/201).

S 745-040-R00
(7) Do the Interrogate the Bleed Valve Control Unit (BVCU) procedure (AMM 75-32-00/201).

S 015-041-R00
(8) If maintenance was done on the engine core tubes, remove the compressor fairings (AMM 72-03-01/401).

S 795-042-R00
(9) Make an inspection of the low pressure compressor case, and the high speed external gearbox for leakage.
(a) If maintenance was done on the engine core tubes, examine the gas generator for leakage.
(b) If there is leakage, correct the cause of the leakage and clean the area fully.
(c) Apply Chalk Mixture or Aerosol Developer to the area of the leakage.

S 795-043-R00
(10) Do the test procedure again if maintenance was done to correct the leakage.

S 145-044-R00
(11) After a satisfactory test, make the areas clean where the Chalk Mixture or Aerosol Developer was applied.

TEST NO. 2 - FUEL AND OIL LEAKS TEST

H. Put the airplane back to its usual condition.

S 415-045-R00

(1) If it is necessary, install the compressor fairings (AMM 72-03-01/401).

S 615-046-R00

(2) Make a check of the engine oil level and fill the engine oil system if it is necessary (AMM 12-13-01/301).

S 415-047-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Close the thrust reversers (AMM 78-31-00/201).

S 415-048-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(4) Close the fan cowl panels (AMM 71-11-04/201).

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

TASK 71-00-00-715-049-R00

5. Test No. 3 - IP/HP Compressor Airflow Control Test

A. General

(1) Do this test with the EEC limiter and supervisory function on.

(a) Set the EEC to off and the EEC switch lower INOP segment comes on with an amber light and the switch upper ON segment will go out.

(b) Set the EEC to on and the EEC switch lower INOP segment amber light will go out and the switch upper ON segment of the switch will come on.

(2) The engine must be surge free during the check of the acceleration and deceleration. If the engine is not surge free, do the bleed valve system fault isolation.

(3) You must do the actions that follow with precision:

- thrust lever movements,
- set the engine power (EPR),
- measure the time of stable engine operation.

NOTE: All the bleed valves should be closed at the high power conditions. At lower power conditions, the valves will stay closed if you move the thrust lever very slowly. If the bleed valves do open, they will automatically close approximately 40 seconds after the thrust lever movements stop.

You must move the thrust levers very slowly to accurately find the EPR values at which the valves close and open during slow and continuous power changes.

B. References

(1) AMM 71-00-00/201, Power Plant
(2) AMM 75-32-00/201, Compressor Bleed Control System
(3) AMM 75-32-07/401, Altitude Switch

C. Access

(1) Location Zones

210 Control Cabin
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Do the Test No. 3 IP/HP Compressor Airflow Control.

S 845-326-R00

CAUTION: IF TEST NO. 4 IS TO BE DONE, DO NOT OPERATE THE ENGINE AT POWER LEVELS THAT ARE MORE THAN THE LEVELS SPECIFIED FOR THIS TEST.

(1) If you must do Test 4, you must observe the limits for this test.

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

S 975-050-R00
(2) Get the outside air temperature (O.A.T.) and pressure altitude values.
  (a) Set the datum pressure on the altimeter at 1013 mb, the pressure indicated is the pressure altitude.

S 975-051-R00
(3) Find the Minimum Rated Thrust EPR for the O.A.T. and the Pressure Altitude values (Fig. 502).

S 865-053-R00
(4) Supply the external electrical power (AMM 24-22-00/201).

S 865-054-R00
(5) Make sure the EEC supervisory function is on.
  (a) Put the L ENG EEC switch or the R ENG EEC switch on the P5 Panel in the ON position.

S 865-055-R00
(6) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).
  (a) Let the engine operation become stable at idle power for five minutes.

S 865-056-R00
(7) Remove the electrical load from the IDG and the bleed air from the engine.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

BLEED VALVE OPERATION LIMITS
TABLE 1

CONDITION	BLEED VALVE(S)	OPERATION	EPR LIMITS	EGT
A	(2) ENGINES POST RR SB 75-7984; HP2	CLOSE	1.08 to 1.15	DECREASE 10 - 20°C
B	IP6 2 RH and 1 LH	CLOSE	1.17 to 1.24	DECREASE 10 - 20°C
C	IP6 2 RH and 1 LH	OPEN	1.21 to 1.14	INCREASE 10 - 20°C
D	(2) ENGINES POST RR SB 75-7984; HP2	OPEN	1.14 to 1.07	INCREASE 10 - 20°C

S 715-583-R00

(8) Make a check of the Transient Mode Bleed Valve Operation.
  (a) With the engine stable at idle, make a record of the EGT value.
  (b) Move the thrust lever forward to 1.07 EPR. You must get this value in 5 seconds or less.
  (c) Let the engine become stable for 1 minute and monitor the conditions that follow:
    1) The EGT starts to increase from the idle reading.
    2) Approximately 40 seconds after the engine becomes stable at 1.07 EPR, there is a sudden decrease in EGT of approximately 40°C.

NOTE: The decrease in EGT shows that the BVCU has moved from the transient mode to the steady state mode, and that the HP3 bleed valves have closed.

S 715-584-R00

(9) Make a check of the Bleed Valve Operation - Condition A.
  (a) Refer to the bleed valve operations limits - Table 1, Condition A.
    1) Find the range of EPR values in which the HP2 bleed valves close.

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

(b) With the engine stable at approximately 1.07 EPR, make a record of the EGT value.
(c) Move the thrust lever slowly forward through the range of EPR given in Table 1 - Condition A.
1) Carefully monitor the EGT.
(d) Make sure that the EGT initially increases from the value recorded in step (b).
(e) Make sure that it is between the values given in Table 1 - Condition A.
1) There should be a sudden decrease in EGT of between 10 and 20°C.

NOTE: THIS SHOWS THAT THE HP2 BLEED VALVES HAVE CLOSED.

(f) Stop the thrust lever movement when you get the maximum EPR value from Table 1 - Condition A.

S 715-058-R00
(10) Make a check of the Bleed Valve Operation - Condition B.
(a) Refer to the bleed valve operations limits in Table 1 - Condition B.
1) Find the range of EPR values at which the IP6 RH and LH bleed valves close.
(b) Very slowly (not less than 20 seconds) move the thrust lever forward to Condition B EPR.
1) Carefully monitor the EGT.
2) Stop the thrust lever movement at the Condition B EPR.
(c) Make a record of the EGT decrease and EPR that indicate the IP6 RH and LH bleed valves have closed.
(d) Make sure the EPR and the EGT decrease are in the limits permitted (Refer to Table 1, Condition B).
1) If the EPR and EGT decrease are in the limits permitted, do the Bleed Valve Operation - Condition C step.

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

NOTE: The operation of the IP6 LH bleed valve and the two IP6 RH bleed valves do not always occur at the same power condition because of the tolerance of the switch points. Thus, a total decrease in EGT for condition B may not be seen initially. Continue to slowly move the thrust lever forward until a second decrease in EGT is seen, then stop the thrust lever movement. Write down the total decrease in EGT and EPR values. Make a check that the EGT decrease and EPR are in the limits permitted for condition B. If the EPR and EGT decrease are in the limits permitted, do the Bleed Valve Operation - Condition C step.

If there is a decrease in EGT between the EGT limits, but it is less than 10°, this can show that the IP6 RH bleed valves have not closed. Move the thrust lever very slowly (not less than 15 seconds) to approximately 1.4 EPR (See the NOTE 2). Carefully monitor the EGT, and if a decrease of approximately 20°C is seen, it shows the altitude pressure switch is defective in the high altitude mode.

ENGINES POST-RR-SB 75-C796;
If no further decrease in EGT is seen when the thrust lever is advanced to 1.42 EPR it is possible that the P30 control valve or ETPU is defective.

NOTE: If test 4 is necessary, do not operate the engine more than one minute when the thrust lever is moved from condition B to 1.4 EPR and back to condition C. Engine seal damage may occur.

Do not allow the engine to stabilize in the range 1.26 to 1.42 EPR. Fan flutter can occur in this range.

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

S 715-059-R00

(11) Make a check of the Bleed Valve Operation - Condition C.
  (a) Refer to the Bleed Valve Operation Limits - Table 1, Condition C.
    1) Find the range of EPR values at which the IP6 RH and the two LH bleed valves open.

      NOTE: REFER TO THE BLEED VALVE OPERATION LIMITS - TABLE 1 CONDITION C.

  (b) Very slowly (not less than 15 seconds) move the thrust lever rearwards to the Condition C EPR.
    1) Carefully monitor the EGT.
  (c) Stop the thrust lever movement at the Condition C EPR.
  (d) Make a record of the EPR and EGT increase that indicates the IP6 LH and the RH valves have opened.
  (e) Make sure the EPR and EGT increase are in the limits permitted (Refer to Table 1, Condition C).

    NOTE: Because of the switch point tolerance, the operation of the one IP6 LH and the two IP6 RH bleed valves may not occur at the same power condition. Thus, a total rise in EGT given for Condition C may not be seen initially. If this occurs, continue to slowly move the thrust lever rearward until a second increase in EGT is seen, then stop the thrust lever movement. Make a record of the total EGT increase and the EPR values at which they occur. Make a check the EPR and the EGT increase are in the limits permitted for Condition C.

    ENGINES POST-RR-SB 75-0796;
    If there is no second increase in EGT or the increase in EGT is towards the lower limit, it is possible that the P30 control valve or ETPU is defective.

S 715-060-R00

(12) Make a check of the Bleed Valve Operation - Condition D.
  (a) Refer to Bleed Valve Operation Limits - Table 1, Condition D.
    1) Find the range of EPR values at which HP2 bleed valves open.
  (b) Very slowly (not less than 15 seconds) move the thrust lever rearward to Condition D EPR and carefully monitor the EGT.
  (c) Stop the thrust lever movement at the Condition D EPR.
  (d) Make a record of the the EPR and EGT increase that indicates the bleed valve has opened.
  (e) Make sure the EPR and the EGT increase are in the limits permitted (Refer to Table 1, Condition D).

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

S 865-061-R00

(13) Slowly move the thrust lever back to idle.

NOTE: If the bleed valve schedule is not in the limits at any condition checked, do the BVCU BITE procedure.

If you think the altitude pressure switch is defective in the altitude mode, change the altitude pressure switch and do this test again.

If you think the P30 control valve or ETPU are faulty, replace the units and do this test again.

If test No. 11 is necessary, do not do the remaining operations of this test.

S 865-062-R00

CAUTION: IF TEST NO. 4 IS NECESSARY, DO TEST NO. 4 BEFORE THIS TEST IS CONTINUED.

(14) For the left engine, open the overhead panel P11 circuit breaker that follows:
(a) 11L7, LEFT ENGINE IDLE CONTROL

S 865-063-R00

(15) For the right engine, open the overhead panel P11 circuit breaker that follows:
(a) 11L33, RIGHT ENGINE IDLE CONTROL

S 865-064-R00

(16) Let the engine operation become stable for 1 minute.

S 865-065-R00

(17) Set the EPR reference and target bug on the EICAS EPR display to a value that is 0.03 below the minimum rated thrust EPR.

EXAMPLE: Reference value = Minimum rated thrust EPR - 0.03

TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST

S 715-066-R00

CAUTION: YOU MUST DO THE SURGE TOLERANCE TEST IN LESS THAN 30 SECONDS. IF YOU DO NOT DO THE SURGE TOLERANCE TEST IN LESS THAN 30 SECONDS, YOU WILL NOT GET THE CORRECT DATA.

(18) Do the surge tolerance test.
  (a) You must monitor the EPR carefully and not exceed the EPR reference when you move the thrust lever forward.
  (b) Move the thrust lever forward in less than 1 second to the maximum forward position.
  (c) Immediately move the thrust lever rearward.

    NOTE: This will prevent the minimum rated thrust being exceeded.

  (d) Slowly move the thrust lever forward to the minimum rated thrust EPR.
  (e) Move the thrust lever to idle power in less than 1 second.

S 865-067-R00
(19) For left engine, close the panel P11 circuit breaker that follows:
  (a) 11L7, LEFT ENGINE IDLE CONTROL

S 865-068-R00
(20) For right engine, close the panel P11 circuit breaker that follows:
  (a) 11L33, RIGHT ENGINE IDLE CONT

S 865-069-R00
(21) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.

S 865-070-R00
(22) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201), or do the next test.

S 865-071-R00
(23) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

PRESSURE ALTITUDE FEET	-1000	0	1000	2000	3000	4000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.					
0	1.722	1.732	1.742	1.754	1.767	1.782
1	1.722	1.732	1.742	1.754	1.767	1.782
2	1.722	1.732	1.742	1.754	1.768	1.782
3	1.722	1.732	1.742	1.754	1.768	1.782
4	1.722	1.732	1.742	1.754	1.768	1.782
5	1.722	1.732	1.742	1.754	1.768	1.782
6	1.721	1.732	1.742	1.754	1.768	1.782
7	1.722	1.732	1.742	1.754	1.768	1.782
8	1.722	1.732	1.742	1.754	1.768	1.782
9	1.722	1.732	1.742	1.754	1.768	1.782
10	1.722	1.732	1.742	1.754	1.768	1.782
11	1.722	1.732	1.742	1.754	1.768	1.782
12	1.722	1.732	1.742	1.754	1.768	1.782
13	1.722	1.732	1.742	1.754	1.768	1.782
14	1.722	1.732	1.742	1.754	1.768	1.782
15	1.722	1.732	1.742	1.754	1.768	1.782
16	1.722	1.732	1.742	1.754	1.768	1.782
17	1.722	1.732	1.742	1.754	1.768	1.782
18	1.722	1.732	1.742	1.754	1.768	1.782
19	1.722	1.732	1.741	1.754	1.768	1.782
20	1.722	1.732	1.741	1.754	1.768	1.782
21	1.722	1.732	1.741	1.754	1.768	1.781
22	1.722	1.732	1.742	1.754	1.768	1.777
23	1.722	1.732	1.742	1.754	1.767	1.772
24	1.722	1.732	1.742	1.754	1.763	1.767
25	1.722	1.732	1.742	1.754	1.758	1.762
26	1.722	1.732	1.742	1.749	1.753	1.758
27	1.722	1.732	1.741	1.744	1.748	1.753
28	1.721	1.732	1.736	1.740	1.744	1.748
29	1.721	1.731	1.730	1.734	1.739	1.742
30	1.722	1.726	1.724	1.729	1.734	1.737

78058A

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 1)

PRESSURE ALTITUDE FEET	-1000	0	1000	2000	3000	4000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.					
31	1.721	1.720	1.719	1.723	1.728	1.732
32	1.715	1.715	1.714	1.718	1.723	1.727
33	1.710	1.709	1.708	1.712	1.717	1.721
34	1.705	1.704	1.703	1.707	1.712	1.715
35	1.699	1.698	1.697	1.701	1.706	1.708
36	1.694	1.693	1.692	1.696	1.701	1.702
37	1.689	1.688	1.687	1.691	1.696	1.696
38	1.683	1.682	1.681	1.685	1.689	1.689
39	1.677	1.676	1.675	1.679	1.683	1.683
40	1.671	1.670	1.669	1.674	1.677	1.677
41	1.665	1.664	1.663	1.668	1.671	1.671
42	1.659	1.659	1.657	1.662	1.664	1.664
43	1.654	1.653	1.652	1.656	1.658	1.658
44	1.648	1.647	1.646	1.650	1.652	1.652
45	1.642	1.641	1.640	1.645	1.645	1.645
46	1.636	1.635	1.634	1.638	1.639	1.639
47	1.631	1.630	1.629	1.633	1.633	1.633
48	1.625	1.624	1.623	1.627	1.627	1.627
49	1.620	1.619	1.618	1.620	1.621	1.620
50	1.614	1.614	1.613	1.614	1.614	1.614
51	1.608	1.608	1.608	1.608	1.608	1.608
52	1.602	1.602	1.602	1.602	1.602	1.602
53	1.596	1.596	1.595	1.596	1.596	1.596
54	1.589	1.590	1.590	1.590	1.589	1.590
55	1.583	1.583	1.583	1.583	1.583	1.583
56	1.577	1.577	1.577	1.577	1.577	1.577
57	1.571	1.571	1.571	1.571	1.571	1.571
58	1.565	1.565	1.564	1.565	1.565	1.565
59	1.559	1.559	1.559	1.558	1.559	1.559
60	1.552	1.552	1.552	1.552	1.552	1.552

78059A

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 2)

PRESSURE ALTITUDE FEET	5000	6000	7000	8000	9000	10000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.					
0	1.789	1.796	1.802	1.808	1.809	1.810
1	1.789	1.796	1.803	1.808	1.809	1.810
2	1.789	1.795	1.803	1.808	1.809	1.810
3	1.789	1.795	1.803	1.808	1.809	1.810
4	1.789	1.795	1.803	1.808	1.809	1.810
5	1.789	1.795	1.803	1.808	1.809	1.810
6	1.789	1.796	1.803	1.808	1.809	1.810
7	1.789	1.796	1.803	1.808	1.809	1.810
8	1.788	1.796	1.803	1.808	1.809	1.810
9	1.789	1.795	1.803	1.808	1.809	1.810
10	1.788	1.796	1.802	1.808	1.809	1.806
11	1.789	1.796	1.803	1.808	1.809	1.802
12	1.789	1.796	1.803	1.808	1.805	1.798
13	1.789	1.796	1.803	1.808	1.801	1.794
14	1.789	1.796	1.803	1.804	1.797	1.790
15	1.789	1.795	1.803	1.800	1.793	1.786
16	1.789	1.796	1.799	1.796	1.789	1.782
17	1.789	1.796	1.795	1.792	1.785	1.778
18	1.789	1.791	1.791	1.789	1.782	1.773
19	1.788	1.787	1.787	1.785	1.777	1.768
20	1.785	1.784	1.783	1.781	1.773	1.763
21	1.781	1.780	1.779	1.776	1.767	1.758
22	1.776	1.775	1.774	1.772	1.763	1.754
23	1.771	1.770	1.769	1.767	1.758	1.749
24	1.766	1.765	1.765	1.762	1.753	1.744
25	1.761	1.761	1.760	1.757	1.748	1.739
26	1.757	1.756	1.755	1.752	1.743	1.734
27	1.752	1.751	1.750	1.747	1.738	1.729
28	1.747	1.746	1.745	1.742	1.734	1.723
29	1.742	1.742	1.741	1.738	1.728	1.718
30	1.737	1.737	1.736	1.733	1.723	1.712

78060A

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 3)

PRESSURE ALTITUDE FEET	5000	6000	7000	8000	9000	10000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.					
31	1.732	1.731	1.731	1.727	1.717	1.706
32	1.727	1.726	1.725	1.722	1.711	1.701
33	1.721	1.721	1.720	1.716	1.706	1.695
34	1.715	1.715	1.714	1.711	1.700	1.690
35	1.708	1.708	1.708	1.705	1.695	1.685
36	1.702	1.702	1.702	1.700	1.690	1.679
37	1.696	1.696	1.696	1.694	1.684	1.674
38	1.689	1.689	1.689	1.689	1.679	1.667
39	1.683	1.683	1.683	1.683	1.673	1.661
40	1.677	1.677	1.677	1.677	1.667	1.656
41	1.671	1.671	1.671	1.671	1.661	1.650
42	1.664	1.664	1.664	1.664	1.655	1.644
43	1.658	1.658	1.658	1.658	1.649	1.638
44	1.652	1.652	1.652	1.652	1.643	1.632
45	1.645	1.645	1.645	1.646	1.637	1.626
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78061A

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 4)

PRESSURE ALTITUDE FEET	11000	12000	13000	14000	15000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.				
0	1.811	1.813	1.814	1.815	1.816
1	1.811	1.813	1.814	1.815	1.816
2	1.811	1.813	1.814	1.815	1.816
3	1.811	1.813	1.814	1.815	1.816
4	1.811	1.813	1.814	1.815	1.816
5	1.811	1.813	1.814	1.815	1.816
6	1.811	1.813	1.814	1.815	1.813
7	1.811	1.813	1.814	1.815	1.809
8	1.811	1.813	1.814	1.812	1.805
9	1.811	1.813	1.814	1.808	1.801
10	1.809	1.813	1.811	1.804	1.797
11	1.805	1.808	1.807	1.800	1.792
12	1.801	1.804	1.803	1.796	1.789
13	1.797	1.800	1.798	1.794	1.784
14	1.793	1.796	1.794	1.787	1.780
15	1.789	1.792	1.790	1.784	1.776
16	1.785	1.789	1.786	1.780	1.771
17	1.781	1.784	1.783	1.775	1.766
18	1.778	1.780	1.779	1.770	1.761
19	1.773	1.776	1.774	1.765	1.756
20	1.767	1.771	1.769	1.760	1.751
21	1.762	1.766	1.764	1.755	1.746
22	1.758	1.762	1.759	1.750	1.741
23	1.752	1.756	1.754	1.745	1.736
24	1.748	1.752	1.749	1.740	1.731
25	1.743	1.747	1.744	1.735	1.725
26	1.738	1.742	1.739	1.730	1.720
27	1.733	1.737	1.734	1.724	1.714
28	1.728	1.732	1.729	1.719	1.708
29	1.722	1.727	1.724	1.713	1.703
30	1.716	1.721	1.718	1.708	1.697

78062A

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 5)

PRESSURE ALTITUDE FEET	11000	12000	13000	14000	15000
O.A.T. DEG.C.	MINIMUM RATED THRUST E.P.R.				
31	1.711	1.716	1.713	1.702	1.691
32	1.705	1.710	1.707	1.696	1.686
33	1.700	1.704	1.701	1.691	1.680
34	1.694	1.699	1.696	1.685	1.675
35	1.689	1.693	1.690	1.680	1.669
36	1.684	1.688	1.685	1.674	1.663
37	1.678	1.682	1.680	1.668	1.657
38	1.672	1.677	1.674	1.662	1.651
39	1.666	1.671	1.668	1.656	1.645
40	1.660	1.665	1.662	1.650	1.639
41					
42					
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A9239

Minimum Rated Thrust EPR
(No Air Bleed or Power Off-Take)
Figure 502 (Sheet 6)

TEST NO. 4 - ENGINE RUN-IN

TASK 71-00-00-715-072-R00

6. Test No. 4 - Engine Run-In

A. General

(1) This test must be satifactorily completed before all tests of a higher number are done. Refer to the table of test procedures.

(2) You must do the actions that follow with precision:
- thrust lever movements,
- set the engine power (EPR),
- measure the time of stable engine operation.

(a) This is important to give the necessary slow and continuous run-in procedure for the maximum correct fit between parts.

(3) The initial part of this test must be done with only the EEC limiter serviceable. The EEC supervisory function must be off.

(a) Set the EEC to off and the EEC switch lower INOP segment comes on with amber light and the switch upper ON segment will go out.

(b) Set the EEC to on and the EEC switch lower INOP segment amber light will go out and the switch upper ON segment will come on.

B. References

(1) AMM 71-00-00/201, Power Plant

C. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right

D. Do the Test No. 4 - Engine Run-In Procedure.

S 865-073-R00

(1) Supply the external electrical power (AMM 24-22-00/201).

S 865-074-R00

(2) Push the L or R ENG EEC switch to turn the EEC supervisory function off.

S 865-076-R00

CAUTION: ALL THRUST LEVER MOVEMENTS DURING THIS TEST ARE TO BE DONE IN A MINIMUM OF 15 SECONDS.

(3) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

TEST NO. 4 - ENGINE RUN-IN

S 865-077-R00

(4) Remove the electrical load from the IDG and the bleed air from the engine.
   (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
   (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 865-078-R00

(5) For the left engine, open this circuit breaker on the overhead panel P11:
   (a) 11L7, LEFT ENGINE IDLE CONTROL

S 865-079-R00

(6) For the right engine, open this circuit breaker on the overhead panel P11:
   (a) 11L33, RIGHT ENGINE IDLE CONT

S 715-080-R00

(7) Do the engine run-in test.
   (a) Make sure the engine speed increases to high idle power.
   (b) Let the engine operation become stable at high idle power for 5 minutes.
   (c) Move the thrust lever forward (15 second thrust lever movement).
   (d) Carefully monitor the EGT and EPR.
   (e) Stop the thrust lever movement when the EGT is 725 to 735° C or the EPR is 1.68.
   (f) Let the engine operation become stable for 1 minute.
   (g) Move the thrust lever rearward (15 second thrust lever movement) to high idle power.
   (h) Let the engine operation become stable for 1.5 minutes.
   (i) Move the thrust lever forward (15 second thrust lever movement).
   (j) Carefully monitor the EGT and EPR.
   (k) Stop the thrust lever movement when the EGT is 725 to 735° C or the EPR is 1.68.
   (l) Let the engine operation become stable for 1.5 minutes.
   (m) Move the thrust lever rearward to get an EPR of 1.52.
   (n) Let the engine operation become stable for 5 minutes.
   (o) Move the thrust lever rearward to get an EPR of 1.42.
   (p) Let the engine operation become stable for 5 minutes.
   (q) Move the thrust lever rearward to get an EPR of 1.23.
   (r) Let the engine operation become stable for 2 minutes.
   (s) Move the thrust lever rearward to high idle power.
   (t) Let the engine operation become stable for 5 minutes.

TEST NO. 4 - ENGINE RUN-IN

S 865-081-R00
(8) For the left engine, close this circuit breaker:
(a) 11L7, LEFT ENGINE IDLE CONTROL

S 865-082-R00
(9) For the right engine, close this circuit breaker:
(a) 11L33, RIGHT ENGINE IDLE CONT

S 865-083-R00
(10) Make sure the engine speed decreases to idle.
(a) Let the engine operation become stable for 5 minutes.

S 865-084-R00
(11) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
(a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
(b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.

E. Put the airplane back to it's usual condition.

S 865-085-R00
(1) Push the L or R ENG EEC switch to turn the EEC supervisory function on.

S 865-087-R00
(2) Do the next test or do the Power Plant (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).

S 865-088-R00
(3) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TEST NO. 5 - PERFORMANCE

TASK 71-00-00-715-089-R00

7. Test No. 5 - Performance

A. General

(1) You can use this procedure as a functional test to find the general condition of the engine. The test shows that the engine can give the necessary take-off power inside the EGT and shaft speed limits during a full rated take-off on a hot day.

(2) The Performance test is not usually sufficiently stable to accurately calculate the health of the engine. Do not use only the Performance test to accept or reject an engine. You can get a better performance analysis if you operate the engine on a test cell or monitor the on-wing performance of the engine together with Test 13, Take-off Power.

B. References

(1) AMM 71-00-00/201, Power Plant

C. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right

D. Do the Test No. 5 - Engine Performance Test

S 975-090-R00

(1) Get the outside air temperature (O.A.T.) and the pressure altitude.

(a) Set the datum pressure on the altimeter at 1013 mb, the pressure indicated is the pressure altitude.

(b) Make a record of these values.

S 975-091-R00

(2) Use the O.A.T. and pressure altitude to find the minimum rated thrust EPR (Fig. 502).

S 975-093-R00

(3) Make a record of the four incremental EPR values that follow:

(a) 1.5 EPR

(b) Two equal spaced EPR values between the minimum rated thrust EPR and 1.5 EPR.

(c) Minimum rated thrust EPR

TEST NO. 5 - PERFORMANCE

EXAMPLE: Outside Air Temperature: 32°C
Pressure Altitude: 1000 feet
Minimum Rated Thrust EPR = 1.714
First EPR Check Point: 1.5

EPR difference: 1.714 - 1.5 = 0.214

Calculate the Increments: $\frac{0.214}{3} = 0.07133$

Calculate the EPR Check Points
- First Point = 1.50
- Second Point = 1.5 + 0.07133 = 1.57133
- Third Point = 1.5 + 0.07133 + 0.07133 = 1.64266
- Fourth Point = 1.5 + 0.07133 + 0.07133 + 0.07133 = 1.71399

Roundoff the EPR Check Points for the EICAS Display

First Point	1.500
Second Point	1.571
Third Point	1.642
Fourth Point	1.714

S 865-094-R00

(4) Supply the external electrical power (AMM 24-22-00/201).

S 865-095-R00

(5) Do the Power Plant (Normal) procedure to start the engine (AMM 71-00-00/201).

S 865-479-R00

(6) Make sure the display control switch on the standby engine indicator located on panel P1 is set to AUTO.

S 865-096-R00

(7) Remove the electrical load from the IDG and the bleed air from the engine.
- (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
- (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 865-097-R00

(8) Let the engine operation become stable at idle power for 5 minutes.

S 715-098-R00

(9) Do the engine performance test.

(a) Slowly move the thrust lever forward until the bleed valves are closed and in the limits.

NOTE: Refer to Test No.3, Bleed Valve Operation Limits - Table 1 to find the EPR limits to close the bleed valves.

(b) Make a record of the engine operation parameters at each of the four incremental EPR values.

1) Move the thrust lever forward to the first EPR value.
2) Let the engine operation become stable for 4 minutes at each of the four incremental EPR values.
3) Make a record of the values that follow at each of the four incremental EPR values.
4) Push the event record button on the EICAS panel to make a record for the values that follow:
   a) EPR
   b) N1%
   c) N2%
   d) N3%
   e) EGT
   f) Oil inlet temperature
   g) Oil differential pressure
   h) Vibration
5) Move the thrust lever forward to the next EPR value.
6) Let the engine operation become stable for 4 minutes.
7) Make a record of the engine operation parameters for the next EPR value.
8) Make a record on paper of the engine operation parameters before you use the event record button again.
9) Do these steps again until you have made a record of the engine operation parameters for all the EPR values.

(c) Slowly move the thrust lever rearward to idle.

(d) Monitor the slow and continuous power decrease and periods of stable engine operation.

(e) Find the corrected values for N1%, N2%, N3%, and EGT (Fig. 522, 523, and 524).

1) Use the outside air temperature (O.A.T.) and the actual N1%, N2%, N3%, and EGT values.

(f) Make a graph of the corrected N1%, N2%, N3% and EGT values against the EPR values (Fig. 503, 504, 505, and 506).

1) Find the maximum acceptance lines (Fig. 503, 504, 505 and 506).
2) Make sure the graph points are not more than the MAX. ACCEPTANCE lines.

TEST NO. 5 - PERFORMANCE

3) If the graph point is more than the MAX. ACCEPTANCE line, do the Fault Isolation procedure (FIM 71-05-00/101).

(g) If the oil temperature, the oil pressure, or the vibration values are more than the limits (AMM 71-00-00/201), do the applicable Fault Isolation procedures (FIM 79-34-00/101, FIM 79-32-00/101 or FIM 71-05-00/101).

(h) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.

1) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.

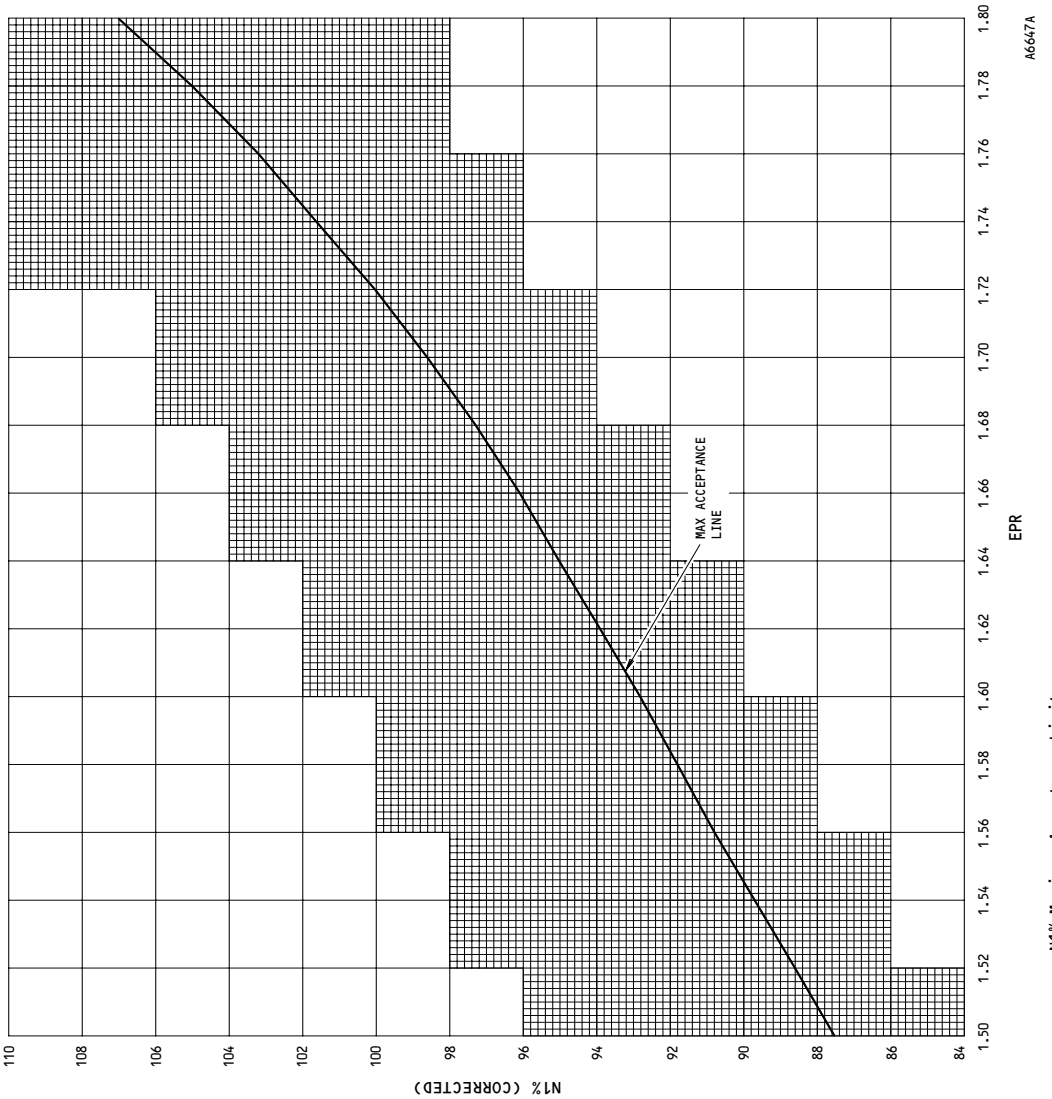
2) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.

S 865-099-R00

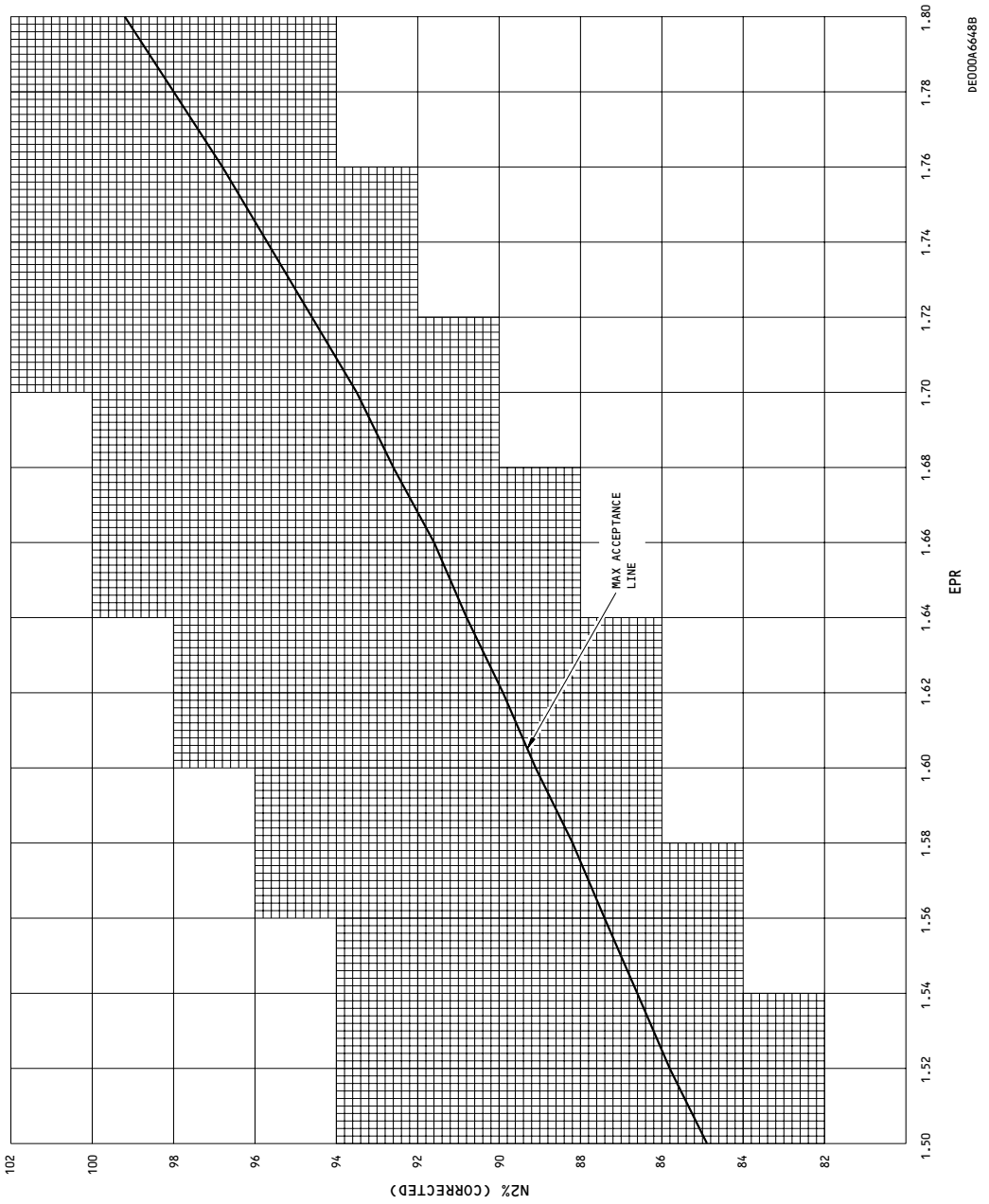
(10) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201), or do the test that follows.

S 865-100-R00

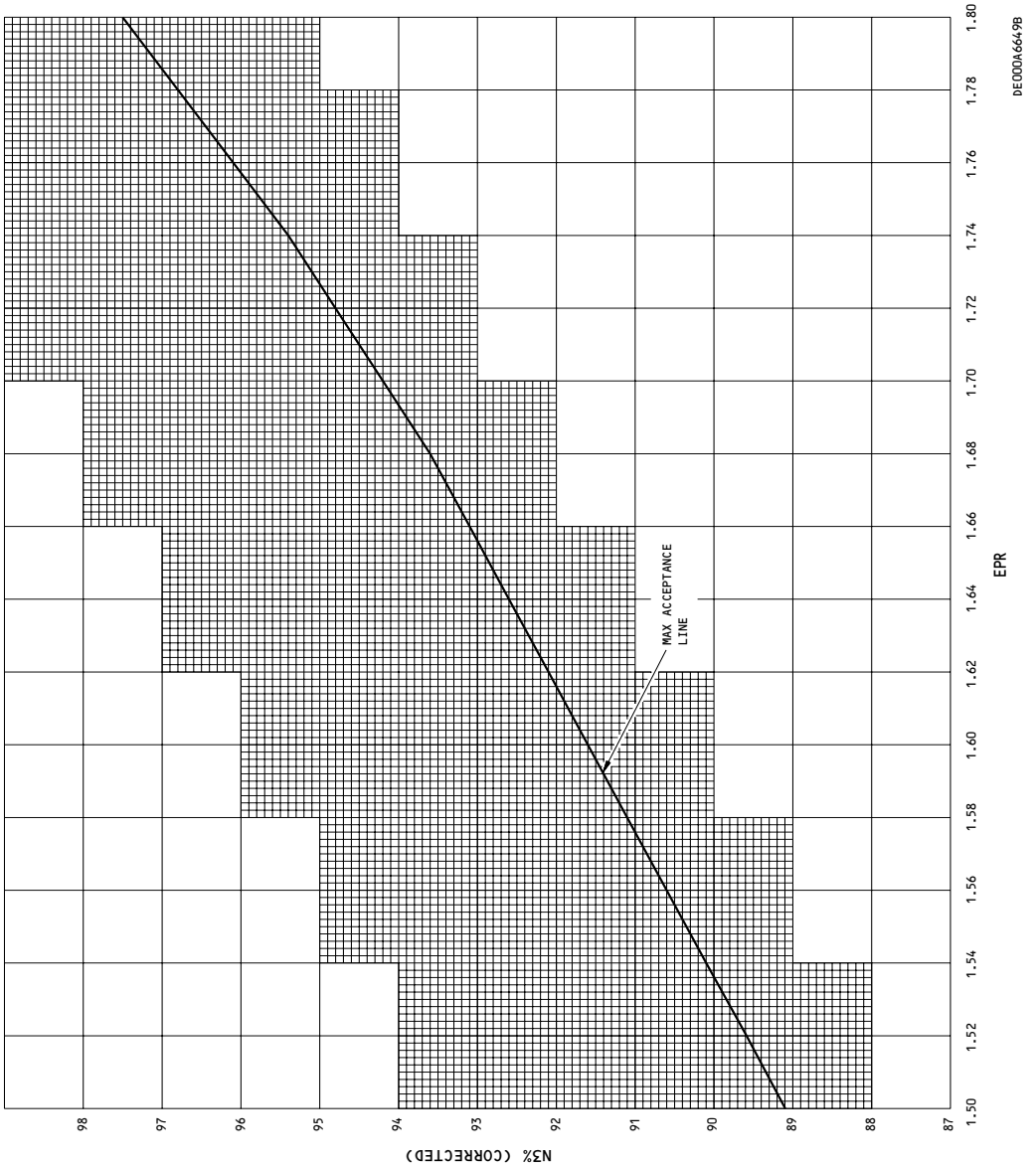
(11) Remove the electrical power if it is not necessary (AMM 24-22-00/201).



N1% Maximum Acceptance Limits
(No Air Bleed or Power Off-Takes)
Figure 503

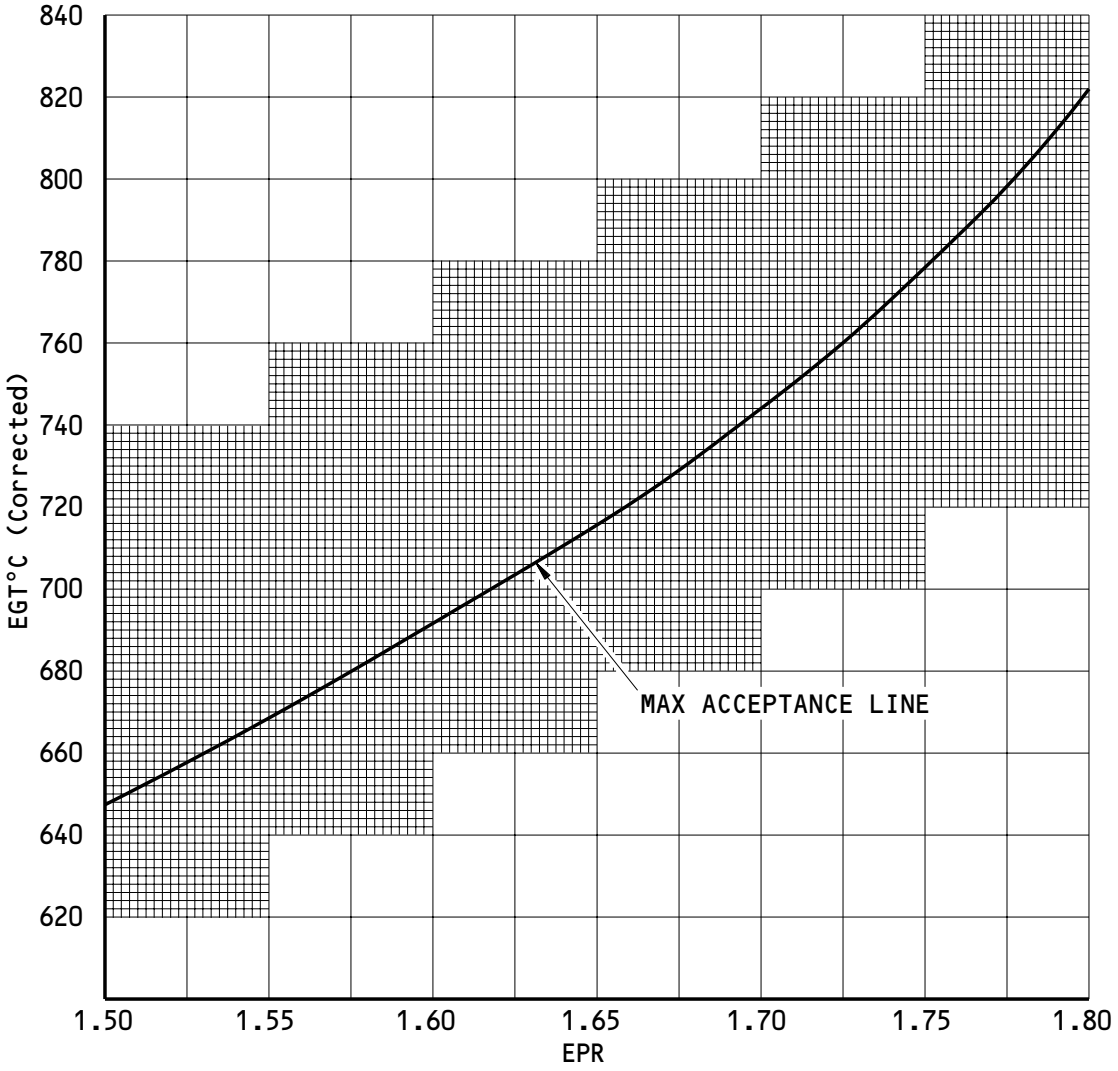


N2% Maximum Acceptance Limits
(No Air Bleed or Power Off-Takes)
Figure 504



N3% Maximum Acceptance Limits
(No Air Bleed or Power Off-Takes)
Figure 505

188218



C6684

EGT Maximum Acceptance Limits (No Air Bleed or Power Off-Takes)
Figure 506

TEST NO. 6 - VIBRATION SURVEY

TASK 71-00-00-715-327-R00

8. Test No. 6 - Vibration Survey

A. General

(1) The vibration survey first records the EPR for each of the highest rotor vibrations while slowly moving the thrust lever forward to the minimum rated EPR. Then, while moving the thrust lever aft to each of the recorded EPRs, make a record of the highest rotor vibrations.

B. References

(1) AMM 71-00-00/201, Power Plant
(2) AMM 72-31-13/401, LP Compressor Rotor Blades
(3) AMM 75-32-00/201, Compressor Bleed Control System

C. Access

(1) Location Zones
    210 Control Cabin
    410 Power Plant Nacelle Left
    420 Power Plant Nacelle Right

D. Test No. 6 - Vibration Survey Test

S 865-597-R00

(1) Do this task: Put the Annulus Sealing Strips in the Correct Position (AMM 72-31-13/401).

S 975-101-R00

(2) Use the outside ambient temperature (O.A.T.) and the pressure altitude to find the EPR for the minimum rated thrust (Fig. 502).

S 865-328-R00

(3) Prepare the EICAS for this test.
    (a) Set the EPR bug on the EPR analog gage to the minimum rated thrust EPR.
        1) Use the manual thrust reference selector on the EICAS forward electronic panel.
    (b) Push the button on the EICAS accessory panel on the P61 panel for the PERF/APU page.

NOTE: You can see the N1, N2, N3 tracked vibration and the broadband (BB) vibration on the lower EICAS display with the PERF/APU page.

TEST NO. 6 - VIBRATION SURVEY

S 865-102-R00
(4) Supply the external electrical power (AMM 24-22-00/201).

S 865-103-R00
(5) Do the Power Plant (Normal) procedure to start the engine (AMM 71-00-00/201).

S 865-330-R00
(6) Remove the electrical load from the IDG and the bleed air from the engine.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 715-104-R00
(7) Do the vibration survey test.
  (a) Let the engine operation become stable at idle power for 5 minutes.
  (b) Slowly move the thrust lever forward to the EPR for the minimum rated thrust.
    1) Monitor the EICAS PERF/APU page for the N1 tracked vibration, N2 tracked vibration, N3 tracked vibration, the associated EPR values, and the broadband vibration.
      a) Make a record of the EPR value for each of the highest N1 tracked vibration, N2 tracked vibration, and N3 tracked vibration that occurs.

        NOTE: It is possible that the peak vibration for each rotor occurs at different levels.

  (c) Slowly move the thrust lever rearward to the EPR value for each high vibration that was seen.
    1) Make a record this data:
      a) The N1 tracked vibration, N2 tracked vibration, and N3 tracked vibration.

        NOTE: The maximum tracked vibration that is permitted is 2.5 units.

TEST NO. 6 - VIBRATION SURVEY

b) The N1, N2, and N3 rotor speed.
c) The broadband vibration.

NOTE: The maximum broadband vibration that is permitted is 2.5

NOTE: It is recommended that you decrease any N1 tracked vibration that is above 1.5 units with a fan trim balance, Test No. 7, when it can be scheduled.

ROTOR	EPR	TRACKED VIBRATION	ROTOR SPEED
N1			
N2			
N3			
BROADBAND VIBRATION AND EPR			

(d) Move the thrust lever rearward to idle power.
(e) Let the engine operation become stable for 5 minutes.
(f) Put the airplane back to the usual condition.

S 865-119-R00

(8) Put the airplane back to the usual condition.
(a) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
1) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
2) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.
(b) Let the engine operation become stable for 5 minutes.

S 865-121-R00

(9) Do the Power Plant (Normal) procedure to do the engine shutdown (AMM 71-00-00/201), or do Test No. 7 - Fan Trim Balance.

TEST NO. 6 - VIBRATION SURVEY

S 745-125-R00
(10) Do the Interrogate the Bleed Valve Control Unit (BVCU) procedure (AMM 75-32-00/201).

S 865-126-R00
(11) Remove the electrical supply if it is not necessary (AMM 24-22-00/201).

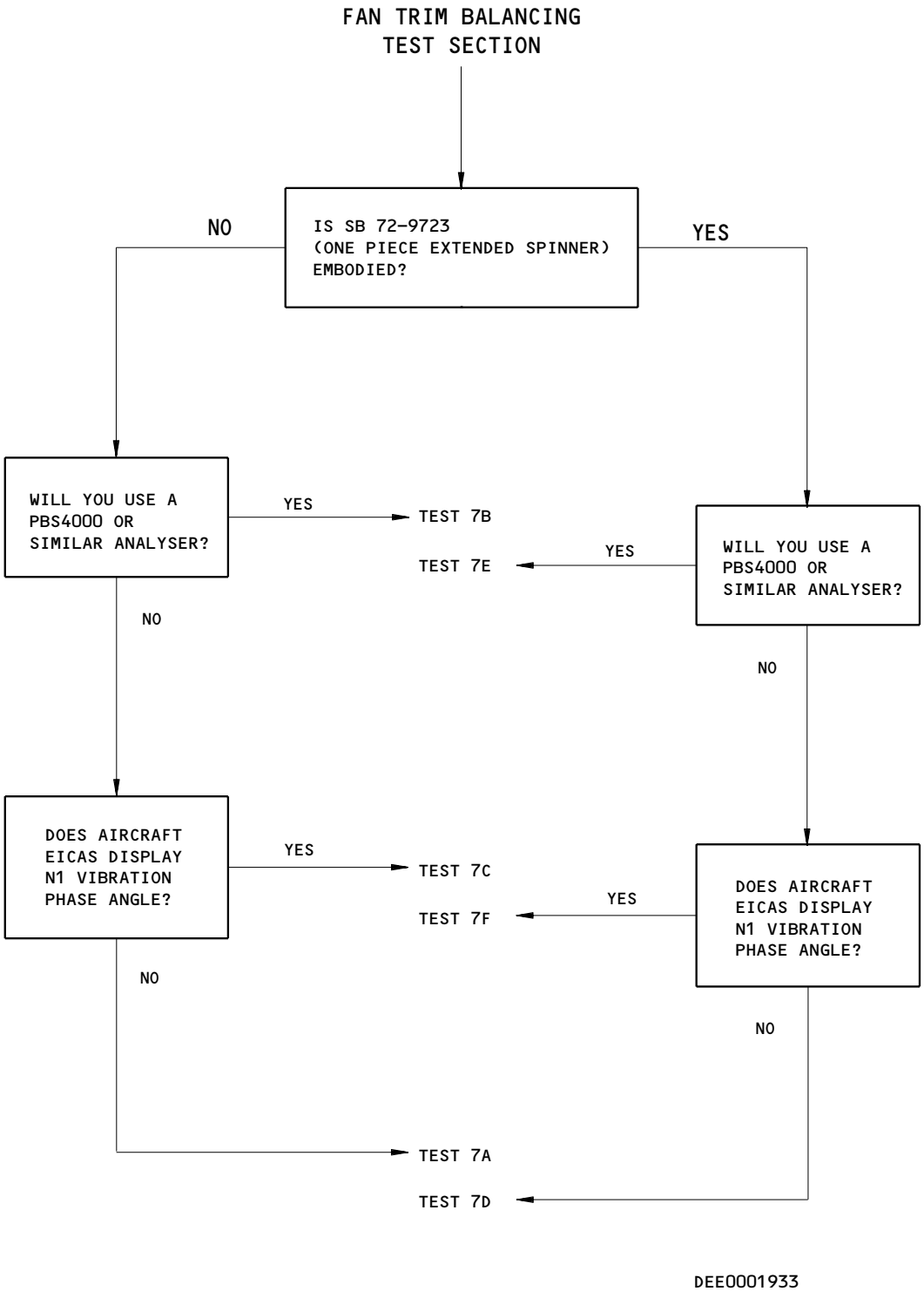
TEST NO. 7 - FAN TRIM BALANCE

TASK 71-00-00-705-444-R00

9. Test No. 7 - Fan Trim Balance
   A. General
      (1) There are different modification standards of the LP Compressor (Fan). The procedure that you use must agree with the modfication standard of the fan.
      (2) There are also different procedures that you can use for a specified modification standard. You can use any of these procedures, if you have the specified equipment that the procedure uses.
      (3) The procedures are:
         (a) Test 7B Pre S.B. 72-9723: Phase angle method using PBS 4000 or similar.
         (b) Test 7C Pre S.B. 72-9723: Phase angle method using the aircraft AVM system.
         (c) Test 7D S.B. 72-9723: 3 Trial Weight Method.
         (d) Test 7E S.B. 72-9723: Phase angle method using 4000 or similar.
         (e) Test 7F S.B. 72-9723: Phase angle method using the aircraft AVM system.

TASK 71-00-00-705-445-R00

10. Test No. 7A - Fan Trim Balance (Pre S.B. 72-9723 3 trial weight method)
   A. General
      (1) Do this test if the N1 vibration is above 1.0 unit at any power or flight condition.
      (2) Before you do this test, make sure the annulus filler seals are in the correct position (AMM 72-31-13/401).
   B. References
      (1) AMM 70-51-00/201, Torque tightening techniques
      (2) AMM 71-00-00/201, Power Plant
      (3) AMM 72-31-10/401, L.P. Compressor Disc and Blades



Trim Balance – Test Flow Chart
Figure 507

TEST NO. 7 - FAN TRIM BALANCE

(4) AMM 72-31-13/401, L.P. Compressor Rotor Blades
(5) AMM 72-35-01/401, L.P. Compressor Inlet Rotating Fairing

C. Equipment
(1) Marker Felt or Fiber tip OMat No. 262
(2) Personal computer with Microsoft Excel version 5 or later.
(3) Rolls-Royce trim balance spread sheets for Excel. These are available on a 3.5 in. diskette from Rolls-Royce Technical Publications.

D. Consumable Materials

(1) Description	R.R. Part No.	No. Required
Balance Plate (Single bolt hole)	UL26757	8 maximum
Washer	LK46713	1 per balance plate
Bolt	AS21512	1 per balance plate

E. Procedure

S 215-154-R00
(1) Make sure the aircraft vibration system is serviceable and no faults are listed.

S 725-487-R00
(2) Weigh a bolt, washer and balance plate. Cut or file the plate to reduce the combined weight to 35 ± 5 grams (1.05 to 1.41 oz.). Identify this plate as your "Trial Weight" and fasten the bolt and washer to it. Keep it for use later in the procedure.

NOTE: You are permitted to use an un-cut single hole plate, bolt and washer (total weight 57 grams (2 oz.) as your "Trial Weight" but this may limit the speeds you can get during the trial runs.

S 715-486-R00
(3) Engine Operation for the Initial Vibration Run
(a) Start the engine (AMM 71-00-00/201).

TEST NO. 7 - FAN TRIM BALANCE

(b) Let the engine become stable at idle for 5 minutes.

NOTE: During the first ground run you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever again to get an N1 indication of 92% ± 0.25 (SPEED 1). Record the N1 speed and N1 vibration level.
(d) Slowly move the thrust lever back to get a N1 indication of 87% ± 0.25 (SPEED 2). Record the N1 speed and N1 vibration level.
(e) Slowly move the thrust lever back to get a N1 indication of 82% ± 0.25 (SPEED 3). Record the N1 speed and N1 vibration level.
(f) Slowly move the thrust lever back to get a N1 indication of 75% ± 0.25 (SPEED 4). Record the N1 speed and N1 vibration level.

NOTE: Use four different SPEEDS if you cannot get the above speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration level is at its maximum.

(g) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(h) Stop the engine.

S 425-485-R00

(4) Prepare to install the Trial Weight on the Balance Flange
(a) Mark the nose cone fairing and L.P. compressor rotor spinner with the marker pen to show the initial installed position.
(b) Remove the nose cone fairing and spinner.
(c) Identify three equally spaced holes on the drive cone (inner) balance flange (25 bolt holes) where the 'Trial Weight' can be installed (Fig. 510). Count one of these holes as 1 and count around counter-clockwise to check that holes 9 and 18 are vacant. Make temporary marks 'A', 'B' and 'C' at these holes. Do not number them.

NOTE: Do not use the outer balance flange (36 holes). This is used for shop balance. Its weights must not be disturbed.

(d) Starting from the permanently marked holes 1, 2 and 3, number all the holes counter clockwise 1 to 25.
(e) Record the number of the hole marked 'A' as the hole at which you will install the 'Trial Weight' for the first trial run.

TEST NO. 7 - FAN TRIM BALANCE

(f) Record the number of the hole marked 'B' as the hole at which you will install the 'Trial Weight' for the second trial run.
(g) Record the number of the hole marked 'C' as the hole at which you will install the "Trial Weight" for the third trial run.

NOTE: If there are so many weights on the balance flange that 3 equally spaced holes are not available, you must do a fan blade root re-lubrication procedure (AMM 72-31-13 para 2) before doing the trim balance. This will remove all the weights from the flange.

S 425-484-R00

(5) Install the trial weight for the First Trial Run
(a) Install the trial weight at the first trial run position.
(b) Secure it with the washer and bolt and torque to standard load (AMM 70-51-00/201).
(c) Install the nose cone fairing and spinner to their initial position.

S 725-488-R00

(6) Engine operation for the First Trial Run
(a) Start the engine (AMM 71-00-00/201).
(b) Let it stabilize at idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get an N1 indication of SPEED 1 ± 0.25%. Record the N1 vibration level.
(d) Slowly move the thrust lever to get an N1 indication of SPEED 2 ± 0.25%. Record the N1 speed and the N1 vibration level.
(e) Slowly move the thrust lever to get an N1 indication of SPEED 3 ± 0.25%. Record the N1 speed and the N1 vibration level.
(f) Slowly move the thrust lever to get an N1 indication of SPEED 4 ± 0.25%. Record the N1 speed and the N1 vibration level.

NOTE: High vibration or other operating limits stop you from getting SPEED 1, 2, 3 or 4. Get as many SPEEDS as possible.

(g) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(h) Stop the engine.

TEST NO. 7 - FAN TRIM BALANCE

S 425-491-R00

(7) Install Trial Weight for the Second Trial Run
  (a) Remove nose cone fairing and spinner.
  (b) Remove the 'Trial Weight' and re-install it at the hole you marked 'B' (the second trial run number).
  (c) Secure it with the washer and bolt and torque the bolt to the standard load (AMM 70-51-00/201).
  (d) Install the nose cone and spinner in their initial positions.

S 725-490-R00

(8) Engine operation for the Second Trial Run
  (a) Repeat paragraphs (6) (a) to (6) (h).

S 425-492-R00

(9) Install trial weight for the Third Trial Run
  (a) Remove the nose cone and spinner.
  (b) Remove the 'Trial Weight' and re-install it at the hole you marked 'C' (the third trial run hole number).
  (c) Secure it with the washer and bolt and torque the bolt to the standard load (AMM 70-51-00/201).
  (d) Install the nose cone and spinner in their initial positions.

S 725-493-R00

(10) Engine operation for the Third Trial Run
  (a) Repeat paragraphs (6) (a) and (6) (h).

S 475-494-R00

(11) Input data into the Rolls-Royce 3-Weight Trim Balance spread sheet using a personal computer:
  (a) Engine number
  (b) Date
  (c) The number of bolt holes in the trim balance flange (25 holes for pre S.B. 72-9723).
  (d) The vibration levels recorded for SPEEDS 1 to 4 on the Initial Vibration run (notrail weight fitted).
  (e) The hole number at which you fitted the "Trial Weight" for the First Trial run. The spread sheet will show the hole numbers at which the "Trial Weight" must be installed for the second and third runs. These will not be whole numbers. (e.g. 9.33 = 9, 17.67 = 18). Check that these are the holes you marked 'B' and 'C'.
  (f) The weight of the 'Trial Weight' and its units, grams or ounces.
  (g) The vibration data you recorded for the three trial weight runs. Leave the input cell blank for any SPEED that you were not able to get.

TEST NO. 7 - FAN TRIM BALANCE

(h) Alternatively, if the spread sheet is not available, use the Trim Balance Worksheet in Test 7 section H. Number the bolt holes on the sheet anti-clockwise starting with the first run hole number at 'A'. Holes at 'B' and 'C' must be used for the second and third runs. Check that these hole numbers agree with your marks on the flange. Record the weight of the 'Trial Weight' and its units, grams or ounces.

S 975-495-R00

(12) Calculate the Correction Weight

(a) The spread sheet now shows the correction weight calculated for each SPEED for which you inputted complete data, and the average of these correction weights. You may delete data for a speed if you think it disagrees with the other SPEEDS.

(b) The correction weight required to achieve balance is shown in the AVERAGE box.

(c) If the spread sheet is not available, you must evaluate the correction weight by the graphical method given in Test 7 section H.

S 425-496-R00

(13) Install Correction Weight

(a) Remove the nose cone fairing and spinner

(b) Remove the trial weight

(c) If there are existing weights on the flange, these can be combined with the correction weight by inputting them into the 3 weight spread sheet. Any existing weights that hve been cut or filed must be weighed individually with their bolts and washers. The spreadsheet will show the correction weight necessary on an empty flange. Let the engine become stable for five minutes.

(d) You get the correction weight by installing several weights positioned to get the necessary vector sum. A single hole weight (UL26757) complete with washer (LK46713) and bolt (AS21512) weighs 57.3 gm. (2.02 oz.). Stop the engine (AMM 71-00-00/201).

(e) Fig. 512 shows the summed weight of pairs of single bolt weights. Use pairs of weights in preference to cutting or filing balance plates.

(f) If other weight combinations are required use the Rolls-Royce Flange Weight Vector Sum spread sheet to calculate their sum.

(g) Select holes at which to fit weights so that their vector sum is within ±9 gm (0. 3 oz.) of the correction weight shown by the spread sheet and aligns to within ±0.5 of the bolt hole shown by the spread sheet.

(h) Alternatively, if the spread sheet is not available, use Fig. 512 to select weights to give the correction weight W at hole H. Cut or file weights if necessary.

(i) Install weights in the holes you have selected.

TEST NO. 7 - FAN TRIM BALANCE

(j) Torque the bolts to the standard load (AMM 70-51-00/201).
(k) Install the nose cone fairing and spinner in their initial positions.

S 715-497-R00

(14) Check N1 Vibration Level
(a) Start engine and let it become stable at idle for 5 minutes.
(b) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration level is satisfactory.
(c) Idle the engine for 1 minute and stop the engine.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13, para 2) and repeat the trim balance as necessary.

TASK 71-00-00-705-127-R00

11. Test No. 7B - Fan Trim Balance (Pre S.B. 72-9723) Phase Angle Method using PBS 4000 or similar

A. General
(1) This test contains the procedure for carrying out the L.P. compressor rotor trim balance using the M.T.I. PBS 4000/4100 portable analyser.
(2) The 'Influence Coefficient' method (paragraph (6)) is an alternative short method which can be used if the coefficients from at least three previous trim balance tests are stored in the PBS 4000/4100 analyser. The engines previously trim balanced must be the same type and mark as the engine on test and all must be pre S.B. 72-9723 standard.
(3) Do not move the weights on the 36 hole balance flange.
(4) Do this test if the N1 vibration level is above 1.0 unit at any power or flight condition.

B. References
(1) AMM 70-51-00/201, Torque Tightening Techniques

TEST NO. 7 - FAN TRIM BALANCE

(2) AMM 71-00-00/201, Power Plant
(3) AMM 72-31-10/401, L.P. Compressor Rotor Disc and Blades
(4) AMM 72-31-13/401, L.P. Compressor Rotor Blades
(5) AMM 72-35-01/401, L.P. Compressor Inlet Rotating
(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 70-50-02/201, Connection of Electrical Plugs.

C. Equipment
(1) Mechanical Technology Inc. (M.T.I.) Trim Balance Computer PSB 4000/4100-UPK71-96
(2) The applicable Cable Harness Assembly Set-UPK72-23
(3) Charge Amplifier
(4) Engine Balance Software Disc (PBS 4000 only)
(5) Marker - Felt or Fiber Tip, OMat 262

D. Consumable Materials

(1) Description	R.R. Part No.	No. Required
Balance Plate (Single bolt hole)	UL26757	8 maximum
Washer	LK46713	1 per balance plate
Bolt	AS21512	1 per balance plate

E. Procedure

S 215-131-R00
(1) Make sure the aircraft vibration system is serviceable and no faults are listed.

S 225-498-R00
(2) Weigh a bolt, washer and balance weight. Cut or file the plate to reduce the combined weight to 35 ±5 grams (1.05 to 1.41 oz.). Identify this plate as your 'Trial Weight' and fasten bolt and washer to it. Keep it for use later in the procedure.

NOTE: You are permitted to use an uncut single hole plate, bolt or washer (total weight 57 gm (2 oz.)) as your 'Trial Weight', but this may limit the speeds you can get during the trial runs.

TEST NO. 7 - FAN TRIM BALANCE

S 415-499-R00

(3) Install the test equipment
  (a) Open the right hand Fan Cowl Panel (AMM 71-11-04/201).
  (b) For the left engine open circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag (11K2, L Vib monitor)
  (c) For the right engine open circuit breaker on the overhead panel P11 and attach a DO-NOT-CLOSE tag (11K28, R Vib Monitor)
  (d) Remove the forward strut fairing
  (e) Put the charge amplifier on the L.P. compressor case.

    NOTE: This will let you connect the electrical connectors.

  (f) Disconnect the engine electrical connector, plug F (D1012P) (Fig. 508) from the electrical connector panel in front of the strut.
  (g) Connect the electrical connector for the vibration signal to the engine electrical connector, plug F (D1012P)

    NOTE: This is also known as the connector for the vibration harness interface.

  (h) Connect the electrical connector for the L.P. speed/once per rev signal to the modular terminal block (Fig. 508).
  (i) Push the test wires through the engine oil fill and blow-off door.

    NOTE: This will let you close the cowl panel.

  (j) Connect the PBS 4000/4100 analyser to the test wires.
  (k) Operate the PBS 4000/4100 analyser.

  CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

  (l) Close the right fan cowl panel (AMM 71-11-04/201).

TEST NO. 7 - FAN TRIM BALANCE

S 865-413-R00

(4) Engine operation for the initial vibration run

(a) Start the engine (AMM 71-00-00/201).

1) Let the engine become stable at idle for five minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(b) Slowly move the thrust lever to get a N1 indication of 92% ±0.25 per cent (SPEED). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 alayser.

(c) Slowly move the thrust lever back to get a N1 indication of 87% ±0.25 per cent (SPEED 2). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

(d) Slowly move the thrust lever back to get a N1 indication of 82% ±0.25 per cent (SPEED 3). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 anlayser.

(e) Slowly move the thrust lever back to get a N1 indication of 75% ±0.25 per cent (SPEED 4). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: Use four different SPEEDS if you cannot get the above speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(f) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.

(g) Stop the engine.

S 485-512-R00

(5) Install a trial weight

(a) Mark the nose cone fairing and L.P. compressor rotor spinner with the marker pen to show their initial installed position.

(b) Remove the nose cone fairing and spinner.

TEST NO. 7 - FAN TRIM BALANCE

(c) Install the trial weight, bolt (AS21512) and washer (LK47713) on the drive cone (inner) balance flange (25 bolt holes) at an empty position (Fig. 510). Torque the bolt to standard load, (AMM 70-51-00/201).
(d) Temporarily mark the hole at which you fitted the Trial Weight as hole No. 1.
(e) Install the nose cone fairing and spinner in their initial positions.
(f) Input the trial weight and position in the PBS 4000/4100 analyser.

S 715-513-R00

(6) Engine Operation for the Trial Weight run.
(a) Start the engine (AMM 71-00-00/201)
(b) Let the engine become stable for 5 minutes.
(c) Repeat paragraphs (4) (c) to (4) (f)

NOTE: If a high vibration or operating level occurs at any speed 1 to 4, do not use that speed. Run as many speeds as possible.

(d) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(e) Stop the engine

S 415-514-R00

(7) Install the Correction Weight
(a) Remove the nose cone fairing, spinner and trial weight
(b) Calculate the correct weight(s) and hole position(s) on the PBS 4000/4100 analyser.

NOTE: The position of the weights must be numbered from the hole temporarily marked No. 1 in paragraph (5), in the direction given by the analyser.

(c) Install the correction weight(s) at the hole position (or positions) given by the PBS 4000/4100 analyser. Retain by bolts (AS21512) and washers (LK46713). Torque the bolts to standard load (AMM 70-51-00/201).
(d) If there are existing weights on the flange, these can be combined with the correction weight(s) by inputting them into the analyser. Any existing weights that have been cut or filed must be weighed individually with their bolts and washers. The analyser will show the correction weight(s) necessary on an empty flange.
(e) Install the nose cone fairing and spinner in their initial postion.

TEST NO. 7 - FAN TRIM BALANCE

S 725-515-R00

(8) Check N1 vibration level

(a) Start engine and let it become stable at idle for 5 minutes.

(b) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration level is satisfactory.

(c) Idle the engine for 1 minute and stop the engine.

NOTE: If the vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13) and repeat the trim balance as necessary.

F. Alternative Test Procedure (Influence Coefficient Method)

S 735-516-R00

(1) Make sure the aircraft vibration system is serviceable and no faults are listed.

S 485-517-R00

(2) Install the test equipment as instructed in (5) (b).

S 715-518-R00

(3) Engine operation for the initial vibration run

(a) Start the engine (AMM 71-00-00/201).

(b) Let it stabilize at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get an N1 indicaton of 92 ±0.25 per cent (SPEED 1). Record the N1 speed. Record the vibration level and phase angle. Recordvibration on the PBS 4000/4100 analyser.

(d) Slowly move the thrust lever to get an N1 indicaton of 87 ±0.25 per cent (SPEED 2). Record the N1 speed. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

(e) Slowly move the thrust lever to get an N1 indicaton of 82 ±0.25 per cent (SPEED 3). Record the N1 speed. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

TEST NO. 7 - FAN TRIM BALANCE

(f) Slowly move the thrust lever to get an N1 indicaton of 75 ±0.25 per cent (SPEED 4). Record the N1 speed. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: Use four different SPEEDS if you cannot get the speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(g) Slowly move the thrust lever back to the Idle position and let the engine become stable for 1 minute.
(h) Stop the engine.

S 425-519-R00
(4) Install the Correction Weight
(a) Remove the nose cone fairing and spinner and remove the Trial Weight.
(b) Identify the asterisk on the weight carrier ring, Fig. 510. This asterisk marks the offset dowel hole.
(c) Identify the first bolt head counter-clockwise (4.5 degrees) from the dowel hole. This aligns with the once-per-rev tooth on the fan shaft.
(d) Identify the hole on the drive cone balance flange that aligns with this bolt head. Mark this hole as No. 1.
(e) Calculate the correction weight(s) and hole position(s) on the PBS 4000/4100 analyser.

NOTE: The position of the weights must be numbered from the hole marked No. 1, in a direction given by the analyser.

(f) Install the correction weight(s) at the hole position(s) given by the PBS 4000/4100 analyser. Retain by bolts (AS21512) and washers (LK46713). Torque the bolts to standard load (AMM 70-51-00/201).
(g) If there are existing weights on the flange, these can be combined with the correction weight(s) by inputting them into the analyser. Any existing weights that have been cut or filed must be weighed individually with their bolts and washers. The analyser will show the correction weight(s) necessary on an empty flange.
(h) Install the nose cone fairing and spinner in their initial postion.

S 715-520-R00
(5) Check the N1 Vibration Level
(a) Start the engine (AMM 71-00-00/201).

TEST NO. 7 - FAN TRIM BALANCE

(b) Let the engine become stable at idle for five minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get a N1 indication of SPEED 1 ±0.25 per cent. Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(d) Slowly move the thrust lever back to get a N1 indication of SPEED 2 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(e) Slowly move the thrust lever back to get a N1 indication of SPEED 3 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(f) Slowly move the thrust lever back to get a N1 indication of SPEED 4 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: If high vibration or other operating limit stops you getting SPEED 1, 2, 3 or 4, do not get that speed. Get as many SPEEDS as possible.

(g) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(h) Stop the engine.
(i) If the vibration is satisfactory, calculate influence coefficients for this test on the PBS 4000/4100 and record these coefficients into its memory.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13) and repeat the trim balance as necessary.

TEST NO. 7 - FAN TRIM BALANCE

G. Put the Airplane Back to Its Usual Condition.

S 015-533-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the right fan cowl panel (AMM 71-11-04/201).

S 025-522-R00
(2) Disconnect and remove the charge amplifier from the engine.

S 025-524-R00
(3) Disconnect the electrical connector for the vibration signal from the modular terminal block.

S 025-525-R00
(4) Disconnect the electrical connector for the L.P. speed/once per rev signal from the engine electrical connector, plug F.

S 025-526-R00
(5) Remove the test wires from the engine oil fill and blow-off door.

S 425-527-R00
(6) Connect the engine electrical connector to the electrical connector panel in front of the strut.

S 415-528-R00
(7) Close the right fan cowl panel (AMM 71-11-04/201).

S 425-529-R00
(8) Install the forward strut fairings (AMM 54-52-01/401).

TEST NO. 7 - FAN TRIM BALANCE

S 415-530-R00

(9) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
(a) 11K2 L VIB Monitor

S 415-531-R00

(10) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
(a) 11K28 R VIB MONITOR

TASK 71-00-00-705-137-R00

12. Test No. 7C - Fan Trim Balance (Pre S.B. 72-9723) Phase Angle method using the aircraft AVM system

A. General

(1) This test contains the procedure to do the LP compressor rotor trim balance by phase angle methods using the aircraft AVM system. The aircraft must have the necessary wiring from the engine to the AVM signal conditioner to enable N1 vibration phase angle to be displayed on the EICAS.
(2) Do not move the weights on the 36 hole balance flange (Fig. 510).
(3) Do this test if the N1 vibration is above 1.0 unit at any power or flight condition.

B. References

(1) AMM 70-51-00/201, Torque Tightening Techniques.
(2) AMM 71-00-00/201, Power Plant.
(3) AMM 72-31-10/401, LP Compressor Rotor Disc and Blades.
(4) AMM 72-31-13/401, LP Compressor Rotor Blades.
(5) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing.

C. Equipment

(1) Marker, felt or fiber tip OMat No. 252.
(2) Personal computer
(3) Rolls-Royce Trim Balance Program VX77. Available from Rolls-Royce Technical Publications.

TEST NO. 7 - FAN TRIM BALANCE

D. Consumable Materials

Description	R.R. Part No.	No. Required
Balance Plate (Single Bolt Hole)	OL26757	8 Maximum
Washer	LK46713	1 per balance plate
Bolt	AS21512	1 per balan ce plate

(1) Procedure

(a) Make sure the aircraft vibration system is serviceable and no faults are listed.

(b) Weigh a bolt, washer, and balance weight. Cut or file a plate to reduce the combined weight to 35 +/- 5 gm (1.05 to 1.41 oz). Identify this plate as your 'Trial Weight' and fasten the bolt and washer to it. Keep for use later in the procedure.

NOTE: You are allowed to use an uncut single hole plate, bolt or washer total weight 57 gm (2 oz) as your 'trial weight'. This may limit the speed you can get during the trial runs.

(c) Operate the engine for the initial vibration run.

1) Start the engine (AMM 71-00-00/201).

2) Let the engine stabilize for 5 minutes.

NOTE: During the ground runs you are permitted a maximum vibration indication of 2.5 units, if the N2 and N3 vibration indications are not more than their limits.

3) Slowly move the thrust lever to get an N1 indication of 92% plus or minus 0.25 percent (SPEED 1). Record the N1 speed, vibration level, and phase angle.

TEST NO. 7 - FAN TRIM BALANCE

4) Slowly move the thrust lever back to get an N1 indication of 87% plus or minus 0.25 percent (SPEED 2). Record the N1 speed, vibration level, and phase angle.
5) Slowly move the thrust lever back to get an N1 indication of 82% plus or minus 0.25 percent (SPEED 3). Record the N1 speed, vibration level, and phase angle.
6) Slowly move the thrust lever back to get an N1 indication of 75% plus or minus 0.25 percent (SPEED 4). Record the N1 speed, vibration level, and phase angle.

NOTE: Use four different speeds if you cannot get the above speeds because of high vibration or or other operating limit. Make sure one of the speeds used the N1 vibration at its maximum.

7) Slowly move the thrust lever back to the idle position and let the engine become stable for one minute.
8) Stop the engine (AMM 71-00-00/201).

(d) Inspect the correction weights.
1) Mark the nose cone fairing and spinner with a marker pen to show the initial installed position.
2) Remove the nose cone fairing.
3) Remove the spinner.
4) Inspect the drive cone (inner) balance flange (25 bolt holes) for the balance weights.
5) Use a marker pen and number an empty bolt hole as position 1. This position will be the trial weight position.
6) Record the bolt hole positions where the balance weights are installed. Count counterclockwise from position 1.

(e) Install a 'Trial Weight'.
1) Install the 'Trial Weight' on the drive cone (inner) balance flange (25 bolt holes) at any position (if possible, bolt position 1). Torque the bolt to standard load (AMM 70-51-00/201).
2) Record the hole position where the 'Trial Weight' was installed.
3) Install the spinner and the nose cone fairing at their initial position.

(f) Engine operation for the 'Trial weight' run.
1) Start the engine (AMM 71-00-00/2010).
2) Let the engine become stable at idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

TEST NO. 7 - FAN TRIM BALANCE

3) Slowly move the thrust lever to get an N1 indication of SPEED 1 plus or minus 0.25 percent. Record the vibration level and phase angle.
4) Slowly move the thrust lever to get an N1 indication of SPEED 2 plus or minus 0.25 percent. Record the vibration level and phase angle.
5) Slowly move the thrust lever to get an N1 indication of SPEED 3 plus or minus 0.25 percent. Record the vibration level and phase angle.
6) Slowly move the thrust lever back to get an N1 indication of SPEED 4 plus or minus 0.25 percent. Record the vibration level and phase angle.

NOTE: Use four different speeds if you cannot get the speeds because of high vibration or other operating limits. Use one or two speeds, move the trial weight to a position approximately 180 degrees from its position and repeat the 'Trial Weight' run.

7) Slowly move the thrust lever back to idle position and let the engine become stable for 1 minute.
8) Stop the engine (AMM 71-00-00/201).

(g) Input the data, which follows, into the VX77 program. Use a personal computer.
1) Engine type RB211-535E4 pre SB 72-9723.
2) Engine serial number.
3) Balance Date.
4) Select phase angle icon.
5) Select the existing weights selection tab.
6) Enter the type and positions of the weights as recorded in 'inspect the correction weights'.
7) Select vibration data selection tab.
8) Enter vibration levels and phase angles recorded in the initial vibration run, no trial weight fitted, for speeds 1 to 4.
9) Select the weight the 'Trial Weight' from the pull down menu. This is custom (15 gm) or uncut single hole weight (UL26757/UL11485).
10) Select the position of the 'Trial Weight' (position of the trial weight as selected in 'install Trial Weight' in this procedure) from the drop down menu.
11) Enter the vibration levels and phase angles you recorded for the 'Trial Weight' run (trial weight fitted). Keep the input cell blank for any speed that you are not able to get.

(h) Calculate the correction weight.
1) Select 'corrections' tab.

TEST NO. 7 - FAN TRIM BALANCE

2) The correction page displays two fields of information for reference and may be used to view data consistency.
   a) The first field displays the weight and angle correction calculated for each speed for which the complete data was inputted. Delete data for a speed if you think it disagrees with the other speeds.
   b) The second field gives the weighted average correction, magnitude, and angular position for the:
      1 existing flange.
      2 clear flange (the necessary correction weights on the drive cone (inner) flange (25 bolt hole) if all balance weights are removed.
3) Select the 'Balance Weights' tab.
4) The balance weight solution contains the final results of the balance calculations for a clear drive cone (inner) balance flange (25 bolt hole). This details the weight locations of single bolt balance weights. The weight locations are counted counterclockwise from position 1. Refer to 'Inspect the correction weights' in this procedure.

(i) Install the correction weight.
1) Remove the nose cone fairing.
2) Remove the 'Trial Weight' and balance weights.
3) Install the correction weights at the bolt positions given by VX77. Count counterclockwise from position 1 marked. Retain by bolt (AS21512) and washer (LK46713).
4) Install the nose cone fairing and spinner in their initial position.

(j) Check the N1 vibration level.
1) Start the engine and let it become stable at idle for 5 minutews.
2) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration is satisfactory.
3) Idle the engine for 1 minute and stop the engine.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13/801) and then the trim balance as necessary. As an alternative if the vibration was high but acceptable prior to trim balance, the engine can be returned to service with the weights restored to their original positions. The fan blade root re-lubrication procedure should be done at the next opportunity.

TEST NO. 7 - FAN TRIM BALANCE

TASK 71-00-00-705-015-R00

13. Test No. 7D - Fan Trim Balance (S.B. 72-9723 3 trial weight method

A. General

(1) Do this test if the N1 vibration is above 1.0 unit any power or flight condition.

(2) Before you do this test, make sure the annulus filler seals are in the correct position (AMM 72-31-13/401).

(3) Use the alternate method (Test 7G), if spreadsheets are not available.

B. References

(1) AMM 70-51-00/201, Torque tightening techniques

(2) AMM 71-00-00/201, Power Plant

(3) AMM 72-31-10/401, L.P. Compressor rotor disc and blades

(4) AMM 72-31-13/401, L.P. Compressor rotor blades

(5) AMM 72-35-01/401, L.P. Compressor inlet rotating fairing

C. Equipment

(1) Marker - Felt or Fiber Tip, OMat 262

(2) Personal computer with Microsoft Excel version 5 or later.

(3) Rolls-Royce Trim Balance spread sheets for Excel. These are available on a 3.5 in. diskette from Rolls-Royce Technical Publications.

D. Consumable Materials

(1)

Description	R.R. Part No.	No. Required
Balance Bolt Assembly	BLT5563	10 (maximum)
Washer	AS12945	10 (Maximum)
Bolt	AS21118	10 (Maximum)

NOTE: Each balance bolt assembly has a bolt and a captive washer (weight). Do not use a different bolt or washer at the position where you must install a balance bolt assembly except where specified for the trial weight runs.

TEST NO. 7 - FAN TRIM BALANCE

E. Procedure

S 215-404-R00

(1) Make sure aircraft vibration system is serviceable and no faults are listed.
   (a) Mark the nose cone fairing with the marker pen to show the initial installed position.
   (b) Remove the nose cone fairing.
   (c) Number all the holes counter-clockwise 1 to 24, starting from any of the 18 holes that are not used for attaching the fairing.
   (d) Record the position of each trim balance bolt assembly if fitted.
   (e) Remove all the existing trim balance bolt assemblies one at a time and replace them with standard bolts (AS21118) and washers (AS12945).

      NOTE: Do not remove more than one nose cone (spinner) attachment bolt before installing a replacement bolt. If you remove more than one bolt at the same time, you must remove and install the spinner again (AMM 72-35-01/401).

   (f) Install the nose cone fairing in its initial position.

S 715-532-R00

(2) Engine operation for the initial vibration run
   (a) Start the engine (AMM 71-00-00/201).
   (b) Let the engine become stable at idle for 5 minutes.

      NOTE: During the first ground run you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibrations are not more than their limits).

TEST NO. 7 - FAN TRIM BALANCE

(c) Slowly move the thrust lever to get a N1 indication of 92% ±0.25 per cent (SPEED 1). Record the N1 speed and N1 vibration level.
(d) Slowly move the thrust lever back to get a N1 indication of 87% ±0.25 per cent (SPEED 2). Record the N1 speed and N1 vibration level.
(e) Slowly move the thrust lever back to get a N1 indication of 82% ±0.25 per cent (SPEED 3). Record the N1 speed and N1 vibration level.
(f) Slowly move the thrust lever back to get a N1 indication of 75% ±0.25 per cent (SPEED 4). Record the N1 speed and N1 vibration level.

NOTE: Use four different SPEEDS if you cannot get the speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(g) Slowly move the thrust lever back to the Idle position and let the engine becomestable for 1 minute.
(h) Stop the engine.

S 825-017-R00

(3) Install the trial weight for the first trial run
(a) Remove the nose cone fairing
(b) Identify holes number 1, 9, and 17 and mark these 'A', 'B' and 'C'. These are the holes at which the Trial Weight is to be fitted for each of the trial weight runs.
(c) Remove the standard bolt and washer at the hole marked 'A'. Put the washer onto a trim balance bolt assembly and install the bolt assembly and washer in hole 'A'. The effect of installing a trim balance bolt assembly and a washer (AS12945) in place of a standard bolt and washer is to add 20. 2 gm (0. 71 oz.). This is the Trial Weight.

TEST NO. 7 - FAN TRIM BALANCE

(d) Install the nose cone fairing in its initial position.

S 715-534-R00

(4) Engine Operation for the First Trial Run
(a) Start the engine (AMM 71-00-00/201).
(b) Let it stabilize at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get an N1 indication of SPEED 1 ±0.25 per cent. Record the N1 vibration level.
(d) Slowly move the thrust lever to get an N1 indication of SPEED 2 ±0.25 per cent. Record the N1 vibration level.
(e) Slowly move the thrust lever to get an N1 indication of SPEED 3 ±0.25 per cent. Record the N1 vibration level.
(f) Slowly move the thrust lever to get an N1 indication of SPEED 4 ±0.25 per cent. Record the N1 vibration level.

NOTE: If high vibration or other operating limit stops you getting SPEED 1, 2, 3 or 4, do not get that speed. Get as many SPEEDS as possible.

(g) Slowly move the thrust lever back to the Idle position and let the engine become stable for 1 minute.
(h) Stop the engine.

S 425-535-R00

(5) Install the Trial Weight for the Second Trial Run
(a) Remove the nose cone fairing.
(b) Remove the trim balance weight assembly and washer (AS12945) from hole 'A' and install a standard bolt and washer.

TEST NO. 7 - FAN TRIM BALANCE

(c) Remove the standard bolt and washer from the hole marked 'B' and install the trim balance weight assembly and washer (Trial Weight) in hole 'B'.
(d) Install the nose cone fairing at its initial position.

S 865-018-R00

(6) Engine Operation for the Second Trial Run
(a) Repeat (5) (a) to (5) (h).

S 825-019-R00

(7) Install the Trial Weight for the Third Trial Run
(a) Remove the nose cone fairing.
(b) Remove the trim balance weight assembly and washer (AS12945) from hole 'B' and install a standard bolt and washer.
(c) Remove the standard bolt and washer from the hole marked 'C' and install the trim balance weight assembly and washer (Trial Weight) in hole 'C'.
(d) Install the nose cone fairing at its initial position.

S 865-020-R00

(8) Engine Operation for the Third Trial Run
(a) Repeat (5) (a) to (5) (h).

S 975-536-R00

(9) Input data into the Rolls-Royce 3-weight Trim Balance spread sheet using a personal computer:
(a) Engine Number
(b) Date
(c) The number of bolt holes in the trim balance flange (24 holes for S.B. 72-9723).
(d) The vibration levels recorded for SPEEDS 1 to 4 on the Initial Vibration run (notrial weight fitted).
(e) The hole number at which you fitted the Trial Weight for the First Trial run (if be No. 1). The spread sheet will show the hole numbers at which the Trial Weight must be installed for the second and third runs. Check that these are the holes you marked 'B' and 'C'.

TEST NO. 7 - FAN TRIM BALANCE

(f) The weight of the Trial Weight and its units grams (ounces).
(g) The vibration data you recorded for the three trial weight runs. Leave the input cell blank for any SPEED that you were not able to get.
(h) Alternatively, if the spread sheet is not available, use the Trim Balance Workshet in Test 7 section H. Number the bolt holes on the sheet counter-clockwise starting with the first trial run hole number at 'A'. Holes at 'B' and 'C' must be used for the second and third runs. Check that these hole numbers agree with your marks on the flange.
(i) Record the weight of the 'Trial Weight' and its units grams (ounces).

S 975-537-R00

(10) Calculate the Correction Weight
(a) Remove the LP compressor rotating fairing (AMM 72-35-01/401).
(b) The spread sheet now shows the correction weight calculated for each SPEED for which you inputted complete data, and the average of these correction weights. You may delete data for a SPEED if you consider it significantly disagrees with the other SPEEDS.
(c) The correction weight required to achieve balance is shown in the AVERAGE box.
(d) If the spread sheet is not available, you must evaluate the correction weight by the graphical method given in Test 7, section H. Check that the correction weight evaluated is approximately 22 g (0.75 oz.) for every 1 aircraft unit of maximum vibration level on the initial run. If it exceeds this figure by more than 25 per cent, recheck your graphical solution. Remove the standard bolt and washer at hole Z.

S 425-538-R00

(11) Install the Correction Weight
(a) Remove the nose cone fairing.

TEST NO. 7 - FAN TRIM BALANCE

(b) Remove the trim balance weight assembly and washer (AS12945) from hole C andinstall a standard bolt and washer.
(c) Make a note of the 6 hole numbers used to retain the fairing. Trim balance weights cannot be fitted at these holes.
(d) You get the correction weight by installing several BLT5563 trim balance weights positioned to achieve the required vector sum.

NOTE: Install BLT5563 WITHOUT washer AS12945 (in accordance with S.B. 72-9723).

(e) The weight effect of a BLT5563 trim balance weight installed in place of a standard bolt and washer is 15.8 g (0.56 oz.). Fig. 511 shows the summed weight of pairs of weights.
(f) Select holes at which to fit weights so that their vector sum is within ±6 g (0.2 oz.) of the correction weight shown by the 3-weight trim balance spread sheet and aligns to within ±0.5 of the bolt hole shown by the spread sheet. You can use the Rolls-Royce Balance Weight Summation spread sheet to calculate the vector sum of your combination of weights.
(g) Alternatively, if the spread sheets are not available, use Fig. 511 to select weights to give the correction weight W at hole H.
(h) Install weights in the holes you have selected.
(i) Torque the bolts to the standard load (AMM 70-51-00/201).
(j) Install the nose cone fairing at its initial position.

S 715-539-R00

(12) Check N1 vibration level
(a) Start the engine and let it become stable at Idle for 5 minutes.
(b) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration is satisfactory.

TEST NO. 7 - FAN TRIM BALANCE

(c) Idle the engine for 1 minute and stop the engine.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13) and repeat the trim balance as necessary.

(d) Alternatively, if the vibration was high but acceptable prior to the trim balance, the engine can be returned to service by restoring the weights to their original positions recorded in (E) (2) (d). The fan blade root re-lubrication procedure should then be done at the next convenient opportunity.

TASK 71-00-00-705-446-R00

14. Test No. 7E - Fan Trim Balance (S.B. 72-9723) Phase Angle Method using PBS 4000/4100 or similar.

A. General

(1) This test contains the procedure for carrying out the L.P. Compressor Rotor Trim Balance using the MTI PBS 4000/4100 portable analyser.

(2) The 'Influence Coefficient' method (paragraph 7) is an alternative short method which can be used if the coefficients from at least three previous trim balance tests are stored in the PBS 4000/4100 analyser. The engines must be the same type and mark as the engine on test and all must be S.B. 72-9723 standard.

(3) Do not move the weights on the 36 hole balance flange.

(4) Do this test if the N1 vibration level is above 1.0 unit at any power or flight condition.

B. References

(1) AMM 54-52-01/401, Strut Fairings

(2) AMM 70-50-02/201, Connection of electrical plugs

(3) AMM 70-51-00/201, Torque tightening procedures

(4) AMM 71-00-00/201, Power Plant

(5) AMM 71-11-04/201, Fan Cowl Panels

TEST NO. 7 - FAN TRIM BALANCE

(6) AMM 72-31-10/401, L.P. Compressor rotor discs and blades
(7) AMM 72-31-13/201, L.P. Compressor rotor blades
(8) AMM 72-35-01/401, L.P. Compressor inlet rotating fairing

C. Equipment
(1) Mechanical Technology INC. (M.T.I.) trim balance computer PBS 4000/4100
(2) The applicable cable harness assembly, refer Equipment Manufacturers Instructions
(3) Charge Amplifier
(4) Engine balance software disc (PBS 4000 only)
(5) Marker Felt or Fiber Tip OMat 262

D. Consumable Materials

(1) Description	R.R. Part No.	No. Required
Balance Bolt	BLT5563	10 (Maximum)
Washer	AS12945	10 (Maximum)
Bolt	AS21118	10 (Maximum)

NOTE: Each balance bolt assembly has a bolt and a captive washer (weight). Do not use a different bolt or washer at the position where you must install a balance bolt assembly except where specified for the trial weight runs.

E. Procedure (Basic Phase Angle Method)

S 215-141-R00
(1) Make sure the vibration system is serviceable and no faults are listed.

S 485-540-R00
(2) Install the test equipment
(a) Open the right hand fan cowl panel (AMM 71-11-04/201).

TEST NO. 7 - FAN TRIM BALANCE

(b) For the left engine open circuit breakers on the overhead panel P11 and attach a'DO-NOT-CLOSE' tag (11K2, L Vib Monitor)
(c) For the right engine open circuit breaker on overhead panel P11 and attach a 'DO-NOT-CLOSE' tag (llK28, R Vib Monitor)
(d) Remove the foward strut fairing 90%.
(e) Put the charge amplifier on the L.P. compressor case.

NOTE: This will let you connect the electrical connector.

(f) Disconnect the electrical connector, plug F (D1012P) (Fig. 508) from the electrical panel in front of the strut.
(g) Connect the electrical connector for the vibration signal to the engine connector, plug F (D1012P).

NOTE: This is also known as the connection for the vibration harness interface.

(h) Connect the electrical connector for the L.P. speed/once per rev signal to the modular terminal block.
(i) Push the two test wires through the engine oil fill and blow off door.

NOTE: This will let you close the fan cowl panel.

(j) Connect the PBS 4000/4100 analyser to the test wires.
(k) Operate the PBS 4000/4100 analyser.

CAUTION: OBEY THE PRECAUTIONS FROM THE KEVLAR WRAHPPING WHEN YOU CLOSE THE FAN COWL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING C AN OCCUR.

(l) Close the right fan cowl panel (AMM 71-11-04/201).

S 025-541-R00

(3) Removal of any existing trim balance bolt assemblies.
(a) Mark the nose cone fairing with the marker pen to show the initial installed position.
(b) Remove the nose cone fairing
(c) Number the holes counter-clockwise 1 to 24 starting from any of the 18 holes that are not used for attaching the fairing.

TEST NO. 7 - FAN TRIM BALANCE

(d) Record the position of each existing trim balance bolt assembly if fitted.
(e) Remove all existing trim balance bolt assemblies one at a time and replace them with standard bolts (AS21118) and washers (AS12945).

NOTE: Do not remove more than one nose cone (spinner) bolt attachment assembly before installing a replacement bolt assembly. If you remove more than one bolt at a time you must remove and install the spinner again (AMM 72-35-01/401).

(f) Install the nose cone fairing in its initial position.

S 865-435-R00
(4) Engine operations for the initial vibration run
(a) Start the engine (AMM 71-00-00/201).
(b) Let the engine become stable at idle for 5 minutes.

NOTE: During the first ground run you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get a N1 indication of 92% ±0.25 per cent (SPEED 1). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 alayser.
(d) Slowly move the thrust lever back to get a N1 indication of 87% ±0.25 per cent (SPEED 2). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(e) Slowly move the thrust lever back to get a N1 indication of 82% ±0.25 per cent (SPEED 3). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 anlayser.

TEST NO. 7 - FAN TRIM BALANCE

(f) Slowly move the thrust lever back to get a N1 indication of 75% ±0.25 per cent (SPEED 4). Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: Use four different SPEEDS if you cannot get the above speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(g) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(h) Stop the engine (AMM 71-00-00/201).

S 825-145-R00
(5) Install a trial weight
(a) Remove the nose cone fairing.
(b) Remove the standard bolt and washer at the hole you marked No. 1. Put the washer onto a trim balance bolt assembly and install the bolt and washer in hole No. 1. The effect of installing a trim balance bolt assembly and a washer (AS12945) in place of a standard bolt and washer is to add 20.2 grams (0.71 oz.). This is the Trial Weight.
(c) Install the nose cone fairing at its initial position.
(d) Input the Trial Weight and its position (Hole No. 1) into the PBS 4000/4100 analyser.

S 865-146-R00
(6) Engine operation for the Trial Weight run
(a) Start the engine (AMM 71-00-00/201).
(b) Let the engine become stable at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get a N1 indication of SPEED 1 ±0.25 per cent. Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(d) Slowly move the thrust lever back to get a N1 indication of SPEED 2 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(e) Slowly move the thrust lever back to get a N1 indication of SPEED 3 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

TEST NO. 7 - FAN TRIM BALANCE

(f) Slowly move the thrust lever back to get a N1 indication of SPEED 4 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: If high vibration or other operating limit stops you getting SPEED 1, 2, 3 or 4, do not get that speed. Get as many SPEEDS as possible.

(g) Stop the engine.

S 825-147-R00

(7) Install the Correction Weight
(a) Remove the nose cone fairing.
(b) Remove the trim balance weight assembly and washer (AS12945) from hole No. 1 andinstall a standard bolt and washer.
(c) Calculate the correction weights and hole positions on the PBS 4000/4100 analyser .
(d) The weight effect of a BLT5563 trim balance weight installed in place of a standard bolt and washer is 0.56 ounces (15.8 grams). Check that this is the value used by the PBS 4000/4100.
(e) Install trim balance weights at the hole position (or positions) given by the PBS 4000/4100 analyser.

NOTE: Install BLT5563 WITHOUT washer AS12945 (in accordance with S.B. 72-9723).

NOTE: The position of the weights must be numbered from the hole you marked No. 1, in the direction given by the analyser.

(f) Torque the bolts to the standard load (AMM 70-51-00/201).
(g) Install the nose cone fairing at its initial position.

TEST NO. 7 - FAN TRIM BALANCE

S 725-542-R00

(8) Check N1 Vibration Level

(a) Start the engine and let it become stable at Idle for 5 minutes.

(b) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration is satisfactory.

(c) Idle the engine for 1 minute and stop the engine.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13/201) and repeat the trim balance as necessary.

F. Alternative Test Procedure (Influence Coefficient Method)

S 725-544-R00

(1) Make sure the aircraft vibration system is serviceable and no faults are listed.

S 485-545-R00

(2) Install the test equipment as instructed in (E) (2).

(a) Start the engine (AMM 71-00-00/201).

(b) Let it stabilize at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Slowly move the thrust lever to get an N1 indication of 92 ±0.25 per cent (SPEED 1). Record the N1 speed. Record the vibration level and phase angle. Recordvibration on the PBS 4000/4100 analyser.

(d) Slowly move the thrust lever to get an N1 indication of 87 ±0.25 per cent (SPEED 2). Record the N1 speed. Record the vibration level and phase angle. Recordvibration on the PBS 4000/4100 analyser.

(e) Slowly move the thrust lever to get an N1 indication of 82 ±0.25 per cent (SPEED 3). Record the N1 speed. Record the vibration level and phase angle. Recordvibration on the PBS 4000/4100 analyser.

TEST NO. 7 - FAN TRIM BALANCE

(f) Slowly move the thrust lever to get an N1 indication of 75 ±0.25 per cent (SPEED 4). Record the N1 speed. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: Use four different SPEEDS if you cannot get the above speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(g) Slowly move the thrust lever back to the Idle position and let the engine become stable for 1 minute.
(h) Stop the engine.

S 425-547-R00
(3) Install the Correction Weight
(a) Mark the nose cone fairing and spinner with the marker pen to show the initial installed position.
(b) Remove the nose cone fairing.
(c) Mark the positions of any existing trim balance bolts (BLT5563) and remove the spinner.
(d) Identify the asterisk on the weight carrier ring, Fig. 501. This asterisk marks the offset dowel hole.
(e) Identify the first bolt head counter-clockwise (4.5 degrees) from the dowel hole. This aligns with the once-per-rev tooth on the fan shaft.
(f) Make a mark on the nose cone support ring that aligns with this bolt head. Make sure the mark can be seen when the spinner is installed.
(g) Install the spinner at its initial position. Make sure to install the existing trim balance bolts (BLT5563) in their marked positions.
(h) Mark the 24 holes on the spinner retention flange 1 to 24 in the direction given by the PBS 4000/4100 analyser. Hole No. 1 must align with the mark made in (f) above.

TEST NO. 7 - FAN TRIM BALANCE

(i) Input the positions and weights of the exising trim balance bolts (BLT5563) into the anaylyser. The weight of each bolt is 15.8 g (0.56 oz.).
(j) Calculate the correction weights and hole positions on the PBS 4000/4100 analyser.
(k) Remove the existing trim balance bolts and install those calculated in (j).

NOTE: Do not remove more than one nose cone (spinner) attachment bolt before you install a replacement bolt. If you remove more than one bolt at a time, you must remove and install the spinner again.

(l) Install the nose cone fairing at its initial position.
(m) Start the engine (AMM 71-00-00/201).
(n) Let it stabilize at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(o) Slowly move the thrust lever to get a N1 indication of SPEED 1 ±0.25 per cent. Record the N1 speed, vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(p) Slowly move the thrust lever back to get a N1 indication of SPEED 2 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(q) Slowly move the thrust lever back to get a N1 indication of SPEED 3 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.
(r) Slowly move the thrust lever back to get a N1 indication of SPEED 4 ±0.25 per cent. Record the vibration level and phase angle. Record vibration on the PBS 4000/4100 analyser.

NOTE: If high vibration or other operating limit stops you getting SPEED 1, 2, 3 or 4, do not get that speed. Get as many SPEEDS as possible.

TEST NO. 7 - FAN TRIM BALANCE

(s) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.
(t) Stop the engine.
(u) If the vibration is satisfactory, calculate influence coefficients for this test on the PBS 4000/4100 and record these coefficients into its memory.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13/201) and repeat the trim balance as necessary.

G. Put the Airplane Back to Its Usual Condition

S 415-550-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the right hand fan cowl panel (AMM 71-11-04/201).

S 025-551-R00
(2) Remove the vibration test equipment.

S 025-552-R00
(3) Disconnect and remove the charge amplifier from the engine.

S 025-553-R00
(4) Disconnect the electrical connector for the vibration signal from the modular terminal block.

S 025-560-R00
(5) Disconnect the electrical connector for the L.P. speed/once per rev signal from the engine electrical connector, plug F.

TEST NO. 7 - FAN TRIM BALANCE

S 015-554-R00

(6) Remove the test wires from the engine oil fill and blow off door.

S 425-555-R00

(7) Connect the engine electricl connector to the electrical connector panel in the front of the strut.

S 415-556-R00

(8) Close the right fan cowl panel (AMM 71-11-04/201).

S 425-557-R00

(9) Install the forward strut fairings (AMM 54-52-01/401).

S 415-558-R00

(10) For the left engine, remove the DO-NO-CLOSE tag and close this circuit breaker on the overhead panel, P11: 11K2, L VIB MONITOR.

S 415-559-R00

(11) For the right engine, remove the DO-NOT-CLOSE tag and close the circuit breker on the overhead panel P11: 11K28, R VIB MONITOR.

TASK 71-00-00-715-561-R00

15. Test No. 7F - Fan Trim Balance (S.B. 72-9723) Phase Angle method using the aircraft AVM system.

A. General

(1) Test 7F can only be completed if the necessary airplane wiring is installed.

(2) This test contains the procedure for carrying out the LP compressor rotor trim balance by phase angle methods using the aircraft AVM system. The aircraft must have the necessary wiring from the engine to the AVM signal conditioner to enable N1 vibration phase angle to be displayed on EICAS.

TEST NO. 7 - FAN TRIM BALANCE

(3) Do not move the weights on the 36 hole balance flange.
(4) Do this test if the N1 vibration is above 1.0 unit at any power or flight condition.

B. References
(1) AMM 70-51-00/201, Torque Tightening Techniques
(2) AMM 71-00-00/201, Power Plant
(3) AMM 72-31-10/401, LP Compressor Rotor Disc and Blades
(4) AMM 72-31-13/401, LP Compressor Rotor Blades
(5) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing

C. Equipment
(1) Marker, Felt or fiber tip
OMat No. 262
(2) Personal Computer with Microsoft Excel version 5 or later.
(3) Rolls-Royce Trim Balance spreadsheet, VX77 for Excel.
(Available, CD / diskette from Rolls-Royce Technical Publications)

D. Consumable Materials
(1)

Description	R.R. Part No.	No. Required
Balance Bolt	BLT5563	10 (Maximum)
Washer	AS12945	10 (Maximum)
Bolt	AS21118	10 (Maximum)

NOTE: Each balance bolt assembly has a bolt and a captive washer (weight). Do not use a different bolt or washer at the position where you must install a balance bolt assembly except where specified for the trial weight runs.

E. Procedure

S 215-574-R00
(1) Make sure the aircraft vibration system is serviceable and no faults are listed.

S 715-606-R00
(2) Operate the Engine for the Initial Vibration Run.
(a) Start the engine (AMM 71-00-00/201).
(b) Let it stabilize at idle for five minutes.

NOTE: During the ground runs, you are permitted a maximum vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Select the EICAS engine performance screen to display the phase angle.

NOTE: The phase angle is displayed below BB vibration indication.

TEST NO. 7 - FAN TRIM BALANCE

(d) Slowly move the thrust lever to get a N1 indication of 92% ±0.25 percent (SPEED 1). Record the N1 speed, vibration level and phase angle.
(e) Slowly move the thrust lever back to get a N1 indication of 87% ±0.25 percent (SPEED 2). Record the N1 speed, vibration level and phase angle.
(f) Slowly move the thrust lever back to get a N1 indication of 82% ±0.25 percent (SPEED 3). Record the N1 speed, vibration level and phase angle.
(g) Slowly move the thrust lever back to get a N1 indication of 75% ±0.25 percent (SPEED 4). Record the N1 speed, vibration level and phase angle.

NOTE: Use four different SPEEDS if you cannot get the above speeds because of high vibration or other operating limit. One of these should be the speed at which the N1 vibration is at its maximum.

(h) Slowly move the thrust lever back to the idle position and let the engine become stable for one minute.
(i) Stop the engine (AMM 71-00-00/201).

S 025-575-R00

(3) Remove any existing trim blance bolt assemblies.
(a) Mark the nose cone fairing and LP compressor rotor spinner with the marker pen to show their initial installed positions.
(b) Remove the nose cone fairing.
(c) Mark the positions of any existing trim balance bolts and remove the spinner.
(d) Identify the asterisk on the weight carrier ring (Fig. 510). This asterisk marks the offset dowel hole.
(e) Identify the first bolt head counter-clockwise, from the dowel hole. This aligns with the once-per-rev tooth on the fan shaft.
(f) Make a mark on the nose cone support ring that aligns with this bolt head. Make sure the mark can be seen when the spinner is installed.

(g) Number the 24 holes on the spinner retention flange 1 to 24 in a counter-clockwise direction. Hole No. 1 must align with the mark made on the nose cone support ring made previously.
(h) Record the hole numbers of the marked positions at which trim balance bolts were fitted.

TEST NO. 7 - FAN TRIM BALANCE

S 825-577-R00

(4) Install a trial weight

(a) Remove any of the 18 standard bolts and washers that retain the spinner. Put the washer onto a trim balance bolt assembly and install the bolt and washer in the hole from which it was removed. The effect of installing a trim balance bolt assembly and a washer (AS12945) in place of a standard bolt and washer is to add 20.2 grams (0.71 oz.). This is the Trial Weight. Record the hole number which you have fitted the Trial Weight.

(b) Install the nose cone fairing at its initial position.

S 865-578-R00

(5) Engine operation for the Trial Weight run

(a) Start the engine (AMM 71-00-00/201).

(b) Let the engine become stable at Idle for 5 minutes.

NOTE: During the ground runs you are permitted a maximum N1 vibration indication of 2.5 units. (If the N2 and N3 vibration indications are not more than their limits).

(c) Select the EICAS engine performance screen to display the phase angle.

NOTE: The phase angle is displayed below BB vibration indication.

(d) Slowly move the thrust lever to get a N1 indication of SPEED 1 ±0.25 percent. Record the vibration level and phase angle.

(e) Slowly move the thrust lever back to get a N1 indication of SPEED 2 ±0.25 percent. Record the vibration level and phase angle.

(f) Slowly move the thrust lever back to get a N1 indication of SPEED 3 ±0.25 percent. Record the vibration level and phase angle.

(g) Slowly move the thrust lever back to get a N1 indication of SPEED 4 ±0.25 percent. Record the vibration level and phase angle.

NOTE: If high vibration or other operating limit stops you getting SPEED 1, 2, 3 or 4, do not get that speed. Get as many SPEEDS as possible. If you can only get 1 or 2 SPEEDS, move the trial weight to a position approximately 180 degrees from its existing position and repeat the Trial Weight run.

(h) Slowly move the thrust lever back to the idle position and let the engine become stable for 1 minute.

(i) Stop the engine.

TEST NO. 7 - FAN TRIM BALANCE

S 825-579-R00

(6) Input the following data into the Phase Angle Trim Balance spreadsheet using a Personal Computer:
  (a) Engine Number
  (b) Date
  (c) The number of bolt holes in the trim balance flange (24 holes for engines post RR SB 72-9723).
  (d) The vibration levels and phase angles recorded for SPEEDS 1 to 4 on the Initial Vibration run (no trial weight fitted).
  (e) The hole number at which the Trial Weight was fitted for the Trial Weight run.
  (f) The weight of the Trial Weight and its units (grams/ounces). This is 20.2 grams or 0.71 ounces, if you have followed the procedure.
  (g) The vibration levels and phase angles you recorded for the trial weight run. Leave the input cell blank for any SPEED that you were not able to get.

S 825-580-R00

(7) Calculate the Correction Weight
  (a) The spreadsheet now shows the correction weight calculated for each SPEED for which you input complete data, and the average of these correction weights. You may delete data for a SPEED if you consider is significantly disagrees with the other SPEEDS.
  (b) The correction weight and hole position required to achieve balance is shown in the AVERAGE box.

S 825-581-R00

(8) Install the Correction Weight
  (a) Remove the nose cone fairing.
  (b) Remove the trim balance weight assembly and washer (AS12945) and install a standard bolt and washer.
  (c) Make a note of the 6 hole numbers used to retain the fairing. The trim balance weights cannot be fitted at these holes.
  (d) You get the correction weight by installing several BLT5563 trim balance weights positioned to achieve the required vector sum.

    NOTE: Install BLT5563 without washer AS12945 (in accordance with RR SB 72-9723).

  (e) The weight effect of a BLT5563 trim balance weight installed in place of a standard bolt and washer is 0.56 ounces (15.8 grams). Fig. 511 shows the summed weight of pairs of weights.

TEST NO. 7 - FAN TRIM BALANCE

(f) Select holes at which to fit weights so that their vector sum is within ±6 grams (0.2 oz.) of the correction weight shown by the 3 weight trim balance spreadsheet and aligns to within ±0.5 of the bolt hole shown by the spreadsheet. You can use the Rolls-Royce Balance Weight Summation spreadsheet to calculate the vector sum of your combination of weights.

(g) Install trim balance weights at the hole position you have selected.

NOTE: Remove the exiting standard bolts (AS21118) and washers (AS12945) one at a time and replace them with trim balance bolt assemblies.

NOTE: Do not remove more than one nose cone (spinner) attachment bolt before installing a replacement bolt. If you remove more than one bolt at the same time, you must remove and install the spinner again.

(h) Torque the bolts to the standard load (AMM 70-51-00/201).

(i) Start the engine and let it become stable at Idle for 5 minutes.

(j) Slowly move the thrust lever to operate the engine over the N1 speed range. Check that the N1 vibration is satisfactory.

(k) Idle the engine for 1 minute and stop the engine.

NOTE: If the N1 vibration is not satisfactory do the fan blade root re-lubrication procedure (AMM 72-31-13) and repeat the trim balance as necessary. As an alternative, if the vibration was high but acceptable prior to the trim balance, the engine can be returned to service by restoring the weights to their original positions recorded in the above steps. The fan blade root re-lubrication procedure should then be done at the next convenient opportunity.

NOTE: If the N1 vibration is satisfactory please supply a copy of your data to Rolls-Royce who will use the data to establish influence coefficients to publish in the Maintenance Manual. This data will enable any future trim balances to be done without the need for trial weight runs.

TEST NO. 7 - FAN TRIM BALANCE

TASK 71-00-00-715-562-R00

16. Alternative Calculation procedure for 3 Trial Weight Balance (pre and post S.B. 72-9723 - Graphical Solution

A. General

(1) This procedure is used to calculate the correction weight and hole position in tests 7a and 7d, when trim balance spread sheets are not available.

(2) This procedure can be used on pre and post S.B. 72-9723 nose cones (spinner).

(3) There are two trim balance worksheets (TBW).

(a) TBW for the 25 hole flange Test 7a (Fig. 513)

(b) TBW for the 24 hole flange Test 7d (Fig. 513A)

(c) Use a new sheet for each speed at which you have complete data.

B. Equipment

(1) Pencil

(2) A pair of compasses

(3) Ruler

(4) Copies of the TBW

C. Procedure

NOTE: Number the bolt hole positions on each TBW you use. Number them counter-clockwise starting from A. The number you write at A is the hole number at which you install the 'Trial Weight' for the first trial run. You determine this in Test 7A or 7D as applicable.

NOTE: You must use the scale at the bottom of the TBW to connvert the vibration levels to dimensions.

S 935-563-R00

(1) Draw a circle of radius equal to the initial run vibration level centered on the intersection of lines A, B and C. Call the radius Ri.

TEST NO. 7 - FAN TRIM BALANCE

S 935-564-R00

(2) Draw a circle of radius equal to the first trial run vibration level centered on the intersection of line A and the circle Ri. Call this radius Ra.

S 935-565-R00

(3) Draw a circle of radius equal to the second trial run vibration level centered on the intersection of line B and the circle Ri. Call this radius Rb.

S 935-566-R00

(4) Draw a circle of radius equal to the third trial run vibration level centered on the intersection of line C and circle Ri. Call this radius Rc.

S 935-567-R00

(5) Mark the intersection of the three trial run circles. If the circles do not intersct at one point but they overlap, find the centre of the triangular area of overlap and mark it. If the three circles do not touch, draw another circle that just touches each of the three circles. Mark the centre of this circle.

S 975-568-R00

(6) Find the distance between the intersection of lines A, B and C and the point marked in (5). Call this radius Rt.

S 975-569-R00

(7) Calculate the correction weight needed to balance the fan.

$$\text{Correction Weight} = TW \times \frac{Ri}{Rt}$$

(TW = the weight of your Trial weight). Record this correction weight as W1.

TEST NO. 7 - FAN TRIM BALANCE

S 975-570-R00

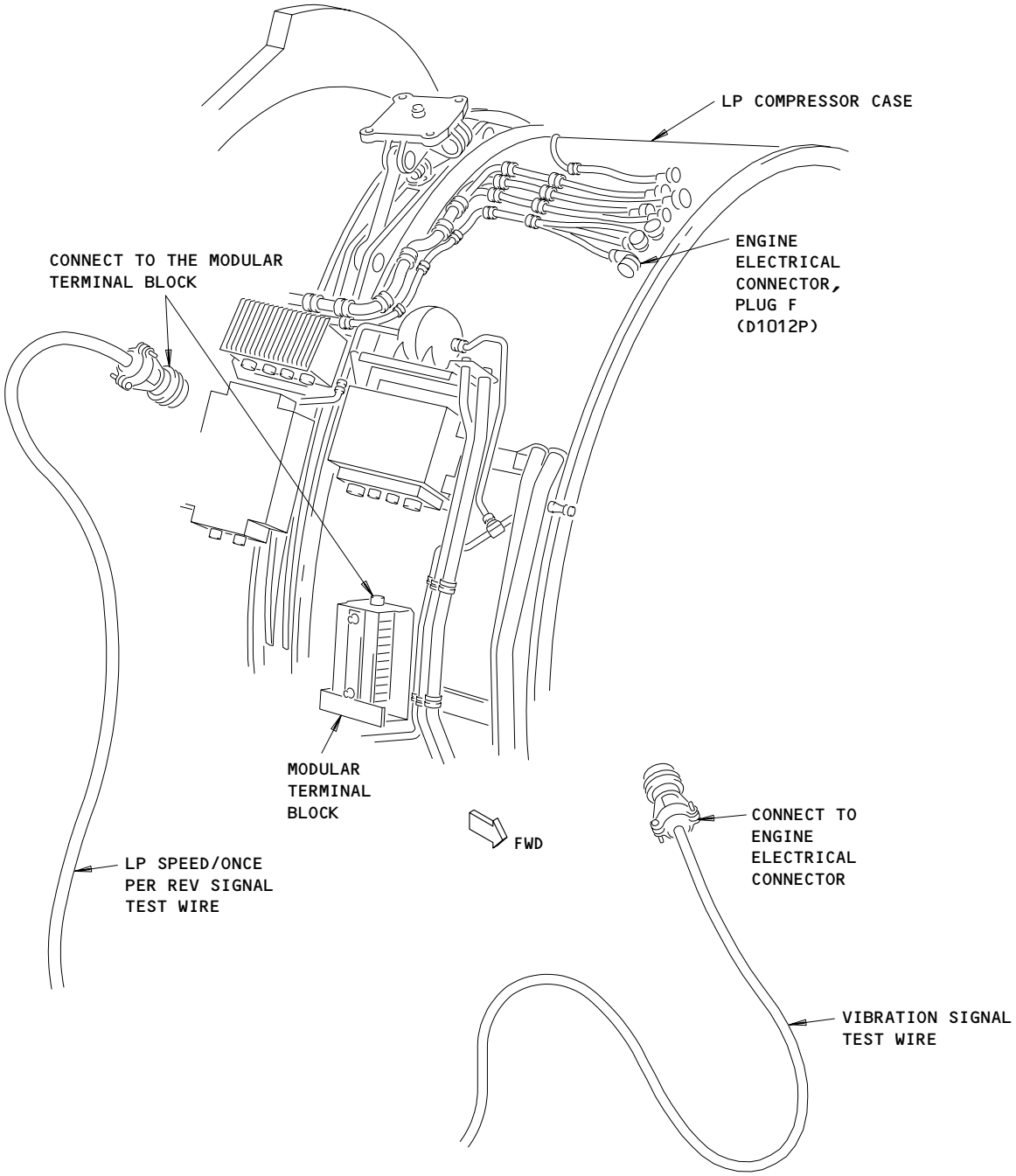
(8) Draw a line from the intersection of lines A, B and C to the point marked in (5). Extend the line until it goes across the bolt hole perimeter. Identify the nearest bolt hole to this line and record it as H1. This is the hole number at which the correction weight must be installed.

S 975-571-R00

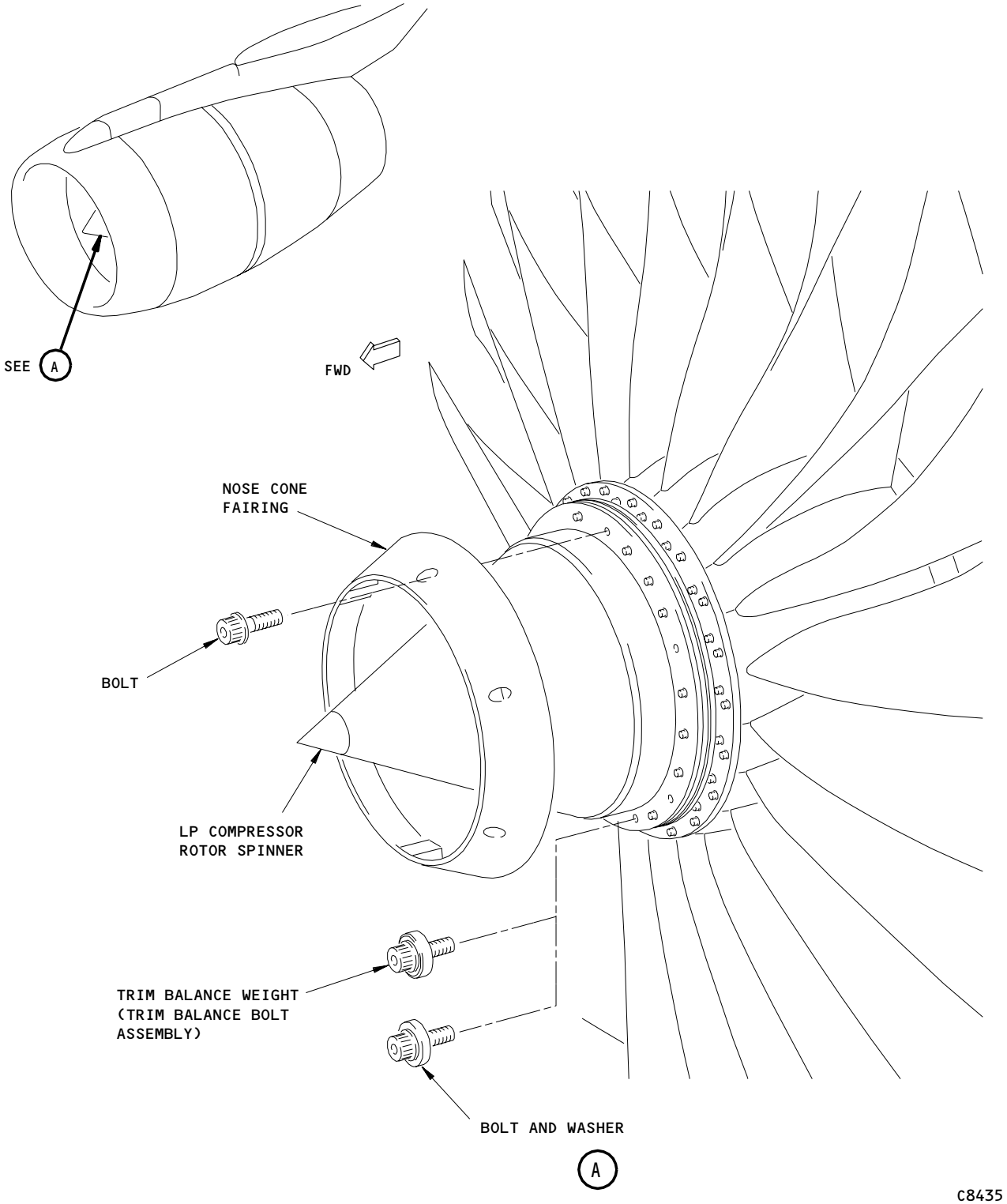
(9) If you have vibration data for more than one speed do stages (1) to (8) for each speed. Record the results as:
   (a) W1/H1 - SPEED 1
       W2/H2 - SPEED 2
       W3/H3 - SPEED 3
       W4/H4 - SPEED 4

S 975-572-R00

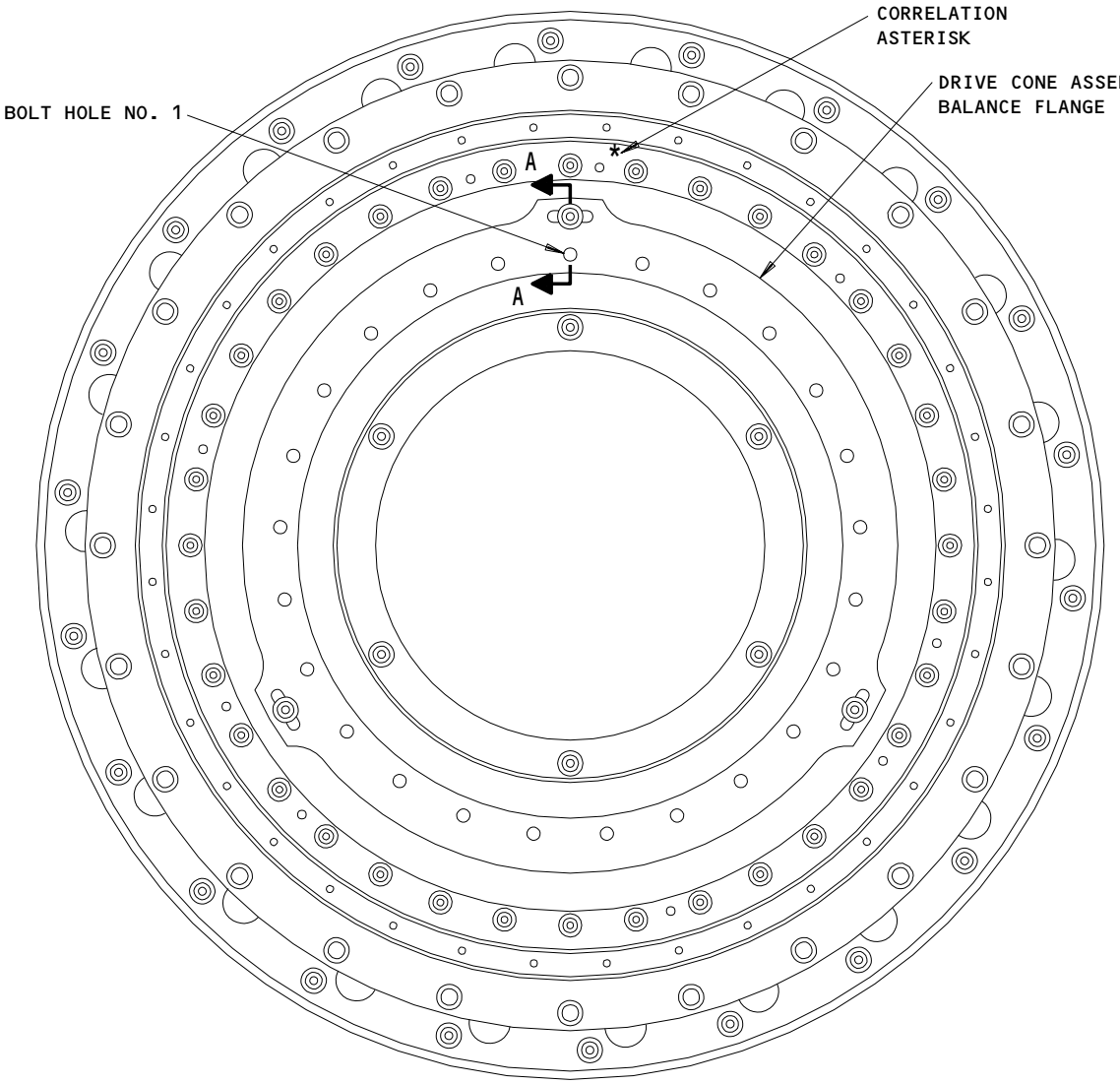
(10) Find the average of your W and H values (Fig. 513B)
   (a) Choose a scale to suit all the W values.
   (b) Make a plot of all the results on a TBW.
   (c) Draw a line from the intersection of lines A, B and C to each H value.
   (d) Make a mark at the applicable distance W from intersection of lines A, B and C on each of the lines.
   (e) Ignore any of your marks that are clearly positioned away from the majority and mark a point in the centre of those retained.
   (f) Read off the W and H for the marked center point.
   (g) This W is the correction weight to be fitted at hole H.
   (h) Check that W is approximately 35 gm (1.25 oz.) for each 1 aircraft unit of maximum vibration level recorded on the initial run of Test 7A or approximately 22 gm (0.75 oz.) for each 1 aircraft unit of maximum vibration level recorded on the initial run of Test 7D. If it exceeds this figure by more than 25 per cent, recheck the graphical solution.



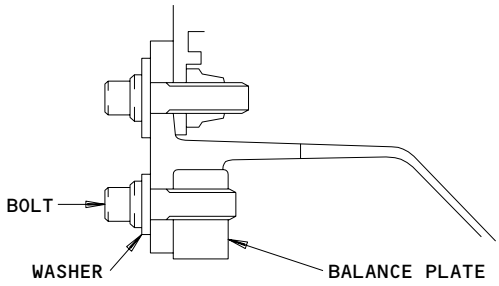
Test Equipment Electrical Connector Locations
Figure 508



Balance Bolt Assembly Installation
Figure 509



VIEW ON THE FRONT OF
THE LP COMPRESSOR

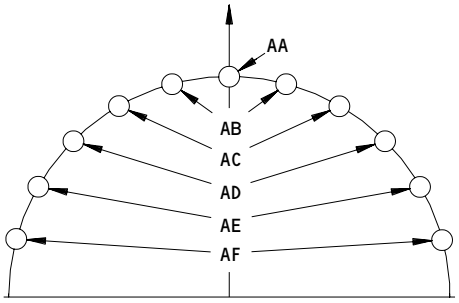


A–A

A8935

Balance Plate Installation
Figure 510

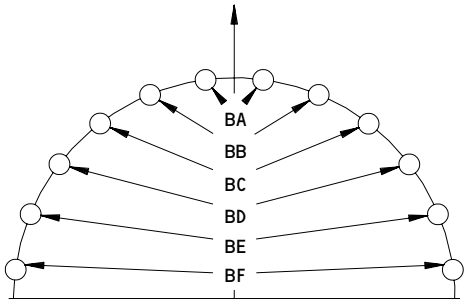
DIRECTION OF WEIGHT SUM



WEIGHTS	AA	AB	AC	AD	AE	AF
WEIGHT SUM (oz)	.56	1.08	.97	.79	.56	.29
WEIGHT SUM (g)	15.8	30.5	27.4	22.3	15.8	8.2

WEIGHT SUM CENTERED ON A BOLT HOLE

DIRECTION OF WEIGHT SUM



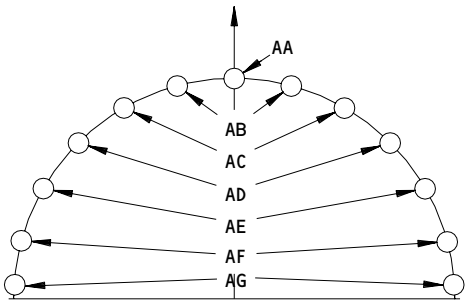
WEIGHTS	BA	BB	BC	BD	BE	BF
WEIGHT SUM (oz)	1.11	1.03	.89	.68	.43	.15
WEIGHT SUM (g)	31.3	29.2	25.1	19.2	12.1	8.2

WEIGHT SUM CENTERED BETWEEN BOLT HOLES

DEE0001932

Effect of Balence Weights BLT5563
Figure 511

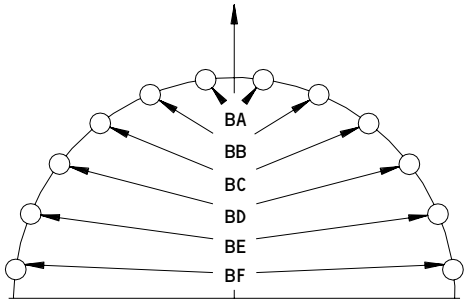
DIRECTION OF WEIGHT SUM



WEIGHTS	AA	AB	AC	AD	AE	AF	AG
WEIGHT SUM (oz)	2.02	3.91	3.54	2.95	2.16	1.25	0.25
WEIGHT SUM (g)	57.3	110.8	100.4	83.6	61.2	35.4	7.1

WEIGHT SUM CENTERED ON A BOLT HOLE

DIRECTION OF WEIGHT SUM



WEIGHTS	BA	BB	BC	BD	BE	BF
WEIGHT SUM (oz)	4.01	3.76	3.27	2.58	1.72	0.76
WEIGHT SUM (g)	113.7	106.6	92.7	73.1	48.8	21.5

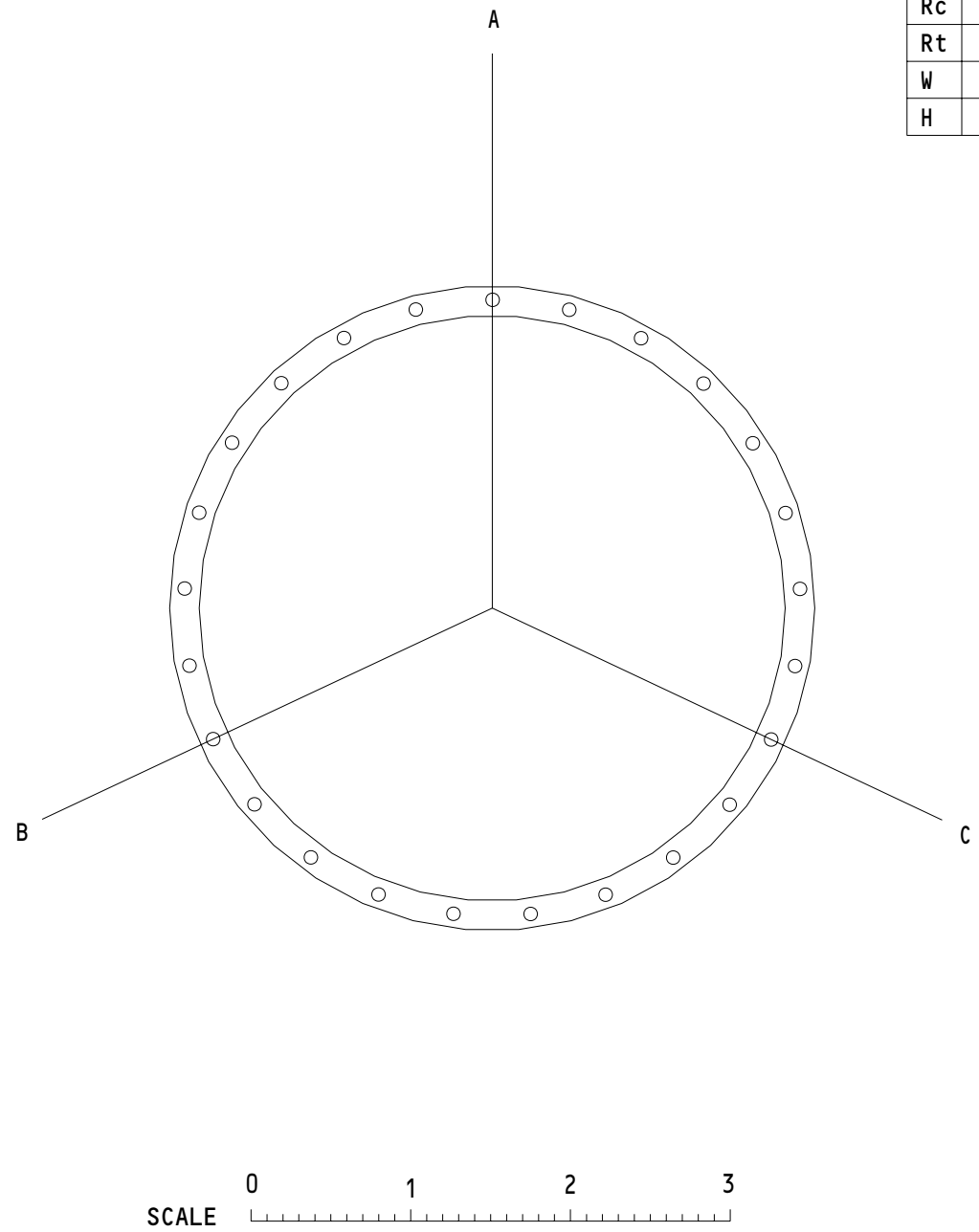
WEIGHT SUM CENTERED BETWEEN BOLT HOLES

DEE0001931

Effect of Balance Weights UL26757 and UL11485
Figure 512

Ri	
Ra	
Rb	
Rc	
Rt	
W	
H	

W = TRIAL WEIGHT x Ri/Rt

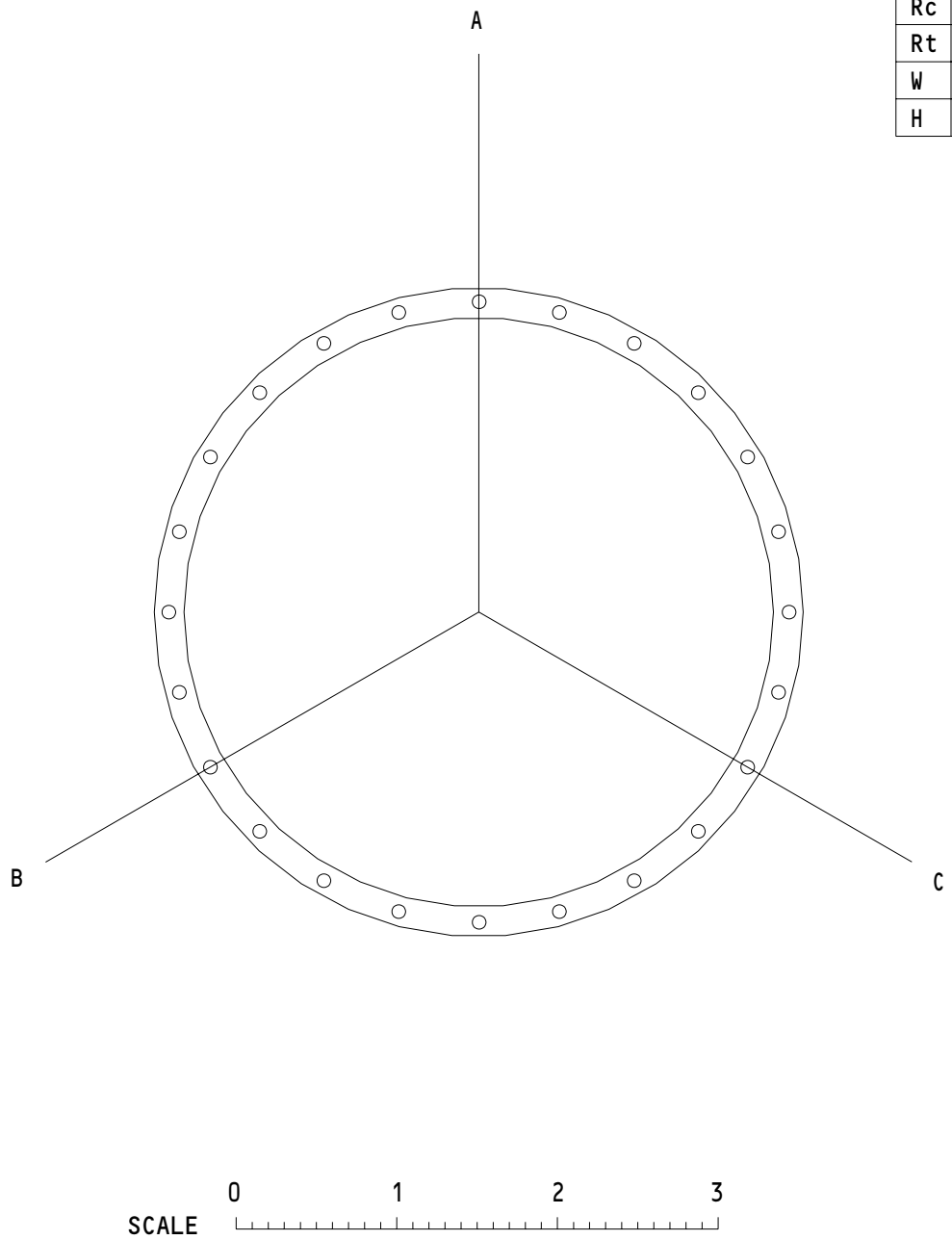


DEE0001929

Trim Balance Worksheet 25 Hole Flange
Figure 513

Ri	
Ra	
Rb	
Rc	
Rt	
W	
H	

W = TRIAL WEIGHT x Ri/Rt



DEE0001930

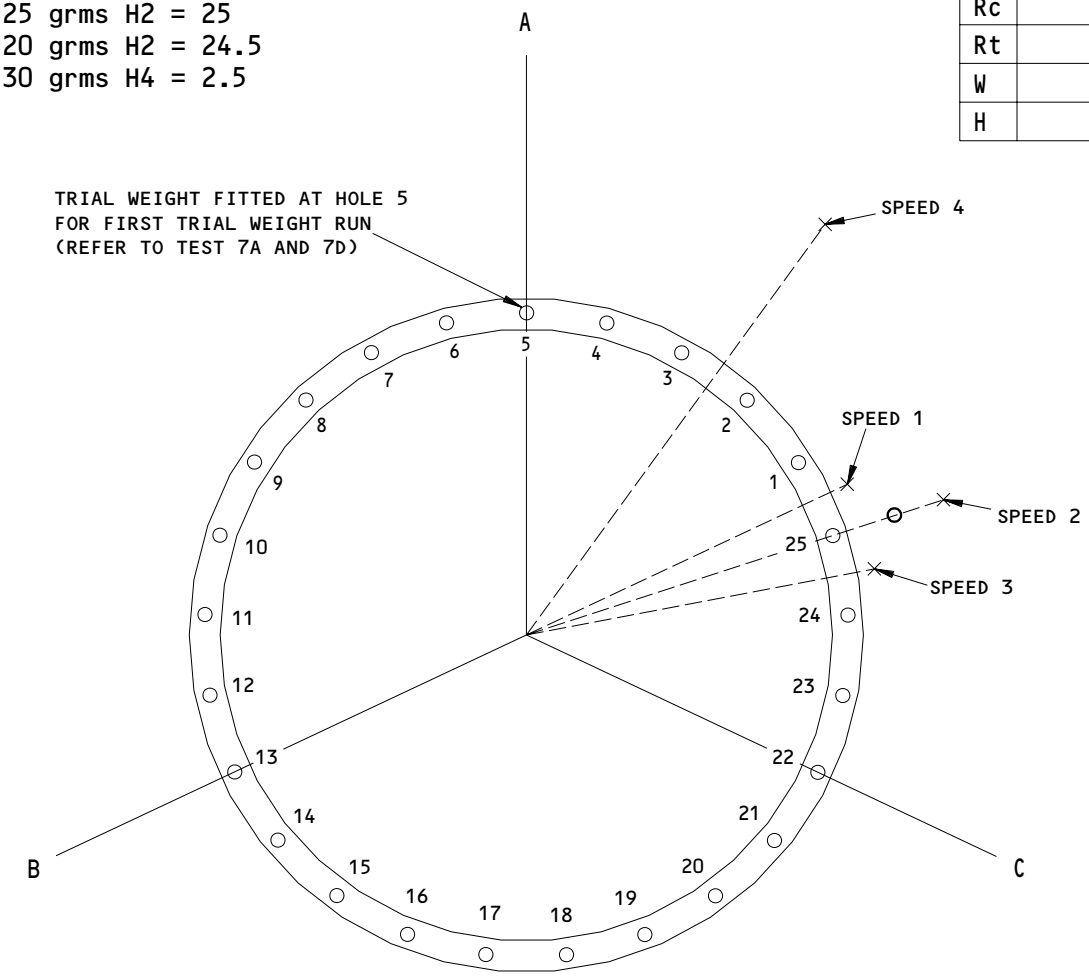
Trim Balance Worksheet 24 Hole Flange
Figure 513A

TRIM BALANCE WORKSHEET
25 HOLE FLANGE

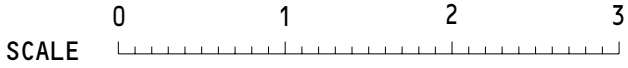
Ri	
Ra	
Rb	
Rc	
Rt	
W	
H	

W = TRIAL WEIGHT x Ri/Rt

W1 = 20 grms H1 = 25.5
W2 = 25 grms H2 = 25
W3 = 20 grms H2 = 24.5
W4 = 30 grms H4 = 2.5



1. DISCOUNT SPEED 4 BECAUSE IT DISAGREES WITH SPEEDS 1,2 AND3
2. ESTIMATE CENTER OF REMAINING POINTS(○)
3. REED OFF POSITION OF○ AS W = 22 grms H =25
4. CORRECTION WEIGHT REQUIRED IS 22 grms AT HOLE 25



DEE00Y2187

Example of Finging the Average Correction Weight for Vibration Results at 4 Speeds
Figure 513B

TEST NO. 7 - FAN TRIM BALANCE

TASK 71-00-00-715-169-R00

17. Test No. 8 - Oil Consumption

A. General

(1) Test No. 8 is removed. Refer to the Fault Isolation Procedure (FIM 79-31-00/101).

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

TASK 71-00-00-715-170-R00

18. Test No. 9 - Thrust Lever Angle/Power Setting

A. General

(1) This test must be done with only the EEC limiter on. The EEC supervisory function must be off for this test.

(a) Put the EEC switch in the off position.

1) The lower INOP segment comes on with amber light and the switch upper ON segment will go out.

(b) Put the EEC switch in the on position.

1) The amber light of the lower INOP segment will go out and the upper ON segment will come on.

(2) The test uses of a part power stop which will prevent maximum engine power. The part power stop must not operate when the engine is put into use.

B. Equipment

(1) Allen key - 0.1875 inch (4.76 millimeters) AF
B73001 - Trim Adjustment Wrench (alternative)

C. References

(1) AMM 31-41-00/201, EICAS
(2) AMM 71-00-00/201, Power Plant
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 73-21-07/401, Electronic Engine Control (EEC) Supervisory and Limiter
(5) AMM 73-21-09/501, Thrust Lever Angle (TLA) Resolver
(6) AMM 76-11-00/501, Engine Control System

D. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right
413/414	Fan Cowl Panels Left
423/424	Fan Cowl Panels Right

E. Test No. 9 - Thrust Lever Angle/Power Setting Test

S 015-171-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the right panel of the fan cowl (AMM 71-11-04/201).

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

S 225-172-R00

CAUTION: MAKE SURE THAT FFG HAS BEEN IDENTIFIED AS THE 104-DEGREE PART POWER STOP (PPS) OR THE 94-DEGREE PPS AND USE THE APPLICABLE THROTTLE ANGLE/EPR SETTING LIMITS (FIG. 515). USE OF THE WRONG DATA COULD CAUSE MIS-TRIM OF ENGINE.

(2) Examine the FFG nameplate part number to make sure the the correct power setting limits curve is used.
(a) 104-DEGREE PPS ANGLE - P/N FFG021AU, FFG021AV, and FFG021AY.
(b) 94-DEGREE PPS ANGLE - All other FFG part numbers.

NOTE: All other FFG part numbers have RR SB 73-8483 - Introduction of reduced PPS angle.

S 865-173-R00
(3) Push the tee head of the part power stop to operate the baulk on the engine control system (Fig. 514).

NOTE: This baulk puts a limit to the angular movement of the FFG input pulley.

S 415-174-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(4) Close the right fan cowl panel (AMM 71-11-04/201).

S 975-175-R00
(5) Get the pressure altitude and make a record.

S 865-176-R00
(6) Push the L or R ENG EEC switch to turn the EEC supervisory function off.

S 865-178-R00
(7) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

S 715-179-R00

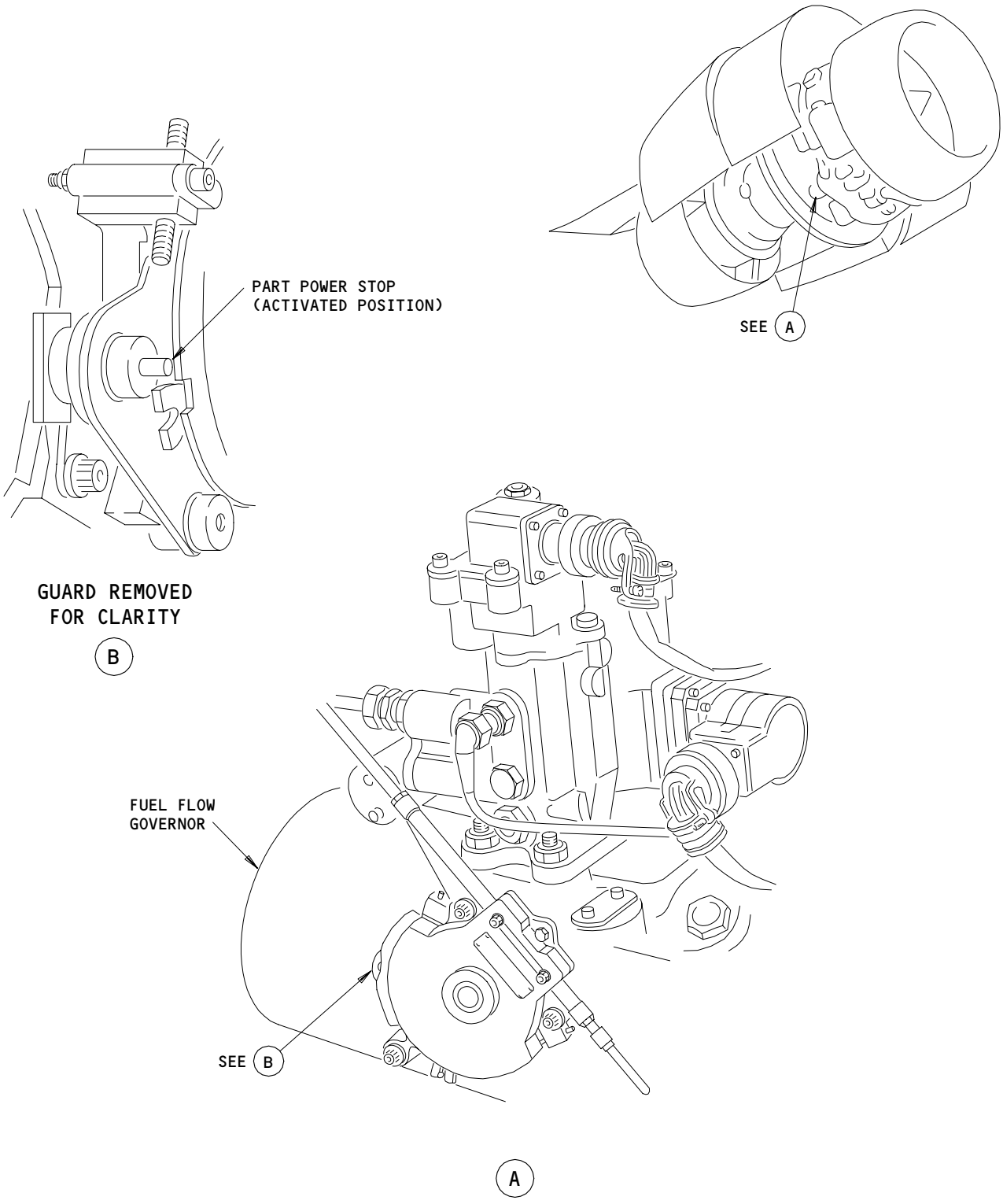
(8) Do the test for the thrust lever angle and the power setting.
  (a) Let the engine operation become stable at idle power for 5 minutes.
  (b) Slowly move the thrust lever forward (minimum of 15 seconds) until it is stopped by the part power stop.
  (c) Let the engine operation become stable for 4 minutes.
  (d) Make a record of the EPR.
  (e) Move the thrust lever rearward to idle power.
  (f) Let the engine operation become stable for 5 minutes.
  (g) Make sure the EPR is in the limits for the record of the pressure altitude (Fig. 515).

    NOTE: After engine has been operated at high power, do the procedure - Decrease of Engine Power and Stable Engine Operation Times.

  (h) If the EPR is in the limits:
    1) Push the L or R ENG EEC switch to turn the EEC supervisory function on.
    2) Select the PERF/APU page (AMM 31-41-00/201).
    3) Slowly move the thrust lever forward (minimum of 15 seconds) until stopped by the part power stop.
    4) Let the engine operation become stable for 2 minutes.
    5) Make sure the EPR Command is in the range of 0.02 to 0.07 less than the EPR Actual, that was recorded above.

      NOTE: The record of EPR Actual was made with the EEC off and the engine operation was stable.

    6) If the EPR is not in the range, examine the Thrust Lever Angle (TLA) resolver setting (AMM 73-21-09/501).
    7) If the EPR is in the range, do these steps.
      a) Make sure the difference between the EPR Command and EPR Actual is less than 0.005 and the engine operation is stable.



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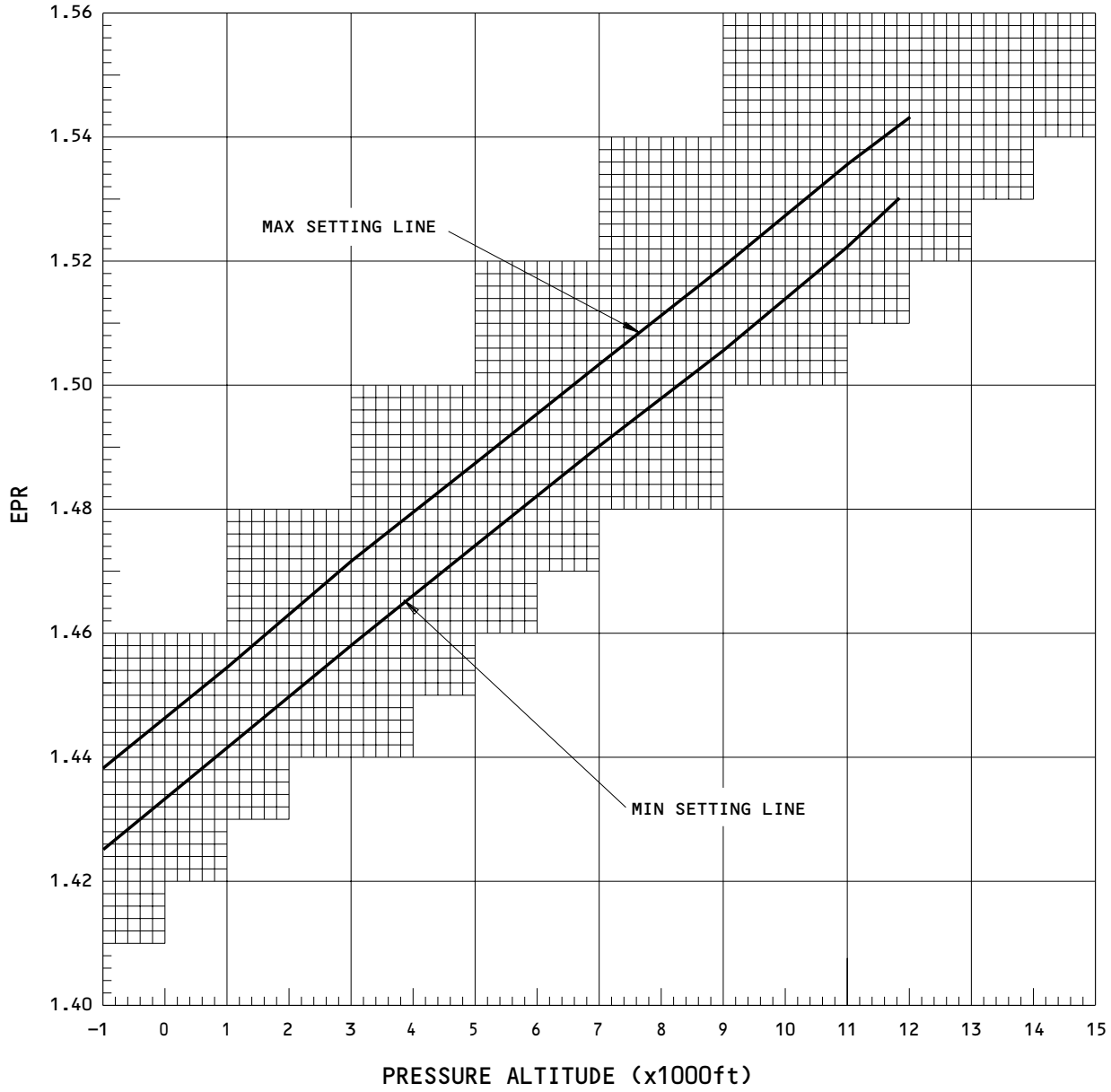
Location of Part Power Stop
Figure 514

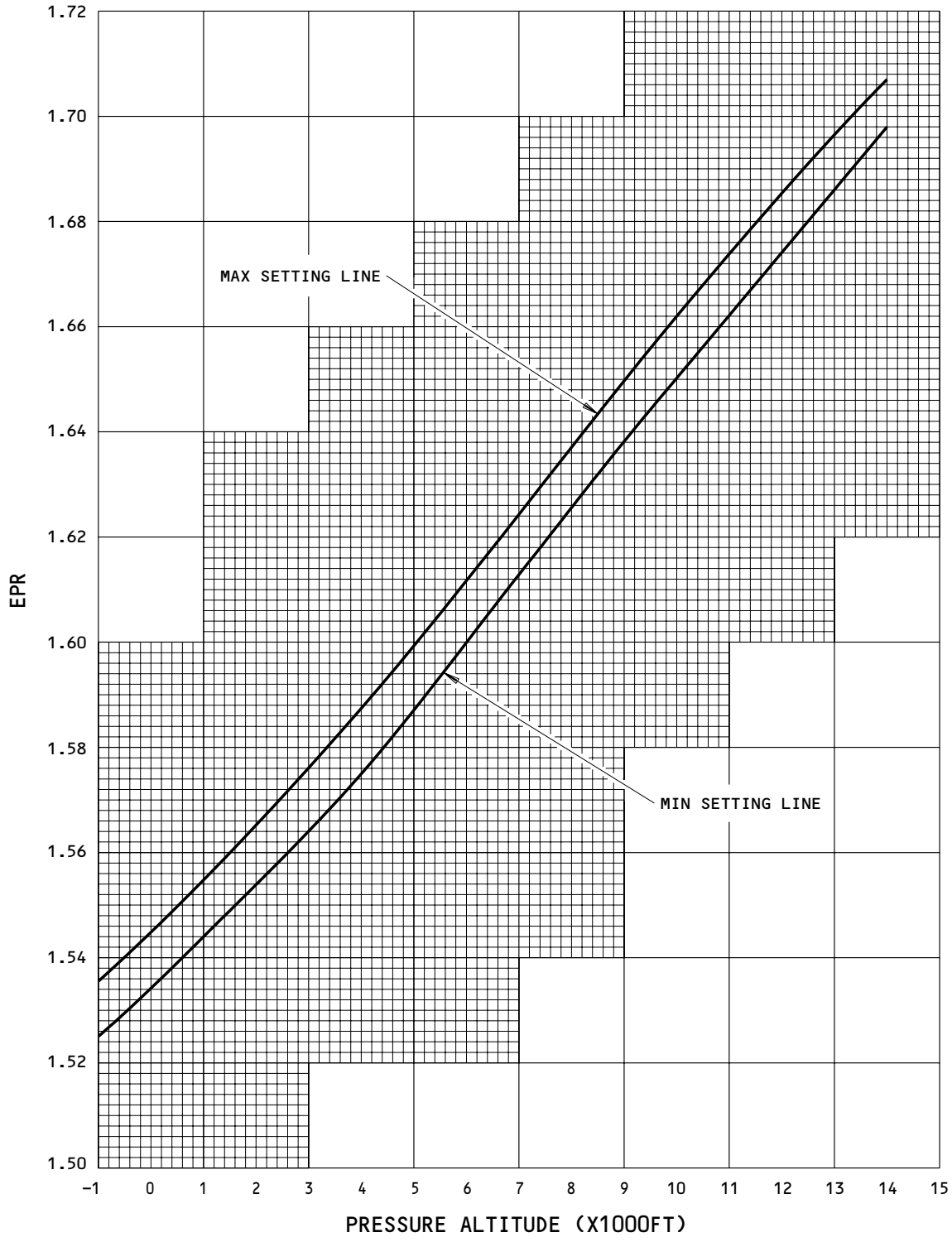


A6992A

Throttle Angle/EPR Setting Limits
(No Air Bleed or Power Off-Takes)
Figure 515 (Sheet 1)

EFFECTIVITY
ENGINES POST RR SB 73-8483

AD1303



A9243

Throttle Angle/EPR Setting Limits
(No Air Bleed or Power Off-Takes)
Figure 515 (Sheet 2)

EFFECTIVITY
ENGINES PRE RR SB 73-8483

849778

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

b) If the EPR difference is more than 0.005, replace the EEC (AMM 73-21-07/401).
c) Move the thrust lever rearward to idle power.
d) Let the engine operation become stable for 5 minutes.

(i) If the EPR is not in the limits:

1) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

2) Open the right fan cowl panel (AMM 71-11-04/201).
3) Use the Allen key to adjust the Power Trim to the EPR that is necessary (Fig. 516).

NOTE: One click of the adjuster changes the EPR by approximately 0.001.

a) Turn the adjuster clockwise to decrease the EPR.
b) Turn the adjuster counterclockwise to increase the EPR.
c) Make a record of the direction and number of clicks.

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

d) Close the right fan cowl panel (AMM 71-11-04/201).
4) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).
5) Let the engine operation become stable at idle power for 5 minutes.

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

6) Do the test procedure again.

S 865-180-R00

(9) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).

S 015-181-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(10) Open the right panel of the fan cowl (AMM 71-11-04/201).

S 865-182-R00

CAUTION: THE PART POWER STOP MUST BE DISCONNECTED BEFORE YOU DO MORE TESTS OR THE ENGINE IS PUT BACK INTO USE. THE ENGINE WILL NOT OPERATE CORRECTLY AND THE ENGINE PERFORMANCE WILL DECREASE IF THE PART POWER STOP IS NOT DISCONNECTED.

(11) Push on the underside of the tee head of the part power stop to disconnect the baulk (Fig. 514).

S 865-414-R00

(12) Move the forward thrust lever through the full range of travel.
   (a) Make sure the full forward stop on the FFG is touched with the power lever.
   (b) If the full forward stop is not touched or if the thrust control system does not move freely, do the engine control system adjustment (AMM 76-11-00/501).

S 865-417-R00

(13) Move the thrust lever rearward to idle power.

TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING

S 415-185-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(14) Close the right fan cowl panel (AMM 71-11-04/201).

TEST NO. 10 - LOW IDLE AND HIGH IDLE CHECK

TASK 71-00-00-715-588-R00

19. Test No. 10 - Low Idle and High Idle Check
    A. General
        (1) Service bulletins referred to in this procedure are:
            (a) RR 73-C793 - Fuel Flow Governor - Incorporation of External High Idle Adjustment
        (2) This test must not be done after the engine is operated at high power. If the engine was operated above high (approach) idle power, do the procedure to shutdown the engine, then do the procedure to start the engine.
    B. Equipment
        (1) Stopwatch
        (2) Open Wrench - 1/2 inches AF
    C. References
        (1) AMM 31-25-00/001, Clocks
        (2) AMM 70-12-04/201, Locking Techniques for Threaded Parts
        (3) AMM 70-51-00/201, Torque Tightening Technique
        (4) AMM 71-00-00/201, Power Plant
        (5) AMM 71-11-04/201, Fan Cowl Panels
        (6) AMM 73-21-01/401, Fuel Flow Governor
    D. Access
        (1) Location Zones
            (a) 210 Control Cabin
            (b) 410 Power Plant Nacelle Left
            (c) 420 Power Plant Nacelle Right
            (d) 413/423 Fan Cowl Panel Left
            (e) 414/424 Fan Cowl Panel Right
    E. Procedure

        S 845-589-R00

        (1) Prepare for the procedure.
            (a) Get the outside air temperature (O.A.T.) and the pressure altitude.
                1) Make a record of the value.
            (b) Open the right fan cowl (AMM 71-11-04/201).
            (c) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).
                1) Let the engine operation become stable at low idle for 5 minutes.
            (d) Make sure the cabin bleeds and the electrical power loads are set to OFF:
                1) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel (Panel 5) to the OFF position.
                2) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel (P5 panel) to the OFF position.

TEST NO. 10 - LOW IDLE AND HIGH IDLE CHECK

F. Section 1 - Low Idle Test

S 725-593-R00

(1) Low Idle Test

(a) For the applicable engine, open the circuit breaker to get high idle:

1) Overhead Circuit Breaker Panel, P11

a) 11L7, L ENG IDLE CONT

b) 11L33, R ENG IDLE CONT

(b) When the engine gets to high idle, close the circuit breaker to get low idle.

1) Let engine become stable at low idle for 1 minute.

(c) Make a record of the actual N1% and N3% speeds.

NOTE: Do not correct the N1 or N3 actual speeds for pressure altitude.

(d) Find the maximum low idle N1 limit for the day (Fig. 517):

1) Use scaling or linear interpolation between the pressure altitude lines on the graph, to draw a parallel line for the pressure altitude for the day on the graph (Fig. 517).

2) Find the intersection between the pressure altitude for the day and the OAT for the day.

a) If the intersection point is below the N3 governor limit line, the N1 (actual) MAXIMUM limit for the day is the governor limit.

b) If the intersection point is above the N3 governor limit line, the intersection point is the N1 (actual) MAXIMUM limit for the day.

3) Make a record of the N1 (actual) MAXIMUM limit for the day.

(e) Compare the N1 actual speed that was recorded during the engine run with the N1 (actual) MAXIMUM limit for the day.

NOTE: The N1 actual speed must be equal to or less than N1 (actual) MAXIMUM limit for the day.

1) If the N1 actual speed is greater than the N1 (actual) MAXIMUM limit for the day, do these steps:

a) Stop the engine (AMM 71-00-00/201).

TEST NO. 10 - LOW IDLE AND HIGH IDLE CHECK

b) Replace the Fuel Flow Governor (AMM 73-21-01/401).

NOTE: Do not adjust the FFG low idle adjuster.

c) Do Tests 1, 2, 9, and 10 with the new FFG.

2) If the N1 actual speed is equal to or less than the N1 (actual) MAXIMUM limit for the day, the N1 speed is correct.

a) Continue with the minimum N3 idle limit check below.

(f) Find the minimum low idle N3 limit for the day (Fig. 517A):

1) Use scaling or linear interpolation between the pressure altitude lines on the graph, to draw a parallel line for the pressure altitude for the day on the graph (Fig. 517A).

2) Find the intersection between the pressure altitude for the day and the OAT for the day.

a) If the intersection point is below the N3 governor limit line, the N3 (actual) MINIMUM limit for the day is the N3 governor limit.

b) If the intersection point is above the N3 governor limit line, the intersection point is the N3 (actual) MINIMUM limit for the day.

3) Make a record of the N3 (actual) MINIMUM limit for the day.

(g) Compare the N3 actual speed that was recorded during the engine run with the N3 (actual) MINIMUM limit for the day.

NOTE: The N3 actual speed that was recorded during the engine run must be equal to or greater than the N3 (actual) MINIMUM limit for the day.

1) If the N3 actual speed is less than the N3 (actual) MINIMUM limit for the day, do the following steps:

a) Stop the engine (AMM 71-00-00/201).

b) Replace the Fuel Flow Governor (AMM 73-21-01/401).

NOTE: Do not adjust the FFG low idle adjuster.

c) Do Tests 1, 2, 9, and 10 with the new FFG.

2) If the N3 speed is equal to or greater than the N3 (actual) MINIMUM limit for the day, the N3 speed is correct.

3) Do the High Idle Test procedure (Section 2).

G. Section 2 - High Idle Test

S 725-591-R00

(1) High Idle Test

(a) For the applicable engine, open the circuit breaker:

1) Overhead Circuit Breaker Panel, P11

a) 11L7, L ENG IDLE CONT

b) 11L33, R ENG IDLE CONT

(b) When the engine gets to high idle, let it become stable for 1 minute.

(c) Make a record of the N1% speed.

(d) For the applicable engine, close these circuit breakers to get low idle:

1) Overhead Circuit Breaker Panel, P11

a) 11L7, L ENG IDLE CONT

b) 11L33, R ENG IDLE CONT

(e) Use the local pressure altitude to find the N1% correction value on the altitude correction chart (Fig. 517B).

(f) Add the N1% correction value to the N1% actual speed to find the N1% corrected value.

(g) Compare the N1% corrected value with the target value for the N1% corrected limits for the OAT (Fig. 517B).

1) If the N1% corrected value is not in the limits, do these steps:

a) If the FFG incorporates SB73-C793, set the N1 idle speed. Use the wrench to turn the high idle adjuster.

NOTE: Turn the external hex nut clockwise to decrease engine N1 speed or counter clockwise to increase engine N1 speed.

NOTE: One click on the external hex nut will change the N1 speed by approximately 0.06%.

Remove the wrench and repeat the High Idle Test (Section 2).

b) If the FFG does NOT incorporate SB73- C793, do the following. Do the Power Plant Operation (normal) procedure to do the engine shutdown (AMM 71-00-00/201. Replace the Fuel Flow Governor (AMM 73-21-01/401) and then do Tests 1, 2, 9 and 10 with the new FFG.

2) If the N1 corrected value is within the limits, the engine is set correctly.

H. Section 3 - Acceleration/Deceleration Time Check.

S 725-605-R00

(1) Acceleration/Deceleration Time Check.

(a) Make a note of the N1 acceleration time from low idle to high idle.

1) Prepare to measure the acceleration time with a stopwatch.
2) For the left engine, open this circuit breaker on the overhead panel, P11:
a) 11L7, L ENG IDLE CONT
3) Measure the acceleration time from the N1 low idle to high idle.
4) For the right engine, open this cucuit breaker on the overhead panel, P11:
a) 11L33, R ENG CONT
5) Measure the acceleration time from the N1 low idle to high idle.

NOTE: The acceleration time must not be more than ten seconds.

(b) Let the engine operation become stable for 1 minute.
(c) Make a record of the N1% actual (high idle).
(d) Add 0.5% to the N1% actual (low idle).
(e) Make a record of this value as N1% (low idle).
(f) Make a check of the deceleration time from approach idle to the N1% (low idle) from the last step.

1) Prepare to measure the deceleration time with a stopwatch.
2) For the left engine , close this circuit breaker:
a) 11L7, L ENG IDLE CONT

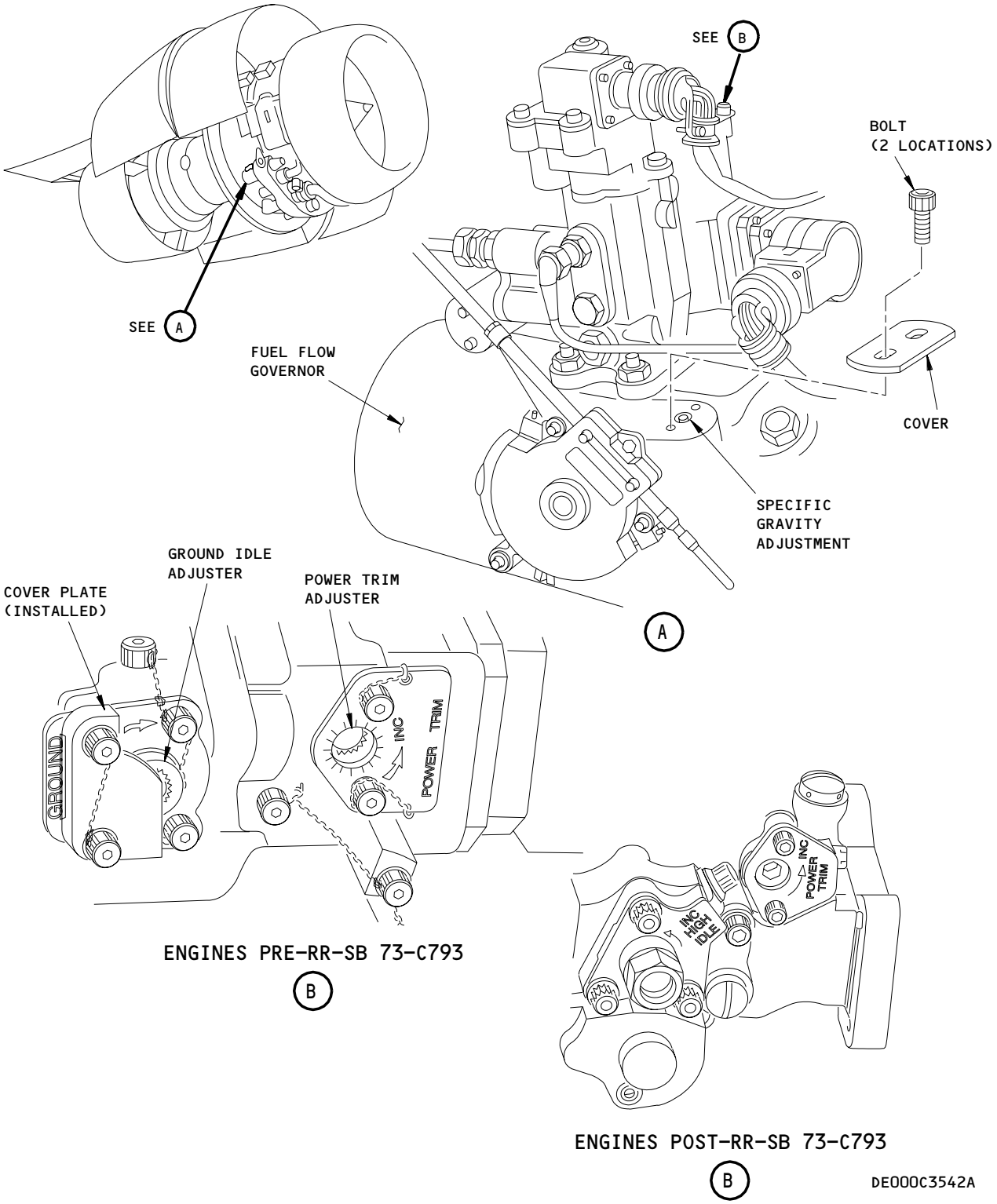
3) Measure the deceleration time from approach idle to the N1% (low idle) value.
4) For the right engine, close this circuit breaker.
   a) 11L33, R ENG CONT
5) Measure the deceleration time from approach idle to the N1% (low idle) value.

NOTE: The deceleration time must not be more than 15 seconds.

(g) Replace the Fuel Flow Governor (FFG) (AMM 73-21-01/401) and do Tests No. 1, 2, 9, and 10 again if one of the conditions that follow occurs.
1) The acceleration time from low idle to N1% (high idle) is more than 10 seconds.
2) The deceleration time from high idle to N1% (low idle) is more than 15 seconds.

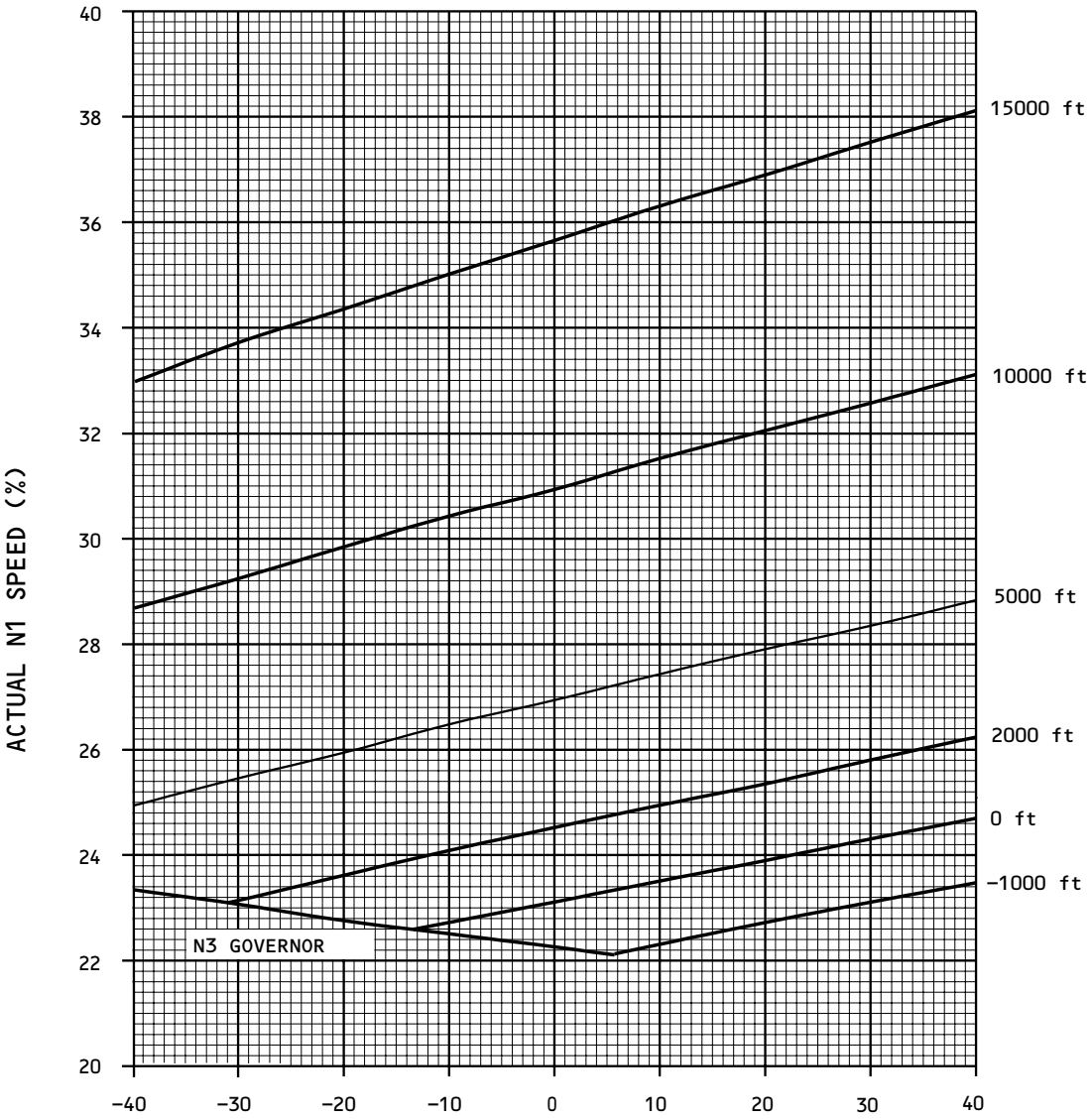
S 845-594-R00

(2) Put the airplane in a serviceable condition:
(a) Make sure that the engines are shut down (AMM 71-00-00/201).
(b) Close the right fan cowl (AMM 71-11-04/201).
(c) If it is necessary, continue to the next applicable test.



Power Trim and Specific Gravity Adjustment
Figure 516

H97688

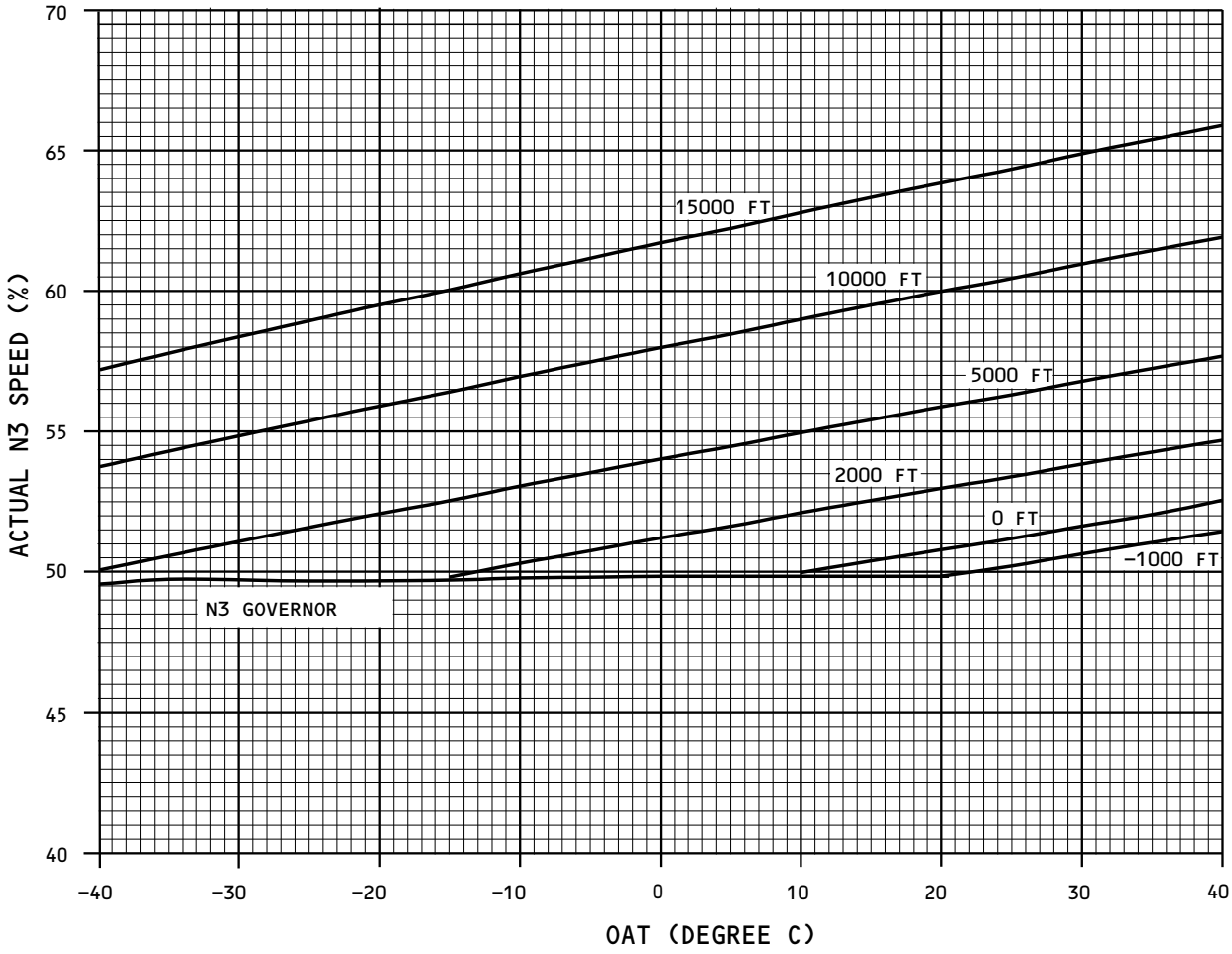


LOW IDLE SETTING CHARTS – MAXIMUM N1 SPEED LIMITS

DE000C8590B

NOTE: NO AIR BLEED OR POWER OFF-TAKES.

Maximum Low Idle N1 Percent (Actual) Setting Check Limits
Figure 517

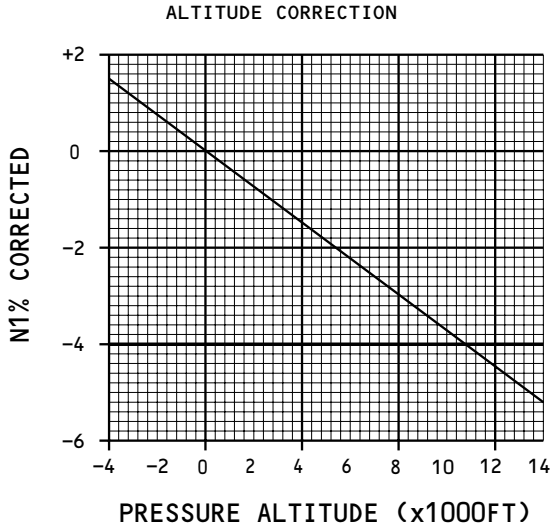


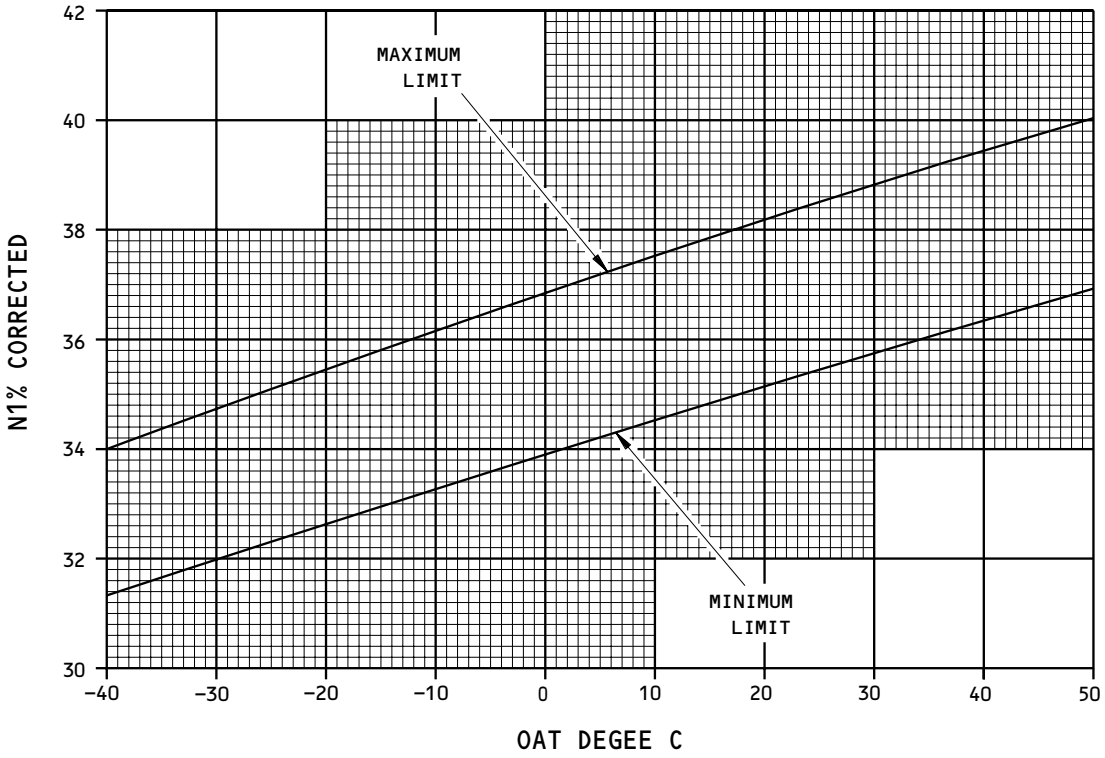
LOW IDLE SETTING CHARTS - MIN N3 SPEED LIMIT

NOTE: NO AIR BLEED OR POWER OFF-TAKES.

DE000C8591A

Minimum Low Idle N3 Percent (Actual) Settings Check Limits
Figure 517A

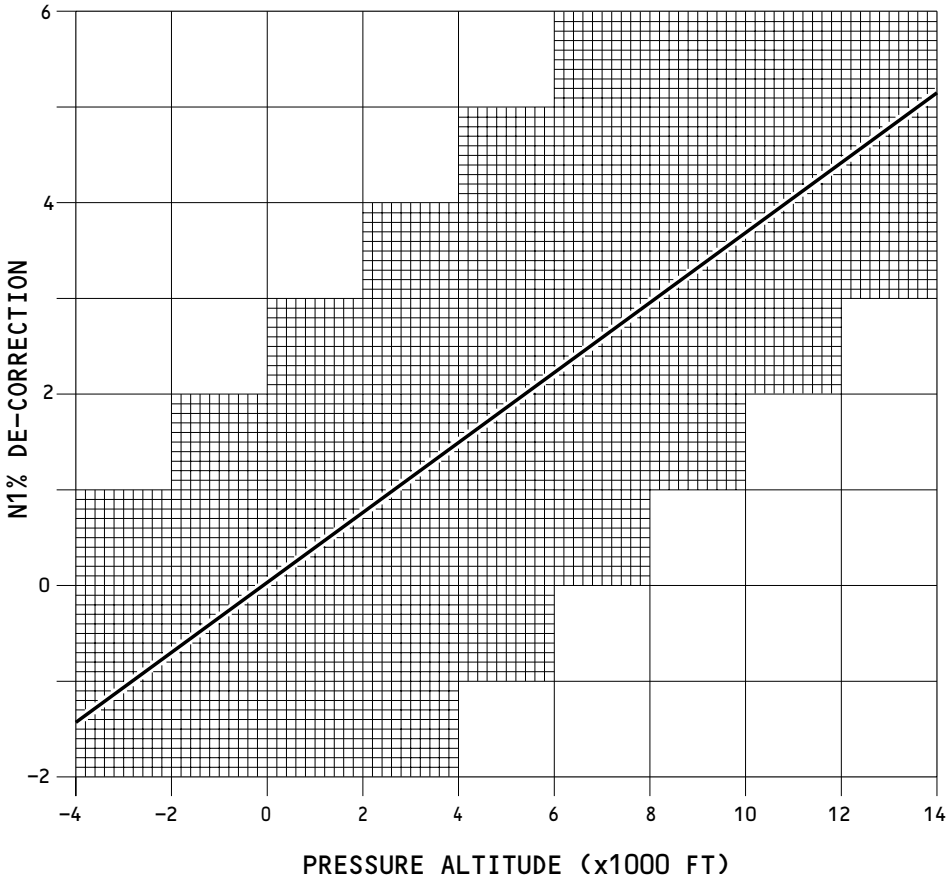




DE000C3767B

NOTE: NO AIR BLEED OR POWER OFF-TAKES.

N1% Pressure Altitude Correction and High Idle Check Limits
Figure 517B



DE000C6205

Pressure Altitude N1% De−correction
(No Air Bleed or Power Off−Take)
Figure 518

TEST NO. 11 - ACCELERATION AND DECCELERATION

TASK 71-00-00-715-197-R00

20. Test No. 11 - Acceleration and Deceleration

A. General

(1) This test must be done with only the EEC limiter serviceable. The EEC supervisory function must be off for this test.

(a) Set the EEC to off and the EEC switch lower INOP segment comes on with amber light and the switch upper ON segment will go out.

(b) Set the EEC to on and the EEC switch lower INOP segment amber light will go out and the switch upper segment ON segment will come on.

B. Equipment

(1) Stopwatch

C. References

(1) AMM 71-00-00/201, Power Plant

(2) AMM 73-21-00/201, Engine Fuel Control System

(3) AMM 73-21-01/401, Fuel Flow Governor

D. Access

(1) Location Zones

210 Control Cabin

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

E. Test No. 11 - Acceleration and Deceleration Test

S 225-198-R00

(1) Make a check of the fuel flow governor (FFG) specific gravity adjuster setting.

S 975-199-R00

(2) Get the outside air temperature (O.A.T.) and pressure altitude and make a record.

(a) Set the datum pressure on the altimeter at 1013 mb, the pressure indicated is the pressure altitude.

S 975-418-R00

(3) Use the O.A.T. and pressure altitude to find the minimum rated thrust EPR (Refer to Fig. 502).

(a) Make a record of the minimum rated thrust EPR.

S 975-419-R00

(4) Use the minimum rated thrust EPR and find the 95% minimum rated thrust EPR (Refer to Fig. 519).

(a) Make a record of the 95% minimum rated thrust EPR.

S 865-420-R00

(5) Push the L or R ENG EEC switch to turn the EEC supervisory function off.

TEST NO. 11 - ACCELERATION AND DECCELERATION

S 865-204-R00
(6) Supply the external electrical power (AMM 24-22-00/201).

S 865-205-R00
(7) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

S 865-206-R00
(8) Remove the electrical load from the IDG and the bleed air from the engine.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 865-421-R00
(9) Let the engine operation become stable at idle power for 5 minutes.

S 975-422-R00
(10) Use the O.A.T. only to find the N1% corrected value from the MIN CHECKING LINE limit (Fig. 517B).
  (a) Make a record of the N1% corrected.

S 975-423-R00
(11) Use the pressure altitude and find the N1% decorrection value from the altitude decorrection graph (Fig. 518).

S 975-210-R00
(12) Add the N1% decorrection value to N1% corrected value to calculate the N1% actual.

S 715-211-R00
(13) Do the acceleration and deceleration time test.
  (a) Move the thrust lever forward to get the N1% actual value.
  (b) Let the engine operation become stable for 5 minutes.
  (c) Measure the acceleration and deceleration time.
    1) Prepare to measure the acceleration and deceleration time with a stopwatch.

TEST NO. 11 - ACCELERATION AND DECCELERATION

CAUTION: THE NEXT THREE STEPS MUST BE DONE IN LESS THAN 30 SECONDS TO GET CORRECT TEST DATA.

2) Move the thrust lever forward to the maximum forward position in less than 1 second.

NOTE: The engine power must not be more than the minimum rated thrust EPR.

a) Measure the acceleration time to get to 95% minimum rated thrust EPR.
b) Monitor the EPR.

3) Immediately at 95% minimum rated thrust EPR, move the thrust lever rearward to make sure the minimum rated thrust EPR limit is not exceeded.
4) Make a record of the acceleration time.

(d) Measure the deceleration time when you move the thrust lever.
1) Prepare to measure the deceleration time with a stopwatch or set the elasped time on the instrument panel clock to zero (AMM 31-25-00/001).
2) Slowly move the thrust lever forward to get the minimum rated thrust EPR.
3) Move the thrust lever rearward to low idle power in less than 1 second.
a) Measure the deceleration time from the minimum rated thrust EPR to 1.075 EPR.
4) Make a record of the deceleration time.

(e) Let the engine operation become stable for 5 minutes.

(f) Make a check that the acceleration time is between the limits (Fig. 520).

(g) Make a check that the deceleration time is not more than 10 seconds.

(h) If acceleration and/or deceleration times are not in the limits, do the steps that follow:
1) Replace the Fuel Flow Governor (FFG) (AMM 73-21-01/401).
2) Do the tests in the Power Plant Test Reference Table that are necessary after the FFG is replaced.
3) Do Test No. 11 again.

S 865-212-R00

(14) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
(a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
(b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.

TEST NO. 11 - ACCELERATION AND DECCELERATION

S 865-213-R00

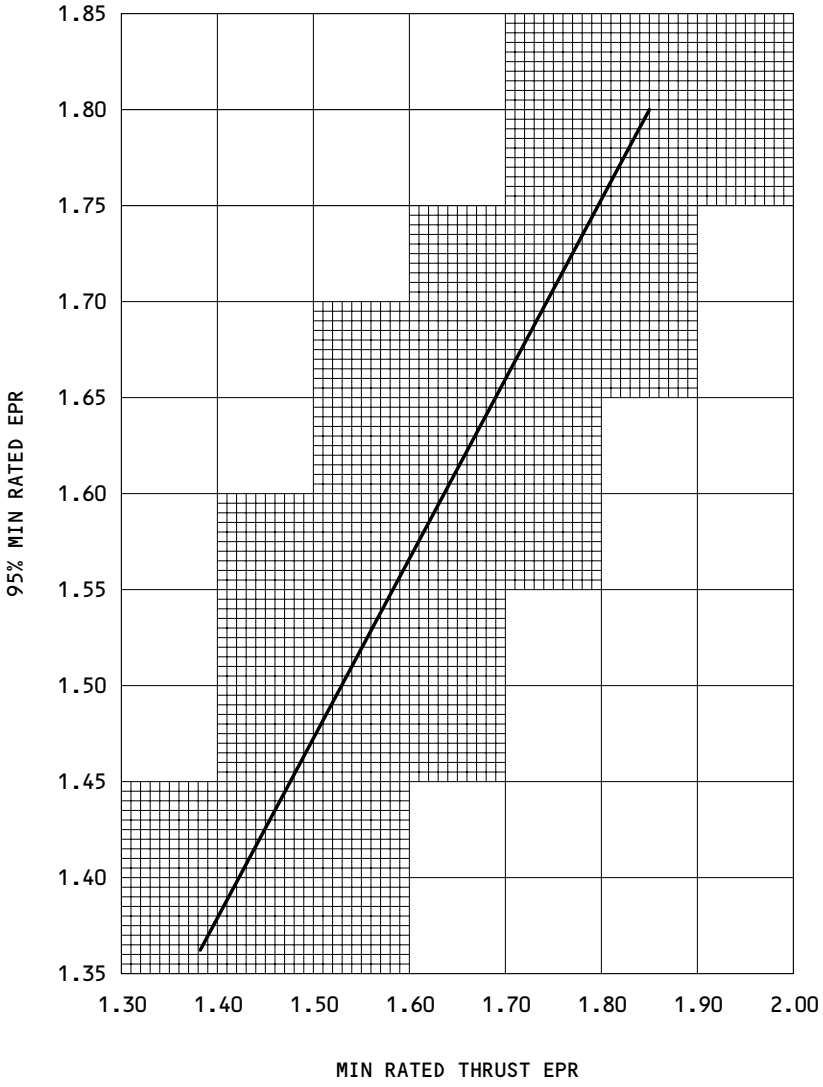
(15) Do the Power Plant Operation (Normal) procedure to do the engine shutdown or do the next test.

S 865-214-R00

(16) Push the L or R ENG EEC switch to turn the EEC supervisory function on.

S 865-216-R00

(17) Remove the electrical supply if it is not necessary (AMM 24-22-00/201).



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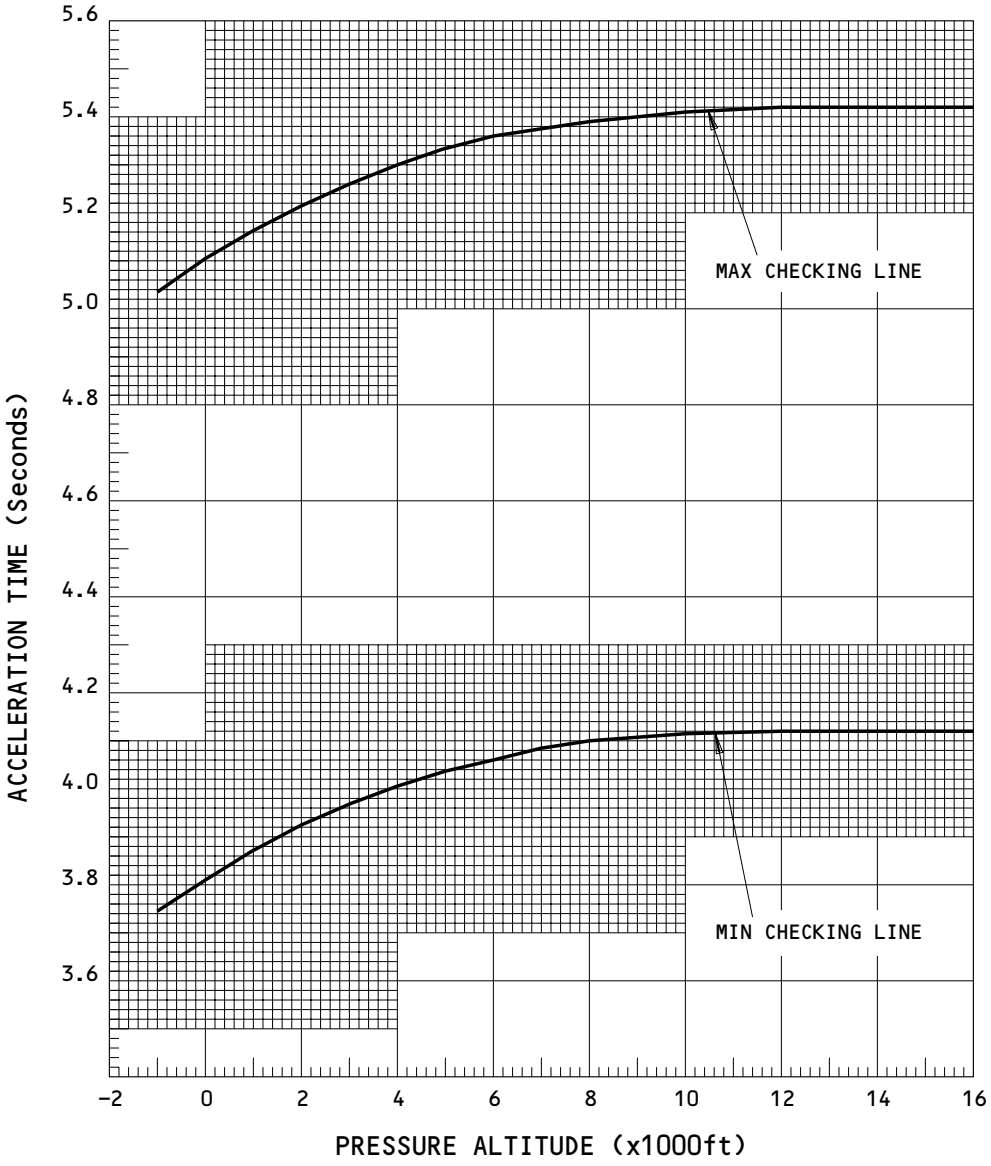
95% Minimum Rated Thrust EPR
(No Air Bleed or Power Off-takes)
Figure 519

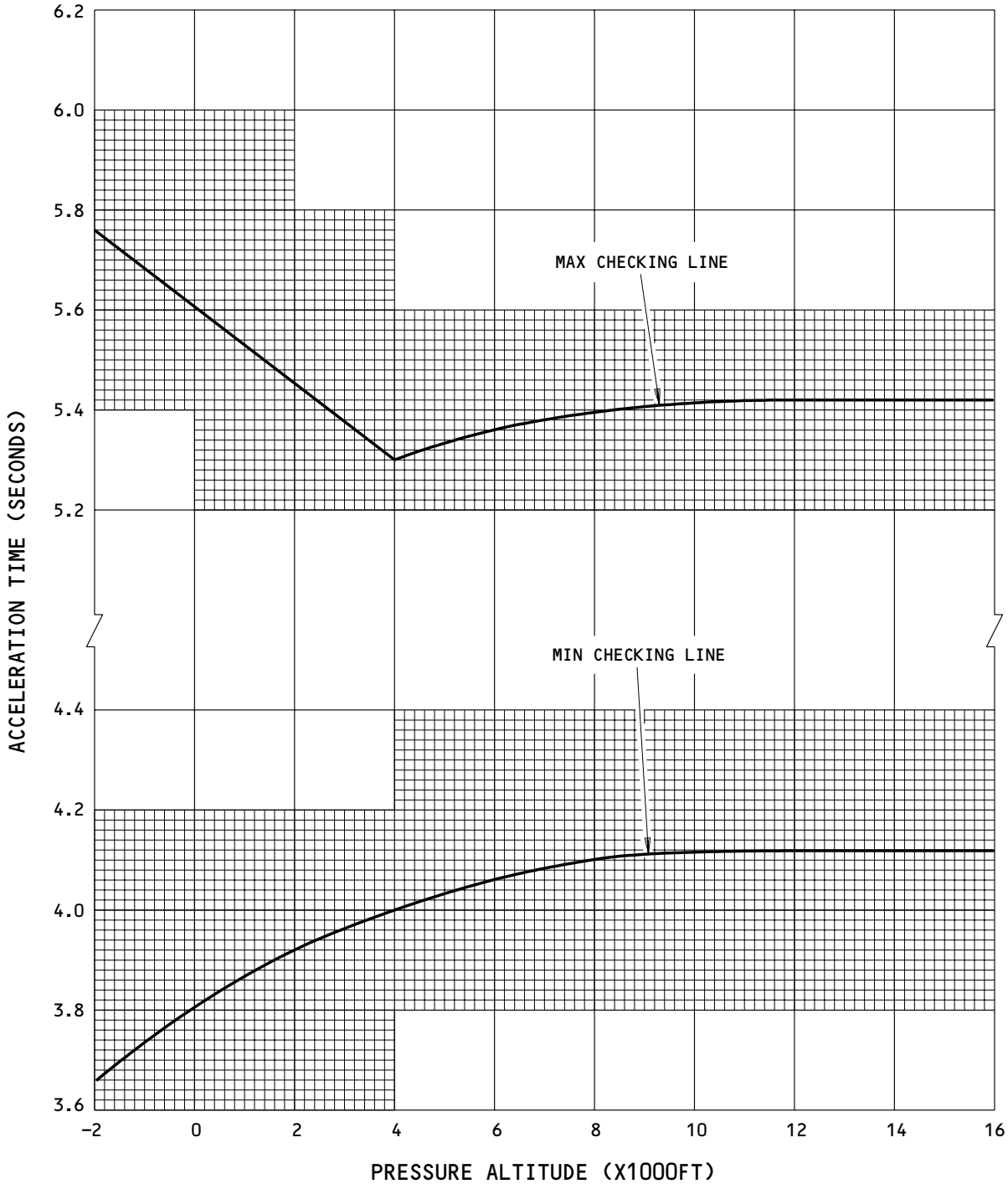


84271

High Idle to 95% Minimum Rated Thrust
Acceleration Time Limits (No Air Bleed or Power Off-Takes)
Figure 520 (Sheet 1)

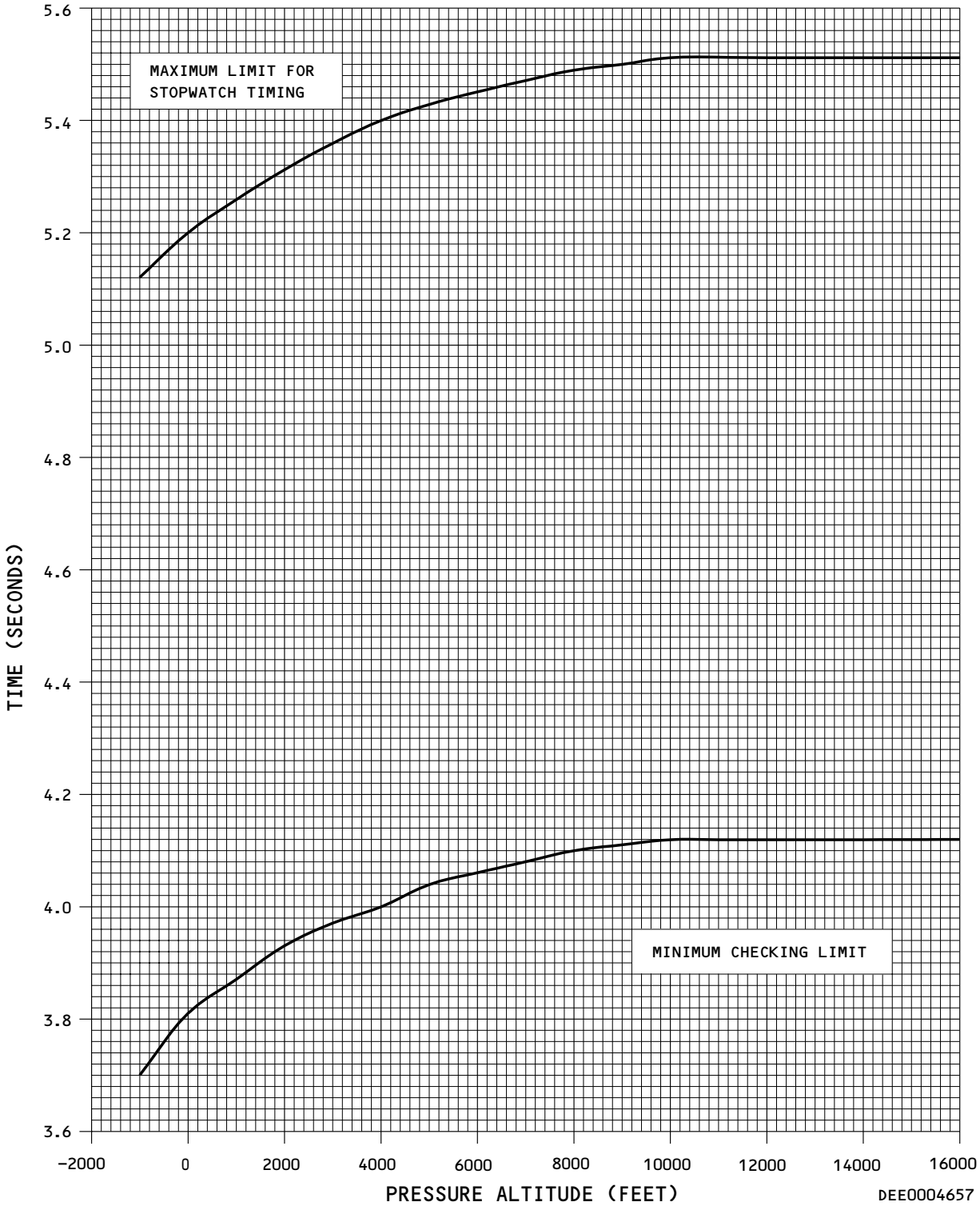
EFFECTIVITY
RB211-535E4 ENGINES
PRE-RR-SB 72-8773
PRE-RR-SB 72-C230

188243



High Idle to 95% Minimum Rated Thrust
Acceleration Time Limits (No Air Bleed or Power Off-Takes)
Figure 520 (Sheet 2)

A9245



High Idle to 95% Minimum Rated Thrust
Acceleration Time Limits (No Air Bleed or Power Off-Takes)
Figure 520 (Sheet 3)

EFFECTIVITY
RB211-535E4 ENGINES
POST-RR-SB 72-C230

L03300

TEST NO. 12 - THRUST REVERSER

TASK 71-00-00-715-217-R00

21. Test No. 12 - Thrust Reverser

A. General

(1) This test may be done without engine operation (AMM 78-30-00/501) or with the engine in operation.

B. References

(1) AMM 71-00-00/201, Power Plant

(2) AMM 78-30-00/501, Thrust Reverser System

C. Test No. 12 - Thrust Reverser Test

S 945-218-R00

CAUTION: MAKE SURE THE AREA AROUND AND BELOW THE ENGINE IS CLEAN OF UNWANTED OBJECTS AND LOOSE MATERIALS WHICH COULD BE MOVED BY THE AIRFLOW INTO THE ENGINE. DAMAGE TO THE ENGINE COULD OCCUR.

(1) Remove all unwanted objects and loose materials from the area around and below the engine nacelle that could be moved by the airflow of the reverse thrust into the engine.

S 865-219-R00

(2) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

S 865-220-R00

(3) Let the engine operation become stable at idle power for 5 minutes.

S 715-221-R00

(4) Do the thrust reverser test.

(a) Make a check that the REV indication on the EICAS upper CRT is not shown.

(b) Move the reverse thrust lever rearward to the reverse thrust interlock position.

NOTE: The reverse thrust lever will not move through this position until the thrust reverser has extended. The reverse thrust interlock baulk mechanism will prevent reverse thrust lever movement to increase thrust until the thrust reverser has extended.

(c) Make sure an amber-colored REV indication is shown on the EICAS upper CRT displays while the translating cowl moves to the extended position (approximately 2 seconds).

(d) After the translating cowl moves to the fully extended position, make sure the REV indication on the EICAS upper CRT changes color from amber to green.

TEST NO. 12 - THRUST REVERSER

CAUTION: THE ENGINE SHOULD NOT BE OPERATED AT MORE THAN REVERSE IDLE POWER FOR THIS TEST.

BUT, YOU ARE PERMITTED TO INCREASE POWER MOMENTARILY TO 30% N1 TO MAKE A CHECK THAT THE REVERSE THRUST INTERLOCK BAULK MECHANISM HAS CORRECTLY OPERATED.

(e) Slowly move the reverse thrust lever rearward to increase reverse thrust to 30% N1.
(f) Make sure the reverse thrust interlock baulk mechanism has operated.
(g) Move the reverse thrust lever forward and down.
(h) Make sure the REV indication on the EICAS upper CRT changes color from green to amber while the translating cowl moves to the retracted position (approximately 2 seconds).
(i) After the translating cowl moves to the fully retracted position, make sure the REV indication is not shown on the EICAS upper CRT.
(j) Slowly move the forward thrust lever from the forward idle position.

NOTE: The forward thrust interlock mechanism prevents forward thrust lever movement until the thrust reverser is retracted.

1) Make sure the forward thrust lever moves smoothly.
(k) Move the forward thrust lever to the idle position.

S 865-222-R00
(5) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201) or continue with the subsequent test.

TEST NO. 13 - TAKE-OFF POWER

TASK 71-00-00-715-223-R00

22. Test No. 13 - Take-Off Power

A. General

(1) This test must be done with only the EEC limiter on. The EEC supervisory function must be off.

(a) Set the EEC to off and the EEC switch lower INOP segment comes on with amber light and the switch upper ON segment will go out.

(b) Set the EEC to on and the EEC switch lower INOP segment amber light will go out and the switch upper segment ON segment will come on.

B. References

(1) AMM 71-00-00/201, Power Plant

C. Access

(1) Location Zones

210 Control Cabin
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Test No. 13 - Take-Off Power Test

S 975-224-R00

(1) Get the outside air temperature (O.A.T.) and pressure altitude.

(a) Set the datum pressure on the altimeter at 1013 mb, the pressure indicated is the pressure altitude.

(b) Make a record of these values.

S 975-225-R00

(2) Use the O.A.T. and pressure altitude, and find the minimum rated thrust EPR (Fig. 502).

S 865-226-R00

(3) Push the L or R ENG EEC switch to turn the EEC supervisory function off.

S 865-228-R00

(4) Supply the external electrical power (AMM 24-22-00/201).

S 865-229-R00

(5) For engine operation at high power, refer to Airplane Skidding Prevention for High Power Operation for the minimum gross weight requirements (AMM 71-00-00/201).

S 865-230-R00

(6) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).

TEST NO. 13 - TAKE-OFF POWER

S 865-231-R00

(7) Remove the electrical load from the IDG and the bleed air from the engine.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 865-232-R00

(8) Let the engine operation become stable at idle power for 5 minimutes.

S 715-233-R00

(9) Do the take-off power test.
  (a) Slowly move the thrust lever forward.
  (b) Make sure the engine operates at minimum rated thrust EPR.
  (c) Move the thrust lever rearward to idle power.
  (d) Push the L or R ENG EEC switch to turn the EEC supervisory function on.
  (e) Slowly move the thrust lever forward to the maximum forward position.
  (f) Make a check that there is an EEC limit to engine power.
  (g) Make sure the EEC limit is not more than 0.01 EPR less than the record of the minimum rated thrust EPR.
  (h) Make a record of the EPR limit.
  (i) Move the thrust lever rearward to idle power.
  (j) Let the engine operation become stable for 5 minutes.

S 865-234-R00

(10) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
  (a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
  (b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.

S 865-235-R00

(11) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201) or continue with the subsequent test.

S 865-236-R00

(12) Remove the electrical supply if it is not necessary (AMM 24-22-00/201).

TEST NO. 14 - OIL FILTER CONTAMINATION

TASK 71-00-00-715-237-R00

23. Test No. 14 - Deleted

A. General

(1) Not Used.

TEST NO. 15 - REVERSE POWER

TASK 71-00-00-715-246-R00

24. Test No. 15 - Reverse Power

A. General

(1) This test makes a check of engine reverse power with the thrust reverser operation prevented.

B. Equipment

(1) Deactivation Pin B78001-1

C. References

(1) AMM 71-00-00/201, Power Plant
(2) AMM 71-11-04/201, Fan Cowl Panels
(3) AMM 78-31-00/201, Thrust Reverser System
(4) AMM 78-34-03/601, Thrust Reverser Feedback Cables

D. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right
413/423	Fan Cowl Panel Left
414/424	Fan Cowl Panel Right

E. Test No. 15 - Reverse Power Test

S 045-324-R00

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 035-247-R00

(2) Disconnect thrust reverser feedback push-pull cables from the throttle baulk levers on the strut drum shaft (AMM 78-34-03/601).

NOTE: The reverse thrust lever can be moved to increase thrust with the reverser retracted in the forward thrust position. The throttle baulk which prevents increased thrust when the reverser is not fully extended is now disconnected.

S 435-248-R00

(3) Temporarily safety the cables to clear the strut drum.

S 435-249-R00

(4) Install the selector valve deactivation (lockout) pin B78001-1 in the thrust reverser isolation valve (AMM 78-31-00/201).

TEST NO. 15 - REVERSE POWER

S 865-250-R00
(5) Supply the external electrical power (AMM 24-22-00/201).

S 975-267-R00
(6) Find the pressure altitude.
(a) Make a record of the pressure altitude.

S 865-268-R00
(7) Do the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).
(a) Let the engine operation become stable for 5 minutes.

S 865-269-R00
(8) Remove the electrical load from the IDG and the bleed air from the engine.
(a) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on panel P5 to OFF.
(b) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to OFF.

S 715-270-R00
(9) Do the reverse power test.
(a) Move the reverse thrust lever up and aft until stopped by the reverse stop of the fuel flow governor (FFG).
(b) Let the engine operation become stable.
(c) Make a record of the EPR.
(d) Move the reverse thrust lever forward and down to go to low idle power.
(e) Let the engine operation become stable for 5 minutes.
(f) Supply the electrical load from the IDG and the bleed air from the engine if it is necessary.
1) Put the BLEED AIR L ENG and the BLEED AIR R ENG switches on the bleed air control panel on the panel P5 to ON.
2) Put the L GEN CONT and the R GEN CONT switches on the electrical systems control panel on the P5 panel to ON.
(g) Do the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).
(h) Use the EPR and pressure altitude values and make sure the EPR is in the limits (Fig. 521).
(i) If the EPR is not in the limits, adjust the FFG reverse power stop as follows:

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

1) Open the right fan cowl panel (AMM 71-11-04/201).

TEST NO. 15 - REVERSE POWER

2) Remove the lockwire which holds the stop screw for the reverse power (Fig. 520B).
3) Turn the forward end of the stop screw to adjust the reverse power stop.

NOTE: One turn equals approximately 0.012 EPR.

a) Turn the stop screw counterclockwise to increase EPR.
b) Turn the stop screw clockwise to decrease EPR.

4) Install lockwire on the stop screw.

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

5) Close the right fan cowl panel (AMM 71-11-04/201).
6) Do the reverse power test again.

S 035-271-R00

(10) Remove the selector valve deactivation (lockout) pin from the isolation valve (AMM 78-31-00/201).

S 435-272-R00

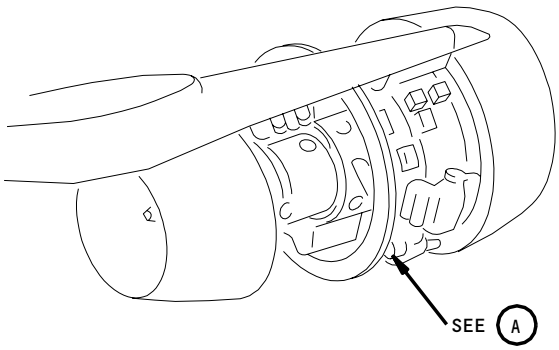
(11) Connect the thrust reverser feedback push-pull cables to the throttle baulk levers on the strut drum shaft (AMM 78-34-03/601).

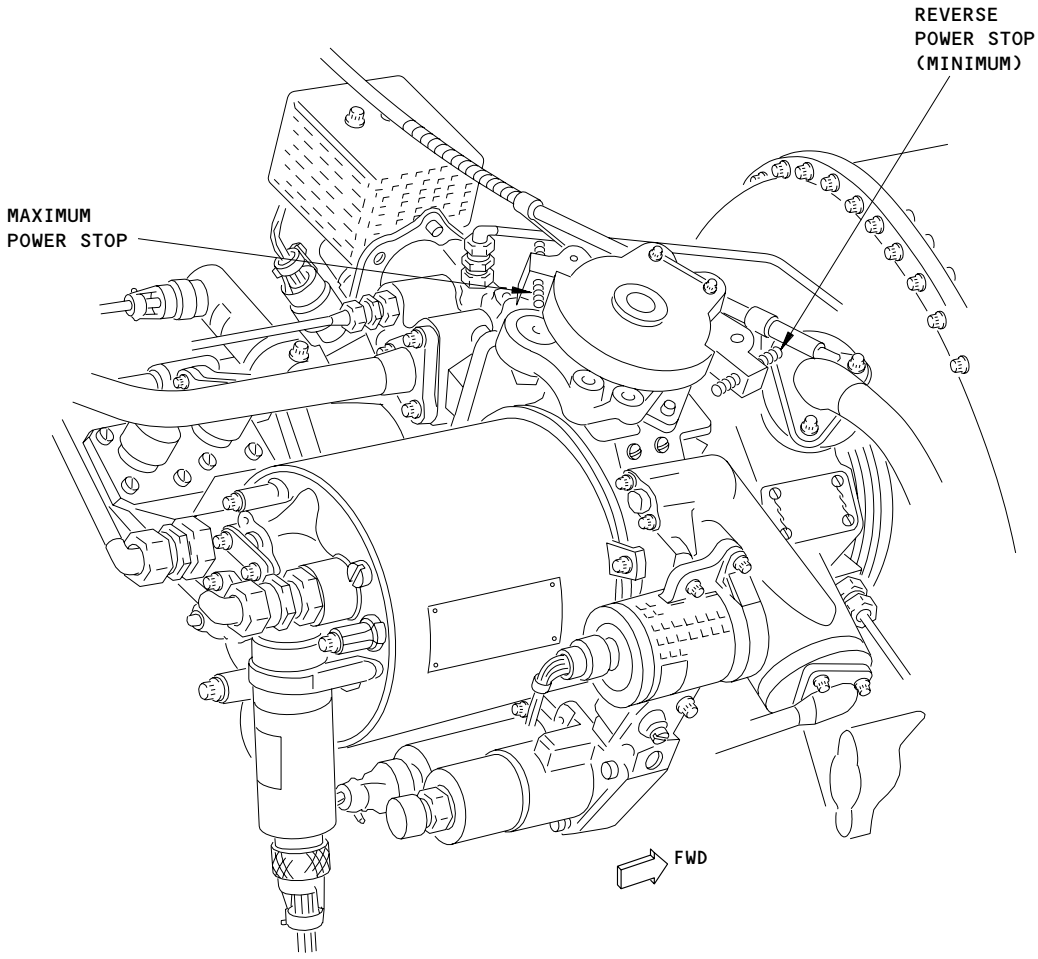
S 445-411-R00

(12) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 865-273-R00

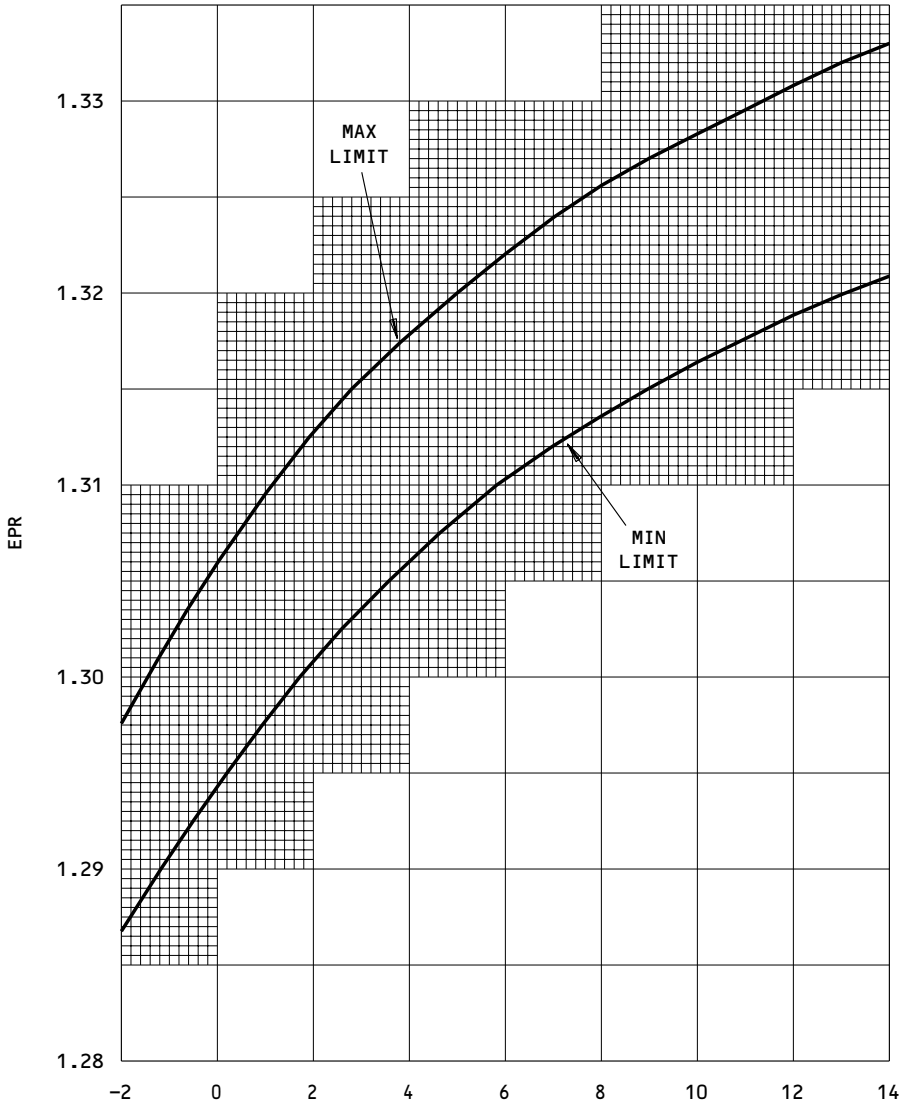
(13) Remove the electrical supply if it is not necessary (AMM 24-22-00/201).





C3570

Fuel Flow Governor – Maximum and Reverse Power Stops
Figure 520A



78462

Reverse Power Setting Limits
Figure 521

Not Used
Figure 521A

TEST NO. 15A - REVERSE POWER

TASK 71-00-00-715-001-R00

25. Test No. 15A - Reverse Power

A. General

(1) This test is used as an alternate procedure to Test No. 15.

(2) During the landing of the airplane, the EPR data must be kept. This data is used to measure the reverse power performance of the engine.

(3) The flight crew must keep the EPR data when the airplane has completed the landing.

(a) A record of the EPR value must be made at the largest indication of reverse power.

(b) This record must be made when the airspeed is 80 knots during the landing.

(4) A record of the pressure altitude indication must be made at the first possible time during the airplane landing.

B. Consumable Materials

(1) Lockwire
British Spec - DTD 189A, 22SWG
American Spec - 21AWG
OMat No. - 238

C. References

(1) AMM 71-11-04/201, Fan Cowl Panels

D. Access

(1) Location Zones

210	Control Cabin
410	Power Plant Nacelle Left
420	Power Plant Nacelle Right
413/423	Fan Cowl Panel Left
414/424	Fan Cowl Panel Right

E. Test No. 15A - Reverse Power

S 975-291-R00

(1) Get the record of the values for the EPR and the pressure altitude.

NOTE: The record of the EPR value and the pressure altitude must be made when the airplane lands. The flight crew must keep the data.

S 975-292-R00

(2) Make a graph of the EPR and pressure altitude values on Fig. 521B.

S 825-293-R00

(3) Make sure the point is in the limits that are given (Fig. 521B).

(a) If the point is in the limits given, it is not necessary to adjust the reverse power stop.

(b) If the points are not in the limits, adjust the reverse power stop.

TEST NO. 15A - REVERSE POWER

S 825-395-R00

(4) Adjust the Reverse Power Stop on the Fuel Flow Governor (FFG).

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAP WHEN YOU OPEN THE FAN COWL PANEL. DAMAGE TO THE KEVLAR WRAP CAN OCCUR WHEN YOU DO NOT FOLLOW THE PRECAUTIONS.

(a) Open the right fan cowl panel (AMM 71-11-04/201).
(b) Remove the lockwire that holds the stop screw for the reverse power (Fig 520B).
(c) Turn the forward end of the stop screw to adjust the reverse power stop.
    1) Turn the stop screw counterclockwise to increase the EPR.

        NOTE: One turn equals approximately 0.012 EPR.

    2) Turn the stop screw clockwise to decrease the EPR.

        NOTE: One turn equals approximately 0.012 EPR.

(d) Install the lockwire on the stop screw.

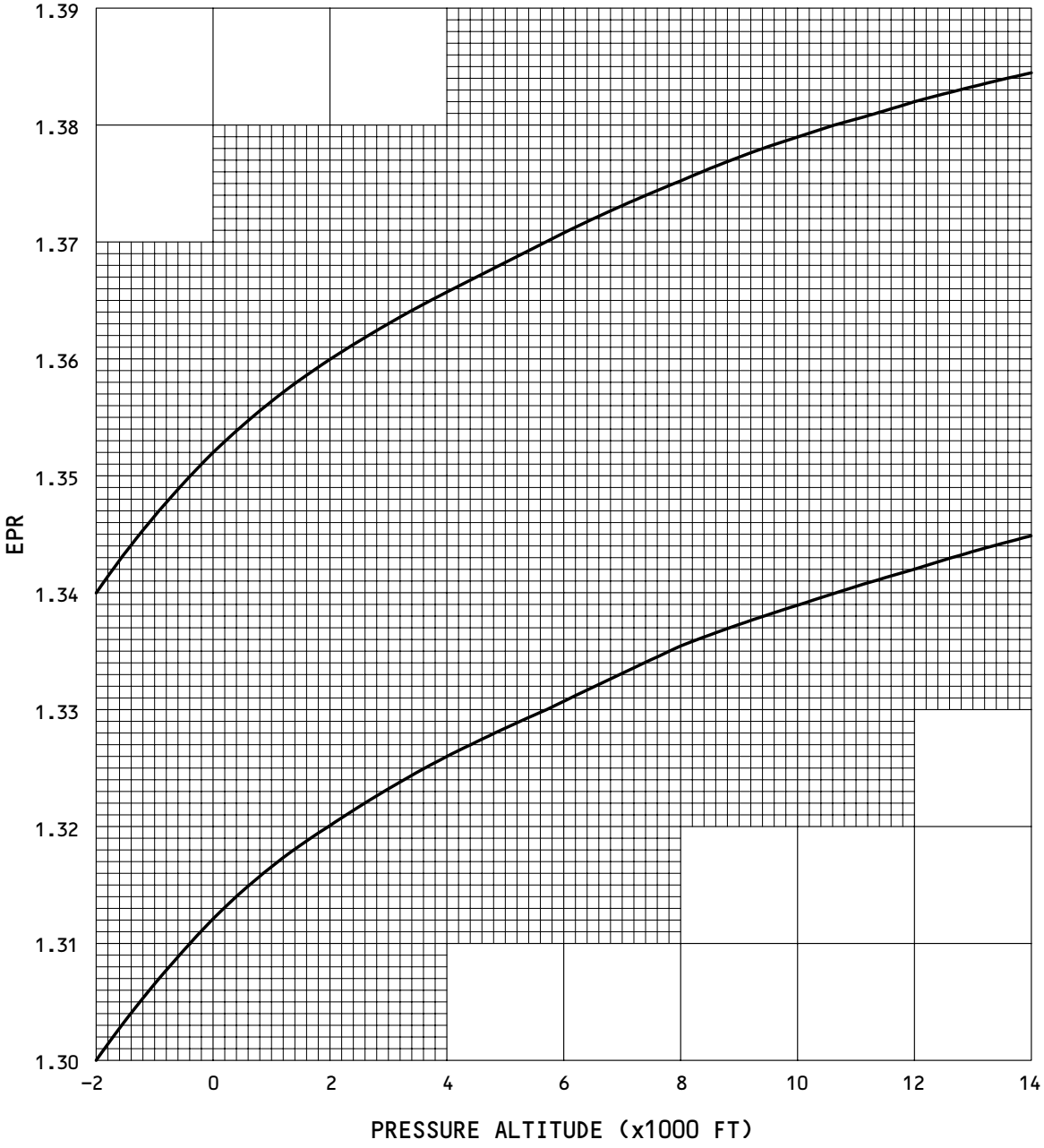
CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAP WHEN YOU CLOSE THE FAN COWL PANEL. DAMAGE TO THE KEVLAR WRAP CAN OCCUR WHEN YOU DO NOT FOLLOW THE PRECAUTIONS.

(e) Close the right fan cowl panel (AMM 71-11-04/201).

    NOTE: Make sure the tension of the lockwire is correct.

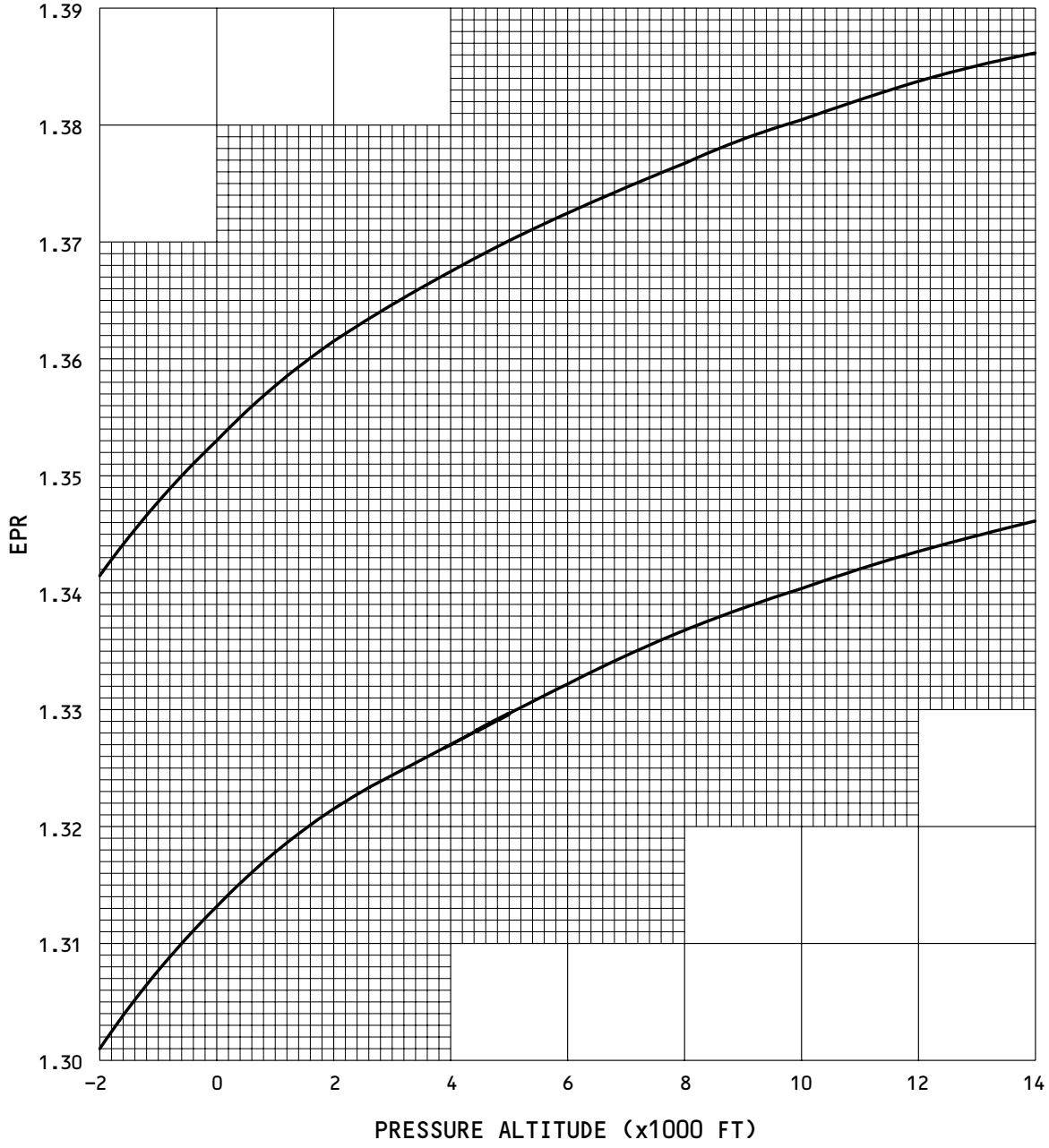
S 715-294-R00

(5) Do this test again, or do the Test No. 15.



A9811

Reverse Power Setting Limits – Test 15A
Figure 521B (Sheet 1)



A9812

Reverse Power Setting Limits - Test 15A
Figure 521B (Sheet 2)

N1% ACTUAL	OAT −°C				
	50.0	49.0	48.0	47.0	46.0
75.00	85.23	85.04	84.85	84.66	84.47
76.00	86.36	86.17	85.98	85.79	85.60
77.00	87.50	87.30	87.11	86.92	86.72
78.00	88.64	88.44	88.24	88.05	87.85
79.00	89.77	89.57	89.37	89.17	88.98
80.00	90.91	90.70	90.50	90.30	90.10
81.00	92.04	91.84	91.63	91.43	91.23
82.00	93.18	92.97	92.77	92.56	92.36
83.00	94.32	94.11	93.90	93.69	93.48
84.00	95.45	95.24	95.03	94.82	94.61
85.00	96.59	96.37	96.16	95.95	95.74
86.00	97.75	97.51	97.29	97.08	96.86
87.00	98.86	98.64	98.42	98.20	97.99
88.00	100.00	99.78	99.55	99.33	99.11
89.00	101.13	100.91	100.68	100.46	100.24
90.00	102.27	102.04	101.82	101.59	101.37
91.00	103.41	103.18	102.95	102.72	102.49
92.00	104.54	104.31	104.08	103.85	103.62
93.00	105.68	105.44	105.21	104.98	104.75
94.00	106.82	106.58	106.34	106.11	105.87
95.00	107.95	107.71	107.47	107.23	107.00
96.00	109.09	108.85	108.60	108.36	108.12
97.00	110.23	109.98	109.73	109.49	109.25
98.00	111.36	111.11	110.87	110.62	110.38
99.00	112.50	112.25	112.00	111.75	111.50
100.00	113.63	113.38	113.13	112.88	112.63
101.00	114.77	114.51	114.26	114.01	113.76
102.00	115.91	115.65	115.39	115.14	114.88
103.00	117.04	116.78	116.52	116.26	116.01
104.00	118.18	117.92	117.65	117.39	117.13
105.00	119.32	119.05	118.79	118.52	118.26
106.00	120.45	120.18	119.92	119.65	119.39
107.00	121.59	121.32	121.05	120.78	120.51
108.00	122.73	122.45	121.18	121.91	121.64
109.00	123.86	123.59	123.31	123.04	122.77
110.00	125.00	124.72	124.44	124.17	123.89

Corrected N1% (OAT −50 to −46 Degrees C)
Figure 522 (Sheet 1)

N1% ACTUAL	OAT –°C				
	45.0	44.0	43.0	42.0	41.0
75.00	84.29	84.10	83.92	83.74	83.56
76.00	85.41	85.22	85.04	84.85	84.67
77.00	86.53	86.35	86.16	86.97	85.79
78.00	87.66	87.47	87.28	87.09	86.90
79.00	88.78	88.59	88.40	88.20	88.01
80.00	89.91	89.71	89.51	89.32	89.13
81.00	91.03	90.83	90.63	90.44	90.24
82.00	92.15	91.95	91.75	91.55	91.36
83.00	93.28	93.07	92.87	92.67	92.47
84.00	94.40	94.20	93.99	93.79	93.58
85.00	95.53	95.32	95.11	94.90	94.70
86.00	96.65	96.44	96.23	96.02	95.81
87.00	97.77	97.56	97.35	97.14	96.93
88.00	98.90	98.68	98.47	98.25	98.04
89.00	100.02	99.80	99.58	99.37	99.16
90.00	101.14	100.92	100.70	100.49	100.27
91.00	102.27	102.04	101.82	101.60	101.38
92.00	103.39	103.17	102.94	102.72	102.50
93.00	104.52	104.29	104.06	103.84	103.61
94.00	105.64	105.41	105.18	104.95	104.73
95.00	106.76	106.53	106.30	106.07	105.84
96.00	107.89	107.65	107.42	107.18	106.95
97.00	109.01	108.77	108.54	108.30	108.07
98.00	110.13	109.89	109.66	109.42	109.18
99.00	111.26	111.02	110.77	110.53	110.30
100.00	112.38	112.14	111.89	111.65	111.41
101.00	113.51	113.26	113.01	112.77	112.52
102.00	114.63	114.38	114.13	113.88	113.64
103.00	115.75	115.50	115.25	115.00	114.75
104.00	116.88	116.62	116.37	116.12	115.87
105.00	118.00	117.74	117.49	117.23	116.98
106.00	119.13	118.87	118.61	118.35	118.09
107.00	120.25	119.99	119.73	119.47	119.21
108.00	121.37	121.11	120.84	120.58	120.32
109.00	122.50	122.23	121.96	121.70	121.44
110.00	123.62	123.35	123.08	122.82	122.55

Corrected N1% (OAT –45 to –41 Degrees C)
Figure 522 (Sheet 2)

N1% ACTUAL	OAT -°C				
	40.0	39.0	38.0	37.0	36.0
75.00	83.38	83.20	83.02	82.85	82.67
76.00	84.49	84.31	84.13	83.95	83.77
77.00	85.60	85.42	85.24	85.06	84.88
78.00	86.71	86.53	86.34	86.16	85.98
79.00	87.83	87.64	87.45	87.27	87.08
80.00	88.94	88.75	88.56	88.37	88.18
81.00	90.05	89.86	89.66	89.47	89.29
82.00	91.16	90.97	90.77	90.58	90.39
83.00	92.27	92.07	91.88	91.68	91.49
84.00	93.38	93.18	92.99	92.79	92.59
85.00	94.50	94.29	94.09	93.89	93.70
86.00	95.61	95.40	95.20	95.00	94.80
87.00	96.72	96.51	96.31	96.10	95.90
88.00	97.83	97.62	97.41	97.21	97.00
89.00	98.94	98.73	98.52	98.31	98.10
90.00	100.05	99.84	99.63	99.42	99.21
91.00	101.17	100.95	100.73	100.52	100.31
92.00	102.28	102.06	101.84	101.63	101.41
93.00	103.39	103.17	102.95	102.73	102.51
94.00	104.50	104.28	104.06	103.83	103.62
95.00	105.61	105.39	105.16	104.94	104.72
96.00	106.72	106.50	106.27	106.04	105.82
97.00	107.84	107.61	107.38	107.15	106.92
98.00	108.95	108.71	108.48	108.25	108.02
99.00	110.06	109.82	109.59	109.36	109.13
100.00	111.17	110.93	110.70	110.46	110.23
101.00	112.28	112.04	111.80	111.57	111.33
102.00	113.39	113.15	112.91	112.67	112.43
103.00	114.51	114.26	114.02	113.78	113.54
104.00	115.62	115.37	115.13	114.88	114.64
105.00	116.73	116.48	116.23	115.99	115.74
106.00	117.84	117.59	117.34	117.09	116.84
107.00	118.95	118.70	118.45	118.20	117.95
108.00	120.06	119.81	119.55	119.30	119.05
109.00	121.18	120.92	120.66	120.40	120.15
110.00	122.29	122.03	121.77	121.51	121.25

Corrected N1% (OAT -40 to -36 Degrees C)
Figure 522 (Sheet 3)

N1% ACTUAL	OAT –°C				
	35.0	34.0	33.0	32.0	31.0
75.00	82.50	82.33	82.15	81.98	81.81
76.00	83.60	83.42	83.25	83.08	82.90
77.00	84.70	84.52	84.34	84.17	84.00
78.00	85.80	85.62	85.44	85.26	85.09
79.00	86.90	86.72	86.54	86.36	86.18
80.00	88.00	87.81	87.63	87.45	87.27
81.00	89.10	88.91	88.73	88.54	88.36
82.00	90.20	90.01	89.82	89.64	89.45
83.00	91.30	91.11	90.92	90.73	90.54
84.00	92.40	92.20	92.01	91.82	91.63
85.00	93.50	93.30	93.11	92.91	92.72
86.00	94.60	94.40	94.20	94.01	93.81
87.00	95.70	95.50	95.30	95.10	94.90
88.00	96.80	96.60	96.39	96.19	96.00
89.00	97.90	97.69	97.49	97.29	97.09
90.00	99.00	98.79	98.58	98.38	98.18
91.00	100.10	99.89	99.68	99.47	99.27
92.00	101.20	100.99	100.78	100.57	100.36
93.00	102.30	102.08	101.87	101.66	101.45
94.00	103.40	103.18	102.97	102.75	102.54
95.00	104.50	104.28	104.06	103.85	103.63
96.00	105.60	105.38	105.16	104.94	104.72
97.00	106.70	106.47	106.25	106.03	105.81
98.00	107.80	107.57	107.35	107.13	106.90
99.00	108.90	108.67	108.44	108.22	107.99
100.00	110.00	109.77	109.54	109.31	109.09
101.00	111.10	110.87	110.63	110.40	110.18
102.00	112.20	111.96	111.73	111.50	111.27
103.00	113.30	113.06	112.82	112.59	112.36
104.00	114.40	114.16	113.92	113.68	113.45
105.00	115.50	115.26	115.02	114.78	114.54
106.00	116.60	116.35	116.11	115.87	115.63
107.00	117.70	117.45	117.21	116.56	116.72
108.00	118.80	118.55	118.30	118.06	117.81
109.00	119.90	119.65	119.40	119.15	118.90
110.00	121.00	120.74	120.49	120.24	119.99

Corrected N1% (OAT –35 to –31 Degrees C)
Figure 522 (Sheet 4)

N1% ACTUAL	OAT –°C				
	30.0	29.0	28.0	27.0	26.0
75.00	81.65	81.48	81.31	81.15	80.98
76.00	82.73	82.56	82.40	82.23	82.06
77.00	83.82	83.65	83.48	83.31	83.14
78.00	84.91	84.74	84.56	84.39	84.22
79.00	86.00	85.82	85.65	85.47	85.30
80.00	87.09	86.91	86.73	86.56	86.38
81.00	88.18	88.00	87.82	87.64	87.46
82.00	89.27	89.08	88.90	88.72	88.54
83.00	90.35	90.17	89.99	89.80	89.62
84.00	91.44	91.26	91.07	90.88	90.70
85.00	92.53	92.34	92.15	91.97	91.78
86.00	93.62	93.43	93.24	93.05	92.86
87.00	94.71	94.51	94.32	94.13	93.94
88.00	95.80	95.60	95.41	95.21	95.02
89.00	96.89	96.69	96.49	96.29	96.10
90.00	97.97	97.77	97.57	97.38	97.18
91.00	99.06	98.86	98.66	98.46	98.26
92.00	100.15	99.95	99.74	99.54	99.34
93.00	101.24	101.03	100.83	100.62	100.42
94.00	102.33	102.12	101.91	101.70	101.50
95.00	103.42	103.21	103.00	102.79	102.58
96.00	104.51	104.29	104.08	103.87	103.66
97.00	105.60	105.38	105.16	104.95	104.74
98.00	106.68	106.47	106.25	106.03	105.82
99.00	107.77	107.55	107.33	107.11	106.90
100.00	108.86	108.64	108.42	108.20	107.98
101.00	109.95	109.72	109.50	109.28	109.06
102.00	111.04	110.81	110.58	110.36	110.14
103.00	112.13	111.90	111.67	111.44	111.22
104.00	113.22	112.98	112.75	112.52	112.30
105.00	114.30	114.07	113.84	113.61	113.38
106.00	115.39	115.16	114.92	114.69	114.46
107.00	116.48	116.24	116.01	115.77	115.53
108.00	117.57	117.33	117.09	116.85	116.61
109.00	118.66	118.42	118.17	117.93	117.69
110.00	119.75	119.50	119.26	119.02	118.77

Corrected N1% (OAT –30 to –26 Degrees C)
Figure 522 (Sheet 5)

N1% ACTUAL	OAT –°C				
	25.0	24.0	23.0	22.0	21.0
75.00	80.82	80.66	80.50	80.33	80.18
76.00	81.90	81.73	81.57	81.41	81.24
77.00	82.97	82.81	82.64	82.48	82.31
78.00	84.05	83.88	83.72	83.55	83.38
79.00	85.13	84.96	84.79	84.62	84.45
80.00	86.21	86.03	85.86	85.69	85.52
81.00	87.28	87.11	86.93	86.76	86.59
82.00	88.36	88.18	88.01	87.83	87.66
83.00	89.44	89.26	89.08	88.90	88.73
84.00	90.52	90.34	90.15	89.98	89.80
85.00	91.59	91.41	91.23	91.05	90.87
86.00	92.67	92.49	92.30	92.12	91.93
87.00	93.75	93.56	93.37	93.19	93.00
88.00	94.83	94.64	94.45	94.26	94.07
89.00	95.91	95.71	95.52	95.33	95.14
90.00	96.98	96.79	96.59	96.40	96.21
91.00	98.06	97.86	97.67	97.47	97.28
92.00	99.14	98.94	98.74	98.54	98.35
93.00	100.22	100.01	99.81	99.62	99.42
94.00	101.29	101.09	100.89	100.69	100.49
95.00	102.37	102.17	101.96	101.76	101.56
96.00	103.45	103.24	103.03	102.83	102.62
97.00	104.53	104.32	104.11	103.90	103.69
98.00	105.60	105.39	105.18	104.97	104.76
99.00	106.68	106.47	106.25	106.04	105.83
100.00	107.76	107.54	107.33	107.11	106.90
101.00	108.84	108.62	108.40	108.18	107.97
102.00	109.91	109.69	109.47	109.26	109.04
103.00	110.99	110.77	110.55	110.33	110.11
104.00	112.07	111.84	111.62	111.40	111.18
105.00	113.15	112.92	112.69	112.47	112.25
106.00	114.22	113.99	113.77	113.54	113.31
107.00	115.30	115.07	114.84	114.61	114.38
108.00	116.38	116.15	115.91	115.68	115.45
109.00	117.46	117.22	116.99	116.75	116.52
110.00	118.53	118.30	118.06	117.82	117.59

Corrected N1% (OAT –25 to –21 Degrees C)
Figure 522 (Sheet 6)

N2 AND N3% ACTUAL	OAT −°C				
	20.0	19.0	18.0	17.0	16.0
78.00	83.22	83.05	82.89	82.73	82.57
79.00	84.28	84.12	83.95	83.79	83.63
80.00	85.35	85.18	85.02	84.85	84.68
81.00	86.42	86.25	86.08	85.91	85.74
82.00	87.49	87.31	87.14	86.97	86.80
83.00	88.55	88.38	88.20	88.03	87.86
84.00	89.62	89.44	89.27	89.09	88.92
85.00	90.69	90.51	90.33	90.15	89.98
86.00	91.75	91.57	91.39	91.21	91.04
87.00	92.82	92.64	92.46	92.27	92.09
88.00	93.89	93.70	93.52	93.34	93.15
89.00	94.95	94.77	94.58	94.40	94.21
90.00	96.02	95.83	95.64	95.46	95.27
91.00	97.09	96.90	96.71	96.52	96.33
92.00	98.15	97.96	97.77	97.58	97.39
93.00	99.22	99.03	98.83	98.64	98.45
94.00	100.29	100.09	99.89	99.70	99.50
95.00	101.35	101.16	100.96	100.76	100.56
96.00	102.42	102.22	102.02	101.82	101.62
97.00	103.49	103.28	103.08	102.88	102.68
98.00	104.56	104.35	104.14	103.94	103.74
99.00	105.62	105.41	105.21	105.00	104.80
100.00	106.69	106.48	106.27	106.06	105.86
101.00	107.76	107.54	107.33	107.12	106.91
102.00	108.82	108.61	108.40	108.18	107.97
103.00	109.89	109.67	109.46	109.24	109.03
104.00	110.96	110.74	110.52	110.31	110.09
105.00	112.02	111.80	111.58	111.37	111.15
106.00	113.09	112.87	112.65	112.43	112.21
107.00	114.16	113.93	113.71	113.49	113.27
108.00	115.22	115.00	114.77	114.55	114.32
109.00	116.29	116.06	115.83	115.61	115.38
110.00	117.36	117.13	116.90	116.67	116.44
111.00	118.42	118.19	117.96	117.73	117.50
112.00	119.49	119.26	119.02	118.79	118.56
113.00	120.56	120.32	120.09	119.85	119.62
114.00	121.63	121.39	121.15	120.91	120.68
115.00	122.69	122.45	122.21	121.97	121.73

Corrected N1% (OAT −20 to −16 Degrees C)
Figure 522 (Sheet 7)

N2 AND N3% ACTUAL	OAT –°C				
	15.0	14.0	13.0	12.0	11.0
78.00	82.41	82.25	82.09	81.93	81.78
79.00	83.46	83.30	83.14	82.98	82.82
80.00	84.52	84.36	84.20	84.03	83.87
81.00	85.58	85.41	85.25	85.08	84.92
82.00	86.63	86.47	86.30	86.13	85.97
83.00	87.69	87.52	87.35	87.19	87.02
84.00	88.75	88.58	88.40	88.24	88.07
85.00	89.80	89.63	89.46	89.29	89.12
86.00	90.86	90.68	90.51	90.34	90.16
87.00	91.92	91.74	91.56	91.39	91.21
88.00	92.97	92.79	92.61	92.44	92.26
89.00	94.03	93.85	93.67	93.49	93.31
90.00	95.09	94.90	94.72	94.54	94.36
91.00	96.14	95.96	95.77	95.59	95.41
92.00	97.20	97.01	96.82	96.64	96.45
93.00	98.26	98.07	97.88	97.69	97.50
94.00	99.31	99.12	98.93	98.74	98.55
95.00	100.37	100.17	99.98	99.79	99.60
96.00	101.42	101.23	101.03	100.84	100.65
97.00	102.48	102.28	102.09	101.89	101.70
98.00	103.54	103.34	103.14	102.94	102.74
99.00	104.59	104.39	104.19	103.99	103.79
100.00	105.65	105.45	105.24	105.04	104.84
101.00	106.71	106.50	106.30	106.09	105.89
102.00	107.76	107.56	107.35	107.14	106.94
103.00	108.82	108.61	108.40	108.19	107.99
104.00	109.88	109.66	109.45	109.24	109.04
105.00	110.93	110.72	110.51	110.29	110.08
106.00	111.99	111.77	111.56	111.34	111.13
107.00	113.05	112.83	112.61	112.40	112.18
108.00	114.10	113.88	113.66	113.45	113.23
109.00	115.16	114.94	114.72	114.50	114.28
110.00	116.22	115.99	115.77	115.55	115.33
111.00	117.27	117.05	116.82	116.60	116.37
112.00	118.33	118.10	117.87	117.65	117.42
113.00	119.39	119.15	118.93	118.70	118.47
114.00	120.44	120.21	119.98	119.75	119.52
115.00	121.50	121.26	121.03	120.80	120.57

Corrected N1% (OAT –15 to –11 Degrees C)
Figure 522 (Sheet 8)

N2 AND N3% ACTUAL	OAT −°C				
	10.0	9.0	8.0	7.0	6.0
78.00	81.62	81.47	81.31	81.16	81.01
79.00	82.67	82.51	82.36	82.20	82.05
80.00	83.71	83.56	83.40	83.24	83.08
81.00	84.76	84.60	84.44	84.28	84.12
82.00	85.81	85.64	85.48	85.32	85.16
83.00	86.85	86.69	86.52	86.36	86.20
84.00	87.90	87.73	87.57	87.40	87.24
85.00	88.95	88.78	88.61	88.44	88.28
86.00	89.99	89.82	89.65	89.48	89.32
87.00	91.04	90.87	90.69	90.52	90.35
88.00	92.09	91.91	91.74	91.56	91.39
89.00	93.13	92.96	92.78	92.61	92.43
90.00	94.18	94.00	93.82	93.65	93.47
91.00	95.22	95.04	94.86	94.69	94.51
92.00	96.27	96.09	95.91	95.73	95.55
93.00	97.32	97.13	96.95	96.77	96.59
94.00	98.36	98.18	97.99	97.81	97.62
95.00	99.41	99.22	99.03	98.85	98.66
96.00	100.46	100.27	100.08	99.89	99.70
97.00	101.50	101.31	101.12	100.93	100.74
98.00	102.55	102.36	102.16	101.97	101.78
99.00	103.60	103.40	103.20	103.01	102.82
100.00	104.64	104.44	104.25	104.05	103.86
101.00	105.69	105.49	105.29	105.09	104.89
102.00	106.74	106.53	106.33	106.13	105.93
103.00	107.78	107.58	107.37	107.17	106.97
104.00	108.83	108.62	108.42	108.21	108.01
105.00	109.87	109.67	109.46	109.25	109.05
106.00	110.92	110.71	110.50	110.29	110.09
107.00	111.97	111.76	111.54	111.33	111.13
108.00	113.01	112.80	112.59	112.38	112.16
109.00	114.06	113.84	113.63	113.42	113.20
110.00	115.11	114.89	114.67	114.46	114.24
111.00	116.15	115.93	115.71	115.50	115.28
112.00	117.20	116.98	116.76	116.54	116.32
113.00	118.25	118.02	117.80	117.58	117.36
114.00	119.29	119.07	118.84	118.62	118.40
115.00	120.34	120.11	119.88	119.66	119.43

Corrected N1% (OAT −10 to −6 Degrees C)
Figure 522 (Sheet 9)

N2 AND N3% ACTUAL	OAT −°C				
	5.0	4.0	3.0	2.0	1.0
78.00	80.86	80.71	80.56	80.41	80.26
79.00	81.89	81.74	81.59	81.44	81.29
80.00	82.93	82.78	82.62	82.47	82.32
81.00	83.97	83.81	83.65	83.50	83.35
82.00	85.00	84.84	84.69	84.53	84.38
83.00	86.04	85.88	85.72	85.56	85.40
84.00	87.08	86.91	86.75	86.59	86.43
85.00	88.11	87.95	87.79	87.62	87.46
86.00	89.15	88.98	88.82	88.65	88.49
87.00	90.19	90.02	89.85	89.69	89.52
88.00	91.22	91.05	90.88	90.72	90.55
89.00	92.26	92.09	91.92	91.75	91.58
90.00	93.30	93.12	92.95	92.78	92.61
91.00	94.33	94.16	93.98	93.81	93.64
92.00	95.37	95.19	95.02	94.84	94.67
93.00	96.41	96.23	96.05	95.87	95.69
94.00	97.44	97.26	97.08	96.90	96.72
95.00	98.48	98.30	98.11	97.93	97.75
96.00	99.52	99.33	99.15	98.96	98.78
97.00	100.55	100.37	100.18	99.99	99.81
98.00	101.59	101.40	101.21	101.03	100.84
99.00	102.63	102.43	102.24	102.06	101.87
100.00	103.66	103.47	103.28	103.09	102.90
101.00	104.70	104.50	104.31	104.12	103.93
102.00	105.74	105.54	105.34	105.15	104.96
103.00	106.77	106.57	106.38	106.18	105.98
104.00	107.81	107.61	107.41	107.21	107.01
105.00	108.85	108.64	108.44	108.24	108.04
106.00	109.88	109.68	109.47	109.27	109.07
107.00	110.92	110.71	110.51	110.30	110.10
108.00	111.96	111.75	111.54	111.33	111.13
109.00	112.99	112.78	112.57	112.36	112.16
110.00	114.03	113.82	113.61	113.40	113.19
111.00	115.07	114.85	114.64	114.43	114.22
112.00	116.10	115.89	115.67	115.46	115.25
113.00	117.14	116.92	116.70	116.49	116.27
114.00	118.17	117.96	117.74	117.52	117.30
115.00	119.21	118.99	118.77	118.55	118.33

Corrected N1% (OAT −5 to −1 Degrees C)
Figure 522 (Sheet 10)

N1% ACTUAL	OAT °C				
	0.0	1.0	2.0	3.0	4.0
78.00	80.11	79.97	79.82	79.68	79.53
79.00	81.14	80.99	80.84	80.70	80.55
80.00	82.17	82.02	81.87	81.72	81.57
81.00	83.19	83.04	82.89	82.74	82.59
82.00	84.22	84.07	83.91	83.76	83.61
83.00	85.25	85.09	84.94	84.78	84.63
84.00	86.28	86.12	85.96	85.81	85.65
85.00	87.30	87.14	86.98	86.83	86.67
86.00	88.33	88.17	88.01	87.85	87.69
87.00	89.36	89.19	89.03	88.87	88.71
88.00	90.38	90.22	90.05	89.89	89.73
89.00	91.41	91.24	91.08	90.91	90.75
90.00	92.44	92.27	92.10	91.93	91.77
91.00	93.47	93.29	93.12	92.96	92.79
92.00	94.49	94.32	94.15	93.98	93.81
93.00	95.52	95.35	95.17	95.00	94.83
94.00	96.55	96.37	96.19	96.02	95.85
95.00	97.57	97.40	97.22	97.04	96.87
96.00	98.60	98.42	98.24	98.06	97.89
97.00	99.63	99.45	99.27	99.09	98.91
98.00	100.65	100.47	100.29	100.11	99.93
99.00	101.68	101.50	101.31	101.13	100.95
100.00	102.71	102.52	102.34	102.15	101.97
101.00	103.74	103.55	103.36	103.17	102.98
102.00	104.76	104.57	104.38	104.19	104.00
103.00	105.79	105.60	105.41	105.21	105.02
104.00	106.82	106.62	106.43	106.24	106.04
105.00	107.84	107.65	107.45	107.26	107.06
106.00	108.87	108.67	108.48	108.28	108.08
107.00	109.90	109.70	109.50	109.30	109.10
108.00	110.93	110.72	110.52	110.32	110.12
109.00	111.95	111.75	111.55	111.34	111.14
110.00	112.98	112.77	112.57	112.36	112.16
111.00	114.01	113.80	113.59	113.39	113.18
112.00	115.03	114.82	114.62	114.41	114.20
113.00	116.06	115.85	115.64	115.43	115.22
114.00	117.09	116.87	116.66	116.45	116.24
115.00	118.12	117.90	117.69	117.47	117.26

Corrected N1% (OAT 0 to +4 Degrees C)
Figure 522 (Sheet 11)

N1% ACTUAL	OAT °C				
	5.0	6.0	7.0	8.0	9.0
78.00	79.39	79.25	79.11	78.97	78.82
79.00	80.41	80.26	80.12	79.98	79.84
80.00	81.43	81.28	81.13	80.99	80.85
81.00	82.44	82.30	82.15	82.00	81.86
82.00	83.46	83.31	83.16	83.01	82.87
83.00	84.48	84.33	84.18	84.03	83.88
84.00	85.50	85.34	85.19	85.04	84.89
85.00	86.51	86.36	86.21	86.05	85.90
86.00	87.53	87.38	87.22	87.06	86.91
87.00	88.55	88.39	88.23	88.08	87.92
88.00	89.57	89.41	89.25	89.09	88.93
89.00	90.59	90.42	90.26	90.10	89.94
90.00	91.60	91.44	91.28	91.11	90.95
91.00	92.62	92.46	92.29	92.13	91.96
92.00	93.64	93.47	93.30	93.14	92.97
93.00	94.66	94.49	94.32	94.15	93.98
94.00	95.67	95.50	95.33	95.16	94.99
95.00	96.69	96.52	96.35	96.18	96.00
96.00	97.71	97.54	97.36	97.19	97.02
97.00	98.73	98.55	98.38	98.20	98.03
98.00	99.75	99.57	99.39	99.21	99.04
99.00	100.76	100.58	100.40	100.22	100.05
100.00	101.78	101.60	101.42	101.24	101.06
101.00	102.80	102.62	102.43	102.25	102.07
102.00	103.82	103.63	103.45	103.26	103.08
103.00	104.84	104.65	104.46	104.27	104.09
104.00	105.85	105.66	105.47	105.29	105.10
105.00	106.87	106.68	106.49	106.30	106.11
106.00	107.89	107.70	107.50	107.31	107.12
107.00	108.91	108.71	108.52	108.32	108.13
108.00	109.92	109.73	109.53	109.34	109.14
109.00	110.94	110.74	110.55	110.35	110.15
110.00	111.96	111.76	111.56	111.36	111.16
111.00	112.98	112.78	112.57	112.37	112.17
112.00	114.00	113.79	113.59	113.39	113.18
113.00	115.01	114.81	114.60	114.40	114.20
114.00	116.03	115.82	115.62	115.41	115.21
115.00	117.05	116.84	116.63	116.42	116.22

Corrected N1% (OAT +5 to +9 Degrees C)
Figure 522 (Sheet 12)

N1% ACTUAL	OAT °C				
	10.0	11.0	12.0	13.0	14.0
84.00	84.74	84.59	84.44	84.29	84.15
85.00	85.75	85.60	85.45	85.30	85.15
86.00	86.76	86.60	86.45	86.30	86.15
87.00	87.76	87.61	87.46	87.30	87.15
88.00	88.77	88.62	88.46	88.31	88.15
89.00	89.78	89.62	89.47	89.31	89.15
90.00	90.79	90.63	90.47	90.31	90.16
91.00	91.80	91.64	91.48	91.32	91.16
92.00	92.81	92.65	92.48	92.32	92.16
93.00	93.82	93.65	93.49	93.32	93.16
94.00	94.83	94.66	94.49	94.33	94.16
95.00	95.84	95.67	95.50	95.33	95.17
96.00	96.84	96.67	96.50	96.33	96.17
97.00	97.85	97.68	97.51	97.34	97.17
98.00	98.66	98.69	98.51	98.34	98.17
99.00	99.87	99.69	99.52	99.35	99.17
100.00	100.88	100.70	100.52	100.35	100.17
101.00	101.89	101.71	101.53	101.35	101.18
102.00	102.90	102.72	102.54	102.36	102.18
103.00	103.91	103.72	103.54	103.36	103.18
104.00	104.91	104.73	104.55	104.36	104.18
105.00	105.92	105.74	105.55	105.37	105.18
106.00	106.93	106.74	106.56	106.37	106.18
107.00	107.94	107.75	107.56	107.37	107.19
108.00	108.95	108.76	108.57	108.38	108.19
109.00	109.96	109.76	109.57	109.38	109.19
110.00	110.97	110.77	110.58	110.38	110.19
111.00	111.98	111.78	111.58	111.39	111.19
112.00	112.98	112.79	112.59	112.39	112.19
113.00	113.99	113.79	113.59	113.39	113.20
114.00	115.00	114.80	114.60	114.40	114.20
115.00	116.01	115.81	115.60	115.40	115.20

Corrected N1% (OAT +10 to +14 Degrees C)
Figure 522 (Sheet 13)

N1% ACTUAL	OAT °C				
	15.0	16.0	17.0	18.0	19.0
84.00	84.00	83.85	83.71	83.57	83.42
85.00	85.00	84.85	84.71	84.56	84.42
86.00	86.00	85.85	85.70	85.56	85.41
87.00	87.00	86.85	86.70	86.55	86.40
88.00	88.00	87.85	87.70	87.55	87.40
89.00	89.00	88.85	88.69	88.54	88.39
90.00	90.00	89.84	89.69	89.54	89.38
91.00	91.00	90.84	90.69	90.53	90.37
92.00	92.00	91.84	91.68	91.52	91.37
93.00	93.00	92.84	92.68	92.52	92.36
94.00	94.00	93.84	93.68	93.51	93.35
95.00	95.00	94.84	94.67	94.51	94.35
96.00	96.00	95.83	95.67	95.50	95.34
97.00	97.00	96.83	96.67	96.50	96.33
98.00	98.00	97.83	97.66	97.49	97.33
99.00	99.00	98.83	98.66	98.49	98.32
100.00	100.00	99.83	99.65	99.48	99.31
101.00	101.00	100.83	100.65	100.48	100.31
102.00	102.00	101.82	101.65	101.47	101.30
103.00	103.00	102.82	102.64	102.47	102.29
104.00	104.00	103.82	103.64	103.46	103.29
105.00	105.00	104.82	104.64	104.46	104.28
106.00	106.00	105.82	105.63	105.45	105.27
107.00	107.00	106.81	106.63	106.45	106.27
108.00	108.00	107.81	107.63	107.44	107.26
109.00	109.00	108.81	108.62	108.44	108.25
110.00	110.00	109.81	109.62	109.43	109.24
111.00	111.00	110.81	110.62	110.43	110.24
112.00	112.00	111.81	111.61	111.42	111.23
113.00	113.00	112.80	112.61	112.42	112.22
114.00	114.00	113.80	113.61	113.41	113.22
115.00	115.00	114.80	114.60	114.41	114.21

Corrected N1% (OAT +15 to +19 Degrees C)
Figure 522 (Sheet 14)

N1% ACTUAL	OAT °C				
	20.0	21.0	22.0	23.0	24.0
84.00	83.28	83.14	83.00	82.86	82.72
85.00	84.27	84.13	83.99	83.84	83.70
86.00	85.26	85.12	84.97	84.83	84.69
87.00	86.25	86.11	85.96	85.82	85.67
88.00	87.25	87.10	86.95	86.80	86.66
89.00	88.24	88.09	87.94	87.79	87.64
90.00	89.23	89.08	88.93	88.78	88.63
91.00	90.22	90.07	89.91	89.76	89.61
92.00	91.21	91.06	90.90	90.75	90.60
93.00	92.20	92.05	91.89	91.74	91.58
94.00	93.19	93.04	92.88	92.72	92.57
95.00	94.19	94.03	93.87	93.71	93.55
96.00	95.18	95.02	94.85	94.69	94.54
97.00	96.17	96.01	95.84	95.68	95.52
98.00	97.16	97.00	96.83	96.67	96.50
99.00	98.15	97.99	97.82	97.65	97.49
100.00	99.14	98.97	98.81	98.64	98.47
101.00	100.13	99.96	99.80	99.63	99.46
102.00	101.13	100.95	100.78	100.61	100.44
103.00	102.12	101.94	101.77	101.60	101.43
104.00	103.11	102.93	102.76	102.59	102.41
105.00	104.10	103.92	103.75	103.57	103.40
106.00	105.09	104.91	104.74	104.56	104.38
107.00	106.08	105.90	105.72	105.54	105.37
108.00	107.08	106.89	106.71	106.53	106.35
109.00	108.07	107.88	107.70	107.52	107.34
110.00	109.06	108.87	108.69	108.50	108.32
111.00	110.05	109.86	109.68	109.49	109.31
112.00	111.04	110.85	110.66	110.48	110.29
113.00	112.03	111.84	111.65	111.46	111.28
114.00	113.02	112.83	112.64	112.45	112.26
115.00	114.02	113.82	113.63	113.44	113.25

Corrected N1% (OAT +20 to +24 Degrees C)
Figure 522 (Sheet 15)

N1% ACTUAL	OAT °C				
	25.0	26.0	27.0	28.0	29.0
84.00	82.58	82.44	82.30	82.17	82.03
85.00	83.56	83.42	83.28	83.15	83.01
86.00	84.55	84.40	84.26	84.12	83.98
87.00	85.53	85.39	85.24	85.10	84.96
88.00	86.51	86.37	86.22	86.08	85.94
89.00	87.49	87.35	87.20	87.06	86.91
90.00	88.48	88.33	88.18	88.04	87.89
91.00	89.46	89.31	89.16	89.01	88.87
92.00	90.44	90.29	90.14	89.99	89.84
93.00	91.43	91.27	91.12	90.97	90.82
94.00	92.41	92.26	92.10	91.95	91.80
95.00	93.39	93.24	93.08	92.93	92.77
96.00	94.38	94.22	94.06	93.91	93.75
97.00	95.36	95.20	95.04	94.88	94.73
98.00	96.34	96.18	96.02	95.86	95.70
99.00	97.33	97.16	97.00	96.84	96.68
100.00	98.31	98.14	97.98	97.82	97.66
101.00	99.29	99.13	98.96	98.80	98.63
102.00	100.27	100.11	99.94	99.77	99.61
103.00	101.26	101.09	100.92	100.75	100.59
104.00	102.24	102.07	101.90	101.73	101.56
105.00	103.22	103.05	102.88	102.71	102.54
106.00	104.21	104.03	103.86	103.69	103.52
107.00	105.19	105.01	104.84	104.67	104.49
108.00	106.17	106.00	105.82	105.64	105.47
109.00	107.16	106.98	106.80	106.62	106.44
110.00	108.14	107.96	107.78	107.60	107.42
111.00	109.12	108.94	108.76	108.58	108.40
112.00	110.11	109.92	109.74	109.56	109.37
113.00	111.09	110.90	110.72	110.53	110.35
114.00	112.07	111.88	111.70	111.51	111.33
115.00	113.06	112.87	112.68	112.49	112.30

Corrected N1% (OAT +25 to +29 Degrees C)
Figure 522 (Sheet 16)

N1% ACTUAL	OAT °C				
	30.0	31.0	32.0	33.0	34.0
87.00	84.82	84.68	84.54	84.40	84.27
88.00	85.80	85.65	85.51	85.37	85.23
89.00	86.77	86.63	86.49	86.34	86.20
90.00	87.75	87.60	87.46	87.31	87.17
91.00	88.72	88.57	88.43	88.28	88.14
92.00	89.70	89.55	89.40	89.25	89.11
93.00	90.67	90.52	90.37	90.22	90.08
94.00	91.64	91.49	91.34	91.19	91.05
95.00	92.62	92.47	92.32	92.17	92.01
96.00	93.59	93.44	93.29	93.14	92.98
97.00	94.57	94.41	94.26	94.11	93.95
98.00	95.54	95.39	95.23	95.08	94.92
99.00	96.52	96.36	96.20	96.05	95.89
100.00	97.49	97.33	97.17	97.02	96.86
101.00	98.47	98.31	98.15	97.99	97.83
102.00	99.44	99.28	99.12	98.96	98.79
103.00	100.42	100.25	100.09	99.93	99.76
104.00	101.39	101.23	101.06	100.90	100.73
105.00	102.37	102.20	102.03	101.87	101.70
106.00	103.34	103.17	103.01	102.84	102.67
107.00	104.32	104.15	103.98	103.81	103.64
108.00	105.29	105.12	104.95	104.78	104.61
109.00	106.27	106.09	105.92	105.75	105.57
110.00	107.24	107.07	106.89	106.72	106.54
111.00	108.22	108.04	107.86	107.69	107.51
112.00	109.19	109.01	108.84	108.66	108.48
113.00	110.17	109.99	109.81	109.63	109.45
114.00	111.14	110.96	110.78	110.60	110.42
115.00	112.12	111.93	111.75	111.57	111.39

Corrected N1% (OAT +30 to +34 Degrees C)
Figure 522 (Sheet 17)

N1% ACTUAL	OAT °C				
	35.0	36.0	37.0	38.0	39.0
87.00	84.13	83.99	83.86	83.72	83.59
88.00	85.10	84.96	84.82	84.69	84.55
89.00	86.06	85.92	85.79	85.65	85.51
90.00	87.03	86.89	86.75	86.61	86.47
91.00	88.00	87.85	87.71	87.57	87.43
92.00	88.96	88.82	88.68	88.53	88.39
93.00	89.93	89.79	89.64	89.50	89.35
94.00	90.90	90.75	90.60	90.46	90.31
95.00	91.87	91.72	91.57	91.42	91.27
96.00	92.83	92.68	92.53	92.38	92.24
97.00	93.80	93.65	93.50	93.35	93.20
98.00	94.77	94.61	94.46	94.31	94.16
99.00	95.73	95.58	95.42	95.27	95.12
100.00	96.70	96.54	96.39	96.23	96.08
101.00	97.67	97.51	97.35	97.20	97.04
102.00	98.63	98.47	98.32	98.16	98.00
103.00	99.60	99.44	99.28	99.12	98.96
104.00	100.57	100.41	100.24	100.08	99.92
105.00	101.54	101.37	101.21	101.04	100.88
106.00	102.50	102.34	102.17	102.01	101.84
107.00	103.47	103.30	103.14	102.97	102.80
108.00	104.44	104.27	104.10	103.93	103.77
109.00	105.40	105.23	105.06	104.89	104.73
110.00	106.37	106.20	106.03	105.86	105.69
111.00	107.34	107.16	106.99	106.82	106.65
112.00	108.30	108.13	107.95	107.78	107.61
113.00	109.27	109.09	108.92	108.74	108.57
114.00	110.24	110.06	109.88	109.71	109.53
115.00	111.21	111.03	110.85	110.67	110.49

Corrected N1% (OAT +35 to +39 Degrees C)
Figure 522 (Sheet 18)

N1% ACTUAL	OAT °C				
	40.0	41.0	42.0	43.0	44.0
87.00	83.46	83.32	83.19	83.06	82.93
88.00	84.41	84.28	84.15	84.01	83.88
89.00	85.37	85.24	85.10	84.97	84.83
90.00	86.33	86.20	86.06	85.92	85.79
91.00	87.29	87.15	87.01	86.88	86.74
92.00	88.25	88.11	87.97	87.83	87.69
93.00	89.21	89.07	88.93	88.79	88.65
94.00	90.17	90.03	89.88	89.74	89.60
95.00	91.13	90.98	90.84	90.70	90.55
96.00	92.09	91.94	91.80	91.65	91.51
97.00	93.05	92.90	92.75	92.60	92.46
98.00	94.01	93.86	93.71	93.56	93.41
99.00	94.97	94.81	94.66	94.51	94.37
100.00	95.93	95.77	95.62	95.47	95.32
101.00	96.88	96.73	96.58	96.42	96.27
102.00	97.84	97.69	97.53	97.38	97.22
103.00	98.80	98.65	98.49	98.33	98.18
104.00	99.76	99.60	99.45	99.29	99.13
105.00	100.72	100.56	100.40	100.24	100.08
106.00	101.68	101.52	101.36	101.20	101.04
107.00	102.64	102.48	102.31	102.15	101.99
108.00	103.60	103.43	103.27	103.11	102.94
109.00	104.56	104.39	104.23	104.06	103.90
110.00	105.52	105.35	105.18	105.02	104.85
111.00	106.48	106.31	106.14	105.97	105.80
112.00	107.44	107.27	107.09	106.93	106.76
113.00	108.40	108.22	108.05	107.88	107.71
114.00	109.35	109.18	109.01	108.83	108.66
115.00	110.31	110.14	109.96	109.79	109.62

Corrected N1% (OAT +40 to +44 Degrees C)
Figure 522 (Sheet 19)

N1% ACTUAL	OAT °C				
	45.0	46.0	47.0	48.0	49.0
87.00	82.80	82.67	82.54	82.41	82.28
88.00	83.75	83.62	83.49	83.36	83.23
89.00	84.70	84.57	84.44	84.30	84.17
90.00	85.65	85.52	85.38	85.25	85.12
91.00	86.60	86.47	86.33	86.20	86.06
92.00	87.56	87.42	87.28	87.15	87.01
93.00	88.51	88.37	88.23	88.09	87.96
94.00	89.46	89.32	89.18	89.04	88.90
95.00	90.41	90.27	90.13	89.99	89.85
96.00	91.36	91.22	91.08	90.93	90.79
97.00	92.31	92.17	92.02	91.88	91.74
98.00	93.27	93.12	92.97	92.83	92.68
99.00	94.22	94.07	93.92	93.78	93.63
100.00	95.17	95.02	94.87	94.72	94.58
101.00	96.12	95.97	95.82	95.67	95.52
102.00	97.07	96.92	96.77	96.62	96.47
103.00	98.02	97.87	97.72	97.56	97.41
104.00	98.98	98.82	98.67	98.51	98.36
105.00	99.93	99.77	99.61	99.46	99.30
106.00	100.88	100.72	100.56	100.41	100.25
107.00	101.83	101.67	101.51	101.35	101.20
108.00	102.78	102.62	102.46	102.30	102.14
109.00	103.73	103.57	103.41	103.25	103.09
110.00	104.69	104.52	104.36	104.20	104.03
111.00	105.64	105.47	105.31	105.14	104.98
112.00	106.59	106.42	106.26	106.09	105.92
113.00	107.54	107.37	107.20	107.04	106.87
114.00	108.49	108.32	108.15	107.98	107.82
115.00	109.44	109.27	109.10	108.93	108.76

Corrected N1% (OAT +45 to +49 Degrees C)
Figure 522 (Sheet 20)

N1% ACTUAL	OAT °C				
	50.0	51.0	52.0	53.0	54.0
90.00	84.99	84.86	84.72	84.59	84.47
91.00	85.93	85.80	85.67	85.53	85.40
92.00	86.88	86.74	86.61	86.47	86.34
93.00	87.82	87.68	87.55	87.41	87.28
94.00	88.76	88.63	88.49	88.35	88.22
95.00	89.71	89.57	89.43	89.29	89.16
96.00	90.65	90.51	90.37	90.23	90.10
97.00	91.60	91.46	91.31	91.17	91.03
98.00	92.54	92.40	92.26	92.11	91.97
99.00	93.49	93.34	93.20	93.05	92.91
100.00	94.43	94.28	94.14	93.99	93.85
101.00	95.37	95.23	95.08	94.93	94.79
102.00	96.32	96.17	96.02	95.87	95.73
103.00	97.26	97.11	96.96	96.81	96.67
104.00	98.21	98.06	97.90	97.75	97.60
105.00	99.15	99.00	98.85	98.69	98.54
106.00	100.10	99.94	99.79	99.63	99.48
107.00	101.04	100.88	100.73	100.57	100.42
108.00	101.98	101.83	101.67	101.51	101.36
109.00	102.93	102.77	102.61	102.45	102.30
110.00	103.87	103.71	103.55	103.39	103.24
111.00	104.82	104.65	104.49	104.33	104.17
112.00	105.76	105.60	105.44	105.27	105.11
113.00	106.71	106.54	106.38	106.21	106.05
114.00	107.65	107.48	107.32	107.15	106.99
115.00	108.59	108.43	108.26	108.09	107.93

Corrected N1% (OAT +50 to +54 Degrees C)
Figure 522 (Sheet 21)

N1% ACTUAL	OAT °C				
	55.0	56.0	57.0	58.0	59.0
90.00	84.34	84.21	84.08	83.95	83.83
91.00	85.27	85.14	85.01	84.89	84.76
92.00	86.21	86.08	85.95	85.82	85.69
93.00	87.15	87.02	86.88	86.75	86.62
94.00	88.08	87.95	87.82	87.68	87.55
95.00	89.02	88.89	88.75	88.62	88.48
96.00	89.96	89.82	89.69	89.55	89.42
97.00	90.90	90.76	90.62	90.48	90.35
98.00	91.83	91.69	91.55	91.42	91.28
99.00	92.77	92.63	92.49	92.35	92.21
100.00	93.71	93.56	93.42	93.28	93.14
101.00	94.64	94.50	94.36	94.21	94.07
102.00	95.58	95.44	95.29	95.15	95.00
103.00	96.52	96.37	96.23	96.08	95.94
104.00	97.46	97.31	97.16	97.01	96.87
105.00	98.39	98.24	98.09	97.95	97.80
106.00	99.33	99.18	99.03	98.88	98.73
107.00	100.27	100.11	99.96	99.81	99.66
108.00	101.20	101.05	100.90	100.74	100.59
109.00	102.14	101.99	101.83	101.68	101.52
110.00	103.08	102.92	102.77	102.61	102.46
111.00	104.02	103.86	103.70	103.54	103.39
112.00	104.95	104.79	104.63	104.48	104.32
113.00	105.89	105.73	105.57	105.41	105.25
114.00	106.83	106.66	106.50	106.34	106.18
115.00	107.76	107.60	107.44	107.27	107.11

Corrected N1% (OAT +55 to +59 Degrees C)
Figure 522 (Sheet 22)

N2 AND N3% ACTUAL	OAT –°C				
	50.0	49.0	48.0	47.0	46.0
70.00	79.34	79.17	79.00	78.82	78.65
71.00	80.47	80.30	80.12	79.95	79.78
72.00	81.61	81.43	81.25	81.08	80.90
73.00	82.74	82.56	82.38	82.20	82.02
74.00	83.87	83.69	83.51	83.33	83.15
75.00	85.01	84.82	84.64	84.45	84.27
76.00	86.14	85.95	85.77	85.58	85.40
77.00	87.28	87.08	86.89	86.71	86.52
78.00	88.41	88.22	88.02	87.83	87.64
79.00	89.54	89.35	89.15	88.96	88.77
80.00	90.68	90.48	90.28	90.08	89.89
81.00	91.81	91.61	91.41	91.21	91.01
82.00	92.94	92.74	92.54	92.34	92.14
83.00	94.08	93.87	93.67	93.46	93.26
84.00	95.21	95.00	94.79	94.59	94.38
85.00	96.34	96.13	95.92	95.71	95.51
86.00	97.48	97.26	97.05	96.84	96.63
87.00	98.61	98.39	98.18	97.97	97.76
88.00	99.74	99.52	99.31	99.09	98.88
89.00	100.88	100.66	100.44	100.22	100.00
90.00	102.01	101.79	101.57	101.34	101.13
91.00	103.14	102.92	102.69	102.47	102.25
92.00	104.28	104.05	103.82	103.60	103.37
93.00	105.41	105.18	104.95	104.72	104.50
94.00	106.54	106.31	106.08	105.85	105.62
95.00	107.68	107.44	107.21	106.98	106.74
96.00	108.81	108.57	108.34	108.10	107.87
97.00	109.94	109.70	109.46	109.23	108.99
98.00	111.08	110.83	110.59	110.35	110.11
99.00	112.21	111.97	111.72	111.48	111.24
100.00	113.34	113.10	112.85	112.61	112.36
101.00	114.48	114.23	113.98	113.73	113.49
102.00	115.61	115.36	115.11	114.86	114.61

Corrected N2 and N3% (OAT –50 to –46 Degrees C)
Figure 523 (Sheet 1)

N2 AND N3% ACTUAL	OAT −°C				
	45.0	44.0	43.0	42.0	41.0
70.00	78.48	78.32	78.15	77.98	77.82
71.00	79.61	79.44	79.27	79.10	78.93
72.00	80.73	80.55	80.38	80.21	80.04
73.00	81.85	81.67	81.50	81.33	81.15
74.00	82.97	82.79	82.62	82.44	82.27
75.00	84.09	83.91	83.73	83.55	83.38
76.00	85.21	85.03	84.85	84.67	84.49
77.00	86.33	86.15	85.96	85.78	85.60
78.00	87.45	87.27	87.08	86.90	86.71
79.00	88.58	88.39	88.20	88.01	87.82
80.00	89.70	89.50	89.31	89.12	88.94
81.00	90.82	90.62	90.43	90.24	90.05
82.00	91.94	91.74	91.55	91.35	91.16
83.00	93.06	92.86	92.66	92.47	92.27
84.00	94.18	93.98	93.78	93.58	93.38
85.00	95.30	95.10	94.90	94.69	94.49
86.00	96.42	96.22	96.01	95.81	95.61
87.00	97.54	97.34	97.13	96.92	96.72
88.00	98.67	98.45	98.24	98.04	97.83
89.00	99.79	99.57	99.36	99.15	98.94
90.00	100.91	100.69	100.48	100.26	100.05
91.00	102.03	101.81	101.59	101.38	101.16
92.00	103.15	102.93	102.71	102.49	102.28
93.00	104.27	104.05	103.83	103.61	103.39
94.00	105.39	105.17	104.94	104.72	104.50
95.00	106.51	106.29	106.06	105.83	105.61
96.00	107.64	107.41	107.18	106.95	106.72
97.00	108.76	108.52	108.29	108.06	107.83
98.00	109.88	109.64	109.41	109.18	108.95
99.00	111.00	110.76	110.53	110.29	110.06
100.00	112.12	111.88	111.64	111.41	111.17
101.00	113.24	113.00	112.76	112.52	112.28
102.00	114.36	114.12	113.87	113.63	113.39

Corrected N2 and N3% (OAT −45 to −41 Degrees C)
Figure 523 (Sheet 2)

N2 AND N3% ACTUAL	OAT –°C				
	40.0	39.0	38.0	37.0	36.0
70.00	77.66	77.49	77.33	77.17	77.01
71.00	78.76	78.60	78.44	78.27	78.11
72.00	79.87	79.71	79.54	79.37	79.21
73.00	80.98	80.81	80.64	80.48	80.31
74.00	82.09	81.92	81.75	81.58	81.41
75.00	83.20	83.03	82.85	82.68	82.51
76.00	84.31	84.13	83.96	83.78	83.61
77.00	85.42	85.24	85.06	84.89	84.71
78.00	86.53	86.35	86.17	85.99	85.81
79.00	87.64	87.46	87.27	87.09	86.91
80.00	88.75	88.56	88.38	88.19	88.01
81.00	89.86	89.67	89.48	89.30	89.11
82.00	90.97	90.78	90.59	90.40	90.21
83.00	92.08	91.88	91.69	91.50	91.31
84.00	93.19	92.99	92.80	92.60	92.41
85.00	94.30	94.10	93.90	93.71	93.51
86.00	95.40	95.20	95.01	94.81	94.61
87.00	96.51	96.31	96.11	95.91	95.71
88.00	97.62	97.42	97.22	97.01	96.81
89.00	98.73	98.53	98.32	98.12	97.91
90.00	99.84	99.63	99.43	99.22	99.01
91.00	100.95	100.74	100.53	100.32	100.11
92.00	102.06	101.85	101.63	101.42	101.21
93.00	103.17	102.95	102.74	102.53	102.31
94.00	104.28	104.06	103.84	103.63	103.41
95.00	105.39	105.17	104.95	104.73	104.51
96.00	106.50	106.28	106.05	105.83	105.61
97.00	107.61	107.38	107.16	106.94	106.71
98.00	108.72	108.49	108.26	108.04	107.81
99.00	109.82	109.60	109.37	109.14	108.91
100.00	110.94	110.70	110.47	110.24	110.01
101.00	112.05	111.81	111.58	111.35	111.12
102.00	113.15	112.92	112.68	112.45	112.22

Corrected N2 and N3% (OAT –40 to –36 Degrees C)
Figure 523 (Sheet 3)

N2 AND N3% ACTUAL	OAT −°C				
	35.0	34.0	33.0	32.0	31.0
70.00	76.85	76.69	76.54	76.38	76.23
71.00	77.95	77.79	77.63	77.47	77.32
72.00	79.05	78.89	78.72	78.56	78.41
73.00	80.15	79.98	79.82	79.66	79.49
74.00	81.24	81.08	80.91	80.75	80.58
75.00	82.34	82.17	82.00	81.84	81.67
76.00	83.44	83.27	83.10	82.93	82.76
77.00	84.54	84.36	84.19	84.02	83.85
78.00	85.63	85.46	85.28	85.11	84.94
79.00	86.73	86.55	86.38	86.20	86.03
80.00	87.83	87.65	87.47	87.29	87.12
81.00	88.93	88.75	88.56	88.38	88.21
82.00	90.03	89.84	89.66	89.48	89.29
83.00	91.12	90.94	90.75	90.57	90.38
84.00	92.22	92.03	91.85	91.66	91.47
85.00	93.32	93.13	92.94	92.75	92.56
86.00	94.42	94.22	94.03	93.84	93.65
87.00	95.52	95.32	95.13	94.93	94.74
88.00	96.61	96.42	96.22	96.02	95.83
89.00	97.71	97.51	97.31	97.11	96.92
90.00	98.81	98.61	98.41	98.21	98.01
91.00	99.91	99.70	98.50	99.30	99.10
92.00	101.01	100.80	100.59	100.39	100.18
93.00	102.10	101.89	101.69	101.48	101.27
94.00	103.20	102.99	102.78	102.57	102.36
95.00	104.30	104.09	103.87	103.66	103.45
96.00	105.40	105.18	104.97	104.75	104.54
97.00	106.49	106.28	106.06	105.84	105.63
98.00	107.59	107.37	107.15	106.93	106.72
99.00	108.69	108.47	108.25	108.03	107.81
100.00	109.79	109.56	109.34	109.12	108.90
101.00	110.89	110.66	110.43	110.21	109.98
102.00	111.98	111.75	111.53	111.30	111.07

Corrected N2 and N3% (OAT −35 to −42 Degrees C)
Figure 523 (Sheet 4)

N2 AND N3% ACTUAL	OAT –°C				
	30.0	29.0	28.0	27.0	26.0
70.00	76.07	75.92	75.77	75.62	75.47
71.00	77.16	77.01	76.85	76.70	76.55
72.00	78.25	78.09	77.93	77.78	77.62
73.00	79.33	79.17	79.02	78.86	78.70
74.00	80.42	80.26	80.10	79.94	79.78
75.00	81.51	81.34	81.18	81.02	80.86
76.00	82.59	82.43	82.26	82.10	81.94
77.00	83.68	83.51	83.35	83.18	83.01
78.00	84.77	84.60	84.43	84.26	84.09
79.00	85.85	85.68	85.51	85.34	85.17
80.00	86.94	86.77	86.59	86.42	86.25
81.00	88.03	87.85	87.68	87.50	87.33
82.00	89.11	88.94	88.76	88.58	88.40
83.00	90.20	90.02	89.84	89.66	89.48
84.00	91.29	91.10	90.92	90.74	90.56
85.00	92.37	92.19	92.00	91.82	91.64
86.00	93.46	93.27	93.09	92.90	92.72
87.00	94.55	94.36	94.17	93.98	93.80
88.00	95.64	95.44	95.25	95.06	94.87
89.00	96.72	96.53	96.33	96.14	95.95
90.00	97.81	97.61	97.42	97.22	97.03
91.00	98.90	98.70	98.50	98.30	98.11
92.00	98.98	99.78	99.58	99.38	99.19
93.00	101.07	100.87	100.66	100.46	100.26
94.00	102.16	101.95	101.75	101.54	101.34
95.00	103.24	103.04	102.83	102.62	102.42
96.00	104.33	104.12	103.91	103.70	103.50
97.00	105.42	105.20	104.99	104.78	104.58
98.00	106.50	106.29	106.08	105.86	105.65
99.00	107.59	107.37	107.16	106.94	106.73
100.00	108.68	108.46	108.24	108.03	107.81
101.00	109.76	109.54	109.32	109.11	108.89
102.00	110.85	110.63	110.41	110.19	109.97

Corrected N2 and N3% (OAT –30 to –26 Degrees C)
Figure 523 (Sheet 5)

N2 AND N3% ACTUAL	OAT −°C				
	25.0	24.0	23.0	22.0	21.0
70.00	75.32	75.17	75.02	74.88	74.73
71.00	76.39	76.24	76.09	75.95	75.80
72.00	77.47	77.32	77.17	77.02	76.87
73.00	78.55	78.39	78.24	78.09	77.93
74.00	79.62	79.47	79.31	79.15	79.00
75.00	80.70	80.54	80.38	80.22	80.07
76.00	81.77	81.61	81.45	81.29	81.14
77.00	82.85	82.69	82.53	82.36	82.20
78.00	83.93	83.76	83.60	83.43	83.27
79.00	85.00	84.83	84.67	84.50	84.34
80.00	86.08	85.91	85.74	85.57	85.41
81.00	87.15	86.98	86.81	86.64	86.47
82.00	88.23	88.06	87.88	87.71	87.54
83.00	89.31	89.13	88.96	88.78	88.61
84.00	90.38	90.20	90.03	89.85	89.68
85.00	91.46	91.28	91.10	90.92	90.74
86.00	92.53	92.35	92.17	91.99	91.81
87.00	93.61	93.43	93.24	93.06	92.88
88.00	94.69	94.50	94.31	94.13	93.95
89.00	95.76	95.97	95.39	95.20	95.01
90.00	96.84	96.65	96.46	96.27	96.08
91.00	97.91	97.72	97.53	97.34	97.15
92.00	98.99	98.80	98.60	98.41	98.22
93.00	100.07	99.87	99.67	99.48	99.28
94.00	101.14	100.94	100.74	100.55	100.35
95.00	102.22	102.02	101.82	101.62	101.42
96.00	103.29	103.09	102.89	102.69	102.49
97.00	104.37	104.16	103.96	103.76	103.56
98.00	105.45	105.24	105.03	104.83	104.62
99.00	106.52	106.31	106.10	105.90	105.69
100.00	107.60	107.39	107.18	106.97	106.76
101.00	108.67	108.46	108.25	108.04	107.83
102.00	109.75	109.53	109.32	109.11	108.89

Corrected N2 and N3% (OAT −25 to −21 Degrees C)
Figure 523 (Sheet 6)

N2 AND N3% ACTUAL	OAT –°C				
	20.0	19.0	18.0	17.0	16.0
75.00	79.91	79.76	79.61	79.45	79.30
76.00	80.98	80.82	80.67	80.51	80.36
77.00	82.04	81.89	81.73	81.57	81.42
78.00	83.11	82.95	82.79	82.63	82.47
79.00	84.18	84.01	83.85	83.69	83.53
80.00	85.24	85.08	94.91	94.75	84.59
81.00	86.31	86.14	85.97	85.81	85.65
82.00	87.37	87.20	87.04	86.87	86.70
83.00	88.44	88.27	88.10	87.93	87.76
84.00	89.50	89.33	89.16	88.99	88.82
85.00	90.57	90.39	90.22	90.05	89.88
86.00	91.63	91.46	91.28	91.11	90.93
87.00	92.70	92.52	92.34	92.17	91.99
88.00	93.76	93.58	93.40	93.23	93.05
89.00	94.83	94.65	94.47	94.28	94.10
90.00	95.90	95.71	95.53	95.34	95.16
91.00	96.96	96.77	96.59	96.40	96.22
92.00	98.03	97.84	97.65	97.46	97.28
93.00	99.09	98.90	98.71	98.52	98.33
94.00	100.16	99.96	99.77	99.58	99.39
95.00	101.22	101.03	100.83	100.64	100.45
96.00	102.29	102.09	101.90	101.70	101.51
97.00	103.35	103.16	102.96	102.76	102.56
98.00	104.42	104.22	104.02	103.82	103.62
99.00	105.49	105.28	105.08	104.88	104.68
100.00	106.55	106.35	106.14	105.94	105.74
101.00	107.62	107.41	107.20	107.00	106.79
102.00	108.68	108.47	108.26	108.06	107.85
103.00	109.75	109.54	109.33	109.12	108.91
104.00	110.81	110.60	110.39	110.18	109.97
105.00	111.88	111.66	111.45	111.23	111.02

Corrected N2 and N3% (OAT –20 to –16 Degrees C)
Figure 523 (Sheet 7)

N2 AND N3% ACTUAL	OAT –°C				
	15.0	14.0	13.0	12.0	11.0
75.00	79.15	79.00	78.85	78.70	78.56
76.00	80.21	80.05	79.90	79.75	79.60
77.00	81.26	81.11	80.96	80.80	80.65
78.00	82.32	82.16	82.01	81.85	81.70
79.00	83.37	83.21	83.06	82.90	82.75
80.00	84.43	84.27	84.11	83.95	83.79
81.00	85.48	85.32	85.16	85.00	84.84
82.00	86.54	86.37	86.21	86.05	85.89
83.00	87.59	87.43	87.26	87.10	86.94
84.00	88.65	88.48	88.31	88.15	87.98
85.00	89.70	89.53	89.37	89.20	89.03
86.00	90.76	90.59	90.42	90.25	90.08
87.00	91.82	91.64	91.47	91.30	91.13
88.00	92.87	92.69	92.52	92.35	92.17
89.00	93.93	93.75	93.57	93.40	93.22
90.00	94.98	94.80	94.62	94.45	94.27
91.00	96.04	95.85	95.67	95.49	95.32
92.00	97.09	96.91	96.73	96.54	96.36
93.00	98.15	97.96	97.78	97.59	97.41
94.00	99.20	99.01	98.83	98.64	98.46
95.00	100.26	100.07	99.88	99.69	99.51
96.00	101.31	101.12	100.93	100.74	100.55
97.00	102.37	102.18	101.98	101.79	101.60
98.00	103.42	103.23	103.03	102.84	102.65
99.00	104.48	104.28	104.09	103.89	103.70
100.00	105.53	105.34	105.14	104.94	104.74
101.00	106.59	106.39	106.19	105.99	105.79
102.00	107.65	107.44	107.24	107.04	106.84
103.00	108.70	108.50	108.29	108.09	107.88
104.00	109.76	109.55	109.34	109.14	108.93
105.00	110.81	110.60	110.39	110.19	109.98

Corrected N2 and N3% (OAT –15 to –11 Degrees C)
Figure 523 (Sheet 8)

N2 AND N3% ACTUAL	OAT −°C				
	10.0	9.0	8.0	7.0	6.0
75.00	78.41	78.26	78.12	77.98	77.83
76.00	79.46	79.31	79.16	79.02	78.87
77.00	80.50	80.35	80.20	80.06	79.91
78.00	81.55	81.40	81.25	81.10	80.95
79.00	82.59	82.44	82.29	82.13	81.98
80.00	83.64	83.48	83.33	83.17	83.02
81.00	84.68	84.53	84.37	84.21	84.06
82.00	85.73	85.57	85.41	85.25	85.10
83.00	86.77	86.61	86.45	86.29	86.14
84.00	87.82	87.66	87.49	87.33	87.17
85.00	88.87	88.70	88.54	88.37	88.21
86.00	89.91	89.74	89.58	89.41	89.25
87.00	90.96	90.79	90.62	90.45	90.29
88.00	92.00	91.83	91.66	91.49	91.32
89.00	93.05	92.87	92.70	92.53	92.36
90.00	94.09	93.92	93.74	93.57	93.40
91.00	95.14	94.96	94.79	94.61	94.44
92.00	96.18	96.01	95.83	95.65	95.48
93.00	97.23	97.05	96.87	96.69	96.51
94.00	98.27	98.09	97.91	97.73	97.55
95.00	99.32	99.14	98.95	98.77	98.59
96.00	100.37	100.18	99.99	99.81	99.63
97.00	101.41	101.22	101.04	100.85	100.66
98.00	102.46	102.27	102.08	101.89	101.70
99.00	103.50	103.31	103.12	102.93	102.74
100.00	104.55	104.35	104.16	103.97	103.78
101.00	105.59	105.40	105.20	105.01	104.82
102.00	106.64	106.44	106.24	106.05	105.85
103.00	107.68	107.48	107.29	107.09	106.89
104.00	108.73	108.53	108.33	108.13	107.93
105.00	109.77	109.57	109.37	109.17	108.97

Corrected N2 and N3% (OAT −10 to −6 Degrees C)
Figure 523 (Sheet 9)

N2 AND N3% ACTUAL	OAT −°C				
	5.0	4.0	3.0	2.0	1.0
75.00	77.69	77.55	77.41	77.27	77.13
76.00	78.73	78.58	78.44	78.30	78.16
77.00	79.76	79.62	79.47	79.33	79.19
78.00	80.80	80.65	80.50	80.36	80.21
79.00	81.83	81.69	81.54	81.39	81.24
80.00	82.87	82.72	82.57	82.42	82.27
81.00	83.91	83.75	83.60	83.45	83.30
82.00	84.94	84.79	84.63	84.48	84.33
83.00	85.98	85.82	85.67	85.51	85.36
84.00	87.01	86.86	86.70	86.54	86.38
85.00	88.05	87.89	87.73	87.57	87.41
86.00	89.09	88.92	88.76	88.60	88.44
87.00	90.12	89.96	89.79	89.63	89.47
88.00	91.16	90.99	90.83	90.66	90.50
89.00	92.19	92.03	91.86	91.69	91.53
90.00	93.23	93.06	92.89	92.72	92.55
91.00	94.26	94.09	93.92	93.75	93.58
92.00	95.30	95.13	94.95	94.78	94.61
93.00	96.34	96.16	95.99	95.81	95.64
94.00	97.37	97.19	97.02	96.84	96.67
95.00	98.41	98.23	98.05	97.87	97.70
96.00	99.44	99.26	99.08	98.90	98.73
97.00	100.48	100.30	100.11	99.93	99.75
98.00	101.52	101.33	101.15	100.96	100.78
99.00	102.55	102.36	102.18	101.99	101.81
100.00	103.59	103.40	103.21	103.02	102.84
101.00	104.62	104.43	104.24	104.05	103.87
102.00	105.66	105.47	105.28	105.08	104.90
103.00	106.70	106.50	106.31	106.12	105.92
104.00	107.73	107.53	107.34	107.15	106.95
105.00	108.77	108.57	108.37	108.18	107.98

Corrected N2 and N3% (OAT −5 to −1 Degrees C)
Figure 523 (Sheet 10)

N2 AND N3% ACTUAL	OAT −°C				
	0.0	1.0	2.0	3.0	4.0
75.00	76.99	76.85	76.72	76.58	76.44
76.00	78.02	77.88	77.74	77.60	77.46
77.00	79.04	78.90	78.76	78.62	78.48
78.00	80.07	79.93	79.78	79.64	79.50
79.00	81.10	80.95	80.81	80.66	80.52
80.00	82.12	81.98	81.83	81.68	81.54
81.00	83.15	83.00	82.85	82.71	82.56
82.00	84.18	84.03	83.88	83.73	83.58
83.00	85.20	85.05	84.90	84.75	84.60
84.00	86.23	86.08	85.92	85.77	85.62
85.00	87.26	87.10	86.94	86.79	86.64
86.00	88.28	88.12	87.97	87.81	87.66
87.00	89.31	89.15	88.99	88.83	88.68
88.00	90.34	90.17	90.01	89.85	89.69
89.00	91.36	91.20	91.04	90.87	90.71
90.00	92.39	92.22	92.06	91.90	91.73
91.00	93.42	93.25	93.08	92.92	92.75
92.00	94.44	94.27	94.10	93.94	93.77
93.00	95.47	95.30	95.13	94.96	94.79
94.00	96.49	96.32	96.15	95.98	95.81
95.00	97.52	97.35	97.17	97.00	96.83
96.00	98.55	98.37	98.20	98.02	97.85
97.00	99.57	99.40	99.22	99.04	98.87
98.00	100.60	100.42	100.24	100.06	99.89
99.00	101.63	101.45	101.26	101.09	100.91
100.00	102.65	102.47	102.29	102.11	101.93
101.00	103.68	103.50	103.31	103.13	102.94
102.00	104.71	104.52	104.33	104.15	103.96
103.00	105.73	105.54	105.36	105.17	104.98
104.00	106.76	106.57	106.38	106.19	106.00
105.00	107.79	107.59	107.40	107.21	107.02

Corrected N2 and N3% (OAT 0 to +4 Degrees C)
Figure 523 (Sheet 11)

N2 AND N3% ACTUAL	OAT °C				
	5.0	6.0	7.0	8.0	9.0
75.00	76.31	76.18	76.04	75.91	75.78
76.00	77.33	77.19	77.06	76.92	76.79
77.00	78.34	78.21	78.07	77.93	77.80
78.00	79.36	79.22	79.08	78.95	78.81
79.00	80.38	80.24	80.10	79.96	79.82
80.00	81.40	81.25	81.11	80.97	80.83
81.00	82.41	82.27	82.13	81.98	81.84
82.00	83.43	83.28	83.14	82.99	82.85
83.00	84.45	84.30	84.15	84.01	83.86
84.00	85.47	85.32	85.17	85.02	84.87
85.00	86.48	86.33	86.18	86.03	85.88
86.00	87.50	87.35	87.19	87.04	86.89
87.00	88.52	88.36	88.21	88.05	87.90
88.00	89.54	89.38	89.22	89.07	88.91
89.00	90.55	90.39	90.24	90.08	89.92
90.00	91.57	91.41	91.25	91.09	90.93
91.00	92.59	92.43	92.26	92.10	91.94
92.00	93.61	93.44	93.28	93.12	92.95
93.00	94.62	94.46	94.29	94.13	93.96
94.00	95.64	95.47	95.31	95.14	94.97
95.00	96.66	96.49	96.32	96.15	95.98
96.00	97.68	97.50	97.33	97.16	96.99
97.00	98.69	98.52	98.35	98.18	98.01
98.00	99.71	99.54	99.36	99.19	99.02
99.00	100.73	100.55	100.38	100.20	100.03
100.00	101.75	101.57	101.39	101.21	101.04
101.00	102.76	102.58	102.40	102.22	102.05
102.00	103.78	103.60	103.42	103.24	103.06
103.00	104.80	104.61	104.43	104.25	104.07
104.00	105.82	105.63	105.44	105.26	105.08
105.00	106.83	106.65	106.46	106.27	106.09

Corrected N2 and N3% (OAT +5 to +9 Degrees C)
Figure 523 (Sheet 12)

N2 AND N3% ACTUAL	OAT °C				
	10.0	11.0	12.0	13.0	14.0
80.00	80.69	80.55	80.41	80.27	80.14
81.00	81.70	81.56	81.42	81.28	81.14
82.00	82.71	82.56	82.42	82.28	82.14
83.00	83.71	83.57	83.43	83.28	83.14
84.00	84.72	84.58	84.43	84.29	84.14
85.00	85.73	85.58	85.44	85.29	85.14
86.00	86.74	86.59	86.44	86.29	86.15
87.00	87.75	87.60	87.45	87.30	87.15
88.00	88.76	88.60	88.45	88.30	88.15
89.00	89.77	89.61	89.46	89.30	89.15
90.00	90.78	90.62	90.46	90.31	90.15
91.00	91.78	91.63	91.47	91.31	91.16
92.00	92.79	82.63	92.47	92.31	92.16
93.00	93.80	93.64	93.48	93.32	93.16
94.00	94.81	94.65	94.48	94.32	94.16
95.00	95.82	95.65	95.49	95.32	95.16
96.00	96.83	96.66	96.49	96.33	96.16
97.00	97.84	97.67	97.50	97.33	97.17
98.00	98.84	98.67	98.50	98.34	98.17
99.00	99.85	99.68	99.51	99.34	99.17
100.00	100.86	100.69	100.51	100.34	100.17
101.00	101.87	101.69	101.52	101.35	101.17
102.00	102.88	102.70	102.52	102.35	102.17
103.00	103.89	103.71	103.53	103.35	103.18
104.00	104.90	104.71	104.53	104.36	104.18
105.00	105.90	105.72	105.54	105.36	105.18

Corrected N2 and N3% (OAT +10 to +14 Degrees C)
Figure 523 (Sheet 13)

N2 AND N3% ACTUAL	OAT °C				
	15.0	16.0	17.0	18.0	19.0
80.00	80.00	79.86	79.73	79.60	79.46
81.00	81.00	80.86	80.73	80.59	80.45
82.00	82.00	81.86	81.72	81.58	81.45
83.00	83.00	82.86	82.72	82.58	82.44
84.00	84.00	83.86	83.72	83.57	83.43
85.00	85.00	84.86	84.71	84.57	84.43
86.00	86.00	85.85	85.71	85.56	85.42
87.00	87.00	86.85	86.71	86.56	86.41
88.00	88.00	87.85	87.70	87.55	87.41
89.00	89.00	88.85	88.70	88.55	88.40
90.00	90.00	89.85	89.70	89.54	89.39
91.00	91.00	90.85	90.69	90.54	90.39
92.00	92.00	91.84	91.69	91.53	91.38
93.00	93.00	92.84	92.69	92.53	92.37
94.00	94.00	93.84	93.68	93.52	93.37
95.00	95.00	94.84	94.68	94.52	94.36
96.00	96.00	95.84	95.68	95.51	95.35
97.00	97.00	96.84	96.67	96.51	96.35
98.00	98.00	97.83	97.67	97.50	97.34
99.00	99.00	98.83	98.67	98.50	98.33
100.00	100.00	99.83	99.66	99.49	99.33
101.00	101.00	100.83	100.66	100.49	100.32
102.00	102.00	101.83	101.65	101.48	101.31
103.00	103.00	102.83	102.65	102.48	102.31
104.00	104.00	103.82	103.65	103.47	103.30
105.00	105.00	104.82	104.64	104.47	104.29

Corrected N2 and N3% (OAT +15 to +19 Degrees C)
Figure 523 (Sheet 14)

N2 AND N3% ACTUAL	OAT °C				
	20.0	21.0	22.0	23.0	24.0
80.00	79.33	79.20	79.06	78.93	78.80
81.00	80.32	80.19	80.05	79.92	79.79
82.00	81.31	81.18	81.04	80.91	80.77
83.00	82.30	82.17	82.03	81.89	81.76
84.00	83.29	83.16	83.02	82.88	82.74
85.00	84.29	84.15	84.01	83.87	83.73
86.00	85.28	85.14	84.99	84.85	84.71
87.00	86.27	86.13	85.98	85.84	85.70
88.00	87.26	87.12	86.97	86.83	86.68
89.00	88.25	88.11	87.96	87.81	87.67
90.00	89.24	89.10	88.95	88.80	88.65
91.00	90.24	90.09	89.94	89.79	89.64
92.00	91.23	91.08	90.92	90.77	90.62
93.00	92.22	92.07	91.91	91.76	91.61
94.00	93.21	93.06	92.90	92.75	92.59
95.00	94.20	94.05	93.89	93.73	93.58
96.00	95.19	95.04	94.88	94.72	94.56
97.00	96.19	96.03	95.87	95.71	95.55
98.00	97.18	97.02	96.85	96.69	96.53
99.00	98.17	98.01	97.84	97.68	97.52
100.00	99.16	99.00	98.83	98.67	98.50
101.00	100.15	99.99	99.82	99.65	99.49
102.00	101.14	100.98	100.81	100.64	100.47
103.00	102.14	101.97	101.80	101.63	101.46
104.00	103.13	102.96	102.78	102.61	102.44
105.00	104.12	103.95	103.77	103.60	103.43

Corrected N2 and N3% (OAT +20 to +24 Degrees C)
Figure 523 (Sheet 15)

N2 AND N3% ACTUAL	OAT °C				
	25.0	26.0	27.0	28.0	29.0
80.00	78.67	78.54	78.42	78.29	78.16
81.00	79.66	79.53	79.40	79.27	79.14
82.00	80.64	80.51	80.38	80.25	80.12
83.00	81.62	81.49	81.36	81.22	81.09
84.00	82.61	82.47	82.34	82.20	82.07
85.00	83.59	83.45	83.32	83.18	83.05
86.00	84.57	84.44	84.30	84.16	84.02
87.00	85.56	85.42	85.28	85.14	85.00
88.00	86.54	86.40	86.26	86.12	85.98
89.00	87.52	87.38	87.24	87.10	86.95
90.00	88.51	88.36	88.22	88.07	87.93
91.00	89.49	89.34	89.20	89.05	88.91
92.00	90.47	90.33	90.18	90.03	89.89
93.00	91.46	91.31	91.16	91.01	90.86
94.00	92.44	92.29	92.14	91.99	91.84
95.00	93.43	93.27	93.12	92.97	92.82
96.00	94.41	94.25	94.10	93.95	93.79
97.00	95.39	95.24	95.08	94.93	94.77
98.00	96.38	96.22	96.06	95.90	95.75
99.00	97.36	97.20	97.04	96.88	96.73
100.00	98.34	98.18	98.02	97.86	97.70
101.00	99.33	99.16	99.00	98.84	98.68
102.00	100.31	100.14	99.98	99.82	99.66
103.00	101.29	101.13	100.96	100.80	100.63
104.00	102.28	102.11	101.94	101.78	101.61
105.00	103.26	103.09	102.92	102.75	102.59

Corrected N2 and N3% (OAT +25 to +29 Degrees C)
Figure 523 (Sheet 16)

N2 AND N3% ACTUAL	OAT °C				
	30.0	31.0	32.0	33.0	34.0
80.00	78.04	77.91	77.78	77.66	77.54
81.00	79.01	78.88	78.76	78.63	78.50
82.00	79.99	79.96	79.73	79.60	79.47
83.00	80.96	80.83	80.70	80.57	80.44
84.00	81.94	81.80	81.67	81.54	81.41
85.00	82.91	82.78	82.65	82.51	82.38
86.00	83.89	83.75	83.62	83.48	83.35
87.00	84.86	84.73	84.59	84.45	84.32
88.00	85.84	85.70	85.56	85.43	85.29
89.00	86.81	86.67	86.54	86.40	86.26
90.00	87.79	87.65	87.51	87.37	87.23
91.00	88.77	88.62	88.48	88.34	88.20
92.00	89.74	89.60	89.45	89.31	89.17
93.00	90.72	90.57	90.42	90.28	90.14
94.00	91.69	91.54	91.40	91.25	91.10
95.00	92.67	92.52	92.37	92.22	92.07
96.00	93.64	93.49	93.34	93.19	93.04
97.00	94.62	94.47	94.31	94.16	94.01
98.00	95.59	95.44	95.29	95.13	94.98
99.00	96.57	96.41	96.26	96.10	95.95
100.00	97.54	97.39	97.23	97.07	96.92
101.00	98.52	98.36	98.20	98.05	97.89
102.00	99.50	99.33	99.17	99.02	98.86
103.00	100.47	100.31	100.15	99.99	99.83
104.00	101.45	101.28	101.12	100.96	100.80
105.00	102.42	102.26	102.09	101.93	101.77

Corrected N2 and N3% (OAT +30 to +34 Degrees C)
Figure 523 (Sheet 17)

N2 AND N3% ACTUAL	OAT °C				
	35.0	36.0	37.0	38.0	39.0
80.00	77.41	77.29	77.17	77.05	76.92
81.00	78.38	78.26	78.13	78.01	77.89
82.00	79.35	79.22	79.10	78.97	78.85
83.00	80.32	80.19	80.06	79.93	79.81
84.00	81.28	81.15	81.03	80.90	80.77
85.00	82.25	82.12	81.99	81.86	81.73
86.00	83.22	83.09	82.95	82.82	82.69
87.00	84.19	84.05	83.92	83.79	83.66
88.00	85.15	85.02	84.88	84.75	84.62
89.00	86.12	85.98	85.85	85.71	85.58
90.00	87.09	86.95	86.81	86.68	86.54
91.00	88.06	87.92	87.78	87.64	87.50
92.00	89.02	88.88	88.74	88.60	88.46
93.00	89.99	89.85	89.71	89.57	89.42
94.00	90.96	90.82	90.67	90.53	90.39
95.00	91.93	91.78	91.64	91.49	91.35
96.00	92.89	92.75	92.60	92.45	92.31
97.00	93.86	93.71	93.57	93.42	93.27
98.00	94.83	94.68	94.53	94.38	94.23
99.00	95.80	95.65	95.49	95.34	95.19
100.00	96.77	96.61	96.46	96.31	96.16
101.00	97.73	97.58	97.42	97.27	97.12
102.00	98.70	98.54	98.39	98.23	98.08
103.00	99.67	99.51	99.35	99.20	99.04
104.00	100.64	100.48	100.32	100.16	100.00
105.00	101.60	101.44	101.28	101.12	100.96

Corrected N2 and N3% (OAT +35 to +39 Degrees C)
Figure 523 (Sheet 18)

N2 AND N3% ACTUAL	OAT °C				
	40.0	41.0	42.0	43.0	44.0
85.00	81.60	81.48	81.35	81.22	81.10
86.00	82.56	82.44	82.31	82.18	82.05
87.00	83.52	83.39	83.26	83.14	83.01
88.00	84.48	84.35	84.22	84.09	83.96
89.00	85.44	85.31	85.18	85.05	84.91
90.00	86.40	86.27	86.14	86.00	85.87
91.00	87.36	87.23	87.09	86.96	86.82
92.00	88.32	88.19	88.05	87.91	87.78
93.00	89.28	89.15	89.01	88.87	88.73
94.00	90.24	90.10	89.96	89.82	89.69
95.00	91.20	91.06	90.92	90.78	90.64
96.00	92.16	92.02	91.88	91.74	91.59
97.00	93.13	92.98	92.83	92.69	92.55
98.00	94.09	93.94	93.79	93.65	93.50
99.00	95.05	94.90	94.75	94.60	94.46
100.00	96.01	95.86	95.71	95.56	95.41
101.00	96.97	96.81	96.66	96.51	96.36
102.00	97.93	97.77	97.62	97.47	97.32
103.00	98.89	98.73	98.58	98.42	98.27
104.00	99.85	99.69	99.53	99.38	99.23
105.00	100.81	100.65	100.49	100.34	100.18

Corrected N2 and N3% (OAT +40 to +44 Degrees C)
Figure 523 (Sheet 19)

N2 AND N3% ACTUAL	OAT °C				
	45.0	46.0	47.0	48.0	49.0
85.00	80.97	80.85	80.73	80.60	80.48
86.00	81.93	81.80	81.67	81.55	81.43
87.00	82.88	82.75	82.62	82.50	82.37
88.00	83.83	83.70	83.57	83.45	83.32
89.00	84.78	84.65	84.52	84.39	84.27
90.00	85.74	85.60	85.47	85.34	85.21
91.00	86.69	86.56	86.42	86.29	86.16
92.00	87.64	87.51	87.37	87.24	87.11
93.00	88.59	88.46	88.32	88.19	88.05
94.00	89.55	89.41	89.27	89.14	89.00
95.00	90.50	90.36	90.22	90.08	89.95
96.00	91.45	91.31	91.17	91.03	90.89
97.00	92.40	92.26	92.12	91.98	91.84
98.00	93.36	93.21	93.07	92.93	92.79
99.00	94.31	94.17	94.02	93.88	93.73
100.00	95.26	95.12	94.97	94.83	94.68
101.00	96.22	96.07	95.92	95.77	95.63
102.00	97.17	97.02	96.87	96.72	96.58
103.00	98.12	97.97	97.82	97.67	97.52
104.00	99.07	98.92	98.77	98.62	98.47
105.00	100.03	99.87	99.72	99.57	99.42

Corrected N2 and N3% (OAT +45 to +49 Degrees C)
Figure 523 (Sheet 20)

N2 AND N3% ACTUAL	OAT °C				
	50.0	51.0	52.0	53.0	54.0
85.00	80.36	80.24	80.11	79.99	79.87
86.00	81.30	81.18	81.06	80.94	80.81
87.00	82.25	82.12	82.00	81.88	81.75
88.00	83.19	83.07	82.94	82.82	82.69
89.00	84.14	84.01	83.88	83.76	83.63
90.00	85.08	84.96	84.83	84.70	84.57
91.00	86.03	85.90	85.77	85.64	85.51
92.00	86.97	86.84	86.71	86.58	86.45
93.00	87.92	87.79	87.65	87.52	87.39
94.00	88.87	88.73	88.60	88.46	88.33
95.00	89.81	89.67	89.54	89.41	89.27
96.00	90.76	90.62	90.48	90.35	90.21
97.00	91.70	91.56	91.42	91.29	91.15
98.00	92.65	92.51	92.37	92.23	92.09
99.00	93.59	93.45	93.31	93.17	93.03
100.00	94.54	94.39	94.25	94.11	93.97
101.00	95.48	95.34	95.19	95.05	94.91
102.00	96.43	96.28	96.14	95.99	95.85
103.00	97.37	97.23	97.08	96.93	96.79
104.00	98.32	98.17	98.02	97.88	97.73
105.00	99.26	99.11	98.96	98.82	98.67

Corrected N2 and N3% (OAT +50 to +54 Degrees C)
Figure 523 (Sheet 21)

N2 AND N3% ACTUAL	OAT °C				
	55.0	56.0	57.0	58.0	59.0
85.00	79.75	79.64	79.52	79.40	79.28
86.00	80.69	80.57	80.45	80.33	80.22
87.00	81.63	81.51	81.39	81.27	81.15
88.00	82.57	82.45	82.32	82.20	82.08
89.00	83.51	83.38	83.26	83.14	83.01
90.00	84.45	84.32	84.20	84.07	83.95
91.00	85.38	85.26	85.13	85.00	84.88
92.00	86.32	86.19	86.07	85.94	85.81
93.00	87.26	87.13	87.00	86.87	86.74
94.00	88.20	88.07	87.94	87.81	87.68
95.00	89.14	89.00	88.87	88.74	88.61
96.00	90.08	89.94	89.81	89.68	89.54
97.00	91.01	90.88	90.74	90.61	90.48
98.00	91.95	91.82	91.68	91.54	91.41
99.00	92.89	92.75	92.61	92.48	92.34
100.00	93.83	93.69	93.55	93.41	93.27
101.00	94.77	94.63	94.49	94.35	94.21
102.00	95.71	95.56	95.42	95.28	95.14
103.00	96.64	96.50	96.36	96.21	96.07
104.00	97.58	97.44	97.29	97.15	97.00
105.00	98.52	98.37	98.23	98.08	97.94

Corrected N2 and N3% (OAT +55 to +59 Degrees C)
Figure 523 (Sheet 22)

EGT ACTUAL °C	OAT °C						
	-50.0	-49.0	-48.0	-47.0	-46.0	-45.0	-44.0
570.00	804.68	800.04	795.45	790.91	786.40	781.92	777.49
575.00	811.10	806.44	801.82	797.25	792.71	788.21	783.75
580.00	817.52	812.84	808.19	803.59	799.02	794.50	790.01
585.00	823.95	819.23	814.56	809.93	805.33	800.78	796.27
590.00	830.37	825.63	820.93	816.27	811.65	807.07	802.53
595.00	836.79	832.02	827.29	822.61	817.96	813.35	808.78
600.00	843.22	838.42	833.66	828.94	824.27	819.64	815.04
605.00	849.64	844.81	840.03	835.28	830.58	825.92	821.30
610.00	856.06	851.21	846.40	841.62	836.90	832.21	827.56
615.00	862.49	857.60	852.76	847.96	843.21	838.49	833.82
620.00	868.91	864.00	859.13	854.30	849.52	844.78	840.08
625.00	875.33	870.39	865.50	860.64	855.83	851.06	846.34
630.00	881.76	876.79	871.87	866.98	862.15	857.35	852.60
635.00	888.18	883.19	878.23	873.32	868.46	863.64	858.85
640.00	894.60	889.58	884.60	879.66	874.77	869.92	865.11
645.00	901.03	895.98	890.97	886.00	881.08	876.21	871.37
650.00	907.45	902.37	897.34	892.34	887.40	882.49	877.63
655.00	913.88	908.77	903.70	898.68	893.71	888.78	883.89
660.00	920.30	915.16	910.07	905.02	900.02	895.06	890.15
665.00	926.72	921.56	916.44	911.36	906.33	901.35	896.41
670.00	933.15	927.95	922.81	917.70	912.65	907.63	902.66
675.00	939.57	934.35	929.17	924.04	918.96	913.92	908.92
680.00	945.99	940.74	935.54	930.38	925.27	920.21	915.18
685.00	952.42	947.14	941.91	936.72	931.59	926.49	921.44
690.00	958.84	953.53	948.28	943.06	937.90	932.78	927.70
695.00	965.26	959.93	954.64	949.40	944.21	939.06	933.96
700.00	971.69	966.33	961.01	955.74	950.52	945.35	940.22
705.00	978.11	972.72	967.38	962.08	956.84	951.63	946.47
710.00	984.53	979.12	973.75	968.42	963.15	957.92	952.73
715.00	990.96	985.51	980.11	974.76	969.46	964.20	958.99
720.00	997.38	991.91	986.48	981.10	975.77	970.49	965.25

EGT 570 to 720°C

OAT -50 to -44°C

PPC3506

EGT Correction Factors
Figure 524 (Sheet 1)

188372

EGT ACTUAL °C	OAT °C						
	-50.0	-49.0	-48.0	-47.0	-46.0	-45.0	-44.0
725.00	1003.80	998.30	992.85	987.44	982.09	976.77	971.51
730.00	1010.23	1004.70	999.22	993.78	988.40	983.06	977.77
735.00	1016.65	1011.09	1005.58	1000.12	994.71	989.35	984.03
740.00	1023.07	1017.49	1011.95	1006.46	1001.02	995.63	990.28
745.00	1029.50	1023.88	1018.32	1012.80	1007.34	1001.92	996.54
750.00	1035.92	1030.28	1024.69	1019.14	1013.65	1008.20	1002.80
755.00	1042.35	1036.68	1031.06	1025.48	1019.96	1014.49	1009.06
760.00	1048.77	1043.07	1037.42	1031.82	1026.27	1020.77	1015.32
765.00	1055.19	1049.47	1043.79	1038.16	1032.59	1027.06	1021.58
770.00	1061.62	1055.86	1050.16	1044.50	1038.90	1033.34	1027.84
775.00	1068.04	1062.26	1056.53	1050.84	1045.21	1039.63	1034.10
780.00	1074.46	1068.65	1062.89	1057.18	1051.53	1045.92	1040.35
785.00	1080.89	1075.05	1069.26	1063.52	1057.84	1052.20	1046.61
790.00	1087.31	1081.44	1075.63	1069.86	1064.15	1058.49	1052.87
795.00	1093.73	1087.84	1082.00	1076.20	1070.46	1064.77	1059.13
800.00	1100.16	1094.23	1088.36	1082.54	1076.78	1071.06	1065.39
805.00	1106.58	1100.63	1094.73	1088.88	1083.09	1077.34	1071.65
810.00	1113.00	1107.02	1101.10	1095.22	1089.40	1083.63	1077.91
815.00	1119.43	1113.42	1107.47	1101.56	1095.71	1089.91	1084.16
820.00	1125.85	1119.82	1113.83	1107.90	1102.03	1096.20	1090.42
825.00	1132.27	1126.21	1120.20	1114.24	1108.34	1102.48	1096.68
830.00	1138.70	1132.61	1126.57	1120.58	1114.65	1108.77	1102.94
835.00	1145.12	1139.00	1132.94	1126.92	1120.96	1115.06	1109.20
840.00	1151.54	1145.40	1139.30	1133.26	1127.28	1121.34	1115.46
845.00	1157.97	1151.79	1145.67	1139.60	1133.59	1127.63	1121.72
850.00	1164.39	1158.19	1152.04	1145.94	1139.90	1133.91	1127.97
855.00	1170.81	1164.58	1158.41	1152.28	1146.21	1140.20	1134.23
860.00	1177.24	1170.98	1164.77	1158.62	1152.53	1146.48	1140.49
865.00	1183.66	1177.37	1171.14	1164.96	1158.84	1152.77	1146.75
870.00	1190.09	1183.77	1177.51	1171.30	1165.15	1159.05	1153.01
875.00	1196.51	1190.16	1183.88	1177.64	1171.47	1165.34	1159.27
880.00	1202.93	1196.56	1190.24	1183.98	1177.78	1171.63	1165.53
885.00	1209.36	1202.96	1196.61	1190.32	1184.09	1177.91	1171.79
890.00	1215.78	1209.35	1202.98	1196.66	1190.40	1184.20	1178.04
895.00	1222.20	1215.75	1209.35	1203.00	1196.72	1190.48	1184.30
900.00	1228.63	1222.14	1215.71	1209.34	1203.03	1196.77	1190.56

EGT 725 to 900°C

OAT -50 to -44°C

PPC3507

EGT Correction Factors
Figure 524 (Sheet 2)

188374

EGT ACTUAL °C	OAT °C						
	-43.0	-42.0	-41.0	-40.0	-39.0	-38.0	-37.0
570.00	773.10	768.74	764.42	760.14	755.89	751.68	747.51
575.00	779.33	774.95	770.60	766.29	762.02	757.78	753.58
580.00	785.56	781.15	776.78	772.45	768.15	763.89	759.66
585.00	791.79	787.36	782.96	778.60	774.28	769.99	765.74
590.00	798.03	793.56	789.14	784.75	780.40	776.09	771.81
595.00	804.26	799.77	795.32	790.91	786.53	782.19	777.89
600.00	810.49	805.97	801.50	797.06	792.66	788.29	783.97
605.00	816.72	812.18	807.68	803.21	798.79	794.40	790.04
610.00	822.95	818.39	813.86	809.37	804.91	800.50	796.12
615.00	829.19	824.59	820.04	815.52	811.04	806.60	802.20
620.00	835.42	830.80	826.22	821.67	817.17	812.70	808.27
625.00	841.65	837.00	832.39	827.83	823.30	818.80	814.35
630.00	847.88	843.21	838.57	833.98	829.42	824.91	820.43
635.00	854.11	849.41	844.75	840.13	835.55	831.01	826.50
640.00	860.35	855.62	850.93	846.29	841.68	837.11	832.58
645.00	866.58	861.82	857.11	852.44	847.81	843.21	838.66
650.00	872.81	868.03	863.29	858.59	853.93	849.31	844.73
655.00	879.04	874.24	869.47	864.75	860.06	855.42	850.81
660.00	885.27	880.44	875.65	870.90	866.19	861.52	856.89
665.00	891.51	886.65	881.83	877.05	872.32	867.62	862.96
670.00	897.74	892.85	888.01	883.21	878.44	873.72	869.04
675.00	903.97	899.06	894.19	889.36	884.57	879.83	875.12
680.00	910.20	905.26	900.37	895.51	890.70	885.93	881.19
685.00	916.43	911.47	906.55	901.67	896.83	892.03	887.27
690.00	922.66	917.67	912.73	907.82	902.96	898.13	893.35
695.00	928.90	923.88	918.91	913.97	909.08	904.23	899.43
700.00	935.13	930.09	925.08	920.13	915.21	910.34	905.50
705.00	941.36	936.29	931.26	926.28	921.34	916.44	911.58
710.00	947.59	942.50	937.44	932.43	927.47	922.54	917.66
715.00	953.82	948.70	943.62	938.59	933.59	928.64	923.73
720.00	960.06	954.91	949.80	944.74	939.72	934.74	929.81

EGT 570 to 720°C

OAT -43 to -37°C

PPC3508

EGT Correction Factors
Figure 524 (Sheet 3)

EGT ACTUAL °C	OAT °C						
	-43.0	-42.0	-41.0	-40.0	-39.0	-38.0	-37.0
725.00	966.29	961.11	955.98	950.89	945.85	940.85	935.89
730.00	972.52	967.32	962.16	957.05	951.98	946.95	941.96
735.00	978.75	973.52	968.34	963.20	958.10	953.05	948.04
740.00	984.98	979.73	974.52	969.35	964.23	959.15	954.12
745.00	991.22	985.94	980.70	975.51	970.36	965.25	960.19
750.00	997.45	992.14	986.88	981.66	976.49	971.36	966.27
755.00	1003.68	998.35	993.06	987.81	982.61	977.46	972.35
760.00	1009.91	1004.55	999.24	993.97	988.74	983.56	978.42
765.00	1016.14	1010.76	1005.42	1000.12	994.87	989.66	984.50
770.00	1022.38	1016.96	1011.60	1006.27	1001.00	995.76	990.58
775.00	1028.61	1023.17	1017.78	1012.43	1007.12	1001.87	996.65
780.00	1034.84	1029.37	1023.95	1018.58	1013.25	1007.97	1002.73
785.00	1041.07	1035.58	1030.13	1024.73	1019.38	1014.07	1008.81
790.00	1047.30	1041.79	1036.31	1030.89	1025.51	1020.17	1014.88
795.00	1053.54	1047.99	1042.49	1037.04	1031.64	1026.28	1020.96
800.00	1059.77	1054.20	1048.67	1043.19	1037.76	1032.38	1027.04
805.00	1066.00	1060.40	1054.85	1049.35	1043.89	1038.48	1033.11
810.00	1072.23	1066.61	1061.03	1055.50	1050.02	1044.58	1039.19
815.00	1078.46	1072.81	1067.21	1061.65	1056.15	1050.68	1045.27
820.00	1084.70	1079.02	1073.39	1067.81	1062.27	1056.79	1051.34
825.00	1090.93	1085.22	1079.57	1073.96	1068.40	1062.89	1057.42
830.00	1097.16	1091.43	1085.75	1080.11	1074.53	1068.99	1063.50
835.00	1103.39	1097.64	1091.93	1086.27	1080.66	1075.09	1069.57
840.00	1109.62	1103.84	1098.11	1092.42	1086.78	1081.19	1075.65
845.00	1115.86	1110.05	1104.29	1098.57	1092.91	1087.30	1081.73
850.00	1122.09	1116.25	1110.47	1104.73	1099.04	1093.40	1087.80
855.00	1128.32	1122.46	1116.64	1110.88	1105.17	1099.50	1093.88
860.00	1134.55	1128.66	1122.82	1117.03	1111.29	1105.60	1099.96
865.00	1140.78	1134.87	1129.00	1123.19	1117.42	1111.70	1106.04
870.00	1147.02	1141.07	1135.18	1129.34	1123.55	1117.81	1112.11
875.00	1153.25	1147.28	1141.36	1135.49	1129.68	1123.91	1118.19
880.00	1159.48	1153.49	1147.54	1141.65	1135.80	1130.01	1124.27
885.00	1165.71	1159.69	1153.72	1147.80	1141.93	1136.11	1130.34
890.00	1171.94	1165.90	1159.90	1153.96	1148.06	1142.22	1136.42
895.00	1178.18	1172.10	1166.08	1160.11	1154.19	1148.32	1142.50
900.00	1184.41	1178.31	1172.26	1166.26	1160.32	1154.42	1148.57

EGT 725 to 900°C

OAT -43 to -37°C

PPC3509

EGT Correction Factors
Figure 524 (Sheet 4)

188376

EGT ACTUAL °C	OAT °C						
	-36.0	-35.0	-34.0	-33.0	-32.0	-31.0	-30.0
570.00	743.37	739.26	735.19	731.15	727.14	723.17	719.23
575.00	749.42	745.29	741.19	737.13	733.10	729.10	725.14
580.00	755.47	751.31	747.19	743.10	739.05	735.03	731.04
585.00	761.52	757.34	753.19	749.08	745.00	740.96	736.95
590.00	767.57	763.37	759.20	755.06	750.96	746.89	742.85
595.00	773.62	769.39	765.20	761.04	756.91	752.82	748.76
600.00	779.68	775.42	771.20	767.01	762.86	758.75	754.66
605.00	785.73	781.45	777.20	772.99	768.82	764.67	760.57
610.00	791.78	787.47	783.20	778.97	774.77	770.60	766.47
615.00	797.83	793.50	789.21	784.95	780.72	776.53	772.38
620.00	803.88	799.53	795.21	790.92	786.68	782.46	778.28
625.00	809.93	805.55	801.21	796.90	792.63	788.39	784.19
630.00	815.99	811.58	807.21	802.88	798.58	794.32	790.09
635.00	822.04	817.61	813.21	808.86	804.54	800.25	796.00
640.00	828.09	823.63	819.22	814.83	810.49	806.18	801.90
645.00	834.14	829.66	825.22	820.81	816.44	812.11	807.81
650.00	840.19	835.69	831.22	826.79	822.40	818.04	813.71
655.00	846.24	841.71	837.22	832.77	828.35	823.97	819.62
660.00	852.30	847.74	843.22	838.74	834.30	829.90	825.53
665.00	858.35	853.77	849.23	844.72	840.26	835.82	831.43
670.00	864.40	859.79	855.23	850.70	846.21	841.75	837.34
675.00	870.45	865.82	861.23	856.68	852.16	847.68	843.24
680.00	876.50	871.85	867.23	862.65	858.11	853.61	849.15
685.00	882.55	877.87	873.23	868.63	864.07	859.54	855.05
690.00	888.61	883.90	879.24	874.61	870.02	865.47	860.96
695.00	894.66	889.93	885.24	880.59	875.97	871.40	866.86
700.00	900.71	895.95	891.24	886.57	881.93	877.33	872.77
705.00	906.76	901.98	897.24	892.54	887.88	883.26	878.67
710.00	912.81	908.01	903.24	898.52	893.83	889.19	884.58
715.00	918.86	914.03	909.25	904.50	899.79	895.12	890.48
720.00	924.91	920.06	915.25	910.48	905.74	901.05	896.39

EGT 570 to 720°C

OAT -36 to -30°C

PPC3510

EGT Correction Factors
Figure 524 (Sheet 5)

188377

EGT ACTUAL °C	OAT °C						
	-36.0	-35.0	-34.0	-33.0	-32.0	-31.0	-30.0
725.00	930.97	926.09	921.25	916.45	911.69	906.97	902.29
730.00	937.02	932.12	927.25	922.43	917.65	912.90	908.20
735.00	943.07	938.14	933.25	928.41	923.60	918.83	914.10
740.00	949.12	944.17	939.26	934.39	929.55	924.76	920.01
745.00	955.17	950.20	945.26	940.36	935.51	930.69	925.91
750.00	961.22	956.22	951.26	946.34	941.46	936.62	931.82
755.00	967.28	962.25	957.26	952.32	947.41	942.55	937.73
760.00	973.33	968.28	963.27	958.30	953.37	948.48	943.63
765.00	979.38	974.30	969.27	964.27	959.32	954.41	949.54
770.00	985.43	980.33	975.27	970.25	965.27	960.34	955.44
775.00	991.48	986.36	981.27	976.23	971.23	966.27	961.35
780.00	997.53	992.38	987.27	982.21	977.18	972.20	967.25
785.00	1003.59	998.41	993.28	988.18	983.13	978.12	973.16
790.00	1009.64	1004.44	999.28	994.16	989.09	984.05	979.06
795.00	1015.69	1010.46	1005.28	1000.14	995.04	989.98	984.97
800.00	1021.74	1016.49	1011.28	1006.12	1000.99	995.91	990.87
805.00	1027.79	1022.52	1017.28	1012.09	1006.95	1001.84	996.78
810.00	1033.84	1028.54	1023.29	1018.07	1012.90	1007.77	1002.68
815.00	1039.90	1034.57	1029.29	1024.05	1018.85	1013.70	1008.59
820.00	1045.95	1040.60	1035.29	1030.03	1024.81	1019.63	1014.49
825.00	1052.00	1046.62	1041.29	1036.00	1030.76	1025.56	1020.40
830.00	1058.05	1052.65	1047.29	1041.98	1036.71	1031.49	1026.30
835.00	1064.10	1058.68	1053.30	1047.96	1042.67	1037.42	1032.21
840.00	1070.15	1064.70	1059.30	1053.94	1048.62	1043.35	1038.11
845.00	1076.21	1070.73	1065.30	1059.91	1054.57	1049.27	1044.02
850.00	1082.26	1076.76	1071.30	1065.89	1060.53	1055.20	1049.93
855.00	1088.31	1082.78	1077.30	1071.87	1066.48	1061.13	1055.83
860.00	1094.36	1088.81	1083.31	1077.85	1072.43	1067.06	1061.74
865.00	1100.41	1094.84	1089.31	1083.82	1078.39	1072.99	1067.64
870.00	1106.46	1100.86	1095.31	1089.80	1084.34	1078.92	1073.55
875.00	1112.52	1106.89	1101.31	1095.78	1090.29	1084.85	1079.45
880.00	1118.57	1112.92	1107.31	1101.76	1096.25	1090.78	1085.36
885.00	1124.62	1118.94	1113.32	1107.73	1102.20	1096.71	1091.26
890.00	1130.67	1124.97	1119.32	1113.71	1108.15	1102.64	1097.17
895.00	1136.72	1131.00	1125.32	1119.69	1114.11	1108.57	1103.07
900.00	1142.77	1137.02	1131.32	1125.67	1120.06	1114.50	1108.98

EGT 725 to 900°C

OAT -36 to -30°C

PPC3511

EGT Correction Factors
Figure 524 (Sheet 6)

EGT ACTUAL °C	OAT °C						
	-29.0	-28.0	-27.0	-26.0	-25.0	-24.0	-23.0
570.00	715.32	711.45	707.60	703.78	700.00	696.25	692.52
575.00	721.20	717.30	713.43	709.60	705.79	702.01	698.26
580.00	727.08	723.16	719.27	715.41	711.58	707.78	704.01
585.00	732.97	729.02	725.10	721.22	717.37	713.54	709.75
590.00	738.85	734.88	730.94	727.03	723.15	719.31	715.49
595.00	744.73	740.74	736.77	732.84	728.94	725.08	721.24
600.00	750.61	746.59	742.61	738.65	734.73	730.84	726.98
605.00	756.49	752.45	748.44	744.47	740.52	736.61	732.72
610.00	762.37	758.31	754.28	750.28	746.31	742.37	738.47
615.00	768.26	764.17	760.11	756.09	752.10	748.14	744.21
620.00	774.14	770.03	765.95	761.90	757.89	753.90	749.95
625.00	780.02	775.88	771.78	767.71	763.68	759.67	755.70
630.00	785.90	781.74	777.62	773.52	769.46	765.44	761.44
635.00	791.78	787.60	783.45	779.34	775.25	771.20	767.18
640.00	797.66	793.46	789.29	785.15	781.04	776.97	772.93
645.00	803.55	799.32	795.12	790.96	786.83	782.73	778.67
650.00	809.43	805.17	800.96	796.77	792.62	788.50	784.41
655.00	815.31	811.03	806.79	802.58	798.41	794.27	790.16
660.00	821.19	816.89	812.62	808.39	804.20	800.03	795.90
665.00	827.07	822.75	818.46	814.20	809.98	805.80	801.64
670.00	832.95	828.61	824.29	820.02	815.77	811.56	807.39
675.00	838.83	834.46	830.13	825.83	821.56	817.33	813.13
680.00	844.72	840.32	835.96	831.64	827.35	823.10	818.87
685.00	850.60	846.18	841.80	837.45	833.14	828.86	824.62
690.00	856.48	852.04	847.63	843.26	838.93	834.63	830.36
695.00	862.36	857.90	853.47	849.07	844.72	840.39	836.10
700.00	868.24	863.75	859.30	854.89	850.50	846.16	841.85
705.00	874.12	869.61	865.14	860.70	856.29	851.92	847.59
710.00	880.01	875.47	870.97	866.51	862.08	857.69	853.33
715.00	885.89	881.33	876.81	872.32	867.87	863.46	859.08
720.00	891.77	887.19	882.64	878.13	873.66	869.22	864.82

EGT 570 to 720°C

OAT -29 to -23°C

PPC3512

EGT Correction Factors
Figure 524 (Sheet 7)

EGT ACTUAL °C	OAT °C						
	-29.0	-28.0	-27.0	-26.0	-25.0	-24.0	-23.0
725.00	897.65	893.04	888.48	883.94	879.45	874.99	870.56
730.00	903.53	898.90	894.31	889.76	885.24	880.75	876.31
735.00	909.41	904.76	900.15	895.57	891.03	886.52	882.05
740.00	915.29	910.62	905.98	901.38	896.81	892.29	887.79
745.00	921.18	916.48	911.81	907.19	902.60	898.05	893.54
750.00	927.06	922.33	917.65	913.00	908.39	903.82	899.28
755.00	932.94	928.19	923.48	918.81	914.18	909.58	905.02
760.00	938.82	934.05	929.32	924.63	919.97	915.35	910.77
765.00	944.70	939.91	935.15	930.44	925.76	921.11	916.51
770.00	950.58	945.77	940.99	936.25	931.55	926.88	922.25
775.00	956.47	951.63	946.82	942.06	937.33	932.65	928.00
780.00	962.35	957.48	952.66	947.87	943.12	938.41	933.74
785.00	968.23	963.34	958.49	953.68	948.91	944.18	939.48
790.00	974.11	969.20	964.33	959.49	954.70	949.94	945.23
795.00	979.99	975.06	970.16	965.31	960.49	955.71	950.97
800.00	985.87	980.92	976.00	971.12	966.28	961.48	956.71
805.00	991.76	986.77	981.83	976.93	972.07	967.24	962.46
810.00	997.64	992.63	987.67	982.74	977.85	973.01	968.20
815.00	1003.52	998.49	993.50	988.55	983.64	978.77	973.94
820.00	1009.40	1004.35	999.34	994.36	989.43	984.54	979.69
825.00	1015.28	1010.21	1005.17	1000.18	995.22	990.31	985.43
830.00	1021.16	1016.06	1011.01	1005.99	1001.01	996.07	991.17
835.00	1027.04	1021.92	1016.84	1011.80	1006.80	1001.84	996.92
840.00	1032.93	1027.78	1022.67	1017.61	1012.59	1007.60	1002.66
845.00	1038.81	1033.64	1028.51	1023.42	1018.38	1013.37	1008.40
850.00	1044.69	1039.50	1034.34	1029.23	1024.16	1019.13	1014.15
855.00	1050.57	1045.35	1040.18	1035.05	1029.95	1024.90	1019.89
860.00	1056.45	1051.21	1046.01	1040.86	1035.74	1030.67	1025.63
865.00	1062.33	1057.07	1051.85	1046.67	1041.53	1036.43	1031.37
870.00	1068.22	1062.93	1057.68	1052.48	1047.32	1042.20	1037.12
875.00	1074.10	1068.79	1063.52	1058.29	1053.11	1047.96	1042.86
880.00	1079.98	1074.64	1069.35	1064.10	1058.90	1053.73	1048.60
885.00	1085.86	1080.50	1075.19	1069.91	1064.68	1059.50	1054.35
890.00	1091.74	1086.36	1081.02	1075.73	1070.47	1065.26	1060.09
895.00	1097.62	1092.22	1086.86	1081.54	1076.26	1071.03	1065.83
900.00	1103.51	1098.08	1092.69	1087.35	1082.05	1076.79	1071.58

EGT 725 to 900°C

OAT -29 to -23°C

PPC3513

EGT Correction Factors
Figure 524 (Sheet 8)

EGT ACTUAL °C	OAT °C						
	-22.0	-21.0	-20.0	-19.0	-18.0	-17.0	-16.0
570.00	688.83	685.16	681.52	677.91	674.33	670.78	667.25
575.00	694.55	690.86	687.20	683.57	679.97	676.39	672.84
580.00	700.27	696.56	692.88	689.22	685.60	682.00	678.43
585.00	705.99	702.26	698.55	694.88	691.23	687.61	684.02
590.00	711.71	707.95	704.23	700.53	696.86	693.22	689.61
595.00	717.43	713.65	709.91	706.19	702.50	698.84	695.20
600.00	723.15	719.35	715.58	711.84	708.13	704.45	700.79
605.00	728.87	725.05	721.26	717.50	713.76	710.06	706.38
610.00	734.59	730.75	726.94	723.15	719.40	715.67	711.97
615.00	740.31	736.45	732.61	728.81	725.03	721.28	717.56
620.00	746.03	742.15	738.29	734.46	730.66	726.89	723.15
625.00	751.76	747.85	743.96	740.12	736.29	732.50	728.74
630.00	757.48	753.54	749.64	745.77	741.93	738.12	734.33
635.00	763.20	759.24	755.32	751.42	747.56	743.73	739.92
640.00	768.92	764.94	760.99	757.08	753.19	749.34	745.51
645.00	774.64	770.64	766.67	762.73	758.83	754.95	751.10
650.00	780.36	776.34	772.35	768.39	764.46	760.56	756.69
655.00	786.08	782.04	778.02	774.04	770.09	766.17	762.28
660.00	791.80	787.74	783.70	779.70	775.73	771.78	767.87
665.00	797.52	793.43	789.38	785.35	781.36	777.40	773.46
670.00	803.24	799.13	795.05	791.01	786.99	783.01	779.05
675.00	808.96	804.83	800.73	796.66	792.62	788.62	784.64
680.00	814.69	810.53	806.41	802.32	798.26	794.23	790.23
685.00	820.41	816.23	812.08	807.97	803.89	799.84	795.82
690.00	826.13	821.93	817.76	813.63	809.52	805.45	801.41
695.00	831.85	827.63	823.44	819.28	815.16	811.06	807.00
700.00	837.57	833.32	829.11	824.94	820.79	816.68	812.59
705.00	843.29	839.02	834.79	830.59	826.42	822.29	818.18
710.00	849.01	844.72	840.47	836.24	832.06	827.90	823.77
715.00	854.73	850.42	846.14	841.90	837.69	833.51	829.36
720.00	860.45	856.12	851.82	847.55	843.32	839.12	834.95

EGT 570 to 720°C

OAT -22 to -16°C

PPC3514

EGT Correction Factors
Figure 524 (Sheet 9)

EGT ACTUAL °C	OAT °C						
	-22.0	-21.0	-20.0	-19.0	-18.0	-17.0	-16.0
725.00	866.17	861.82	857.50	853.21	848.95	844.73	840.54
730.00	871.89	867.52	863.17	858.86	854.59	850.34	846.13
735.00	877.61	873.21	868.85	864.52	860.22	855.96	851.72
740.00	883.34	878.91	874.53	870.17	865.85	861.57	857.31
745.00	889.06	884.61	880.20	875.83	871.49	867.18	862.90
750.00	894.78	890.31	885.88	881.48	877.12	872.79	868.49
755.00	900.50	896.01	891.56	887.14	882.75	878.40	874.08
760.00	906.22	901.71	897.23	892.79	888.38	884.01	879.67
765.00	911.94	907.41	902.91	898.45	894.02	889.62	885.26
770.00	917.66	913.11	908.59	904.10	899.65	895.24	890.85
775.00	923.38	918.80	914.26	909.76	905.28	900.85	896.44
780.00	929.10	924.50	919.94	915.41	910.92	906.46	902.03
785.00	934.82	930.20	925.62	921.06	916.55	912.07	907.62
790.00	940.54	935.90	931.29	926.72	922.18	917.68	913.21
795.00	946.27	941.60	936.97	932.37	927.82	923.29	918.80
800.00	951.99	947.30	942.64	938.03	933.45	928.90	924.39
805.00	957.71	953.00	948.32	943.68	939.08	934.51	929.98
810.00	963.43	958.69	954.00	949.34	944.71	940.13	935.57
815.00	969.15	964.39	959.67	954.99	950.35	945.74	941.16
820.00	974.87	970.09	965.35	960.65	955.98	951.35	946.75
825.00	980.59	975.79	971.03	966.30	961.61	956.96	952.34
830.00	986.31	981.49	976.70	971.96	967.25	962.57	957.93
835.00	992.03	987.19	982.38	977.61	972.88	968.18	963.52
840.00	997.75	992.89	988.06	983.27	978.51	973.79	969.11
845.00	1003.47	998.58	993.73	988.92	984.15	979.41	974.70
850.00	1009.19	1004.28	999.41	994.58	989.78	985.02	980.29
855.00	1014.92	1009.98	1005.09	1000.23	995.41	990.63	985.88
860.00	1020.64	1015.68	1010.76	1005.88	1001.04	996.24	991.47
865.00	1026.36	1021.38	1016.44	1011.54	1006.68	1001.85	997.06
870.00	1032.08	1027.08	1022.12	1017.19	1012.31	1007.46	1002.65
875.00	1037.80	1032.78	1027.79	1022.85	1017.94	1013.07	1008.24
880.00	1043.52	1038.48	1033.47	1028.50	1023.58	1018.69	1013.83
885.00	1049.24	1044.17	1039.15	1034.16	1029.21	1024.30	1019.42
890.00	1054.96	1049.87	1044.82	1039.81	1034.84	1029.91	1025.01
895.00	1060.68	1055.57	1050.50	1045.47	1040.47	1035.52	1030.60
900.00	1066.40	1061.27	1056.18	1051.12	1046.11	1041.13	1036.19

EGT 725 to 900°C

OAT -22 to -16°C

PPC3515

EGT Correction Factors
Figure 524 (Sheet 10)

EGT ACTUAL °C	OAT °C						
	-15.0	-14.0	-13.0	-12.0	-11.0	-10.0	-9.0
570.00	663.75	660.28	656.84	653.42	650.02	646.65	643.31
575.00	669.32	665.83	662.36	658.92	655.51	652.12	648.76
580.00	674.89	671.38	667.89	664.43	660.99	657.58	654.20
585.00	680.46	676.92	673.42	669.93	666.48	663.05	659.64
590.00	686.03	682.47	678.94	675.44	671.96	668.51	665.09
595.00	691.60	688.02	684.47	680.95	677.45	673.98	670.53
600.00	697.17	693.57	690.00	686.45	682.93	679.44	675.98
605.00	702.74	699.12	695.52	691.96	688.42	684.91	681.42
610.00	708.30	704.66	701.05	697.46	693.91	690.37	686.87
615.00	713.87	710.21	706.58	702.97	699.39	695.84	692.31
620.00	719.44	715.76	712.10	708.48	704.88	701.30	697.76
625.00	725.01	721.31	717.63	713.98	710.36	706.77	703.20
630.00	730.58	726.85	723.16	719.49	715.85	712.23	708.65
635.00	736.15	732.40	728.68	724.99	721.33	717.70	714.09
640.00	741.72	737.95	734.21	730.50	726.82	723.16	719.54
645.00	747.29	743.50	739.74	736.01	732.30	728.63	724.98
650.00	752.85	749.05	745.26	741.51	737.79	734.09	730.43
655.00	758.42	754.59	750.79	747.02	743.28	739.56	735.87
660.00	763.99	760.14	756.32	752.53	748.76	745.02	741.32
665.00	769.56	765.69	761.85	758.03	754.25	750.49	746.76
670.00	775.13	771.24	767.37	763.54	759.73	755.96	752.21
675.00	780.70	776.78	772.90	769.04	765.22	761.42	757.65
680.00	786.27	782.33	778.43	774.55	770.70	766.89	763.10
685.00	791.84	787.88	783.95	780.06	776.19	772.35	768.54
690.00	797.40	793.43	789.48	785.56	781.67	777.82	773.99
695.00	802.97	798.97	795.01	791.07	787.16	783.28	779.43
700.00	808.54	804.52	800.53	796.57	792.65	788.75	784.88
705.00	814.11	810.07	806.06	802.08	798.13	794.21	790.32
710.00	819.68	815.62	811.59	807.59	803.62	799.68	795.76
715.00	825.25	821.17	817.11	813.09	809.10	805.14	801.21
720.00	830.82	826.71	822.64	818.60	814.59	810.61	806.65

EGT 570 to 720°C

OAT -15 to -9°C

PPC3516

EGT Correction Factors
Figure 524 (Sheet 11)

EGT ACTUAL °C	OAT °C						
	-15.0	-14.0	-13.0	-12.0	-11.0	-10.0	-9.0
725.00	836.39	832.26	828.17	824.10	820.07	816.07	812.10
730.00	841.96	837.81	833.69	829.61	825.56	821.54	817.54
735.00	847.52	843.36	839.22	835.12	831.04	827.00	822.99
740.00	853.09	848.90	844.75	840.62	836.53	832.47	828.43
745.00	858.66	854.45	850.27	846.13	842.01	837.93	833.88
750.00	864.23	860.00	855.80	851.64	847.50	843.40	839.32
755.00	869.80	865.55	861.33	857.14	852.99	848.86	844.77
760.00	875.37	871.10	866.86	862.65	858.47	854.33	850.21
765.00	880.94	876.64	872.38	868.15	863.96	859.79	855.66
770.00	886.51	882.19	877.91	873.66	869.44	865.26	861.10
775.00	892.07	887.74	883.44	879.17	874.93	870.72	866.55
780.00	897.64	893.29	888.96	884.67	880.41	876.19	871.99
785.00	903.21	898.83	894.49	890.18	885.90	881.65	877.44
790.00	908.78	904.38	900.02	895.68	891.38	887.12	882.88
795.00	914.35	909.93	905.54	901.19	896.87	892.58	888.33
800.00	919.92	915.48	911.07	906.70	902.36	898.05	893.77
805.00	925.49	921.03	916.60	912.20	907.84	903.51	899.22
810.00	931.06	926.57	922.12	917.71	913.33	908.98	904.66
815.00	936.62	932.12	927.65	923.21	918.81	914.44	910.11
820.00	942.19	937.67	933.18	928.72	924.30	919.91	915.55
825.00	947.76	943.22	938.70	934.23	929.78	925.37	921.00
830.00	953.33	948.76	944.23	939.73	935.27	930.84	926.44
835.00	958.90	954.31	949.76	945.24	940.75	936.30	931.89
840.00	964.47	959.86	955.28	950.75	946.24	941.77	937.33
845.00	970.04	965.41	960.81	956.25	951.73	947.23	942.77
850.00	975.61	970.95	966.34	961.76	957.21	952.70	948.22
855.00	981.18	976.50	971.87	967.26	962.70	958.16	953.66
860.00	986.74	982.05	977.39	972.77	968.18	963.63	959.11
865.00	992.31	987.60	982.92	978.28	973.67	969.09	964.55
870.00	997.88	993.15	988.45	983.78	979.15	974.56	970.00
875.00	1003.45	998.69	993.97	989.29	984.64	980.02	975.44
880.00	1009.02	1004.24	999.50	994.79	990.12	985.49	980.89
885.00	1014.59	1009.79	1005.03	1000.30	995.61	990.95	986.33
890.00	1020.16	1015.34	1010.55	1005.81	1001.09	996.42	991.78
895.00	1025.73	1020.88	1016.08	1011.31	1006.58	1001.88	997.22
900.00	1031.29	1026.43	1021.61	1016.82	1012.07	1007.35	1002.67

EGT 725 to 900°C

OAT -15 to -9°C

PPC3517

EGT Correction Factors
Figure 524 (Sheet 12)

EGT ACTUAL °C	OAT °C						
	-8.0	-7.0	-6.0	-5.0	-4.0	-3.0	-2.0
570.00	639.99	636.70	633.43	630.18	626.96	623.77	620.59
575.00	645.42	642.10	638.81	635.55	632.31	629.09	625.90
580.00	650.84	647.51	644.20	640.91	637.65	634.42	631.21
585.00	656.27	652.91	649.58	646.28	643.00	639.74	636.51
590.00	661.69	658.32	654.97	651.65	648.35	645.07	641.82
595.00	667.12	663.72	660.35	657.01	653.69	650.40	647.13
600.00	672.54	669.13	665.74	662.38	659.04	655.72	652.43
605.00	677.96	674.53	671.12	667.74	664.38	661.05	657.74
610.00	683.39	679.94	676.51	673.11	669.73	666.38	663.05
615.00	688.81	685.34	681.89	678.47	675.07	671.70	668.35
620.00	694.24	690.75	687.28	683.84	680.42	677.03	673.66
625.00	699.66	696.15	692.66	689.20	685.77	682.35	678.97
630.00	705.09	701.56	698.05	694.57	691.11	687.68	684.28
635.00	710.51	706.96	703.43	699.93	696.46	693.01	689.58
640.00	715.94	712.36	708.82	705.30	701.80	698.33	694.89
645.00	721.36	717.77	714.20	710.66	707.15	703.66	700.20
650.00	726.79	723.17	719.59	716.03	712.49	708.99	705.50
655.00	732.21	728.58	724.97	721.39	717.84	714.31	710.81
660.00	737.64	733.98	730.36	726.76	723.19	719.64	716.12
665.00	743.06	739.39	735.74	732.12	728.53	724.97	721.43
670.00	748.49	744.79	741.13	737.49	733.88	730.29	726.73
675.00	753.91	750.20	746.51	742.85	739.22	735.62	732.04
680.00	759.33	755.60	751.90	748.22	744.57	740.94	737.35
685.00	764.76	761.01	757.28	753.58	749.91	746.27	742.65
690.00	770.18	766.41	762.67	758.95	755.26	751.60	747.96
695.00	775.61	771.82	768.05	764.31	760.60	756.92	753.27
700.00	781.03	777.22	773.44	769.68	765.95	762.25	758.57
705.00	786.46	782.63	778.82	775.04	771.30	767.58	763.88
710.00	791.88	788.03	784.21	780.41	776.64	772.90	769.19
715.00	797.31	793.44	789.59	785.78	781.99	778.23	774.50
720.00	802.73	798.84	794.98	791.14	787.33	783.55	779.80

EGT 570 to 720°C

OAT -8 to -2°C

PPC3518

EGT Correction Factors
Figure 524 (Sheet 13)

EGT ACTUAL °C	OAT °C						
	-8.0	-7.0	-6.0	-5.0	-4.0	-3.0	-2.0
725.00	808.16	804.24	800.36	796.51	792.68	788.88	785.11
730.00	813.58	809.65	805.75	801.87	798.02	794.21	790.42
735.00	819.01	815.05	811.13	807.24	803.37	799.53	795.72
740.00	824.43	820.46	816.52	812.60	808.72	804.86	801.03
745.00	829.86	825.86	821.90	817.97	814.06	810.19	806.34
750.00	835.28	831.27	827.29	823.33	819.41	815.51	811.64
755.00	840.71	836.67	832.67	828.70	824.75	820.84	816.95
760.00	846.13	842.08	838.05	834.06	830.10	826.16	822.26
765.00	851.55	847.48	843.44	839.43	835.44	831.49	827.57
770.00	856.98	852.89	848.82	844.79	840.79	836.82	832.87
775.00	862.40	858.29	854.21	850.16	846.14	842.14	838.18
780.00	867.83	863.70	859.59	855.52	851.48	847.47	843.49
785.00	873.25	869.10	864.98	860.89	856.83	852.80	848.79
790.00	878.68	874.51	870.36	866.25	862.17	858.12	854.10
795.00	884.10	879.91	875.75	871.62	867.52	863.45	859.41
800.00	889.53	885.32	881.13	876.98	872.86	868.77	864.71
805.00	894.95	890.72	886.52	882.35	878.21	874.10	870.02
810.00	900.38	896.12	891.90	887.71	883.56	879.43	875.33
815.00	905.80	901.53	897.29	893.08	888.90	884.75	880.64
820.00	911.23	906.93	902.67	898.44	894.25	890.08	885.94
825.00	916.65	912.34	908.06	903.81	899.59	895.41	891.25
830.00	922.08	917.74	913.44	909.17	904.94	900.73	896.56
835.00	927.50	923.15	918.83	914.54	910.28	906.06	901.86
840.00	932.92	928.55	924.21	919.91	915.63	911.38	907.17
845.00	938.35	933.96	929.60	925.27	920.97	916.71	912.48
850.00	943.77	939.36	934.98	930.64	926.32	922.04	917.78
855.00	949.20	944.77	940.37	936.00	931.67	927.36	923.09
860.00	954.62	950.17	945.75	941.37	937.01	932.69	928.40
865.00	960.05	955.58	951.14	946.73	942.36	938.02	933.71
870.00	965.47	960.98	956.52	952.10	947.70	943.34	939.01
875.00	970.90	966.39	961.91	957.46	953.05	948.67	944.32
880.00	976.32	971.79	967.29	962.83	958.39	953.99	949.63
885.00	981.75	977.20	972.68	968.19	963.74	959.32	954.93
890.00	987.17	982.60	978.06	973.56	969.09	964.65	960.24
895.00	992.60	988.00	983.45	978.92	974.43	969.97	965.55
900.00	998.02	993.41	988.83	984.29	979.78	975.30	970.86

EGT 725 to 900°C

OAT -8 to -2°C

PPC3519

EGT Correction Factors
Figure 524 (Sheet 14)

EGT ACTUAL °C	OAT °C						
	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
570.00	617.44	614.31	611.21	608.12	605.06	602.02	599.01
575.00	622.73	619.58	616.46	613.36	610.28	607.22	604.18
580.00	628.02	624.85	621.71	618.59	615.49	612.41	609.36
585.00	633.30	630.12	626.96	623.82	620.70	617.61	614.53
590.00	638.59	635.39	632.21	629.05	625.91	622.80	619.71
595.00	643.88	640.66	637.46	634.28	631.13	628.00	624.89
600.00	649.17	645.93	642.71	639.51	636.34	633.19	630.06
605.00	654.46	651.20	647.96	644.74	641.55	638.38	635.24
610.00	659.74	656.46	653.21	649.97	646.77	643.58	640.41
615.00	665.03	661.73	658.46	655.21	651.98	648.77	645.59
620.00	670.32	667.00	663.71	660.44	657.19	653.97	650.77
625.00	675.61	672.27	668.96	665.67	662.40	659.16	655.94
630.00	680.90	677.54	674.21	670.90	667.62	664.36	661.12
635.00	686.18	682.81	679.46	676.13	672.83	669.55	666.30
640.00	691.47	688.08	684.71	681.36	678.04	674.74	671.47
645.00	696.76	693.35	689.96	686.59	683.26	679.94	676.65
650.00	702.05	698.62	695.21	691.83	688.47	685.13	681.82
655.00	707.34	703.88	700.46	697.06	693.68	690.33	687.00
660.00	712.62	709.15	705.71	702.29	698.89	695.52	692.18
665.00	717.91	714.42	710.96	707.52	704.11	700.72	697.35
670.00	723.20	719.69	716.21	712.75	709.32	705.91	702.53
675.00	728.49	724.96	721.46	717.98	714.53	711.11	707.70
680.00	733.77	730.23	726.71	723.21	719.74	716.30	712.88
685.00	739.06	735.50	731.96	728.45	724.96	721.49	718.06
690.00	744.35	740.77	737.21	733.68	730.17	726.69	723.23
695.00	749.64	746.04	742.46	738.91	735.38	731.88	728.41
700.00	754.93	751.30	747.71	744.14	740.60	737.08	733.58
705.00	760.21	756.57	752.96	749.37	745.81	742.27	738.76
710.00	765.50	761.84	758.21	754.60	751.02	747.47	743.94
715.00	770.79	767.11	763.46	759.83	756.23	752.66	749.11
720.00	776.08	772.38	768.71	765.07	761.45	757.86	754.29

EGT 570 to 720°C

OAT -1 to +5°C

PPC3520

EGT Correction Factors
Figure 524 (Sheet 15)

EGT ACTUAL °C	OAT °C						
	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
725.00	781.37	777.65	773.96	770.30	766.66	763.05	759.46
730.00	786.65	782.92	779.21	775.53	771.87	768.24	764.64
735.00	791.94	788.19	784.46	780.76	777.09	773.44	769.82
740.00	797.23	793.46	789.71	785.99	782.30	778.63	774.99
745.00	802.52	798.73	794.96	791.22	787.51	783.83	780.17
750.00	807.81	803.99	800.21	796.45	792.72	789.02	785.35
755.00	813.09	809.26	805.46	801.69	797.94	794.22	790.52
760.00	818.38	814.53	810.71	806.92	803.15	799.41	795.70
765.00	823.67	819.80	815.96	812.15	808.36	804.61	800.87
770.00	828.96	825.07	821.21	817.38	813.58	809.80	806.05
775.00	834.25	830.34	826.46	822.61	818.79	814.99	811.23
780.00	839.53	835.61	831.71	827.84	824.00	820.19	816.40
785.00	844.82	840.88	836.96	833.07	829.21	825.38	821.58
790.00	850.11	846.15	842.21	838.31	834.43	830.58	826.75
795.00	855.40	851.41	847.46	843.54	839.64	835.77	831.93
800.00	860.68	856.68	852.71	848.77	844.85	840.97	837.11
805.00	865.97	861.95	857.96	854.00	850.07	846.16	842.28
810.00	871.26	867.22	863.21	859.23	855.28	851.35	847.46
815.00	876.55	872.49	868.46	864.46	860.49	856.55	852.63
820.00	881.84	877.76	873.71	869.69	865.70	861.74	857.81
825.00	887.12	883.03	878.96	874.93	870.92	866.94	862.99
830.00	892.41	888.30	884.21	880.16	876.13	872.13	868.16
835.00	897.70	893.57	889.46	885.39	881.34	877.33	873.34
840.00	902.99	898.84	894.71	890.62	886.56	882.52	878.52
845.00	908.28	904.10	899.96	895.85	891.77	887.72	883.69
850.00	913.56	909.37	905.21	901.08	896.98	892.91	888.87
855.00	918.85	914.64	910.46	906.31	902.19	898.10	894.04
860.00	924.14	919.91	915.71	911.54	907.41	903.30	899.22
865.00	929.43	925.18	920.96	916.78	912.62	908.49	904.40
870.00	934.72	930.45	926.21	922.01	917.83	913.69	909.57
875.00	940.00	935.72	931.46	927.24	923.05	918.88	914.75
880.00	945.29	940.99	936.71	932.47	928.26	924.08	919.92
885.00	950.58	946.26	941.96	937.70	933.47	929.27	925.10
890.00	955.87	951.52	947.21	942.93	938.68	934.47	930.28
895.00	961.15	956.79	952.46	948.16	943.90	939.66	935.45
900.00	966.44	962.06	957.71	953.40	949.11	944.85	940.63

EGT 725 to 900°C

OAT -1 to +5°C

PPC3521

EGT Correction Factors
Figure 524 (Sheet 16)

EGT ACTUAL °C	OAT °C						
	6.0	7.0	8.0	9.0	10.0	11.0	12.0
570.00	596.01	593.03	590.08	587.15	584.23	581.34	578.47
575.00	601.17	598.17	595.20	592.25	589.32	586.41	583.52
580.00	606.33	603.31	600.32	597.36	594.41	591.48	588.57
585.00	611.48	608.45	605.45	602.46	599.49	596.55	593.62
590.00	616.64	613.59	610.57	607.56	604.58	601.62	598.68
595.00	621.80	618.73	615.69	612.67	609.67	606.69	603.73
600.00	626.96	623.87	620.81	617.77	614.75	611.76	608.78
605.00	632.11	629.01	625.93	622.88	619.84	616.82	613.83
610.00	637.27	634.15	631.06	627.98	624.93	621.89	618.88
615.00	642.43	639.29	636.18	633.08	630.01	626.96	623.93
620.00	647.59	644.43	641.30	638.19	635.10	632.03	628.98
625.00	652.75	649.57	646.42	643.29	640.19	637.10	634.04
630.00	657.90	654.71	651.54	648.40	645.27	642.17	639.09
635.00	663.06	659.85	656.67	653.50	650.36	647.24	644.14
640.00	668.22	664.99	661.79	658.61	655.45	652.31	649.19
645.00	673.38	670.13	666.91	663.71	660.53	657.38	654.24
650.00	678.54	675.27	672.03	668.81	665.62	662.44	659.29
655.00	683.69	680.41	677.15	673.92	670.70	667.51	664.35
660.00	688.85	685.55	682.28	679.02	675.79	672.58	669.40
665.00	694.01	690.69	687.40	684.13	680.88	677.65	674.45
670.00	699.17	695.83	692.52	689.23	685.96	682.72	679.50
675.00	704.33	700.97	697.64	694.33	691.05	687.79	684.55
680.00	709.48	706.11	702.76	699.44	696.14	692.86	689.60
685.00	714.64	711.25	707.89	704.54	701.22	697.93	694.65
690.00	719.80	716.39	713.01	709.65	706.31	703.00	699.71
695.00	724.96	721.53	718.13	714.75	711.40	708.07	704.76
700.00	730.12	726.67	723.25	719.86	716.48	713.13	709.81
705.00	735.27	731.81	728.37	724.96	721.57	718.20	714.86
710.00	740.43	736.95	733.50	730.06	726.66	723.27	719.91
715.00	745.59	742.09	738.62	735.17	731.74	728.34	724.96
720.00	750.75	747.23	743.74	740.27	736.83	733.41	730.02

EGT 570 to 720°C

OAT +6 to +12°C

PPC3522

EGT Correction Factors
Figure 524 (Sheet 17)

EGT ACTUAL °C	OAT °C						
	6.0	7.0	8.0	9.0	10.0	11.0	12.0
725.00	755.91	752.37	748.86	745.38	741.92	738.48	735.07
730.00	761.06	757.51	753.98	750.48	747.00	743.55	740.12
735.00	766.22	762.65	759.11	755.58	752.09	748.62	745.17
740.00	771.38	767.79	764.23	760.69	757.18	753.69	750.22
745.00	776.54	772.93	769.35	765.79	762.26	758.76	755.27
750.00	781.69	778.07	774.47	770.90	767.35	763.82	760.32
755.00	786.85	783.21	779.59	776.00	772.43	768.89	765.38
760.00	792.01	788.35	784.71	781.11	777.52	773.96	770.43
765.00	797.17	793.49	789.84	786.21	782.61	779.03	775.48
770.00	802.33	798.63	794.96	791.31	787.69	784.10	780.53
775.00	807.48	803.77	800.08	796.42	792.78	789.17	785.58
780.00	812.64	808.91	805.20	801.52	797.87	794.24	790.63
785.00	817.80	814.05	810.32	806.63	802.95	799.31	795.69
790.00	822.96	819.19	815.45	811.73	808.04	804.38	800.74
795.00	828.12	824.33	820.57	816.83	813.13	809.45	805.79
800.00	833.27	829.47	825.69	821.94	818.21	814.51	810.84
805.00	838.43	834.61	830.81	827.04	823.30	819.58	815.89
810.00	843.59	839.75	835.93	832.15	828.39	824.65	820.94
815.00	848.75	844.89	841.06	837.25	833.47	829.72	825.99
820.00	853.91	850.03	846.18	842.36	838.56	834.79	831.05
825.00	859.06	855.17	851.30	847.46	843.65	839.86	836.10
830.00	864.22	860.31	856.42	852.56	848.73	844.93	841.15
835.00	869.38	865.45	861.54	857.67	853.82	850.00	846.20
840.00	874.54	870.59	866.67	862.77	858.91	855.07	851.25
845.00	879.70	875.73	871.79	867.88	863.99	860.13	856.30
850.00	884.85	880.87	876.91	872.98	869.08	865.20	861.36
855.00	890.01	886.01	882.03	878.08	874.17	870.27	866.41
860.00	895.17	891.15	887.15	883.19	879.25	875.34	871.46
865.00	900.33	896.29	892.28	888.29	884.34	880.41	876.51
870.00	905.49	901.43	897.40	893.40	889.42	885.48	881.56
875.00	910.64	906.57	902.52	898.50	894.51	890.55	886.61
880.00	915.80	911.71	907.64	903.61	899.60	895.62	891.66
885.00	920.96	916.85	912.76	908.71	904.68	900.69	896.72
890.00	926.12	921.99	917.89	913.81	909.77	905.76	901.77
895.00	931.27	927.13	923.01	918.92	914.86	910.82	906.82
900.00	936.43	932.27	928.13	924.02	919.94	915.89	911.87

EGT 725 to 900°C

OAT +6 to +12°C

PPC3523

EGT Correction Factors
Figure 524 (Sheet 18)

EGT ACTUAL °C	OAT °C						
	13.0	14.0	15.0	16.0	17.0	18.0	19.0
570.00	575.62	572.78	570.00	567.18	564.40	561.64	558.91
575.00	580.65	577.80	575.00	572.16	569.37	566.59	563.84
580.00	585.68	582.82	580.00	577.14	574.33	571.54	568.77
585.00	590.72	587.83	585.00	582.13	579.30	576.49	573.71
590.00	595.75	592.85	590.00	587.11	584.27	581.44	578.64
595.00	600.79	597.87	595.00	592.09	589.23	586.39	583.57
600.00	605.82	602.89	600.00	597.07	594.20	591.34	588.50
605.00	610.86	607.90	605.00	602.06	599.16	596.29	593.44
610.00	615.89	612.92	610.00	607.04	604.13	601.24	598.37
615.00	620.92	617.94	615.00	612.02	609.10	606.19	603.30
620.00	625.96	622.95	620.00	617.01	614.06	611.14	608.24
625.00	630.99	627.97	625.00	621.99	619.03	616.09	613.17
630.00	636.03	632.99	630.00	626.97	624.00	621.04	618.10
635.00	641.06	638.01	635.00	631.96	628.96	625.99	623.03
640.00	646.10	643.02	640.00	636.94	633.93	630.94	627.97
645.00	651.13	648.04	645.00	641.92	638.89	635.89	632.90
650.00	656.16	653.06	650.00	646.90	643.86	640.84	637.83
655.00	661.20	658.07	655.00	651.89	648.83	645.79	642.77
660.00	666.23	663.09	660.00	656.87	653.79	650.74	647.70
665.00	671.27	668.11	665.00	661.85	658.76	655.69	652.63
670.00	676.30	673.12	670.00	666.84	663.73	660.63	657.56
675.00	681.34	678.14	675.00	671.82	668.69	665.58	662.50
680.00	686.37	683.16	680.00	676.80	673.66	670.53	667.43
685.00	691.40	688.18	685.00	681.79	678.62	675.48	672.36
690.00	696.44	693.19	690.00	686.77	683.59	680.43	677.30
695.00	701.47	698.21	695.00	691.75	688.56	685.38	682.23
700.00	706.51	703.23	700.00	696.74	693.52	690.33	687.16
705.00	711.54	708.24	705.00	701.72	698.49	695.28	692.10
710.00	716.58	713.26	710.00	706.70	703.45	700.23	697.03
715.00	721.61	718.28	715.00	711.68	708.42	705.18	701.96
720.00	726.64	723.30	720.00	716.67	713.39	710.13	706.89

EGT 570 to 720°C

OAT +13 to +19°C

PPC3524

EGT Correction Factors
Figure 524 (Sheet 19)

EGT ACTUAL °C	OAT °C						
	13.0	14.0	15.0	16.0	17.0	18.0	19.0
725.00	731.68	728.31	725.00	721.65	718.35	715.08	711.83
730.00	736.71	733.33	730.00	726.63	723.32	720.03	716.76
735.00	741.75	738.35	735.00	731.62	728.29	724.98	721.69
740.00	746.78	743.36	740.00	736.60	733.25	729.93	726.63
745.00	751.82	748.38	745.00	741.58	738.22	734.88	731.56
750.00	756.85	753.40	750.00	746.57	743.18	739.83	736.49
755.00	761.88	758.41	755.00	751.55	748.15	744.78	741.42
760.00	766.92	763.43	760.00	756.53	753.12	749.73	746.36
765.00	771.95	768.45	765.00	761.52	758.08	754.68	751.29
770.00	776.99	773.47	770.00	766.50	763.05	759.62	756.22
775.00	782.02	778.48	775.00	771.48	768.02	764.57	761.16
780.00	787.05	783.50	780.00	776.46	772.98	769.52	766.09
785.00	792.09	788.52	785.00	781.45	777.95	774.47	771.02
790.00	797.12	793.53	790.00	786.43	782.91	779.42	775.95
795.00	802.16	798.55	795.00	791.41	787.88	784.37	780.89
800.00	807.19	803.57	800.00	796.40	792.85	789.32	785.82
805.00	812.23	808.59	805.00	801.38	797.81	794.27	790.75
810.00	817.26	813.60	810.00	806.36	802.78	799.22	795.69
815.00	822.29	818.62	815.00	811.35	807.75	804.17	800.62
820.00	827.33	823.64	820.00	816.33	812.71	809.12	805.55
825.00	832.36	828.65	825.00	821.31	817.68	814.07	810.48
830.00	837.40	833.67	830.00	826.29	822.64	819.02	815.42
835.00	842.43	838.69	835.00	831.28	827.61	823.97	820.35
840.00	847.47	843.70	840.00	836.26	832.58	828.92	825.28
845.00	852.50	848.72	845.00	841.24	837.54	833.87	830.22
850.00	857.53	853.74	850.00	846.23	842.51	838.82	835.15
855.00	862.57	858.76	855.00	851.21	847.48	843.77	840.08
860.00	867.60	863.77	860.00	856.19	852.44	848.72	845.02
865.00	872.64	868.79	865.00	861.18	857.41	853.67	849.95
870.00	877.67	873.81	870.00	866.16	862.37	858.61	854.88
875.00	882.71	878.82	875.00	871.14	867.34	863.56	859.81
880.00	887.74	883.84	880.00	876.13	872.31	868.51	864.75
885.00	892.77	888.86	885.00	881.11	877.27	873.46	869.68
890.00	897.81	893.88	890.00	886.09	882.24	878.41	874.61
895.00	902.84	898.89	895.00	891.07	887.20	883.36	879.55
900.00	907.88	903.91	900.00	896.06	892.17	888.31	884.48

EGT 725 to 900°C

OAT +13 to +19°C

PPC3525

EGT Correction Factors
Figure 524 (Sheet 20)

EGT ACTUAL °C	OAT °C						
	20.0	21.0	22.0	23.0	24.0	25.0	26.0
570.00	556.19	553.49	550.80	548.14	545.49	542.86	540.25
575.00	561.10	558.39	555.69	553.01	550.34	547.70	545.07
580.00	566.02	563.29	560.57	557.87	555.20	552.53	549.89
585.00	570.94	568.19	565.46	562.74	560.05	557.37	554.71
590.00	575.85	573.09	570.34	567.61	564.90	562.21	559.53
595.00	580.77	577.99	575.22	572.48	569.75	567.04	564.35
600.00	585.69	582.89	580.11	577.35	574.60	571.88	569.17
605.00	590.60	587.79	584.99	582.21	579.45	576.71	573.99
610.00	595.52	592.69	589.87	587.08	584.31	581.55	578.81
615.00	600.44	597.59	594.76	591.95	589.16	586.38	583.63
620.00	605.35	602.49	599.64	596.82	594.01	591.22	588.45
625.00	610.27	607.39	604.53	601.68	598.86	596.05	593.27
630.00	615.18	612.29	609.41	606.55	603.71	600.89	598.09
635.00	620.10	617.19	614.29	611.42	608.56	605.73	602.91
640.00	625.02	622.09	619.18	616.29	613.41	610.56	607.73
645.00	629.93	626.99	624.06	621.15	618.27	615.40	612.55
650.00	634.85	631.89	628.94	626.02	623.12	620.23	617.37
655.00	639.77	636.79	633.83	630.89	627.97	625.07	622.19
660.00	644.68	641.69	638.71	635.76	632.82	629.90	627.01
665.00	649.60	646.59	643.60	640.62	637.67	634.74	631.83
670.00	654.52	651.49	648.48	645.49	642.52	639.58	636.65
675.00	659.43	656.39	653.36	650.36	647.38	644.41	641.47
680.00	664.35	661.29	658.25	655.23	652.23	649.25	646.29
685.00	669.27	666.19	663.13	660.09	657.08	654.08	651.11
690.00	674.18	671.09	668.01	664.96	661.93	658.92	655.93
695.00	679.10	675.99	672.90	669.83	666.78	663.75	660.75
700.00	684.01	680.89	677.78	674.70	671.63	668.59	665.56
705.00	688.93	685.79	682.67	679.56	676.48	673.42	670.38
710.00	693.85	690.69	687.55	684.43	681.34	678.26	675.20
715.00	698.76	695.59	692.43	689.30	686.19	683.10	680.02
720.00	703.68	700.49	697.32	694.17	691.04	687.93	684.84

EGT 570 to 720°C

OAT +20 to +26°C

PPC3526

EGT Correction Factors
Figure 524 (Sheet 21)

EGT ACTUAL °C	OAT °C						
	20.0	21.0	22.0	23.0	24.0	25.0	26.0
725.00	708.60	705.39	702.20	699.04	695.89	692.77	689.66
730.00	713.51	710.29	707.08	703.90	700.74	697.60	694.48
735.00	718.43	715.19	711.97	708.77	705.59	702.44	699.30
740.00	723.35	720.09	716.85	713.64	710.45	707.27	704.12
745.00	728.26	724.99	721.74	718.51	715.30	712.11	708.94
750.00	733.18	729.89	726.62	723.37	720.15	716.94	713.76
755.00	738.10	734.79	731.50	728.24	725.00	721.78	718.58
760.00	743.01	739.69	736.39	733.11	729.85	726.62	723.40
765.00	747.93	744.59	741.27	737.98	734.70	731.45	728.22
770.00	752.84	749.49	746.15	742.84	739.55	736.29	733.04
775.00	757.76	754.39	751.04	747.71	744.41	741.12	737.86
780.00	762.68	759.29	755.92	752.58	749.26	745.96	742.68
785.00	767.59	764.19	760.81	757.45	754.11	750.79	747.50
790.00	772.51	769.09	765.69	762.31	758.96	755.63	752.32
795.00	777.43	773.99	770.57	767.18	763.81	760.47	757.14
800.00	782.34	778.89	775.46	772.05	768.66	765.30	761.96
805.00	787.26	783.79	780.34	776.92	773.52	770.14	766.78
810.00	792.18	788.69	785.22	781.78	778.37	774.97	771.60
815.00	797.09	793.59	790.11	786.65	783.22	779.81	776.42
820.00	802.01	798.49	794.99	791.52	788.07	784.64	781.24
825.00	806.92	803.39	799.88	796.39	792.92	789.48	786.06
830.00	811.84	808.29	804.76	801.25	797.77	794.31	790.88
835.00	816.76	813.19	809.64	806.12	802.62	799.15	795.70
840.00	821.67	818.09	814.53	810.99	807.48	803.99	800.52
845.00	826.59	822.99	819.41	815.86	812.33	808.82	805.34
850.00	831.51	827.89	824.29	820.73	817.18	813.66	810.16
855.00	836.42	832.79	829.18	825.59	822.03	818.49	814.98
860.00	841.34	837.69	834.06	830.46	826.88	823.33	819.80
865.00	846.26	842.59	838.95	835.33	831.73	828.16	824.62
870.00	851.17	847.49	843.83	840.20	836.59	833.00	829.44
875.00	856.09	852.39	848.71	845.06	841.44	837.83	834.26
880.00	861.01	857.29	853.60	849.93	846.29	842.67	839.08
885.00	865.92	862.19	858.48	854.80	851.14	847.51	843.90
890.00	870.84	867.09	863.37	859.67	855.99	852.34	848.72
895.00	875.75	871.99	868.25	864.53	860.84	857.18	853.54
900.00	880.67	876.89	873.13	869.40	865.69	862.01	858.36

EGT 725 to 900°C

OAT +20 to +26°C

PPC3527

EGT Correction Factors
Figure 524 (Sheet 22)

188397

EGT ACTUAL °C	OAT °C						
	27.0	28.0	29.0	30.0	31.0	32.0	33.0
570.00	537.66	535.08	532.52	529.97	527.45	524.94	522.44
575.00	542.46	539.87	537.29	534.73	532.19	529.66	527.15
580.00	547.26	544.66	542.06	539.49	536.93	534.39	531.86
585.00	552.07	549.44	546.84	544.25	541.67	539.12	536.58
590.00	556.87	554.23	551.61	549.00	546.42	543.84	541.29
595.00	561.68	559.02	556.38	553.76	551.16	548.57	546.00
600.00	566.48	563.81	561.16	558.52	555.90	553.30	550.71
605.00	571.28	568.60	565.93	563.28	560.64	558.02	555.42
610.00	576.09	573.39	570.70	568.03	565.38	562.75	560.13
615.00	580.89	578.17	575.47	572.79	570.13	567.48	564.85
620.00	585.70	582.96	580.25	577.55	574.87	572.20	569.56
625.00	590.50	587.75	585.02	582.31	579.61	576.93	574.27
630.00	595.30	592.54	589.79	587.06	584.35	581.66	578.98
635.00	600.11	597.33	594.57	591.82	589.09	586.38	583.69
640.00	604.91	602.12	599.34	596.58	593.84	591.11	588.40
645.00	609.72	606.90	604.11	601.34	598.58	595.84	593.12
650.00	614.52	611.69	608.88	606.09	603.32	600.57	597.83
655.00	619.32	616.48	613.66	610.85	608.06	605.29	602.54
660.00	624.13	621.27	618.43	615.61	612.80	610.02	607.25
665.00	628.93	626.06	623.20	620.37	617.55	614.75	611.96
670.00	633.74	630.85	627.98	625.12	622.29	619.47	616.68
675.00	638.54	635.64	632.75	629.88	627.03	624.20	621.39
680.00	643.35	640.42	637.52	634.64	631.77	628.93	626.10
685.00	648.15	645.21	642.29	639.39	636.51	633.65	630.81
690.00	652.95	650.00	647.07	644.15	641.26	638.38	635.52
695.00	657.76	654.79	651.84	648.91	646.00	643.11	640.23
700.00	662.56	659.58	656.61	653.67	650.74	647.83	644.95
705.00	667.37	664.37	661.39	658.42	655.48	652.56	649.66
710.00	672.17	669.15	666.16	663.18	660.23	657.29	654.37
715.00	676.97	673.94	670.93	667.94	664.97	662.01	659.08
720.00	681.78	678.73	675.70	672.70	669.71	666.74	663.79

EGT 570 to 720°C

OAT +27 to +33°C

PPC3528

EGT Correction Factors
Figure 524 (Sheet 23)

EGT ACTUAL °C	OAT °C						
	27.0	28.0	29.0	30.0	31.0	32.0	33.0
725.00	686.58	683.52	680.48	677.45	674.45	671.47	668.50
730.00	691.39	688.31	685.25	682.21	679.19	676.20	673.22
735.00	696.19	693.10	690.02	686.97	683.94	680.92	677.93
740.00	700.99	697.88	694.80	691.73	688.68	685.65	682.64
745.00	705.80	702.67	699.57	696.48	693.42	690.38	687.35
750.00	710.60	707.46	704.34	701.24	698.16	695.10	692.06
755.00	715.41	712.25	709.11	706.00	702.90	699.83	696.77
760.00	720.21	717.04	713.89	710.76	707.65	704.56	701.49
765.00	725.01	721.83	718.66	715.51	712.39	709.28	706.20
770.00	729.82	726.61	723.43	720.27	717.13	714.01	710.91
775.00	734.62	731.40	728.21	725.03	721.87	718.74	715.62
780.00	739.43	736.19	732.98	729.79	726.61	723.46	720.33
785.00	744.23	740.98	737.75	734.54	731.36	728.19	725.05
790.00	749.03	745.77	742.52	739.30	736.10	732.92	729.76
795.00	753.84	750.56	747.30	744.06	740.84	737.64	734.47
800.00	758.64	755.34	752.07	748.82	745.58	742.37	739.18
805.00	763.45	760.13	756.84	753.57	750.33	747.10	743.89
810.00	768.25	764.92	761.62	758.33	755.07	751.82	748.60
815.00	773.05	769.71	766.39	763.09	759.81	756.55	753.32
820.00	777.86	774.50	771.16	767.85	764.55	761.28	758.03
825.00	782.66	779.29	775.93	772.60	769.29	766.01	762.74
830.00	787.47	784.07	780.71	777.36	774.04	770.73	767.45
835.00	792.27	788.86	785.48	782.12	778.78	775.46	772.16
840.00	797.07	793.65	790.25	786.88	783.52	780.19	776.87
845.00	801.88	798.44	795.03	791.63	788.26	784.91	781.59
850.00	806.68	803.23	799.80	796.39	793.00	789.64	786.30
855.00	811.49	808.02	804.57	801.15	797.75	794.37	791.01
860.00	816.29	812.81	809.34	805.90	802.49	799.09	795.72
865.00	821.09	817.59	814.12	810.66	807.23	803.82	800.43
870.00	825.90	822.38	818.89	815.42	811.97	808.55	805.14
875.00	830.70	827.17	823.66	820.18	816.71	813.27	809.86
880.00	835.51	831.96	828.44	824.93	821.46	818.00	814.57
885.00	840.31	836.75	833.21	829.69	826.20	822.73	819.28
890.00	845.11	841.54	837.98	834.45	830.94	827.45	823.99
895.00	849.92	846.32	842.75	839.21	835.68	832.18	828.70
900.00	854.72	851.11	847.53	843.96	840.42	836.91	833.41

EGT 725 to 900°C

OAT +27 to +33°C

PPC3529

EGT Correction Factors
Figure 524 (Sheet 24)

EGT ACTUAL °C	OAT °C						
	34.0	35.0	36.0	37.0	38.0	39.0	40.0
570.00	519.96	517.50	515.05	512.62	510.20	507.80	505.42
575.00	524.66	522.18	519.72	517.27	514.84	512.43	510.03
580.00	529.36	526.86	524.39	521.92	519.48	517.05	514.64
585.00	534.05	531.54	529.05	526.58	524.12	521.67	519.24
590.00	538.75	536.23	533.72	531.23	528.75	526.30	523.85
595.00	543.45	540.91	538.39	535.88	533.39	530.92	528.46
600.00	548.14	545.59	543.05	540.53	538.03	535.54	533.07
605.00	552.84	550.27	547.72	545.19	542.67	540.16	537.68
610.00	557.54	554.95	552.39	549.84	547.30	544.79	542.29
615.00	562.23	559.63	557.05	554.49	551.94	549.41	546.89
620.00	566.93	564.32	561.72	559.14	556.58	554.03	551.50
625.00	571.63	569.00	566.39	563.79	561.22	558.66	556.11
630.00	576.32	573.68	571.05	568.45	565.85	563.28	560.72
635.00	581.02	578.36	575.72	573.10	570.49	567.90	565.33
640.00	585.72	583.04	580.39	577.75	575.13	572.53	569.94
645.00	590.41	587.73	585.06	582.40	579.77	577.15	574.55
650.00	595.11	592.41	589.72	587.06	584.40	581.77	579.15
655.00	599.81	597.09	594.39	591.71	589.04	586.39	583.76
660.00	604.50	601.77	599.06	596.36	593.68	591.02	588.37
665.00	609.20	606.45	603.72	601.01	598.32	595.64	592.98
670.00	613.90	611.13	608.39	605.66	602.95	600.26	597.59
675.00	618.59	615.82	613.06	610.32	607.59	604.89	602.20
680.00	623.29	620.50	617.72	614.97	612.23	609.51	606.81
685.00	627.99	625.18	622.39	619.62	616.87	614.13	611.41
690.00	632.68	629.86	627.06	624.27	621.50	618.75	616.02
695.00	637.38	634.54	631.72	628.92	626.14	623.38	620.63
700.00	642.08	639.22	636.39	633.58	630.78	628.00	625.24
705.00	646.77	643.91	641.06	638.23	635.42	632.62	629.85
710.00	651.47	648.59	645.73	642.88	640.05	637.25	634.46
715.00	656.17	653.27	650.39	647.53	644.69	641.87	639.06
720.00	660.86	657.95	655.06	652.19	649.33	646.49	643.67

EGT 570 to 720°C

OAT +34 to +40°C

PPC3530

EGT Correction Factors
Figure 524 (Sheet 25)

EGT ACTUAL °C	OAT °C						
	34.0	35.0	36.0	37.0	38.0	39.0	40.0
725.00	665.56	662.63	659.73	656.84	653.97	651.12	648.28
730.00	670.26	667.32	664.39	661.49	658.61	655.74	652.89
735.00	674.95	672.00	669.06	666.14	663.24	660.36	657.50
740.00	679.65	676.68	673.73	670.79	667.88	664.98	662.11
745.00	684.35	681.36	678.39	675.45	672.52	669.61	666.72
750.00	689.04	686.04	683.06	680.10	677.16	674.23	671.32
755.00	693.74	690.72	687.73	684.75	681.79	678.85	675.93
760.00	698.44	695.41	692.39	689.40	686.43	683.48	680.54
765.00	703.13	700.09	697.06	694.06	691.07	688.10	685.15
770.00	707.83	704.77	701.73	698.71	695.71	692.72	689.76
775.00	712.53	709.45	706.40	703.36	700.34	697.35	694.37
780.00	717.22	714.13	711.06	708.01	704.98	701.97	698.98
785.00	721.92	718.81	715.73	712.66	709.62	706.59	703.58
790.00	726.62	723.50	720.40	717.32	714.26	711.21	708.19
795.00	731.31	728.18	725.06	721.97	718.89	715.84	712.80
800.00	736.01	732.86	729.73	726.62	723.53	720.46	717.41
805.00	740.71	737.54	734.40	731.27	728.17	725.08	722.02
810.00	745.40	742.22	739.06	735.92	732.81	729.71	726.63
815.00	750.10	746.91	743.73	740.58	737.44	734.33	731.23
820.00	754.80	751.59	748.40	745.23	742.08	738.95	735.84
825.00	759.49	756.27	753.06	749.88	746.72	743.57	740.45
830.00	764.19	760.95	757.73	754.53	751.36	748.20	745.06
835.00	768.89	765.63	762.40	759.19	755.99	752.82	749.67
840.00	773.58	770.31	767.07	763.84	760.63	757.44	754.28
845.00	778.28	775.00	771.73	768.49	765.27	762.07	758.89
850.00	782.98	779.68	776.40	773.14	769.91	766.69	763.49
855.00	787.67	784.36	781.07	777.79	774.54	771.31	768.10
860.00	792.37	789.04	785.73	782.45	779.18	775.94	772.71
865.00	797.07	793.72	790.40	787.10	783.82	780.56	777.32
870.00	801.76	798.40	795.07	791.75	788.46	785.18	781.93
875.00	806.46	803.09	799.73	796.40	793.09	789.80	786.54
880.00	811.16	807.77	804.40	801.06	797.73	794.43	791.14
885.00	815.85	812.45	809.07	805.71	802.37	799.05	795.75
890.00	820.55	817.13	813.73	810.36	807.01	803.67	800.36
895.00	825.25	821.81	818.40	815.01	811.64	808.30	804.97
900.00	829.94	826.50	823.07	819.66	816.28	812.92	809.58

EGT 725 to 900°C

OAT +34 to +40°C

PPC3531

EGT Correction Factors
Figure 524 (Sheet 26)

EGT ACTUAL °C	OAT °C						
	41.0	42.0	43.0	44.0	45.0	46.0	47.0
570.00	503.05	500.69	498.35	496.03	493.71	491.42	489.13
575.00	507.64	505.27	502.92	500.58	498.25	495.94	493.64
580.00	512.24	509.85	507.48	505.13	502.79	500.46	498.15
585.00	516.83	514.43	512.05	509.68	507.33	504.99	502.66
590.00	521.42	519.01	516.61	514.23	511.86	509.51	507.17
595.00	526.02	523.59	521.18	518.78	516.40	514.03	511.68
600.00	530.61	528.17	525.75	523.33	520.94	518.56	516.19
605.00	535.21	532.75	530.31	527.89	525.48	523.08	520.70
610.00	539.80	537.33	534.88	532.44	530.01	527.60	525.21
615.00	544.39	541.91	539.44	536.99	534.55	532.13	529.72
620.00	548.99	546.49	544.01	541.54	539.09	536.65	534.23
625.00	553.58	551.07	548.57	546.09	543.63	541.18	538.74
630.00	558.18	555.65	553.14	550.64	548.16	545.70	543.25
635.00	562.77	560.23	557.70	555.20	552.70	550.22	547.76
640.00	567.37	564.81	562.27	559.75	557.24	554.75	552.27
645.00	571.96	569.39	566.84	564.30	561.78	559.27	556.78
650.00	576.55	573.97	571.40	568.85	566.31	563.79	561.29
655.00	581.15	578.55	575.97	573.40	570.85	568.32	565.80
660.00	585.74	583.13	580.53	577.95	575.39	572.84	570.31
665.00	590.34	587.71	585.10	582.50	579.93	577.36	574.82
670.00	594.93	592.29	589.66	587.06	584.46	581.89	579.33
675.00	599.52	596.87	594.23	591.61	589.00	586.41	583.84
680.00	604.12	601.45	598.80	596.16	593.54	590.93	588.35
685.00	608.71	606.03	603.36	600.71	598.08	595.46	592.86
690.00	613.31	610.61	607.93	605.26	602.61	599.98	597.37
695.00	617.90	615.19	612.49	609.81	607.15	604.51	601.88
700.00	622.49	619.77	617.06	614.36	611.69	609.03	606.39
705.00	627.09	624.35	621.62	618.92	616.23	613.55	610.90
710.00	631.68	628.93	626.19	623.47	620.76	618.08	615.41
715.00	636.28	633.51	630.75	628.02	625.30	622.60	619.92
720.00	640.87	638.09	635.32	632.57	629.84	627.12	624.42

EGT 570 to 720°C

OAT +41 to +47°C

PPC3532

EGT Correction Factors
Figure 524 (Sheet 27)

EFFECTIVITY

ALL

188404

EGT ACTUAL °C	OAT °C						
	41.0	42.0	43.0	44.0	45.0	46.0	47.0
725.00	645.47	642.67	639.89	637.12	634.38	631.65	628.93
730.00	650.06	647.25	644.45	641.67	638.91	636.17	633.44
735.00	654.65	651.83	649.02	646.23	643.45	640.69	637.95
740.00	659.25	656.41	653.58	650.78	647.99	645.22	642.46
745.00	663.84	660.99	658.15	655.33	652.53	649.74	646.97
750.00	668.44	665.57	662.71	659.88	657.06	654.26	651.48
755.00	673.03	670.15	667.28	664.43	661.60	658.79	655.99
760.00	677.62	674.73	671.85	668.98	666.14	663.31	660.50
765.00	682.22	679.31	676.41	673.53	670.68	667.84	665.01
770.00	686.81	683.89	680.98	678.09	675.21	672.36	669.52
775.00	691.41	688.47	685.54	682.64	679.75	676.88	674.03
780.00	696.00	693.05	690.11	687.19	684.29	681.41	678.54
785.00	700.59	697.63	694.67	691.74	688.83	685.93	683.05
790.00	705.19	702.20	699.24	696.29	693.36	690.45	687.56
795.00	709.78	706.78	703.81	700.84	697.90	694.98	692.07
800.00	714.38	711.36	708.37	705.40	702.44	699.50	696.58
805.00	718.97	715.94	712.94	709.95	706.98	704.02	701.09
810.00	723.57	720.52	717.50	714.50	711.51	708.55	705.60
815.00	728.16	725.10	722.07	719.05	716.05	713.07	710.11
820.00	732.75	729.68	726.63	723.60	720.59	717.59	714.62
825.00	737.35	734.26	731.20	728.15	725.13	722.12	719.13
830.00	741.94	738.84	735.76	732.70	729.66	726.64	723.64
835.00	746.54	743.42	740.33	737.26	734.20	731.17	728.15
840.00	751.13	748.00	744.90	741.81	738.74	735.69	732.66
845.00	755.72	752.58	749.46	746.36	743.28	740.21	737.17
850.00	760.32	757.16	754.03	750.91	747.81	744.74	741.68
855.00	764.91	761.74	758.59	755.46	752.35	749.26	746.19
860.00	769.51	766.32	763.16	760.01	756.89	753.78	750.70
865.00	774.10	770.90	767.72	764.57	761.43	758.31	755.21
870.00	778.69	775.48	772.29	769.12	765.96	762.83	759.72
875.00	783.29	780.06	776.86	773.67	770.50	767.35	764.23
880.00	787.88	784.64	781.42	778.22	775.04	771.88	768.74
885.00	792.48	789.22	785.99	782.77	779.58	776.40	773.25
890.00	797.07	793.80	790.55	787.32	784.11	780.92	777.76
895.00	801.67	798.38	795.12	791.87	788.65	785.45	782.27
900.00	806.26	802.96	799.68	796.43	793.19	789.97	786.77

EGT 725 to 900°C

OAT +41 to +47°C

PPC3533

EGT Correction Factors
Figure 524 (Sheet 28)

EGT ACTUAL °C	OAT °C						
	48.0	49.0	50.0	51.0	52.0	53.0	54.0
570.00	486.86	484.61	482.37	480.14	477.93	475.73	473.54
575.00	491.36	489.09	486.84	484.60	482.37	480.15	477.95
580.00	495.86	493.57	491.30	489.05	486.81	484.58	482.37
585.00	500.35	498.06	495.77	493.51	491.25	489.01	486.78
590.00	504.85	502.54	500.24	497.96	495.69	493.44	491.20
595.00	509.34	507.02	504.71	502.42	500.13	497.87	495.61
600.00	513.84	511.50	509.18	506.87	504.58	502.30	500.03
605.00	518.34	515.98	513.65	511.33	509.02	506.72	504.44
610.00	522.83	520.47	518.12	515.78	513.46	511.15	508.86
615.00	527.33	524.95	522.59	520.24	517.90	515.58	513.27
620.00	531.82	529.43	527.05	524.69	522.34	520.01	517.69
625.00	536.32	533.91	531.52	529.15	526.79	524.44	522.10
630.00	540.82	538.40	535.99	533.60	531.23	528.87	526.52
635.00	545.31	542.88	540.46	538.06	535.67	533.29	530.93
640.00	549.81	547.36	544.93	542.51	540.11	537.72	535.35
645.00	554.30	551.84	549.40	546.97	544.55	542.15	539.77
650.00	558.80	556.33	553.87	551.42	548.99	546.58	544.18
655.00	563.30	560.81	558.34	555.88	553.44	551.01	548.60
660.00	567.79	565.29	562.80	560.33	557.88	555.44	553.01
665.00	572.29	569.77	567.27	564.79	562.32	559.86	557.43
670.00	576.78	574.25	571.74	569.24	566.76	564.29	561.84
675.00	581.28	578.74	576.21	573.70	571.20	568.72	566.26
680.00	585.78	583.22	580.68	578.15	575.64	573.15	570.67
685.00	590.27	587.70	585.15	582.61	580.09	577.58	575.09
690.00	594.77	592.18	589.62	587.06	584.53	582.01	579.50
695.00	599.26	596.67	594.08	591.52	588.97	586.44	583.92
700.00	603.76	601.15	598.55	595.97	593.41	590.86	588.33
705.00	608.26	605.63	603.02	600.43	597.85	595.29	592.75
710.00	612.75	610.11	607.49	604.88	602.29	599.72	597.16
715.00	617.25	614.60	611.96	609.34	606.74	604.15	601.58
720.00	621.74	619.08	616.43	613.80	611.18	608.58	605.99

EGT 570 to 720°C

OAT +48 to +54°C

PPC3534

EGT Correction Factors
Figure 524 (Sheet 29)

EGT ACTUAL °C	OAT °C						
	48.0	49.0	50.0	51.0	52.0	53.0	54.0
725.00	626.24	623.56	620.90	618.25	615.62	613.01	610.41
730.00	630.73	628.04	625.37	622.71	620.06	617.43	614.82
735.00	635.23	632.52	629.83	627.16	624.50	621.86	619.24
740.00	639.73	637.01	634.30	631.62	628.95	626.29	623.65
745.00	644.22	641.49	638.77	636.07	633.39	630.72	628.07
750.00	648.72	645.97	643.24	640.53	637.83	635.15	632.48
755.00	653.21	650.45	647.71	644.98	642.27	639.58	636.90
760.00	657.71	654.94	652.18	649.44	646.71	644.00	641.31
765.00	662.21	659.42	656.65	653.89	651.15	648.43	645.73
770.00	666.70	663.90	661.12	658.35	655.60	652.86	650.14
775.00	671.20	668.38	665.58	662.80	660.04	657.29	654.56
780.00	675.69	672.86	670.05	667.26	664.48	661.72	658.97
785.00	680.19	677.35	674.52	671.71	668.92	666.15	663.39
790.00	684.69	681.83	678.99	676.17	673.36	670.58	667.80
795.00	689.18	686.31	683.46	680.62	677.80	675.00	672.22
800.00	693.68	690.79	687.93	685.08	682.25	679.43	676.63
805.00	698.17	695.28	692.40	689.53	686.69	683.86	681.05
810.00	702.67	699.76	696.86	693.99	691.13	688.29	685.46
815.00	707.17	704.24	701.33	698.44	695.57	692.72	689.88
820.00	711.66	708.72	705.80	702.90	700.01	697.15	694.29
825.00	716.16	713.21	710.27	707.35	704.46	701.57	698.71
830.00	720.65	717.69	714.74	711.81	708.90	706.00	703.13
835.00	725.15	722.17	719.21	716.26	713.34	710.43	707.54
840.00	729.65	726.65	723.68	720.72	717.78	714.86	711.96
845.00	734.14	731.13	728.15	725.17	722.22	719.29	716.37
850.00	738.64	735.62	732.61	729.63	726.66	723.72	720.79
855.00	743.13	740.10	737.08	734.09	731.11	728.14	725.20
860.00	747.63	744.58	741.55	738.54	735.55	732.57	729.62
865.00	752.13	749.06	746.02	743.00	739.99	737.00	734.03
870.00	756.62	753.55	750.49	747.45	744.43	741.43	738.45
875.00	761.12	758.03	754.96	751.91	748.87	745.86	742.86
880.00	765.61	762.51	759.43	756.36	753.31	750.29	747.28
885.00	770.11	766.99	763.90	760.82	757.76	754.71	751.69
890.00	774.61	771.48	768.36	765.27	762.20	759.14	756.11
895.00	779.10	775.96	772.83	769.73	766.64	763.57	760.52
900.00	783.60	780.44	777.30	774.18	771.08	768.00	764.94

EGT 725 to 900°C

OAT +48 to +54°C

PPC3535

EGT Correction Factors
Figure 524 (Sheet 30)

EGT ACTUAL °C	OAT °C					
	55.0	56.0	57.0	58.0	59.0	60.0
570.00	471.36	469.20	467.05	464.92	462.80	460.69
575.00	475.77	473.59	471.43	469.28	467.15	465.02
580.00	480.17	477.98	475.81	473.65	471.50	469.36
585.00	484.57	482.37	480.18	478.01	475.85	473.70
590.00	488.97	486.76	484.56	482.37	480.20	478.04
595.00	493.37	491.15	488.93	486.73	484.55	482.37
600.00	497.78	495.54	493.31	491.10	488.90	486.71
605.00	502.18	499.92	497.69	495.46	493.25	491.05
610.00	506.58	504.31	502.06	499.82	497.60	495.38
615.00	510.98	508.70	506.44	504.19	501.95	499.72
620.00	515.38	513.09	510.81	508.55	506.30	504.06
625.00	519.79	517.48	515.19	512.91	510.65	508.40
630.00	524.19	521.87	519.56	517.27	515.00	512.73
635.00	528.59	526.26	523.94	521.64	519.35	517.07
640.00	532.99	530.65	528.32	526.00	523.70	521.41
645.00	537.39	535.04	532.69	530.36	528.05	525.75
650.00	541.80	539.42	537.07	534.73	532.40	530.08
655.00	546.20	543.81	541.44	539.09	536.75	534.42
660.00	550.60	548.20	545.82	543.45	541.10	538.76
665.00	555.00	552.59	550.20	547.81	545.45	543.09
670.00	559.40	556.98	554.57	552.18	549.80	547.43
675.00	563.80	561.37	558.95	556.54	554.15	551.77
680.00	568.21	565.76	563.32	560.90	558.50	556.11
685.00	572.61	570.15	567.70	565.27	562.85	560.44
690.00	577.01	574.54	572.07	569.63	567.20	564.78
695.00	581.41	578.92	576.45	573.99	571.55	569.12
700.00	585.81	583.31	580.83	578.35	575.90	573.45
705.00	590.22	587.70	585.20	582.72	580.25	577.79
710.00	594.62	592.09	589.58	587.08	584.60	582.13
715.00	599.02	596.48	593.95	591.44	588.95	586.47
720.00	603.42	600.87	598.33	595.81	593.30	590.80

EGT 570 to 720°C

OAT +55 to +60°C

PPC3536

EGT Correction Factors
Figure 524 (Sheet 31)

EGT ACTUAL °C	OAT °C					
	55.0	56.0	57.0	58.0	59.0	60.0
725.00	607.82	605.26	602.71	600.17	597.65	595.14
730.00	612.23	609.65	607.08	604.53	602.00	599.48
735.00	616.63	614.03	611.46	608.89	606.35	603.81
740.00	621.03	618.42	615.83	613.26	610.70	608.15
745.00	625.43	622.81	620.21	617.62	615.05	612.49
750.00	629.83	627.20	624.58	621.98	619.40	616.83
755.00	634.24	631.59	628.96	626.35	623.75	621.16
760.00	638.64	635.98	633.34	630.71	628.10	625.50
765.00	643.04	640.37	637.71	635.07	632.45	629.84
770.00	647.44	644.76	642.09	639.43	636.80	634.18
775.00	651.84	649.15	646.46	643.80	641.15	638.51
780.00	656.25	653.53	650.84	648.16	645.50	642.85
785.00	660.65	657.92	655.21	652.52	649.85	647.19
790.00	665.05	662.31	659.59	656.89	654.20	651.52
795.00	669.45	666.70	663.97	661.25	658.55	655.86
800.00	673.85	671.09	668.34	665.61	662.90	660.20
805.00	678.26	675.48	672.72	669.97	667.25	664.54
810.00	682.66	679.87	677.09	674.34	671.60	668.87
815.00	687.06	684.26	681.47	678.70	675.95	673.21
820.00	691.46	688.65	685.85	683.06	680.30	677.55
825.00	695.86	693.03	690.22	687.43	684.65	681.88
830.00	700.27	697.42	694.60	691.79	689.00	686.22
835.00	704.67	701.81	698.97	696.15	693.35	690.56
840.00	709.07	706.20	703.35	700.51	697.70	694.90
845.00	713.47	710.59	707.72	704.88	702.05	699.23
850.00	717.87	714.98	712.10	709.24	706.40	703.57
855.00	722.28	719.37	716.48	713.60	710.75	707.91
860.00	726.68	723.76	720.85	717.97	715.10	712.24
865.00	731.08	728.14	725.23	722.33	719.45	716.58
870.00	735.48	732.53	729.60	726.69	723.80	720.92
875.00	739.88	736.92	733.98	731.05	728.15	725.26
880.00	744.28	741.31	738.36	735.42	732.50	729.59
885.00	748.69	745.70	742.73	739.78	736.85	733.93
890.00	753.09	750.09	747.11	744.14	741.20	738.27
895.00	757.49	754.48	751.48	748.51	745.55	742.61
900.00	761.89	758.87	755.86	752.87	749.90	746.94

EGT 725 to 900°C

OAT +55 to +60°C

PPC3537

EGT Correction Factors
Figure 524 (Sheet 32)

TASK 71-00-00-735-396-R00

26. Power Plant Test Profiles

A. General

(1) These power olant test profiles are an aid to the power plant test. First, read the test instructions.
Second, compare the instrtuctions with the related part of the profile before you do the test.

(2) The Power Plant Test Profiles are given as an aid to the Power Plant tests and for the collection of data.

(a) The profiles do not replace the test instructions.

(3) The profiles were designed to give a representation of the steps in the test.

(a) Not all the steps are represented in the profiles:

1) Some calculations must be done before you go to the airplane.

2) Some decisions cannot be made until you have reviewed the charts and graphs from the figures referenced in the test.

(b) A copy of the test and the necessary figures are also required to do the test.

(4) There are no time scales or engine pressure ratio (EPR) scales associated with the X-axis or the Y-axis of these profiles.

(a) This was done to put the profiles on to a few sheets of paper.

(5) You are required to read and understand the test, and review the profile with the test before you do the test.

(6) You must use the Figure 525, Decrease of Engine Power and Stable Engine Operation Times to stabilize the engine temperature and control the engine cooldown in the tests.

(7) Profiles for Tests 2,3,4,5,6,9,10,11,12,13,and 15 are represented.

(8) Profiles Symbols

(a) Thrust lever movement times are shown on the profile as follows:

1) The thrust lever movement is 15 seconds or more, a slow thrust lever movement:

TL > 15 SEC

2) The thrust lever movement is less than one second, a very fast thrust lever movement:

TL < 1 SEC

(b) Data collection is shown on the profile by data points; a number in a circle that is also shown on the data collection table.

(c) Engine operation time for stable engine operation during the test is shown under the profile line.

1) 5 MIN or five minutes is the time you should operate the engine before you do the next step.

(d) Engine power settings are shown above the profile line as follows:
1) LOW IDLE is the low idle power setting with the forward thrust lever moved to the aft idle stop.
2) HIGH IDLE is the high idle power setting after opening the IDLE CONTROL circuit breakers with the forward thrust lever at the aft idle stop.
3) Various Engine Pressure Ratio (EPR) settings are the EICAS EPR indication as you move the forward thrust levers in the forward direction.
4) The Minimum Rated Thrust EPR is the maximum allowable thrust lever power setting for the outside air temperature and pressure altitude.

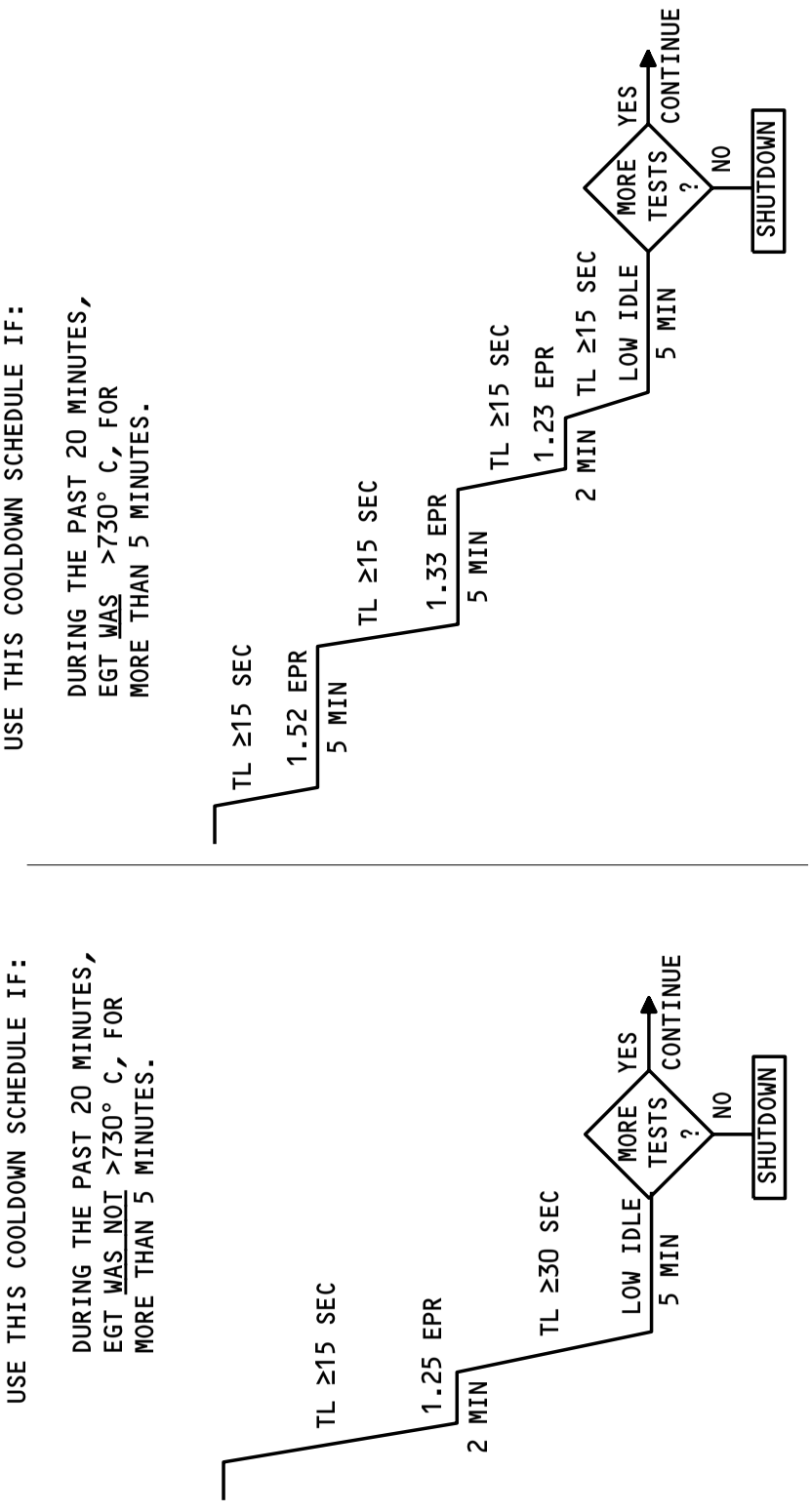
(e) Flagnotes are used to show WARNINGS and CAUTIONS that apply to steps in the test instructions.

B. Procedure

S 735-397-R00

(1) Use the profile for the applicable test (Fig. 525 - 536).

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.



Decrease of Engine Power and Stable Engine Operation Time
Figure 525

E39226

TEST NO. 2	AIRPLANE NO.	
	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 2 – FUELS AND OIL LEAKS TEST				ENGINE: L R
Data Points (1)	Oil Press.		N1 VIB	
	Oil Temp.		N2 VIB	
	Oil Qty.		N3 VIB	
	Fuel Flow		BB VIB	

Test No. 2 – Fuel and Oil Leaks
Figure 526

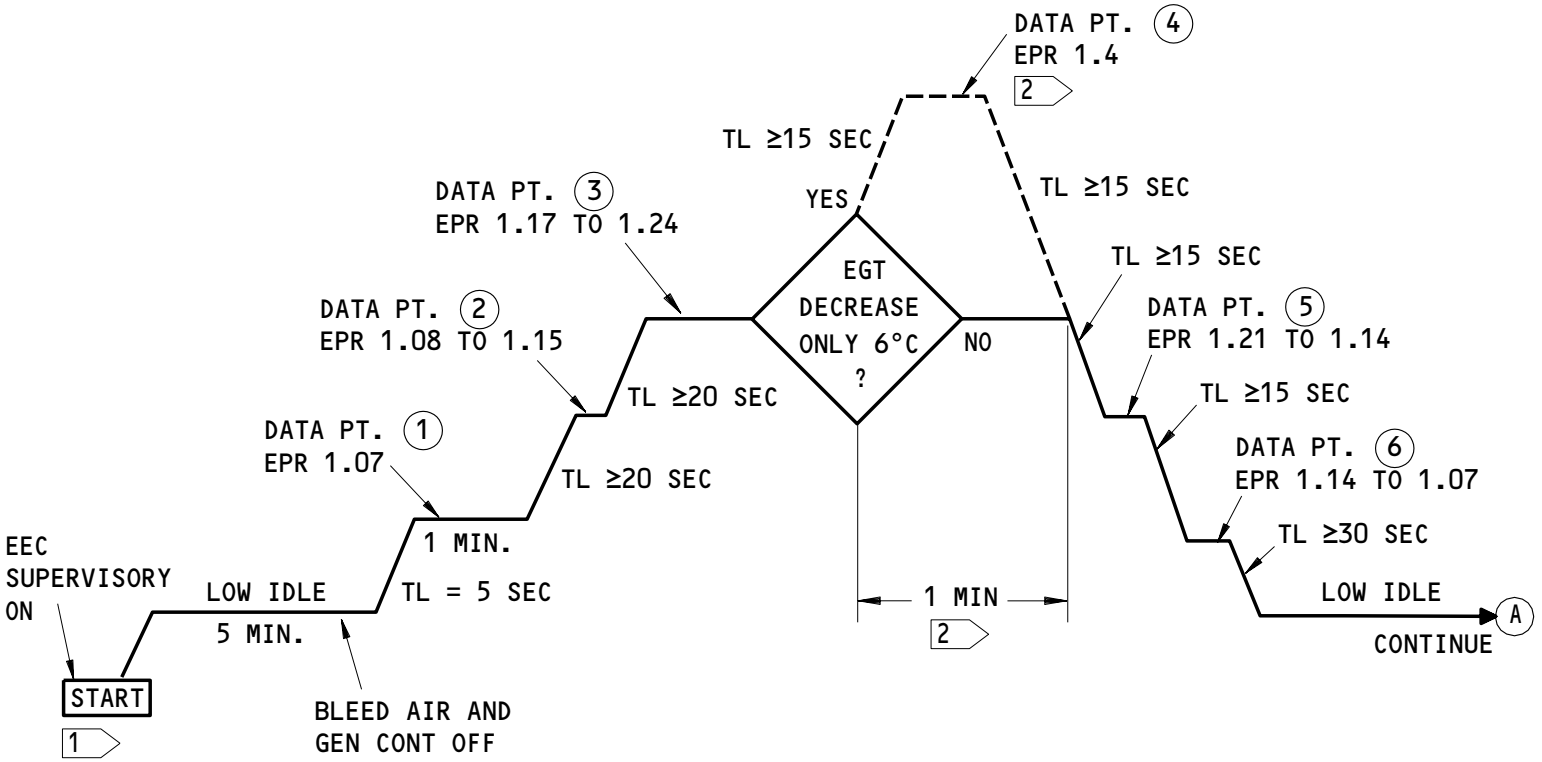
E38977

EFFECTIVITY
ALL

Test No. 3 - IP/HP Compressor Airflow Control Test
Figure 527 (Sheet 1)

TEST NO. 3	AIRPLANE NO.	
SHEET 1 OF 4	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

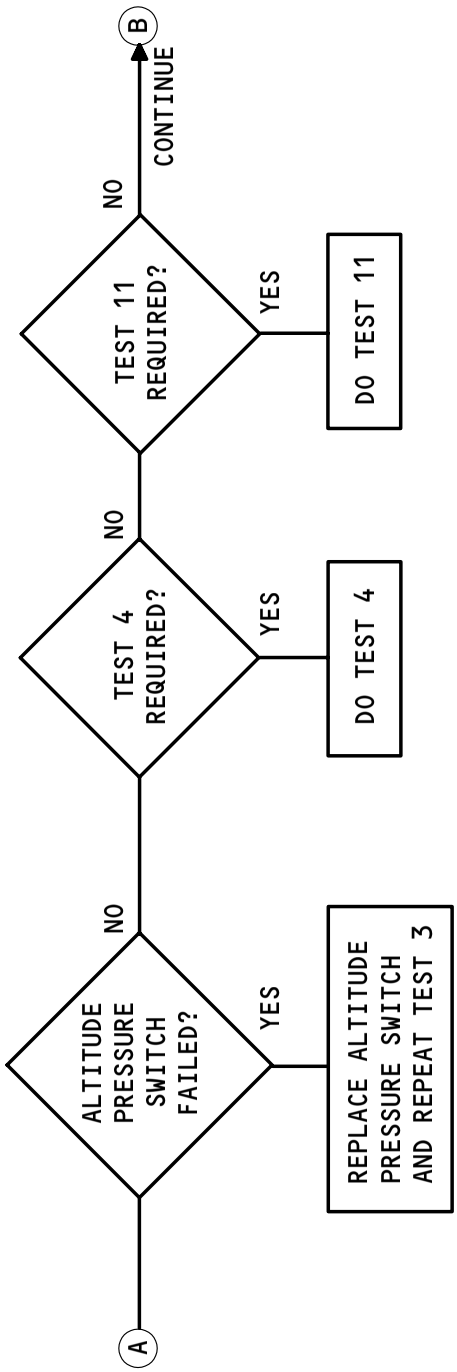


1 CAUTION: IF TEST NO. 4 IS TO BE DONE, DO NOT OPERATE ENGINE AT POWER LEVELS MORE THAN LEVELS SPECIFIED IN THIS TEST.

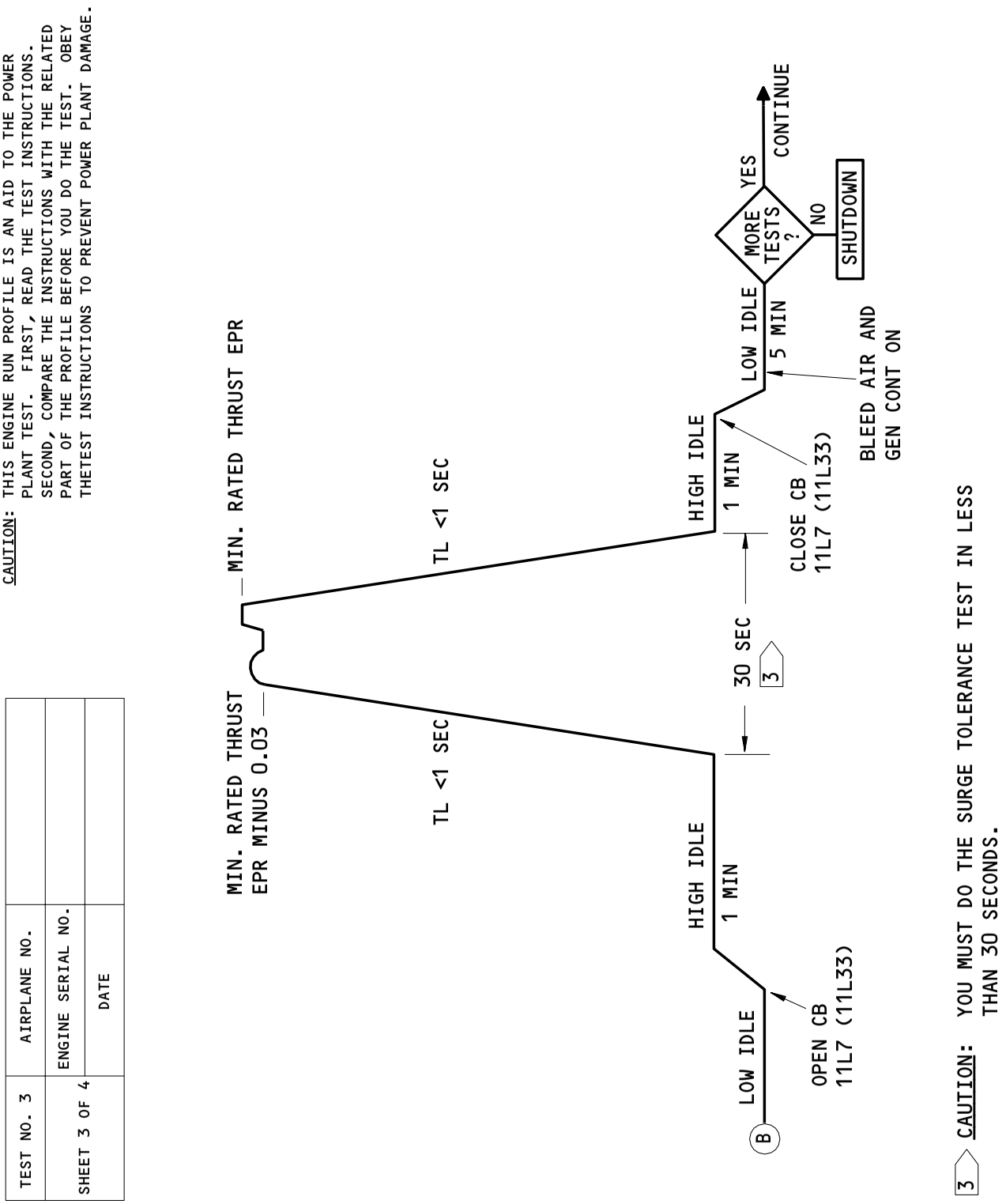
2 CAUTION: DO NOT OPERATE ENGINE FOR MORE THAN 1 MINUTE AT EPR 1.4. ENGINE SEAL DAMAGE CAN occur.

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 3	AIRPLANE NO.	
SHEET 2 OF 4	ENGINE SERIAL NO.	
	DATE	



Test No. 3 - IP/HP Compressor Airflow Control Test
Figure 527 (Sheet 2)



Test No. 3 - IP/HP Compressor Airflow Control Test
Figure 527 (Sheet 3)

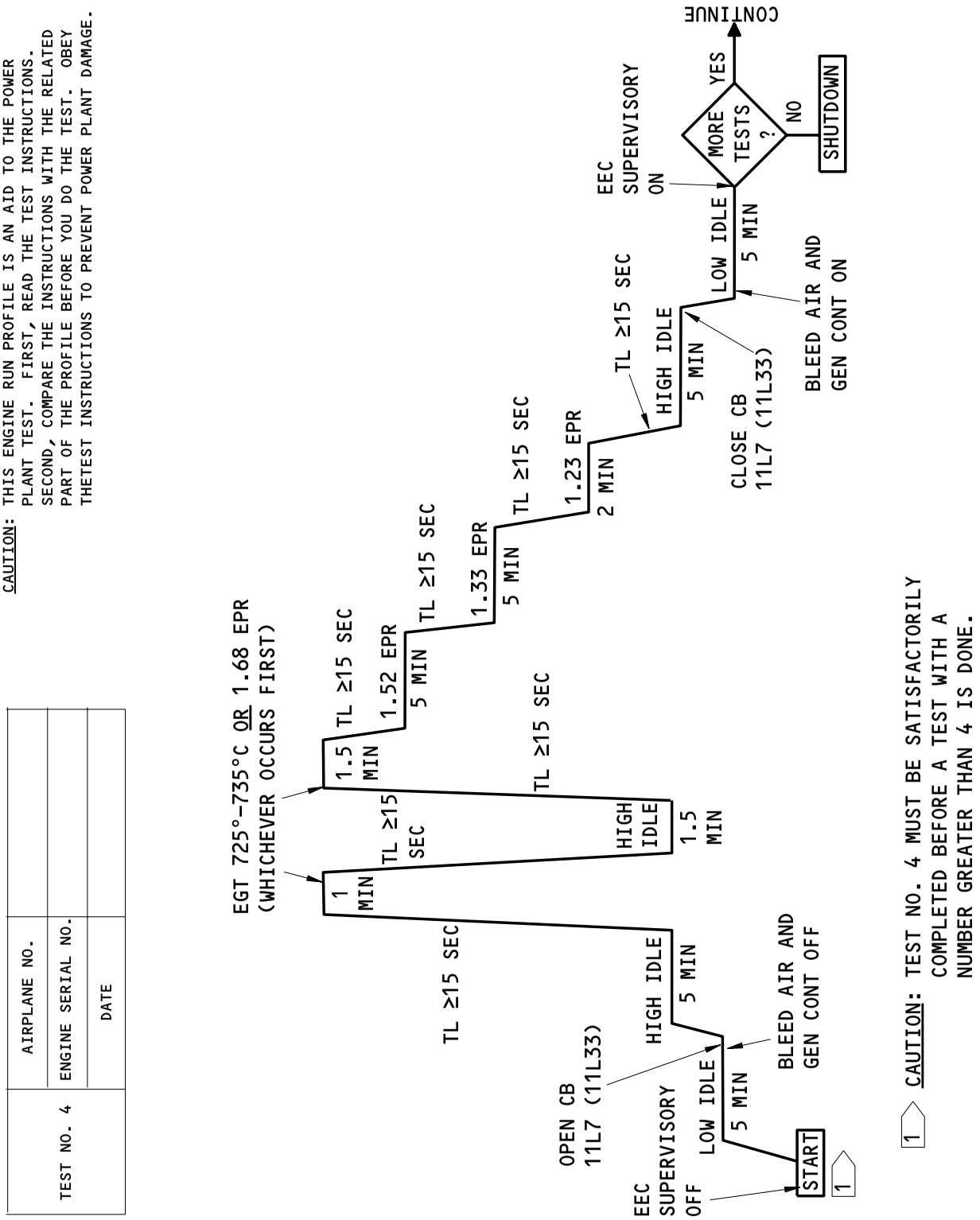
E39832

TEST NO. 3	AIRPLANE NO.	
SHEET 4 OF 4	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

Test No. 3 - IP/HP Compressor Airflow Control Test
Figure 527 (Sheet 4)

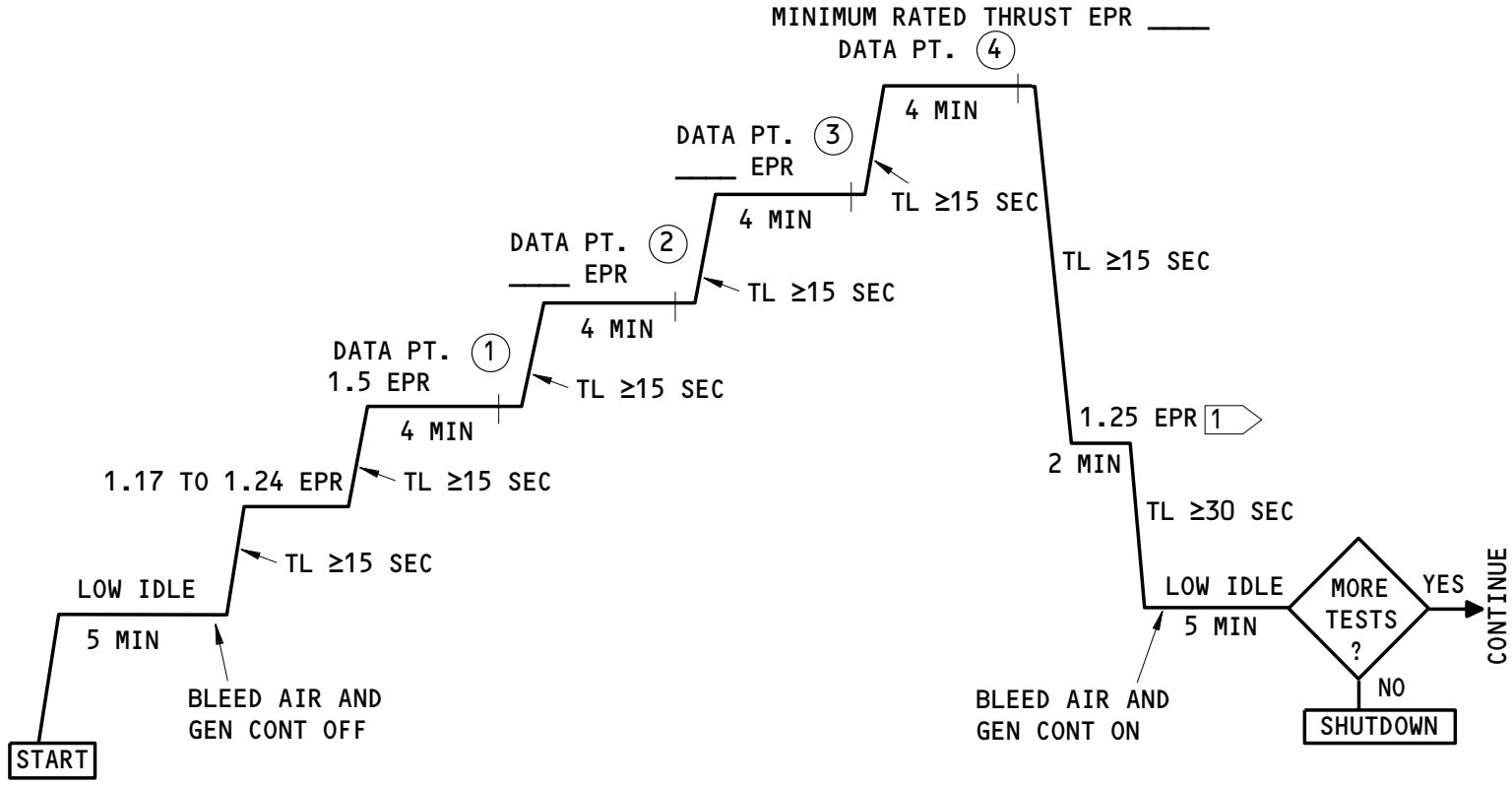
TEST NO. 3 - IP/HP COMPRESSOR AIRFLOW CONTROL TEST					ENGINE: L R				
Pressure Altitude				Min Rated Thrust EPR					
Outside Air Temp.				Min Rated Thrust EPR minus 0.03					
DATA POINTS									
(1)	EPR 1.07		EGT		(4)	If EGT Decrease only 6°C, EPR 1.4		EGT	
(2)	Condition A	EPR 1.08 to 1.15	EPR		(5)	Condition C	EPR 1.21 to 1.14	EPR	
		EGT Decrease Approx 20°C	EGT				EGT Increase Approx 20°C	EGT	
(3)	Condition B	EPR 1.17 to 1.24	EPR		(6)	Condition D	EPR 1.14 to 1.07	EPR	
		EGT Decrease Approx 20°C	EGT				EGT Increase Approx 20°C	EGT	



Test No. 4 - Engine Run-In
Figure 528

TEST NO. 5	AIRPLANE NO.	
SHEET 1 OF 2	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.



1 USE FIGURE 525 FOR ENGINE COOLDOWN IF EGT >730°C FOR MORE THAN 5 MINUTES.

Test No. 5 - Performance Test
Figure 529 (Sheet 1)

E39513

EFFECTIVITY

ALL

TEST NO. 5	AIRPLANE NO.	
SHEET 2 OF 2	ENGINE SERIAL NO.	
	DATE	

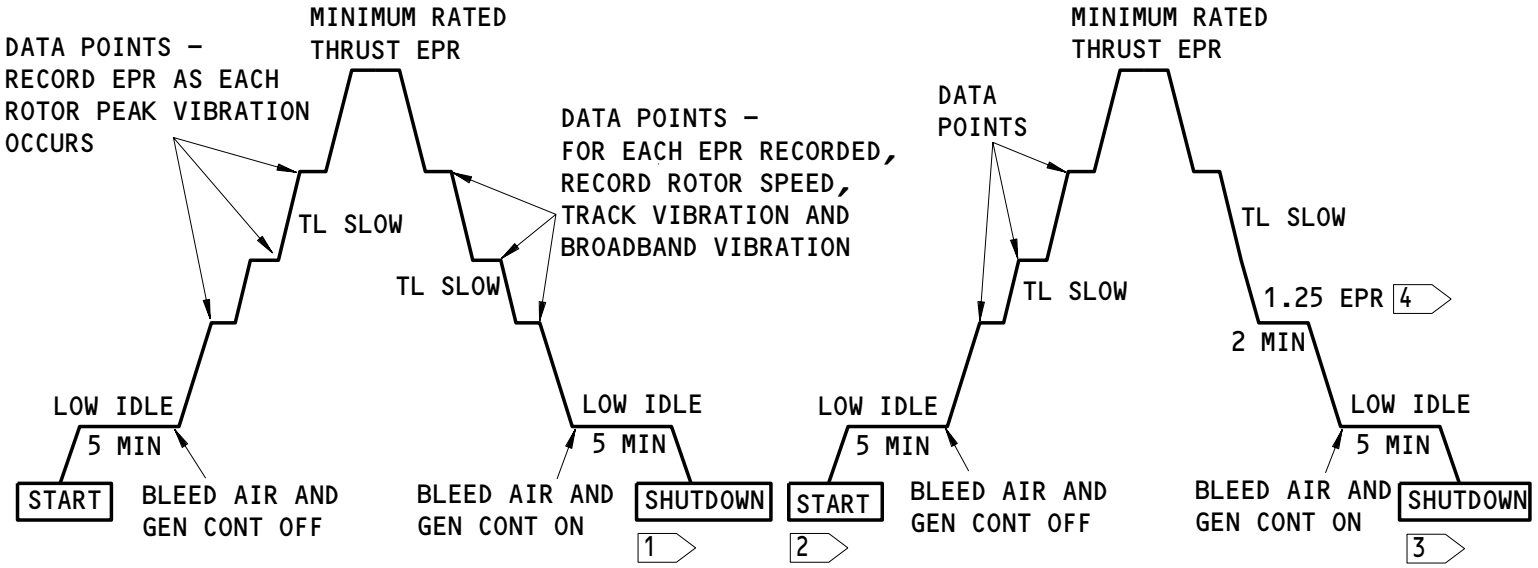
CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 5 – PERFORMANCE TEST								ENGINE: L R					
Pressure Altitude			Outside Air Temp.					Min Rated Thrust EPR					
Data Point	EPR Set	EPR Act.	N1		N2		N3		EGT		Oil Temp.	Oil Press.	Vib
			Act.	Cor.	Act.	Cor.	Act.	Cor.	Act.	Cor.			
(1)	1.5												
(2)													
(3)													
(4)													

Test No. 5 – Performance Test
Figure 529 (Sheet 2)

TEST NO. 6	AIRPLANE NO.	
SHEET 1 OF 2	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.



Test No. 6 – Vibration Survey
Figure 530 (Sheet 1)

1 FOR AIRPLANES WITH EICAS COMPUTERS WITH PART NUMBER S242N701-110 AND HIGHER, THE TEST ENDS HERE.

2 FOR AIRPLANES WITH EICAS COMPUTERS WITH PART NUMBER S242N701-105, -106, -107, -108, OR -109, DISCONNECT THE TACHOMETER INPUT FROM ONE ROTOR AT TERMINAL BLOCK TB207.

3 CONNECT THE TACHOMETER INPUT WIRES TO TERMINAL BLOCK TB207.

4 USE FIGURE 525 FOR ENGINE COOLDOWN IF EGT >730° C FOR MORE THAN 5 MINUTES.

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 6	AIRPLANE NO.	
SHEET 2 OF 2	ENGINE SERIAL NO.	
	DATE	

TEST NO. 6 - VIBRATION SURVEY — Engine: L R

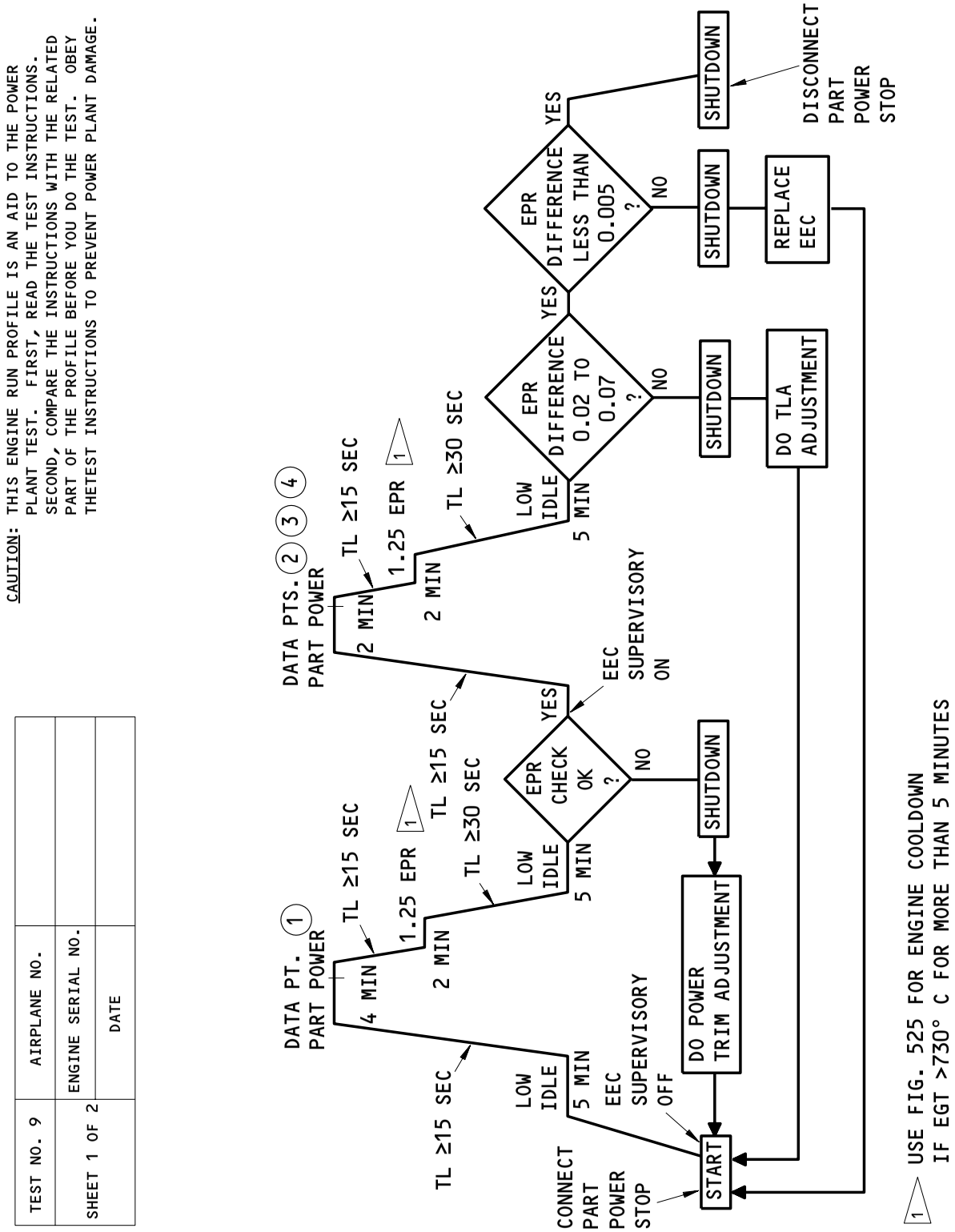
Outside Air Temperature — Pressure Altitude

Minimum Rated Thrust EPR

Data Points	Rotor	EPR	BB Vib	Tracked Vibration N1	Tracked Vibration N2	Tracked Vibration N3	Rotor Speed N1	Rotor Speed N2	Rotor Speed N3
Airplanes with EICAS P/N S242N702-105,-106,-107,-108,-109	LP								
	IP								
	HP								
	LP								
	IP								
	HP								
	Rotor with Lowest Tracked Vibration								

Test No. 6 - Vibration Survey
Figure 530 (Sheet 2)

E39777



Test No. 9 - Thrust Lever Angle/Power Setting Test
Figure 531 (Sheet 1)

E39223

E39565

EFFECTIVITY
ALL

Test No. 9 - Thrust Lever Angle/Power Setting Test
Figure 531 (Sheet 2)

TEST NO. 9	AIRPLANE NO.	
SHEET 2 OF 2	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

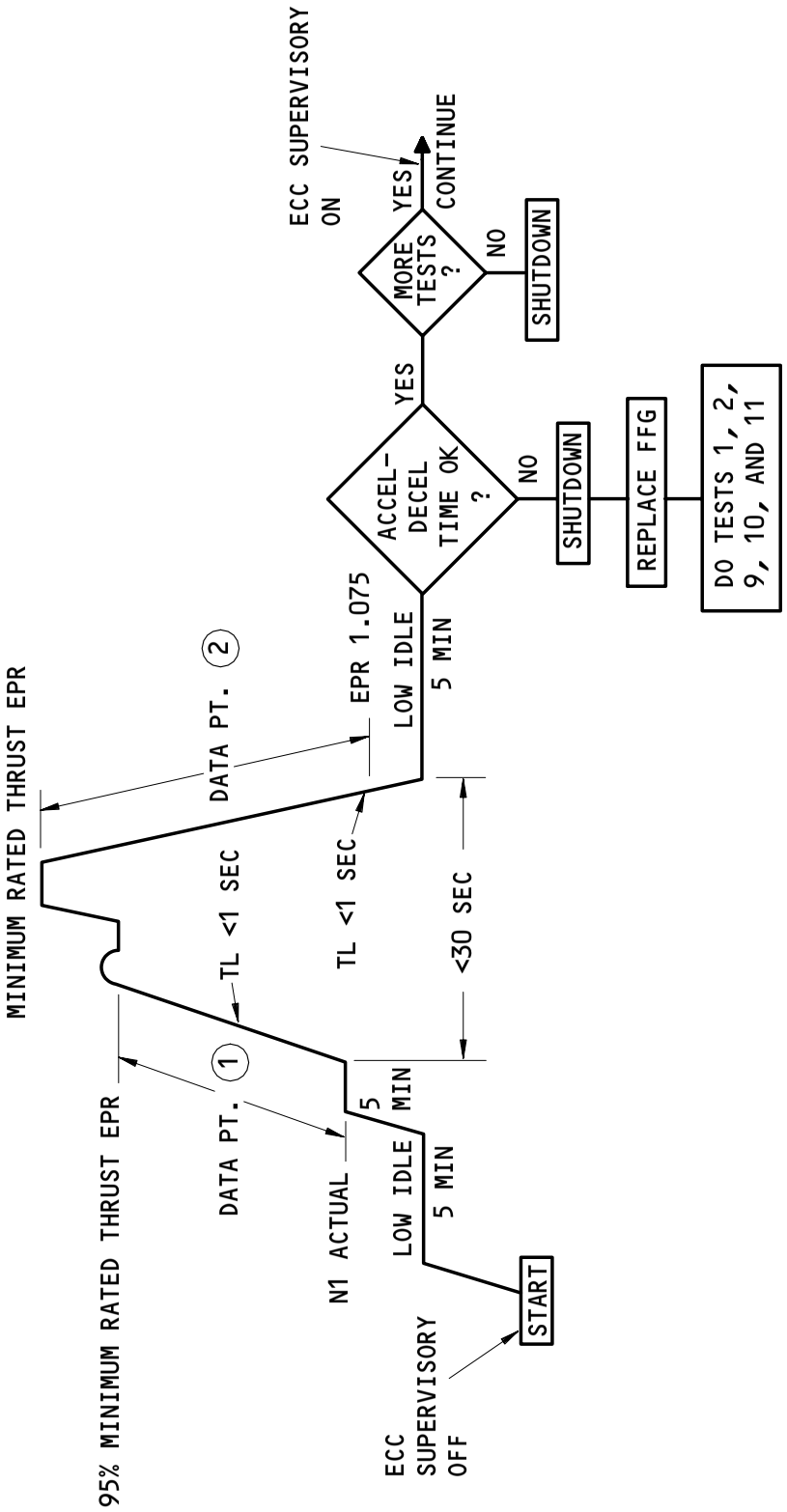
TEST NO. 9 - THRUST LEVER ANGLE/POWER SETTING TEST				
Engine: L R		Pressure Altitude		
Data Points	(1)	EPR Actual (EEC Off)		
	(2)	EPR Command (EEC On)		
	(3)	EPR Actual (EEC On; EICAS PERF/APU page)		
	(4)	EPR Command (EEC On; EICAS PERF/APU page)		
EPR Actual (EEC Off) in the Limits?			Yes	No
Is EPR Command (EEC On) 0.02 to 0.07 less than EEC Actual (EEC Off)?			Yes	No
From the PERF/APU page, is the difference between EPR Command (EEC On) and EPR Actual (EEC On) less than 0.005?			Yes	No

TEST 10 PROFILE NOT USED
(SEE TEST 10A AND 10B)

Test 10 - High Idle and Low Idle Test
Figure 532

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 11	AIRPLANE NO.	
SHEET 1 OF 2	ENGINE SERIAL NO.	
	DATE	



Test No. 11 - Acceleration and Deceleration
Figure 533 (Sheet 1)

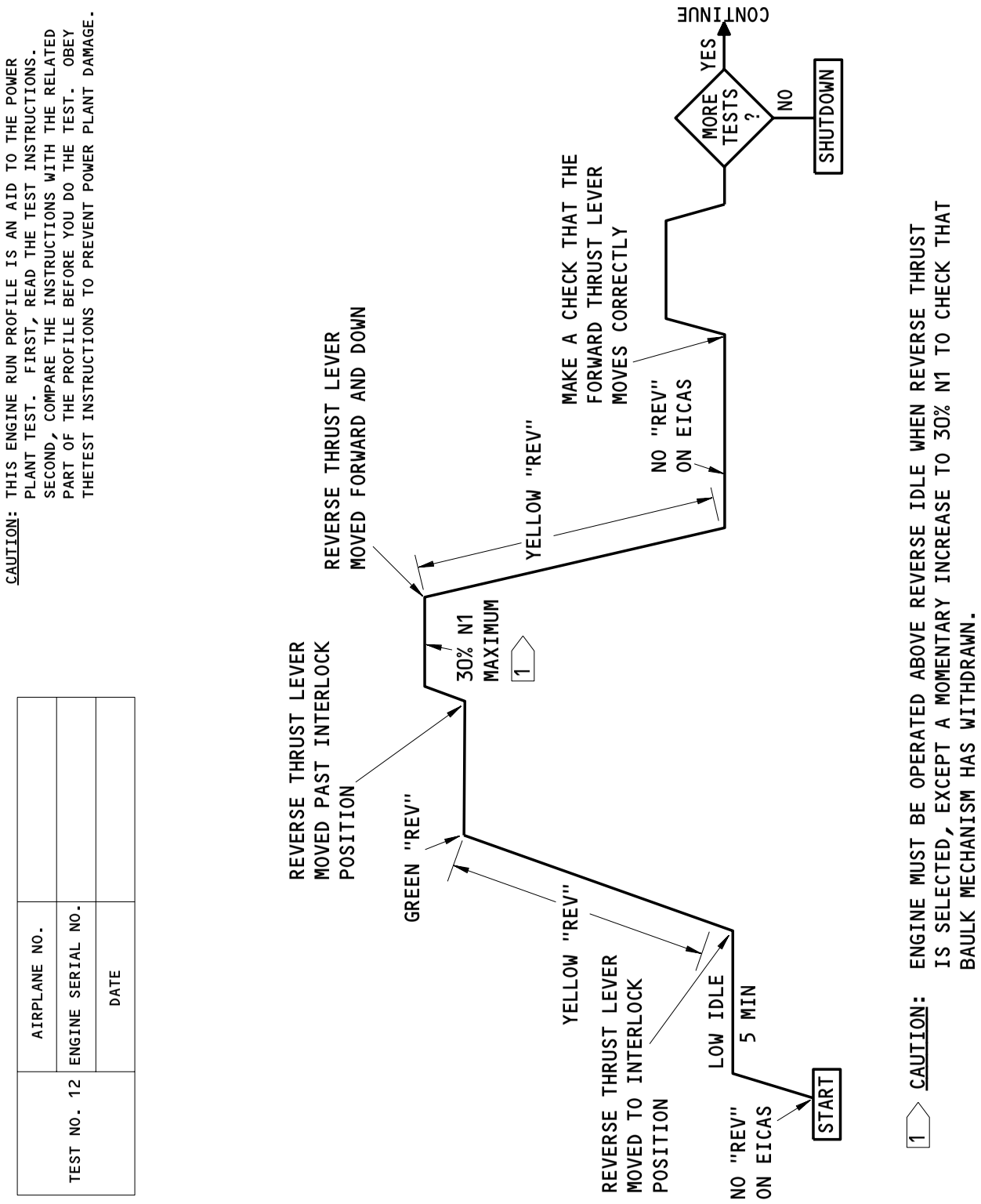
CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 11	AIRPLANE NO.	
SHEET 2 OF 2	ENGINE SERIAL NO.	
	DATE	

TEST NO. 11 - ACCELERATION AND DECELERATION TEST		
Engine: L R		
Outside Air Temp		
Pressure Altitude		
Min Rated Thrust EPR		
95% Min Rated Thrust EPR		
N1 Corrected		
N1 Decorrection		
N1 Actual		
Data Points		
(1)	Acceleration time to 95% EPR	
(2)	Deceleration Time to 1.075 EPR	

Test No. 11 - Acceleration and Deceleration Test
Figure 533 (Sheet 2)

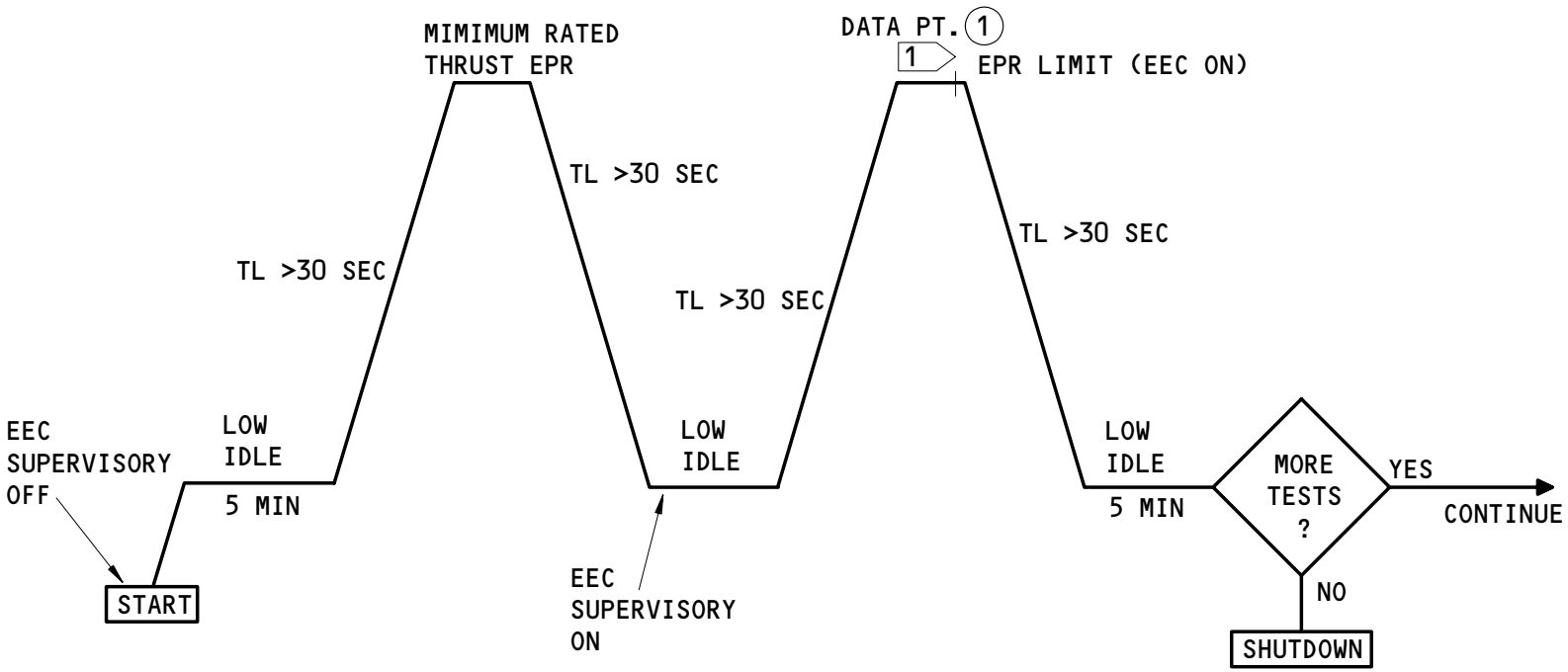
E39576



Test No. 12 - Thrust Reverser Test
Figure 534

TEST NO. 13	AIRPLANE NO.	
SHEET 1 OF 2	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.



Test No. 13 – Takeoff Power Test
Figure 535 (Sheet 1)

1 THRUST LEVER TO MAXIMUM FORWARD POSITION

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THETEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 13	AIRPLANE NO.	
SHEET 2 OF 2	ENGINE SERIAL NO.	
	DATE	

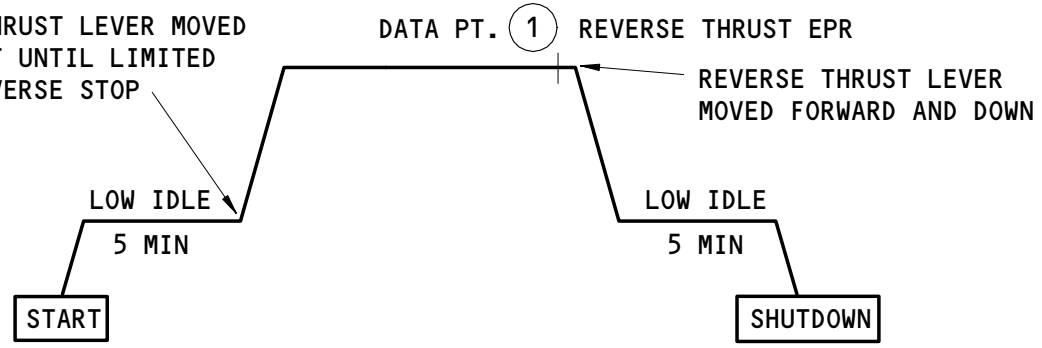
TEST NO. 13 - TAKEOFF POWER TEST		
Engine: L R		
Pressure Altitude		
Outside Air Temp.		
Min Rated Thrust EPR		
Data Point		
(1)	EPR Limit (EEC on)	
	EPR Difference	

Test No. 13 - Takeoff Power Test
Figure 535 (Sheet 2)

TEST NO. 15	AIRPLANE NO.	
	ENGINE SERIAL NO.	
	DATE	

CAUTION: THIS ENGINE RUN PROFILE IS AN AID TO THE POWER PLANT TEST. FIRST, READ THE TEST INSTRUCTIONS. SECOND, COMPARE THE INSTRUCTIONS WITH THE RELATED PART OF THE PROFILE BEFORE YOU DO THE TEST. OBEY THE TEST INSTRUCTIONS TO PREVENT POWER PLANT DAMAGE.

TEST NO. 15 – REVERSE POWER TEST		ENGINE: L R
Pressure Altitude		
EPR Min Limit		
EPR Max Limit		
Data Point		
(1)	Reverse Thrust EPR	



Test No. 15 – Reverse Power Test
Figure 536

POWER PLANT - INSPECTION/CHECK

1. General
   A. This procedure has these tasks:
      (1) Examine the power plant after a shock load.
      (2) Examine the power plant after a surge.
      (3) Examine the power plant after it has been stopped in flight.
      (4) Examine the Power Plants after a Dual Engine Failure Procedure.
      (5) Examine the power plant after contamination with volcanic ash.
      (6) Examine the power plant after it has been started in flight.
      (7) Examine the power plant after sand ingestion.

TASK 71-00-00-206-001-R00

2. Examine the Power Plant After Shock Load
   A. General
      (1) Shock load to a power plant or engine may occur when the engine is removed, installed, or moved.
      (2) The inspections that follow are to find if the power plant or engine can be used. The decision to keep the engine in use will depend on the type and cause of the damage. If engine damage is apparent, more work may be necessary and you should get repair instructions from Rolls-Royce.
   B. References
      (1) AMM 70-42-12/201, Engine Standard Practices
      (2) AMM 71-00-00/201, Powerplant
      (3) AMM 72-00-00/201, Engine
      (4) AMM 72-00-00/601, Engine
      (5) AMM 76-11-00/601, Engine Controls
      (6) AMM 79-00-00/601, Magnetic Chip Detectors
   C. Access
      (1) Location Zones
          410 No. 1 Power Plant (Left)
          420 No. 2 Power Plant (Right)

   D. Procedure

      S 216-002-R00
      (1) Examine the Power Plant Externally.
          (a) Examine the components that follow for general damage, cracks and distortion:
              1) Look for unwanted material, broken pieces, contamination, in the inlet cowl and the air intake.
              2) Make sure the air duct for the (air inlet) zone 1 cooling is not blocked.
              3) Use a spotlight and examine, as possible, the engine low pressure compressor (LPC).

4) Use a spotlight and examine, as possible, the intermediate pressure compressor (IPC).
5) Use a spotlight and examine, as possible, the low pressure turbine (LPT).
6) Examine the engine mounts and associated areas.
7) Examine the support structure of the LP compressor case and the outlet guide vanes.
8) Examine the LP compressor blades and the blade tips for evidence of foul with the attrition lining in the LP compressor case.
9) Examine the gas generator fairings.
10) Examine the LP compressor case and the gas generator cases and examine the bolted flanges.
11) Examine the mounting brackets and suspension links of the HS external gearbox.
12) Examine the gearbox drive and housing, the drive shaft and the shroud of the HS external gearbox.
13) Examine the accessory units, tubes and electrical harness that are mounted on the power plant.
    a) The crack test for the fuel and oil system units is recommended.
    b) If you think that damage may have been transmitted to the engine structure the unit is mounted on, it will be necessary to examine the engine more fully.
14) Make sure the engine controls move freely over the full range of movement and operate correctly (AMM 76-11-00/601).

(b) If the external inspection of the power plant shows no damage, do these steps:
1) Do the procedure to turn these engine rotor systems (AMM 72-00-00/201).
    a) The low pressure (LP) system.
    b) The intermediate pressure (IP) system.
    c) The high pressure (HP) system.
2) Make sure that each system turns freely and smoothly.
3) Listen for unusual noises which are an indication of internal damage.

S 216-003-R00

(2) Do this procedure: Inspection of the Engine (AMM 72-00-00/601).

S 216-004-R00

(3) Do a test of the engine (AMM 71-00-00/501).
(a) Listen for unusual noises which are an indication of distortion or parts that are not aligned.
(b) Examine the tubes and connectors that are mounted on the LP compressor case for leaks.
(c) Monitor the time for the engine to stop to make sure it is normal (AMM 71-00-00/201).

S 216-005-R00

(4) Do the procedure to examine the scavenge filter, magnetic chip detectors and scavenge strainers (AMM 79-00-00/601).

S 376-006-R00

(5) If the engine can be used; repair all the surface damage (AMM 70-42-12/201).

TASK 71-00-00-206-007-R00

3. Examine the Power Plant After A Surge

A. General

(1) All operations must be completed unless the engine is rejected at any stage in the inspection procedure.

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-00-00/601, Engine
(3) AMM 72-31-13/601, LP Compressor Rotor Blades
(4) AMM 79-00-00/601, Magnetic Chip Detectors

C. Access

(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

D. Procedure

S 216-010-R00

(1) Examine the LP compressor for damage (AMM 72-31-13/401).

S 216-011-R00

(2) Examine the exhaust components for metal particles.
  (a) Examine the exhaust transition case.
  (b) Examine the exhaust cone.
  (c) Examine the support assembly spokes of the LP turbine bearing.
    1) If you find metal particles and/or metal spatters on the exhaust components, it could be caused by a turbine failure.

S 296-039-R00

(3) Do an internal inspection of the H.P., I.P., and L.P. turbines first for signs of internal damage (AMM 72-00-00/601).
  (a) Examine the magnetic chip detectors (AMM 79-00-00/601).
  (b) Do an internal inspection (borescope) of the compressors and turbines (AMM 72-00-00/601).

S 296-040-R00

(4) Examine the I.P. and H.P. compressors for signs of internal damage (AMM 72-00-00/601).
  (a) Examine the H.P. compressor stages 1 to 6 blades.

NOTE: If you know or think that a bird strike occured before the engine surged, internal damage may have occured. It can cause the worst damage at the H.P. compressor stage 1 blades. Do an inspection of this first (AMM 72-00-00/601).

  (b) Examine the H.P. compressor rotor path liners stages 1 to 4 if the engine has had a high power surge.

NOTE: "High Power Surge" is defined as a surge at cruise power and above. Top of "Descent" deceleration surges are not induded.

  (c) Examine the I.P. compressor stages 1 to 6 blades.

S 296-041-R00

(5) Examine the H.P., I.P., and L.P. turbines for signs of internal damage (AMM 72-00-00/601).
  (a) After a known or suspected bird strike which goes into the gas generator system, do this step:
    1) Examine the heat-shields and metering panel of the front combustion liner for distortion and bowing (AMM 72-00-00/601).

TASK 71-00-00-206-015-R00

4. Examine the Power Plant After It Has Been Stopped In Flight

A. References
  (1) AMM 12-13-01/301, Engine - Servicing
  (2) AMM 29-11-05/401, Engine - Driven Pump
  (3) AMM 71-00-00/201, Powerplant
  (4) AMM 72-34-10/601, LP Compressor Case
  (5) AMM 79-00-00/601, Magnetic Chip Detectors

B. Access
  (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

C. Procedure

S 216-016-R00

(1) If the engine shutdown was done with the operation of fire handle (AMM 29-11-05/401).

S 216-017-R00

(2) The procedures that follow must only be done after the cause for the shutdown has been found and corrected.
   (a) Power plant was stopped 30 minutes or less, with or without the complete loss of oil pressure:
      1) Do an engine oil level check (AMM 12-13-01/301).
      2) If engine oil level is low, do the procedure to motor the engine for 30 seconds (AMM 71-00-00/201).
      3) Do an engine oil level check and add oil as necessary (AMM 12-13-01/301).
   (b) Power plant was stopped more than 30 minutes, without the complete loss of oil pressure.
      1) Do the LP compressor outlet guide vanes inspection (AMM 72-34-10/601).
      2) Do an inspection of the magnetic chip detectors (AMM 79-00-00/601).
      3) Do the procedure to motor the engine for 30 seconds (AMM 71-00-00/201).
      4) Do an engine oil level check and add oil as necessary (AMM 12-13-01/301).
   (c) Power plant was stopped more than 30 minutes, with the complete loss of oil pressure.
      1) Do an inspection of the LP compressor outlet guide vanes (AMM 72-34-10/601).
      2) Do an inspection of the magnetic chip detectors (AMM 79-00-00/601).
      3) Do the procedure to motor the engine for 30 seconds (AMM 71-00-00/201).
      4) Do an inspection of the magnetic chip detectors (AMM 79-00-00/601).
      5) Do an engine oil level check and add oil as necessary (AMM 12-13-01/301).
      6) Do the procedure to start the engine, operate the engine at idle power for 5 minutes, then stop the engine (AMM 71-00-00/201).
      7) Do the magnetic chip detectors and scavenge filter inspections (AMM 79-00-00/601).
         a) If the inspections are satisfactory, the engine can continue in use.
      8) Do the magnetic chip detectors inspection (AMM 79-00-00/601) in less than 10 hours, if possible after the next flight.

TASK 71-00-00-716-042-R00

5. Examine the Power Plants After a Dual Engine Failure Procedure

A. General

(1) This procedure is used when the flight crew did the Dual Engine Failure Procedure in the Flight Operations Manual.

B. Procedure

S 026-043-R00

(1) Replace the power plants and do a full shop inspection after a dual engine failure procedure.

TASK 71-00-00-206-018-R00

6. Examine the Power Plant After Contamination With Volcanic Ash

A. General

(1) The procedure that follows must be done on a power plant after contamination with volcanic ash. If the power plant is rejected during the inspection, do not do the steps that remain.

B. References

(1) AMM 71-00-00/501, Powerplant
(2) AMM 71-00-03/201, Power Plant (Preservation and Depreservation)
(3) AMM 72-00-00/601, Engine
(4) AMM 73-11-01/401, Low Pressure Fuel Pump
(5) AMM 73-11-03/401, High Pressure Fuel Pump
(6) AMM 73-11-10/401, Low Pressure Fuel Filter Element
(7) AMM 73-11-12/401, High Pressure Fuel Filter Element
(8) AMM 73-21-01/401, Fuel Flow Governor
(9) AMM 73-31-01/401, Fuel Flow Transmitter
(10) AMM 75-32-00/201, Compressor Bleed Control System
(11) AMM 76-11-00/601, Engine Controls
(12) AMM 79-00-00/601, Magnetic Chip Detectors
(13) AMM 79-11-00/301, Engine Oil Storage
(14) AMM 79-21-01/401, Fuel Filter Housing and Fuel-Cooled Oil Cooler

C. Access

(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

D. Procedure

S 286-019-R00

(1) Examine the Volcanic Ash Sample.

(a) Do an analysis of the ash sample for acidity and alkalinity.

NOTE: Rolls-Royce Product Support Department, Derby, will give you the method to make an analysis of the volcanic ash.

1) If the sample is not neutral, reject the power plant.
a) Do the power plant preservation procedure before the power plant is sent to be internally cleaned and repaired (AMM 71-00-03/201).

2) If the sample is neutral, continue the procedure.

S 216-020-R00

(2) Examine the EICAS computer to find if the engine operated at more than the permitted limits.

NOTE: If the engine operates at more than the permitted limits, the EICAS computer will make a record.

(a) Push the ENG EXCD display select switch on the EICAS maintenance panel P61.
(b) Look on the ENG EXCD page.
(c) If an exceedance record is shown, do the fault isolation for the parameter that had the exceedance (FIM 71-Fault Code Diagrams).

S 216-021-R00

(3) Examine the Engine Oil System.
(a) Examine the magnetic chip detectors (AMM 79-00-00/601).
(b) Examine the scavenge and pressure oil filter elements (AMM 79-00-00/601).
(c) If contamination of the engine oil is found, reject the engine.
(d) If no contamination of the engine oil system is found, do the Engine - Servicing (Oil Change) procedure (AMM 79-11-00/301).

S 216-022-R00

(4) Examine the Engine Fuel System.
(a) Remove the low pressure (LP) fuel filter element (AMM 73-11-10/401).
(b) Remove the high pressure (HP) fuel filter element (AMM 73-11-12/401).
(c) Examine the fuel filter elements for contamination.
1) If contamination is found in the LP and HP fuel filter elements, do these steps:
a) Flush the fuel system tubes.
b) Clean the fuel tanks (AMM 28-11-00/701).
c) Replace the LP fuel pump (AMM 73-11-01/401).
d) Replace the HP fuel pump (AMM 73-11-03/401).
e) Replace the fuel filter housing and the fuel cooled oil cooler (FCOC) (AMM 79-21-01/401).
f) Replace the fuel flow governor (FFG) (AMM 73-21-01/401).
g) Replace the fuel flow transmitter (AMM 73-31-01/401).
2) If contamination is not found in the fuel filter elements, continue the inspection.

S 746-023-R00

(5) Do the bleed valve control unit (BVCU) and transient pressure sensor unit (TPU) BITE procedure (FIM 75-32-00/101).

S 296-024-R00

(6) Examine the Engine Internally.

(a) Examine these engine components (AMM 72-00-00/601).

1) Examine the combustion section.

2) Examine the HP nozzle guide vanes.

3) Examine the HP turbine.

(b) If the components are not satisfactory, reject the engine.

(c) If the components are satisfactory, continue with the inspection.

NOTE: If the blockage of the airfoil film cooling holes (because of a build-up of fused deposits) is seen during the inspection, this can be permitted if the area is examined again after the engine operation on the ground.

S 216-025-R00

(7) Examine the HP compressor and the LP compressor (AMM 72-00-00/601).

S 716-026-R00

(8) Do a test of the engine.

(a) Do the Test No. 13 - Take Off Power procedure (AMM 71-00-00/501).

1) If Test No. 13 is not satisfactory, reject the engine.

(b) Replace the LP fuel filter element (AMM 73-11-10/401).

(c) Replace the HP fuel filter element (AMM 73-11-12/401).

S 216-027-R00

(9) Do the procedure to examine these engine oil system components for contamination (AMM 79-00-00/601).

(a) The magnetic chip detectors.

(b) The scavenge and pressure oil filter elements.

(c) If the magnetic chip detectors and oil filter elements are satisfactory, you can use the engine.

TASK 71-00-00-206-029-R00

7. Examine The Power Plant After It Has Been Started In Flight

A. References

(1) AMM 72-00-00/601, Engine

B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

C. Procedure

S 296-030-R00
(1) Do the inspection of all stages of the HP compressor (AMM 72-00-00/601).

NOTE: Some operators may complete a schedule relight test (intentional engine shutdown and relight) in flight as part of their maintenance programs. This inspection is not necessary if the steps below have been followed when the schedule relight test was done.

(a) To keep the deterioration of the engine to a minimum when a schedule relight test is done, the engine should be operated at idle for five minutes before shutdown.
(b) After relight, the engine should be operated at idle for five minutes before the power is increased.

TASK 71-00-00-716-046-R00

8. Power Plant After Sand Ingestion - Inspection
A. General
(1) This task contains the steps to examine the power plant after sand is ingested.
B. References
(1) AMM 71-00-00/501, Power Plant
(2) AMM 71-11-01/601, Nose Cowl
(3) AMM 72-00-00/601, Engine
(4) AMM 72-34-10/601, LP Compressor Case
(5) AMM 72-35-01/601, LP Compressor Spinner
(6) AMM 72-31-13/601, LP Compressor Rotor Blades
(7) AMM 78-31-00/201, Thrust Reverser
(8) AMM 79-00-00/601, Oil
C. Procedure

S 226-047-R00

WARNING: DO THE DEACTIVATION PROCEDURE OF THE THRUST REVERSER SYSTEM, WHICH MUST INCLUDE THE INSTALLATION OF LOCKBARS (OR BLOCKERS), TO PREVENT THE ACCIDENTAL OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure of the thrust reverser system in the forward thrust position for ground maintenance (AMM 78-31-00/201).

S 226-048-R00
(2) Examine the EICAS computer to find if the engine operated at more than the permitted limits.
(a) Push the ENG EXCD display select switch on the EICAS maintenance panel, P61.
(b) Look on the ENG EXCD page.
(c) If an exceedance record is shown, do the fault isolation procedure for the parameter that had the exceedance (FIM-Fault Code Diagrams).

S 226-049-R00
(3) Examine the magnetic chip detectors and the oil filter elements (AMM 79-00-00/601).
(a) If the magnetic chip detectors or the oil filter elements are not satisfactory, reject the engine.

S 226-050-R00
(4) Examine the lip skin of the nose cowl (AMM 71-11-01/601).

S 226-051-R00
(5) Examine the P1 probe.
(a) Make sure the hole in the P1 probe is not blocked.

S 226-052-R00
(6) Examine the LP Compressor Case (AMM 72-34-10/601).

S 226-053-R00
(7) Examine the LP Compressor Spinner (AMM 72-35-01/601).

S 226-054-R00
(8) Examine the LP Compressor Blades (AMM 72-31-13/601).

S 226-055-R00
(9) Examine the LP Compressor (AMM 72-00-00/601).

S 226-056-R00
(10) Examine the HP Compressor (AMM 72-00-00/601).

S 226-057-R00
(11) Examine the combustion section (AMM 72-00-00/601).

S 226-058-R00
(12) Examine HP nozzle guide vanes (AMM 72-00-00/601).

S 226-059-R00
(13) Examine the HP turbine blades (AMM 72-00-00/601).

S 226-060-R00
(14) If you see damage on the HP turbine blades, examine the IP turbine blades (AMM 72-00-00/601).

S 226-061-R00
(15) If you see damage on the HP turbine blades, examine the LP turbine blades (AMM 72-00-00/601).

S 086-067-R00
(16) Remove the access platform and protective pads.

S 226-062-R00
(17) Do the activation procedure for the thrust reverser system (AMM 78-31-00/201).

S 216-063-R00
(18) Do Test 3 - IP Compressor Airflow and Control Test (AMM 71-00-00/501).
  (a) If Test 3 is not satisfactory, refer to FIM 71-Fault Code Diagrams to identify the applicable fault code.
  (b) Do the applicable fault isolation.

S 216-064-R00
(19) Do Test 11 - Acceleration and Deceleration Test (AMM 71-00-00/501).
  (a) If Test 11 is not satisfactory, refer to FIM 71-Fault Code Diagrams to identify the applicable fault code.
  (b) Do the applicable fault isolation.

S 216-065-R00
(20) Do Test 13 - Take-off Power Test (AMM 71-00-00/501).
  (a) If Test 13 is not satisfactory, reject the engine.

S 216-066-R00
(21) Examine the magnetic chip detectors and the oil filter elements (AMM 79-00-00/601).
  (a) If the magnetic chip detectors and the oil filter elements are satisfactory, the engine is serviceable.
  (b) If the magnetic chip detectors or the oil filter elements are not satisfactory, reject the engine.

POWER PLANT - REMOVAL/INSTALLATION

1. General
   A. You must do the tasks given below in sequence when you remove or install an engine:

Paragraph Number	Title
2	Prepare The Airplane for the Removal of the Power Plant
3	Power Plant Removal - Bootstrap Method
4	Power Plant Installation - Bootstrap Method
5	Power Plant Removal - Single Point Sling Method
6	Power Plant Installation - Single Point Sling Method
7	Put the Airplane Back In Its Usual Condition

   B. You must use platforms and stands when you get access to the disconnect points.
      (1) Almost all the disconnect points are approximately 12 1/2-13 feet above the ground.
   C. The engine, when it is removed from the airplane, weighs approximately 9,620 pounds. When you lift the engine, you must also add the weight of all ground support equipment which is lifted with the engine. This weight can change with the type of equipment you use.
   D. Make sure you do not use too much force to lift the power plant when it is engaged with the strut.
      (1) You must use load cells when you use the bootstrap hoisting equipment.
      (2) Make sure you monitor the load cells during the procedure.
      (3) If you use a force which is more than the specified load, you must make an inspection as follows:
         (a) Examine the fittings of the front and rear engine mounts.
            1) Look for chips, nicks, gouges, and other damage.
         (b) Examine the structure of the strut in the area of the engine mounts.
            1) Look for fasteners which are loose and other damage.

(c) You must use the 757 Overhaul Manual of the 757 Structural Repair Manual to repair the damage you find.

E. The strut-mounted bootstrap components use a lever hoist at each of the four support posts. You can adjust the pitch and the roll of the engine with the lever hoists when it is held by the bootstrap. To adjust the pitch, lift or lower the two front or the rear hoists together. To adjust the roll, lift or lower the aft outboard hoist.

F. When you use the bootstrap components, the airplane must be level to ±3 degrees in the pitch and the roll attitudes (AMM 8-21-00/201).

G. Before you remove the power plant, make sure the center of gravity (C.G.) for the airplane will stay in the safe limits. Refer to 10-11-04/201, Parking With Engines Removed.

H. The electrical power must be off when you connect and disconnect the fuel, hydraulic, and electrical lines to the strut.

I. During the power plant removal or installation, you must seal all openings with approved caps.

J. During the power plant removal, you must cap all tube ends, ducts and electrical connectors as soon as possible after they are disconnected.

K. During the power plant installation, do not remove the caps until they are connected. You must use external caps; not internal plugs.

L. When you remove or disconnect an engine, is it not possible to get the maintenance pages on the EICAS display. To keep access to the maintenance pages, you must connect a jumper wire between the pins 10 and 4 of the connectors which follow.
(1) For the left engine D1108J, AS1080 Connector No. 4
(2) For the right engine D1208J, AS2080 Connector No. 4

M. They are found on the firewall where the engine was disconnected. This jumper must have a streamer to which is attached a note which tells you to remove the jumper before you connect of install the engine.

N. When you operate the engine, the airflow moves unwanted objects into the engine. It is important that the power plant (the engine compartment and the inner nose cowl) and the adjacent work area is clean before you operate the engine.

O. Make sure you do the removal and installation of the power plant during noise conditions that make it easy to hear commands from the lead mechanic.

P. Use the procedures given in (AMM 70-02-01/201) for identification, lubricant, and installation of rubber seal rings.
Q. Use the procedures given in (AMM 70-50-02/201) for connection of electrical plugs.
R. Use the procedures given in (AMM 70-51-00/201) to tighten fasteners. Tighten the fasteners to the torque values given in (AMM 70-51-00/201) unless a torque value is specified in this procedure.

Prepare the Airplane for the Removal of the Power Plant

TASK 71-00-02-844-001-R00

2. Prepare the Airplane for the Removal of the Power Plant

A. General

(1) The list of equipment given below is for the preparation of the power plant for removal. The list of equipment for the bootstrap method and the single point sling method are given in each task.

B. Equipment

(1) C-Duct Safety Rod - B71025-9 (Optional to C-Duct Actuator Lock B71009-9 or optional to Thrust Reverser Hold-Open Equipment B71006-79)

(2) Thrust Reverser and C-Duct Hold Open Equipment - B71006-79 (Optional to B71009-9 and B71025-9)

(3) Hand Pump, T/R Hydraulic - B54001-11 (Part of Flyaway Kit)

(4) Container (for fuel), 5-gallon capacity - commercially availiable

(5) Container (for hydraulic fluid), 1-gallon capacity - commercially availiable

(6) Protective pad (carpet) - 2 foot square, 2 required (AMM 20-30-07/201)

C. Consumable Materials

(1) Packing, TAI pressure regulating valve, HU33538/1

D. References

(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Panels and Doors

(2) AMM 08-21-00/201, Leveling

(3) AMM 10-11-04/201, Parking With Engines Removed

(4) AMM 12-12-01/301, Hydraulic Systems

(5) AMM 12-25-01/301, Airplance Servicing

(6) AMM 20-41-00/201, Grounding

(7) AMM 24-22-00/201, Electrical Power - Control

(8) AMM 27-81-00/201, Leading Edge Slat System

(9) AMM 29-11-00/201, Main Hydraulic Systems

(10) AMM 54-52-01/401, Strut Fairings

Prepare the Airplane for the Removal of the Power Plant

(11) AMM 71-00-00/201, Power Plant
(12) AMM 71-11-04/401, Fan Cowl Panels
(13) AMM 71-11-07/401, Strut to Common Nozzle Fairing Seal
(14) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

210	Control Cabin
413/423	Fan Cowl Panels, Left
414/424	Fan Cowl Panels, Right
415/425	Thrust Reverser, Left
416/426	Thrust Reverser, Right
431/441	Nacelle Strut - Forward Fairing

(2) Access Panels

431AL/441AL	Nacelle Strut Forward Fairing

F. Prepare The Airplane for the Removal of the Power Plant

S 584-005-R00
(1) Ground the airplane to an approved grounding lug (AMM 20-41-00/201).

S 584-443-R00
(2) Make sure that the airplane is at zero +/- 3 degree pitch (nose down) and zero +/- 3 degree roll (AMM 8-21-00/201).

S 944-430-R00

CAUTION: MAKE SURE THE CENTER OF GRAVITY (C.G.) LIMITS FOR THE AIRPLANE ARE CORRECT. IF THE C.G. IS NOT CORRECT WHEN THE POWER PLANT IS REMOVED, DAMAGE TO THE AIRPLANE (TAIL) CAN OCCUR.

(3) Make sure the center of gravity (C.G.) for the airplane will stay in the safe limits (AMM 10-11-04/201).

S 864-007-R00
(4) Make sure the forward thrust levers are in the idle stop position.
(a) Attach a DO-NOT-OPERATE tag to the thrust levers.

Prepare the Airplane for the Removal of the Power Plant

S 044-008-R00

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

(5) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201) (Fig. 403).

S 014-009-R00

(6) Open the access panels (AMM 6-43-00/201).

S 864-010-R00

(7) Supply the electrical power (AMM 24-22-00/201).

S 864-011-R00

(8) On the engine to be removed, decrease the pressure of the hydraulic system (AMM 29-11-00/201).

S 864-012-R00

WARNING: MAKE SURE THE SPAR FUEL VALVE IS CLOSED. IF THE SPAR FUEL VALVE IS NOT CLOSED, FUEL COULD FLOW FROM THE WING TANKS AND CAUSE A FIRE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(9) Do these steps to make sure the left (right) valve for the engine fuel cutoff and the left (right) spar fuel valve are closed:
   (a) Make sure that the left (right) FUEL CONTROL switch on the control stand is in the CUTOFF position.
      1) Attach a DO-NOT-OPERATE tag.
   (b) Make sure the left (right) ENG VALVE and SPAR VALVE panel lights on the control stand are not on.
   (c) For the left engine, open these circuit breakers and attach a DO-NOT-CLOSE tag:
      1) P6 Main Power Distribution Panel
         a) 6C1, FUEL COND CONT L
         b) 6E1, FUEL VALVES L SPAR
   (d) For the right engine, open these circuit breaker and attach a DO-NOT-CLOSE tag:
      1) P6 Main Power Distribution Panel
         a) 6C2, FUEL COND CONT R
         b) 6E2, FUEL VALVES R SPAR
   (e) Close the left (right) shutoff valve for the hydraulic supply of the engine driven pump (EDP).

Prepare the Airplane for the Removal of the Power Plant

(f) For the left engine, open these circuit breakers and attach a DO-NOT-CLOSE tag:
  1) P6 Main Power Distribution Panel
    a) 6H1, FIRE EXTINGUISHING ENG L BTL 1
    b) 6H2, FIRE EXTINGUISHING ENG L BTL 2
  2) P11 Overhead Circuit Breaker Panel
    a) 11J26, FIRE DET ALTN PWR L ENGINE
    b) 11B20, FIRE DETECTION L ENGINE 1
    c) 11B21, FIRE DETECTION L ENGINE 2

(g) For the right engine, open these circuit breakers and attach a DO-NOT-CLOSE tag:
  1) P6 Main Power Distribution Panel
    a) 6H3, FIRE EXTINGUISHING ENG R BTL 1
    b) 6H4, FIRE EXTINGUISHING ENG R BTL 2
  2) P11 Overhead Circuit Breaker Panel
    a) 11J27, FIRE DET ALTN PWR ENGINE R
    b) 11B22, FIRE DETECTION R ENGINE 1
    c) 11B23, FIRE DETECTION R ENGINE 2

(h) Push and hold the manual override switch on the bottom of the left (right) fire handle.

(i) Pull up on the left (right) fire handle and attach a DO-NOT-OPERATE tag to the fire handle.

NOTE: Do not turn the fire handle.

(j) Make sure the left (right) position indicator for the shutoff valve for the EDP hydraulic supply has moved to the closed position.

NOTE: The position indicator is on the EDP shutoff valve in the strut hydraulic bay.

S 864-013-R00

WARNING: USE THE PROCEDURE IN AMM 27-81-00/201 WHEN YOU REMOVE THE LOCK. THE SLATS RETRACT IN APPROXIMATELY 7 SECONDS AND CAN CAUSE INJURIES TO PERSONS.

(10) If they are extended, retract the leading edge slats (AMM 27-81-00/201).

Prepare the Airplane for the Removal of the Power Plant

S 044-014-R00

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE WHEN YOU DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS CAN OCCUR.

(11) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).

S 014-015-R00

(12) Remove the access panels 431AL (441AL) (AMM 54-52-01/401).

NOTE: The bulb seals below the forward fairing are a tight fit. A soft mallet can be used to lightly hit the end of the fairing to move it forward.

S 014-016-R00

(13) Remove the fan cowl panels (AMM 71-11-04/401).

S 014-017-R00

(14) Remove the left (right) flex fairings (AMM 54-52-01/401).

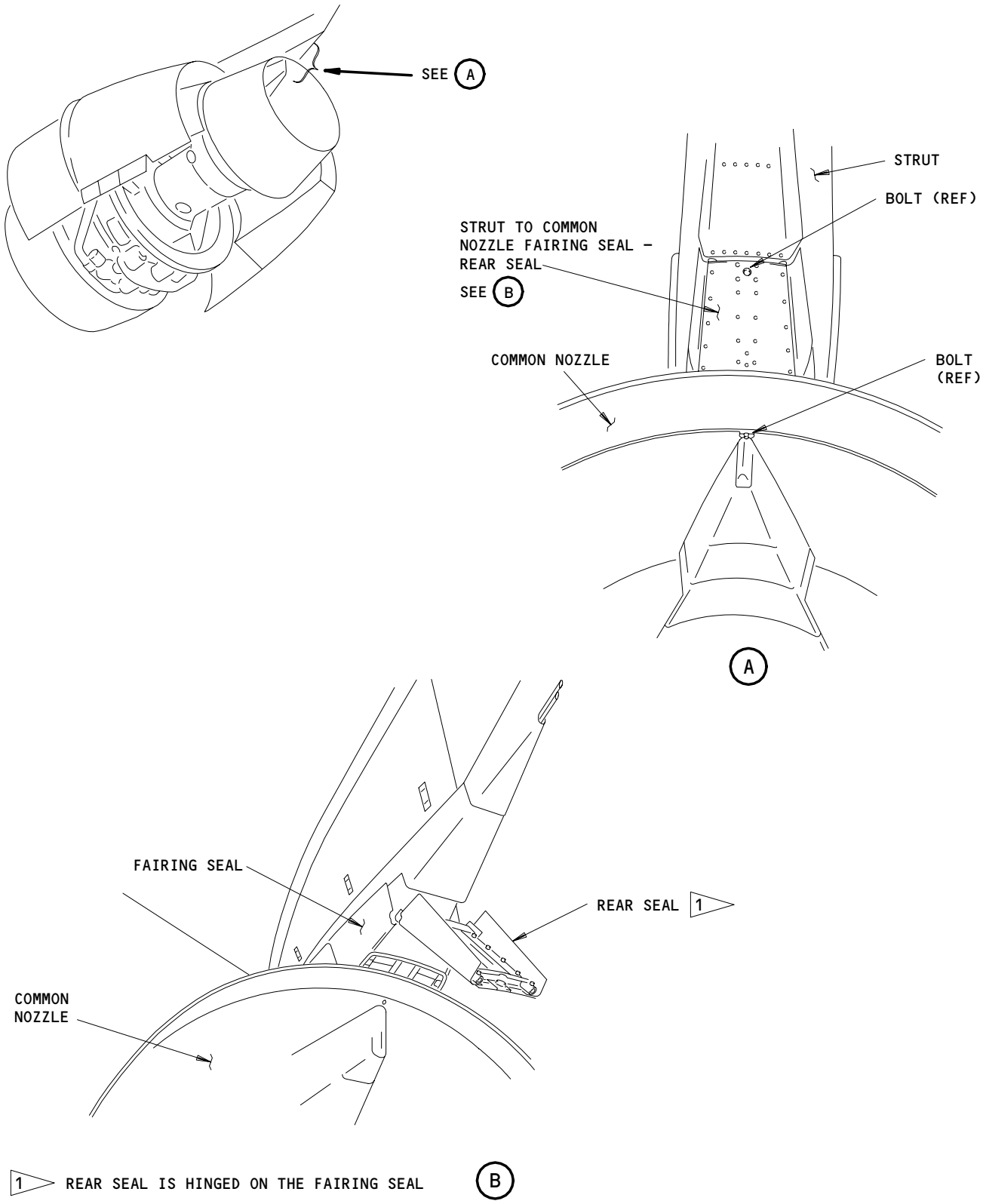
S 014-020-R00

(15) Remove the seal between the strut and the common nozzle fairing (AMM 71-11-07/401) (Fig. 401).

S 014-021-R00

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

(16) Open the left (right) thrust reversers (AMM 78-31-00/201).



Strut Seal Installation
Figure 401

Prepare the Airplane for the Removal of the Power Plant

S 494-022-R00

(17) Install the actuator locks B71009 for the thrust reverser (Fig. 402).
  (a) Loosen the wingnut and open the lock sleeve.
  (b) Open the warning streamer.
  (c) Use the hand pump to pressurize the opening actuator and fully open the thrust reverser.
  (d) When the thrust reversers are fully open, the hold-open rods will disengage from the attach point on the engine.
  (e) Retract and lock the hold-open rods.
  (f) Put the lock around the piston rod of the opening actuator. Close the lock sleeve and tighten the wingnut.
  (g) Remove the hydraulic pressure at the hand pump and let the lock hold the weight of the thrust reverser.

S 494-023-R00

(18) If the actuator locks B71009 for the thrust reverser are not available, install the safety rod B71025 as follows:
  (a) Install the safety rod on the lower end of the left and right actuator rods.

    NOTE: Make sure the thicker side of the rod faces forward.

  (b) Push the tightener in from the rear.

S 494-172-R00

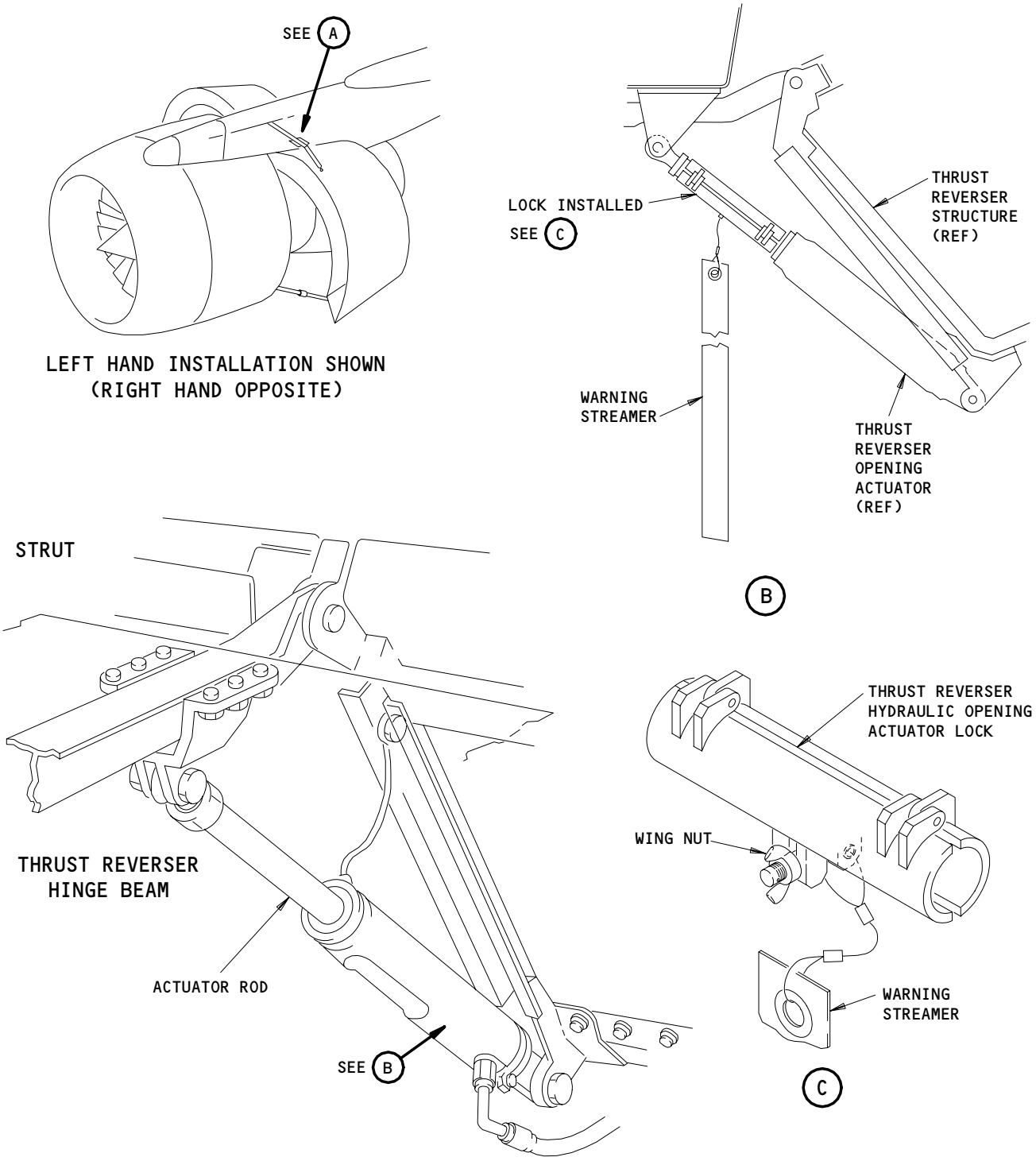
(19) If the actuator locks B71009 or the safety rod B71025 for the thrust reverser are not available, the thrust reverser hold-open equipment B71006 can be installed when the bootstrap equipment B71001 is installed.

S 494-024-R00

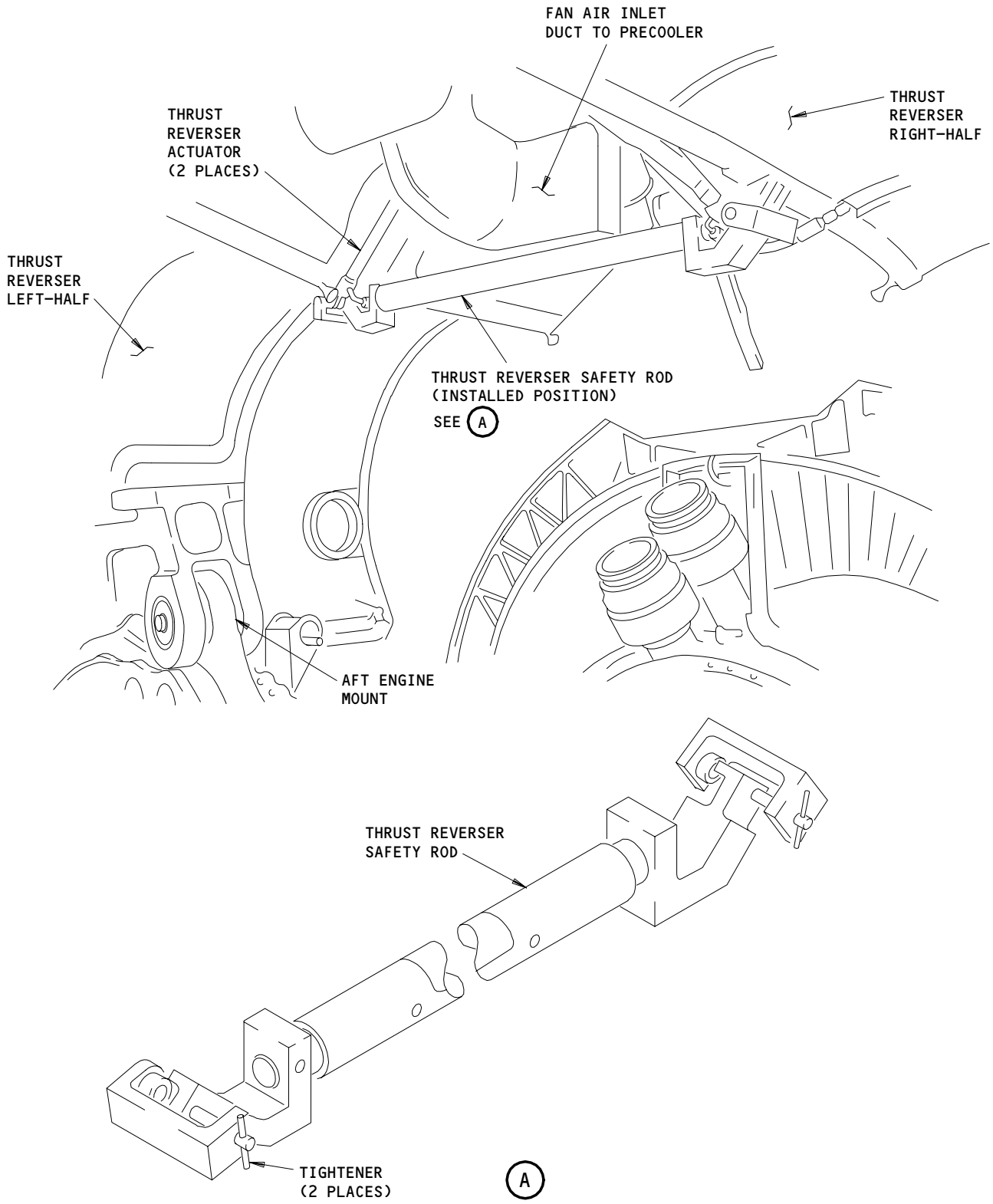
CAUTION: MAKE SURE YOU INSTALL THE PINS IN THE HINGE SUPPORTS BEFORE YOU REMOVE THE ENGINE. IF THE PINS ARE NOT INSTALLED, YOU COULD PUT TOO MUCH LOAD ON THE THRUST REVERSER HINGES. THIS CAN CAUSE DAMAGE TO THE HINGES. MAKE SURE YOU KEEP THE PINS INSTALLED IN THE HINGE SUPPORTS UNTIL THE ENGINE IS INSTALLED.

(20) Install the ball lockpins and the streamers in the hinge beam support on the thrust reverser (Fig. 403A).

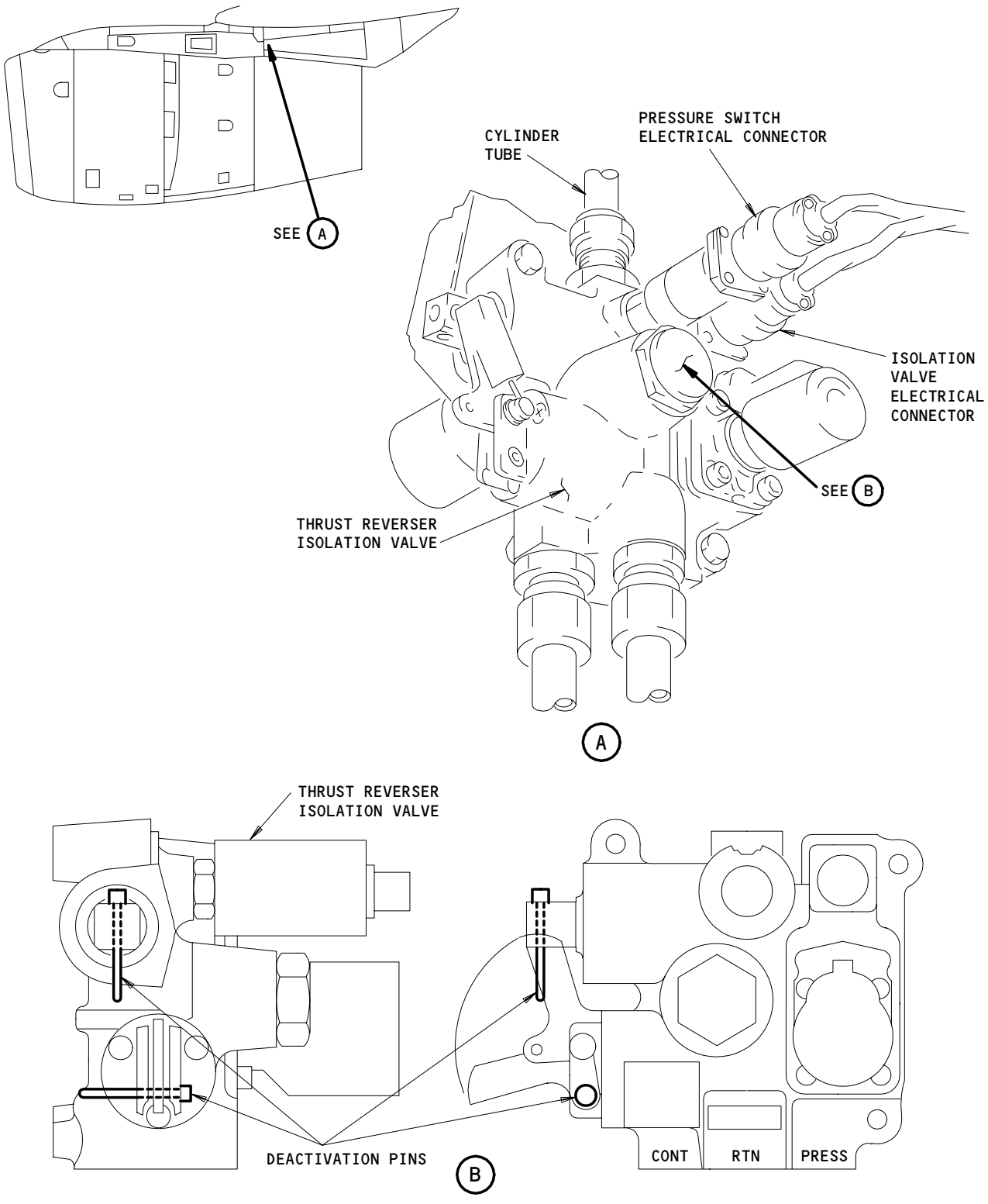
  NOTE: It could be necessary to lightly move the thrust reversers from side to side until you can align the holes.



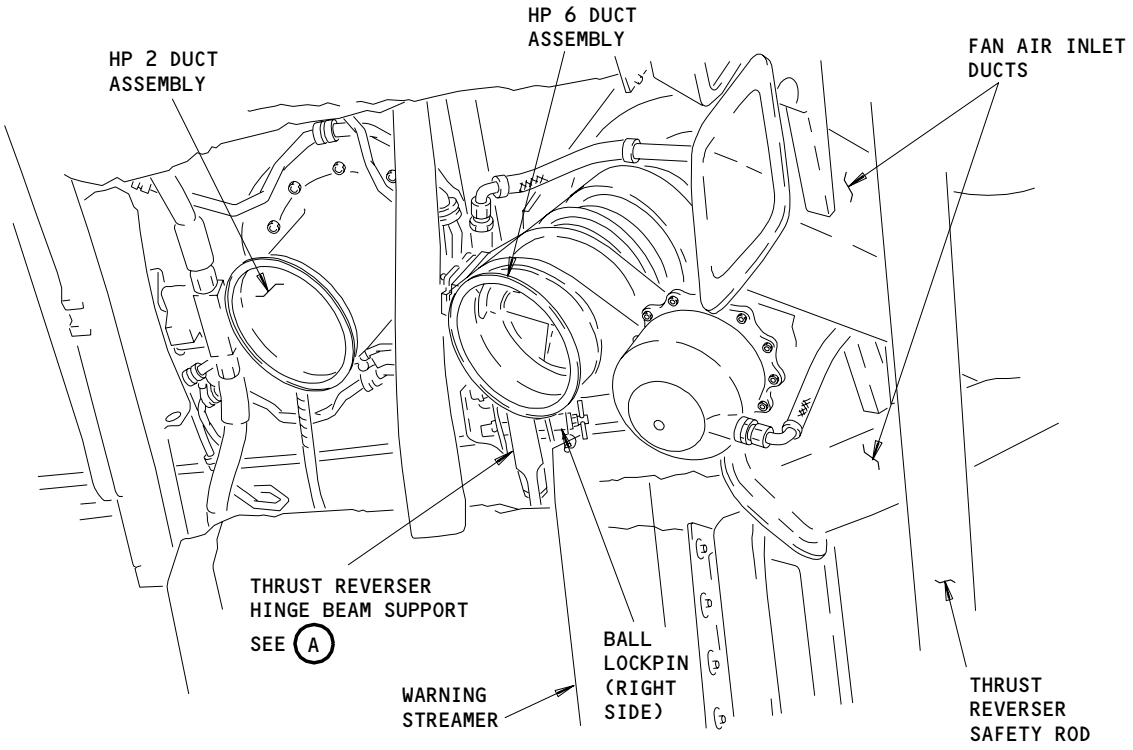
Thrust Reverser Hydraulic Opening Actuator Lock Installation
Figure 402



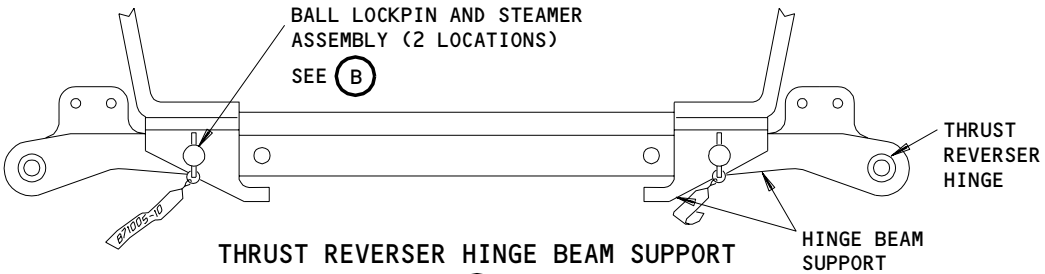
Thrust Reverser Safety Rod Installation
Figure 402A



Thrust Reverser Isolation Valve Deactivation Pins Installation
Figure 403

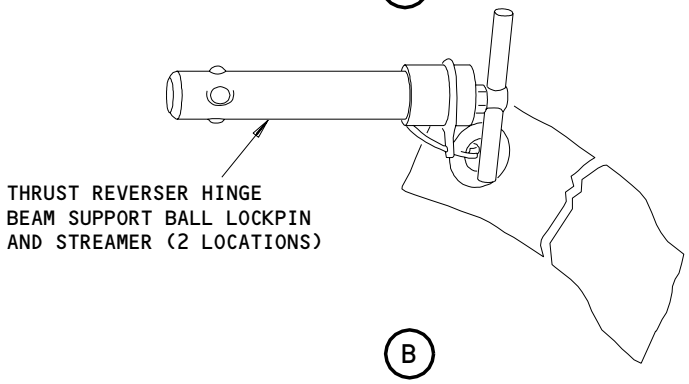


THRUST REVERSER HINGE BEAM SUPPORT LOCATION



THRUST REVERSER HINGE BEAM SUPPORT

A



B

Thrust Reverser Hinge Beam Support Lockpin Installation
Figure 403A

Prepare the Airplane for the Removal of the Power Plant

S 844-025-R00

(21) Do these steps to prepare the engine for the removal:

CAUTION: DO NOT STAND OR PULL ON THE THERMAL ANTI-ICE DUCT ON THE INLET COWL OR THE STARTER AIR DUCT. DAMAGE TO THE DUCTS COULD OCCUR.

(a) Remove the V-clamps (3 and 4) to disconnect the thermal anti-ice duct of the inlet cowl and the starter air duct (Fig. 404).

(b) Install the packing piece (HU33538/1) to the pressure regulating valve of the anti-icing system.

NOTE: Make sure the packing is installed between the pressure regulating valve and the engine fan case.

WARNING: DO NOT DISCONNECT THE FUEL, HYDRAULIC, OR ELECTRICAL LINES WHEN THE ELECTRICAL POWER IS ON. ACCIDENTAL PRESSURIZATION OF THE FUEL OR HYDRAULIC FLUIDS, ENERGIZIED ELECTRICAL CIRCUITS, OR A FIRE CAN CAUSE INJURIES TO YOU AND DAMAGE TO EQUIPMENT.

(c) Remove the electrical power (AMM 24-22-00/201).

(d) Do these steps to drain the low pressure (L.P.) fuel system (Fig. 405):

1) Disconnect the drain tube on the main fuel line adjacent to the low pressure fuel pump.

NOTE: Put a container below the drain tube to catch the leakage.

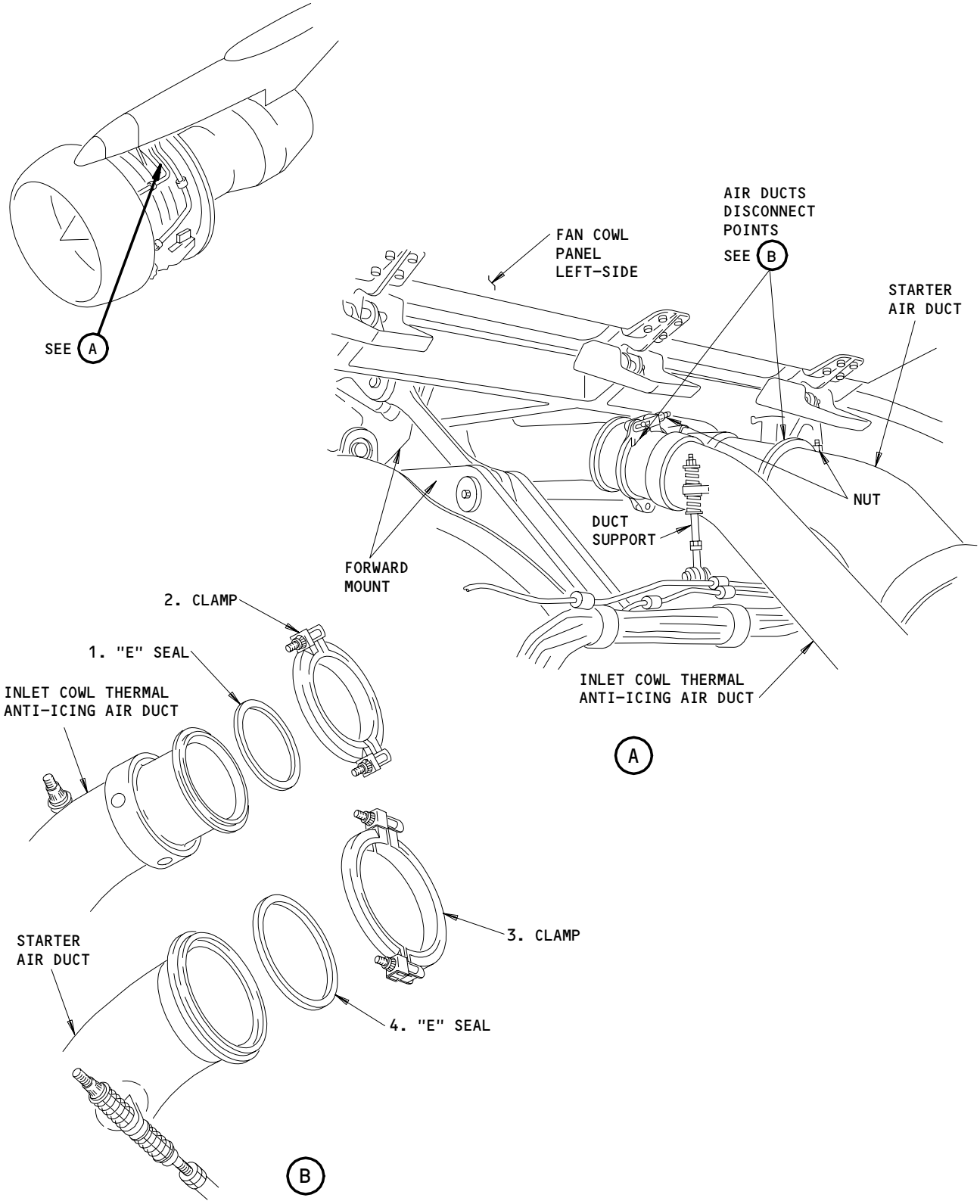
2) Remove the bolts (1) which attach the supply line for the main engine fuel to the strut fuel connection.

3) Remove the seal (3).

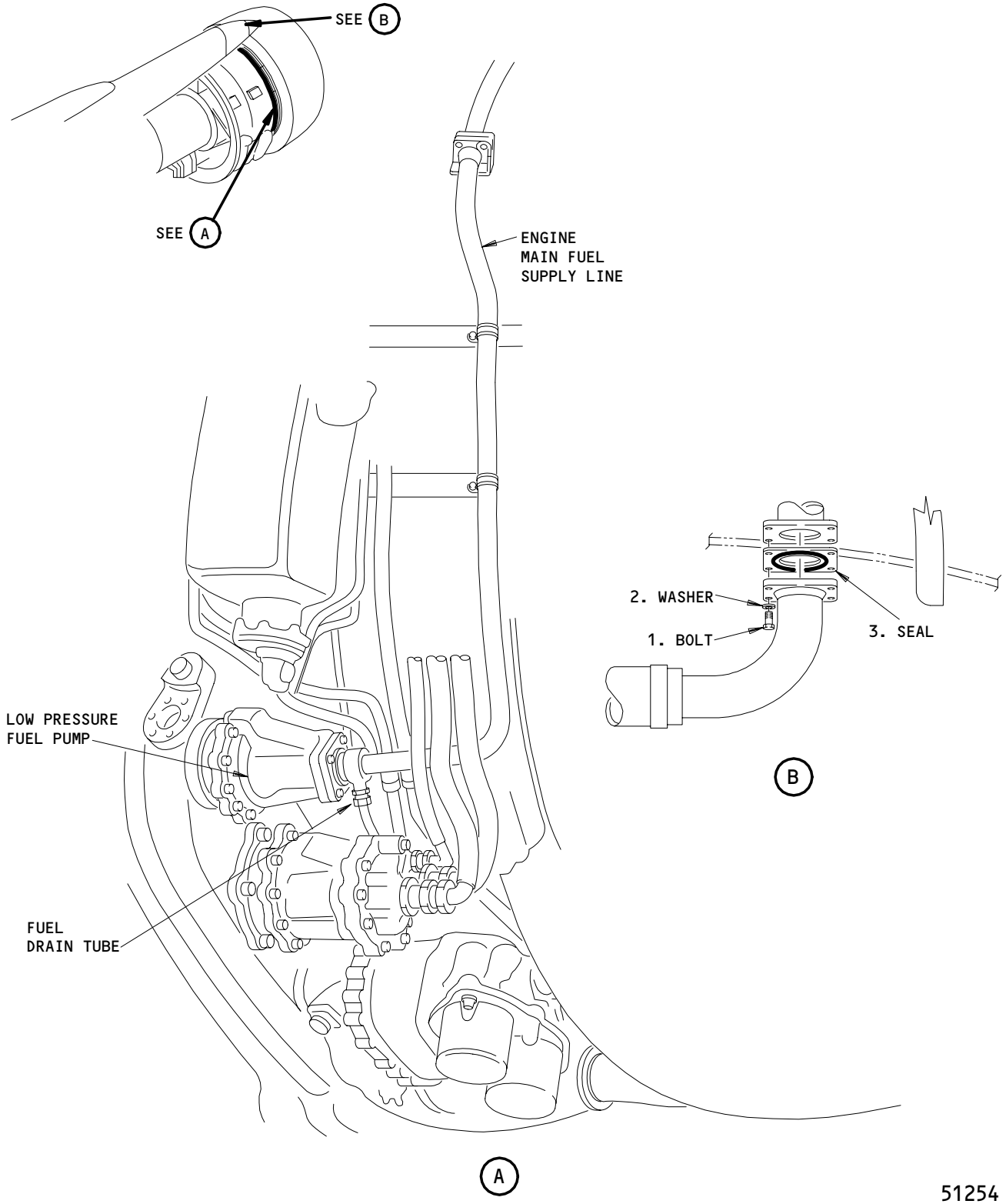
CAUTION: PUT CAPS ON THE SUPPLY LINE FOR THE MAIN ENGINE FUEL AND THE STRUT FUEL LINE. CONTAMINATION OF THE FUEL SUPPLY LINES COULD OCCUR IF YOU DO NOT PUT CAPS ON THE FUEL LINES.

4) Install the caps on the engine and the strut fuel lines.

5) Connect the drain tube on the L.P. fuel line.



Thermal Anti-Ice and Starter Air Ducts Disconnect Points
Figure 404



Engine Main Fuel Supply Line Connection
Figure 405

Prepare the Airplane for the Removal of the Power Plant

6) Tighten the tube nut and apply a lockwire.

CAUTION: BE CAREFUL WITH THE HYDRAULIC SUPPLY LINE. DO NOT WIND IT INTO A TIGHT COIL. HOSE KINKS CAN DECREASE THE SUPPLY OF THE HYDRAULIC FLUID AND CAUSE FAILURE OF THE ENGINE DRIVEN PUMP.

PUT CAPS ON THE HYDRAULIC LINES. CONTAMINATION OF THE HYDRAULIC LINES AND LEAKAGE OF HYDRAULIC FLUID COULD OCCUR.

CLEAN ALL THE HYDRAULIC FLUID LEAKAGE.

(e) Do these steps to disconnect the hydraulic lines (Fig. 406):

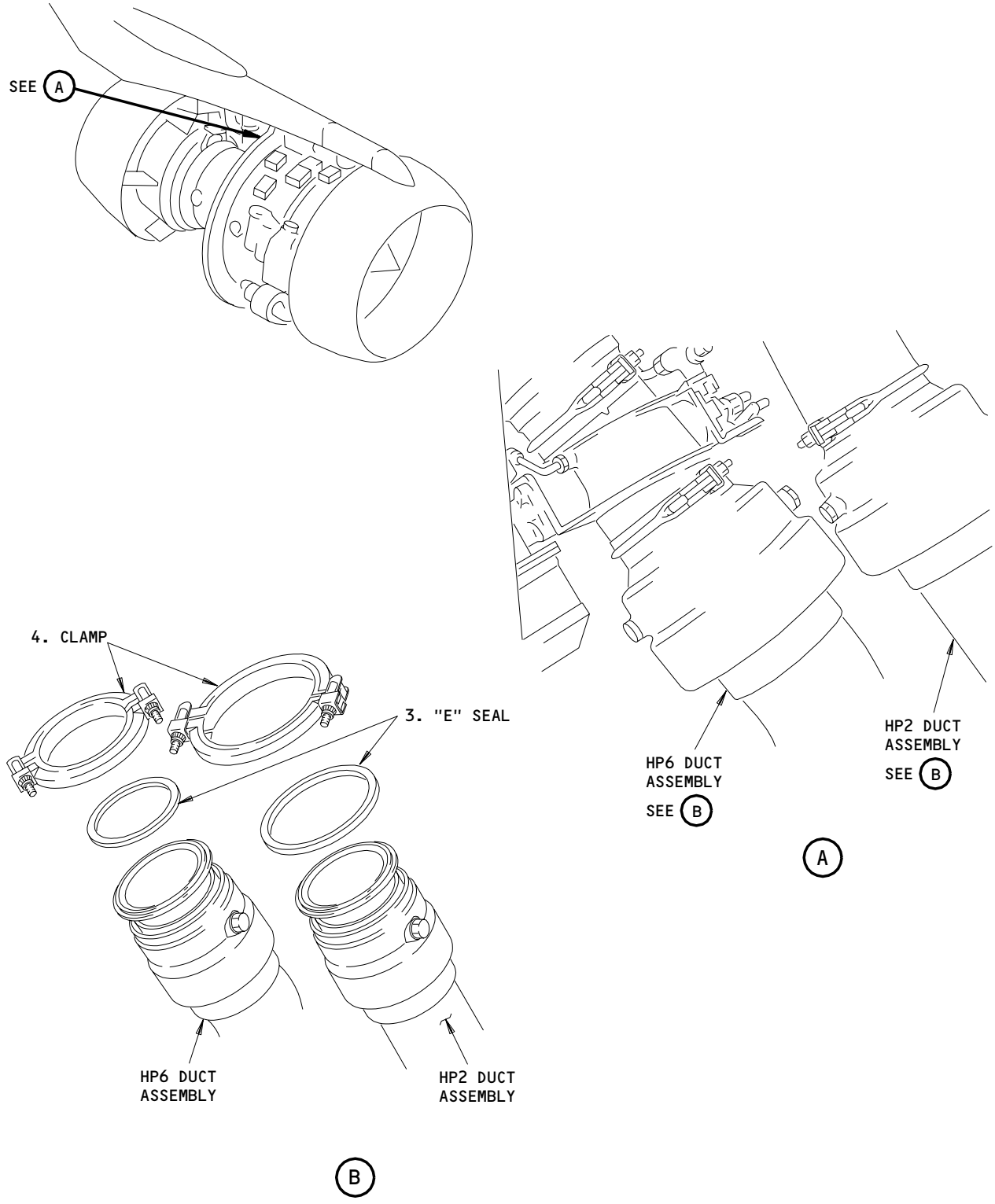
NOTE: When you disconnect the hydraulic lines, make sure you put a protective end cap on the line and the mating connector.

1) Disconnect the inlet hose for the hydraulic supply and let the fluid drain in an applicable container.
2) Disconnect the outlet pressure for the hydraulic pressure.
3) Disconnect the case drain hose for the hydraulic pump.

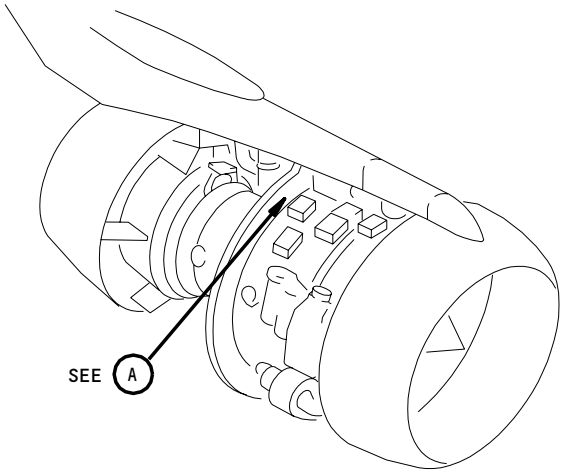
CAUTION: WHEN YOU DISCONNECT THE ELECTRICAL PLUGS AND RECEPTACLES, INSTALL CAPS TO PREVENT CONTAMINATION BY WATER OR ACCIDENTAL DAMAGE BY PERSONS. DAMAGE TO EQUIPMENT CAN OCCUR.

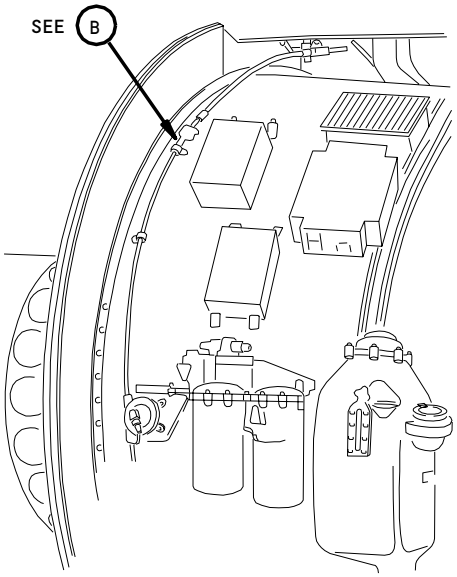
(f) Do these steps to disconnect the electrical plugs (Fig. 407A):

NOTE: When you disconnect the electrical connectors, make sure you put a protective end cap on the line and the mating connector.



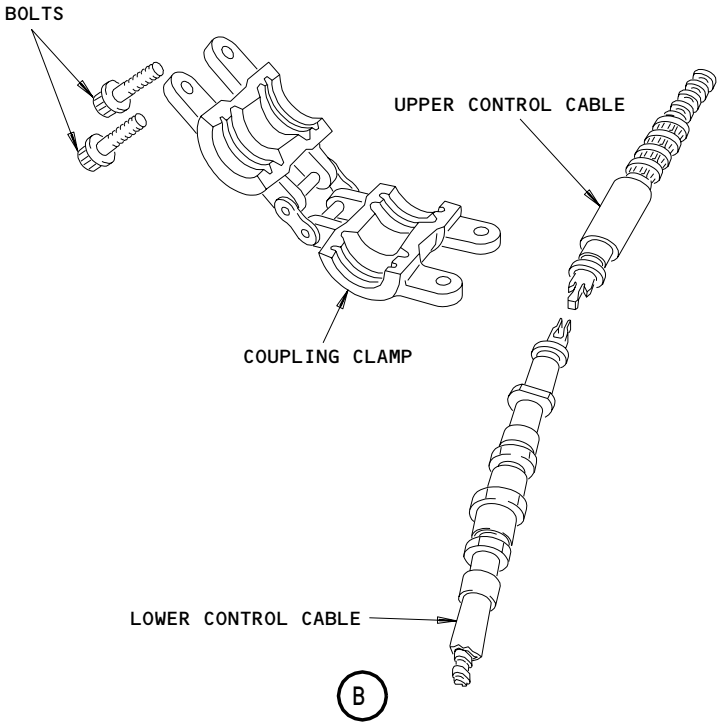
HP2 and HP6 Duct Assembly Disconnect Points
Figure 406





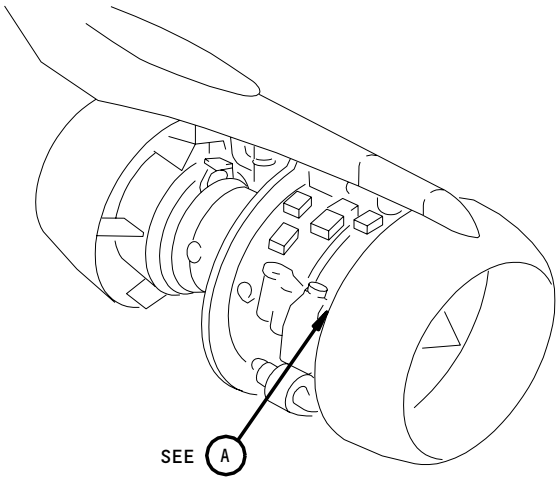
THROTTLE CONTROL DISCONNECT
(ARROWHEAD DISCONNECT/MICROADJUSTER)

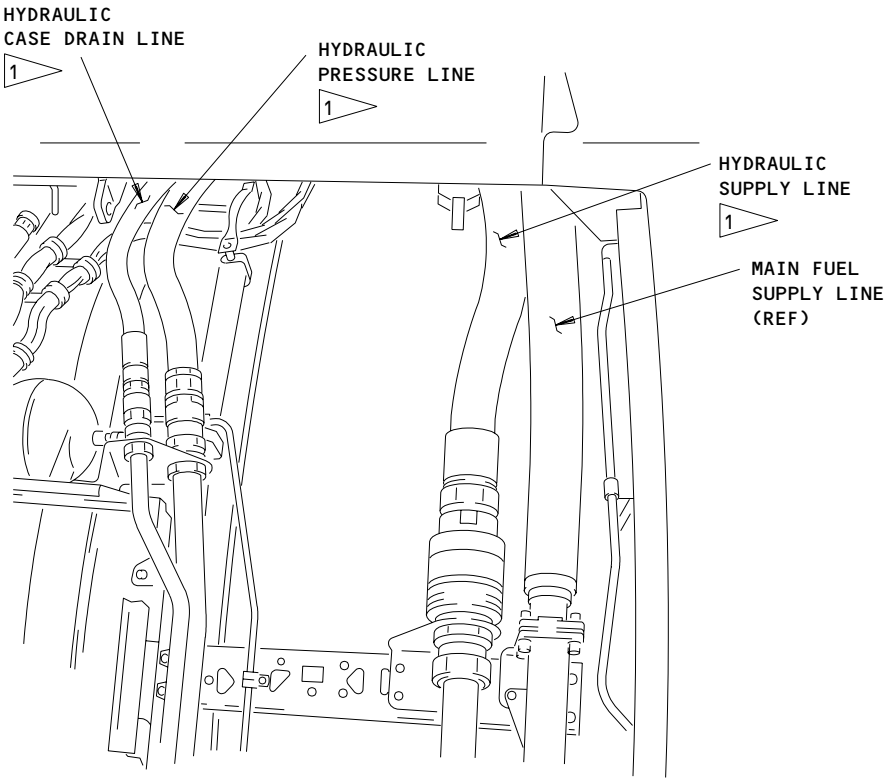
A



B

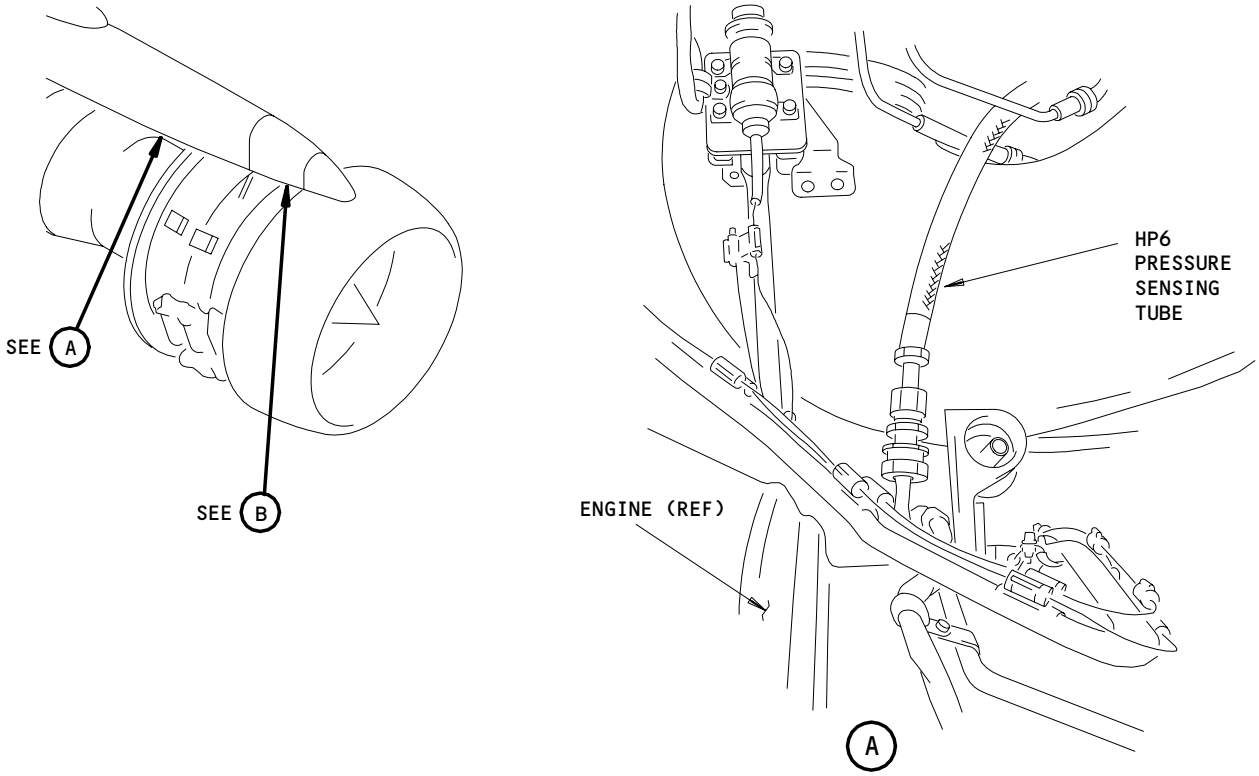
Engine Control System Disconnect
Figure 406A

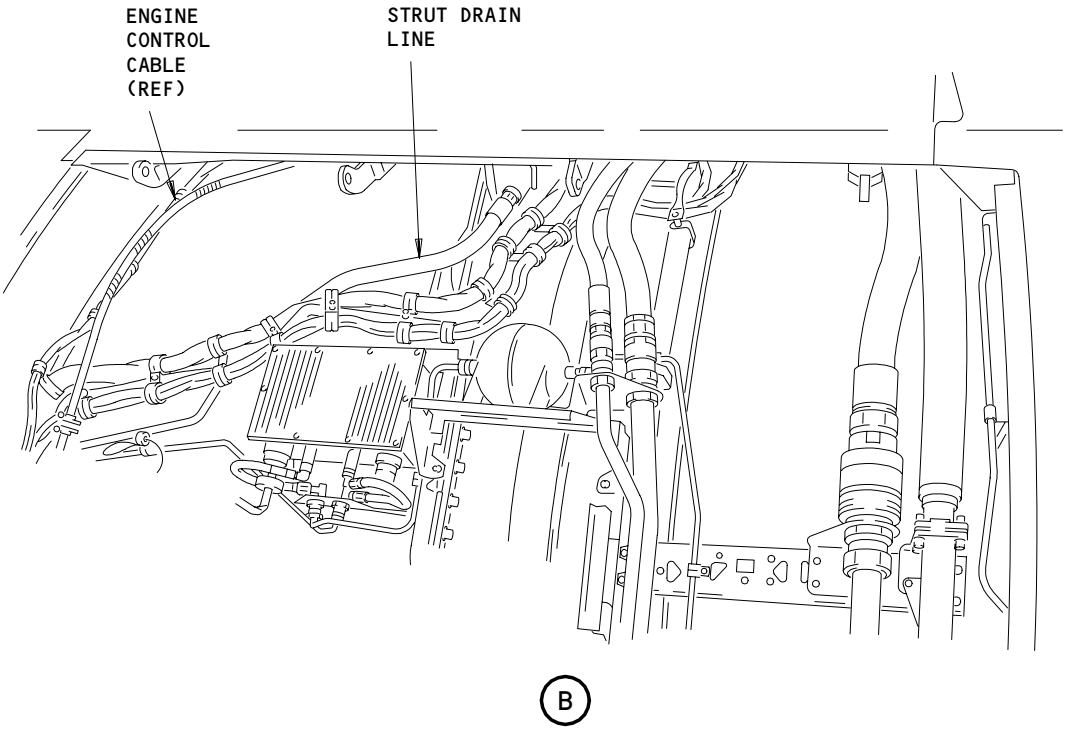




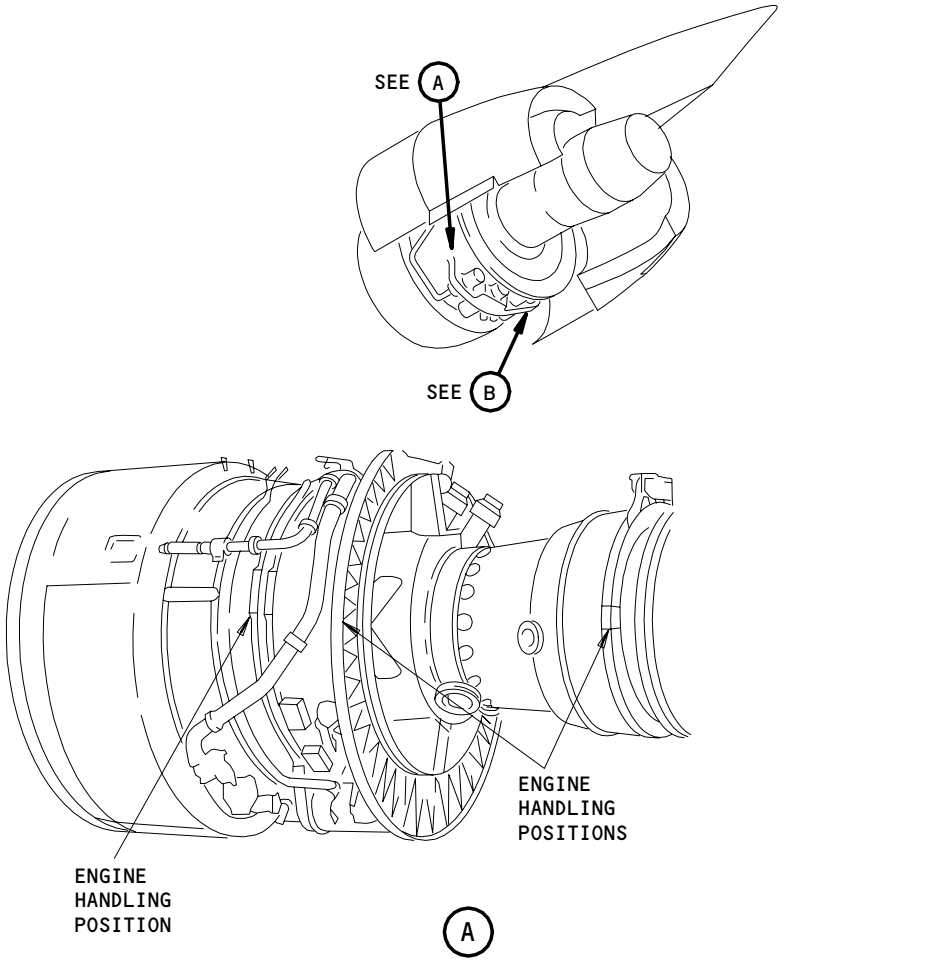
1 HYDRAULIC LINES HAVE CHECK VALVE OR QUICK DISCONNECT FITTINGS TO PREVENT FLUID DRAIN.

Hydraulic System Disconnect
Figure 406B

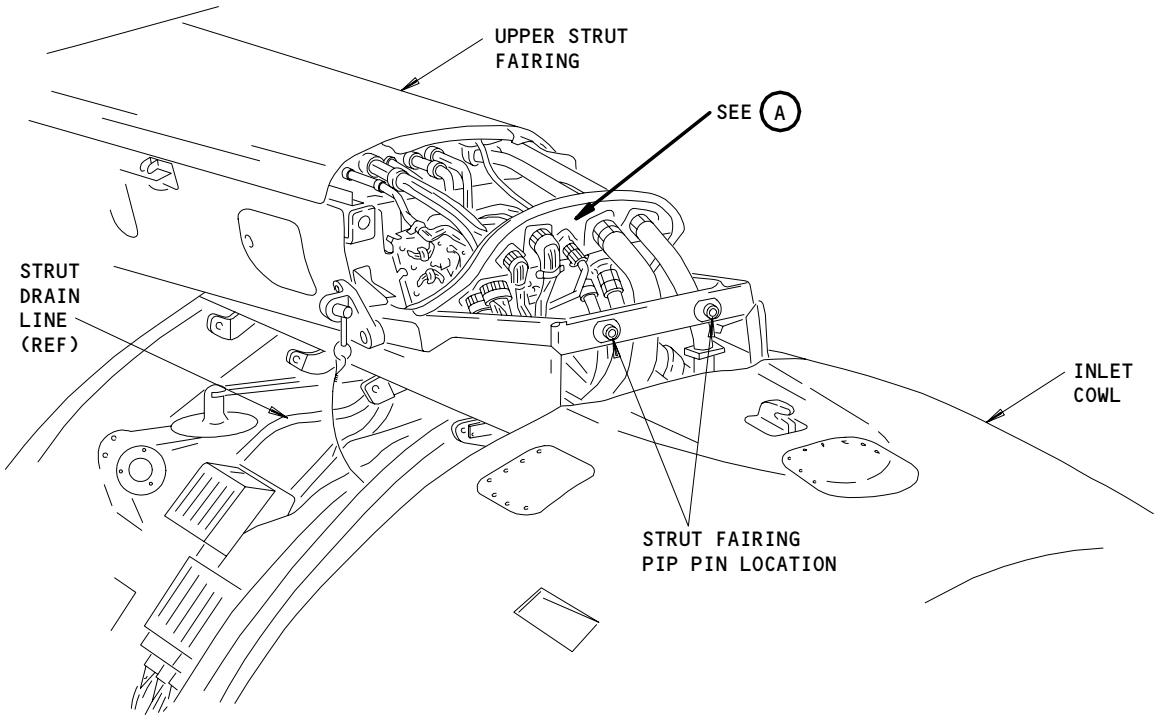


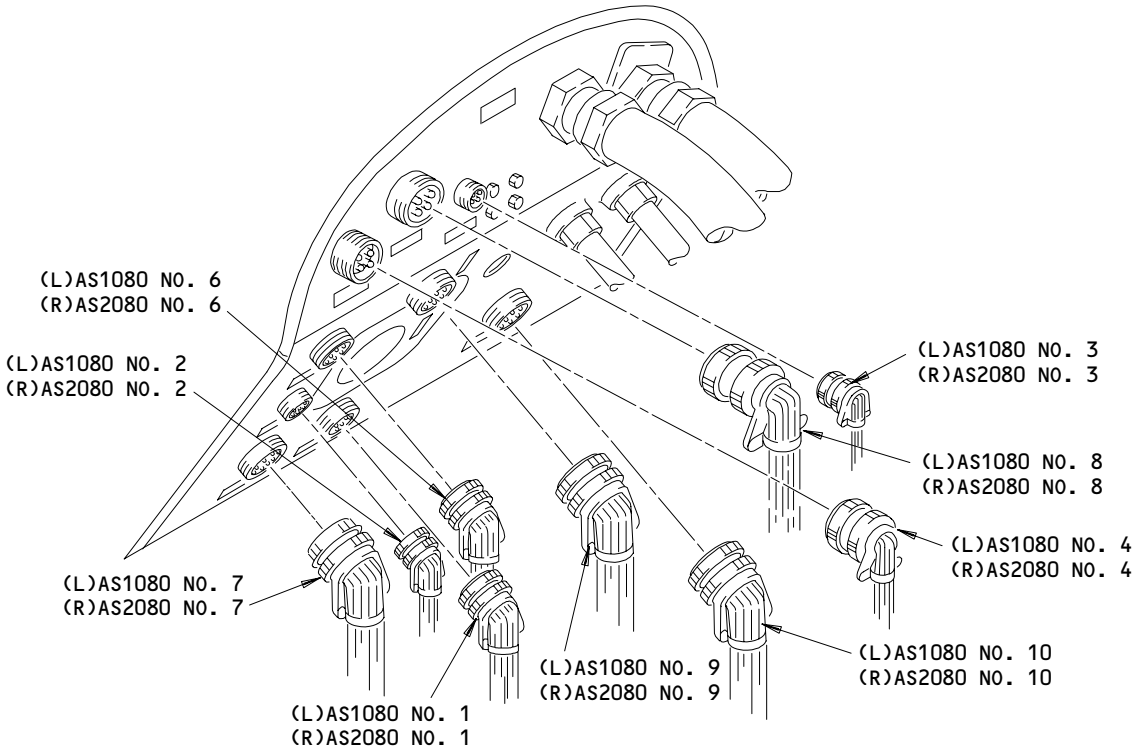


HP6 Pressure Sensing Tube and Strut Drain Line
Figure 406C



Engine Handling Positions
Figure 407





ELECTRICAL INTERFACE CONNECTORS

(A)

Electrical Interface Connectors
Figure 407A

Prepare the Airplane for the Removal of the Power Plant

1) Disconnect the feeder cable for the electrical power on the integral drive generator (IDG) on the left side of the engine fan case, forward of the front engine mount.
2) Disconnect the electrical connectors between the airplane and the strut at the front of the strut.

(g) If electrical power is necessary for other maintenance, supply the electrical power (AMM 24-22-00/201).

CAUTION: WHEN YOU DISCONNECT THE STRUT DRAIN LINES, MAKE SURE YOU INSTALL END CAPS TO KEEP THE DRAIN LINES FREE OF CONTAMINATION. UNWANTED OBJECTS CAN FALL FROM THE DRAIN LINES ON THE ENGINE. DAMAGE TO EQUIPMENT COULD OCCUR.

(h) Disconnect the strut drain line at the strut (Fig. 406C).

NOTE: The drain line is found below the strut, forward of the front engine mount on the right side of the engine.

1) Make sure you install end caps on the open lines.

(i) Disconnect the sensing tube for the HP6 pressure (Fig. 406C).

NOTE: The sensing tube is found below the top of the right thrust reverser.

(j) Disconnect the arrowhead disconnect/microadjuster on the teleflex control cable (Fig. 406).
(k) Remove the clamp (4) from the duct of the HP2 duct assembly (Fig. 406).
(l) Remove the clamp (4) from the duct of the HP6 duct assembly (Fig. 406).

Power Plant Removal - Bootstrap Method

TASK 71-00-02-004-002-R00

3. Power Plant Removal - Bootstrap Method

A. Equipment

WARNING: DO NOT USE INCORRECT EQUIPMENT TO LIFT THE ENGINE. USE ONLY EQUIPMENT GIVEN BELOW.

IF YOU USE INCORRECT EQUIPMENT, THE ENGINE COULD FALL AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Bootstrap Equipment - B71001-341
(Replaces B71001-312)

(2) Engine Cradle - B71007-117 (Used with
Transportation Trailer, Stanley Aviation
P/N 110059-501)

(3) Rolls-Royce equipment (Used with Engine Cradle B71007-117),
Rolls-Royce Ltd., Aero Division, Engine Group, Derby England
(PRE-SB 72-9188):
- Handling Adaptor - CP30379/8 (2 required)
- Handling Adaptor - CP30350/1 (2 required)
- Trunnion Assembly - CP30502/2 (2 required)

NOTE: The Rolls Royce CP30379/8 and CP30502 are optional to the B71007-119. CP30351 is optional to the B71007-97.

(4) POST-SB 72-9188;
- Handling Adaptor - CP30379/8 (1 required LH (Port))
- Handling Adaptor - HU55007/1 (1 required RH (Stbd))
- Handling Adaptor - CP30350/1 (2 required)
- Trunnion Assembly - CP30502/2 (2 required)

(5) Boeing equipment to be used with Engine Cradle B71007-117:
- Forward Attach Fitting Assembly - B71007-119
(CP30379/8 and CP30502/2 optional) (2 required)
- HU55007/1 (SB 72-9188) (1 required)
- Aft Attach Fitting Assembly - B71007-97
(CP30350 optional) (2 required)

(6) Transportation Trailer - P/N 110059-501,
Stanley Aviation

(7) Cradle Assembly - CP30501/9, Rolls-Royce
(Used with Rolls-Royce Transportation Stand
CP30503/2) (Alternate to B71007-117)

(8) Bootstrap Adapter Kit - CP30506/1 (Used with Rolls-Royce Cradle
CP30501/9)

(9) Transportation Stand Base Assembly - CP30503/2,
Rolls-Royce (Used with RR Cradle CP30501/4)

Power Plant Removal - Bootstrap Method

(10) Caster Assembly - CP30499, Rolls-Royce, (Used with RR Transportation Stand Base CP30503/2)
(11) Tow Bar - CP30500, Rolls Royce, (used with RR Cradle Assembly - CP30501/9).
(12) Tool Set, Engine Change - B71005-36 (recommended) Tool Set, Engine Change - B71005-27 (alternative)
(a) Adapter - B71005-37 (recommended)
Adapter - B71005-2 (alternative)
(b) Adapter - B71005-28
(c) C-Duct Actuator Lock - B71009-9
(d) T/R Isolation Valve Lock - B78001-1
(e) Pin & Streamer - B71005-10
(f) Torquemeter 1/2 Dr - TE250FU
(g) Torquemeter 3/4 Dr - TE602FUA
(h) Torquemeter 3/8 Dr - TE50A
(i) 5/8 Crowfoot Wrench 3/8 Dr - FC032
(j) 13/16 Socket 3/4 Dr - LDH262
(k) Breaker Bar 3/4 Dr - L112EL
(l) 15/16 Socket 3/4 Dr - LDH302
(m) Breaker Bar 3/4 Dr - L112EJ
(n) 13/16 Socket 1/2 Dr - SW261
(o) Ratchet Adapter 1/2 Dr - SF730A (recommended)
Ratchet Adapter 1/2 Dr - SF730 (alternative)
(p) 15/16 Socket 1/2 Dr - SW301
(q) Ratchet Adapter 1/2 Dr - SL715
(r) Wrench Assembly - B71005-11
(s) 6" Extension Bar 1/2 Dr - IMX62A

B. References
(1) AMM 12-15-01/301, Main Gear Shock Strut
(2) AMM 54-52-01/401, Strut Fairing
(3) AMM 71-11-04/401, Fan Cowl Panels
(4) AMM 78-31-00/201, Thrust Reverser

C. Access
(1) Location Zones

410	No. 1 Power Plant
420	No. 2 Power Plant
433/443	Nacelle Strut - Mid Structure

(2) Access Panels

433FL/443FL	Outboard Strut-To-Wing Attach Pin, Left
433MR/443MR	Outboard Strut-To-Wing Attach Pin, Right

D. Remove the Power Plant.

S 844-026-R00
(1) Do the procedure to prepare the airplane for the power plant removal.

S 954-027-R00

(2) Use duct tape to install a protective pad on the outer surface of the common nozzle at the 3 and 9 o'clock positions.

S 494-029-R00

(3) Do these steps to install the aft bootstrap components (B71001) (Fig. 408 and 409):

(a) Remove the access panels 433FL, 433MR, 443ML, and 443FR (AMM 54-52-01/401).

(b) Remove one setscrew from the two sides of the strut aft bulkhead.

(c) Make sure there is no paint in the hole for the shear pin of the aft bootstrap.

NOTE: The fit of the shear pin in the hole is tight.

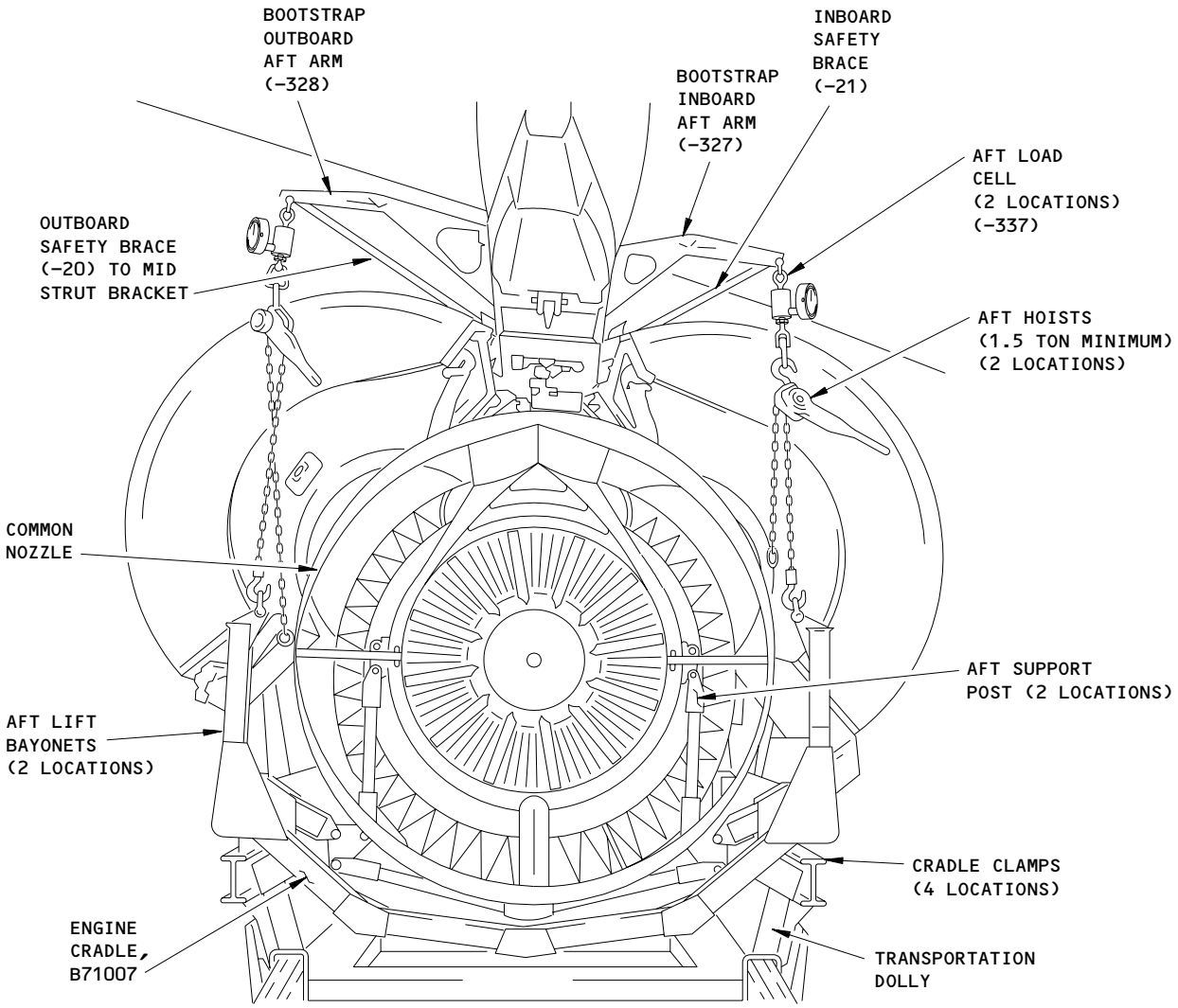
(d) Remove the 5/8 inch nut and the washer from the end of the through-rod on the outboard aft arm.

(e) Install the outboard aft arm (-328) on the strut.
1) The through-rod will go through the strut.
2) There will be no clearance on the surface where the arm and the strut touch.

(f) Install the inboard aft arm (-327) on the strut.
1) The through-rod will go through the base of the arm.
2) There will be no clearance on the surface where the arm and the strut touch.
3) Install the nut and the washer on the through-rod.
4) Tighten the nut to 200-250 pound-inches.

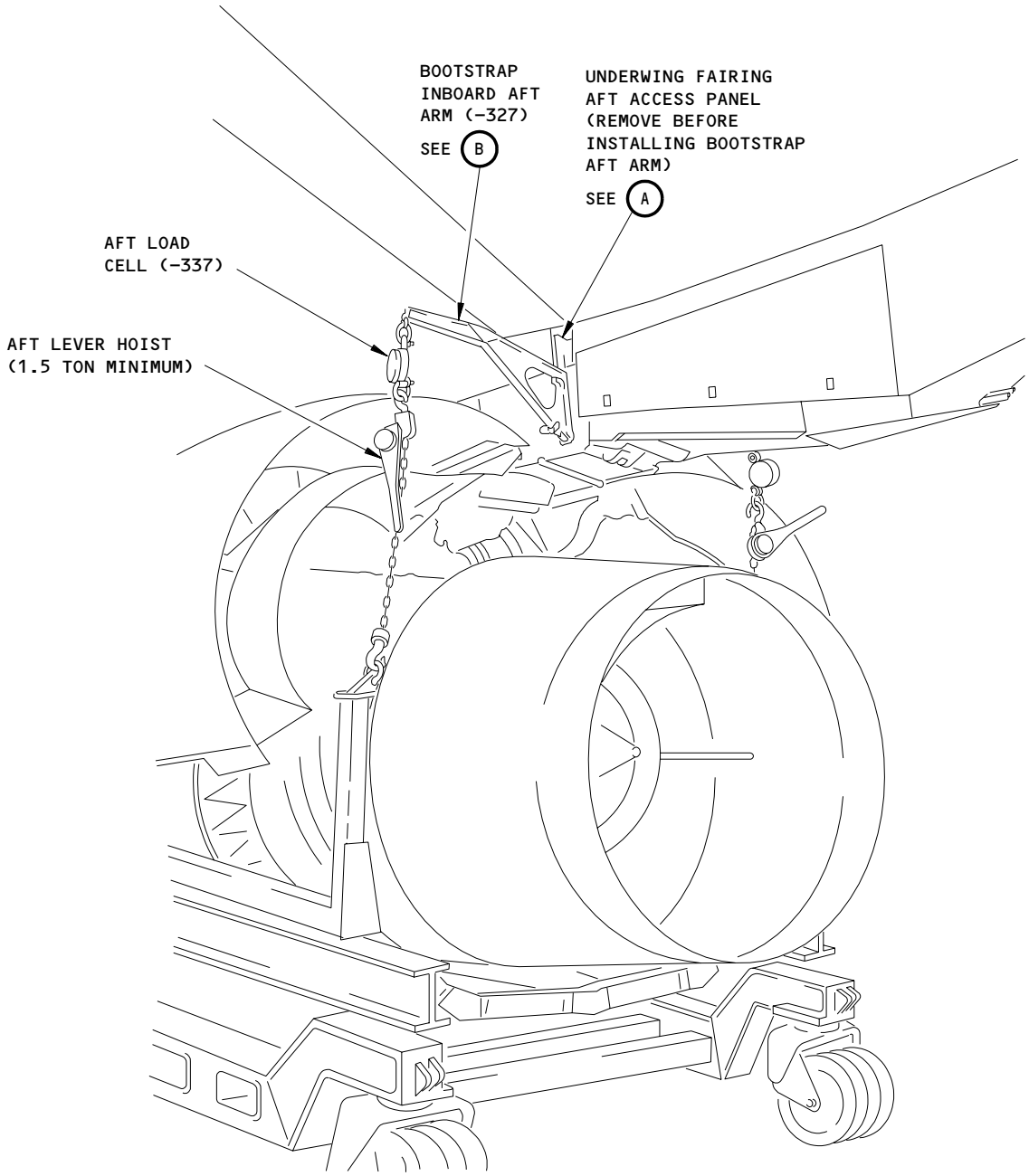
NOTE: Because of the tight clearance between the nut and the arm structure, use the torquemeter TE50A and the crowfoot wrench FC032 or equivalent to tighten the

5/8 inch nut on the through-rod.

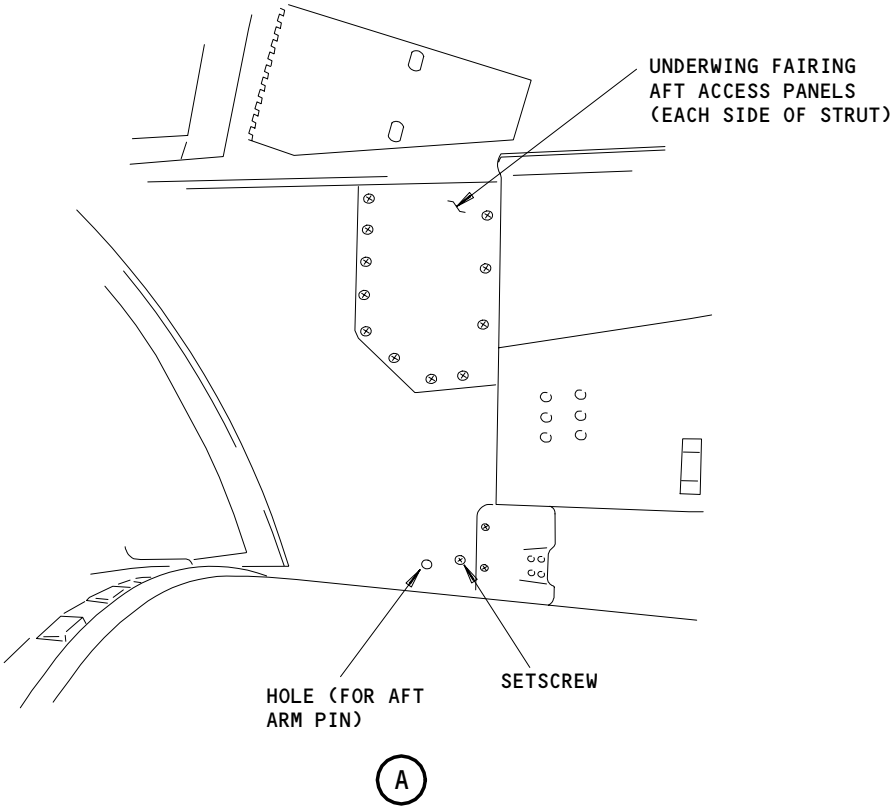


ENGINE - REAR VIEW

Bootstrap Equipment Installation - Aft Components
Figure 408 (Sheet 1)



Bootstrap Equipment Installation – Aft Components
Figure 408 (Sheet 2)



Bootstrap Equipment Installation - Aft Components
Figure 408 (Sheet 3)

Power Plant Removal - Bootstrap Method

(g) Install a 5/16 inch bolt and a washer at the bottom of each arm (-327 and -328).
1) Tighten the bolt to 150-200 pound-inches.
2) Install the setscrew in the bolt/washer storage hole.

(h) Remove the two setscrews from the two sides of the strut, approximately 2 feet forward of the aft bulkhead.

(i) Use the 3/8 inch bolts to install the outboard mid-strut bracket (-15) and the inboard mid-strut bracket (-16) on the strut (Fig. 409A).

NOTE: The brackets have stencil marks to show the forward direction. Two 3/8 inch bolts are installed on each bracket.

1) Tighten the bolts to 250-350 pound-inches.
2) Install the setscrews in the bolt storage holes on the bracket.

(j) Connect the inboard and outboard drag braces (which are attached to the mid-strut brackets) to the aft arms with the ball lock pins.

NOTE: Turn the drag brace body in the direction shown by the stencils to make the brace longer.

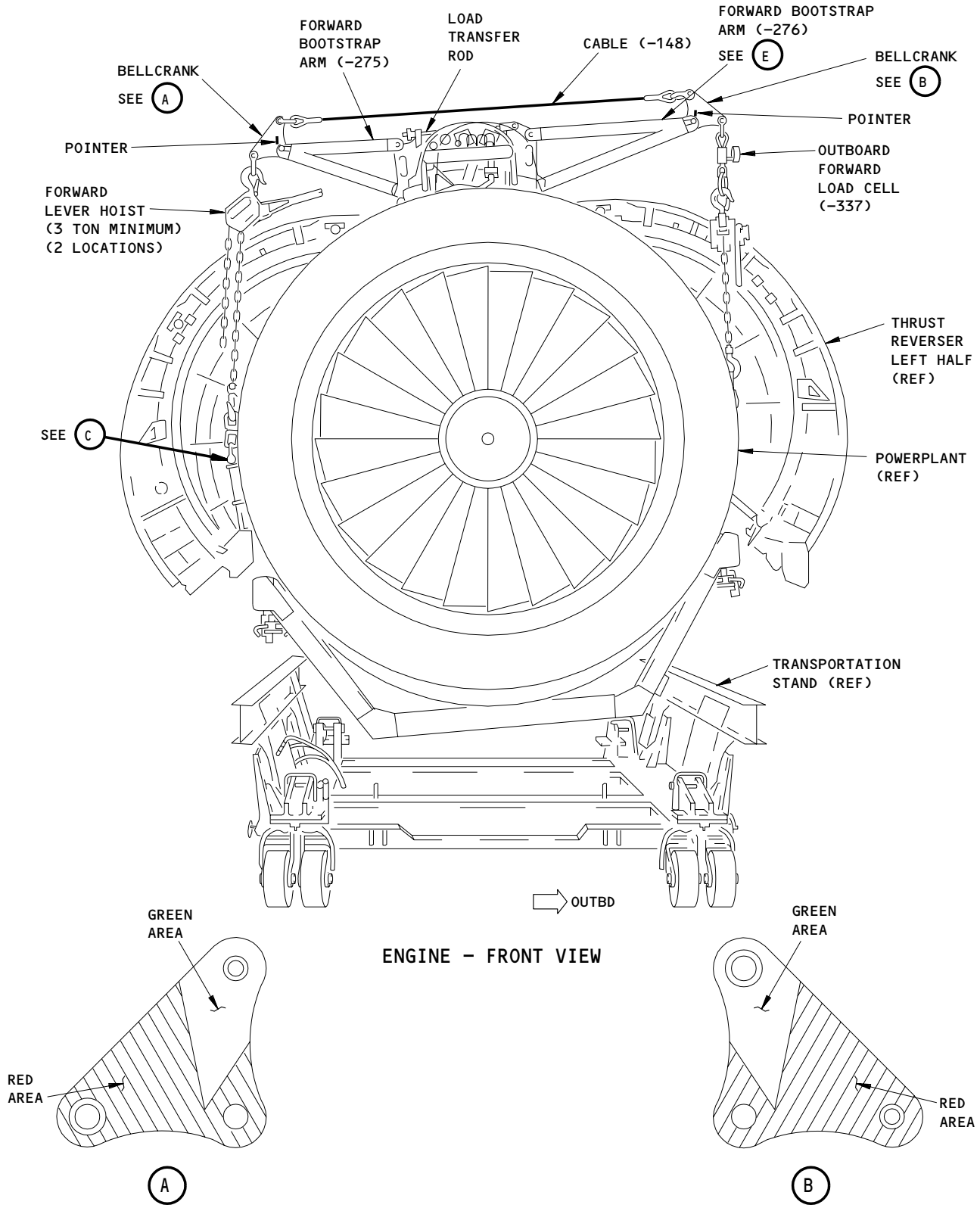
(k) Connect the inboard safety brace (-21) and the outboard safety brace (-20) to the inboard and outboard aft arms and the mid strut brackets with the ball lock pins.

(l) Attach a load cell (-337) to the inboard aft arm and to the outboard aft arm.

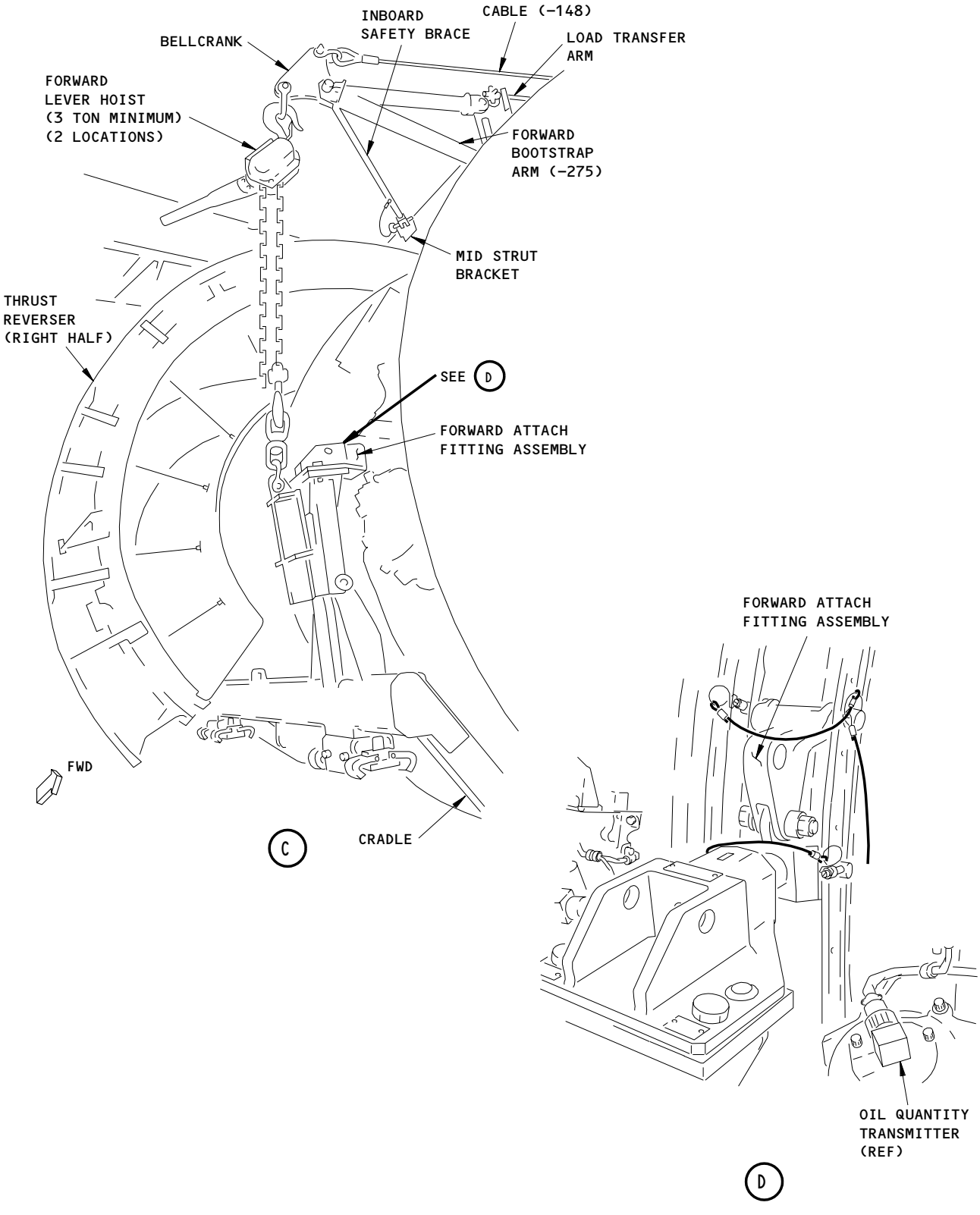
(m) Attach the aft hoists (1.5 Ton Minimum Lever Hoist) to the aft load cells.

S 494-031-R00

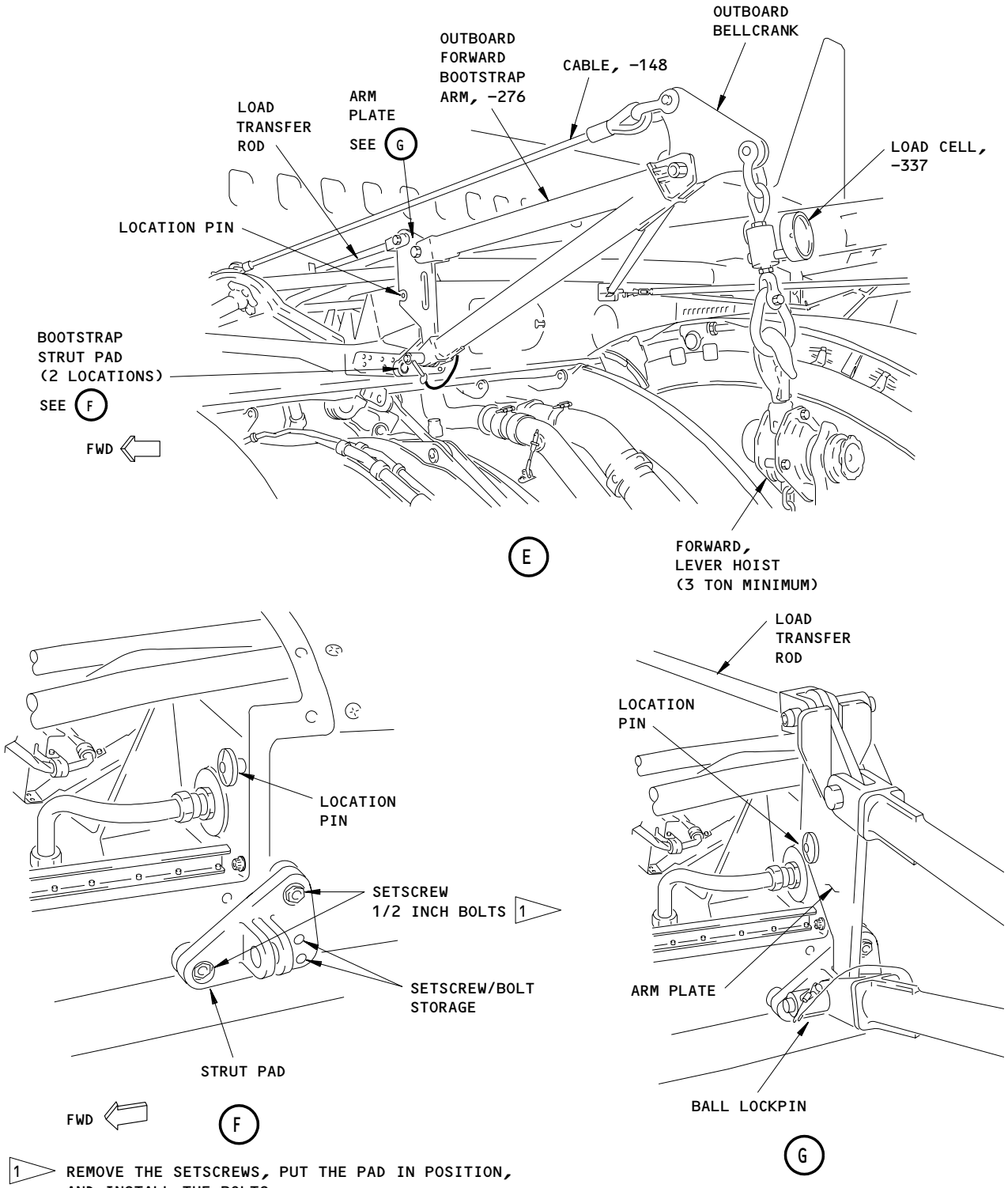
(4) Do these steps to install the forward bootstrap components (Fig. 410):



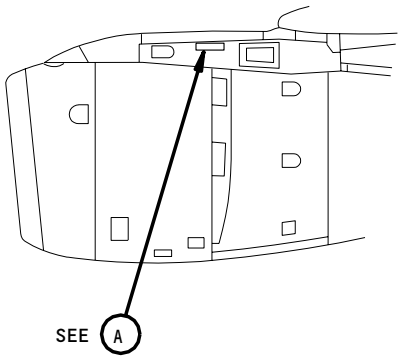
Bootstrap Equipment Installation – Forward Components
Figure 409 (Sheet 1)

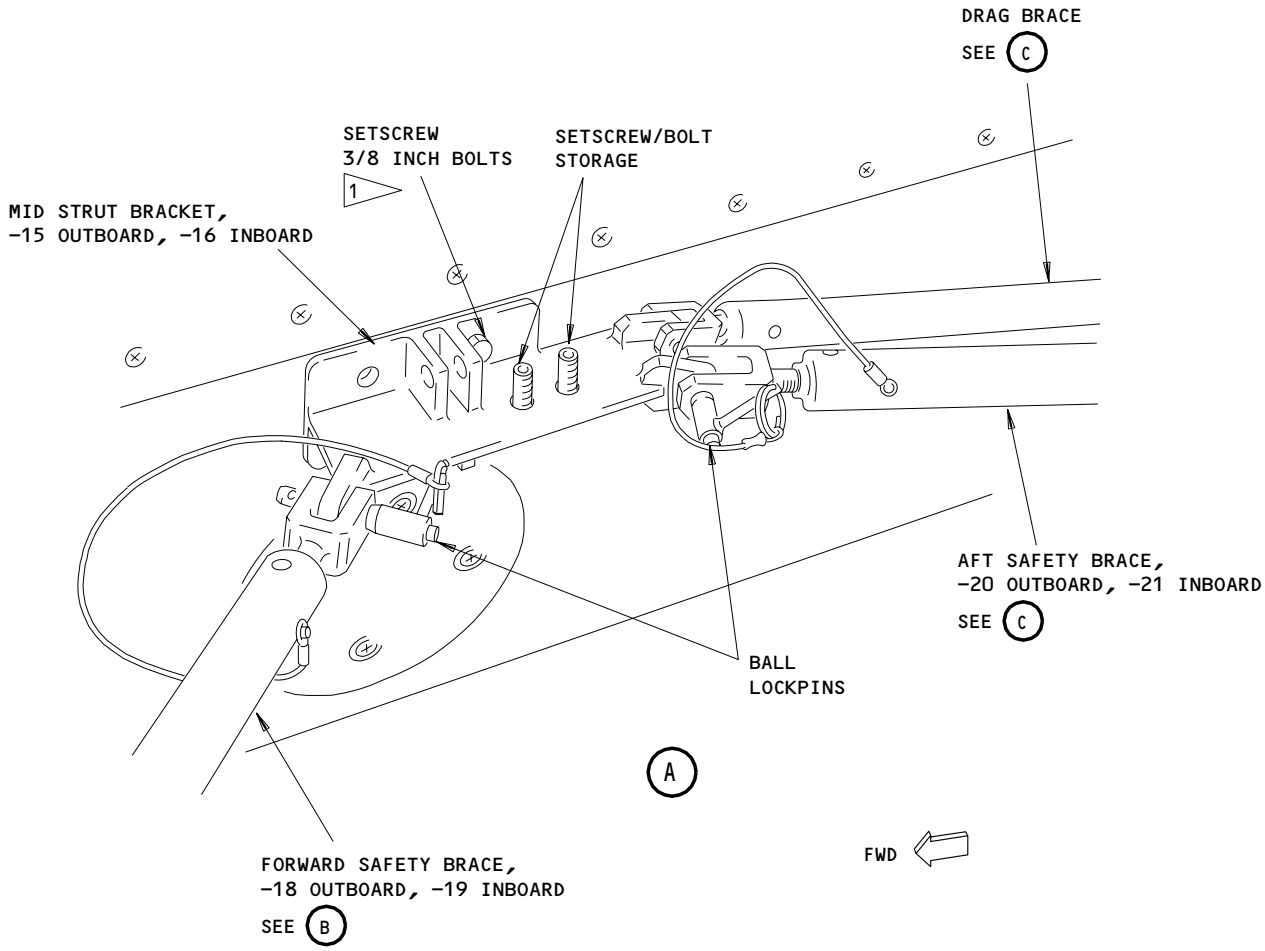


Bootstrap Equipment Installation – Forward Components
Figure 409 (Sheet 2)



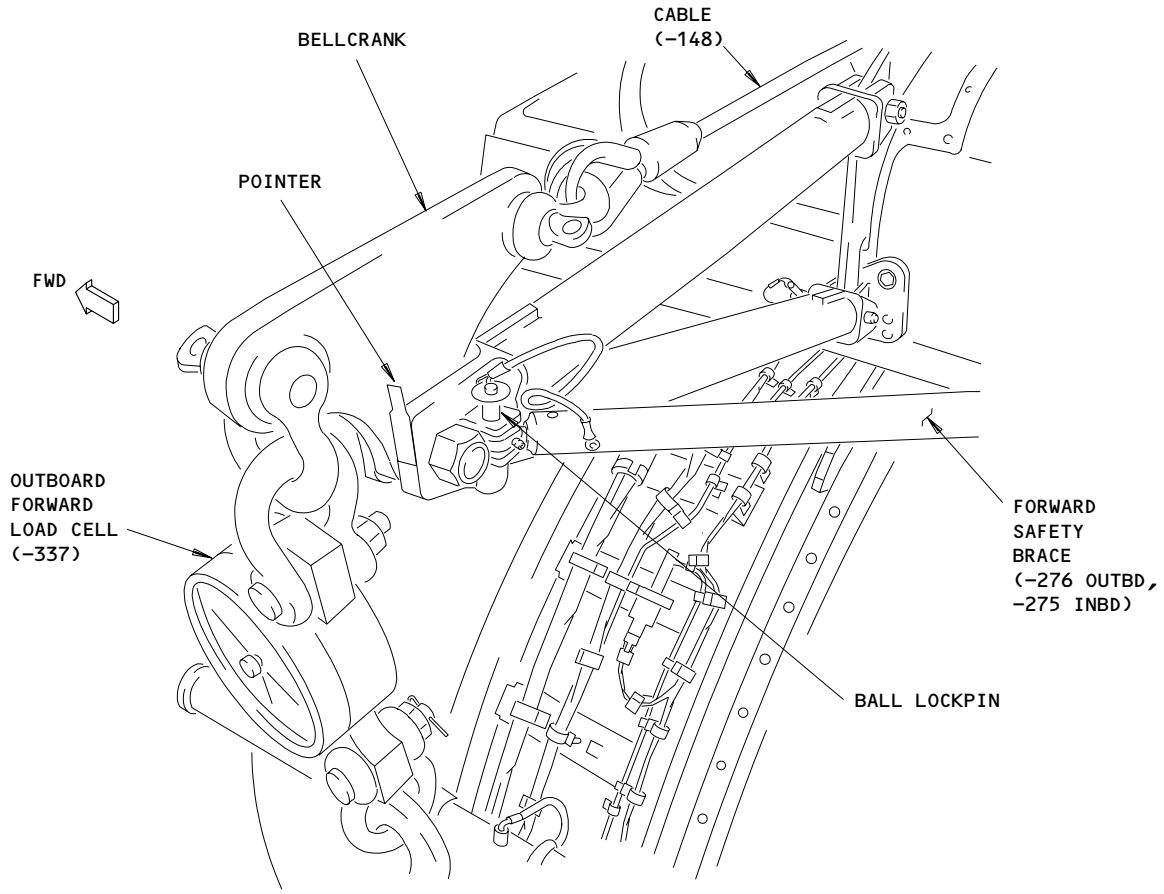
Bootstrap Equipment Installation - Forward Components
Figure 409 (Sheet 3)





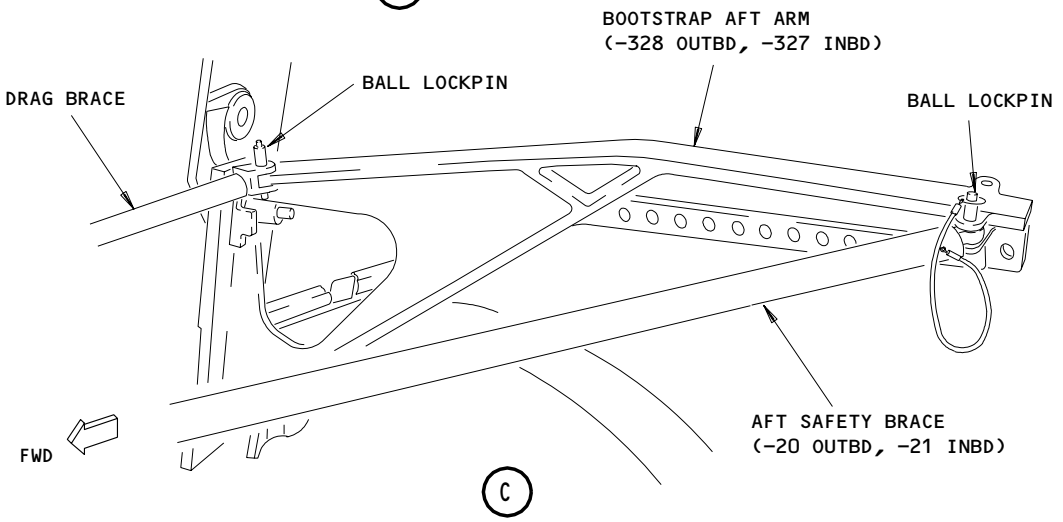
1 REMOVE THE SETSCREWS, PUT THE BRACKET IN POSITION AND INSTALL THE BOLTS.

Mid-Strut Bracket and Safety/Drag Brace Installation
Figure 409A (Sheet 1)



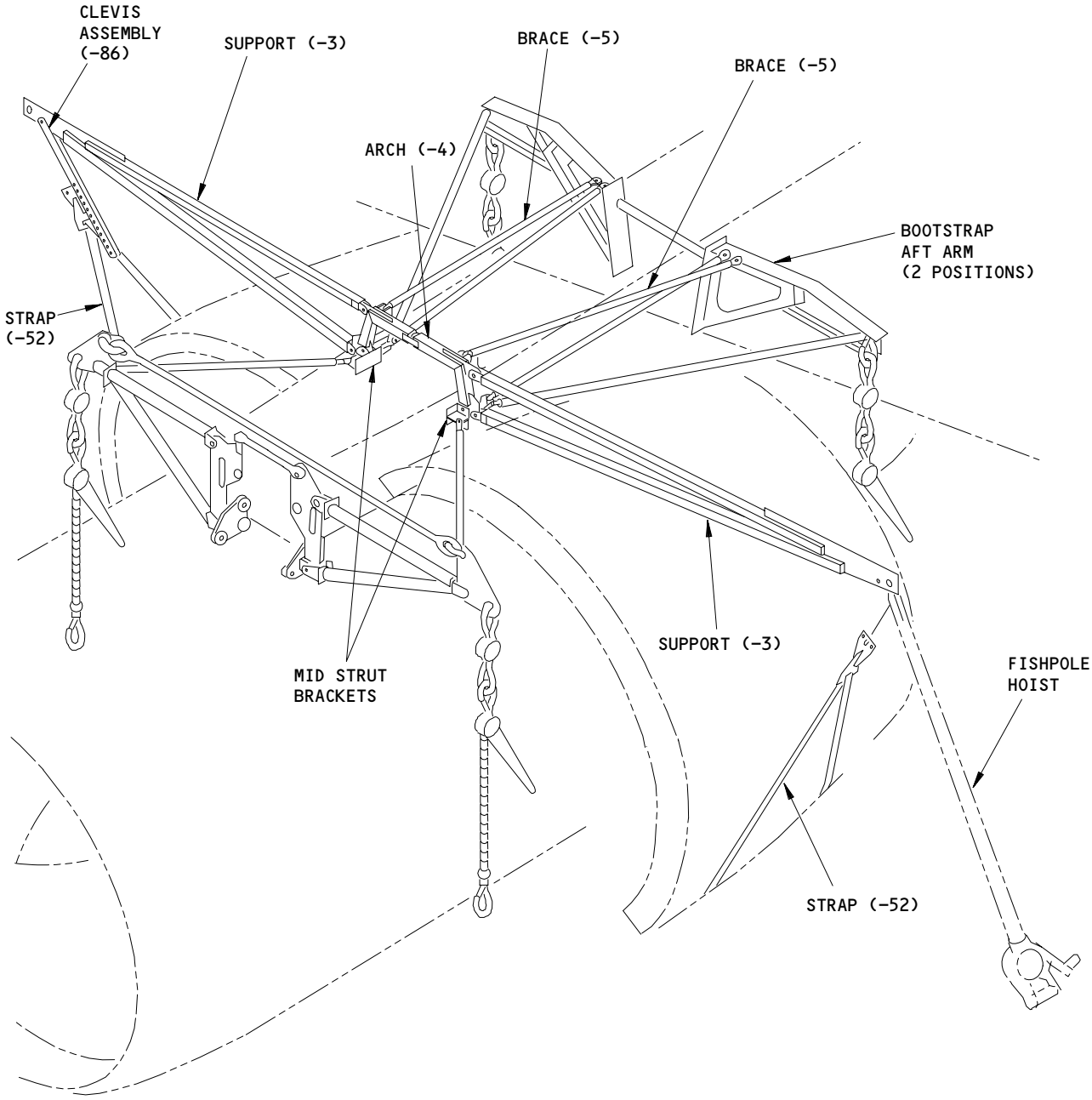
FORWARD OUTBOARD BOOTSTRAP ARM
(INBOARD ARM SIMILAR)

B



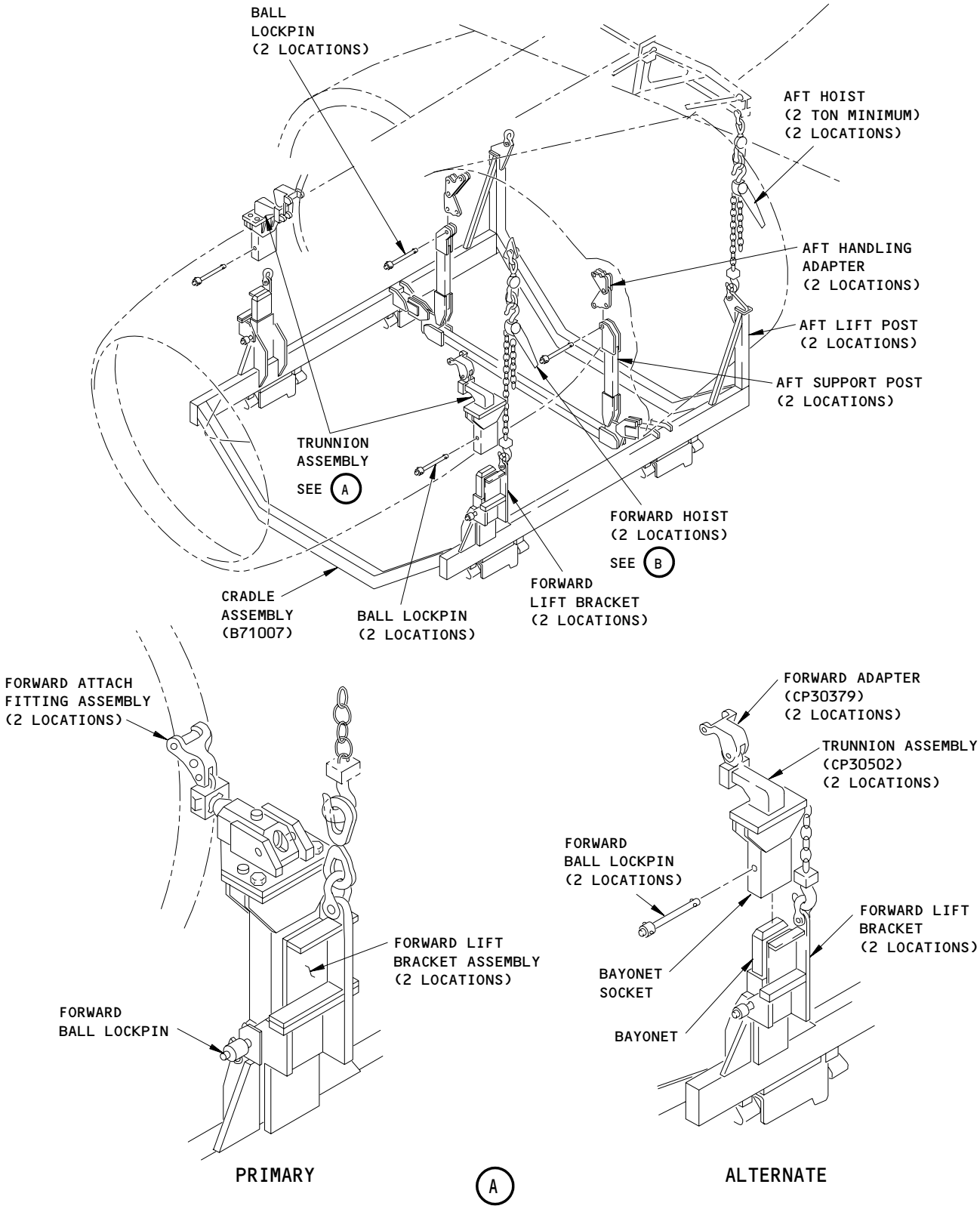
C

Mid-Strut Bracket and Safety/Drag Brace Installation
Figure 409A (Sheet 2)

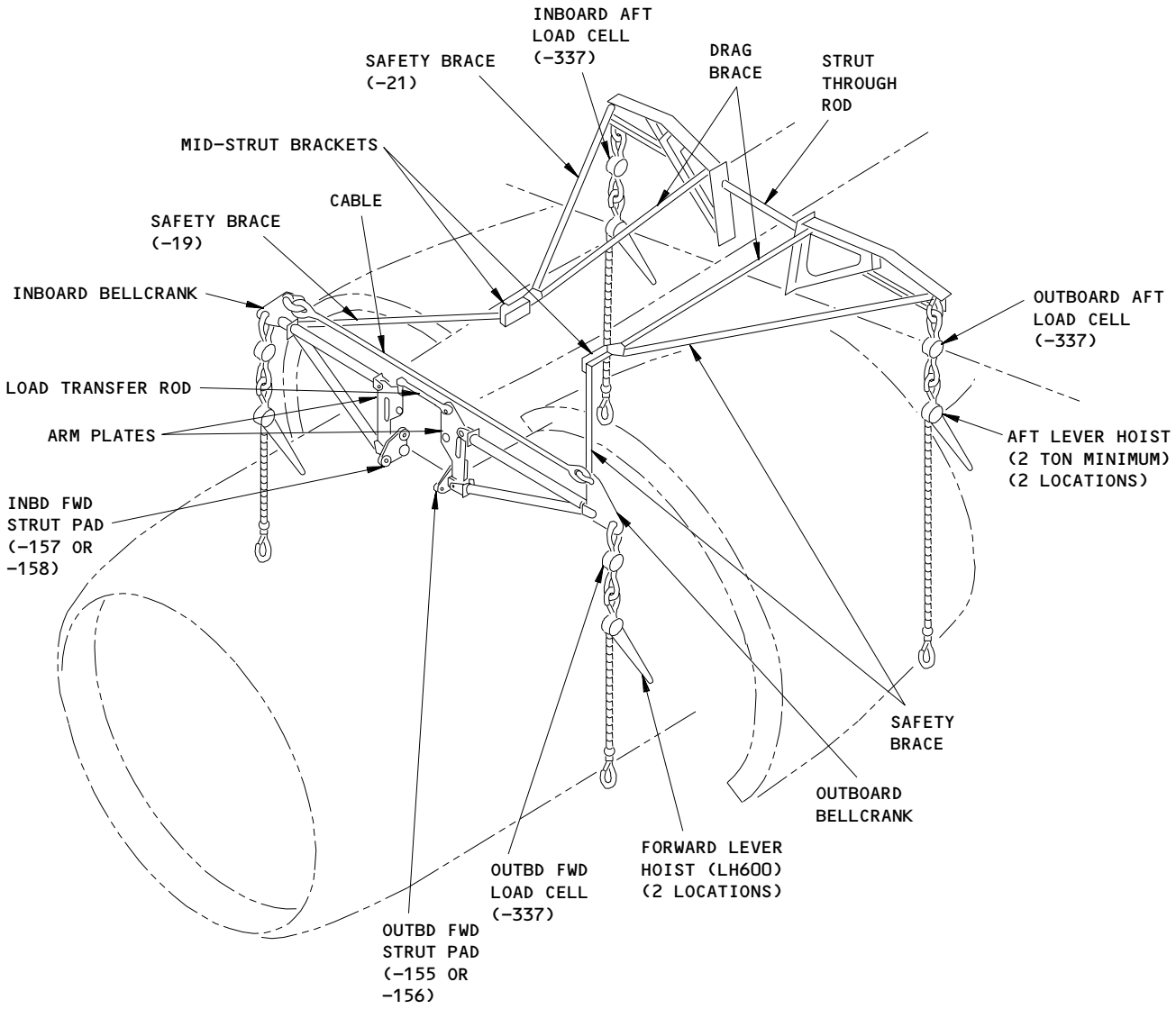


Thrust Reverser Hold Open Equipment B71006 Installed on the Bootstrap Equipment
Figure 409B

F81574



Engine Cradle and Bootstrap Assembly
Figure 410 (Sheet 1)



B

Engine Cradle and Bootstrap Assembly
Figure 410 (Sheet 2)

Power Plant Removal - Bootstrap Method

(a) Remove the two setscrews from each side of the forward strut structure.

NOTE: Make sure there is no sealant in the lower, forward setscrew nutplate before you remove the setscrew. If there is sealant, you could cause damage to the nutplate.

(b) Do these steps to install each inboard and outboard forward strut pad to the strut.

NOTE: For the left engine/strut; install the outboard pad (-155) and the inboard pad (-158). For the right engine/strut, install the outboard pad (-156) and the inboard pad (-157).

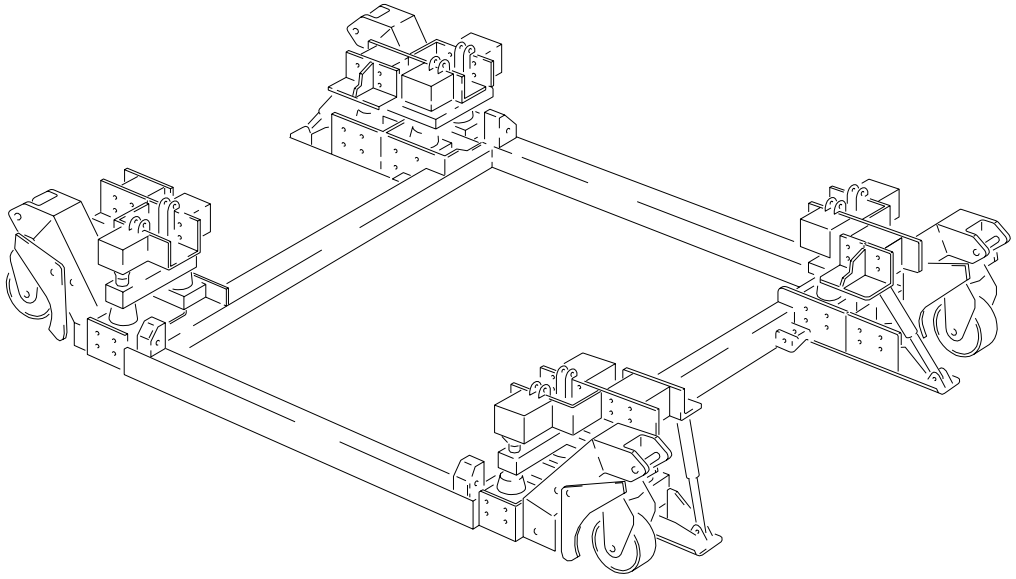
1) Use two 1/2 inch bolts.
2) Do not tighten the bolts until you install the forward arms.
3) There should not be a space between the pads and the strut when you install the bolts.
4) Install the setscrews in the bolt storage holes on the strut pad.

CAUTION: MAKE SURE THE ARM PLATES ARE CORRECTLY INSTALLED. THE PLATE TOUCHES AGAINST THE STRUT AND THE INNER RIDGE (ADJACENT TO THE STRUT SURFACE) OF THE PIN. THE ARM PLATE DOES NOT FIT IN THE NOTCH OF THE PIN. DAMAGE TO EQUIPMENT COULD OCCUR.

(c) Do these steps to install the inboard (-275) and outboard (-276) forward bootstrap arms:
1) Put the arm plates forward of the locating pins on the strut and move the plates rearwards until they are over the locating pins.
2) Lift the arms to make sure they are aligned and correctly installed on the locating pin.

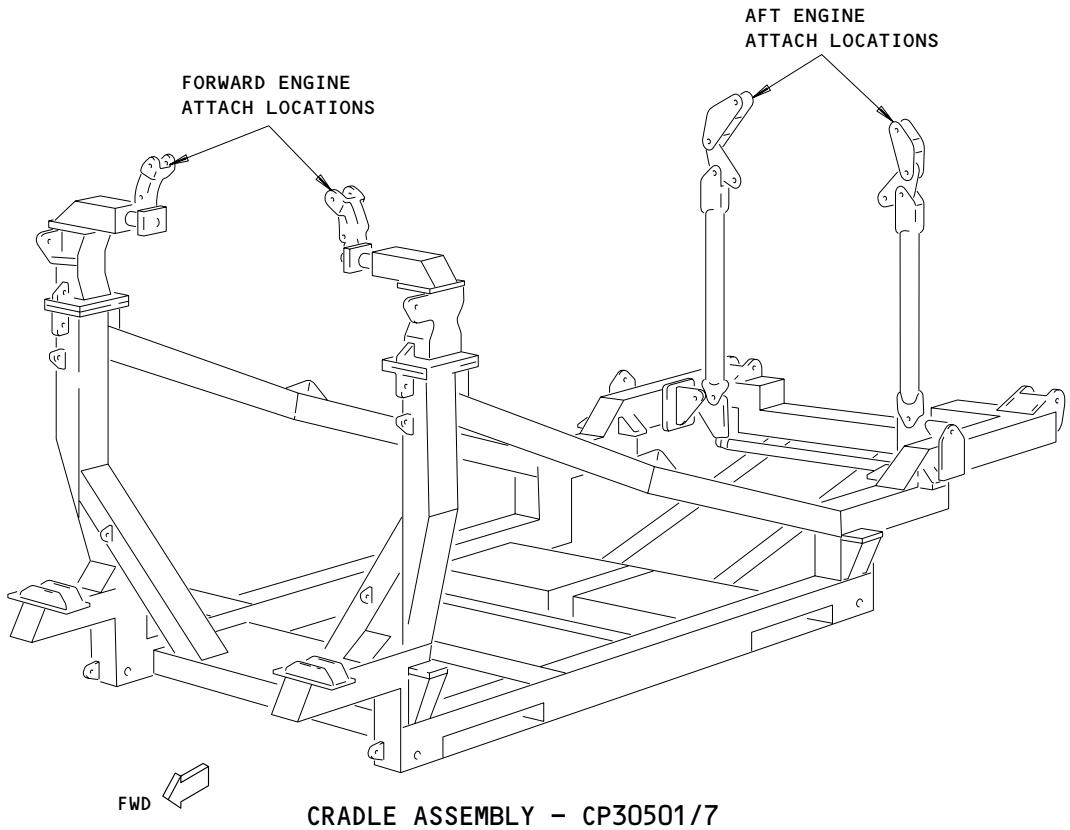
NOTE: The arms will hang from the locating pins.

(d) Tighten the 1/2-inch bolts in the strut pad to 780-960 pound-inches.
(e) Use the ball lock pin to connect the load transfer rod to the arm plate of the outboard forward bootstrap.



59668A

TRANSPORTATION STAND BASE ASSEMBLY – CP30503/2



CRADLE ASSEMBLY – CP30501/7

59667B

Engine Cradle and Transportation Stand
Figure 410A

Power Plant Removal - Bootstrap Method

(f) Connect the cable (-148) between the bellcranks.

NOTE: Make sure the cable stays free from the bolts on the forward bootstrap arms when a force is applied to the cable.

(g) Use the ball lock pins to connect the inboard and forward safety brace (-19) and the outboard and forward safety brace (-18) to the mid-strut brackets and the forward bootstrap arms.
(h) Attach a load cell (-337) to the outboard arm bellcrank.
(i) Attach the hoists (3 Ton Minimum Lever Hoist) to the outboard load cell and the inboard bellcrank.

S 494-174-R00

(5) If the actuator locks B71009 or the safety rod B71025 for the thrust reverser were not available, install the thrust reverser hold-open equipment B71006 with the bootstrap equipment B71001 (Fig. 409B).
(a) Install the arch (-4) on the mid strut brackets at the inboard and outboard positions.
1) Install the arch with the two shoulder clevises on the aft side of the arch.
2) Use the two ball lockpins on the bottom legs of the arch to attach the arch to the mid strut brackets.
(b) Install the inboard and outboard braces (-5) between the arch and the two bootstrap aft arms.
1) Telescope the brace to the extended position.
a) Install the center ball lockpin to hold the brace in the extended position.
2) Install the rod end of the brace into the clevis on the aft side of the arch.
a) Use the ball lockpin at the shoulder of the arch to attach the rodend to the arch.
3) Install the yoke of the brace on the upper flange of the bootstrap aft arm.
a) Make sure the yokes are installed outboard of the two bootstrap drag braces.
b) Use the ball lockpin near the yoke to attach the yoke to the aft arm.
(c) Install the two supports (-3) to the arch (-4).
1) Use the two ball lockpins on the ends of the support arms to attach the support to the arch.
(d) Attach the single hole end of the clevis assembly (-86) to the end of the support (-3).

NOTE: Do not use the key hole on the end of the support. This key hole is used to attach the fishpole hoist.

1) Use the ball lockpin on the end of the support to attach the clevis assembly to the support.

Power Plant Removal - Bootstrap Method

(e) Attach the strap (-52) to the bottom of the thrust reverser half.

NOTE: The strap has 3 plates; two end plates attached to the ends of the strap and one center plate that has a slot that allows the plate to move along the strap.

1) Attach the two end plates to the bottom of the thrust reverser half.
   a) Use the two bolts that are stored on each end plate to attach the end plate to the thrust reverser half.

(f) Attach the center plate of the strap (-52) to the clevis assembly (-86) to hold the thrust reverser in the open position.

NOTE: One end of the clevis assembly has multiple holes. Take up as much slack on the strap as possible to hold the weight of the thrust reverser half.

1) Use the ball lockpin on the center plate to attach the plate to the clevis assembly.

(g) If the thrust reverser open position must be adjusted, use the hand pump to open the thrust reverser to the required position.

NOTE: Use the fishpole hoist to open the thrust reverser half if the thrust reverser opening actuators have been removed or if the hand pump is not available.

1) Use the hand pump to pressurize the opening actuator and fully open the thrust reverser.
2) When the thrust reversers are fully open, the hold-open rods will disengage from the attach point on the engine.
3) Retract and lock the hold-open rods.

Power Plant Removal - Bootstrap Method

S 494-034-R00

(6) Do these steps to attach the cradle to the engine and the bootstrap equipment (Fig. 410 and 410A).

(a) Remove the forward and aft attach fitting assemblies - B71007-119 and B71007-97 (forward and aft adapters - CP30379/8, (HU55007/1 (SB 72-9188)) and CP30350/1) from the cradle and attach them to the engine with lockpins.

1) If the Rolls Royce adapters are being used, remove the lockpins which attach the front bayonet sockets to the cradle.

NOTE: Rolls Royce CP30379/8 (HU55007/1 (SB 72-9188)) and CP30502/2 are optional to the B71007-119.

The handling adaptor CP30379/8 (HU55007/1 (SB 72-9188)) is attached to the trunnion CP30502/2. The trunnion is attached on the bayonet socket with 4 bolts. If these adapters are being used, the trunnion and bayonet socket will stay attached to the adapter.

2) Move the posts for the cradle aft support down.

3) If using the Rolls Royce adapter, remove the lockpins and remove the forward lift brackets from the cradle.

CAUTION: MAKE SURE THERE IS SUFFICIENT CLEARANCE BETWEEN THE BOTTOM OF THE ENGINE AND THE CRADLE BEFORE YOU MOVE THE TRANSPORTATION STAND BELOW THE ENGINE. IF IT IS NECESSARY, PRESSURIZE THE SHOCK STRUT FOR THE MAIN GEAR TO LIFT THE ENGINE ON THE WING (AMM 12-15-01). DAMAGE TO EQUIPMENT CAN OCCUR IF THE STAND HITS THE ENGINE.

(b) Put the transportation stand, with the cradle attached to the stand, below the engine.

(c) Attach the foam pads to the rear of the thrust reverser between the chains and the thrust reverser.

(d) Extend the hoists and the chains and attach the chain to the cradle.

Power Plant Removal - Bootstrap Method

WARNING: THE TRANSPORTATION STAND AND THE CRADLE WILL MOVE FROM SIDE TO SIDE IF YOU LIFT IT TOO HIGH OFF THE GROUND. ONLY LIFT THE STAND AND CRADLE UP SUFFICIENTLY UNTIL YOU CAN LIGHTLY RUB THEM ACROSS THE GROUND. YOU MUST REMOVE ALL PERSONS AND EQUIPMENT WHICH ARE NOT NECESSARY FROM THE AREA AS INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

ONLY PERSONS WHO KNOW THE CORRECT INSTRUCTIONS MUST OPERATE THE LEVER HOISTS. WHEN THE LEVER CHAIN HOISTS ARE LIGHTLY LOADED, THEY CAN RELEASE THE LOAD WHEN THE CONTROL LEVER OR THE CHAIN IS PUT IN THE NEUTRAL OR FREE CHAIN POSITION. IF THE LEVER OR THE CHAIN IS IN THE NEUTRAL OR FREE CHAIN POSITION, THE ENGINE COULD FALL. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(e) Lift the cradle/stand equally on all four corners to permit it to lightly rub across the ground.
(f) Let the stand/cradle move until it is aligned with the engine.
(g) Make a check that the pointer on the forward bootstrap arms is in the green color area of the bellcranks at all times the chain hoists are loaded.
(h) Release the load on the hoists and disconnect the cradle from the transportation stand.

NOTE: You must lift the cradle clamp up and out before you move the cradle and the stand apart.

(i) Make a check that the through-rod nut of the aft bootstrap arm is tightened to 200-250 pound-inches.
(j) Make sure the pointers on the forward bootstrap bellcranks are in the green, or correct, position.

NOTE: If it is necessary to turn the bellcranks and not the cradle, use the forward chain hoists.

Power Plant Removal - Bootstrap Method

(k) Lift the cradle from the transportation stand.
1) Lightly roll and pitch the cradle until its attitude is equivalent to the engine's attitude.

NOTE: Use the aft outboard hoist to make the engine roll. The bellcranks will turn in the same direction when the engine rolls. Use the person at the aft chain hoist position to look at the forward bellcrank position. Use flashlights at night.

Look axially at the engine from a position on the ground to make sure the roll attitudes of the cradle and the engine are equivalent.

Look at the side beam of the cradle and the stand rail to make sure the pitch attitudes are also equivalent.

2) As you lift the cradle, the bellcranks will turn to the inboard position.
3) Keep the bellcrank pointers in the green area.

(l) Continue to lift the engine/cradle assembly equally to connect the forward and aft attach points

NOTE: Adjust the inboard or outboard forward hoist to correctly position the bellcranks into the green area.

(m) Install the lockpins in the forward and aft attach fittings and connect the engine to the cradle.

S 824-035-R00

WARNING: MONITOR THE LOAD CELLS ON THE FORWARD AND THE AFT HOISTS. DO NOT PUT MORE THAN 5200 POUNDS ON THE FORWARD LOAD CELL AND 2600 POUNDS ON THE AFT LOAD CELLS. IF YOU PUT MORE LOAD ON THE CELLS, THE ENGINE COULD FALL. THIS COULD CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(7) Hold the weight of the engine and the preload on the bootstrap with the hoists. Make sure the bellcrank pointers are in the green area.

NOTE: The aft load cells give the actual load. The forward load cells gives 0.625 of the actual load because of the diagonal lift.

(a) Remove the play from the aft hoists until the two load cells read a minimum of 2250 pounds.
1) Do not apply more than 2600 pounds.

Power Plant Removal - Bootstrap Method

(b) Remove the play from the forward hoists until the load cell reads a minimum of 4600 pounds.
1) Do not apply more than 5200 pounds.

S 024-036-R00

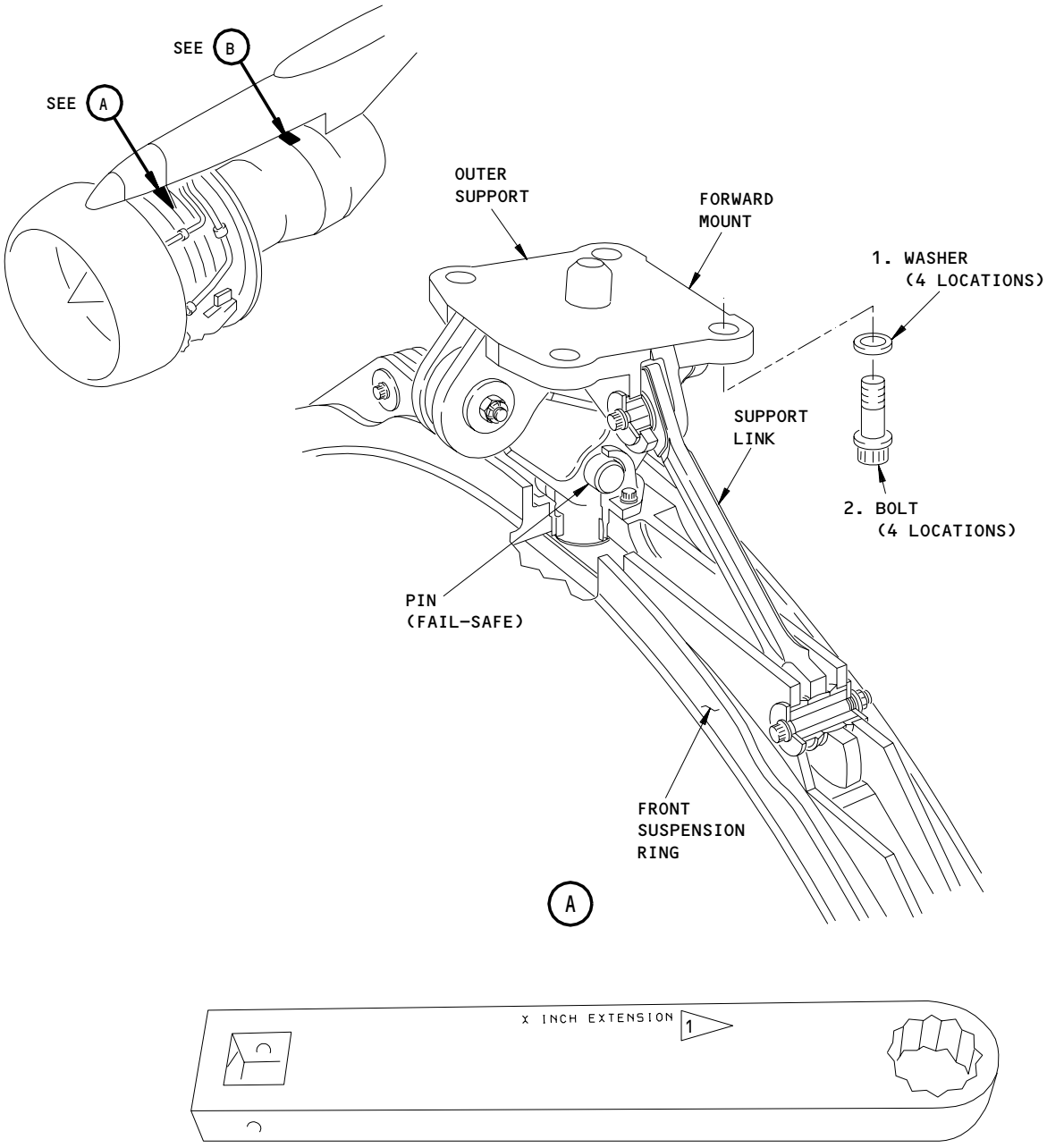
(8) Disconnect the engine from the strut (Fig. 411).
(a) Loosen by one-half turn each of the forward and aft engine mount bolts.
1) The forward and aft engine mount bolts attach the forward and aft mounts to the strut.

NOTE: Use a 36.5 inch long, 3/4 inch square drive breaker bar (L112EL) and a 15/16 inch socket (LDH302) or equivalent for the front engine mount bolts.

Use a 21.5 inch long, 3/4 inch square drive, breaker bar (L112EJ) and a 13/16 inch socket (LDH262) or equivalent for the aft engine mount bolts.

WARNING: MONITOR THE LOAD CELLS ON THE FORWARD AND THE AFT HOISTS. DO NOT PUT MORE THAN 5200 POUNDS ON THE FORWARD LOAD CELL AND 2600 POUNDS IN AFT LOAD CELLS. IF YOU PUT MORE LOAD ON THE CELLS, THE ENGINE COULD FALL. THIS COULD CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

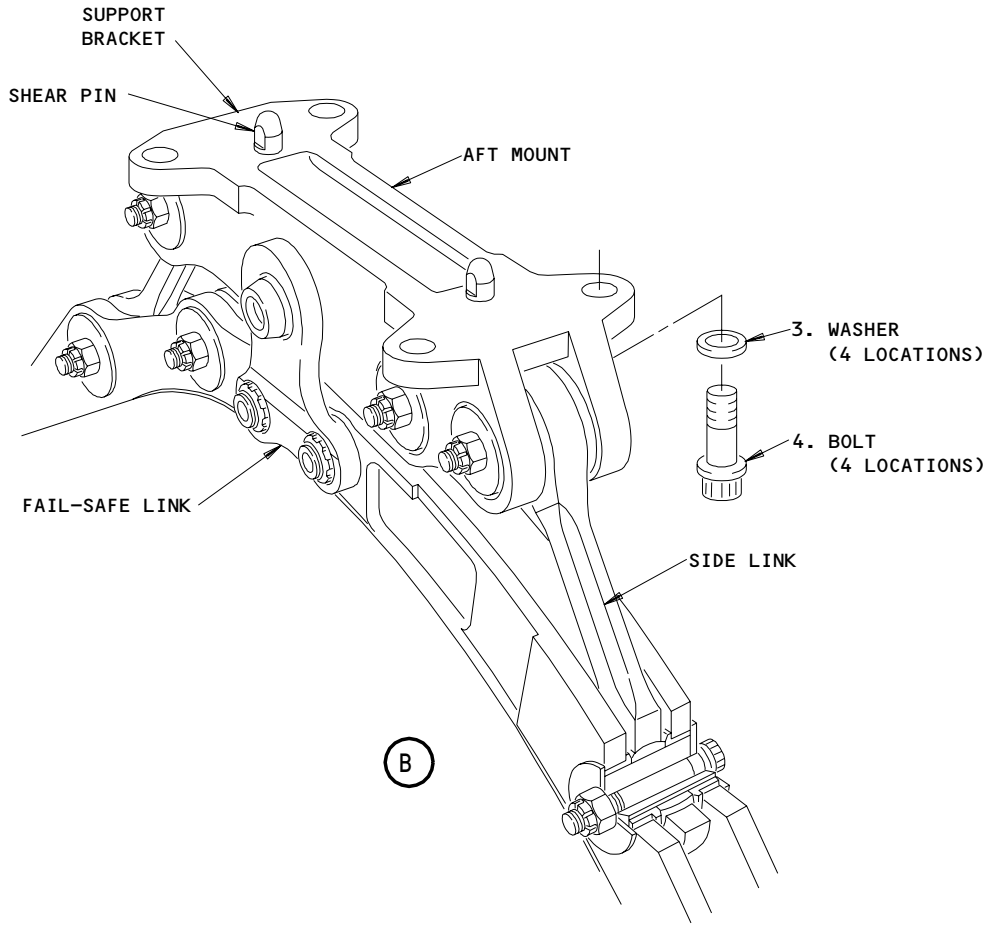
(b) Do these steps when you remove the engine mount bolts:
1) Monitor the load cell indications and the strut-to-engine interface.
2) The load cell indications should not change and there should not be a clearance between the engine mounts and the strut.
3) If you see a clearance between the engine and the strut, operate the applicable hoist to remove the clearance.

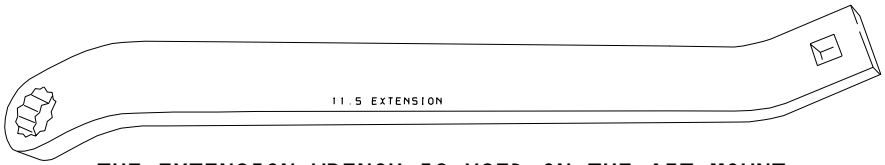


THE EXTENSION WRENCH IS USED ONLY ON
THE OUTBOARD SIDE OF THE FORWARD MOUNT

1 THE EXTENSION WRENCH HAS TWO LENGTHS.
B71005-2 IS AN 8-INCH EXTENSION WRENCH.
B71005-37 IS AN OPTIONAL 11.5-INCH EXTENSION WRENCH.

Engine Disconnect Points - Forward and Aft Mounts
Figure 411 (Sheet 1)





THE EXTENSION WRENCH IS USED ON THE AFT MOUNT

Engine Disconnect Points-Forward and Aft Mounts
Figure 411 (Sheet 2)

Power Plant Removal - Bootstrap Method

4) If the load cell indication increases, do a check to make sure the indication is not more than the limits.
   a) It is important that you do not put more load on the load cells than that specified.

(c) Loosen the forward and aft bolts again by one half turn and monitor the load cells and the clearance between the engine mount and the strut
   1) Do this step until the bolts are fully loose.

(d) Remove the engine mount bolts.

S 024-037-R00

(9) Lower the power plant and attach it to the transportation stand (Fig. 411A).

WARNING: THE ENGINE CAN MOVE INDEPENDENTLY FROM THE STRUT WHEN THE ENGINE IS CLEAR OF THE STRUT. MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Lower the forward hoists slowly and equally until the forward shear pin of the engine mount is free of the strut (Fig. 411).

(b) Lower the aft hoists slowly and equally until the shear pins for the aft strut are free of the strut.

CAUTION: IF THE FORWARD BOOTSTRAP BELLCRANK POINTERS MOVE OUT OF THE GREEN SECTION ON THE BELLCRANKS, OR IF A LOAD ON A LOAD CELL IS MORE THAN THE LIMIT, YOU MUST STOP THE OPERATION AND CORRECT THE PROBLEM. IF YOU CONTINUE WITH THE OPERATION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

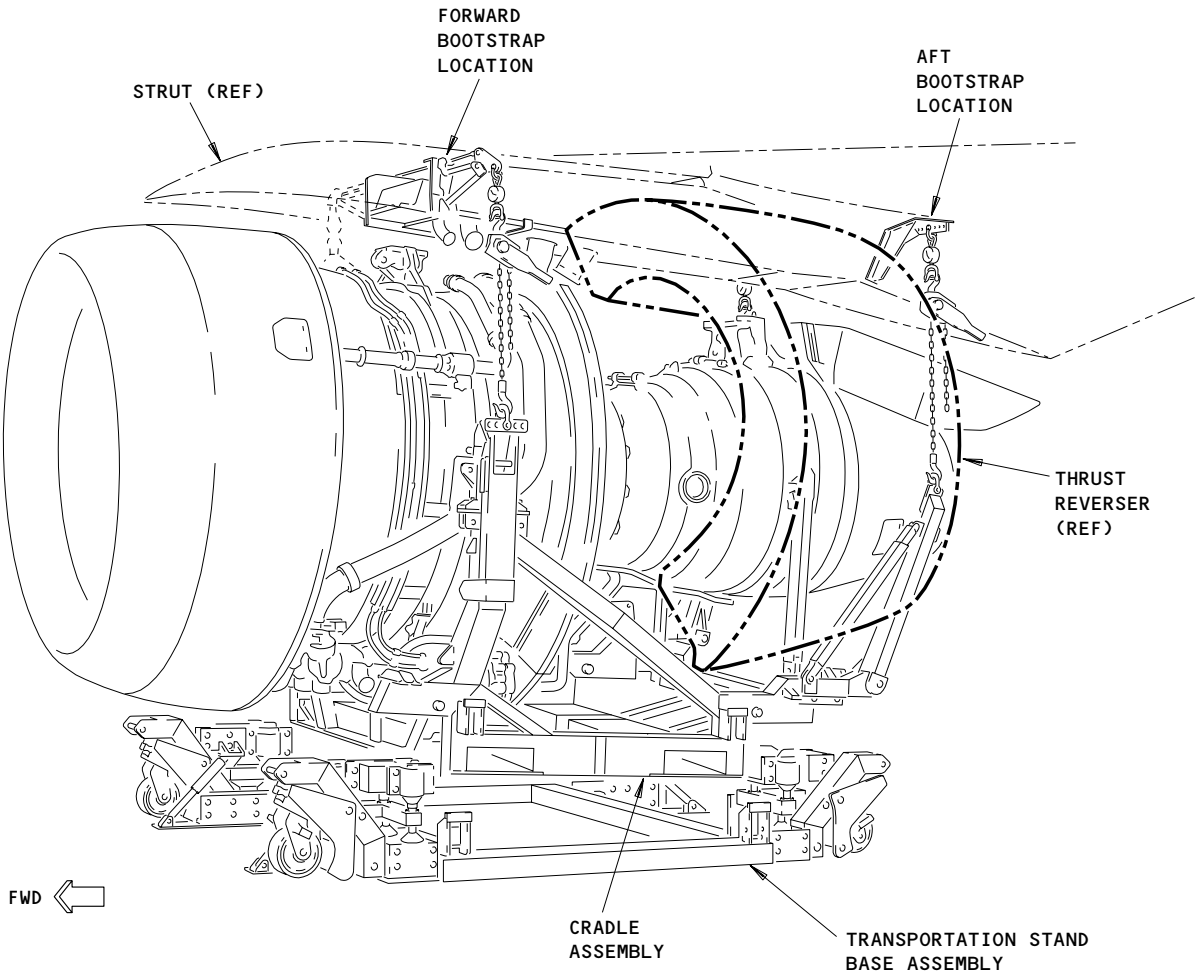
(c) Lower the engine 3 to 4 inches and and turn it axially to align it with the transportation stand.

(d) Align the cradle and the transportation stand.

(e) Lower and attach the cradle to the transportation stand.

(f) Disconnect the hoists from the cradle and pull the engine and the transportation stand forward until they are clear of the strut.

(g) Remove the foam pads.



Engine Removal
Figure 411A

Power Plant Removal - Bootstrap Method

S 034-039-R00

CAUTION: PUT THE CAPS ON THE END OF THE DUCTS FOR THE HP2 AND HP6 AIR OFFTAKE TO PREVENT CONTAMINATION BY UNWANTED MATERIAL OR WATER. DAMAGE TO EQUIPMENT CAN OCCUR.

(10) Remove the seals (3) and put the caps on the ducts for the HP2 and HP6 air takeoff (Fig 404).

S 034-040-R00

CAUTION: IMMEDIATELY PUT CAPS ON THE THERMAL ANTI-ICE DUCT OF THE INLET COWL AND THE STARTER AIR DUCT TO PREVENT CONTAMINATION BY UNWANTED MATERIAL OR WATER.

(11) Remove the seals (1,4) and install the caps on the strut and the thermal anti-icing duct of the inlet cowl and the starter air duct (Fig. 404).

S 214-041-R00

(12) Make a check of the intake duct, bellows and bellows seal of the precooler fan air.
(a) Look for dents, cracks, loose parts, and other damage.

S 214-042-R00

(13) Make a check of the mounted zone seals for the thrust reverser.

NOTE: Make an inspection of the areas you can see.

(a) Look for cracks, breaks, loose parts, and other damage.

S 094-043-R00

(14) If the power plant will be removed from the airplane for more than one day, remove the bootstrap equipment.

S 414-044-R00

(15) Do these steps to close the cowls on the engine:

NOTE: If the engine will stay off the strut for more than one day, close the engine cowls.

(a) Close the thrust reversers (AMM 78-31-00/201).
(b) Install the fan cowl panels (AMM 71-11-04/401).

TASK 71-00-02-404-003-R00

4. Power Plant Installation - Bootstrap Method

A. References
(1) AMM 20-11-00/201, Standard Torque Values
(2) AMM 54-52-01/401, Strut Fairings
(3) AMM 70-20-04/201, Fluorescent Penetrant Inspection
(4) AMM 71-21-01/601, Forward Mounts
(5) AMM 71-21-02/601, Aft Mount
(6) AMM 71-21-03/401, Engine Mount Barrel Nuts

B. Consumable Materials
(1) D00550 Antiseize Compound - Bostic Never-Seez Pure Nickel (AMM 70-30-00/201)

C. Access
(1) Location Zones

410	No. 1 Power Plant
420	No. 2 Power Plant
433/443	Nacelle Strut - Mid Structure

(2) Access Panels

433FL/443FL	Outboard Strut-To-Wing Attach Pin, Left
433MR/443MR	Outboard Strut-To-Wing Attach Pin, Right

D. Prepare to Install the Power Plant

S 914-045-R00
(1) Get new engine mount bolts or make an inspection of the old bolts as follows:
(a) If possible, obtain the improved (preferred) engine mount bolts, washers, and barrel nuts identified in the IPC.

NOTE: Refer to Service Letter 757-SL-71-021 for information on the improved engine mount bolts, washers and barrel nuts.

(b) Visually examine the bolts for signs of thread galling, nicks, shank scratches and irregular dimensions.
(c) Make an inspection of the bolts with the fluorescent penetrant (AMM 70-20-04/201).

S 914-166-R00
(2) Make an inspection of the forward engine mount (AMM 71-21-01/601) and the rear engine mount (AMM 71-21-02/601).
(a) Look for discolorization caused by heat damage, cracks, corrosion, worn areas, loose fasteners, worn bearings, missing/damaged cotter pins or signs of damage in the adjacent structure.

Power Plant Installation - Bootstrap Method

S 864-048-R00

(3) Make sure the airplane is in the same configuration given in the power plant removal.

S 494-051-R00

(4) Make sure the two ball lock pins and the streamers (B71005-10) are installed in the hinge beam support of the thrust reverser (Fig. 403).

S 494-053-R00

(5) Make sure the actuator lock for the thrust reverser B71009 is installed (Fig. 402).
   (a) If the actuator lock is not available, install the safety rod B71011 or B71025.

S 644-054-R00

CAUTION: INSTALL ONLY THE NEW BOLTS OR THE BOLTS WHICH WERE EXAMINED WITH THE DYE PENETRANT. USE OF OTHER BOLTS CAN CAUSE BOLT FAILURE.

(6) Apply the antiseize compound to the threads and the shanks of the engine mount bolts.

   NOTE: There are four bolts on the forward mount and four on the aft mount.

S 214-056-R00

(7) Make a check of the self-locking torque of the barrel nuts on the forward engine mount as follows:
   (a) Make sure that the torque is not less than 45 pound-inches (5.08 Newton meters).
   (b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

S 214-057-R00

(8) Do a check of the self-locking torque of the barrel nuts on the aft engine mount as follows:
   (a) Do a check that the specified torque is not less than 30 pound-inches (3.39 Newton meters).
   (b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

S 644-058-R00

(9) Apply the antiseize compound to the two shear pins on the aft engine mount and to the one shear pin on the forward engine mount (Fig. 411).

Power Plant Installation - Bootstrap Method

S 214-059-R00
(10) Do a check of the mating surfaces of the forward and aft mounts.
(a) Make sure they are free of unwanted objects.

S 214-060-R00
(11) Make a check of the strut structure in the area of the engine mounts.
(a) Look for fasteners which are loose and other damage.

S 434-061-R00
(12) Remove the caps from the thermal anti-ice duct of the inlet cowl, the starter air duct, and the ducts for the HP2 and HP6 duct assemblies.

E. Install the Power Plant

S 494-062-R00
(1) Make sure the bootstrap components are correctly installed.

NOTE: If the bootstrap components are not installed, install the bootstrap components. Refer to the procedure for the installation of the bootstrap equipment.

S 494-063-R00
(2) Put the transportation stand with the cradle and the engine below the strut.

S 824-064-R00
(3) Remove the engine from the transportation stand and align it with the strut (Fig. 409).

Power Plant Installation - Bootstrap Method

WARNING: THE TRANSPORTATION STAND AND THE CRADLE WILL MOVE FROM SIDE TO SIDE IF YOU LIFT IT TOO HIGH OFF THE GROUND. ONLY LIFT THE STAND AND CRADLE UP SUFFICIENTLY UNTIL YOU CAN LIGHTLY RUB THEM ACROSS THE GROUND. YOU MUST REMOVE ALL PERSONS AND EQUIPMENT WHICH ARE NOT IMPORTANT FROM THE AREA AS INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING: ONLY PERSONS WHO KNOW THE CORRECT INSTRUCTIONS MUST OPERATE THE LEVER HOISTS. WHEN THE LEVER CHAIN HOISTS ARE LIGHTLY LOADED, THEY CAN RELEASE THE LOAD WHEN THE CONTROL LEVER OR THE CHAIN IS PUT IN THE NEUTRAL OF FREE CHAIN POSITION. IF THE LEVER OR THE CHAIN IS IN THE NEUTRAL OR FREE CHAIN POSITION, THE ENGINE COULD FALL. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Increase the play in the hoists and attach the chain to the cradle.
(b) Only lift the cradle/stand equally on all four corners until it can lightly rub on the ground.
    1) Put the cradle/stand assembly in its correct position below the engine.
    2) It is important that you do not lift the cradle/stand up sufficiently to permit it to move from side to side.

        NOTE: It is not necessary to fully lift the engine/cradle/transportation stand from the bootstrap equipment. You can align the assembly before you lift it fully off the ground.

(c) Make a check that the pointer on the forward bootstrap arms are kept in the green color section of the bellcranks at all times when the chain hoists are loaded.
(d) Remove the load from the engine/cradle and the transportation stand.
(e) Disconnect the cradle from the transportation stand (Fig. 410).

    NOTE: You must lift the cable clamps out and up before you move the cradle and the stand apart.

(f) Do a check that the through-rod nut for the aft bootstrap arm is tightened to 200-250 pound-inches (Fig. 408).
(g) Put the forward bootstrap bellcranks in the position where the pointers are in an average position in the green area.
    1) To roll the bellcranks without an engine/cradle roll, use the forward chain hoists.

Power Plant Installation - Bootstrap Method

(h) Do these steps to get the engine/cradle assembly in the correct position below the strut:
1) Lift the assembly equally on all four corners until it is clear of the transportation stand.
2) Lift the engine/cradle until you can see that the assembly and the strut are aligned.

NOTE: This position is approximately six inches below the strut.

3) Lightly roll and pitch the engine/cradle assembly until its attitude is equivalent to the strut.

NOTE: Use the aft outboard hoist to make the engine roll. The bellcranks will turn in the same direction when the engine rolls. Use the person at the aft chain hoist position to look at the forward bellcrank position. Use flashlights at night.

Look axially at the engine from a position on the ground to make sure the roll attitudes of the cradle and the engine are equivalent.

Look at the side beam of the cradle and the stand rail to make sure the pitch attitudes are also equivalent.

4) The bellcranks will turn to the inboard direction (Fig. 409).
5) Keep the front arm pointers in the green area of the bellcranks.

S 424-065-R00

(4) Do these steps to install the engine (Fig. 411):

NOTE: If you use the torque wrench adapters, do a check for the corrected reading for the torque wrench before you tighten the engine mount bolts (AMM 20-11-00/201).

(a) Lift the power plant and let the forward shear pin go into the strut alignment hole a distance of 0.10 inch before the aft shear pins.
(b) Make sure the forward hinge beam of the thrust reverser aligns with the engine fan case.
1) Make sure the fire seals and the bulb seals align with the top of the engine fire shield.

Power Plant Installation - Bootstrap Method

WARNING: MONITOR THE LOAD CELLS ON THE FORWARD AND THE AFT HOISTS. DO NOT PUT MORE THAN 5200 POUNDS ON THE FORWARD LOAD CELL AND 2600 POUNDS IN AFT LOAD CELLS. IF YOU PUT MORE LOAD ON THE CELLS, THE ENGINE COULD FALL. THIS COULD CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

CAUTION: MAKE SURE THE SHEAR PINS GO INTO THE ALIGNMENT HOLES SMOOTHLY. IT SHOULD NOT RUB OR BIND. DAMAGE TO THE ALIGNMENT HOLES OR THE SHEAR PINS COULD OCCUR.

(c) Lift the engine and adjust the pitch and roll as necessary until the mount surfaces are approximately 1/8 inch apart.

NOTE: The forward load cell must read 4600-4700 pounds before you install the engine. Do not apply more than 5200 pounds to the forward load cell.

The aft load cells must read 2200-2300 pounds each. Do not apply more than 2600 pounds to each aft load cell.

CAUTION: THE ENGINE MOUNT SURFACES MUST BE CLEAN AND FREE OF UNWANTED OBJECTS BEFORE YOU TIGHTEN THE ENGINE MOUNT BOLTS. STRESS CONCENTRATIONS AT THE ENGINE MOUNT COULD CAUSE THE STRUCTURE TO BECOME WEAK.

(d) Apply a light source from the opposite side of the mount and make an inspection of the engine mount surface for metal flakes.
1) If you find metal flakes, lower the engine and do a check of the shear pins.
2) It is not permitted to have metal which separated from the shear pin.
3) If the metal flakes come from the shear pin, you must replace the shear pins before you lift the engine.

Power Plant Installation - Bootstrap Method

WARNING: MONITOR THE LOAD CELLS ON THE FORWARD AND THE AFT HOISTS. DO NOT PUT MORE THAN 5200 POUNDS ON THE FORWARD LOAD CELL AND 2600 POUNDS IN AFT LOAD CELLS. IF YOU PUT MORE LOAD ON THE CELLS, THE ENGINE COULD FALL. THIS COULD CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

CAUTION: MAKE SURE THERE IS NO CLEARANCE BETWEEN THE ENGINE MOUNTS AND THE STRUT BEFORE YOU INSTALL THE ENGINE MOUNT BOLTS. DO NOT USE THE ENGINE MOUNT BOLTS TO LIFT THE ENGINE IN THE CORRECT POSITION. DAMAGE TO EQUIPMENT COULD OCCUR.

(e) Lift the engine until the engine mount surfaces touch the strut; no clearance is permitted.
   1) Make sure the load cell indications are in the permitted limits.

(f) Make sure you lubricate the threads and the shanks of the engine mount bolts with the antiseize compound.

(g) Do these steps to install the engine mount bolts (2) and the countersunk washers (1) in the forward engine mount.

   NOTE: If extra washers are installed under the bolt heads, follow the recommendations in the Service Letter 757-SL-71-021 to install the improved (preferred) parts identified in Table 1 or 2.

   1) Use a 1/2 inch square drive ratchet adapter (SL715) and a 15/16 inch socket (SW301) or equivalent to install the front engine mount bolts.
   2) Tighten the bolts with the adapter B71005-2 and a 3/4 inch square drive torquemeter (TE602FU) or equivalent because the access to the bolts is tight.
   3) Tighten the bolts to the values given below in the table.

Power Plant Installation - Bootstrap Method

	POUND-INCHES	POUND-FEET	USING SHORT ADAPTER (B71005-2) LB-FEET *[1]	USING LONG ADAPTER (B71005-37) LB-FEET *[2]	USING ADAPTER (B71005-3 OR -28) LB-FEET *[3]
FORWARD MOUNT	3060 to 3740	255 to 312	212-259	199-243	-
AFT MOUNT	1935 to 2365	161 to 197	-	-	108-132

*[1] The P/N B71005-2 tool is an 8-inch extension which attaches to the torque wrench. It can only be used on the outboard side of the forward mount bolts. The torque given with the adapter is 83% of the true torque which is applied to the bolts.

*[2] The P/N B71005-37 tool is an 11.5-inch extension which attaches to the torque wrench. It can only be used on the outboard side of the forward mount bolts. The torque given with the adapter is 78% of the true torque which is applied to the bolts.

*[3] The P/N B71005-3 and B71005-28 tools are 11.5-inch extensions which attach to the torque wrench and are used when access is tight because of the thrust reverser. The torque given with this tool is 67% of the true torque value which is applied to the bolts.

(h) Do these steps to install the engine mount bolts (4) and the countersunk washers (3) in the aft mount fitting.

NOTE: If extra washers are installed under the bolt heads, follow the recommendations in the Service Letter 757-SL-71-021 to install the improved (preferred) parts identified in Table 1 or 2.

1) Tighten the bolts to the value given in the table.
2) Use a 1/2 inch square drive ratchet adapter (SL730) and a 13/16 inch socket (SW261) or equivalent to install the aft engine mount bolts.
3) Tighten the bolts with the adapter B71005-28 and a 1/2 inch square drive torquemeter (TE250FU) or equivalent because the access to the bolts is tight.

(i) After you tighten all the bolts, remove the forward and aft attach fitting assemblies (forward and aft adapters).
1) Move the aft support posts down.

S 094-165-R00

CAUTION: THE CRADLE CAN MOVE INBOARD A SMALL DISTANCE WHEN IT IS FREE OF THE ADAPTERS.

(5) Do these steps to lower the cradle.
  (a) Lower the cradle to the transportation stand.
    1) Make sure the attitude of the cradle does not change.
    2) Make sure the distance between the engine and the cradle is the same at all locations.
  (b) Connect the cradle to the transportation stand.
  (c) Adjust the lever hoists until you remove the play and then remove the bootstrap components.

S 094-173-R00

(6) Remove the thrust reverser hold open equipment B71006 if this was installed (Fig. 409B).
  (a) Attach the hand pump to the thrust reverser opening system.
  (b) Operate the hand pump to pressurize the thrust reverser opening actuators to take the weight of the thrust reverser.
  (c) Use the forward and aft hold open rods to hold open the thrust reverser half.
  (d) Disconnect the center plates of the strap (-52) from the clevis assembly (-86).
  (e) Remove the end plates of the strap (-52) from the bottom of the thrust reverser half.
    1) Store the bolts in the threaded holes of the end plate.
  (f) Remove the clevis assemblies (-86) from the supports (-3).
  (g) Remove the supports (-3) from the arch (-4).
  (h) Remove the braces (-5).
  (i) Remove the arch (-4) from the mid strut brackets.

S 094-068-R00

(7) Do these steps to remove the bootstrap components.
  (a) Remove the forward and aft hoists.
  (b) Remove the forward and the aft load cells.
  (c) Remove the forward safety braces from the forward arms and the mid-strut brackets.
  (d) Remove the aft safety braces from the aft arms and the mid-strut brackets.
  (e) Remove the mid-strut brackets and the drag braces.
    1) Install the 3/8 inch bolts in the bracket storage holes.
  (f) Install two setscrews on the two sides of the strut and make them level with the surface.
  (g) Remove the forward and the aft arms.
    1) Install the 5/16 inch bolts and washer in the aft arm storage holes.
    2) Install a 5/8 inch nut on the outboard aft arm through-rod.

Power Plant Installation - Bootstrap Method

(h) Remove the forward strut pads and install the 1/2 inch bolts in the pad storage holes.
(i) Install two setscrews on each side of the forward strut structure.
1) Make sure the setscrews are level with the surface so you can install the forward strut fairing.
(j) Install one setscrew and make it level with the surface on the two sides of the strut aft bulkhead.
(k) Install the access panels 433FL(443FL) and 433MR(443MR) (AMM 54-52-01/401).

S 094-069-R00

(8) Remove the protective pads from the common nozzle.

S 844-071-R00

(9) Do the procedure to put the airplane back to its usual condition.

TASK 71-00-02-004-073-R00

5. Power Plant Removal - Single Point Sling Method

A. General

(1) This section contains instructions when you remove the power plant with the Rolls-Royce single point sling.

(2) You must use platforms and stands to give safe access to install the sling components.

(3) The single point sling equipment is only used when you do an engine change inside a structure.

(4) The sling weighs approximately 0.52 metric ton.

(5) You must be careful not to apply too much force to the strut when you install the equipment.

(6) The single load sensor can give the load indication away from the sensor with the remote readout. This permits you to monitor the total load or the preload at the ground level. This indicator is calibrated in metric tons.

(7) The left beam assembly is attached to the spreader beam with a fixed length sling, and is used for the left and right installations.

(8) The right beam assembly is attached to the spreader beam with a long or short sling. The decision on which beam assembly to use is found by the installed position of the engine.

(a) The long sling gives a 5 degree roll to the right for the left installations.

(b) The short sling gives a 5 degree roll to the left for the right installations.

(c) You can adjust the roll angle when you operate the right sling turnbuckle.

(9) The sling which is not used is kept in the stowage bracket on the support beam.

(10) With the pitch adjusters in approximately the mid position, the engine will be at a 2-degree nose-up attitude.

(a) You can adjust the pitch with an inclinometer and the screws at the top beam jack when the engine is held by the sling.

(b) The left beam assembly features an indicator plate and a plumb bob.

(c) The indicator plate gives the datum points for the left and the right installations.

Power Plant Removal - Single Point Sling Method

(d) When the play is removed from the sling, you move the crane jib until the plumb bob is aligned with the applicable datum point.
(e) This tells you that the jib is in the correct position, and makes sure that there will be no sudden movement when you release the engine from the strut to the cradle.

(11) When you use the single point sling equipment, the airplane must be level to 3 degrees of zero pitch and roll attitude (AMM 08-21-00/201).

(12) This procedure contains these topics:
(a) Prepare for the installation of the single point sling
(b) Installation of the single point sling
(c) Removal of the engine.

B. Equipment

WARNING: DO NOT USE INCORRECT EQUIPMENT TO LIFT THE ENGINE. USE ONLY THE EQUIPMENT GIVEN BELOW. USE OF THE INCORRECT EQUIPMENT CAN CAUSE THE ENGINE TO DROP. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Tool Set, Engine Change - B71005-36 (recommended)
Tool Set, Engine Change - B71005-27 (alternative)
(a) Adapter - B71005-37 (recommended)
Adapter - B71005-2 (alternative)
(b) Adapter - B71005-28
(c) C-Duct Actuator Lock - B71009-9
(d) T/R Isolation Valve Lock - B78001-1
(e) Pin & Streamer - B71005-10
(f) Torquemeter 1/2 Dr - TE250FU
(g) Torquemeter 3/4 Dr - TE602FUA
(h) Torquemeter 3/8 Dr - TE50A
(i) 5/8 Crowfoot Wrench 3/8 Dr - FC032
(j) 13/16 Socket 3/4 Dr - LDH262
(k) Breaker Bar 3/4 Dr - L112EL
(l) 15/16 Socket 3/4 Dr - LDH302
(m) Breaker Bar 3/4 Dr - L112EJ
(n) 13/16 Socket 1/2 Dr - SW261
(o) Ratchet Adapter 1/2 Dr - SF730A (recommended)
Ratchet Adapter 1/2 Dr - SF730 (alternative)
(p) 15/16 Socket 1/2 Dr - SW301
(q) Ratchet Adapter 1/2 Dr - SL715
(r) Wrench Assembly - B71005-11
(s) 6" Extension Bar 1/2 Dr - IMX62A

Power Plant Removal - Single Point Sling Method

(2) Single Point Sling - CP30463/12, Rolls-Royce
(3) Cradle Assembly - CP30501/9, Rolls-Royce
    (a) PRE-SB 72-9188;
        Fan Case Handling Adapter (Strong Ring) - CP30379/8, Rolls-Royce (2 required, Detail of CP30501/7)

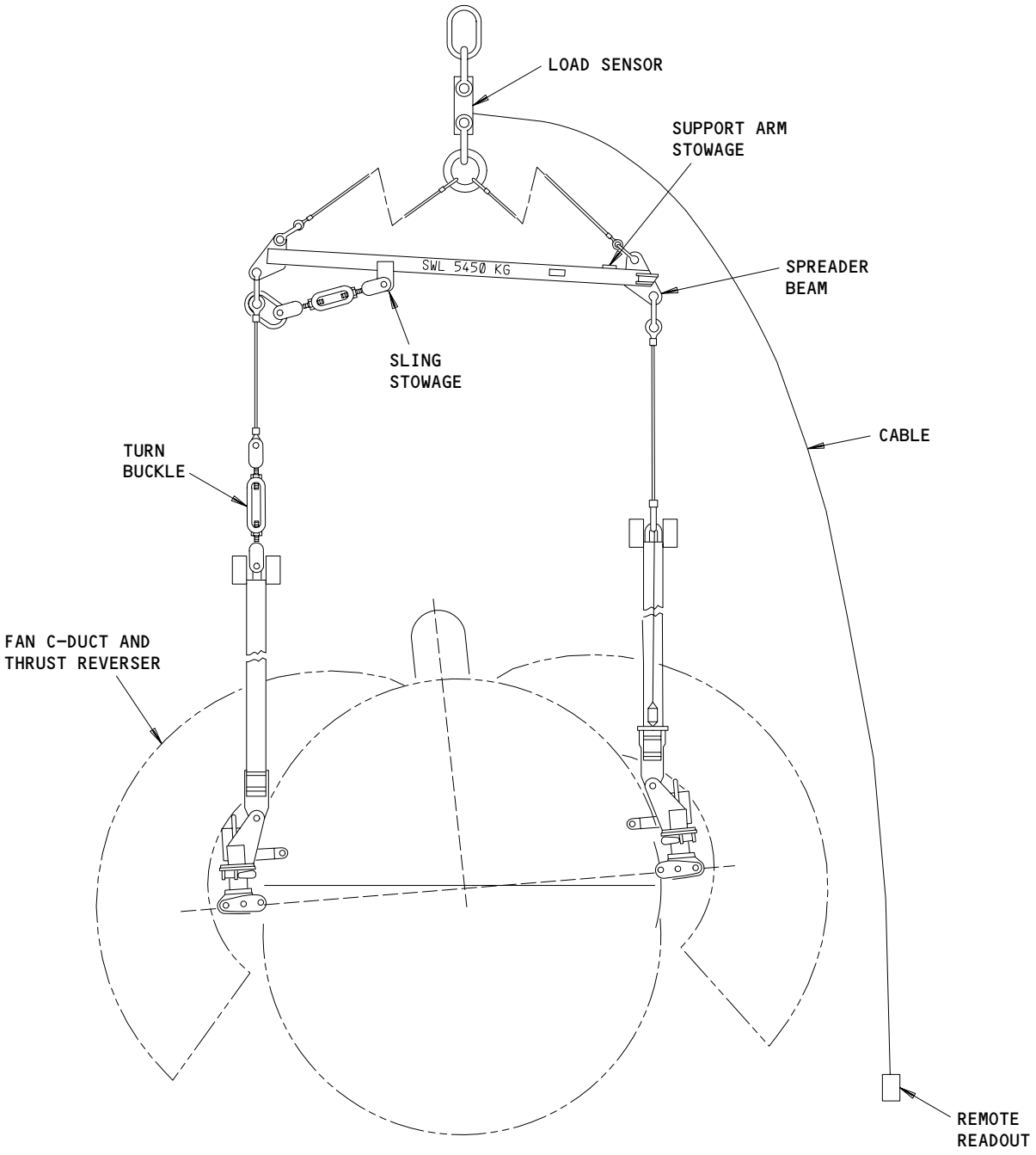
    (b) POST-SB 72-9188;
        Fan Case Handling Adapter (Strong Ring) - CP30379/8 (1 required LH (Port))
        Fan Case Handling Adapter (Strong Ring) - HU55007/1 (1 required RH (Stbd))

    (c) Rear Suspension Handling Adapter (Mounting Ring) - CP30350/1, Rolls-Royce (2 required, Detail of CP30501/9)
    (d) Trunnion Bracket - CP30502/2, Rolls-Royce (2 required, Detail of CP30501/9)
(4) Transportation Stand Base Assembly - CP30503/2, Rolls-Royce
(5) Caster Assembly - CP30499, Rolls-Royce, (Used with RR Transportation Stand Base CP30503/2)
(6) Tow Bar - CP30500, Rolls Royce (used with RR Cradle Assembly - CP30501/4).

C. References
(1) AMM 8-21-00/201, Leveling

D. Access
(1) Location Zones
    410 No. 1 Power Plant
    420 No. 2 Power Plant

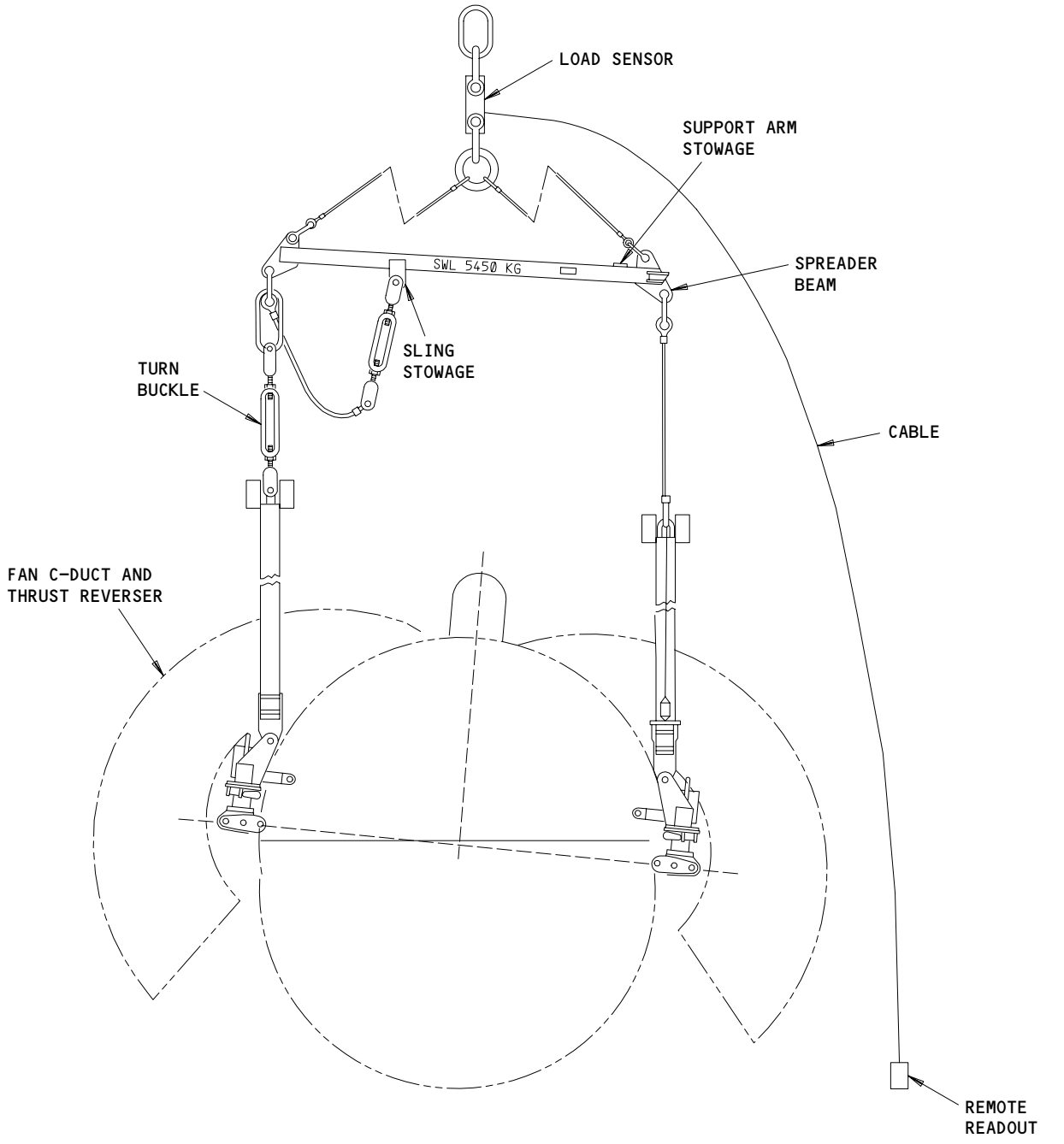
E. Prepare the Single Point Sling (Fig. 412)



LEFT INSTALLATION

A6325

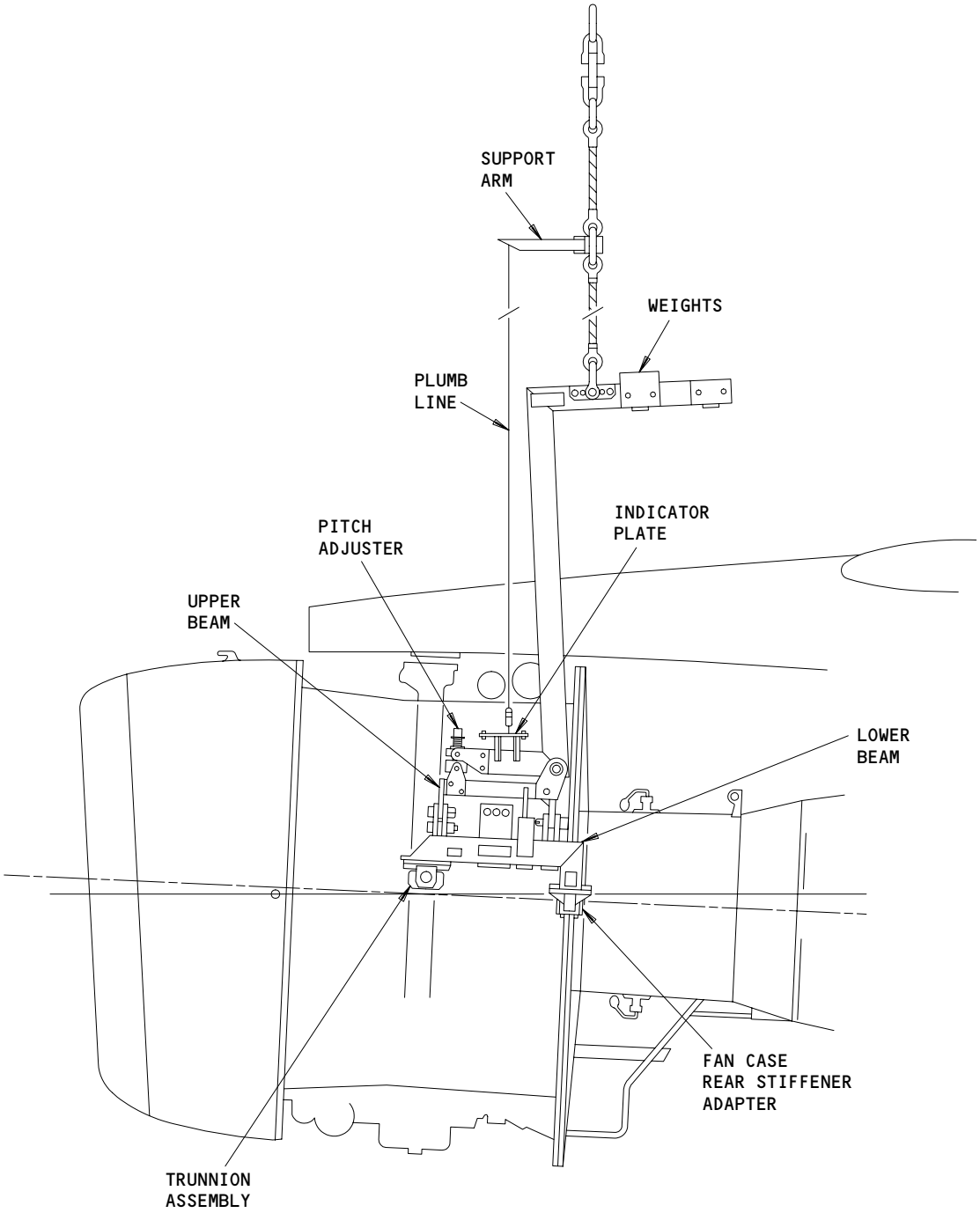
Single Point Sling Component Location
Figure 412 (Sheet 1)



RIGHT INSTALLATION

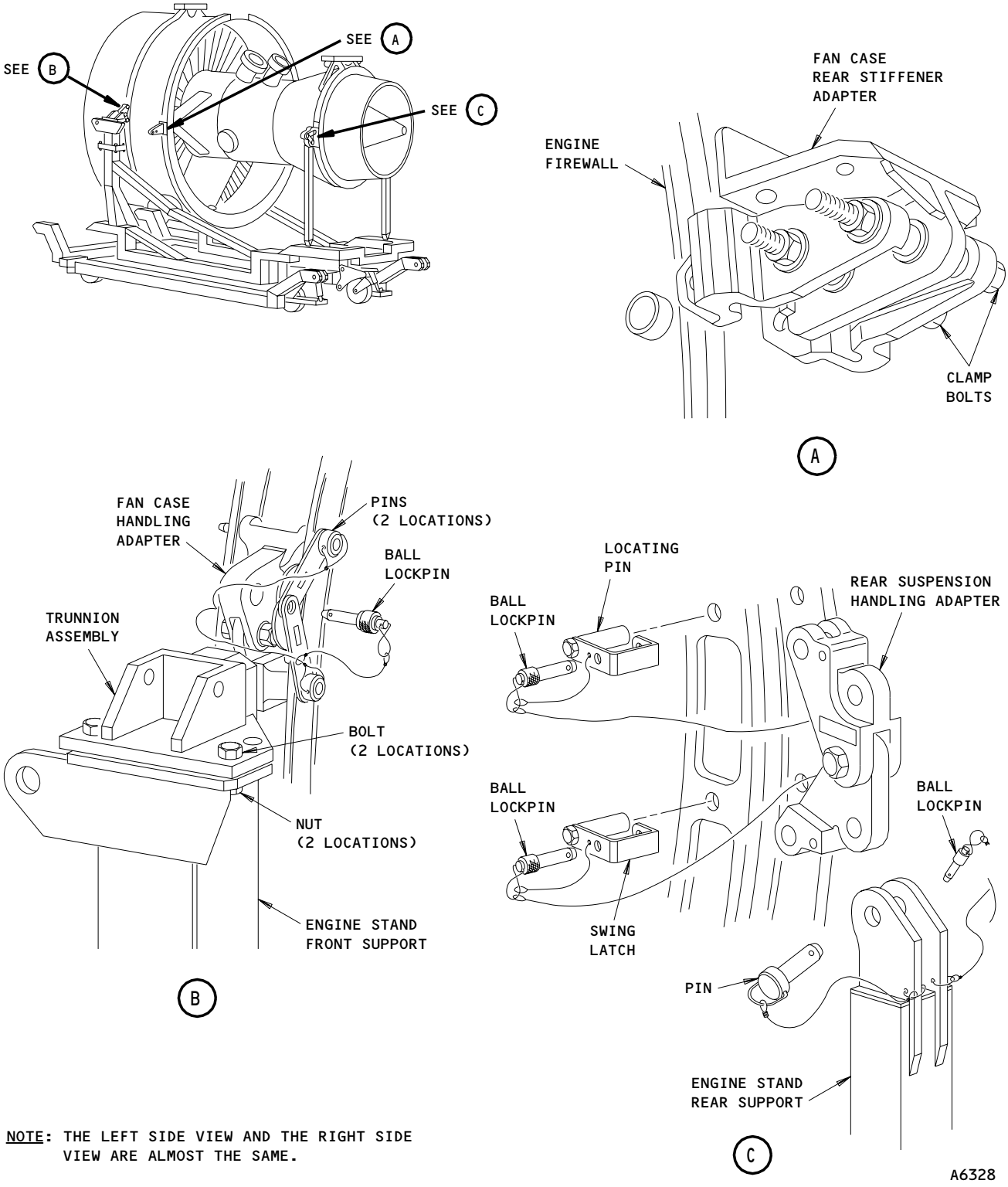
A6326

Single Point Sling Component Location
Figure 412 (Sheet 2)



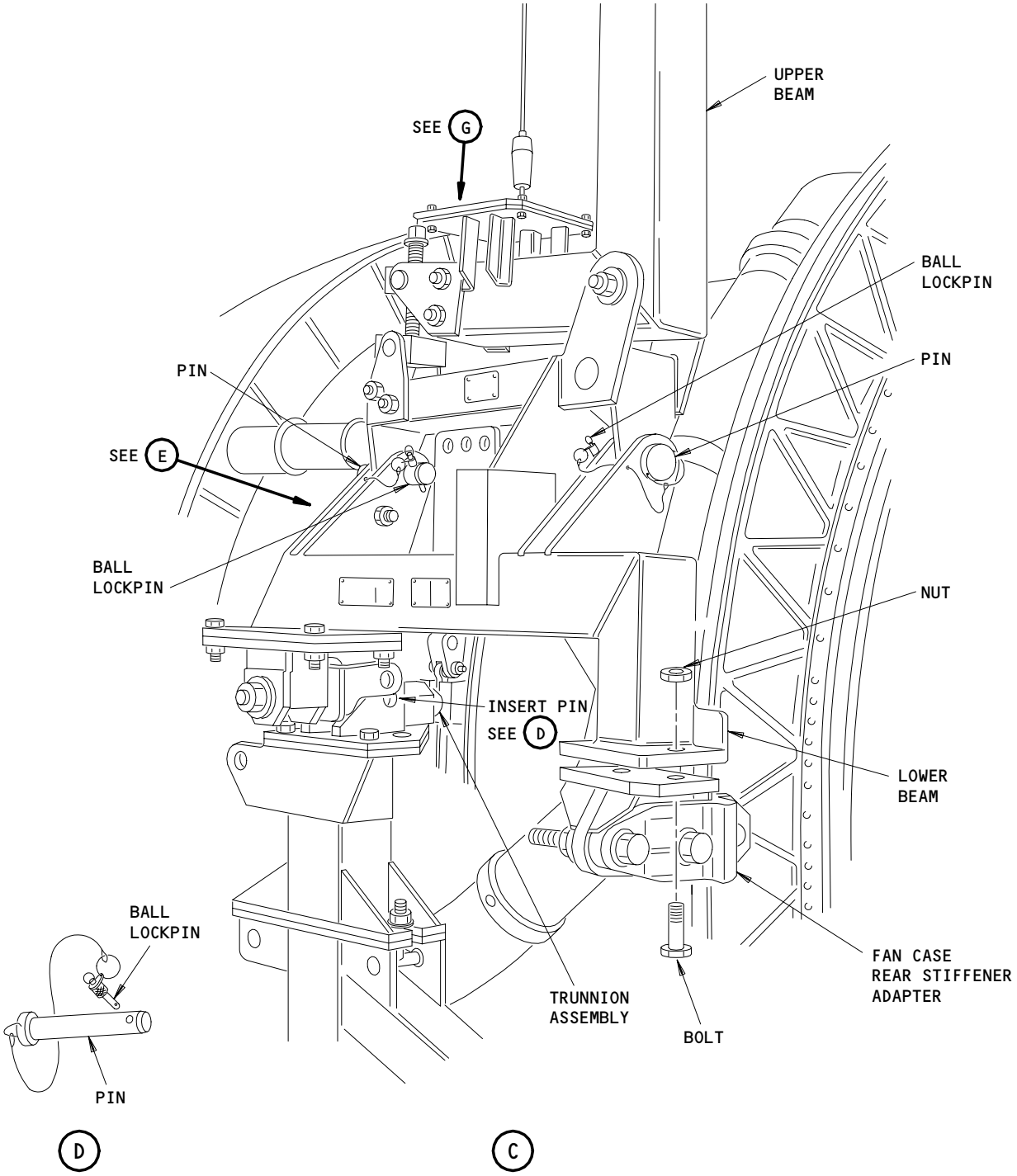
A6327

Single Point Sling Component Location
Figure 412 (Sheet 3)



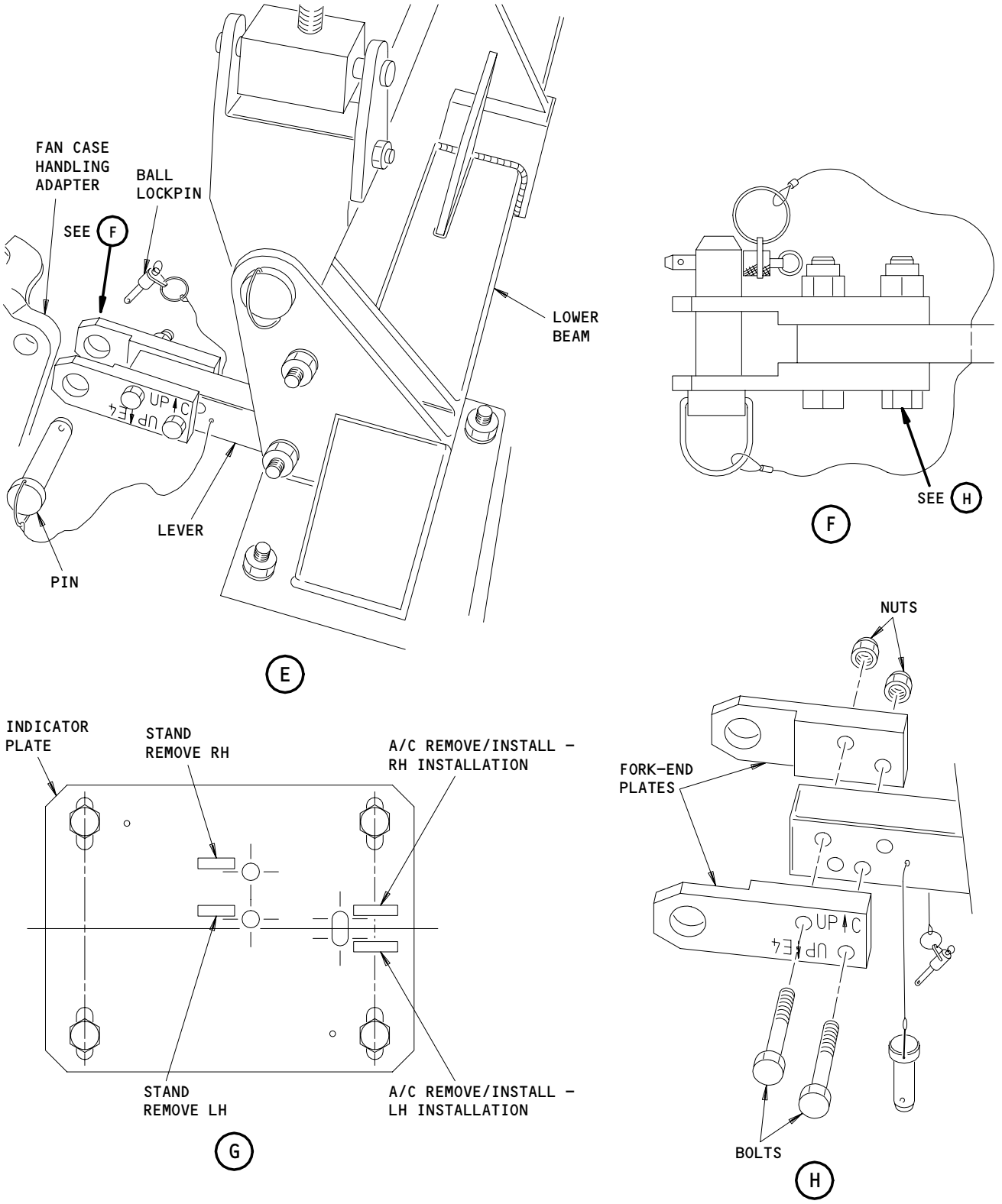
NOTE: THE LEFT SIDE VIEW AND THE RIGHT SIDE VIEW ARE ALMOST THE SAME.

Single Point Sling Installation
Figure 413 (Sheet 1)



A6329

Single Point Sling Installation
Figure 413 (Sheet 2)



Single Point Sling Installation
Figure 413 (Sheet 3)

Power Plant Removal - Single Point Sling Method

S 844-442-R00

WARNING: BE CAREFUL WHEN YOU MOVE THE SLING EQUIPMENT BECAUSE IT IS HEAVY. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(1) Do the procedure to prepare the engine for the removal of the power plant.

S 824-075-R00

(2) Make sure balance weight for the upper beam is in the ENGINES WITH NOSE COWL position.
   (a) Install the balance weights on the left upper beam at the forward location.
      1) Use a bolt and a nut.
   (b) Do the step again for the right upper beam.

S 824-076-R00

(3) Make sure the shackle is installed in the center hole for the lifting point on the left upper beam.

S 494-077-R00

(4) Attach the upper beams to the spreader beam.
   (a) Use the fixed-length sling to attach the left upper beam to the spreader beam.

      NOTE: The fixed-length sling is used in all roll conditions and must be located adjacent to the plumb line.

   (b) LEFT ENGINE INSTALLATION;
   Use the long sling to attach the right upper beam to the spreader beam.

      NOTE: The long sling contains a wire rope and a turnbuckle.

   (c) RIGHT ENGINE INSTALLATION;
   Use the short sling to attach the right upper beam to the spreader beam.

      NOTE: The short sling contains a link and a turnbuckle.

   (d) Attach the sling which is not used to the stowage bracket on the spreader beam with the pin and the ball lockpin.

S 494-078-R00

(5) Do these steps to adjust the forward lever position of the lower beam position (Fig. 413):
   (a) Remove the ball lockpin and the pin from the lever fork end of the left lower beam.
   (b) Remove the bolt and the nut which attaches the fork end plates to the lever.
   (c) Put the fork end plates, with the 'UP E4' mark, at the top of the lever rear face.
   (d) Align the plates with the applicable bolt holes in the lever and install the bolt and the nut.
      1) Tighten the bolts.
   (e) Temporarily install the pin and the ball lockpin.
   (f) Do the procedure again for the right lower beam.

S 494-079-R00

(6) Remove the rear stiffener adapters for the fan case from the rear attachment point of the lower beam.

S 494-080-R00

(7) Attach the lower beams to the upper beams with the pins and the ball lockpins.

S 494-081-R00

(8) Connect the remote readout cable to the single load cell.

S 494-082-R00

(9) Remove the ball lockpin which attaches the support arm for the plumb line in the spreader beam stowage. Align the support arm with the indicator plate for the upper beam and attach with the ball lockpin.

S 494-441-R00

WARNING: IF THE AIR CONDITIONS ARE NOT STABLE, THE PLUMB BOB WILL NOT OPERATE. DO NOT USE THE SLING IF THE PLUMB BOB IS NOT ALIGNED. IF THE CRANE JIB IS NOT IN THE CORRECT POSITION, THE ENGINE CAN TURN SUDDENLY ABOUT ITS AXIS. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(10) Release the plumb-bob line and let it hang free.

F. Install the sling equipment (Fig. 413).

S 494-084-R00

(1) Remove the handling adapter for the fan case, the trunnion assembly, and the handling adapter for the rear suspension from the engine cradle.

Power Plant Removal - Single Point Sling Method

S 494-085-R00
(2) Install the handling adapter for the fan case to the fan case.
(a) Install the ball lockpins and the discs.

S 494-086-R00
(3) Install the trunnion assembly.

S 494-087-R00
(4) Install the handling adapter for the rear suspension to the rear mounting ring

S 494-088-R00

CAUTION: THE BOLT THREADS FOR THE REAR STIFFENER ADAPTER OF THE FAN FRAME MUST FACE FORWARD. IF THEY DO NOT, YOU CAN DAMAGE THE THRUST REVERSER.

(5) Install the rear stiffener adapter for the fan case to the engine firewall.
(a) Tighten the clamp bolts to 20 pound-feet (27 Newton-meters).

S 494-089-R00
(6) Operate the roller switch for the remote readout until the unit gives a 'zero' indication.

S 494-090-R00

WARNING: THE WEIGHT OF THE SLING IS APPROXIMATELY 0.52 METRIC TONS. BE CAREFUL WHEN YOU MOVE THE SLING. INJURIES TO PERSONS CAN OCCUR.

CAUTION: BE CAREFUL WHEN YOU LOWER THE SLING TO THE ENGINE. IF YOU ARE NOT CAREFUL, DAMAGE TO THE ENGINE ACCESSORIES COULD OCCUR.

(7) Carefully lift the sling assembly and move it to the engine,
(a) Make sure the plumb bob and the remote readings are temporarily held.

S 494-091-R00
(8) Do these steps to lower the sling and attach it to the engine:
(a) Install the forward lever of the lower beam to the handling adapter of the fan case.
1) Use the pin and the ball lockpins.
(b) Install the forward attachment of the lower beam to the trunnion assembly.
1) Use the ball and the lockpins.

Power Plant Removal - Single Point Sling Method

(c) Install the rear attachment of the lower beam to the rear stiffener adapter of the fan case.
1) Use the bolt and the nut.
2) Tighten the bolt to 84 pound-feet (114 Newton meters).
(d) Do the step again for the opposite lower beam.

G. Remove the Power Plant

S 214-092-R00

(1) Make sure all the pins, lockpins, and sling attaching components are installed correctly.

S 024-093-R00

(2) Do these steps when you loosen the forward and aft engine mount bolts:
(a) Remove the play from the sling assembly, but do not apply the load of the engine.
(b) Move the crane jib horizontally until the plumb bob is aligned with the A/C REMOVE/INSTALL marker on the indicator plate for the applicable engine.

NOTE: To keep the engine in the correct roll and pitch attitude, you must make sure the plumb bob is aligned.

CAUTION: DO NOT APPLY A TOTAL INDICATED LOAD OF MORE THAN 5.0 METRIC TONS. DAMAGE TO THE STRUT CAN OCCUR.

(c) Apply a total indicated load of 4.8 metric tons. Use the remote readout.
(d) Loosen each of the forward and aft engine mount bolts by one half turn.

CAUTION: MAKE SURE YOU KEEP AN EQUAL DISTANCE BETWEEN THE FORWARD AND THE AFT MOUNTS AND THE STRUT. IF THE DISTANCE IS NOT THE SAME, THE PITCH OF THE ENGINE COULD CHANGE. THIS COULD CAUSE DAMAGE TO THE STRUT.

(e) Do this again until the engine mount bolts are fully loose.

NOTE: The increments at which the engine is lowered is controlled by the speed at which you remove the bolts.

When the bolts are loose, the sling will hold the full weight of the engine.

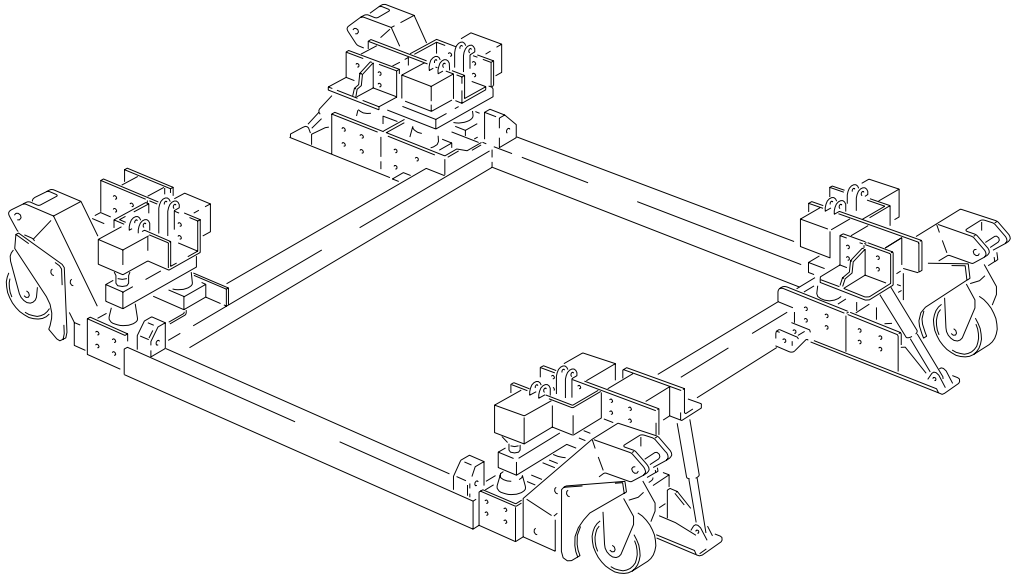
Power Plant Removal - Single Point Sling Method

S 024-162-R00

WARNING: BE CAREFUL WHEN YOU MOVE THE ENGINE. THE ENGINE WEIGHS APPROXIMATELY 9620 POUNDS (4.2 METRIC TONS). INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

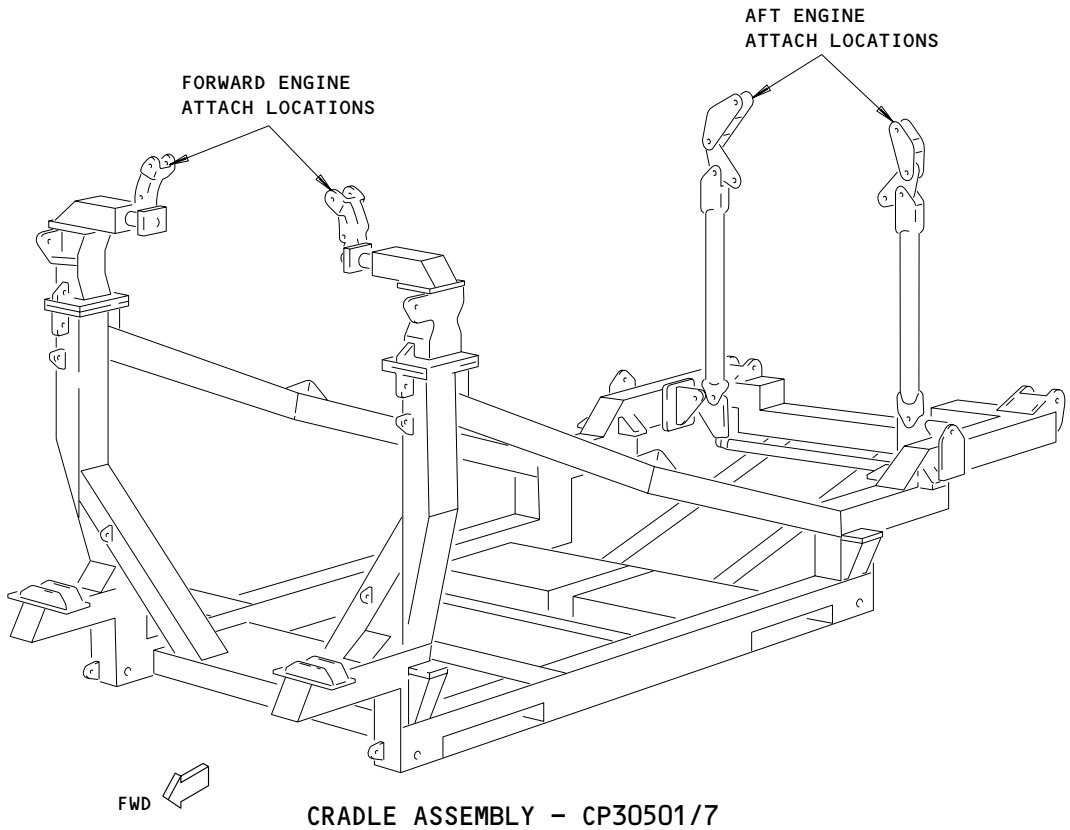
CAUTION: DO NOT LOWER THE ENGINE FROM THE STRUT TO THE CRADLE. THE UPPER BEAM EXTENSION OF THE INBOARD SLING WILL TOUCH THE LEADING EDGE SLAT. DAMAGE TO THE AIRPLANE CAN OCCUR.

(3) Do these steps to lower the engine and attach it to the engine cradle and transportation stand assembly (Figs. 413, 413A and 413B):
   (a) Lower the engine.
      1) Monitor the plumb bob to make sure it is aligned with the indicator plate and the front and rear engine mounts.
      2) Make sure you keep the correct roll and pitch of the engine until the mount shear pins are free of the strut.
   (b) Move the engine forward until it is free of the thrust reverser and the strut.
   (c) Align the engine with the cradle and transportation stand assembly; lower the engine until it touches the inboard trunnion on the cradle dowels.
   (d) Attach the handling adapter for the rear inboard suspension to the cradle.
      1) Use the pin and the ball lockpin.
   (e) Attach the handling adapter for the rear outboard suspension to the cradle.
      1) Use the pin and the ball lockpin.
   (f) Continue to lower the engine until the outboard trunnion is installed on the cradle dowels.
   (g) Install the bolt and the nut to attach the trunnion assemblies to the engine cradle.



59668A

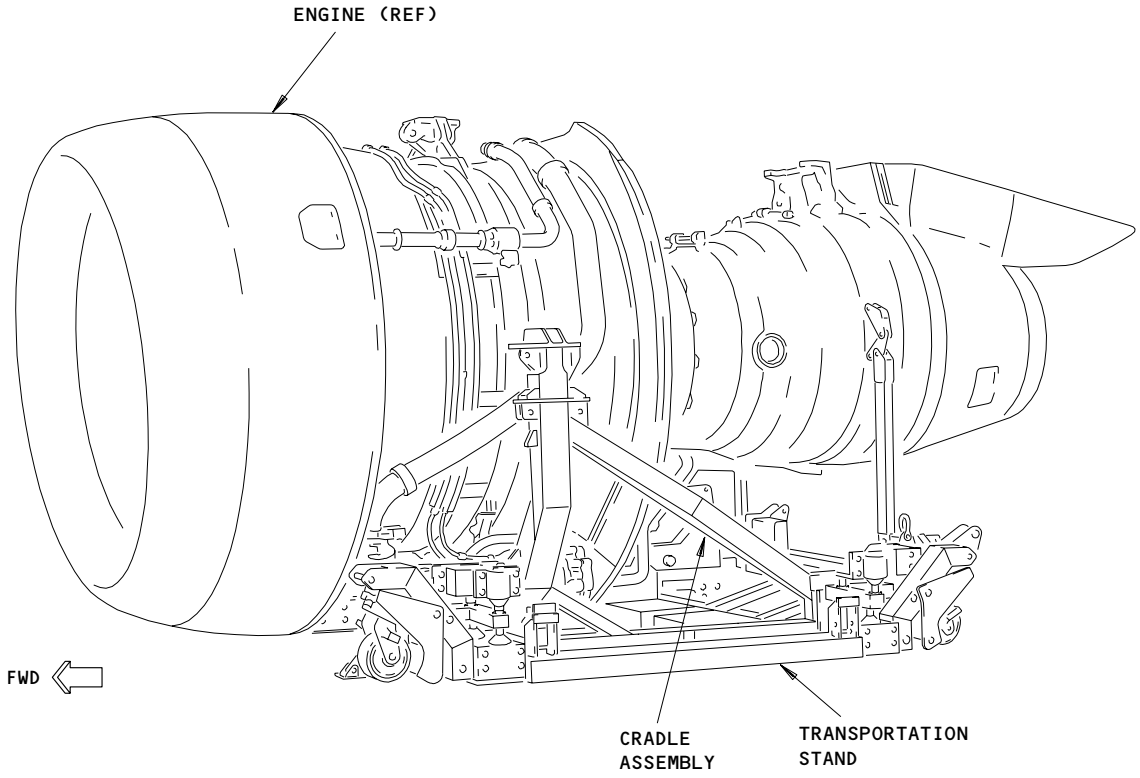
TRANSPORTATION STAND BASE ASSEMBLY – CP30503/2



CRADLE ASSEMBLY – CP30501/7

59667B

Engine Cradle and Transportation Stand
Figure 413A



Engine with Cradle Assembly and Transportation Stand
Figure 413B

Power Plant Removal - Single Point Sling Method

S 094-096-R00

(4) Remove the single point sling (Fig. 413)
  (a) Release the tension from the sling.
  (b) Remove the bolt and the nut to disconnect the rear attachment of the lower beam from the rear stiffener adapter of the fan case.
  (c) Remove the ball lockpin and the pin from the forward lever of the forward beam.
    1) This will disconnect it from the handling adapter of the fan case.
  (d) Remove the ball lockpin and the pin from the forward attachment of the lower beam.
    1) This will disconnect it from the trunnion assembly.
  (e) Do the step again to remove the opposite lower beam.

WARNING: THE WEIGHT OF THE ASSEMBLED SLING IS APPROXIMATELY 0.52 METRIC TONS. BE CAREFUL WHEN YOU MOVE THE SLING. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

  (f) Lift the single point sling equipment away from the engine.
  (g) Loosen the bolts and remove the rear stiffener adapter of the fan case from the engine.
  (h) Temporarily install the rear stiffener adapters of the fan case to the sling lower beams.

Power Plant Installation - Single Point Sling

TASK 71-00-02-404-004-R00

6. Power Plant Installation - Single Point Sling Method

A. References
(1) AMM 70-20-04/201, Fluorescent Penetrant Inspection
(2) AMM 71-21-01/601, Forward Engine Mount
(3) AMM 71-21-02/601, Aft Engine Mount
(4) AMM 71-21-03/401, Engine Mount Barrel Nuts

B. Consumable Materials
(1) D00550 Antiseize Compound - Bostic Never-Seez Pure Nickel (AMM 70-30-00/201)

C. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

D. Prepare for the Installation of the Power Plant

S 914-100-R00
(1) Get new engine mount bolts or make an inspection of the old bolts as follows:
(a) If possible, obtain the improved (preferred) engine mount bolts, washers, and barrel nuts identified in the IPC.

NOTE: Refer to Service Letter 757-SL-71-021 for information on the improved engine mount bolts, washers and barrel nuts.

(b) Visually examine the bolts for signs of thread galling, nicks, shank scratches and irregular dimensions.
(c) Make an inspection of the bolts with the fluorescent penetrant (AMM 70-20-04/201).

S 214-101-R00
(2) Make an inspection of the forward engine mount (AMM 71-21-01/601) and the rear engine mount (AMM 71-21-02/601).
(a) Look for discolorization caused by heat damage, cracks, corrosion, worn areas, loose fasteners, worn bearings missing/damaged cotter pins or signs damage in the adjacent structure.

Power Plant Installation - Single Point Sling

S 644-103-R00

CAUTION: INSTALL ONLY THE NEW BOLTS OR THE BOLTS WHICH WERE EXAMINED WITH THE DYE PENETRANT. USE OF OTHER BOLTS CAN CAUSE BOLT FAILURE.

(3) Apply the antiseize compound to the threads and the shanks on the engine mount bolts.

NOTE: There are four bolts on the forward mount and four on the aft mount.

S 214-105-R00

(4) Make a check of the self-locking torque of the barrel nuts on the forward engine mount as follows:
(a) Make sure that the torque is not less than 45 pound-inches (5.08 Newton meters).
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

S 214-106-R00

(5) Do a check of the self-locking torque of the barrel nuts on the aft engine mount as follows:
(a) Do a check that the specified torque is not less than 30 pound-inches (3.39 Newton meters).
(b) Replace all nuts which are not in the specified range (AMM 71-21-03/401) and do the check again.

S 644-107-R00

(6) Apply the antiseize compound to the two shear pins on the aft engine mount and to the one shear pin on the forward engine mount (Fig. 411).

S 214-108-R00

(7) Do a check of the mating surfaces of the forward and aft mounts.
(a) Make sure they are free of unwanted objects.

S 214-109-R00

(8) Do a check of the strut structure in the area of the engine mounts.
(a) Look for fasteners which are loose and other damage.

Power Plant Installation - Single Point Sling

S 494-110-R00

CAUTION: MAKE SURE YOU INSTALL THE PINS IN THE HINGE SUPPORTS BEFORE YOU REMOVE THE ENGINE. IF THE PINS ARE NOT INSTALLED, YOU COULD PUT TOO MUCH LOAD ON THE THRUST REVERSER HINGES AND CAUSE DAMAGE TO THE HINGES. MAKE SURE YOU KEEP THE PINS INSTALLED IN THE HINGE SUPPORTS UNTIL THE ENGINE IS INSTALLED.

(9) Make sure the two ball lock pins and streamers (B71005-10) are installed in the hinge beam support of the thrust reverser (Fig. 403).

S 494-111-R00

(10) Make sure you install the actuator lock B71009 for the thrust reverser (Fig. 402). If the actuator lock is not availiable, install the safety rod B71011 or B71025.

NOTE: The safety rod B71011 is for the RB211-535C engines. The safety rod B71025 is for the RB211-535E4 engines.

S 434-113-R00

(11) Remove the caps from the thermal anti-ice duct of the inlet cowl, the starter air duct, and the ducts for the HP2 and HP6 air offtake.

E. Install the Power Plant

S 424-114-R00

(1) Do these steps to align the engine with the strut:
   (a) Put the engine and the stand adjacent to the strut.
   (b) If it is necessary, do the procedure to install the single point sling components.
   (c) Make sure that all pins, lockpins, and sling components are installed correctly.
   (d) Put the sling in tension, but do not apply the engine load.
   (e) Move the crane jib horizontally.
   (f) Stop the jib when the plumb bob is aligned with the STAND-REMOVE mark on the indicator plate for the applicable (left or right) installation (Fig. 413).

NOTE: When the plumb bob is aligned correctly, the engine will get the correct attitude. If it is not aligned correctly, the engine can move suddenly when it is released from the cradle.

   (g) Apply the weight of the engine to the sling.
   (h) Remove the bolts and the nuts to disconnect the trunnions from the engine cradle (Fig. 413).

Power Plant Installation - Single Point Sling

(i) Remove the pins and the ball lockpins to disconnect the handling adapters of the rear suspension from the engine cradle (Fig. 413).

(j) While you monitor the jib to make sure it is aligned, lift the engine away from the engine cradle.

NOTE: The outboard trunnion will release from the engine cradle and the engine roll will increase until the inboard trunnion is released. This gives the engine the correct roll attitude for the installation to the strut.

WARNING: BE CAREFUL WHEN YOU MOVE THE ENGINE BECAUSE IT WEIGHS APPROXIMATELY 9260 POUNDS (4.2 METRIC TONS). INJURIES TO PERSONS COULD OCCUR IF YOU ARE NOT CAREFUL.

CAUTION: BE CAREFUL WHEN YOU MOVE THE ENGINE TO THE STRUT. IF THE ENGINE IS TOO LOW, THE UPPER BEAM EXTENSION OF THE INBOARD SLING WILL TOUCH THE LEADING EDGE SLAT. THIS CAN CAUSE DAMAGE TO EQUIPMENT.

(k) Lift the engine and align it with the strut. Move the engine rearward to align the forward and aft engine mounts with the strut.

(l) Lift the engine until the mount shear pins go into the strut holes.

1) Make sure you install the shear pins to a depth which is not less than the chamfer pins.

(m) Examine the plumb bob to make sure it is correctly aligned with the indicator plate.

1) The plumb bob must be aligned with the A/C REMOVE INSTALL marker for the applicable left or right installation.

NOTE: If it is necessary to adjust the pitch because the airplane's pitch attitude has changed, adjust the pitch of the engine. To adjust the pitch, operate the pitch adjusters for the screw jack of the upper beam.

(n) While you monitor the plumb bob, lift the engine until there is a distance of approximately 1/8 inch between the mount surfaces.

Power Plant Installation - Single Point Sling

CAUTION: THE ENGINE MOUNT SURFACES MUST BE CLEAN AND FREE OF UNWANTED OBJECTS BEFORE YOU TIGHTEN THE ENGINE MOUNT BOLTS. STRESS CONCENTRATIONS IN THE ENGINE MOUNTS CAN OCCUR. THIS COULD CAUSE THE STRUCTURE TO BECOME WEAK AND CAUSE DAMAGE TO EQUIPMENT.

(o) Use a light source and apply it from the other side of the engine mount. Make an inspection of the engine mount as follows:
1) Look for metal flakes and, if found, lower the engine and do a check of the shear pins.
2) It is not permitted to have metal which has removed from the shank of the shear pin.
3) You must replace all damaged shear pins before you lift the engine again.

S 424-115-R00

(2) Do these steps to install the engine mount bolts.
(a) Make sure you lubricate the threads and the shanks of the engine mount bolts with the antiseize compound.
(b) Install the engine mount bolts with the countersunk washers in the forward mount fitting.

NOTE: Make sure that you install the same number and type of washers under the head of the forward engine mount bolt that were removed.

1) Use a 1/2 inch square drive ratchet adapter (SL715) and a 15/16 inch socket (SW301) or equivalent to install the front engine mount bolts.

(c) Install the engine mount bolts with the countersunk washers in the aft mount fitting.

NOTE: Make sure that you install the same number and type of washers under the head of the aft engine mount bolt that were removed.

If extra washers are installed under the bolt heads, follow the recommendations in the Service Letter 757-SL-71-021 to install the improved (preferred) parts identified in Table 1 or 2.

1) Use a 1/2 inch square drive ratchet adapter (SL730) and a 13/16 inch socket (SW261) or equivalent to install the aft engine mount bolts.

Power Plant Installation - Single Point Sling

	POUND-INCHES	POUND-FEET	USING THE SHORT ADAPTER POUND-FEET *[1]	USING THE LONG ADAPTER POUND-FEET *[2]
FORWARD MOUNT	3060-3740	255-312	212-259	-
AFT MOUNT	1935-2365	161-197	-	101-124

*[1] This tool is an 8-inch extension which attaches to the torque wrench. It can only be used on the outboard side of the forward mount bolts. The torque given with the adapter is 83% of the true torque which is applied to the bolts.

*[2] This tool is an 11.5-inch extension which attaches to the torque wrench and is used when access because of the thrust reverser is tight. The torque given with this tool is 63% of the true torque which is applied to the bolts.

CAUTION: DO NOT APPLY A TOTAL INDICATED LOAD OF MORE THAN 5.0 METRIC TONS. DAMAGE TO THE AIRPLANE STRUT WILL OCCUR.

MAKE SURE THAT YOU KEEP AN EQUAL DISTANCE BETWEEN THE FORWARD AND AFT ENGINE MOUNTS AND THE STRUT. IF THE PITCH IS NOT CORRECT, DAMAGE TO THE STRUT CAN OCCUR.

(d) Lift the engine to remove the distance and apply the load to the strut.
   1) Get a total indicated load of 4.8 metric tons on the remote readout for the load cell.
(e) Tighten the engine mount bolts at the forward mount fitting:
   1) Tighten the bolts with the 8 inch extension adapter and a 3/4 inch square drive torquemeter (TE620FU) or equivalent because the access to the bolts is tight.
(f) Tighten the engine mount bolts at the aft mount fitting:
   1) Tighten the bolts with the adapter B71005-28 and a 1/2 inch square drive torquemeter (TE250FU) or equivalent because the access to the bolts is tight.
(g) After you tighten all the engine mount bolts, make sure all the compression loads from the sling are removed.

Power Plant Installation - Single Point Sling

S 094-116-R00

(3) Do these steps to remove the single point sling:
   (a) Remove the trunnions and the handling adapters for the fan case and the rear suspension.
   (b) Attach them to the cradle.
   (c) Remove the rear stiffener adapters for the fan case and install it on the rear attachment of the lower beams of the sling.

S 844-117-R00

(4) Do the procedure to put the airplane back to its usual condition.

Put the Airplane Back To Its Usual Condition

TASK 71-00-02-844-119-R00

7. Put the Airplane Back To Its Usual Condition

A. Consumable Materials

(1) D00550 Antiseize Compound - Bostic Never-Seez Pure Nickel (AMM 70-30-00/201)

(2) D00148 Hydraulic Fluid, Fire Resistant (AMM 70-30-00/201)

(3) Duct tape (AMM 20-30-07/201)

Put the Airplane Back To Its Usual Condition

B. Parts

(1) Refer to IPC for part numbers and effectivities of items in the table that follows.

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	1	Seal Assy-Front	71-00-02	04	180
		Seal Assy-Rear			185
	2	Bolt			140
	3	Bolt			165
404	1	Seal	30-21-52	01	20
	2	Clamp-V			15
	3	Coupling-V	71-00-02	02	10
	4	Gasket			25
405	1	Bolt	71-00-02	02	33
	2	Washer			33A
	3	Plate-seal			34
406	3	Gasket	71-00-02	02	30
	4	Coupling-V			15
407	1	Quick Engine Change Unit - RB211-535E4	71-00-02	04	70
408		Setscrew	54-51-61	01	235
409		Setscrew	54-51-61	01	48J
410		Setscrew	54-51-61	01	48
411	1	Washer	71-00-02	04	84
	2	Bolt			82
	3	Washer			105
	4	Bolt			100

C. References

(1) AMM 12-13-01/301, Engine Servicing (Oil Replenishing)
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 26-11-00/501, Fire Detection Printed Circuit Card
(4) AMM 36-11-01/401, Pneumatic Duct
(5) AMM 54-52-01/401, Strut Fairings
(6) AMM 71-00-00/501, Power Plant

Put the Airplane Back To Its Usual Condition

(7) AMM 71-11-04/401, Fan Cowl Panels
(8) AMM 71-11-07/401, Strut to Common Fairing Seal
(9) AMM 76-11-00/501, Engine Control System
(10) AMM 78-30-00/501, Thrust Reverser
(11) AMM 78-31-00/201, Thrust Reverser System
(12) AMM 79-31-00/501, Oil Quantity Indicating System

D. Access

(1) Location Zones

415/425	Thrust Reverser, Left
416/426	Thrust Reverser, Right

(2) Access Panels

431AL(441AL)	Nacelle Strut Forward Fairing

E. Put the Airplane Back To Its Usual Condition

S 434-120-R00
(1) Do these steps to install the thermal anti-ice duct of the inlet cowl (Fig. 404):
(a) Remove the packing, if installed, between the pressure regulating valve and the engine fan case.
(b) Connect the duct with a new seal (1).
(c) Install the V-clamp (2) and tighten the clamp bolt to 85-100 pound-inches (9.62-11.3 Newton meters).

S 434-121-R00
(2) Do these steps to install the starter air duct (Fig. 404):
(a) Connect the duct with a new seal (4).
(b) Install the V-clamp (3) and tighten the clamp bolt to 110-120 pound-inches (12.4-13.6 Newton meters).

S 034-169-R00
(3) Remove the blanking cap from the altitude pressure switch.

S 434-123-R00
(4) Do these steps to install the duct for the HP2 air off take (Fig. 406):
(a) Install the duct with a new seal (3).
(b) Install the V-clamp (4) and tighten the clamp bolt to 110-120 pound-inches (12.4-13.6 Newton meters).

S 434-124-R00
(5) Do these steps to install the duct for the HP6 air off take (Fig. 406):
(a) Install the duct with a new seal (3).
(b) Install the V-clamp (4) and tighten the clamp bolt to 110-120 pound-inches (12.4-13.6 Newton meters).

Put the Airplane Back To Its Usual Condition

S 434-125-R00

(6) Remove the caps and install the HP6 pressure sensing tube.

S 434-126-R00

(7) Remove the caps and install the strut drain line (Fig. 406).

S 434-129-R00

(8) Connect the teleflex cable for the engine control (Fig. 406A).
  (a) Connect the upper and the lower cable at the arrowhead coupling.
  (b) Put the coupling clamp on the arrowhead coupling.
  (c) Install the bolts and tighten to 25-32 pound-inches (2.82-3.62 Newton-meters).

S 824-437-R00

CAUTION: MAKE SURE THERE IS A MINIMUM CLEARANCE OF 0.75 INCH (19.05 mm) BETWEEN THE ENGINE ANTI-ICE DUCT AND THE THRUST REVERSER VALVE INPUT CAM. INTERFERENCE CAN CAUSE DAMAGE TO EQUIPMENT.

(9) If the clearance between the engine anti-ice duct and the thrust reverser input valve cam is not a minimum of 0.75 inch (19.05 mm), adjust the HP2 Y-duct and cowl anti-ice duct (AMM 36-11-01/401).

S 864-130-R00

WARNING: DO NOT CONNECT THE FUEL, HYDRAULIC, OR ELECTRICAL LINES WHILE THE ELECTRICAL POWER IS ON. ACCIDENTAL PRESSURIZATION OF THE FUEL OR HYDRAULIC FLUIDS, ENERGIZIED ELECTRICAL CIRCUITS, OR A FIRE CAN CAUSE INJURY TO YOU OR DAMAGE TO EQUIPMENT.

(10) Make a check that there is no electrical power supply.
  (a) If the power is supplied, remove the electrical power (AMM 24-22-00/201).

S 434-131-R00

CAUTION: BE CAREFUL WITH THE HYDRAULIC SUPPLY LINE. DO NOT WIND IT INTO A TIGHT COIL. KINKS IN THE HOSE COULD DECREASE THE HYDRAULIC FLUID SUPPLY AND CAUSE A FAILURE OF THE ENGINE DRIVEN PUMP.

CLEAN ALL THE HYDRAULIC FLUID LEAKAGE.

(11) Do these steps to connect the hydraulic lines (Fig. 406):
  (a) Remove the caps from the inlet hose for the hydraulic supply and the mating connector.

Put the Airplane Back To Its Usual Condition

(b) Fill the hydraulic supply line for the engine with hydraulic fluid and connect the supply inlet hose.

NOTE: Some fluid leakage can occur when the caps are removed.

(c) Remove the caps from the case drain hose of the hydraulic pump and its mating connector and connect the line.
(d) Remove the caps from the outlet hose for the hydraulic pressure and its mating connector and connect the line.

S 434-132-R00
(12) Remove the caps from the fuel supply line and its mating connector and connect the line.
using a seal (3), washers (2), and bolts (1) (Fig. 405).
(a) Use a seal (3), washers (2), and bolts (1) (Fig. 405).

S 434-133-R00
(13) Do these steps to connect the electrical cables (Fig. 407A):
(a) Remove all the caps.
(b) If necessary, do these steps to make sure the connector installation is satisfactory.

NOTE: More data is available in Maintenance Tip 757 MT 24-010.

1) Make sure that there is sufficient wire length from the firewall feed through to the receptable connector on the engine.

NOTE: This will permit full installation of the plug connector to the receptacle connector without strain on the wire.

2) Examine the pin and socket contacts in the connectors to see if they are free from signs of fret or arc.
a) If any sign of fret or arc is found, replace both sets of contacts.
3) Make sure the connector shells are in good condition.

NOTE: Conditions like mating thread burrs or damaged elastomers will affect the performance of the connector pair.

4) Assemble the connector backshell cable clamp as follows:
a) Tighten the connector backshell to 115-120 inch-pounds with a P/N BT-BS-618BSS strap wrench, P/N TG-70 strap wrench or equivalent.
b) Loosen backshell cable clamps, move the backshell, clamp end first, over the wires and out of the way.

Put the Airplane Back To Its Usual Condition

c) Build up the diameter of the AWG 4 wire to 0.39 to 0.55 inch.
d) Put the wire separator, that is supplied with the backshell, between the wires with the large diameter end toward the connector.
e) Push the separator against the connector.
f) Cut approximately a 1 inch piece of 0.375 inch diameter Teflon rod.
g) Put the Teflon rod between the wires and against the wire separator.
h) Apply a minimum of eight wraps of 1 inch width, Teflon tape, in the center of the end of the separator and around the wire bundle.
i) Apply one or two drops of thread locking compound to the threads (SWPM 20-60-09).
j) Screw the backshell on the connector and tighten (SWPM 20-60-09).

5) Make sure that the plug connector is fully installed to the receptacle connector.
a) If necessary, tighten the plug connector to 450 inch-pounds with a Daniels P/N BT-BBS-618BSS strap wrench, or equivalent.

(c) Connect the feeder cable for the electrical power from the integrated drive generator (IDG).
1) This is found on the left side of the engine fan case, forward of the front engine mount.
(d) Connect the electrical connectors which connect the engine with the strut.

S 864-134-R00
(14) Supply the electrical power (AMM 24-22-00/201).

S 864-136-R00
(15) Do a check to make sure the indicating system for the oil quantity is adjusted correctly (AMM 79-31-00/501).

NOTE: Do not remove the electrical power from the airplane after you have done the check of the indicating system.

S 724-142-R00
(16) Do a test for fuel leakage as follows:
(a) Remove the DO-NOT-OPERATE tag and push the left (right) fire handle down.
(b) Make sure that the left (right) ENG VALVE and SPAR VALVE lights are not on.
(c) Remove the DO-NOT-OPERATE tag from the FUEL CONTROL switch.
(d) Make sure that the left (right) FUEL CONTROL switch on the control stand is in the CUTOFF position.

Put the Airplane Back To Its Usual Condition

(e) For the left engine, remove the DO-NOT-CLOSE tag and close these circuit breakers:
1) P6 Main Power Distribution Panel
a) 6E1, FUEL VALVES L SPAR
(f) For the right engine, remove the DO-NOT-CLOSE tag and close these circuit breaker:
1) P6 Main Power Distribution Panel
a) 6E2, FUEL VALVES R SPAR
(g) Move the FUEL CONTROL switch to the RUN positon.
(h) Move the BOOST PUMP switches to the ON position.
(i) Do a check of the engine and the strut for fuel leakage.
(j) Move the BOOST PUMP switches to the OFF position.
(k) Move the FUEL CONTROL switch to the CUTOFF position.
(l) For the left engine, remove the DO-NOT-CLOSE tag and close these circuit breakers:
1) P6 Main Power Distribution Panel
a) 6C1, FUEL COND CONT L
(m) For the right engine, remove the DO-NOT-CLOSE tag and close these circuit breaker:
1) P6 Main Power Distribution Panel
a) 6C2, FUEL COND CONT R

S 864-143-R00

(17) Open the left (right) shut-off valve for the hydraulic supply of the engine driven pump (EDP).
(a) Do a check that the left (right) position indicator for the shutoff valve for the EDP supply has moved to the open position.

NOTE: The position indicator is on the shutoff valve for the EDP supply in the strut hydraulic bay.

(b) For the left engine, remove the DO-NOT-CLOSE tag and close these circuit breakers:
1) P6 Main Power Distribution Panel
a) 6H1, FIRE EXTINGUISHING ENG L BTL 1
b) 6H2, FIRE EXTINGUISHING ENG L BTL 2
2) P11 Overhead Circuit Breaker Panel
a) 11J26, FIRE DET ALTN PWR L ENGINE
b) 11B20, FIRE DETECTION L ENGINE 1
c) 11B21, FIRE DETECTION L ENGINE 2
(c) For the right engine, remove the DO-NOT-CLOSE tag and close these circuit breakers:
1) P6 Main Power Distribution Panel
a) 6H3, FIRE EXTINGUISHING ENG R BTL 1
b) 6H4, FIRE EXTINGUISHING ENG R BTL 2
2) P11 Overhead Circuit Breaker Panel
a) 11J27, FIRE DET ALTN PWR ENGINE R
b) 11B22, FIRE DETECTION R ENGINE 1

Put the Airplane Back To Its Usual Condition

c) 11B23, FIRE DETECTION R ENGINE 2

S 824-168-R00
(18) Do the procedure, Adjust the engine controls after engine installation (AMM 76-11-00/501).
(a) Move the thrust levers through their full range; the thrust levers should move smoothly.
(b) Remove the DO-NOT-OPERATE tags from the thrust levers.

S 094-146-R00
(19) Remove the ball lockpin and the streamer assemblies in the hinge beam support of the thrust reverser (Fig. 402).

S 094-147-R00
(20) If it was used, remove the safety rod for the thrust reverser (Fig. 402).

S 094-148-R00
(21) Remove the opening actuator locks for the thrust reverser (Fig. 402).
(a) Loosen and remove the wingnut which attaches the lock sleeves together.
(b) Open the sleeve jacket and remove it from the piston rod of the opening actuator.

S 444-149-R00
(22) Do the activation procedure for the thrust reverser (AMM 78-31-00/201) (Fig. 403).

S 414-150-R00

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

(23) Close the thrust reverser (AMM 78-31-00/201).

S 824-438-R00
(24) Adjust the thrust reverser latches and bumpers (AMM 78-30-00/501).

S 414-151-R00
(25) Install the access panels 431AL (441AL) (AMM 54-52-01/401).

S 414-432-R00
(26) Install the access panels 434AL (444AL) (AMM 06-43-00/201).

Put the Airplane Back To Its Usual Condition

S 414-154-R00
(27) Install the seal between the strut and the common nozzle fairing (AMM 71-11-07/401).

S 414-155-R00
(28) Install the flex fairings (AMM 54-52-01/401).

S 414-156-R00
(29) Install the fan cowl panels (AMM 71-11-04/401).

S 724-157-R00
(30) Do the test for the fire detection system (AMM 26-11-00/501).
(a) Make sure that you install the correct logic card for the type of fire detection system that is installed on the engine.

S 724-431-R00

CAUTION: MAKE SURE ALL TOOLS, HARDWARE, OR OTHER UNWANTED OBJECTS ARE NOT IN THE INLET COWL OR AROUND THE ADJACENT WORK AREA. THESE UNWANTED OBJECTS CAN CAUSE DAMAGE TO THE POWER PLANT WHEN THE POWER PLANT IS OPERATED.

(31) Do the test of the engine as shown in the Power Plant Reference Table (AMM 71-00-00/501).
(a) After you operate the engine for the first time at idle, do a check of the engine oil level.

NOTE: If you fill the oil tank fully before you operate the engine at idle, the oil system will be too full. This can cause a large quantity or oil to be released through the breather outlet duct of the engine.

1) If it is necessary, fill the oil system (AMM 12-13-01/301).
2) Make sure the hydraulic reservoir is full (AMM 12-12-01/301).

S 414-439-R00
(32) Make sure that these circuit breakers on the P11 panel are closed.
(a) 11k14, L ENG PUMP VLV DEPRESS or LEFT ENGINE PUMP DEPRESS.
(b) 11K23, R ENG PUMP VLV DEPRESS or RIGHT ENGINE PUMP DEPRESS.

Put the Airplane Back To Its Usual Condition

S 114-440-R00

CAUTION: QUICKLY CLEAN ALL HYDRAULIC FLUID FROM THE GEARBOX SURFACES. HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE ENGINE GEARBOX HOUSING.

(33) Clean all hydraulic fluid leakage from the engine and the area (AMM 12-25-01/301).
  (a) Operate the engine at idle (AMM 71-00-00/201).
  (b) Make sure the system pressure is between 2850 and 3150 psi.
  (c) Make sure there is no leakage at the hydraulic hose connections to the pump.
  (d) Put the L (R) HYD PUMPS ENG pump switch to the DEPRESS position.
  (e) Let the hydraulic system pressure decrease.
  (f) Make sure the engine-driven pump PRESS indicator light comes on.
  (g) Put the L (R) HYD PUMPS ENG switch to the ON position.
  (h) Make sure the system pressure is between 2850 and 3150 psi.
  (i) Make sure the engine-driven pump PRESS indicator light goes off.
  (j) Stop the engine (AMM 71-00-00/201).

S 714-170-R00

(34) Do an operational test of the IDG if the IDG was replaced (AMM 24-11-00/501).

S 444-433-R00

(35) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

S 864-159-R00

(36) If it is no longer used, remove the electrical power (AMM 24-22-00/201).

POWER PLANT - MAINTENANCE PRACTICES
(CLEANING, PRESERVATION AND DEPRESERVATION)

1. General
   A. This procedure has six tasks. The first task cleans the engine. The second task is for the engine component protection. The third task preserves the engine. The fourth task depreserves the engine. The fifth task examines and repairs the MVP bag. The sixth task inhibits the engine fuel system.
   B. Engines, Q.E.C. units, and propulsion systems which are to be put in storage or removed from wing must have protection from unwanted materials and the air. Before they are put in storage, they must be cleaned externally, all the corrosion must be removed, and the exposed metal must have protection. For long-term storage, you must do the inhibition process to the fuel system.
   C. All openings in the engine must be sealed from unwanted materials. You must do the inhibition process to the engine to prevent corrosion, and put vapour phase inhibitor (V.P.I.) paper in the air intake and exhaust. The unit is then put in a moisture vapour proof (M.V.P.) bag with the correct amount of desiccant.
   D. The protective treatment can be different for depending whether the units are installed or non-installed, and the climatic conditions under which they are stored. The minimum storage requirements are given in Fig. 201. It is recommended that the engines and Q.E.C. units are put in a M.V.P. bag whenever possible, even when the storage time is less than 6 months.

TASK 71-00-03-102-001-R00

2. Clean the Engine, Q.E.C. Unit, or the Propulsion System
   A. Consumable Materials
      (1) White spirit
          British Spec - B.S.245
          OMat No. - 103
      (2) Stoddard solvent
          American Spec - A.S.T.M. D484-52
          OMat No. - 1/5
      (3) Engine cleaning solution
          British Spec - MC58
          OMat No. - 176

	CONDITION	ANTICIPATED PERIOD	PRESERVE MAIN LINE BEARINGS	FIT COVERS AND BLANKS	INSERT VPI/CHC PAPER	INHIBIT FUEL SYSTEM	INSTALL DESICCANT	PACK IN MVP BAG (POWER PLANT MUST BE REMOVED)
OUTSIDE	ARID (FOR EXAMPLE, DESERT CLIMATE)	UP TO 30 DAYS		*				
		31 DAYS TO 3 MONTHS		*		+		
		OVER 3 MONTHS		*		*		
	NON-ARID CLIMATE	UP TO 30 DAYS		*	*		*	
		31 DAYS TO 3 MONTHS		*	*	+	*	
		OVER 3 MONTHS	*	*	*	*	*	*
INSIDE	CONSTANT TEMPERATURE AND HUMIDITY (AIR CONDITIONED ENVIRONMENT)	UP TO 30 DAYS						
		31 DAYS TO 3 MONTHS				*		
		OVER 3 MONTHS				*		
	NON-AIR CONDITIONED ENVIRONMENT	UP TO 30 DAYS		*	*		*	
		31 DAYS TO 3 MONTHS		*	*	*	*	
		OVER 3 MONTHS	*	*	*	*	*	*

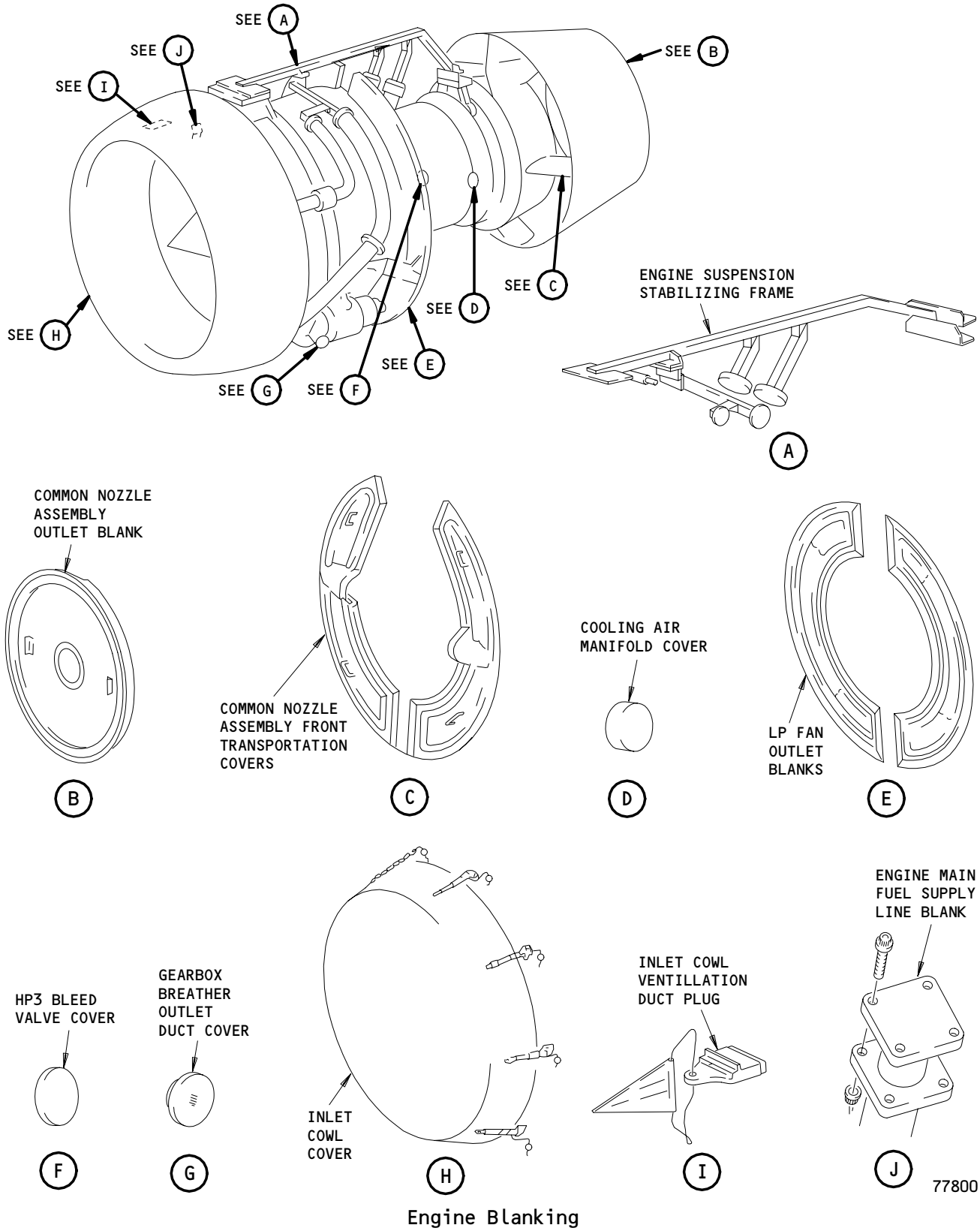
INSTALLED POWER PLANT OR NON-INSTALLED ENGINES OR Q.E.C. UNITS

+ AS AN ALTERNATIVE TO INHIBITING THE FUEL SYSTEM THE ENGINE MAY BE GROUND RUN FOR 5 MINUTES AT IDLE EVERY 31 DAYS (AMM 71-00-00).

NOTE: 1. REFER TO VENDOR COMPONENT MAINTENANCE MANUALS FOR UNIT STORAGE LIVES

DE000A9686B

Storage Requirements
Figure 201



Engine Blanking
Figure 202

B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

C. Clean the Engine, Q.E.C. Unit or Propulsion System Before You Do the Preservation Procedure. (AMM 72-30-00/701)

S 112-002-R00
(1) Clean the engine, the Q.E.C. unit or the propulsion system externally with the cleaning solution.
(a) Make sure the cleaning solution does not accumulate in the engine air inlet or in the openings.

S 212-003-R00
(2) Examine all the painted parts for chipped enamel and corrosion.
(a) If you find corrosion, remove and paint the component.
1) Refer to the task: "Engine Component Protection".

TASK 71-00-03-112-056-R00

3. Clean the Power Plant after the Engine Fire Extinguisher(s) Were Used

A. General
(1) This task gives the steps to clean the power plant after the engine fire extinguisher(s) were used. This task has these steps.
(a) Replace the engine fire extinguisher bottle(s) and discharge cartridge squib(s).
(b) Do a visual inspection of the engine extinguisher feed tubes and the discharge nozzle outlets.

B. Equipment
(1) Gloves - Rubber protective
(2) Shields - Eye
(3) Cloth - Clean, dry, with no lint

C. References
(1) AMM 26-21-01/401, Engine Fire Extinguisher Bottle
(2) AMM 26-21-04/401, Engine Fire Extinguisher Discharge Cartridge (Squib)

(3) AMM 71-11-04/201, Fan Cowl Panels

D. Access

(1) Location Zones

410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panels

413AL Left Engine Fan Cowl Panel (LH)
413AR Left Engine Fan Cowl Panel (RH)
423AL Right Engine Fan Cowl Panel (LH)
423AR Right Engine Fan Cowl Panel (RH)

E. Procedure

S 112-057-R00

WARNING: DO NOT BREATHE THE GAS FROM THE FIRE EXTINGUISHER AGENT, AND DO NOT LET THE AGENT TOUCH YOUR SKIN. HAVE A GOOD FLOW OF AIR AT THE POSITION WHERE THE AGENT WAS USED. BE CAREFUL WHEN YOU OPEN THE HINGED COWLS. THE AGENT IS DANGEROUS AFTER YOU USE IT.

(1) Allow the agent to evaporate.

NOTE: The agent can collect in the inner surface of the fan cowls.

(a) Open the left and right fan cowl panels to drain the small pockets of fluid (AMM 71-11-04/201).
(b) For a minimum of 30 minutes, let the agent evaporate.

S 422-058-R00

(2) Replace the engine fire extinguisher bottle(s) and discharge cartridges (squib(s)) (AMM 26-21-01/401 and AMM 26-21-04/401).

S 212-059-R00

(3) Do a visual inspection of the engine fire extinguisher discharge nozzle outlets and the visible portions of the feed tubes for the engine fire extinguisher(s).
(a) Make the necessary repairs.

TASK 71-00-03-112-060-R00

4. Clean the Power Plant after the Ground Fire Extinguisher(s) Were Used

A. General

(1) This task is to clean the power plant after you use the ground fire extinguisher(s) that follow:
(a) The carbon dioxide type of fire extinguisher

(b) The dry powder type of fire extinguisher

NOTE: This includes the inspection of the fixed inlet guide vanes and the L.P. turbine third-stage rotor blades.

(c) The vaporized chemical type of fire extinguisher
(d) The foam type of fire extinguisher

B. Equipment
(1) Gloves - Rubber protective
(2) Shields - Eye
(3) Cloth - Clean, dry, with no lint

C. References
(1) AMM 26-21-01/401, Engine Fire Extinguisher Bottle
(2) AMM 26-21-04/401, Engine Fire Extinguisher Discharge Cartridge (Squib)
(3) AMM 71-11-04/201, Fan Cowl Panels

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panel
413AL Left Engine Fan Cowl Panel (LH)
413AR Left Engine Fan Cowl Panel (RH)
423AL Right Engine Fan Cowl Panel (LH)
423AR Right Engine Fan Cowl Panel (RH)

E. Procedure

S 112-061-R00
(1) Clean the power plant after you use the carbon dioxide type of fire extinguisher.
(a) It is not necessary to clean the engine after you use the carbon dioxide type of fire extinguisher.
(b) Carbon dioxide gas cannot cause a chemical reaction or corrosion.
(c) The gas will not cause damage to the engine and will go away into the air.

S 112-062-R00

(2) Clean the power plant after you use the dry powder type of fire extinguisher.

NOTE: When you use a dry powder type of fire extinguisher, the powder can go into the gas generator. If the powder goes into the gas generator, the items that follow can occur:

The dry powder can become a glass type material on the high temperature components. This can cause a turbine to not be balanced.

The dry powder can mix with the engine oil to become sludge.

(a) Do an inspection of these items:
  1) Do a visual inspection of the inlet guide vanes for particles of dry powder.
    a) If you find particles of dry powder, remove the engine (AMM 71-00-02/401).
  2) Do a visual inspection of the L.P. Turbine third-stage rotor blades and the exhaust mixer duct for a glass type material.
  3) If you find a glass type material on these components, remove the engine (AMM 71-00-02/401).
  4) If you find no powder went into the gas generator, do the subsequent step.

(b) Remove all the dry powder from the power plant external surfaces with a suction cleaner.

S 112-063-R00

WARNING: DO NOT BREATHE THE GAS FROM THE FIRE EXTINGUISHER AGENT, AND DO NOT LET THE AGENT TOUCH YOUR SKIN. HAVE A GOOD FLOW OF AIR AT THE POSITION WHERE THE AGENT WAS USED. BE CAREFUL WHEN YOU OPEN THE FAN COWL PANELS. THE AGENT IS DANGEROUS.

(3) Clean the power plant after use of a vaporized chemical type of fire extinguisher.

NOTE: Most of the vaporized chemical type of fire extinguishers will not cause corrosion to the metals on the power plant. The vaporized chemical agent will cause damage to the rubber and the plastics. If the agent touches the high temperature components, the agent will change and cause corrosion. The agent can collect in the inner surface of the fan cowl panels.

(a) Use the protective rubber gloves and the eye shields to keep the agent off your hands and out of your eyes.

(b) Open the left and right fan cowl panels to drain the small pockets of fluid (AMM 71-11-04/201).
(c) For a minimum of 30 minutes, let the agent dry.
(d) If the agent went into the gas generator, dry motor the engine to blow out the agent (AMM 71-00-00/201).
(e) If you can start the engine and the agent went into the gas generator, do as follows:
1) Start the engine (AMM 71-00-00/201).
2) Operate the engine at ground (low) idle for a minimum of five minutes to stop the corrosion.
3) Stop the engine (AMM 71-00-00/201).

S 112-064-R00

(4) Clean the power plant after you have used a foam type of fire extinguisher.
(a) When you use a foam type of fire extinguisher, it can cause corrosion on the power plant.
(b) To stop the corrosion, remove the foam before it becomes a solid.

NOTE: The foam that is not removed will become sludge, which is the color of cream. On a hot surface, the foam becomes hard.

(c) Use clean water to remove the foam that you find on the external surfaces.
1) Continue until all the water that drains from the engine contain no foam.
(d) If the agent went into the gas generator, remove the engine (AMM 71-00-02/401).

TASK 71-00-03-302-006-R00

5. Engine Component Protection
A. References
(1) AMM 70-42-12/201, Local Surface Protection
B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

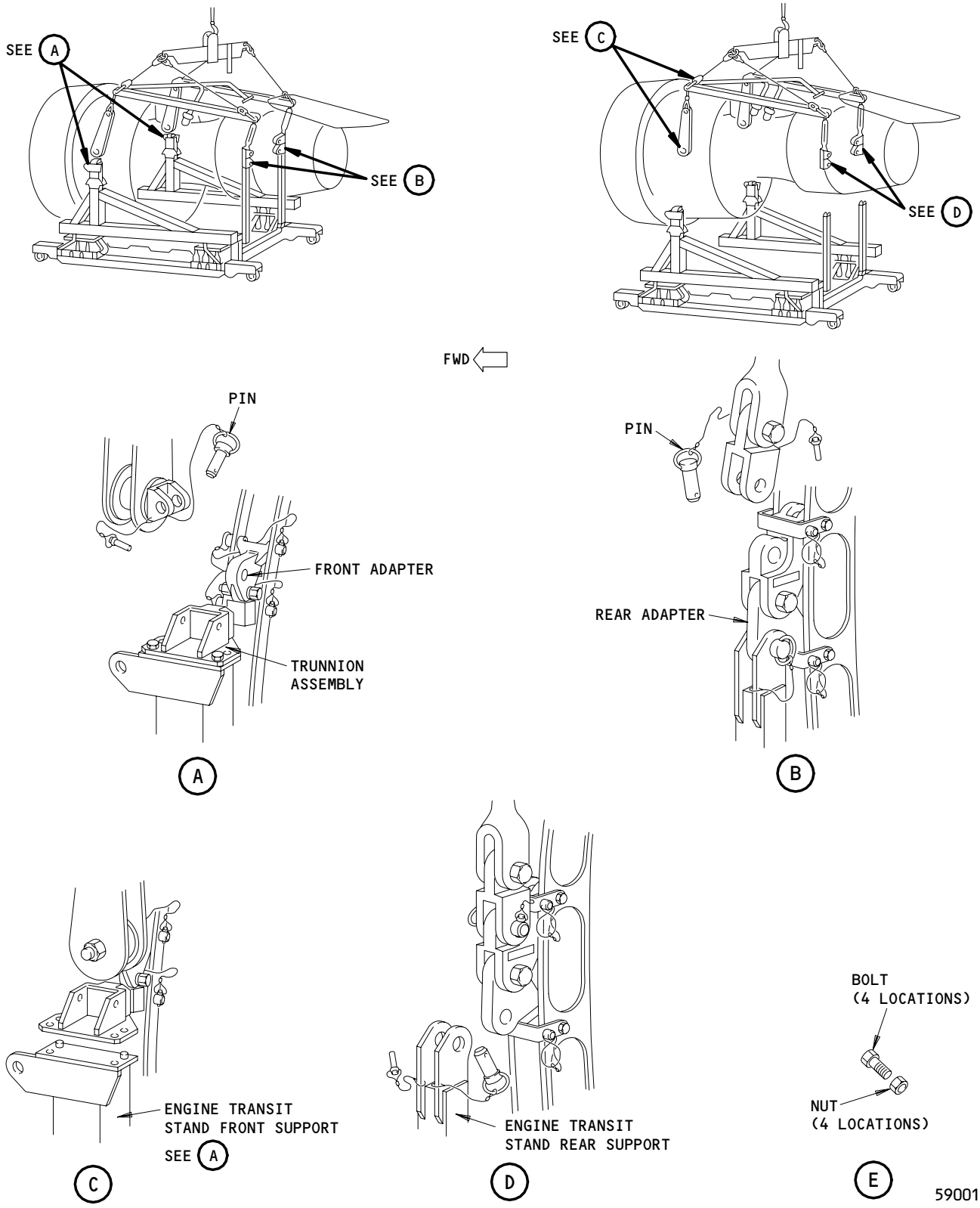
C. Paint the Engine Components.

S 372-007-R00

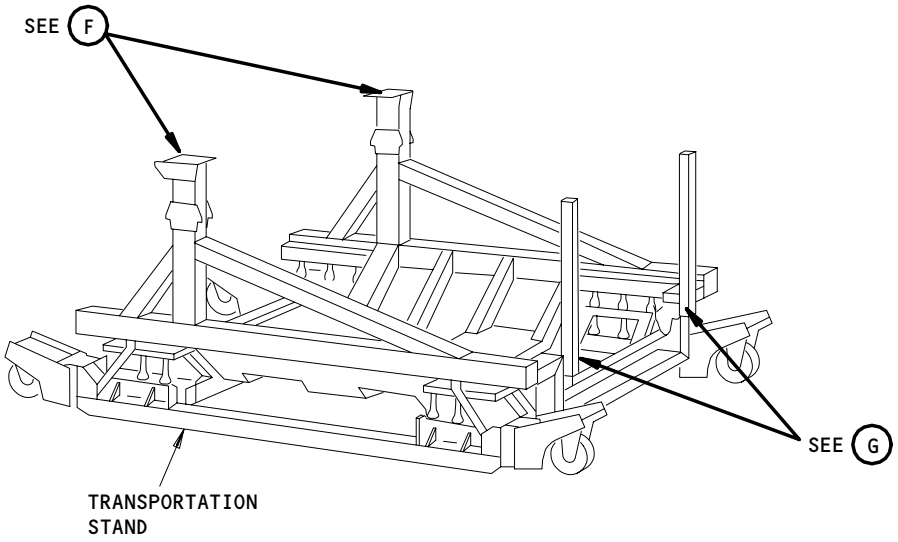
(1) If you must paint the aluminum or steel casings, and the magnesium components, refer to Local Surface Protection - Maintenance Practices (AMM 70-42-12/201).

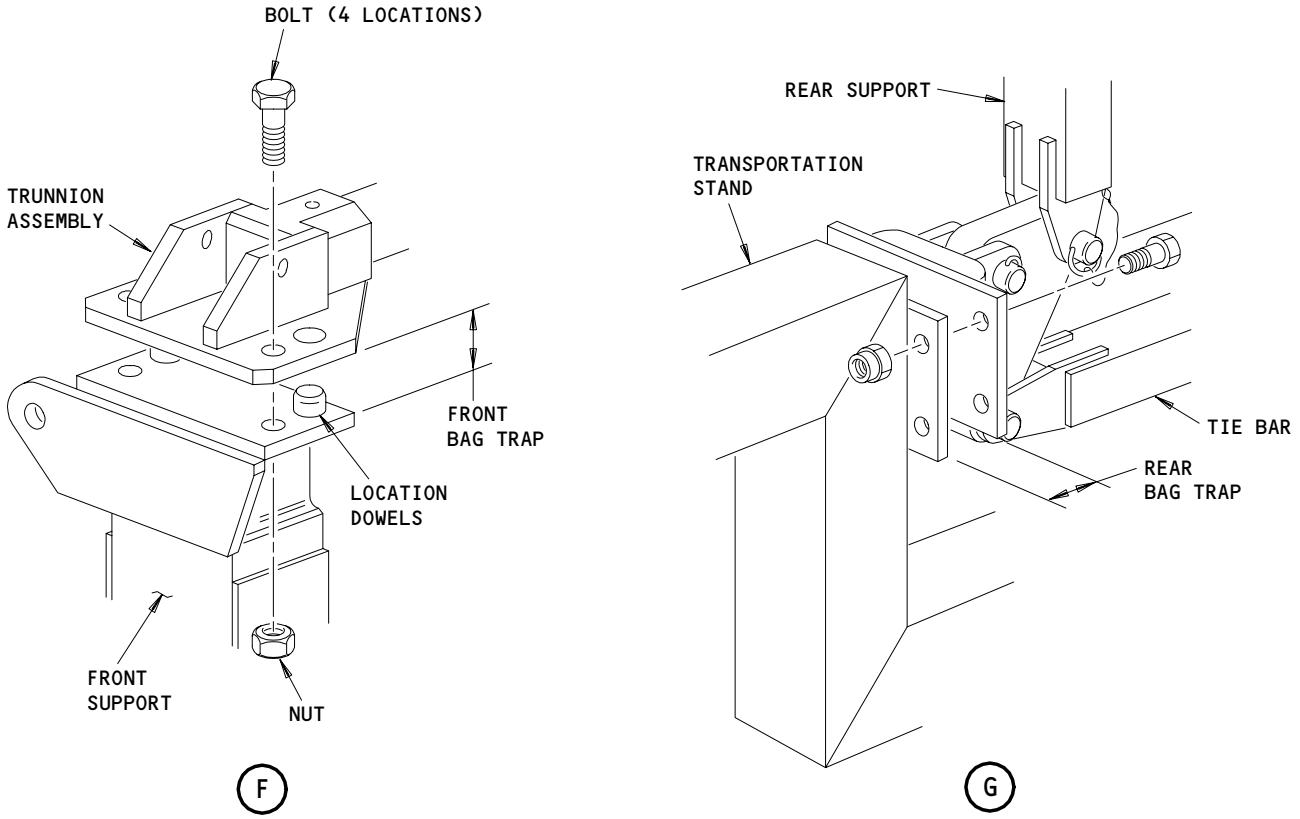
TASK 71-00-03-602-008-R00

6. Engine Preservation
A. General



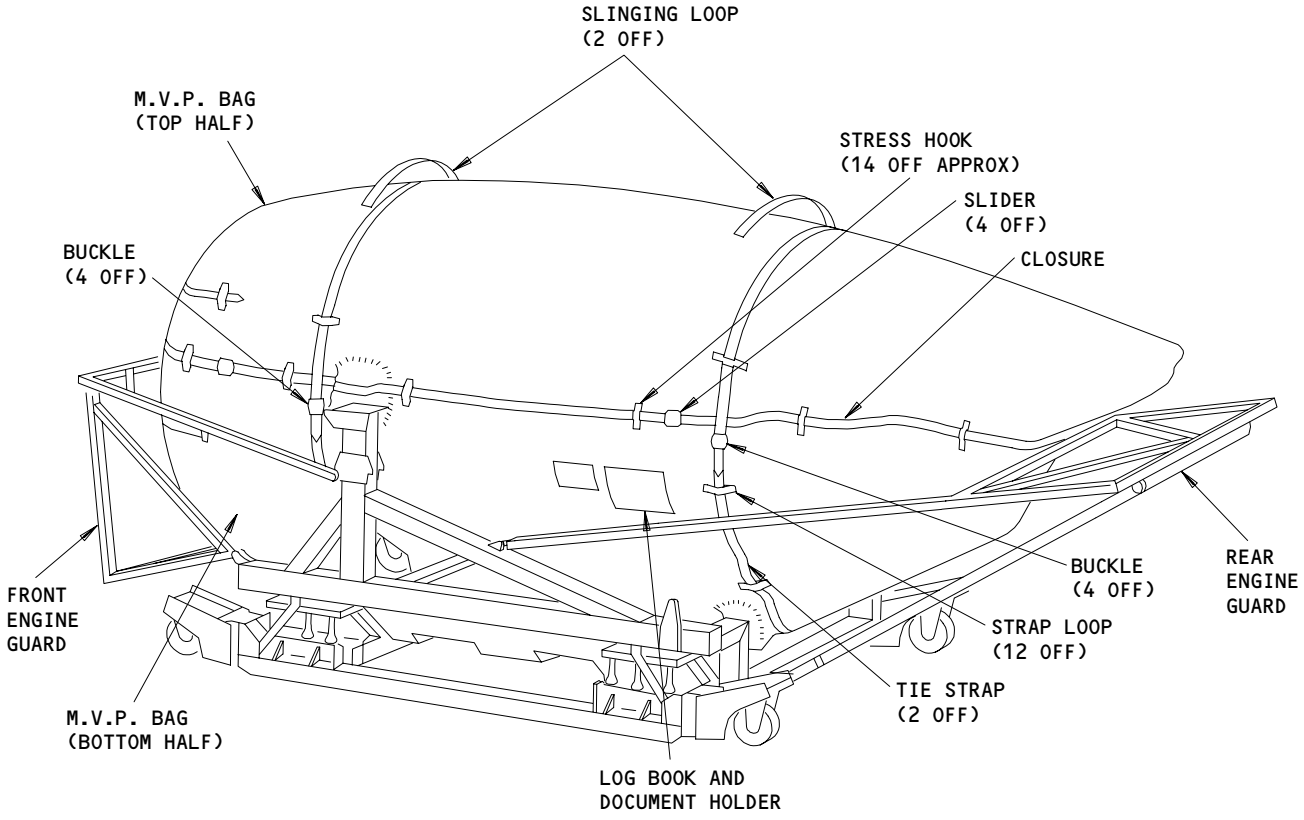
M.V.P. Bag Installation
Figure 203 (Sheet 1)





59002

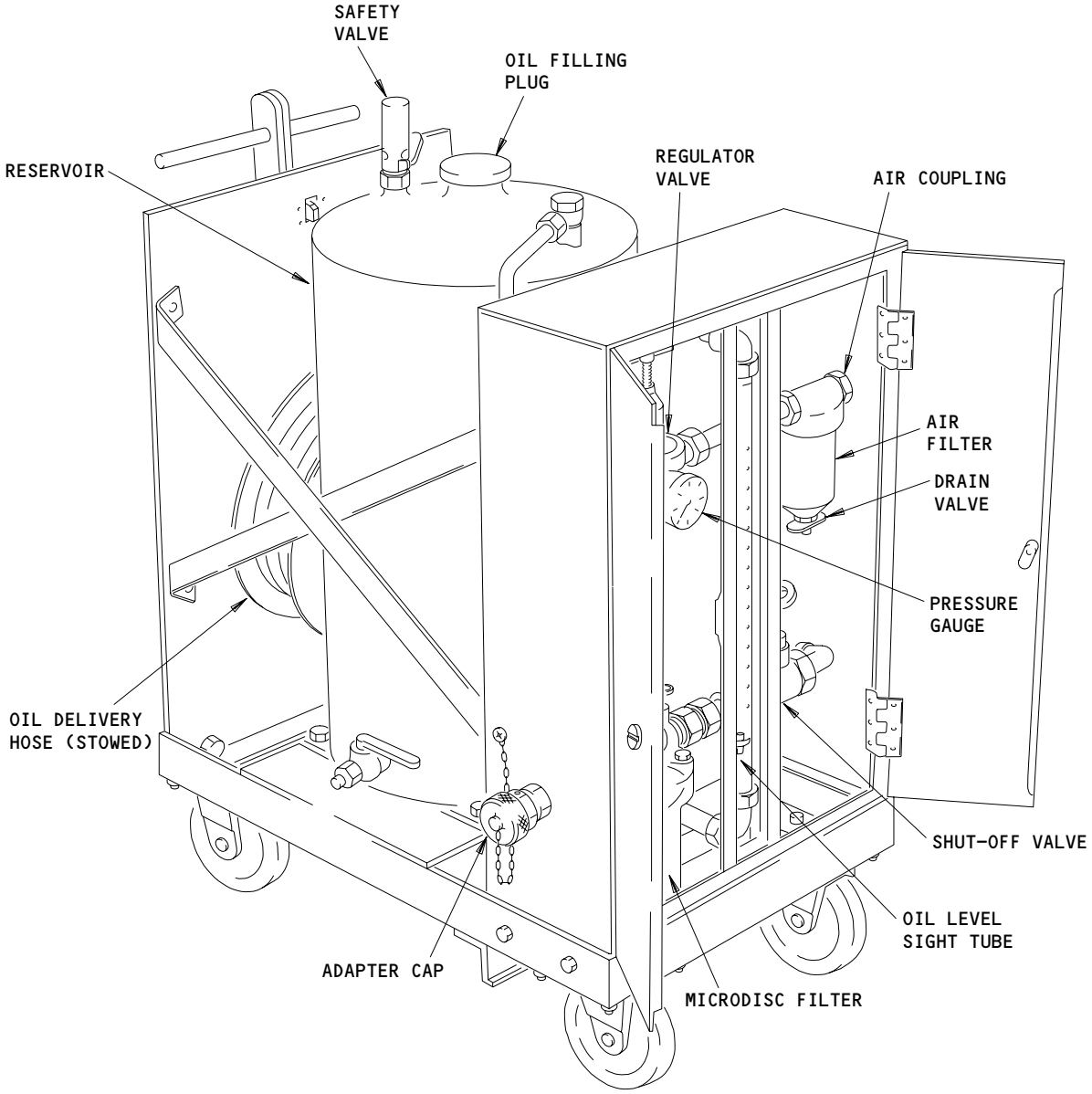
M.V.P. Bag Installation
Figure 203 (Sheet 2)



59019

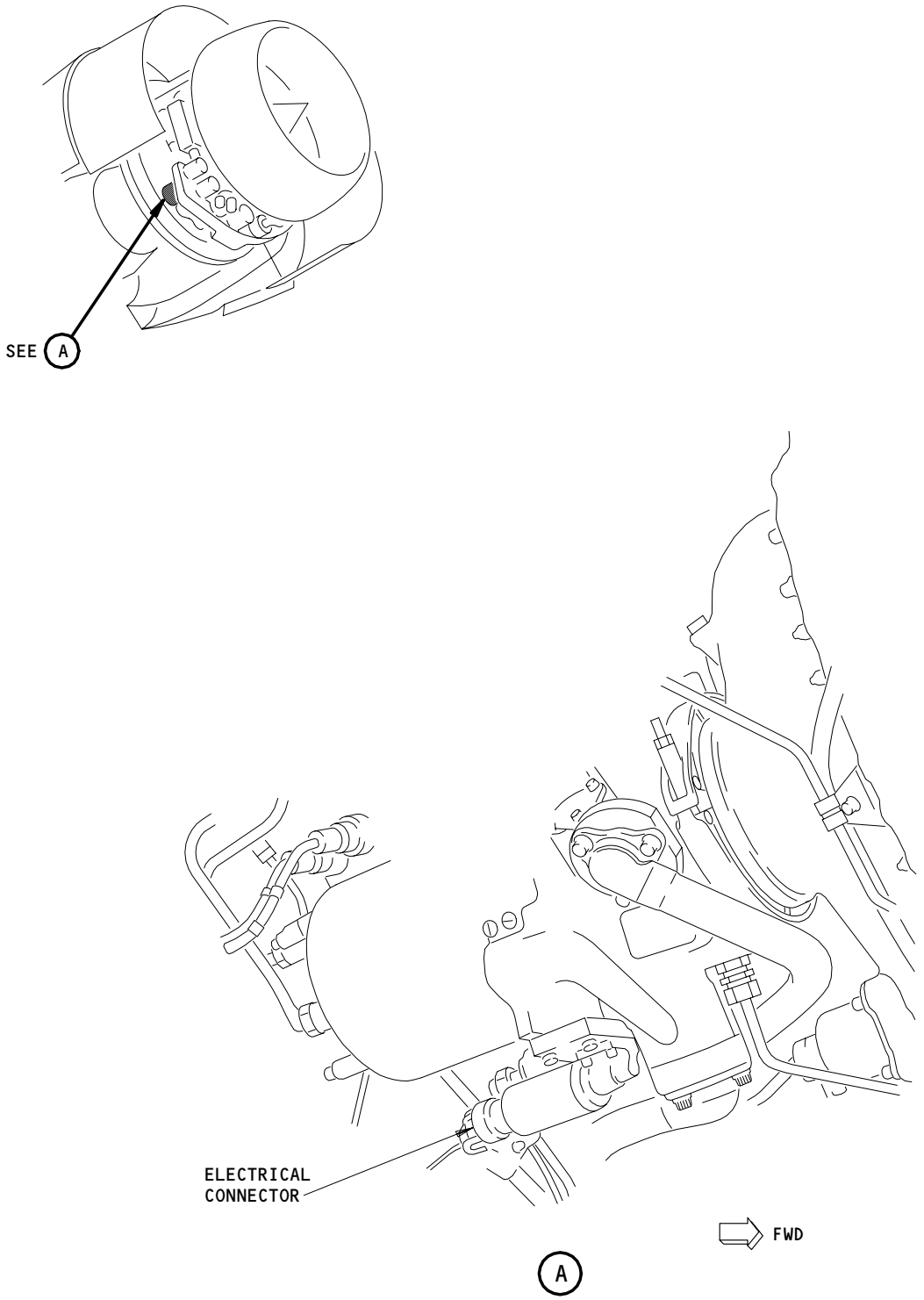
M.V.P. Bag - Installed Position
Figure 204

69474



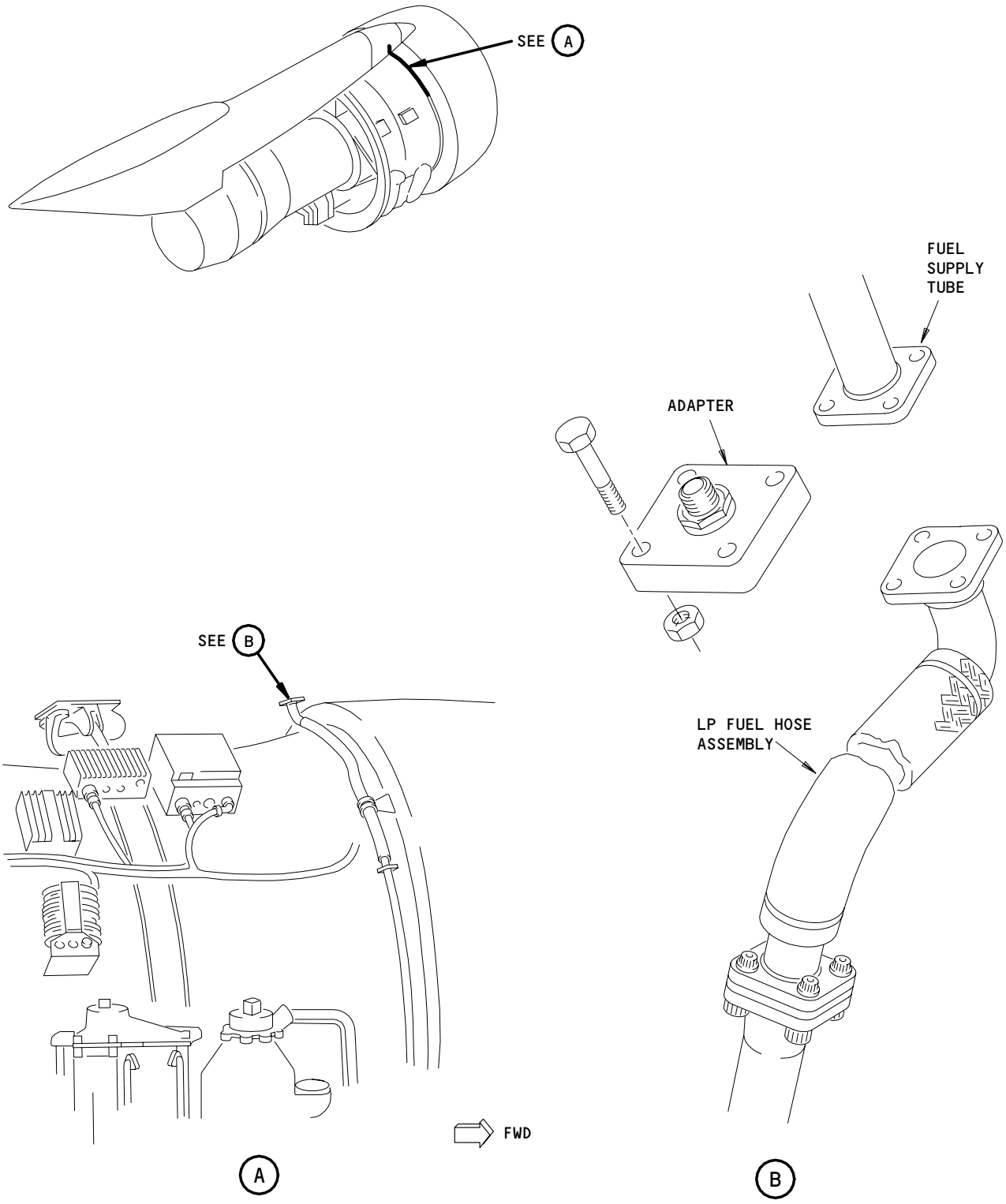
23470A

Inhibiting Rig
Figure 205

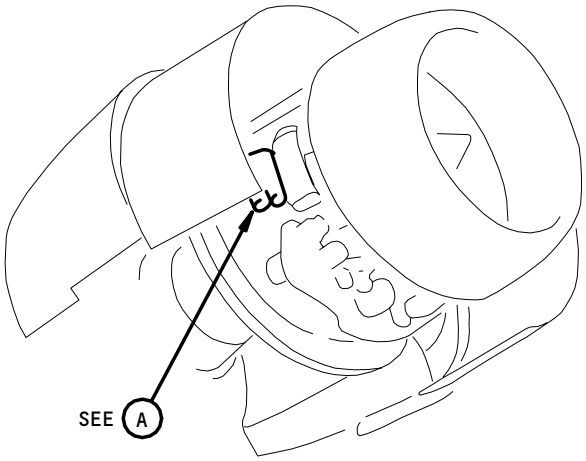


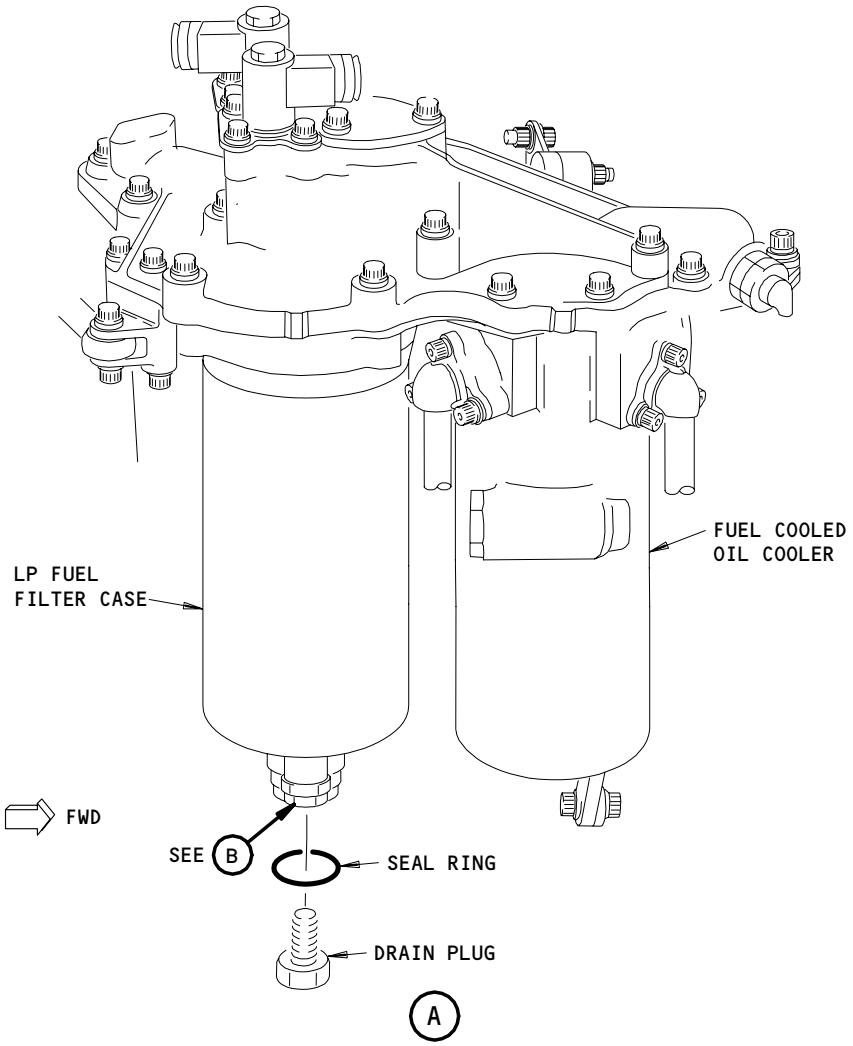
67149A

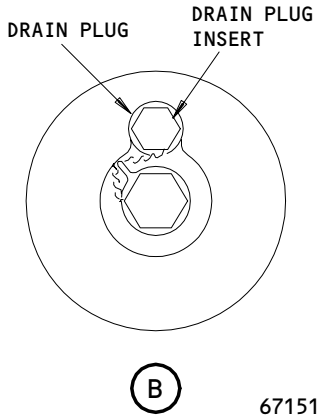
Minimum Flow Reset Solenoid
Figure 206



LP Fuel System Disconnect
Figure 207

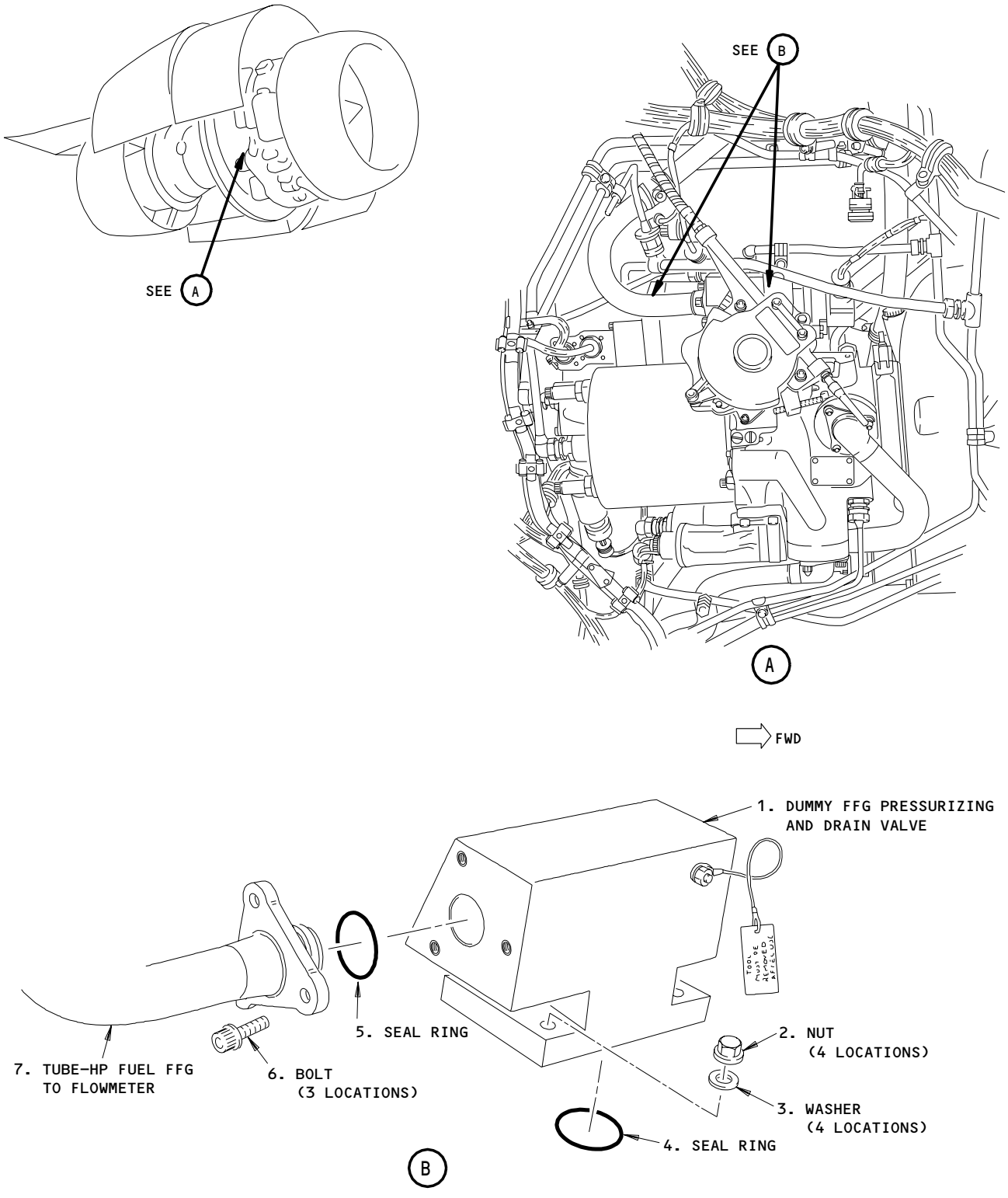




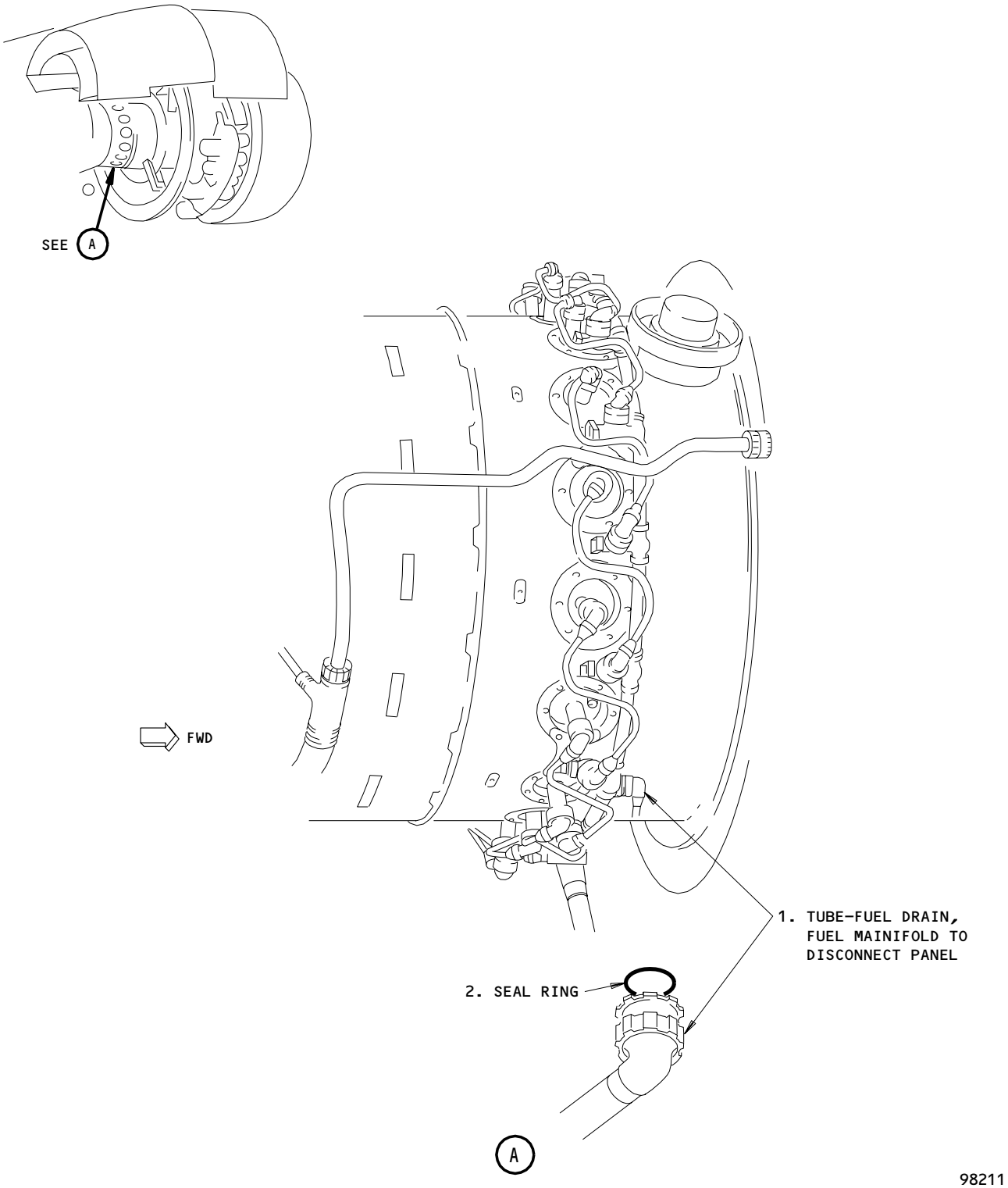


67151A

LP Fuel Filter Drain
Figure 208



Fuel Flow Governor - Dummy Pressurizing and Drain Valve Installation
Figure 209



Fuel Drain Tube – Fuel Manifold to Disconnect Installation
Figure 210

CAUTION: YOU MUST OBEY THE ROLLS-ROYCE STORAGE PROCEDURES. IF YOU DO NOT OBEY THE PROCEDURES, CORROSION OF THE CORE ENGINE, FUEL SYSTEM AND OIL SYSTEM CAN OCCUR.

(1) If an engine, a Q.E.C. unit, or a propulsion system is to be put in storage, refer to Fig. 201 and 202 for the procedure.

NOTE: For all storage conditions the preservation procedure for the main line bearings and gearbox must be accomplished. It is recommended that this procedure is completed before the engine is removed from the airplane. Refer to AMM 79-00-00/701. Refer to Fig. 201 to establish if you need to inhibit the Engine Fuel System. Refer to AMM 71-00-03/601.

(2) Before you preserve the engine, you must clean the engine externally and put protection on the components if it is necessary.
(a) Refer to these tasks:
1) Clean the Engine, Q.E.C. Unit, or the Propulsion System.
2) Engine Component Protection.

(3) Minimum storage requirements are given in Fig. 201. It is recommended that units are put in a M.V.P. bag when possible, even when the storage period is less than 3 months.

B. Equipment
(1) Covers and Blankets

Frame - Engine Suspension Stabilizing	CP30414/1
Cover - Inlet Cowl	LJ34924
Cover - HP 3 Bleed Valve	LK87390
Cover - Cooling Air Manifold	UL10187
Cover - Gearbox Breather Outlet Duct	LJ29883
Cover - LP Fan Case, Left Hand Rear	UL16382
Cover - LP Fan Case, Right Hand Rear	UL16383
Cover - Common Nozzle Assembly Left Hand Front	UL16377
Cover - Common Nozzle Assembly Right Hand Front	UL16378
Cover - Common Nozzle Assembly Rear	UL16357
Blank - LP Fuel Tube	LK84268

Plug - Inlet Cowl Ventilation Duct	LJ34935

(2) Hardware

M.V.P. Bag - Full Engine	CP27612
Transportation Stand Base Assembly Cradle Assembly	 CP30503/2 CP30501/4
Tow bar	CP30500
Wheel Assembly (use with CP30503/2 or CP30501/4)	CP30499
Engine/Stand Lifting Sling	CP30712
Freight Guard - Front, For Engines Without Inlet Cowl	CP30504/2
Freight Guard - Front, For Engines With Inlet Cowl	CP30513
Freight Guard - Rear, For Engines Without Common Nozzle Assembly	CP30514
Freight Guard - Rear With Common Nozzle Assembly	CP30520/1
Jack Fit - With casters removed use with	CP30501 or CP30503

C. Consumable Materials

(1) V.P.I. Impregnated Paper
British Spec - V.P.I. No.260
American Spec - UU-P00270
OMat No. - 1221

(2) P.V.C. self adhesive tape
OMat No. - 1228
(3) Grease resistant paper
British Spec - DEF.1316
OMat No. - 1226
(4) Dessicant and humidity indicator
British Spec - BS.2540
OMat No. - 1208

D. References
(1) AMM 70-51-00/201, Torque Tightening Technique
(2) AMM 79-00-00/701, Oil System

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Prepare for Procedure

S 622-065-R00
(1) Do the preservation procedure for the main line bearings and gearbox (AMM 79-00-00/701).

S 622-066-R00
(2) If required, do the preservation procedure for Engine Fuel System.

G. Put Dessicant in the engine if it is kept on-wing, or not kept in the MVP bag for storage. Refer to Fig. 201 for when dessicant needs to be used.

S 622-047-R00
(1) Use the correct quantity of dessicant for the storage time:

NOTE: The quantities of dessicant are calculated to give the maximum protection from moisture for the storage time given. It will not usually be necessary to open any engine covers or blanks and look for moisture during this time.

It is not necessary to install dessicant or the VPI/CHC paper in engines which are kept in dry conditions (in the desert or in air-conditioned hangar).

It is not necessary to install engine covers or blanks on engines which are kept in an air conditioned hangar.

(a) For up to 30 days, use 132 lb (60 kg).
(b) For up to 3 months, use 264 lb (120 kg).

S 622-048-R00

(2) Divide the correct quantity of dessicant equally and place it in these locations:
  (a) The nose cowl.
  (b) The rear of the fan case (in the cold stream duct).
  (c) The exhaust case.

H. Install the Blanks on the Engine, Q.E.C. Units, and Propulsion Systems.

S 532-011-R00

(1) Before you install the LP compressor case front cover or the nose cowl cover, install the V.P.I. paper on the LP compressor rotor.
  (a) The sheets must be slightly crumpled to hold them in position, with the coated side to the compressor.

S 532-012-R00

(2) Before you install the LP fan exhaust cover, install the V.P.I. paper on the rear of the LP compressor outlet guide vanes.
  (a) Install the coated side of the paper to the outlet guide vanes.

S 532-009-R00

(3) Install the applicable blanks (caps) on all the openings of the engine (Fig. 202).
  (a) Install the grease resistant paper with P.V.C. self-adhesive tape at the openings where blanks are not available.

S 532-010-R00

(4) If there are any disconnected harness connectors, install blanks.
  (a) Attach the harness connectors to the adjacent structure to prevent damage to the connector.

S 862-014-R00

(5) Make sure the blanks are installed on the engine openings.
  (a) Refer to the step: "Install the Blanks on the Engine, Q.E.C. Units and Propulsion Systems".

S 862-015-R00

(6) If the engine or Q.E.C. unit is to be put in storage or the time in-transit is more than 30 days, do these steps:
  (a) Make sure the fuel system has been inhibited.
    1) Refer to the task: "Inhibit the Engine Fuel System".

(b) Do the storage requirement steps in Fig. 201.

S 532-016-R00

(7) Install the M.V.P. bag on the engine.
  (a) Open the M.V.P. bag into its two parts.
  (b) Make sure the M.V.P. bag is clean and does not have punctures and tears.
    1) If you find damage, do the task: "Examine and Repair the M.V.P. Bag".
  (c) Use the hoist to lift the sling into position on the engine.
  (d) Attach the sling to the engine.
  (e) Remove the parts that hold the engine to the transportation stand at the front positions.
  (f) Release the pins that hold the rear support to the engine.
  (g) Lift the engine out of the transportation stand.
  (h) Remove the nuts and the bolts that hold the rear support to the transportation stand.
  (i) Remove the rear support with the tie bar from the transportation stand.
  (j) Put the lower half of M.V.P. bag in the transportation stand.
  (k) Make sure the location dowels on the front support are correctly installed through the M.V.P. bag trap.
  (l) Install the rear support with the tie bar on the transportation stand.
    1) Make sure the M.V.P. bag is trapped correctly between the rear supports of the transportation stand.
    2) Install and tighten the nuts and bolts to attach the rear support to the transportation stand (AMM 70-51-00/201).
  (m) Put the necessary amount of the dessicant in the lower half of the M.V.P. bag.
    1) The amount of dessicant that is necessary can be found on an instruction card behind a clear view window in the M.V.P. bag.
  (n) Make sure the rear supports are at the up position.
  (o) Lower the engine into the transportation stand.
  (p) Make sure the M.V.P. bag is correctly trapped between the trunnion assembly and the front support.
  (q) Install and tighten the nuts and bolts (AMM 70-51-00/201).
  (r) Move the rear supports into the attach points on the engine.
    1) Install the pins and the locking pins.
  (s) Remove the sling from the engine.
  (t) Lift the sling from the engine.
  (u) Remove the sling from hoist.
  (v) Attach the hoist to the upper half of the M.V.P. bag.
  (w) Lower the bag on the engine.
  (x) Remove the hoist from the bag.
  (y) Attach the bottom-half of the M.V.P. bag to the top-half with the stress hooks.

(z) Attach the bottom-half of the M.V.P. bag to the top-half with the interlocking closure and sliders.

NOTE: You must start the first few inches of the interlocking closure by hand. The sliders, then clipped over and you apply a steady pull along the joint so that the force is near parallel as possible to the closure.

(aa) Feed the straps through strap loops then take-up slack in tie straps and secure with buckles.

(ab) Install the front freight guard and the rear freight guard if it is necessary.

I. Examine the Engine and the Bag During the Storage.

S 552-017-R00

(1) Make sure the humidity indicator shows 'safe' (blue color) at the these intervals:

(a) At 24 hours after desiccation or receipt of the engine or the Q.E.C. unit.

(b) One week after desiccation or receipt of the engine or the Q.E.C. unit.

(c) Each month during the time the engine is in storage.

S 552-018-R00

(2) If the humidity indicator shows 'unsafe' (changed color from blue to lilac or pink), do these steps:

(a) Open the M.V.P. bag.

(b) Examine the engine or Q.E.C. unit for corrosion.

1) If you find corrosion, you must do the task: "Engine Component Protection".

NOTE: Use a warm air blower to put dry air through the engine to dry the engine.

(c) Examine the M.V.P. bag for damage.

1) If you find damage, repair the bag.

a) Refer to the task: "Examine and Repair the M.V.P. Bag".

(d) Put dry desiccant in the bottom half of the M.V.P. bag.

NOTE: Bandoliers of used desiccant can be dried and used again. To dry the desiccant, heat the dessicant for one hour at 150 degrees C.

(e) Put new humidity indicator paper in the pocket of the M.V.P. bag.
(f) Seal the M.V.P. bag.

S 552-019-R00
(3) If the M.V.P. bag is opened, dry desiccant must be put into the bag before the M.V.P. bag is sealed again.

S 632-051-R00
(4) Remove all of the dessicant, V.P.I./C.H.C. paper and adhesive tape before you put the engine into service again.

TASK 71-00-03-602-052-R00

7. Engine Depreservation
A. References
(1) AMM 71-00-00/501, Power Plant
B. Remove the M.V.P. bag.

S 632-022-R00
(1) Remove the M.V.P. bag from the engine (Fig. 204).
(a) Release the tie straps from the buckles and pull the straps through the strap loops.
(b) Remove the sliders.
(c) Bend sides of the interlocking closure, between the M.V.P. bag bottom-half and top-half, through 90 degreees to release the closure.
(d) Release the stress hooks.
(e) Attach a sling to the loops on the M.V.P. bag.
(f) Use a hoist to remove the top half of the M.V.P. bag from the engine or the Q.E.C. unit.
(g) Remove the desiccant from the bottom of the M.V.P. bag.

NOTE: It is recommended that the bottom of the M.V.P. bag remains in position on the multi-purpose stand. Remove the M.V.P. bag from the stand when the engine or Q.E.C. unit is lifted from the multi-purpose stand.

S 542-020-R00

(2) When a basic engine is converted to a Q.E.C. unit or immediately before the installation of the Q.E.C. unit, remove the applicable blanks and V.P.I. paper from the engine or Q.E.C. unit.

S 632-021-R00

(3) The depreservation of the engine fuel system will be done during Test No.1 (AMM 71-00-00/501).

TASK 71-00-03-502-045-R00

8. Examine and Repair the M.V.P. Bag

A. Equipment

(1) Repair Kit - M.V.P. bag,
CP.15306, Rolls-Royce

B. Consumable Materials

(1) Fluorescent penetrant remover (Detergent)
British Spec - Lissapol 'N'
OMat No. - 621

(2) Adhesive tape, Black waterproof
British Spec - Isatape 160
OMat No. - 285

(3) French chalk
British Spec - DTD.527
OMat No. - 1225

C. Examine the M.V.P. Bag before it is put into storage.

S 212-023-R00

(1) Fully examine the bag for damage or contamination from fluids or dirt.

(a) Wash the bag with detergent to remove the contamination or the dirt.

(b) You must fully dry the bag.

(c) If damage is found, repair the bag.

S 552-024-R00

(2) If the bag is put into storage, fold the bag carefully and put the bag in a clean, dry place.

D. Repair the M.V.P. bag.

S 212-025-R00

(1) Examine the bag for tears or punctures.
  (a) Fractures to the interlocking closures are not permitted.
  (b) You can repair the puncture if the diameter is not more than one inch.
  (c) You can repair the tear, if the length of the tear is not more than 3.0 inches (76.2 mm.) in two directions.
  (d) There is no limit to the number of patches that can be applied, but two patches cannot overlap.

S 352-026-R00

(2) Do a permanent repair to the areas not adjacent to the seams.
  (a) Get the materials in the repair kit CP.15306.
  (b) Cut two patches that are large enough to overlap the damaged area by 1.50in. (38.1 mm.) all round.
  (c) Clean the area around the damage and one side of each patch with detergent.
    1) Let the patch and the area on the bag become dry.
  (d) Apply a thin layer of adhesive to the cleaned side of the patches and the mating area of the bag.
    1) Let the adhesive dry for 15 minutes.
  (e) Put the first patch on the outside of the bag, over the damaged area, and press firmly together on a flat surface.

    NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly when touched.

  (f) Put the second patch on the inside of the bag, over the damaged area, and press firmly together on a flat surface.

    NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly on touch.

(g) Apply the French chalk on the inside and the outside of the bag adjacent to the repair area.

S 352-027-R00

(3) Do a permanent repair to the areas adjacent to the seams.
(a) Get the materials contained in the repair kit CP.15306.
(b) Cut away part of the raised seam, on the inside of the bag, that is adjacent to the damage.
(c) Cut two patches that are large enough to overlap the damaged area by 1.50in. (38.1 mm.) all round.
(d) Cut two slots in the inner patch to accept the raised seam that has not been cut away.
(e) Clean the area around the damage and one side of each patch with the detergent.
1) Let the damage area and the patch become dry.
(f) Apply a thin layer of adhesive to the cleaned side of the patches and the mating area of the bag.
1) Let the adhesive dry for 15 minutes.
(g) Put the first patch on the outside of the bag, over the damaged area, and press firmly together on a flat surface.

NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly when touched.

(h) Put the second patch on the inside of the bag, over the damaged area, and press firmly together on a flat surface.

NOTE: The patch must be in the correct position before you apply pressure because the adhesive will bond tightly on touch.

(i) Apply the French chalk on the inside and the outside of the bag adjacent to the repair area.

S 352-028-R00

(4) If the repair kit CP.15306 is not available, this temporary repair is permitted.
(a) Clean the inside and the outside areas to be repaired with the detergent.

(b) Let the repair area dry completely.
(c) Overlap strips of 2.0in. (50.8 mm.) wide adhesive tape over the tear or puncture, on the inside and the outside of the bag.

S 352-029-R00

(5) The temporary repair to the M.V.P. bag must be removed and replaced with a permanent repair as soon as possible.

TASK 71-00-03-602-030-R00

9. Inhibit the Engine Fuel System

A. General

(1) Perform fuel system inhibiting as specified in Fig. 201. The fuel system inhibiting procedure is performed with the engine installed on the airplane as the engine must achieve a minimum speed of 15% N3.

B. Equipment

(1) Engine is installed on the wing.
(a) Inhibiting Rig - Rolls-Royce 1702198, 29001H, or 3409702
(b) Adapter - Rolls-Royce HU31811 (Replaces HU29623)
(c) Clean container - minimum capacity
5 U.S. gallons
4 Imperial gallons
18 Liters

(2) Engine is not installed on the wing.
(a) Turning Tool - HP System (via starter motor mounting pad) Rolls-Royce E2J54584
(b) Turning Tool - HP System (through H.S. gearbox breather) Rolls-Royce E2J52189
(c) Drain Valve - Dummy FFG Pressurizing and Drain Valve, Rolls-Royce HU30645/1

(d) Wrench - Burner Rail Nuts,
Rolls-Royce UT818
(e) Clean container - Minimum Capacity:
5 U.S. Gallons
4 Imperial Gallons
18 Liters

C. Consumable Materials
(1) Lockwire
British Spec - DTD.189A, 22 SWG
American Spec - 21 AWG
OMat No. - 238

(2) Mineral Oil
American Spec - MIL-L-6081C
OMat No. - 1024A, 1024C, 1024D
(3) Dry, compressed - minimum pressure 60 psig
air supply

D. References
(1) AMM 70-02-01/201, Identification, Lubrication and
Fitting of Rubber Seal Rings
(2) AMM 70-12-04/201, Locking Techniques For Threaded Parts
(3) AMM 70-50-02/201, Connection of Electrical Plugs
(4) AMM 70-51-00/201, Torque Tightening Technique
(5) AMM 71-00-00/201, Power Plant
(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 72-00-00/201, Rotate HP System
(8) AMM 73-21-15/401, Fuel Flow Governor Solenoid Valves

E. Access
(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)

F. Inhibit the Fuel System with the Engine Installed on the Wing.

S 942-031-R00

(1) Prepare the Inhibiting Rig (Fig. 205)

WARNING: DO NOT APPLY AIR PRESSURE MORE THAN 50 PSIG TO THE RIG OR IT COULD CAUSE THE FRACTURE OF THE AIR FILTER BOWL. INJURY TO THE RIG OPERATOR COULD OCCUR.

(a) Remove the adapter cap from the oil outlet.
(b) Attach the oil delivery hose to the oil outlet.
(c) Turn the handle on the microdisc filter to clear the filter element.
(d) Depress the safety valve lever to make sure the air pressure in the reservoir is zero.
(e) Remove the oil filling plug.
(f) Fill the reservoir with inhibiting fluid until the sight tube shows 9.6 U.S. gallons (8 Imperial gallons or 36.4 litres).
(g) Install the oil filling plug.
(h) Close the regulator valve.
(i) Connect the external air supply to the air coupling.
(j) Unscrew the drain valve to drain the air filter.
1) When clear, close the drain valve.
(k) Adjust the regulator valve until the pressure gage shows 50 psig.
(l) Open the shutoff valve to flush the hose.
1) When the hose is free from contamination, close the valve.
(m) Disconnect the external air supply from the air coupling.

S 862-032-R00

(2) Prepare the Engine for Inhibiting the Fuel System.
(a) For the left engine, open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags.
1) 6E1, FUEL VALVES L SPAR
(b) For the right engine, open these circuit breakers on the main power distribition panel, P6, and attach DO-NOT-CLOSE tags.
1) 6E2, FUEL VALVES R SPAR

(c) For the left engine, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags.
  1) 11D7, ENGINES STBY IGNITION LEFT 1
  2) 11D8, ENGINES STBY IGNITION LEFT 2
  3) 11L1, LEFT ENGINE IGN 1

(d) For the right engine, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags.
  1) 11D9, ENGINES STBY IGNITION RIGHT 1
  2) 11D10, ENGINES STBY IGNITION RIGHT 2
  3) 11L28, RIGHT ENGINE IGN 1

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(e) Open the left fan cowl panel (AMM 71-11-04/201).

(f) Disconnect the electrical connector from the minimum flow reset solenoid on the fuel flow governor (Fig. 206) (AMM 70-50-02/201).
  1) Install a warning streamer.

(g) Disconnect the LP fuel hose assembly at the engine/airplane interface (Fig. 207).

(h) Install the adapter on the LP fuel hose.

(i) Remove the fuel from the LP fuel filter.
  1) Put a container below the LP fuel filter.
  2) Remove the drain plug from the LP fuel filter case (Fig. 208).
    a) When you remove the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
    b) Discard the old seal ring from the drain plug.
  3) Let the fuel drain.
  4) Lubricate and install the new seal ring for the drain plug (Ref 70-02-01).

5) Install and tighten the drain plug to 250 pound-inches (28.2 Newton-meters) (AMM 70-51-00/201).
   a) When you install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
6) Install lockwire on the drain plug (AMM 70-12-04/201).

(j) Put a container below the drain outlet of the turbine section.
(k) Connect the inhibiting rig to the adapter (Fig. 207).
(l) Connect the external air supply to the air coupling (Fig. 205).
(m) Open the rig shut-off valve (Fig. 205).

S 622-033-R00

(3) Inhibit the fuel system with the engine installed on the wing.
   (a) Make sure the pressure gage on the inhibiting rig shows 50 psi (Fig. 205).
      1) If the pressure is not correct, adjust the pressure.
   (b) Remove the fuel from the engine.
      1) Do the procedure to dry motor the engine (AMM 71-00-00/201).
         a) Dry motor the engine at a speed between 15% and 30% N3.
      2) Move the FUEL CONTROL switch to the RUN position.
      3) Dry motor the engine for 2 minutes.
      4) Stop the dry motor procedure (AMM 71-00-00/201).
         a) Do not use the starter again until the N3 speed is zero.
      5) Dry motor the engine for 2 minutes more (AMM 71-00-00/201).
      6) Move the FUEL CONTROL switch to the CUTOFF position.
      7) Stop the dry motor procedure (AMM 71-00-00/201).
   (c) Examine the inhibiting fluid that has come from the turbine section drain.
      1) Make sure that the inhibiting fluid does not have fuel in it.
      2) If the inhibiting fluid has fuel in it, do the steps to remove the fuel from the engine again.

         NOTE: If you must dry motor the engine again, you must follow the starter operation limits (AMM 71-00-00/201).

S 862-034-R00

(4) Put the airplane back to the usual condition.
  (a) Close the regulator valve (Fig. 205).
  (b) Close the rig shut-off valve (Fig. 205).
  (c) Depress the safety valve lever to make sure the air pressure in reservoir is zero (Fig. 205).
  (d) Disconnect the external air supply from the air coupling (Fig. 205).
  (e) Disconnect the inhibiting rig from the adapter (Fig. 207).
  (f) Connect the LP fuel hose to airplane fuel system (Fig. 207).
  (g) Connect the electrical connector to the minimum flow reset solenoid on the fuel flow governor (Fig. 206) (AMM 70-50-02/201).
    1) Remove the warning streamer.
  (h) For the left engine, remove the DO-NOT-CLOSE tags and close this circuit breaker on the main power distribution panel, P6.
    1) 6E1, FUEL VALVES L SPAR
  (i) For the right engine, remove the DO-NOT-CLOSE tags and close this circuit breaker on the main power distribution panel, P6.
    1) 6E2, FUEL VALVES R SPAR
  (j) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11.
    1) 11D7, ENGINES STBY IGNITION LEFT 1
    2) 11D8, ENGINES STBY IGNITION LEFT 2
    3) 11L1, LEFT ENGINE IGN 1
  (k) For the right engine, remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11.
    1) 11D9, ENGINES STBY IGNITION RIGHT 1
    2) 11D10, ENGINES STBY IGNITION RIGHT 2
    3) 11L28, RIGHT ENGINE IGN 1

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

  (l) Close the left fan cowl panel (AMM 71-11-04/201).

G. Inhibit the fuel system with the engine not installed on the wing.

S 682-035-R00

(1) Remove the fuel from the LP fuel filter.
  (a) Put a container below the LP fuel filter.
  (b) Remove the drain plug from the LP fuel filter case (Fig. 208).
    1) When you remove or install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
    2) Discard the old seal ring from the drain plug.
  (c) Let the fuel drain.
  (d) Lubricate and install the new seal ring on the drain plug (AMM 70-02-01/201).
  (e) Install and tighten the drain plug to 250 pound-inches (28.2 Newton-meters) (AMM 70-51-00/201).
    1) When you install the drain plug, hold the drain plug insert with a spanner to prevent the insert from turning.
  (f) Install lockwire on the drain plug (AMM 70-12-04/201).

S 032-036-R00

(2) Remove the fuel flow governor (FFG) pressurizing and drain valve and switch assembly from the FFG (AMM 73-21-15/401).

S 492-037-R00

(3) Install the dummy FFG pressurizing and drain valve (1) on the FFG (Fig. 209).
  (a) Make sure the mating faces are clean and are not damaged.
  (b) Install the new seal ring (4) below the valve assembly (Ref 70-02-01).
  (c) Put the dummy valve on the FFG.
  (d) Install the nuts (2) and washers (3).
    1) Tighten the nuts to 35-45 pound-inches (4.0-5.0 Nm) (Ref 70-51-00).
  (e) Install a new seal ring (5) to the tube (7)(AMM 70-02-01/201).
    1) Install the bolts (6) and tighten (AMM 70-51-00/201).

S 622-038-R00

(4) Remove the fuel from the engine.
  (a) Put a clean container below the fuel drain tube (1) (Fig. 210).
  (b) Disconnect the fuel drain tube (1) from the drain union of the fuel manifold (Fig. 210).
  (c) Fill the LP fuel hose with the inhibiting fluid (Fig. 207).
  (d) Manually turn the HP engine system with the turning tool (AMM 72-00-00/201).
    1) Examine the inhibiting fluid that comes out of the drain union on the fuel manifold.
    2) You must turn the HP engine system until the inhibiting fluid does not have fuel in it.
    3) You must keep the LP fuel hose full of inhibiting fluid during the time you turn the HP engine system.

S 432-039-R00

(5) Connect the fuel drain tube to the drain union on the fuel manifold (Fig. 210).
  (a) Discard the old seal ring (2) on the fuel drain tube.
  (b) Install a new seal ring on the fuel drain tube (AMM 70-02-01/201).
  (c) Connect the fuel drain tube (1) to the drain union (AMM 70-51-00/201).
    1) Install lockwire on the tube (AMM 70-12-04/201).

S 092-040-R00

(6) Remove the dummy FFG valve (Fig. 209).
  (a) Remove the bolts (6) that hold the tube (7).
  (b) Remove the nuts (2) and washers (3) to disconnect the dummy FFG valve.
  (c) Remove dummy FFG valve (1).

S 432-041-R00

(7) Install the FFG Pressurizing and Drain valve and switch assembly (AMM 73-21-15/401).

S 532-042-R00
(8) Install the blank to the LP fuel tube (Fig. 202).

S 632-054-R00
(9) Remove all of the dessicant, V.P.I./C.H.C. paper and adhesive tape before you put the engine into service again.

POWER PLANT - MAINTENANCE PRACTICES (ENGINE INTERMIX/SUBSTITUTION)

1. General
   A. This procedure contains one task:
      (1) Intermix engines with different basic model types.

TASK 71-00-07-902-001-R00

2. Intermix Engines with Different Basic Model Types
   A. General
      (1) 757-71-0089, Intermix One or Substitute Two RB211-535E4 Engines for RB211-535E4-B Base Engines and Change to Operate the RB211-535E4-B Base Engines at the RB211-535E4 Thrust Level.
      (2) This task provides instructions to intermix different basic engine model types (i.e. RB211-535E4-B and RB211-535E4-C), and operate these engines at a common thrust rating.
      (3) The same engine thrust rating must be used on both the No. 1 and No. 2 engines. If you do not use the same engine thrust rating on both engines, the engines will produce asymmetric thrust.
      (4) You must do this step to complete the procedure.
         (a) Follow the instructions in the applicable Boeing service bulletin.
      (5) Use the instructions in the Boeing service bulletin to intermix the engines.

         NOTE: A Boeing service bulletin is required to intermix, substitute, interchange, derate or change the takeoff thrust rating of the engines. You must follow the steps in the service bulletin to accomplish the engine intermix procedure. Contact your Boeing Customer Engineering representative for specific information regarding service bulletin applicability to your fleet.

      (6) The following is a list of Boeing service bulletins that provide instructions for engine intermix.
         (a) 757-71-0066, Intermix of One or Substitution of Two Different Configuration RB211-535E4-B-37/( ) Engines for RB211-535E4-B Base Engines or Intermix of One or Substitution of Two Different Configuration RB211-535E4-37/( ) Engines for RB211-535E4 Engines.
         (b) 757-71-0070, Intermix of One or Substitution of RB211-535E4 Engines With RB211-535E4-C Base Engines, Operated at RB211-535E4 Performance Levels.
         (c) 757-71-0071, Intermix of One or Substitution of RB211-535E4-B Engines With RB211-535E4-C Base Engines, Operated at RB211-535E4-B Performance Levels.

(d) 757-71-0075, Intermix of One or Substitution of Two Different Configuration RB211-535E4-C-37/( ) Engines for RB211-535E4-C-37/( ) Base Engines or Different Configuration RB211-535E4-B-37/( ) Engines for RB211-535E4-B-37/( ) Base Engines or Different Configuration RB211-535E4-37/( ) Engines for the RB211-535E4-37/( ) Base Engines

(e) 757-71-0058, Intermix of One or Substitution of Two Different Configuration RB211-535E4-37/( ) Engines for RB211-535E4 Base Engines or Different Configuration RB211-535E4-B-37/( ) Engines for RB211-535E4-B Base Engines

(f) 757-71-0067, Intermix One or Substitute One or Two RB211-535E4 Engines for RB211-535E4-B Base Engines and Modification to Operate the RB211-535E4-B Base Engines at the RB211-535E4 Thrust Level

(g) 757-71-0061, Intermix or Substitution of One RB211-535E4-B Engine for the RB211-535E4 Base Engine

(h) 757-71-0057, Intermix or Substitution of One RB211-535E4-B Engine for the RB211-535E4 Base Engines or Replacement of the RB211-535E4 Base Engines with RB211-535E4-B Engines or Intermix of One or Substitution of One or Two RB211-535E4 Engines for RB211-535E4-B Engines

(i) 757-71-0055, Intermix One or Substitute One or Two RB211-535E4 Engines for RB211-535E4-B Engines with Operation at the RB211-535E4 Thrust Level

(j) 757-71-0040, Intermix of One or Substitution of One or Two RB211-535E4 Engines for the RB211-535E4-B Base Engines or Modification to Operate the RB211-535E4-B Base Engines at RB211-535E4 Thrust Levels

(k) 757-71-0053, Intermix of One or Substitution of Two RB211-535E4-37/12B Engines for RB211-535E4-37/11B Base Engines

(l) 757-71-0051, Intermix of One or Substitution of Two RB211-535E4-37/12B Engines for RB211-535E4-37/11B Base Engines

(m) 757-71-0049, Intermix One or Substitute Two RB211-535E4-37/11B or RB211-535E4-37/17B Engines for RB211-535E4-37/10C Engines

(n) 757-71-0048, Intermix of One or Substitution of Two RB211-535E4-37/12B Engines for RB211-535E4-37/11B Base Engines or Intermix of One or Substitution of Two RB211-535E4-37/11B Engines for RB211-535E4-37/12B Base

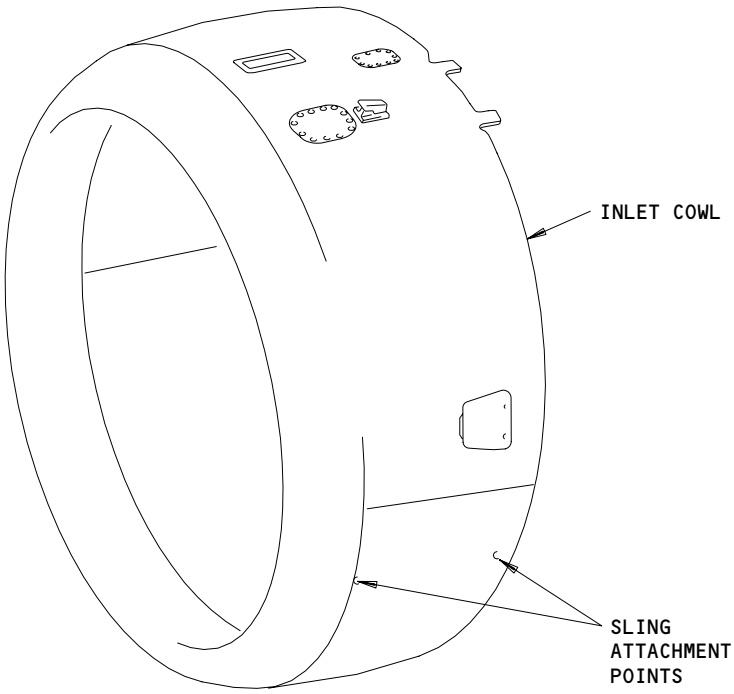
(o) 757-71-0046, Intermix of One or Substitution of Two RB211-535E4-37/11B Engines for RB211-535E4-37/12B Base Engines

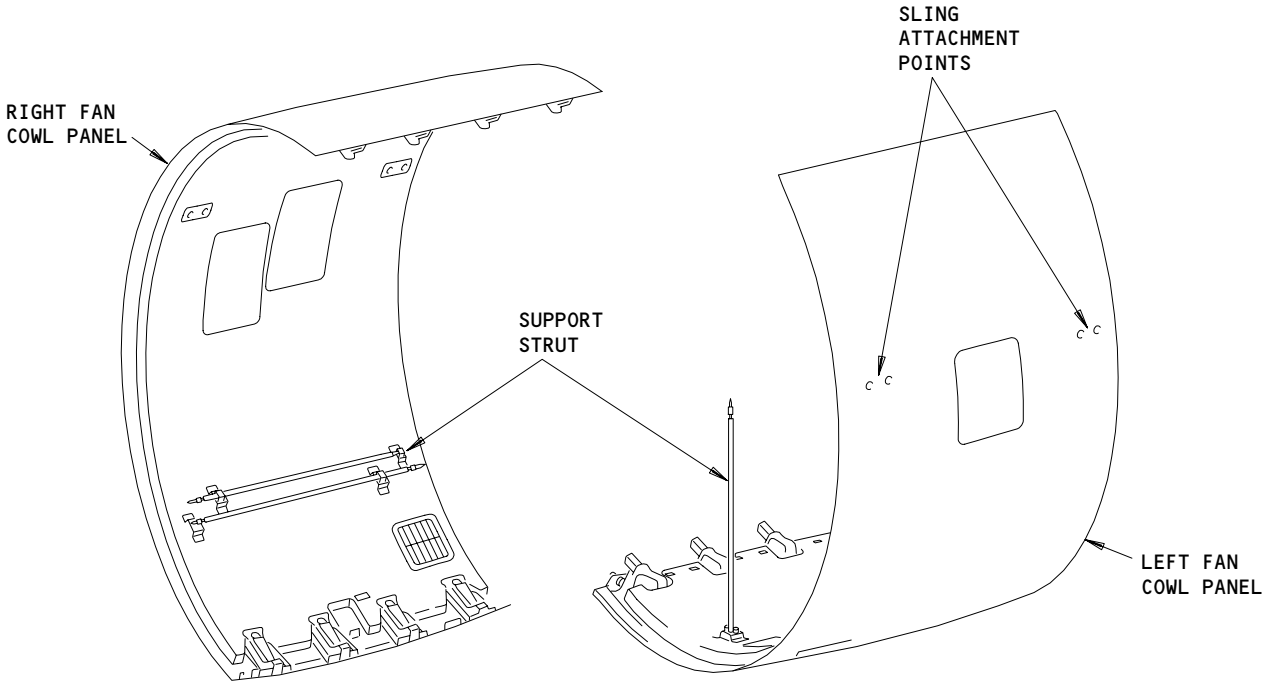
(p) 757-71-0042, Intermix of One or Substitution of Two RB211-535E4-37/11B Engines for RB211-535E4-37/12B Engines

(q) 757-71-0041, Substitution of Various Model RB211-535E4 Engines

ENGINE COWLING - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The engine cowls are utilized to give an even airflow through and over the engine. These cowls consist of an inlet cowl and left and right fan cowl panels.
   B. Acoustic materials incorporated in construction assist in engine noise suppression.
   C. AIRPLANES WITH ENGINES PRE-RR-SB 71-9634;
      The inlet cowl outer skin forward and rear edges are coated with flame sprayed aluminium to protect the cowl from a lightning strike.
   D. AIRPLANES WITH ENGINES POST-RR-SB 71-9634;
      The inlet cowl outer skin forward and rear edges include aluminum wire mesh to protect the cowl from a lightning strike.
2. Component Details
   A. Fan Cowl Panels (Fig. 2)
      (1) The fan cowl panels extend aft from the inlet cowl to the engine firewall. They provide access to the engine accessories on the low pressure (LP) compressor case.
      (2) Each panel is supported by four support hinges with bolts attaching to the engine strut. When closed, the hinged cowls are interconnected by four hook-type latches on the right-hand cowl and four corresponding U-bolts on the left-hand cowl: the abutment faces being dowel located.
      (3) The panels are located and sealed circumferentially on lands integral with the inlet cowl and engine firewall. A longitudinal seal attached to the upper edge of each panel provides a seal with the engine strut. Seals along the lower edge of the left panel provides a seal between the two panels.
      (4) Incorporated in the panels are two hold open rods, mounted on swivel joints and retained inside the panel by clip brackets. Each rod folds outward, and locates in an anchorage bracket on the LP compressor case and inlet cowl. The rods support the panel in the open position to facilitate access to units mounted on the LP compressor case.





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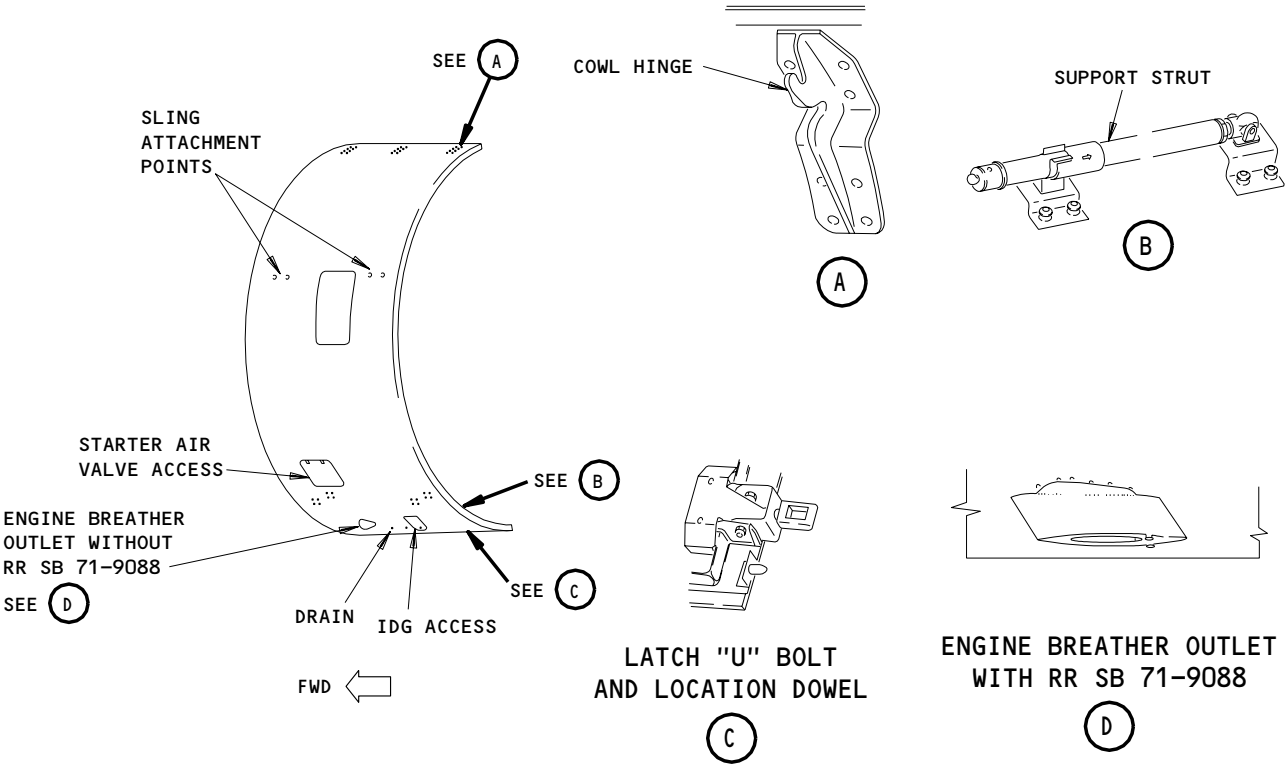
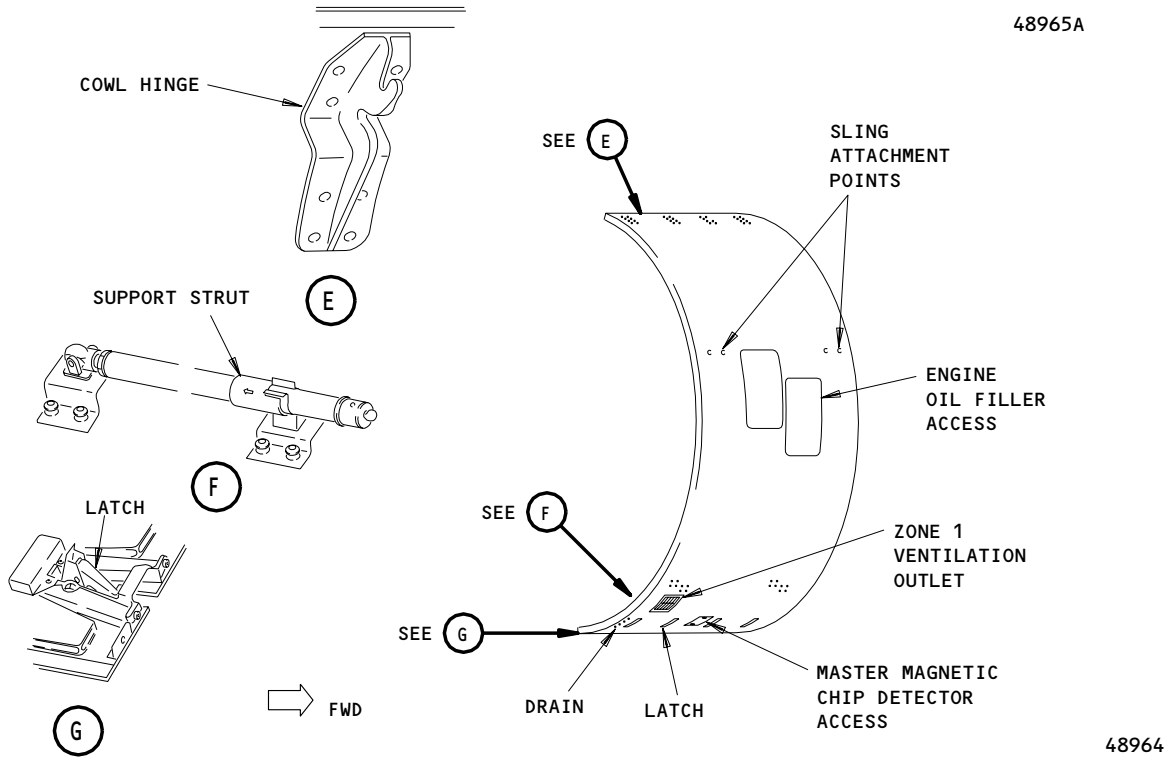
Cowling Arrangement
Figure 1

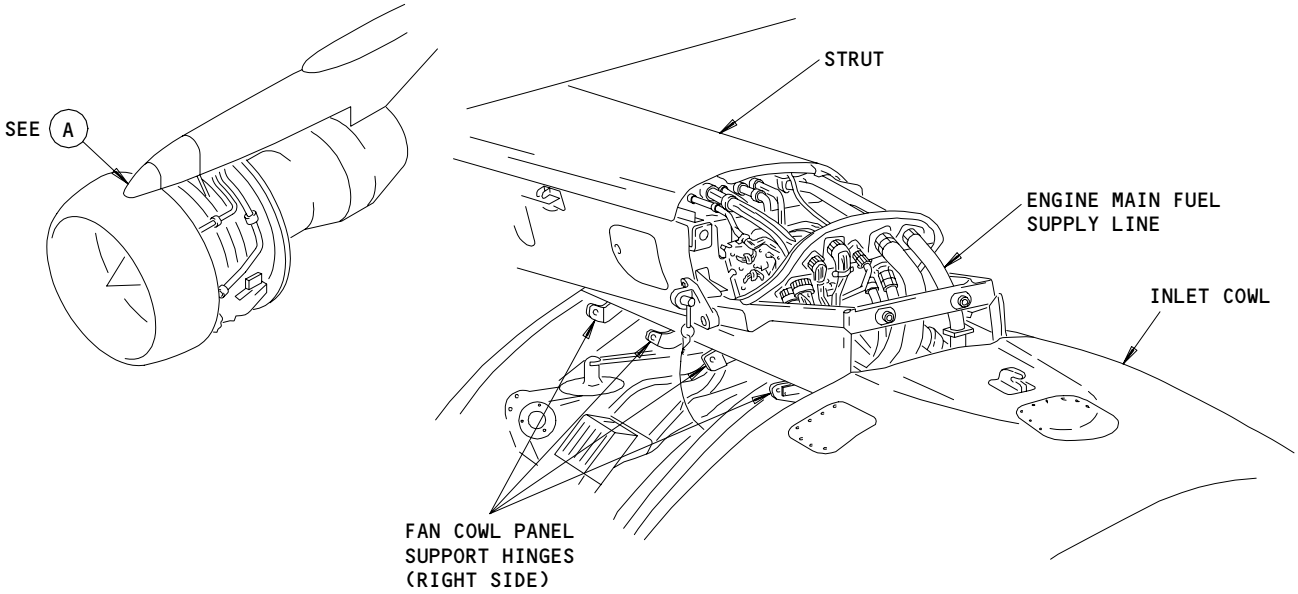




Fan Cowl Panels
Figure 2

(5) Doors located in the right-hand cowl provide access to the engine oil tank filler and the master magnetic chip detector. Both incorporate an over-pressure blow-out feature. The cowl also includes an outlet duct for the zone 1 ventilation air.

(6) Doors located in the left-hand cowl provide access to the engine starter air valve and intergrated drive generator (IDG) oil filler and sight glass. The cowl also includes the engine breather outlet and two holes in the lower panel area allow for drainage from Zone 1.



STRUT FORWARD FAIRING -
AFT AND FOWARD SECTIONS SHOWN REMOVED

A

Fan Cowl Support Location
Figure 3

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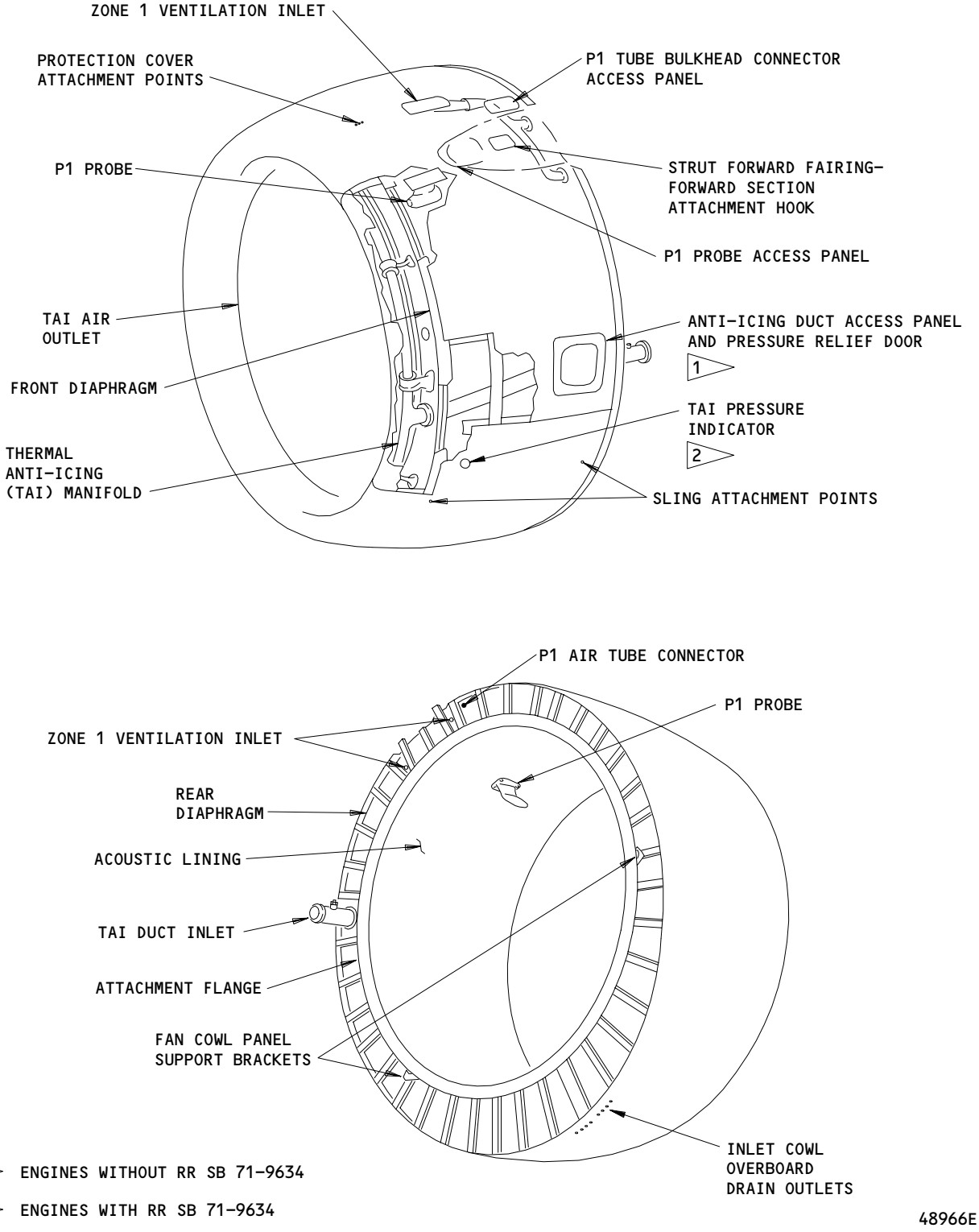

Inlet Cowl
Figure 4

(7) ENGINES POST RR SB 71-9088;
The engine breather louvered outlet cover is replaced with a breather mast. The breather mast is contained in a fabricated aerodynamic fairing and is attached to the left fan cowl panel.
(8) Sling attachment points are provided in each panel to facilitate cowl removal/installation (AMM 71-11-04/401).

B. Inlet Cowl (Fig. 4)
(1) The inlet cowl is secured to the front flange of the LP compressor case. The outer skin provides for an even airflow over the engine, while the inner skin forms the engine air inlet. Two interposed diaphragms, front and rear, provide attachment for the inner and outer skins. The rear diaphragm forms the front wall of the engine accessories compartment.
(2) PRE RR SB 71-9634;
The inner skin is made from three Dynorah panels riveted to the forward defuser ring and the rear diaphragm. Three butt straps join the individual panels along their longitudinal joint line.
(3) Do the steps that follow:
(a) POST RR SB 71-9634;
The inner skin is made from three composite panels riveted to the forward defuser ring and the rear diaphragm. Three butt straps join the individual panels along their longitudinal joint line.
(4) PRE RR SB 71-9634;
The outer skin has access panels for the P1 probe, P1 tube bulkhead connector, and thermal anti-icing duct. An air inlet, flush with the inlet cowl outer skin, feeds air to a duct on the front face of the rear diaphragm, where it is distributed through two holes for Zone 1 ventilation (AMM 75-21-00/001).
(a) POST RR SB 71-9634;
The outer skin has these features:
1) Access panels for the P1 probe, P1 tube bulkhead connector, and thermal anti-icing duct.
2) An air inlet, flush with the inlet cowl outer skin, feeds air to a duct on the front face of the rear diaphragm, where it is distributed through two holes for Zone 1 ventilation (AMM 75-21-00/001).

3) A thermal anti-ice pressure (TAI) indicator. The indicator gives a visual indication if the TAI supply duct is defective. An examination of the pressure indicator is part of the pre-flight check.

(5) A circumferential manifold housed between the inner and outer skins, attached to the front diaphragm through brackets provides thermal anti-icing (TAI) (AMM 30-21-00/001) of the inlet cowl. A duct from the manifold extends aft along the mid right hand position, through the rear diaphragm to provide the anti-icing air inlet.

(6) The P1 probe is secured at the top center position of the inner skin, protrudes into the air intake, and senses air inlet pressure (P1) (AMM 73-00-00/001).

(a) The probe is protected from ice formation by an electrically heated system. The electrical connection is mounted on the rear face of the rear diaphragm, toward the top right-hand position.

(7) At the top center position on the outer skin is attached a hook arrangement which provides the location for the front removal section of the strut nose fairing.

(8) Two sling attachment holes are situated on either side of the inlet cowl, on approximately the cowl center line, to facilitate the removal/installation (AMM 71-11-01/401). Eight attachment points for a protective cover are located around the outer forward section of the cowl.

ENGINE COWLING

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
COWL - INLET	--	2		71-11-01
LATCH - FAN COWL PANEL	--	8	413AL,414AR,423AL,424AR	71-11-05
PANELS - FAN COWL	--	4	413AL,414AR,423AL,424AR	71-11-04

Engine Cowling - Component Index
Figure 101

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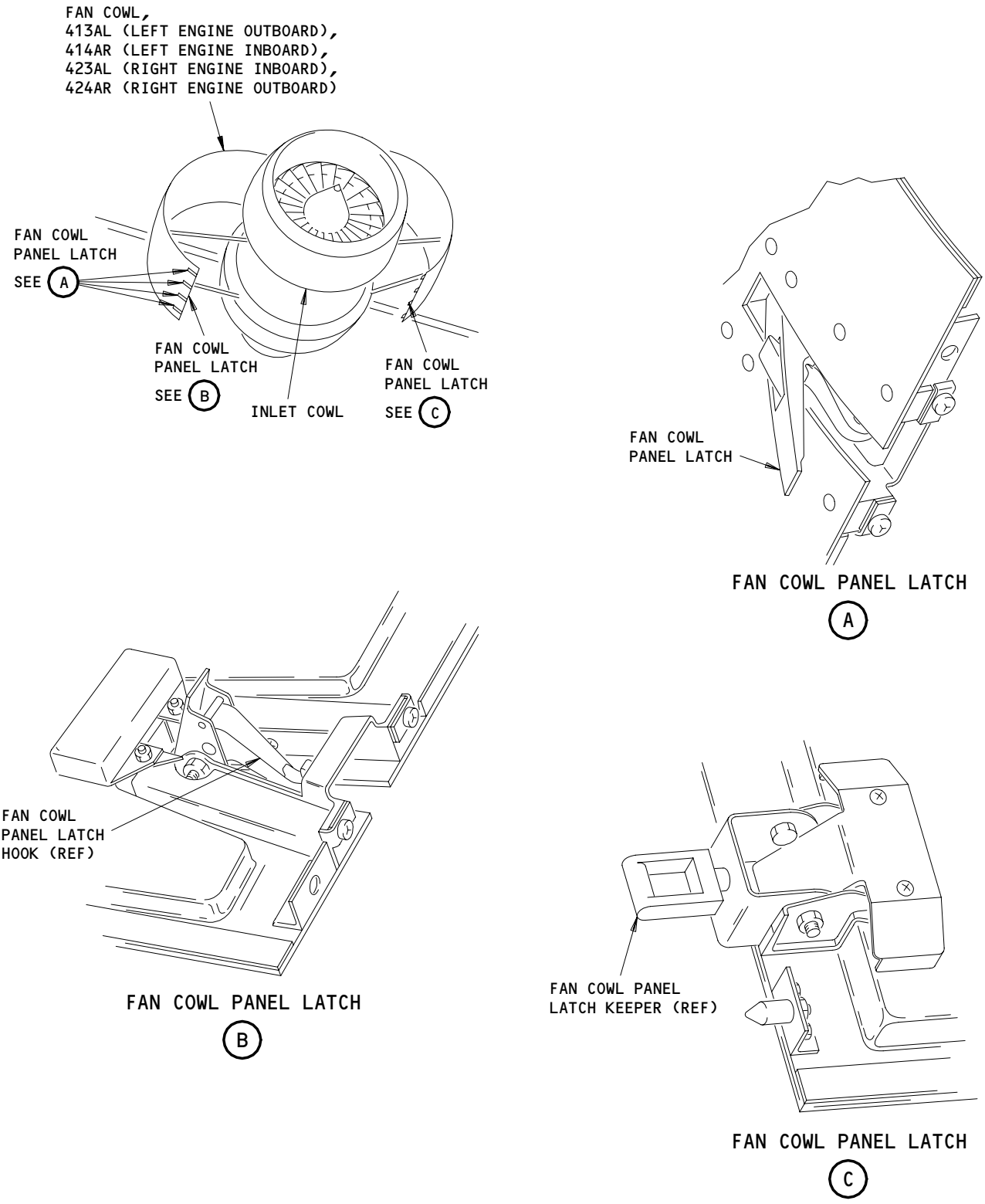


Engine Cowling - Component Location
Figure 102

ENGINE COWLING - INSPECTION/CHECK

1. General
   A. This procedure has one task. This task examines the fan cowl and the inlet cowl on the engine.

   TASK 71-11-00-206-001-R00

2. Engine Cowling Inspection
   A. References
      (1) 71-11-04/201, Fan Cowl Panels
      (2) 71-11-04/601, Fan Cowl Panels
   B. Access
      (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)

   C. Examine the Engine Cowling

      NOTE: Refer to the Structural Repair Manual for the repair of the damaged structure.

      S 216-002-R00
      (1) Examine the fan cowl panels for pressure relief doors that are open and for fluid leakage.

      S 216-003-R00
      (2) Examine the inlet cowl for pressure relief doors that are open and and for fluid leakage.

      S 216-004-R00
      (3) Examine the external side of the fan cowl panels for damage and correct installation.

S 216-005-R00

(4) Examine the external side of the inlet cowl for damage and correct installation.

S 016-006-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(5) Open the fan cowl panels (Ref 71-11-04/201).

S 216-007-R00

(6) Examine the attachment flange of the inlet cowl and the flange of the LP compressor case.
   (a) Look for damage and cracks in the flanges.
   (b) Make sure all the bolts that attach the inlet cowl to the LP compressor are installed.

S 216-008-R00

(7) Examine the hinges, latches and adjacent cowl structure of the fan cowl panel for damage and correct installation.

S 216-009-R00

(8) Examine the inside of the fan cowl panels (Ref 71-11-04/601).

S 416-010-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

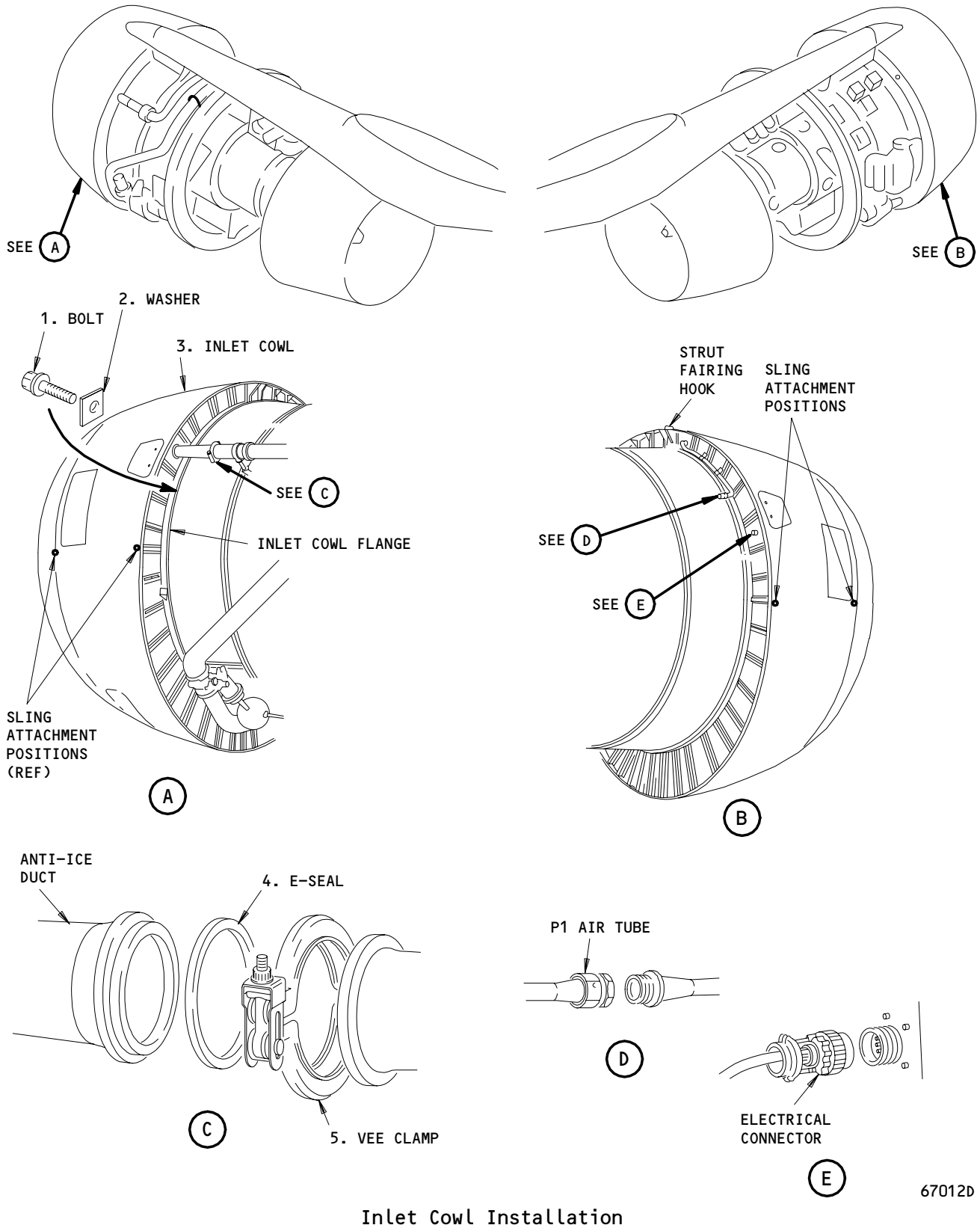
(9) Close the fan cowl panels (Ref 71-11-04/201).

INLET COWL - REMOVAL/INSTALLATION

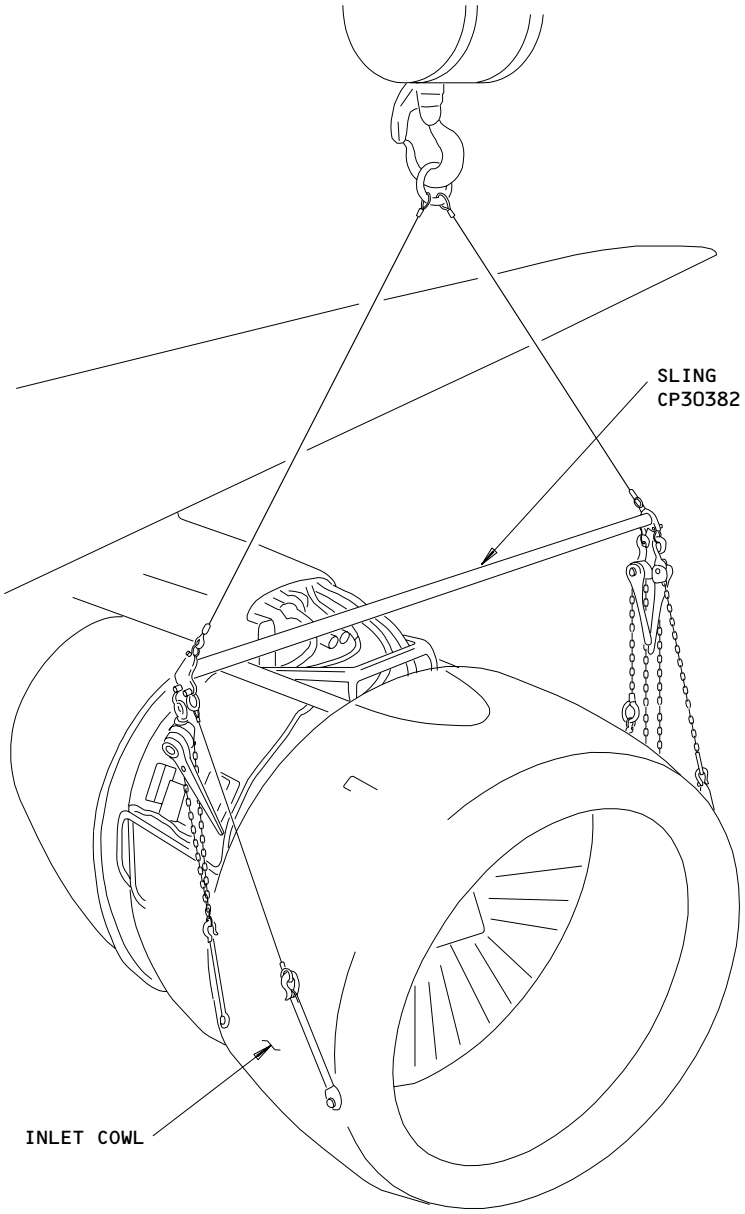
1. General
   A. This procedure contains two tasks, to remove and to install the engine inlet cowl.

TASK 71-11-01-024-063-R00

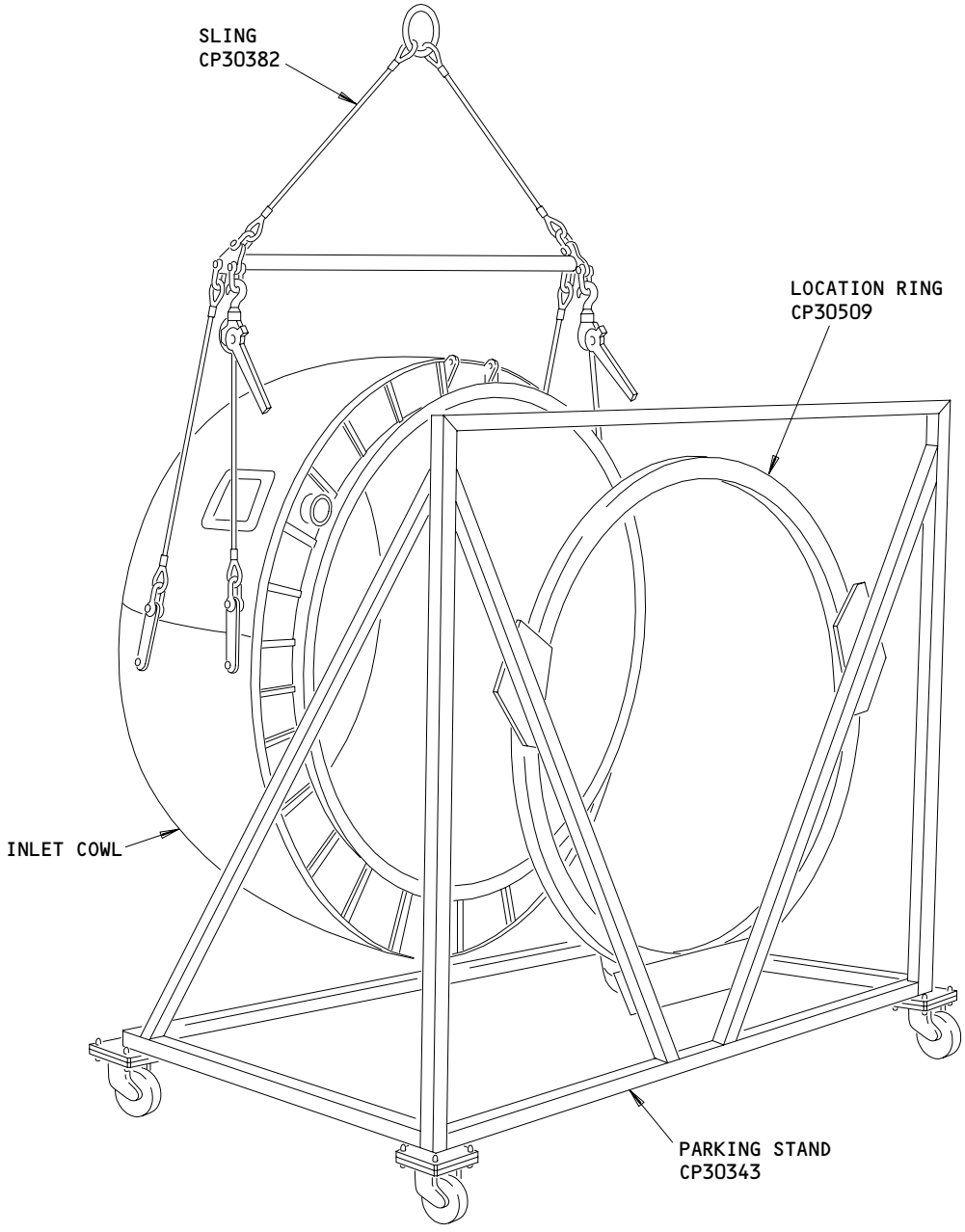
2. Inlet Cowl Removal (Fig. 401)
   A. General
      (1) This section gives the procedure to remove the inlet cowl.
   B. Equipment
      (1) Wrench - Nose Cowl, B71005-11
          (Part of Engine Change Tool Set B71005)
      (2) Bar - Breaker, F10LB,
          3/8 inch square drive, 9.5 inch long.
          (Part of engine change tool set B71005)
      (3) Sling - Inlet Cowl, B71040
      (4) Crane - Overhead, 1000 pound minimum capacity (Used with B71040)
      (5) Dynamometer (Customer supplied, used with B71040)
      (6) Sling - Inlet Cowl, CP30382, Rolls-Royce
      (7) Stand - Parking, Inlet Cowl, CP30343/4, Rolls-Royce
      (8) Ring - Mounting Location, Inlet Cowl CP30451/1 or CP30509, Rolls-Royce
      (9) Plate - Adapter, CP26863, Rolls-Royce (use with CP30451/1)
      (10) Rubber mat - 1 1/2 inches thick, 2 feet by one foot
   C. References
      (1) AMM 54-52-01/401, Strut Fairings
      (2) AMM 70-12-02/201, Fitting Vee Band Coupling Clamps
      (3) AMM 71-11-04/401, Fan Cowl Panels



Inlet Cowl Installation
Figure 401



Rolls-Royce Parking Stand and Sling
Figure 402 (Sheet 1)



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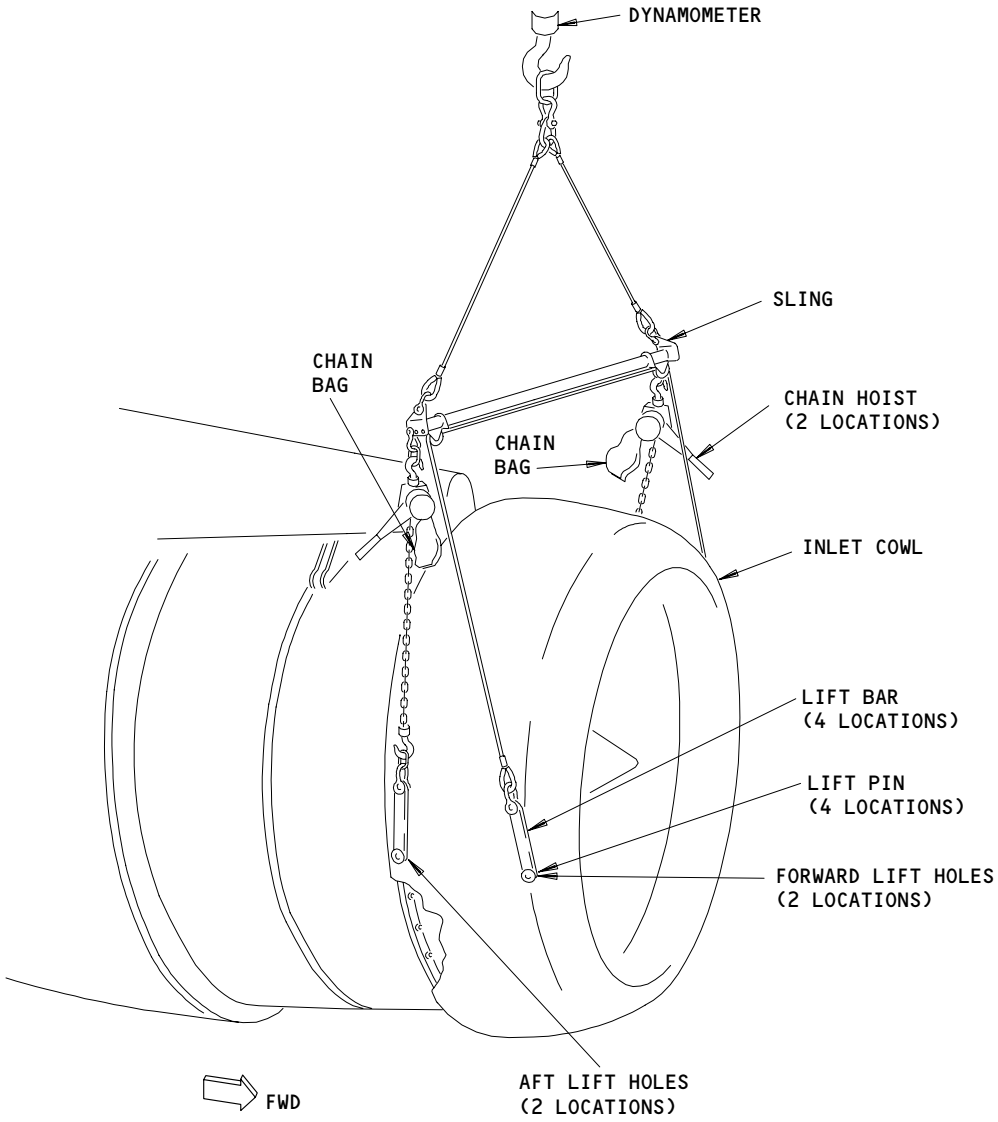
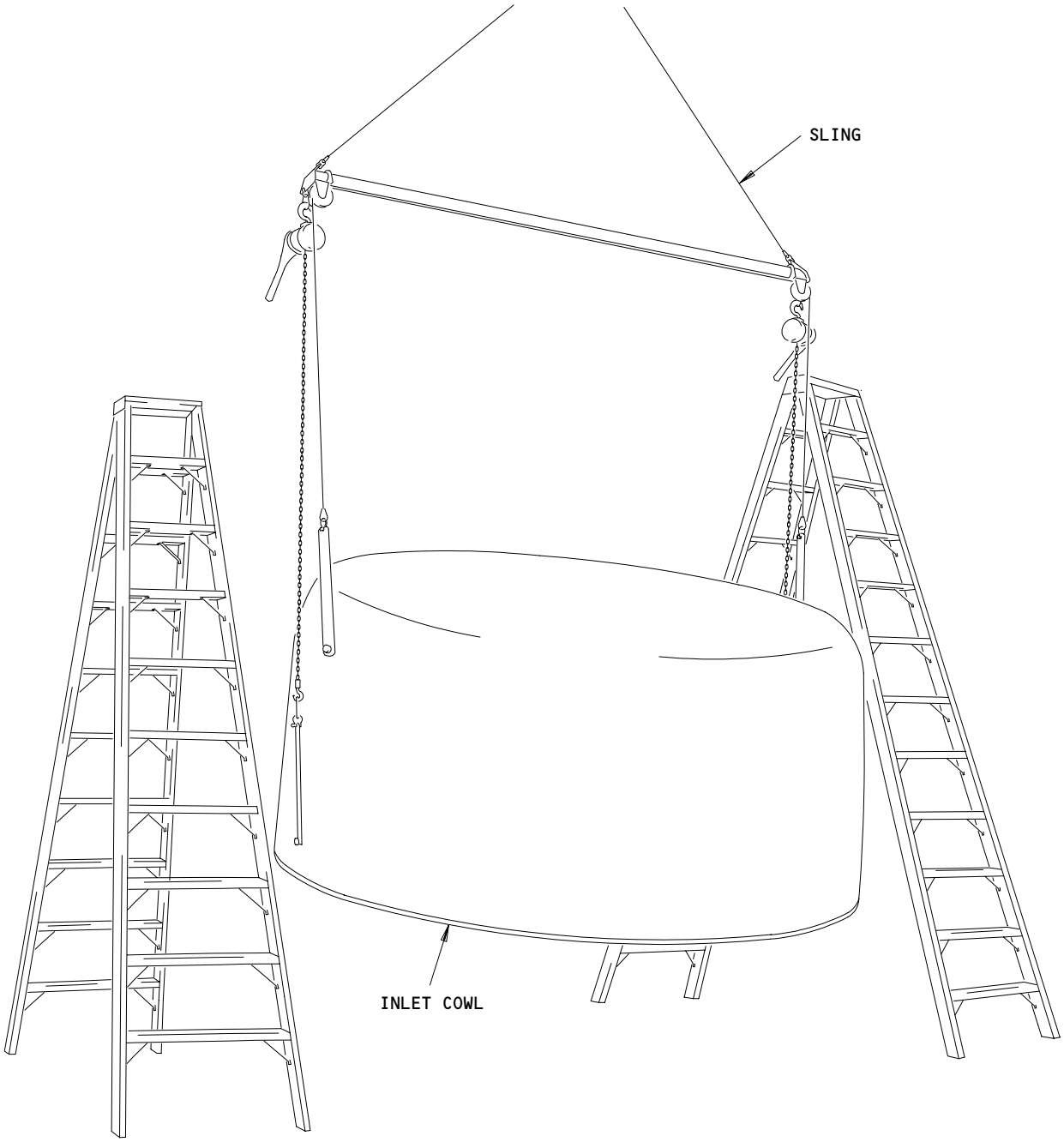
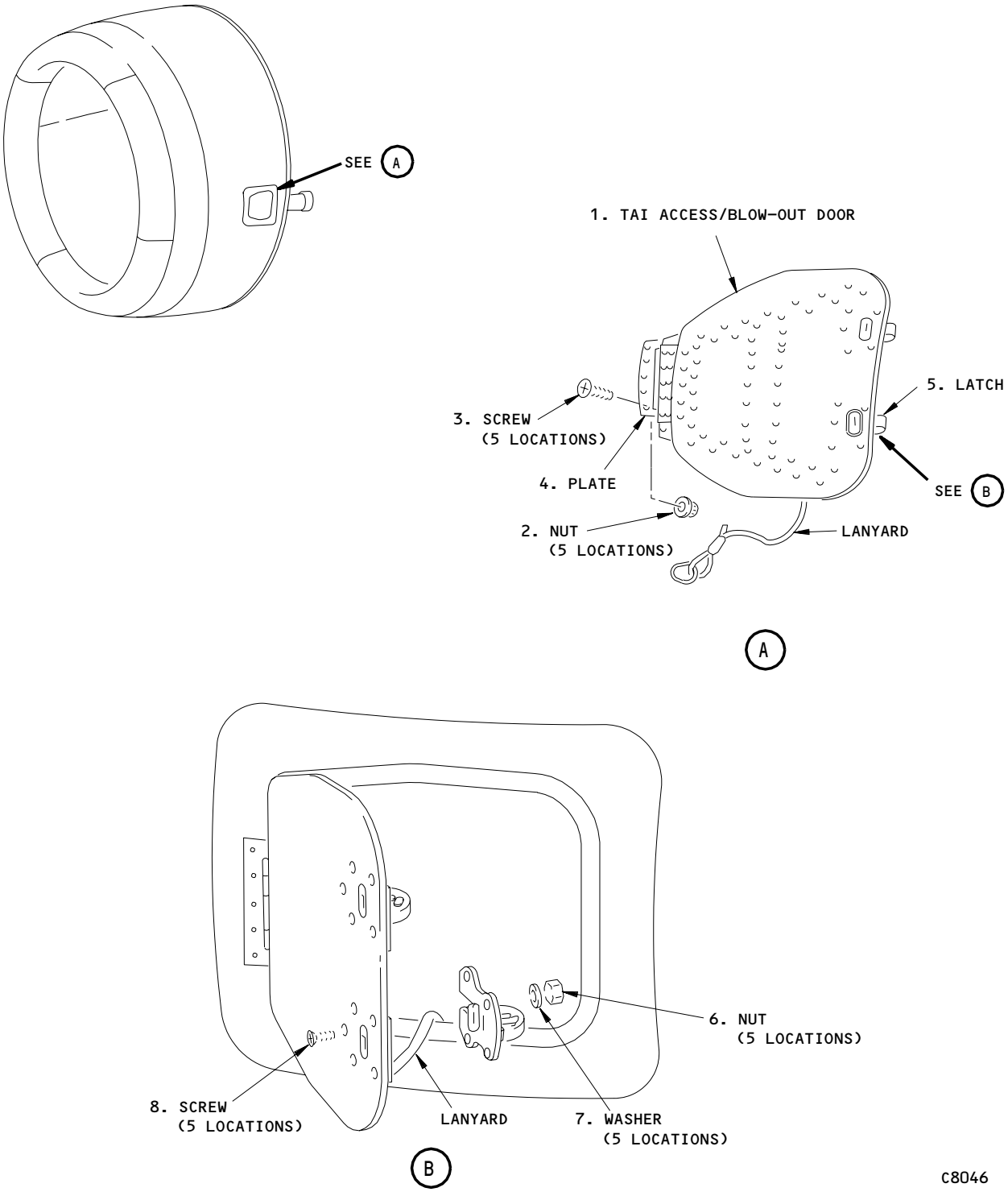
Rolls-Royce Parking Stand and Sling
Figure 402 (Sheet 2)



Boeing Inlet Cowl Sling
Figure 403 (Sheet 1)



Boeing Inlet Cowl Sling
Figure 403 (Sheet 2)



TAI Access/Blow-out Door
Figure 404

(4) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zone

411 Engine, left
421 Engine, right

(2) Access Panel

412 Nose cowl, left engine
422 Nose cowl, right engine

E. Prepare for the Removal of the Inlet Cowl (Fig. 401)

S 864-003-R00

(1) For the left engine, open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11C27, ENGINE ANTI-ICE L

S 864-055-R00

(2) For the right engine, open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11C28, ENGINE ANTI-ICE R

S 044-001-R00

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

(3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-004-R00

(4) Remove the fan cowl panels.
(a) Obey the precautions that apply to the Kevlar wrapping (AMM 71-11-04/401).

S 014-058-R00

CAUTION: DO NOT USE THE ENGINE COMPONENTS AS REPLACEMENTS FOR THE SUPPORT EQUIPMENT WHEN YOU DO WORK ON THE ENGINE. MAKE SURE THAT YOU DO NOT USE THE ANTI-ICE AND THE STARTER DUCTS FOR HAND OR FOOT HOLDS. YOU CAN CAUSE DAMAGE TO THE DUCTS.

(5) Remove the forward section of the strut forward fairing (AMM 54-52-01/401).

NOTE: The bulb seals below the fairing are a tight fit. Use a mallet with a soft face to hit the fairing end with a small force to move it forward.

S 034-056-R00
(6) Disconnect the electrical connector from the right side of the inlet cowl.

S 034-057-R00
(7) Disconnect the air tube used for the P1 signal.

S 944-010-R00
(8) Put the rubber pad on the Kevlar wrapping below the anti-ice duct.
  (a) Make sure there is protection for the Kevlar wrapping during the removal.

S 944-012-R00
(9) Attach a dynamometer to the crane.
  (a) Attach the sling to the dynamometer.

S 944-013-R00
(10) Move the sling to a position above the inlet cowl.
  (a) Attach the four lift bars of the sling to the inlet cowl.

S 944-059-R00

CAUTION: MAKE SURE THE CRANE LOAD ON THE INLET COWL IS NOT MORE THAN THE WEIGHT OF THE INLET COWL AND THE SLING EQUIPMENT. IF THE LOAD AND THE WEIGHT ARE NOT EQUAL, THE COWL CAN MOVE UP AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHEN THE COWL IS RELEASED FROM THE LOCATION PIN.

(11) Use the crane to lift the sling and the inlet cowl.
  (a) Adjust the crane and the sling straps until the straps are tight.
  (b) Monitor the dynamometer to make sure the load on the inlet cowl is not more than the weight of the inlet cowl and the sling equipment.
    1) Do not use a force of more than 550 pounds on the inlet cowl.

S 024-017-R00

(12) Remove the bolts (1) and the washers (2) from the inlet cowl flange.

NOTE: Use the wrench B71005-11 for the nose cowl. Also, use the breaker bar, FL10LB, to turn the cowl bolts that you cannot turn easily.

There are five bolts that you cannot remove easily. You can find four of the five bolts below the fuel line on the right side of the engine. These bolts are between the 12 and the 2 o'clock location. The fifth bolt is below the anti-ice duct.
You cannot remove the bolts from the lower-half of the inlet cowl, if the engine is in a (cradle/transportation) stand.

(a) Slowly move the cowl forward to be clear of the dowel holes and the rotor spinner of the LP compressor.

F. Do the procedures that follow to keep the inlet cowl.

S 944-018-R00

(1) If you will put the inlet cowl on the ground, do the steps that follow:
   (a) Prepare an area for the protection of the inlet cowl.
      1) Put a pallet on the ground adjacent to the inlet cowl for protection.
         a) The pallet can be made of wood, a large carpet or a rubber mat.
         b) The pallet must have a carpet cover or a rubber mat to prevent damage to the inlet cowl flange.
   (b) Operate the two chain hoists together to turn the inlet cowl from the vertical position to the horizontal position.
   (c) You must lower the inlet cowl and the sling to the pallet or the ground.

S 944-019-R00

(2) If you use the Rolls-Royce stand to keep the inlet cowl, do the steps that follow:
   (a) Put the parking stand with the location ring adjacent to the inlet cowl (3).
   (b) Remove the two flange brackets on the parking stand found at the 4 and 8 o'clock positions.
   (c) Put the inlet cowl (3) in the parking stand.
      1) Make sure the dowel pins align with the dowel holes.
      2) Tighten the eight bolts (Fig. 402).
   (d) Remove the sling from the inlet cowl (3).
   (e) Remove the E seal (4) from the anti-ice duct (AMM 70-12-02/201).
      1) Keep the E seal for the installation.

TASK 71-11-01-424-020-R00

3. Install the Inlet Cowl (Fig. 401)
   A. General
      (1) This section gives the procedure to install the inlet cowl.
   B. Equipment
      (1) Wrench - Nose Cowl, B71005-11
          (Part of Engine Change Tool Set B71005)
      (2) Bar - Breaker, F10LB,
          3/8 inch square drive, 9.5 inch long.
          (Part of engine change tool set B71005)
      (3) Sling - Inlet Cowl, B71040
      (4) Crane - Overhead, 1000 pound minimum
          capacity (Used with B71040)
      (5) Dynamometer (Customer supplied, used
          with B71040)
      (6) Sling - Inlet Cowl, CP30382,
          Rolls-Royce
      (7) Stand - Parking, Inlet Cowl, CP30343/4,
          Rolls-Royce
      (8) Ring - Mounting Location, Inlet Cowl
          CP30451/1 or CP30509, Rolls-Royce
      (9) Plate - Adapter, CP26863,
          Rolls-Royce (use with CP30451/1)
      (10) Rubber mat - 1 1/2 inches thick,
          2 feet by one foot
   C. Consumable Materials
      (1) Lockwire
          British Spec - DTD189A 22 S.W.G
          American Spec - 21 A.W.G
          OMat No. - 238
      (2) Jointing Compound, Hylomar PL32 (light)
          British Spec - DTD900/4586
          OMat No. - 4/46
   D. References
      (1) AMM 30-34-00/501, Engine Probe Heat
      (2) AMM 54-52-01/401, Strut Fairings
      (3) AMM 54-53-00/001, Strut Access Doors and Panels
      (4) AMM 70-12-02/201, Fitting Vee Band Coupling Clamps
      (5) AMM 70-12-04/201, Locking Techniques for Threaded Parts
      (6) AMM 70-42-13/201, Screw Threads
      (7) AMM 70-50-02/201, Connection of Electrical Plugs
      (8) AMM 70-51-00/201, Torque Tightening Techniques
      (9) AMM 71-11-04/401, Fan Cowl Panels

(10) AMM 77-11-00/501, EPR Indication System

E. Access

(1) Location Zone

411 Engine, left
421 Engine, right

(2) Access Panel

412 Nose cowl, left engine
422 Nose cowl, right engine

F. Install the inlet cowl.

S 944-062-R00

CAUTION: DO NOT USE THE ENGINE COMPONENTS AS REPLACEMENTS FOR THE SUPPORT EQUIPMENT WHEN YOU DO WORK ON THE ENGINE. MAKE SURE THAT YOU DO NOT USE THE ANTI-ICE AND THE STARTER DUCTS FOR HAND OR FOOT HOLDS. YOU CAN CAUSE DAMAGE TO THE DUCTS.

(1) Do not use the anti-ice and starter ducts for hand holds or foot holds.

S 944-021-R00

(2) Remove all of the dust caps from the openings and the connectors.

S 434-023-R00

(3) Install the E seal (4) in the external flange of the anti-ice duct (AMM 70-12-02/201).

S 944-060-R00

(4) If you put the inlet cowl on the ground, do the steps that follow:
(a) Use the crane to lift the sling to a position above the inlet cowl.
(b) Attach the sling to the inlet cowl (3).
(c) Lift the inlet cowl and the sling up from the ground with the crane.
(d) Operate the two chain hoists together to turn the inlet cowl from a horizontal position to a vertical position.

S 944-061-R00

(5) If you use the Rolls-Royce stand, do the steps that follow:
(a) Use the crane to lift the sling to a position above the inlet cowl and the stand.
(b) Attach the sling to the inlet cowl (3).
(c) Hold the weight of the inlet cowl (3).
(d) Remove the bolts.
(e) Remove the inlet cowl from the parking stand.

S 944-036-R00

(6) Use the crane to move the inlet cowl (3) near the flange of the LP compressor case.
  (a) Operate the one chain hoist to turn the inlet cowl around the longitudinal axis.
    1) Turn the inlet cowl to align the six dowels in the flange of the compressor case.
  (b) When you align the six dowels, move the inlet cowl to touch the flange of the compressor case.

S 634-064-R00

(7) Put the jointing compound on the 32 inlet cowl bolts.
  (a) Make sure that you install the bolts before the jointing compound dries.

S 424-038-R00

(8) Install the inlet cowl (3) with 32 bolts (1) and washers (2) (AMM 70-51-00/201).
  (a) Torque the Nose Cowl installation bolts to 370 lb.in. (41.8Nm) (AMM 70-51-00/201, Table D).

NOTE: Use the wrench B71005-11 for the nose cowl. Also, use the breaker bar, FL10LB, to turn the cowl bolts that you cannot turn easily.

You can use only 30 bolts (from a total of 32 bolts) to install the inlet cowl. There must be a minimum of 9 bolts between the two bolt holes that you do not use. The wire thread inserts must be replaced (AMM 70-42-13/201, FRS 3002) during the subsequent inlet cowl removal.

S 944-039-R00

(9) Remove the sling from the inlet cowl (Fig. 402).

S 434-041-R00

(10) Install the Vee clamp (5) and the E seal (4) to the anti-ice duct (AMM 70-12-02/201).

S 434-045-R00

(11) Connect the electrical connector (AMM 70-50-02/201).

S 434-077-R00

CAUTION: YOU MUST CONNECT AND TIGHTEN THE P1 SYSTEM CONNECTIONS CORRECTLY. LEAKAGE IN THE P1 SYSTEM WILL CAUSE A REDUCTION IN ENGINE POWER.

(12) Connect and tighten (AMM 70-51-00/201) the air tube used for the P1 signal.
(a) Install lockwire on the air tube (AMM 70-12-04/201).

S 714-095-R00
(13) Do the Operational Test of the Engine Probe Heat System (AMM 30-34-00/501).

S 784-096-R00
(14) Do the Pressure Test of the P1 System (AMM 77-11-00/501).

S 424-048-R00
(15) Install the strut nose fairing (AMM 54-52-01/401).

S 944-050-R00
(16) Remove the rubber mat, found below the anti-ice duct, that protects the Kevlar wrapping.

S 414-051-R00
(17) Install the fan cowl panels (AMM 71-11-04/401).

S 864-052-R00
(18) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C27, ENGINE ANTI-ICE L

S 864-054-R00
(19) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C28, ENGINE ANTI-ICE R

S 444-053-R00
(20) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 71-11-01-714-073-R00

4. TAI Access/Blow-Out Door and Latches Removal (Fig. 404)

A. Access

(1) Location Zone

411 Engine, left
421 Engine, right

B. Procedure

S 024-066-R00
(1) Do these steps to remove the TAI Access/Blow-out door.
(a) Release the latches (5) and open the door.
(b) Disconnect the lanyard.
(c) Remove the nuts (2) and screws (3) that attach the door to the cowl.
(d) Remove the door (1) and plate (4).

S 024-067-R00
(2) Do these steps to remove the latches (5).
(a) Remove the nuts (6), washers (7) and the the screws (8) that attach the latches to the door.
(b) Remove the latches.

TASK 71-11-01-714-074-R00

5. TAI Access/Blow-Out Door and Latches Installation (Fig. 404)

A. Consumable Materials
(1) Jointing Compound
Omat 446

B. References
(1) AMM 70-51-00/201, Torque Tightening Techniques
(2) AMM 71-11-01/501, Inlet Cowl

C. Access
(1) Location Zone
411 Engine, left
421 Engine, right

D. Procedure

S 424-069-R00
(1) Do these steps to install the latches (5).
(a) Install the latches (5) with the screws (8), washers (7) and the nuts (6).
(b) Tighten the nuts (6) (AMM 70-51-00/201).

S 424-070-R00
(2) Do these steps to install the TAI access/blow-out door.
(a) Apply jointing compound to all contact surfaces.
(b) Install the door (1) and the plate (4) with the screws (3) and the nuts (2).
(c) Tighten the nuts (AMM 70-51-00/201).
(d) Connect the lanyard.

S 414-071-R00
(3) Close the door (1) and lock the latches (5).

S 714-072-R00
(4) Do a pull off test of the door (AMM 71-11-01/501).

INLET COWL - ADJUSTMENT/TEST

1. General
   A. ENGINES PRE RR SB 71-9634;
      This procedure contains the steps to make sure the Thermal Anti-Ice (TAI) Access and Blow Out Door is adjusted correctly.

      NOTE: This procedure is not used on engines post RR SB 71-9634.

   TASK 71-11-01-725-001-R00

2. Pull-Off Test of the Thermal Anti-Ice Access and Blow Out Door
   A. Equipment
      (1) Eye Bolt - 0.190 inch dia.,
          Locally available
      (2) Spring Balance - 125 pound capacity
   B. Access
      (1) Location Zone
          411 Engine, left
          421 Engine, right

      (2) Access Panel
          412 Inlet cowl, left engine
          422 Inlet cowl, right engine

   C. Prepare to do the test (Fig. 501).

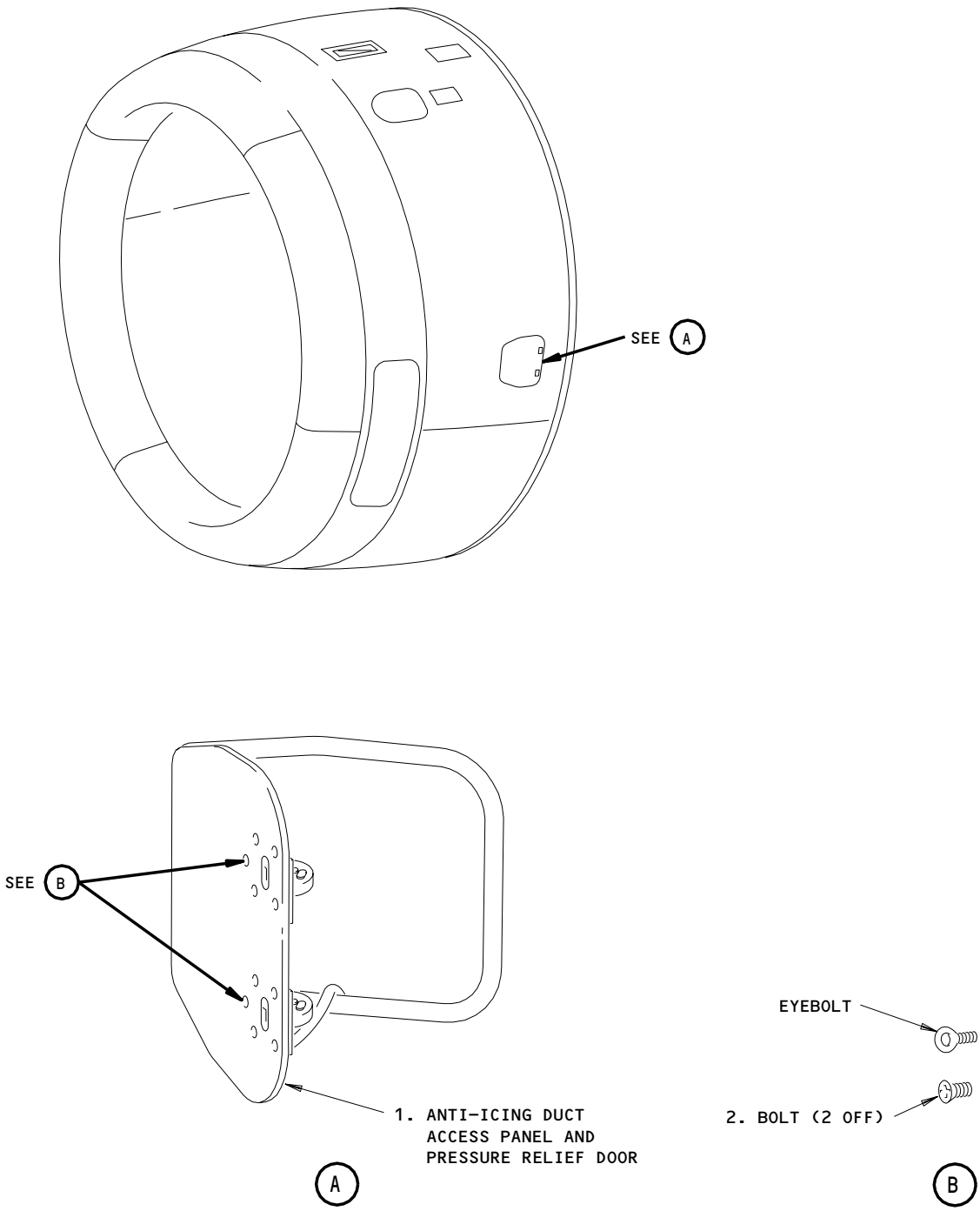
      S 415-002-R00
      (1) Close and latch the TAI access and blow out door.

      S 035-003-R00
      (2) Remove the bolts (2) from the door (1).

      S 485-004-R00
      (3) Install the eye bolts where you removed the bolts.
          (a) Tighten the eye bolts with your hand.
   D. Do the test (Fig. 501).

      S 485-005-R00
      (1) Attach the spring balance to the eye bolts.

      S 975-006-R00
      (2) Measure the force that is necessary to open the door (1).
          (a) The force that is necessary to open the door (1) must be between 101.1 and 117.5 pounds (45.95 and 53.40 Kg).



Inlet Cowl - Adjustment/Test
Figure 501

(b) If the force is not in the limits - Reject.

S 725-007-R00

(3) Do the test again to make sure the load is constant.

E. Put the engine back to its usual condition.

S 085-008-R00

(1) Remove the spring balance and the eye bolts.

S 435-009-R00

(2) Install the bolts (2).

S 415-010-R00

(3) Close and lock the door (1).

INLET COWL - INSPECTION/CHECK

1. General
   A. This procedure has one task; to make a check for damage to the inlet cowl.
   B. The Structural Repair Manual is known as the SRM in this procedure.

   TASK 71-11-01-206-001-R00

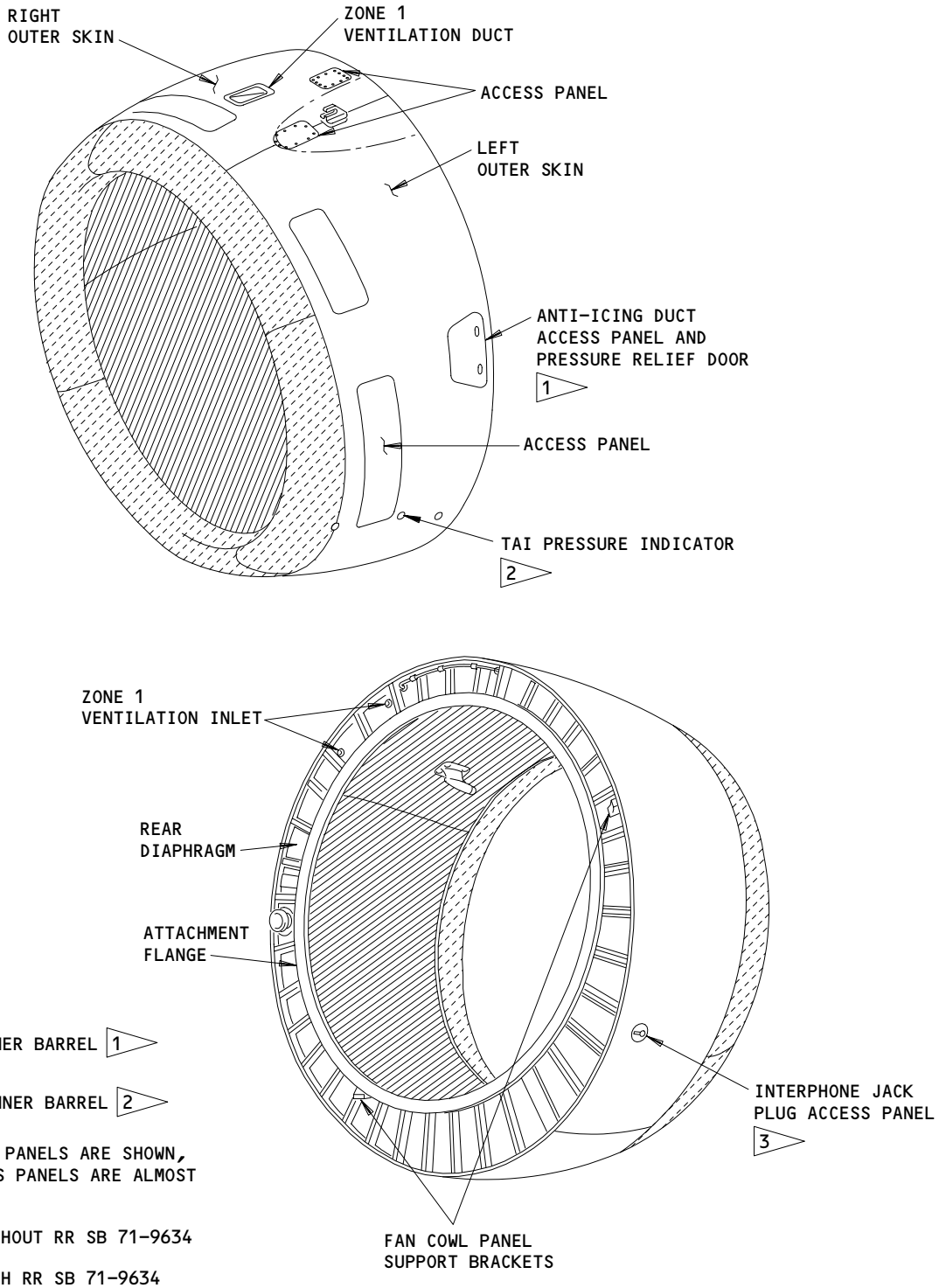
2. Inlet Cowl Check
   A. Equipment
      (1) Work Mat - Air Intake, RR289200
   B. Consumable Materials
      (1) Aluminium tape (Speedtape)
          OMat no. - 298
   C. References
      (1) SRM 54-10-01, Inlet Cowl Repair - Boeing 757 Structural Repair Manual (SRM)
      (2) AMM 70-42-11/201, Repair of Surfaces Affected By Minor Damage
      (3) AMM 70-42-22/201, Seal Exposed Fibres on Fibre Reinforced Composites
      (4) AMM 71-11-01/801, Inlet Cowl
   D. Access
      (1) Location Zones
          410 Power Plant Nacelle Left
          420 Power Plant Nacelle Right

   E. Prepare for the Inlet Cowl Check

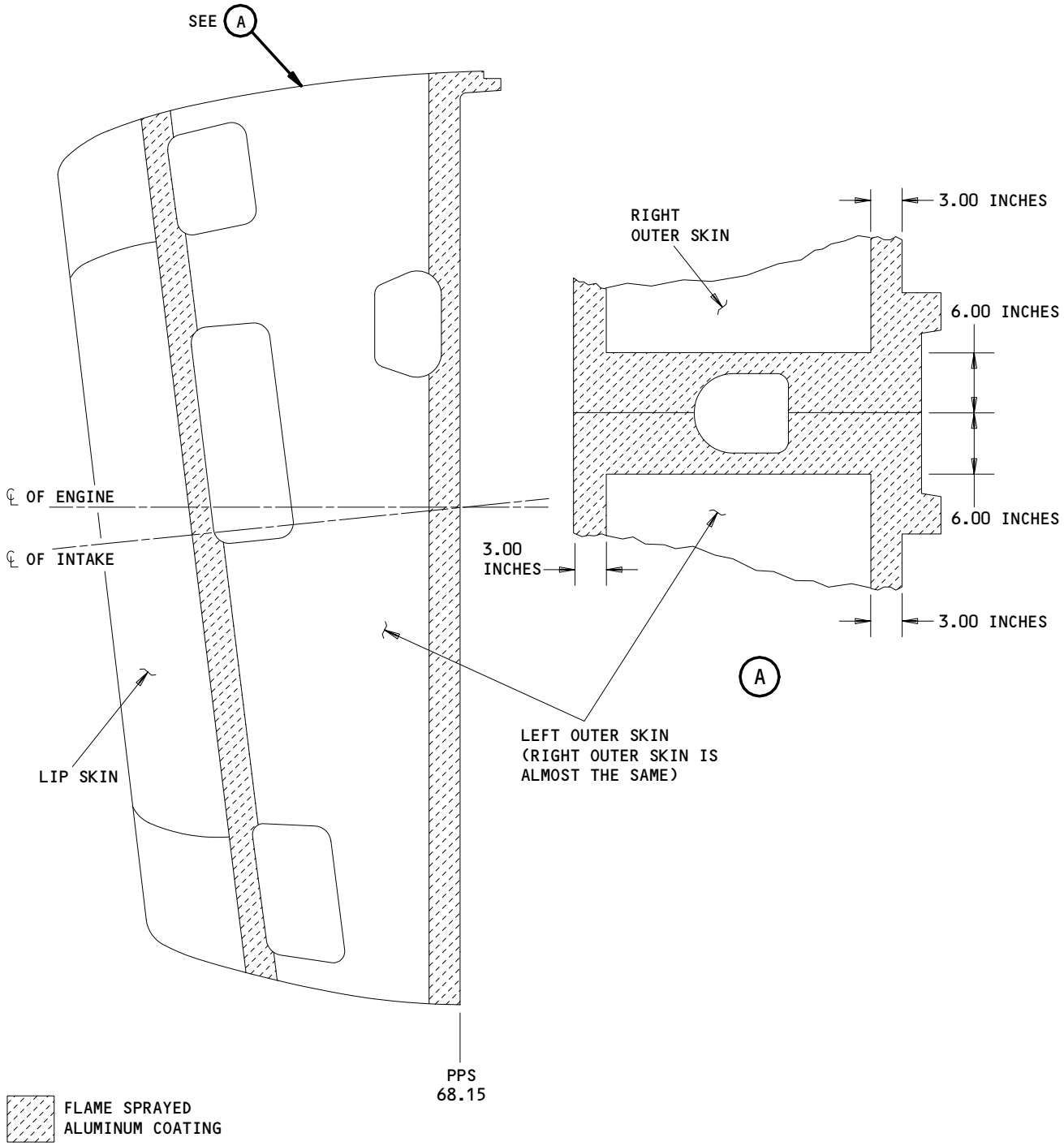
      S 866-002-R00
      (1) For the left engine, open this circuit breaker on the overhead P11 panels and attach a DO-NOT-CLOSE tag.
          (a) 11D19, ENGINE START CONT LEFT

      S 866-003-R00
      (2) For the right engine, open this circuit breaker on the overhead P11 panels and attach a DO-NOT-CLOSE tag.
          (a) 11D20, ENGINE START CONT RIGHT

      S 496-004-R00
      (3) Put the work mat in the air intake of the inlet cowl to prevent damage to the intake surface.



Inlet Cowl Check
Figure 601



NOTE: METAL SPRAYED COATING
IS OVERSPRAYED WITH THE
NACELLE PAINT SYSTEM

A7507

Inlet Cowl Lightning Strike Protection
Figure 602

EFFECTIVITY

ALL

786447

F. Inlet Cowl Check (Fig. 601, 602)

S 216-005-R00

(1) Examine the inlet lip for cracks, nicks, gouges, dents and holes in the skin.

S 216-006-R00

(2) Examine the outer skin of the inlet cowl for damage to the paint and cracks, gouges, nicks, delamination and holes in the skin.
   (a) An inlet cowl that does not have paint on it is permitted.

      NOTE: It is recommended that paint must be appllied to the inlet cowl. Use the repair procedure FRS6400 (AMM 71-11-01/801).

S 216-007-R00

(3) Examine the areas of the aluminium layer on the outer skin if the damage to the paint or the outer skin can be seen.
   (a) Replace the inlet cowl if the full width of the aluminium layer area is gone (AMM 71-11-01/401).

      NOTE: The aluminium layer is flame sprayed on the outer skin.

S 216-008-R00

(4) Examine the inner barrel of the inlet cowl for surface damage, the delamination, and leading edge filler that is gone.
   (a) Surface damage to the inner barrel identified as loose wire strands or holes in the surface is not permitted.
   (b) The delamination of the mesh that is not more 1.4 square feet with no free edge must be examined after each 25 hours.
   (c) Replace or repair the inlet cowl before 90 days if the damage area is more than 1.4 square feet (1300 square cm). The delamination of mesh or less of mesh must not reduce the strength of the inlet cowl.
   (d) Filler that is gone from the leading edge is permitted.

      NOTE: It is recommended that the filler must be repaired to prevent more deterioration of the filler. Use the repair procedure FRS6152 (SRM 54-10-01).

S 216-010-R00

(5) Examine the access doors and panels on the inlet cowl.
   (a) Look for paint that is gone, and the delamination of the leading edge of the doors or panels, gouges, dents, cracks, and holes.
   (b) Examine the hinges and latches for damage and correct operation.

(c) Paint that is gone from the access doors and panels is permitted.
1) It is recommended that paint is applied to the doors or panels. Use the procedure FRS6400 (AMM 71-11-01/801).
(d) The delamination of the edges of the doors or panels must be repaired with the procedure FRS3254 (AMM 70-42-22/201).

NOTE: The doors and panels can be temporarily repaired with aluminium tape if a record is made that a permanent repair is necessary.

(e) Gouges and dents in the doors and panels are permitted.
(f) Cracks that are less than 2.00 inches (50.80 mm) long can be temporarily repaired with the aluminium tape.

NOTE: The tape will prevent water in the inlet cowl.

1) The door or panel must be replaced in 250 hours.
(g) Holes that have a diameter less than 1.00 inch (25.40 mm) can be temporarily repaired with the aluminium tape.

NOTE: The tape will prevent water in the inlet cowl.

1) The door or panel must be replaced in 250 hours.
(h) Holes that have a diameter more than 1.00 inch (25.40 mm) can be temporarily repaired with the aluminium tape.

NOTE: The tape will prevent water in the inlet cowl.

1) The door or panel must be replaced in 25 hours.
(i) Replace the door or panel if the hinges or latches are damaged or if they do not operate correctly.

S 216-011-R00
(6) Examine the ventilation duct of Zone 1 for gouges, dents, cracks, and holes.
(a) Gouges and dents in the duct are permitted.
(b) Replace the duct in 250 hours if the cracks in the duct are less than 2.00 inches (50.80 mm) long.
(c) Replace the duct in 25 hours if the cracks in the duct are more than 2.00 inches (50.80 mm) long.
(d) Replace the duct in 250 hours if the diameter of holes in the duct are less than 1.00 inch (25.40 mm).
(e) Replace the duct in 25 hours if the diameter of holes in the duct are more than 1.00 inch (25.40 mm).

S 216-012-R00

(7) Examine the rear diaphragm for paint that is gone, gouges, dents, distortion, cracks and holes.
  (a) Paint that is gone from the diaphragm is permitted.
  (b) Gouges and dents in the diaphragm are permitted.
  (c) Distortion in the diaphragm caused by distortion of the radial stiffeners is permitted.
  (d) Replace the inlet cowl if there are cracks or holes in the diaphragm skin or radial stiffeners (AMM 71-11-01/401).

S 216-013-R00

(8) Examine the attachment flange of the inlet cowl for cracks and corrosion.
  (a) Replace the inlet cowl if there are cracks in the attachment flange (AMM 71-11-01/401).
  (b) Repair the inlet cowl if there is corrosion on the attachment flange to FRS.5971 (AMM 71-11-01/801).

S 216-014-R00

(9) Examine the support brackets for the struts that hold the hinge cowl panel in the open position.
  (a) Look for cracks.
  (b) Replace the support brackets for the hold open struts if there are cracks.

G. Put the Airplane Back To The Usual Condition.

S 096-015-R00

(1) Remove the work mat from the inlet cowl.

S 866-016-R00

(2) For the left engine, make sure this circuit breaker on the P11 panels is closed.
  (a) 11D19, ENGINE START CONT LEFT

S 866-017-R00

(3) For the right engine, make sure this circuit breaker on the P11 panels is closed.
  (a) 11D20, ENGINE START CONT RIGHT

INLET COWL - APPROVED REPAIRS

1. General
   A. The repairs contained in this procedure follow:

Paragraph Number	Repair Number	Title
2.	FRS.6400/	Inlet Cowl - Surface Protection Repair
3.	FRS.5842/	Inlet Cowl - Temporary Repair of Lightning Strike Protection
4.	FRS.5811/	Inlet Cowl - Repair of Lightning Strike Protection
5.	FRS.6154/	Inlet Cowl - Acoustic Panel Repair
6.	FRS.5971/	Inlet Cowl - Engine Attachment Ring Flange - Remove Corrosion and Reprotect the Flange Surface.

TASK 71-11-01-378-001-R00

2. Inlet Cowl - Surface Protection Repair
   A. General
      (1) This repair procedure can be used on three different components:
          (a) The inlet cowl.
          (b) The fan cowl panels.
          (c) The thrust reverser.
      (2) The damaged surface is repaired with a filler material, if it is necessary. A layer of paint is applied as a finish.
      (3) The paint system has a two component polyurethane primer and a two component polyurethane finish.
      (4) The primer, with or without the finish, gives corrosion protection.
      (5) The external layer of paint will prevent damage from these fluids:
          (a) Acids
          (b) Fuels
          (c) Lubricant oils
          (d) Hot diester oils
          (e) Solvents
   B. Equipment
      (1) Weighing scales (0 - 200 grams)

C. Consumable Materials
(1) GO2098 Waterproof Silicon carbide paper, Grit size 400
OMat No/ - 5/31
(2) GO2098 Waterproof, Silicon carbide paper, Grit size 360
OMat No. - 5/32
(3) GO2098 Waterproof, Silicon carbide paper, Grit size 320,
OMat No. - 5/33
(4) GO2098 Waterproof, Silicon carbide paper, Grit size 280
OMat No. - 5/34
(5) Abrasive paper, Grit size 240
OMat No. - 5/35
(6) Abrasive paper, Grit size 220
OMat No. - 5/36
(7) GOO251 Scotch brite
OMat No. - 583
(8) GO1352 Surface inspection fluid
OMat No. - 641
(9) AOO681 Filler EC3524A/B
OMat No. - 874
(10) COO584 P33 polyurethane primer base or Rohr and Boeing system
British Spec - SL3233
American Spec - 513X329
OMat No. - 7/152
(11) COO584 P33 polyurethane primer catalyst or Rohr and Boeing system
British Spec - CSH 3334
American Spec - 910X456
OMat No. - 7/151
(12) COO032 P66 polyurethane finish base (grey) or Rohr and Boeing system
British Spec - SH 3266
American Spec - 643-3
OMat No. - 7/154
(13) COO032 P66 polyurethane finish catalyst or Rohr and Boeing system
British Spec - CSH 3367
American Spec - X310A
OMat No. - 7/155
(14) GO1029 Polyvinyl chloride sheet
OMat No. - 1222
(15) COO259 P33 polyurethane thinner
British Spec - TSL 3233
OMat No. - 7/153
(16) COO032 P66 polyurethane thinner or Rohr and Boeing system
British Spec - TSL 3261A
American Spec - TL59
OMat No. - 7/156
(17) Lint free cloth - Local resources

(18) B00090 Degrease fluid,
Inhibited and stabilized 1.1.1. trichloroethane
British Spec - B.S. 4487: 1969
American Spec - MIL-T-81533
OMat No. - 1/21
(19) D00178 Acetone
OMat No. - 150

D. References
(1) AMM 71-11-01/401, Inlet Cowl
(2) AMM 71-11-04/201, Fan Cowl Panels

E. Access
(1) Location Zone
411 Engine, left
421 Engine, right

F. Do these steps to repair the surface protection.

S 118-002-R00
(1) Remove the grease from the surface of the damaged area.

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(a) Be careful when you use the consumable materials for this repair:
1) Use gloves when you use degreasers.
2) Do not smoke when you use degreasers.
3) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
4) Use degreasers in work areas that have a good flow of air.
(b) Use a lint-free cloth moist with degrease fluid to remove all of the grease from the repair area.

NOTE: It is important to use a lint-free clean cloth for each operation that removes grease from the parts. Put the liquid on the cloth to prevent contamination of the remaining liquid.

1) Discard the dirty cloth.
2) Immediately, make the repair area dry with a lint free cloth.

S 128-011-R00
(2) Prepare the repair surface.
(a) Make the repair surface rough with silicon carbide paper (grit sizes 400, 360, 320), if it is necessary.
1) Be careful and do not touch the fibers.
2) A light circular motion will prevent an accident.
(b) Clean the surface with the Scotch Brite pads to remove the gloss from the indentations.

(c) Remove the unwanted material from the repair area with an air spray that has no oil.
(d) Do again the step that removes grease from the part to be repaired.

S 208-004-R00

(3) Do the water break test to make sure the surface is clean.
(a) Get a clean and soft hair brush.
(b) Quickly apply a layer of surface inspection fluid on the area to be bonded with the brush.
(c) Immediately monitor the repair area for a stop in the continuity of the fluid layer.
(d) If a stop in the continuity occurs in 30 seconds, do these steps again.
1) Remove the grease from the surface.
2) Prepare the repair area.
3) Do the water break test.
(e) Remove the surface inspection fluid with a clean lint free cloth that is moist with acetone.
(f) Let the surface dry.

NOTE: If the repair area is not to be immediately bonded, then put a polyvinyl chloride sheet cover on the repair area. Be careful to prevent contamination during this operation.

S 348-067-R00

WARNING: DO NOT GET THE FILLER MATERIAL IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. WEAR GLOVES FOR PROTECTION OF YOUR HANDS WHEN YOU PREPARE AND APPLY THE FILLER MATERIAL.

(4) Mix the filler material to the proportions and thickness that follows:
(a) Measure one hundred (100) parts EC3524B (blue) to ninety-four (94) parts EC3524A (white) by weight.

(b) Knead the materials until a uniform blue color, free of streaks is obtained.

NOTE: This procedure permits approximately one hour at 22°C (72°F) to apply the filler material.

(c) Remove the polyvinyl chloride sheet cover from the repair area, if it is necessary.

S 348-007-R00

(5) Apply the filler material to the repair area.
(a) Lightly fill the damaged area more than necessary so that the prepared area can subsequently be made smooth.
(b) Cure at 72°F (22°C) until the filler repair starts (not fully) to stiffen.
(c) Remove the unwanted filler material.
1) Use a pallet knife that is clean and warm or a similiar tool.
2) Clean the knife before you make it warm again.
3) Make the surface of the filler material smooth with the adjacent contour.
(d) Let the repair area cure for 24 hours at 72°F (22°C).
1) The repair area's cure time is longer at a lower temperature.
2) The repair area cures faster at a higher temperature.

NOTE: The cure time must agree with the temperature as shown in Table 1. The maximum heat possible for the repair area is 302°F (150°C). If the filler burns because of too much heat, make the area rough by hand to remove the burned surface.

Refer to Table 1 for the cure time/temperature relation. The filler will not cure at temperatures below 54°F (12°C).

Cure Time - Temperature
Table 1

Time - Hours	24	16	8	4	2	1	1/2
Temp - °C	22	25	30	35	45	60	100
°F	72	77	86	95	113	140	212

(e) Make the repair area smooth with the adjacent contours if it is necessary.
1) Use silicon carbide paper (grit sizes 280) and abrasive paper (grit sizes 240, 220).

(f) Use an air spray that has no oil to remove the loose materials from the area.
(g) Do the step again that removes grease from the part to be repaired.

NOTE: If the repair area is not to be immediately painted, put a cover made from a polyvinyl chloride sheet on the repair area.

S 348-009-R00

(6) Mix the polyurethane primer base and prime catalyst to the instructions supplied.

NOTE: The polyurethane mixture's satisfactory life is 8 hours at 72°F (22°C). The thickness can be adjusted with P33 polyurethane thinner if it is necessary. A thinner is not available for the Rohr and Boeing system.

(a) Remove the cover made from the polyvinyl chloride sheet from the repair area, if it is necessary.
(b) Apply the primer to the prepared surface with a spray gun.

NOTE: The recommended time to apply the polyurethane primer is 24 hours before the polyurethane finish. If this time is more than 72 hours, then the surface must be prepared again. Do again the procedures in the paragraph, "Steps to repair the surface protection."

1) Before you apply the polyurethane finish, let the primer dry for a minimum of 4 hours.

NOTE: For the Rohr and Boeing system, let the primer dry for a minimum of 24 hours.

S 348-010-R00

(7) Mix the polyurethane finish base and the finish catalyst to the instructions supplied.

NOTE: The thickness can be adjusted with P66 polyurethane thinner if it is necessary.

S 378-068-R00

(8) Apply the polyurethane finish to the prepared area.
(a) Apply the first layer of paint to the prepared area.

(b) After a minimum of 10 minutes, apply the second layer of paint while the first layer is wet.
(c) Do not touch the repair area for a minimum of 6 hours.

TASK 71-11-01-378-012-R00

3. Inlet Cowl - Temporary Repair of Lightning Strike Protection

A. General
(1) The repair in this procedure is FRS.5842.
(2) This repair gives the procedure to replace the lightning strike protection of the inlet cowl.
(3) This repair is temporary. Do the permanent repair referred to in FRS.5811 before 250 hours of operation.
(4) The inlet cowl skin is made of a carbon fiber composite. Be careful when you prepare the surface with damage for the repair. Damage to the carbon fiber composite can occur.
(5) This repair can be used for the inlet cowls with the part numbers that follow:

LJ35708, LJ35810, LJ39447, LJ39448, LJ38036, LJ38066, LJ38068

B. Equipment
(1) Multimeter - Range 50,000 ohm, near half scale
(2) Surface Resistance Measuring Probes
(3) Two Bare Metal Strips (same size)

C. Consumable Materials
(1) Methylethylketone (MEK)
OMat No. - 135
(2) Clean Cotton cloth
OMat No/ - 290
(3) Waterproof silicon carbide abrasive paper, 180 grade
OMat No. - 5/37
(4) Conductive layer and catalyst,
Temporary lightning strike protection - 528X302
OMat No. - 7/179

D. Access
(1) Location Zone
411 Engine, left
421 Engine, right

E. Prepare the damaged area of the inlet cowl for the repair.

S 358-013-R00

CAUTION: BE CAREFUL WHEN YOU USE ABRASIVE PAPER. DO NOT REMOVE TOO MUCH MATERIAL. IF YOU REMOVE A LARGE QUANTITY OF MATERIAL, DAMAGE TO THE CARBON FIBER COMPOSITE WILL OCCUR.

(1) Use silicon carbide abrasive paper to make the damaged area lightly rough.

S 358-014-R00

(2) Use an abrasive paper on the spray area that is not damaged to make it rough.
   (a) Remove a minimum of 0.500 inches (12,7 mm) of surface protection from around the damaged area with the abrasive paper.

S 118-066-R00

WARNING: DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove all of the grease from the repair area with a clean cotton cloth, moist with the degrease fluid.
   (a) Dry the repair area before the fluid becomes a gas.

F. Prepare the conductive layer.

S 378-016-R00

(1) Fully shake the conductive layer and catalyst containers.

S 378-017-R00

(2) Mix the conductive layer and the catalyst.
   (a) Do the specified material mix procedure to get a satisfactory mix.

      NOTE: The container in which the material solution is mixed must be identified with the date and the time the solution was initially mixed. The date and the time after which the solution must not be used must also be identified on the container. If the material solution is kept at 75 degrees F (25 degrees C) it must be used in less than 4 hours.

S 378-018-R00

(3) After you mix the conductive layer and the catalyst, do not move the solution for 30 minutes.

G. Apply the conductive layer.

S 958-019-R00

(1) Apply masking tape to the area around the repair area.

S 378-020-R00

(2) Apply the conductive layer with a brush or with the spray procedure.
   (a) The conductive layer must have a dry film which is no more than 0.030 inches (0.8 mm) thick.

H. Let the conductive layer set.

S 978-021-R00

(1) To find the time necessary for the conductive layer to set at a specified temperature, refer to Table 1.

Cure Time - Temperature
Table 1

Time - Minutes	120	105	90	75	60	45
Temp - °C	27	30	32	36	42	49
°F	80	86	90	97	107	120

NOTE: Permit sufficient time for the layer to set. Do not measure the resistant quality of the conductive layer before the layer is set.

I. Measure the resistant quality of the conductive layer.

S 868-022-R00

(1) Get two pieces of metal that are related to the repair area and are of equal length and width.

S 978-023-R00
(2) Measure the length of the metal peices.

S 978-024-R00
(3) Calculate 0.1 of the metal length.

S 438-025-R00
(4) Put the metal pieces on the repaired conductive layer with a constant distance of 0.1 of the metal length between them.

NOTE: The distance between each metal piece must be constant along the full length of the pieces.

S 488-026-R00
(5) Install the instrument which is to measure the surface resistance of the repair area at 90 degrees to each metal piece.

NOTE: The instrument must touch each metal piece.

S 978-027-R00
(6) Use a multimeter to make sure a value of no more than 50,000 ohms is shown while you push the instrument in the direction of the repaired area.

S 378-028-R00
(7) If the surface resistance value is more than 50,000 ohms, make the conductive layer lightly rough with silicon carbide paper.
(a) Apply a new conductive layer.

J. Replace the surface protection on the repaired area.

S 378-029-R00
(1) Apply the surface protection on the repaired area (Refer to FRS.6400).

K. Identify the repair.

S 938-030-R00

(1) Make a mark that identifies FRS.5842 on the assembly adjacent to the part number.
  (a) Use a vibro etch or an alternative permanent identification system.

TASK 71-11-01-378-031-R00

4. Inlet Cowl - Repair of Lightning Strike Protection

A. General
  (1) The repair in this procedure is FRS.5811.
  (2) This procedure gives the repair for the inlet cowl lightning strike protection.
  (3) This repair can be done with one of the two procedures that follow:
    (a) Part 1 - Apply a flame sprayed aluminum layer.
    (b) Part 2 - Apply a plasma sprayed aluminum layer.
  (4) You can use this procedure to repair the inlet cowls which have the part numbers that follow:

    LJ35708, LJ38036, LJ35810, LJ38066, LJ39447, LJ38068, LJ39448

  (5) When this repair is complete, refer to FRS.6400 (71-11-01/801).
    (a) The repair FRS.6400 gives the procedure to put the surface protection on the repaired area.

B. Equipment
  (1) Workshop Tools
  (2) Degreasing Equipment
  (3) Portable Flame Spray Equipment
    or
    Portable Plasma Spray Equipment
  (4) Metco 12E Flame Spray Gun
    or
    Metco 3MB Plasma Spray Gun
  (5) Portable Grit Blasting Equipment

(6) Vibro-etch Equipment

C. Consumable Materials
(1) Degreasing fluid, Methylethylketone (MEK)
OMat No. - 135
(2) Metal spray wire, Aluminum
OMat No. - 3/40
(3) Aluminum metal spray powder
OMat No. - 3/115
(4) Resin
OMat No. - 805
(5) Hardener
OMat No. - 806
(6) Abrasive grit, Aloxite powder 80 grade
OMat No. - 518
(7) Abrasive paper, Aluminum oxide 80 grade
OMat No. - 5/66
(8) Lint free cloth - Locally available

D. References
(1) AMM 71-11-01/401, Inlet Cowl
(2) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zone
411 Engine, left
421 Engine, right

F. Part 1 - Apply the flame sprayed aluminum layer to the repair area.

S 868-042-R00

WARNING: REMOVE THE INLET COWL FROM THE AIRPLANE BEFORE YOU DO THIS REPAIR. THE FLAME SPRAY REPAIR CAN CAUSE AN EXPLOSION AND FIRE IF FUEL VAPOR IS PRESENT. INJURY TO YOU AND DAMAGE TO THE EQUIPMENT CAN OCCUR. DO THIS REPAIR AWAY FROM THE AIRPLANE.

(1) Remove the inlet cowl from the engine (AMM 71-11-01/401).

S 958-032-R00

CAUTION: DO NOT USE PAINT STRIPPERS ON THE COMPOSITE STRUCTURE. CHEMICAL PAINT STRIPPERS CAN CAUSE DAMAGE TO THE RESIN IN THE COMPOSITE STRUCTURE.

DO NOT DAMAGE THE CARBON FIBER COMPOSITE. DAMAGE TO THE COMPOSOITE WILL MAKE THE STRUCTURE WEAK.

(2) Prepare the damaged area for the repair.
  (a) Apply masking tape around the damaged area.
    1) Keep approximately 1.000 inches (25,4 mm) of clearance from the edge of the area to the inner edge of the masking tape (Ref Fig. 801 and 802).

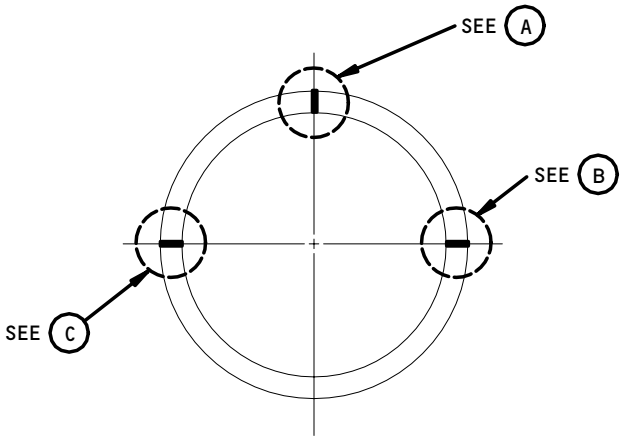
      NOTE: Make sure the leading edge and lip skin interface areas are clear.

  (b) Make the damaged area lightly rough with aluminum oxide abrasive paper, 80 grade.

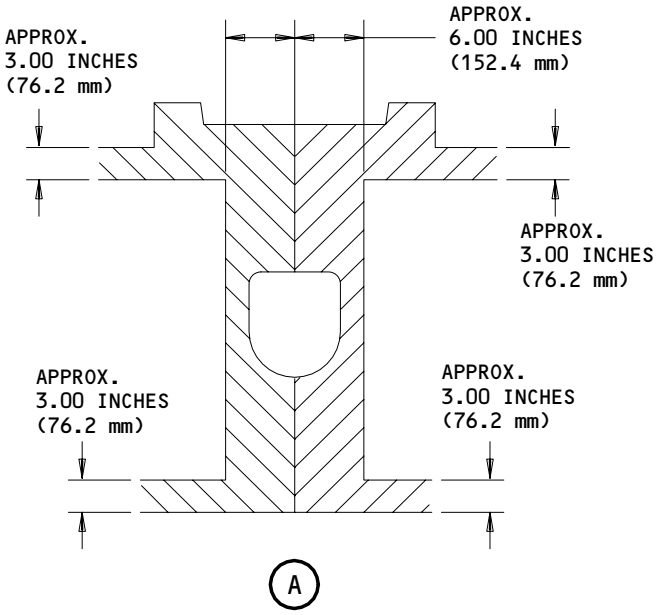
S 118-033-R00

WARNING: DO NOT GET METHYL ETHYL KETONE (MEK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP MEK AWAY FROM SPARKS, FLAME AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Clean the repair area.
  (a) Make a lint free cloth moist with the degreasing fluid.
  (b) Clean the repair area with the moist cloth.
  (c) Discard the dirty cloth.



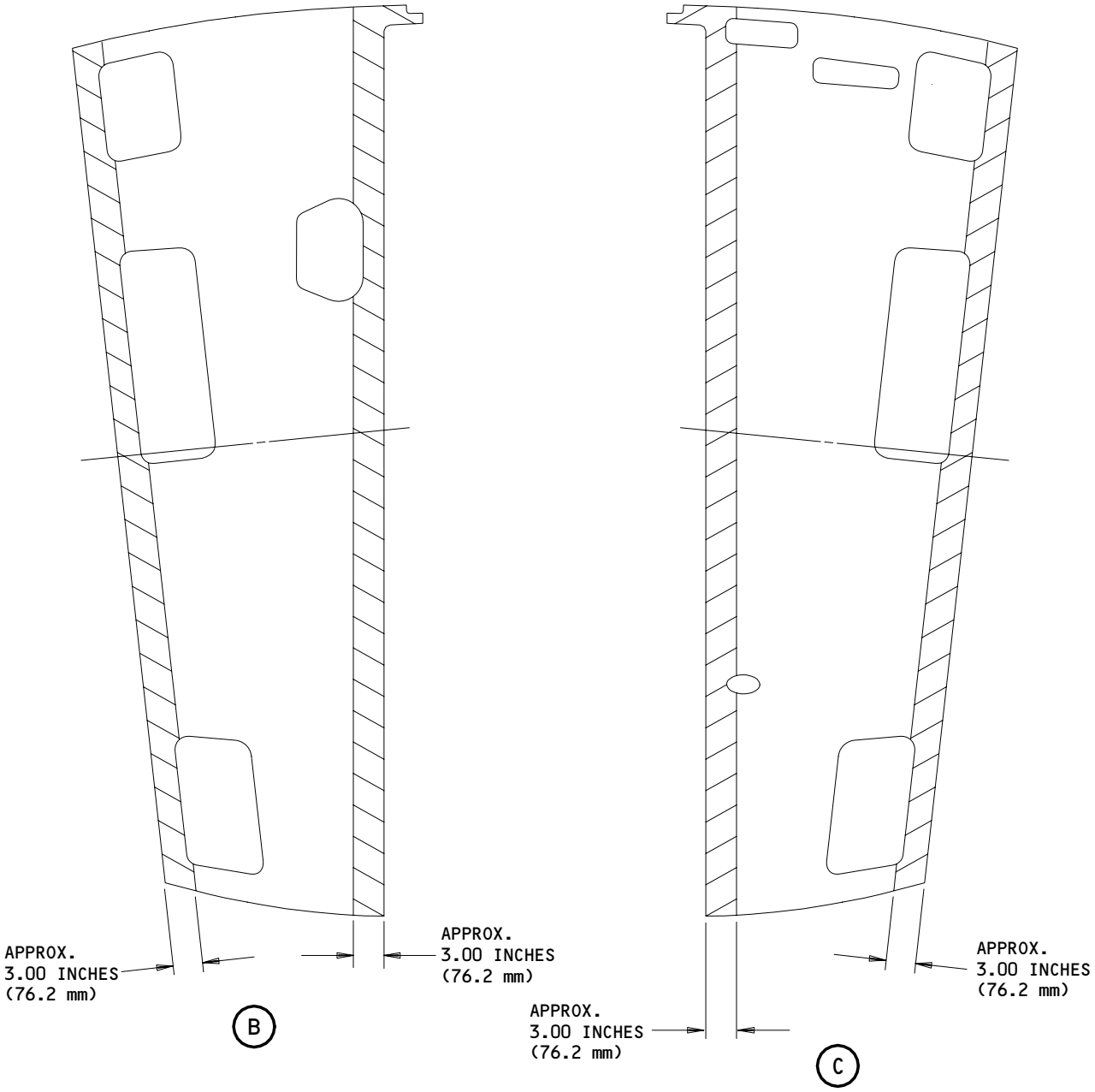
DIAGRAMMATIC VIEW ON NOSE COWL
(LOOKING AFT)



APPLY ALUMINUM FLAME SPRAY WHERE SHOWN SHADED TO INSTRUCTIONS.

A0319

Repair Details
Figure 801 (Sheet 1)



Repair Details
Figure 801 (Sheet 2)

(d) Dry the repair area with a clean lint free cloth before the liquid becomes a gas.

S 378-034-R00

WARNING: DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE THESE MATERIALS ARE USED.

YOU MUST USE BARRIER CREAM, GLOVES AND OVERALLS WHEN YOU USE THESE MATERIALS. DO NOT LET THE MATERIALS TOUCH YOUR SKIN. AT THE END OF WORK OR CONTAMINATION, WASH YHOUR HANDS WITH A SPECIFIED CREAM TO REMOVE ALL RESIN.

THE MATERIALS MUST BE PREPARED AND USED IN AREAS WITH GOOD AIR MOVEMENT.

CAUTION: DO NOT LET THE CLEAN AREA BECOME DIRTY. YOU MUST MIX AND APPLY THE ADHESIVE IMMEDIATELY AFTER YOU CLEAN THE REPAIR AREA.

(4) Apply the adhesive.
  (a) Mix the adhesive compound.
    1) Weigh out 70 parts of the resin.
    2) Weigh out 30 parts of the hardener.
    3) Mix the resin and hardener until the compound is a constant cream color.
  (b) Apply a thin layer of adhesive compound to the repair area.

S 378-035-R00

WARNING: YOU MUST USE A WELDERS HELMET, SAFETY GLASSES, EAR DEFENDERS, HIGH NECKED DARK OVERALLS AND GLOVES. IF YOU DO NOT USE THE CORRECT PROTECTION, INJURY CAN OCCUR.

CAUTION: THE ADHESIVE LAYER MUST BE CURED FOR 4 TO 6 HOURS BEFORE THE FLAME SPRAYED LAYER IS APPLIED. IF THE ADHESIVE IS CURED FOR 6 HOURS, APPLY THE FLAME SPRAYED LAYER IMMEDIATELY AFTER THE 6 HOUR CURE TIME IS COMPLETE.

(5) Apply the flame sprayed aluminum layer.
  (a) Use the flame spray equipment to apply the aluminum metal spray wire on to the repair area.

(b) Details of the flame spray procedure are given in the Flame Spray Data that follows:

Flame Spray Data

Fuel gas pressure	15 psi (103 kPa)
Oxygen gas pressure	30 psi (207 kPa)
Air gas pressure	75 psi (518 kPa)
Nozzle diameter	0.118 inches (3,00 mm)
Air cap	EC
Fuel gas flow	40 Metco units
Oxygen gas flow	44 Metco units
Air gas flow	65 Metco units
Spray distance	6 - 7 inches (152 - 178 mm)
Material applied per pass	0.001 inches (0,025 mm)

NOTE: Use a surface speed of 2.5 feet per second (0.75 meters per second). It is possible that the composite surface will become too hot if this instruction is not obeyed.

Make sure an equal layer thickness is applied to all the repair area. Apply more equal layers until the applied aluminum is sufficiently thick. Apply the aluminum layer in continuous spray movements. Each spray movement must overlap the last spray movement by a third of the spray movement width.

The layer thickness must be 0.004 inches to 0.006 inches (0,11mm to 0,14 mm).

(c) Do a visual inspection of the flame sprayed aluminum layer.
1) The layer must be a constant thickness and overlap the remaining layer.

S 398-036-R00

WARNING: DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE THESE MATERIALS ARE USED.

YOU MUST USE BARRIER CREAM, GLOVES AND OVERALLS WHEN YOU USE THESE MATERIALS. DO NOT LET THE MATERIALS TOUCH YOUR SKIN. AT THE END OF WORK OR CONTAMINATION, WASH YHOUR HANDS WITH A SPECIFIED CREAM TO REMOVE ALL RESIN.

YOU MUST PREPARE THE MATEIALS AND USED IN AREAS WITH GOOD AIR MOVEMENT.

CAUTION: DO NOT LET THE CLEAN AREA BECOME DIRTY. YOU MUST MIX AND APPLY THE ADHESIVE IMMEDIATELY AFTER YOU CLEAN THE REPAIR AREA.

(6) Seal the repair area.
  (a) Mix the sealant adhesive.
    1) Weigh out 70 parts of the resin.
    2) Weigh out 30 parts of the hardener.
    3) Mix the resin and hardener until the compound is a constant cream color.
  (b) Apply a thin layer of sealant adhesive on the repair area with a fine camel hair brush.
    1) Make sure the sealant adhesive is on all the repair area.
  (c) Let the sealant adhesive cure for one hour at 95 to 105 degrees C (203 to 221 degrees F).
  (d) Remove the masking tape from around the repair area.
  (e) Replace the surface protection (Ref FRS.6400).

S 978-037-R00

(7) Make a record of the repair.
  (a) Use a vibro etch tool to make a mark that identifies FRS.5811 adjacent to the part number.

S 868-043-R00

(8) Install the inlet cowl (AMM 71-11-01/401).

G. Part 2 - Apply the plasma sprayed aluminum layer

S 868-044-R00

WARNING: REMOVE THE INLET COWL FROM THE AIRPLANE BEFORE YOU DO THIS REPAIR. THE PLASMA SPRAY REPAIR CAN CAUSE AN EXPLOSION AND A FIRE IF FUEL VAPOR IS PRESENT. INJURY TO YOU AND DAMAGE TO THE EQUIPMENT CAN OCCUR. DO THIS REPAIR AWAY FROM THE AIRPLANE.

(1) Remove the inlet cowl from the engine (AMM 71-11-01/401).

S 958-038-R00

CAUTION: DO NOT USE PAINT STRIPPERS ON THE COMPOSITE STRUCTURE. CHEMICAL PAINT STRIPPERS CAN CAUSE DAMAGE TO THE RESIN IN THE COMPOSITE STRUCTURE.

DO NOT DAMAGE THE CARBON FIBER COMPOSITE. DAMAGE TO THE COMPOSOITE WILL MAKE THE STRUCTURE WEAK.

(2) Prepare the damaged area for the repair.
  (a) Apply masking tape around the damaged area.
    1) Keep approximately 1.000 inches (25,4 mm) of clearance from the edge of the area to the inner edge of the masking tape (Ref Fig. 801 and 802).
  (b) Abrasive blast the repair area.
    1) Use the portable grit blasting equipment and abrasive grit, 80 grade.

S 378-039-R00

WARNING: YOU MUST USE A WELDERS HELMET, SAFETY GLASSES, EAR PLUGS, HIGH NECKED DARK OVERALLS AND GLOVES. IF YOU DO NOT USE THE CORRECT PROTECTION, INJURY CAN OCCUR.

CAUTION: THE INLET COWL OUTER SKIN IS MADE OF CARBON FIBER COMPOSITE. DAMAGE TO THE CARBON FIBER COMPOSITE WILL MAKE THE COMPOSITE STRUCTURE WEAK.

(3) Apply the plasma sprayed aluminum layer to the repair area.
  (a) Use the plasma spray equipment to apply the aluminum metal spray powder to the repair area (Ref Fig. 801 and 802).
  (b) Details of the plasma spray procedure are given in the Plasma Spray Data that follows:

Plasma Spray Data

Primary gas pressure (argon)	100 psi (689 kPa)
Secondary gas pressure (hydrogen)	50 psi (344 kPa)
Primary gas pressure	150 Metco units
Secondary gas pressure	10 Metco units
Gun type	3MB
Cathode	3M-275A
Anode	3M-7A-GH
Powder feed rate	1.76 ounces per minute (50 gm-l)
Carrier gas flow (argon)	37 Metco units
Current	500 amps
Voltage	55 - 70
Spray distance	4 - 6 inches (100 - 150 mm)

NOTE: Make sure you apply an equal layer thickness to all the repair area. Apply more equal layers until the applied aluminum is sufficiently thick. Apply the aluminum layer in continuous spray movements. Each spray movement must overlap the last spray movement by a third of the spray movement width.

The layer thickness must be 0.004 inches to 0.006 inches (0,11 mm to 0,14 mm).

S 398-040-R00

WARNING: DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE THESE MATERIALS ARE USED.

YOU MUST USE BARRIER CREAM, GLOVES AND OVERALLS WHEN YOU USE THESE MATERIALS. DO NOT LET THE MATERIALS TOUCH YOUR SKIN. AT THE END OF WORK OR CONTAMINATION, WASH YHOUR HANDS WITH A SPECIFIED CREAM TO REMOVE ALL RESIN.

THE MATEIALS MUST BE PREPARED AND USED IN AREAS WITH GOOD AIR MOVEMENT.

CAUTION: DO NOT LET THE CLEAN AREA BECOME DIRTY. YOU MUST MIX AND APPLY THE ADHESIVE IMMEDIATELY AFTER YOU CLEAN THE REPAIR AREA.

(4) Seal the repair area.
  (a) Mix the adhesive compound.
    1) Weigh out 70 parts of the resin.
    2) Weigh out 30 parts of the hardener.
    3) Mix the resin and hardener until the compound is a constant cream color.

(b) Apply a thin layer of sealant adhesive on the repair area with a fine camel hair brush.
1) Make sure the sealant adhesive is on all the repair area.
(c) Let the sealant adhesive cure for one hour at 95 to 105 degrees C (203 to 221 degrees F).
(d) Remove the masking tape from around the repair area.
(e) Replace the surface protection (Ref FRS.6400).

S 978-041-R00

(5) Make a record of the repair.
(a) Use a vibro etch tool to make a mark that identifies FRS.5811 adjacent to the part number.

S 868-045-R00

(6) Install the inlet cowl (AMM 71-11-01/401).

TASK 71-11-01-328-064-R00

5. Inlet Cowl - Acoustic Panel Repair

A. General

(1) The repair in this procedure is FRS6154.
(2) This procedure repairs the acoustic panel perforate skin on the inlet cowl.
(3) The repair is done by the removal of the wire mesh material that is damaged. A repair panel is installed on the damaged area. The repair panel is held in position by rivets and an adhesive filler.
(4) This procedure can be used to repair inlet cowl acoustic panels on RB211-535E4 engines. This repair can be done to an inlet cowl that has the part number that follows:

LJ35708

(5) This procedure can not be used to repair core material that is damaged.
(6) This procedure can be used to repair damaged areas that are not more than 8.000 in. (203.00 mm) in length.
(7) The minimum distance between the edges of each repair must be 5.000 in. (127.00 mm).
(8) The distance from the edge of the acoustic panel to a repair must be more than 2.000 in. (50.80 mm).

(9) No more than three repairs can be done on an acoustic panel.
(10) The maximum decrease in the area of the acoustic panel material from all repairs must not be more than 1.4 sq ft (0.13 sq metres).

NOTE: The area of the acoustic panel material that will be replaced by this repair, is specified from the outer layer of adhesive.

(11) The acoustic panel can be damaged by unwanted material that is made when this repair is done. Be careful to make sure unwanted material does not get on the adjacent areas of the repair.

B. Equipment
(1) Workshop tools
(2) Fingernail scissors
(3) Heat lamp (explosion proof)
(4) Drills and drilling equipment
(5) Riveting equipment
(6) Permanent marker pen

C. Parts
(1) Rivet, blind - NAS1738E5-2 (RR1013786)

D. Consumable Materials
(1) Degreasing fluid, Methylethylketone (MEK)
British Spec - BDH26268
OMat No. - 135
(2) Adhesive tape, teflon PTFE
British Spec - Scotch 5490
OMat No. - 2/30
(3) Adhesive, 2 part pack
British Spec - Hysol EA934NA
OMat No. -8/52
(4) Chromate conversion coating, aluminium
British Spec - Alocrom 1200, Parts A + B
OMat No. - 175D
(5) Abrasive paper, aluminium oxide 180 grade
OMat No. - 5/62
(6) Lint-free cloth - local resource
(7) Aluminium sheet clad 2024-0,
0.031 in. (0.79 mm) thick - local resource

E. Access
(1) Location Zones
412 No. 1 Inlet Cowl
422 No. 2 Inlet Cowl

F. Repair the acoustic panel

S 118-046-R00
(1) Degrease the damaged area.

WARNING: DO NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET FLUID IN YOUR MOUTH OR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY AND/OR DAMAGE.

(a) Make a lint-free cloth moist with degreasing fluid.
(b) Make the repair area clean. Make the repair area dry before the liquid becomes a gas.
(c) Discard the dirty cloth.

S 128-047-R00

(2) Prepare a stable area of the panel (Fig. 802).

WARNING: DO NOT GET THE ADHESIVE ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU THE ADHESIVE ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET ADHESIVE IN YOUR MOUTH OR EYES.

(a) Prepare an area of the panel that will not be removed when the panel is cut.
    1) Put a length of the teflon adhesive tape around the damaged area. The inner edge of the tape must be 1.174 in. (30.00 mm) from the edge of the damage.
    2) Put one more length of teflon adhesive tape around the damaged area. The inner edge of the tape must be 1.549 in. (39.50 mm) from the edge of the damage.
(b) Prepare the adhesive
    1) Get the two part adhesive. Mix the grey paste before it is weighed out.
    2) Weigh out 100 parts of grey paste. Weigh out 33 parts of amber liquid.
    3) Mix the grey paste and amber liquid together.

        NOTE: If the adhesive is kept at 22°C (72°F), use in less than 1 hour.

(c) Apply the adhesive to the stable area of the panel.
1) Apply adhesive to the area of the panel that is between the two lengths of teflon adhesive tape.

NOTE: Make sure a sufficient quantity of adhesive is applied to the stable area to cover the wire. The adhesive layer that is applied to the stable area must not be more than 0.015 in. (0.39 mm) thick. The adhesive is applied to keep the wire in position when the panel is cut.

(d) Use a heat lamp to cure the adhesive. Refer to Table 1 for the cure times and temperatures.

Table 1

Time - Hours	168	96	40	24	16	8	4	2	1
Temp - Deg.C	12	15	20	22	25	30	35	45	60
Deg.F	54	59	68	72	77	86	96	113	140

NOTE: The minimum cure time is 1 hour.

The adhesive will not cure if the temperature is less than 12°C (54°F).

When the cure time is made shorter, the surface temperature of the adhesive must be monitored. Use thermocouples or one more applicable procedure to measure the surface temperature of the adhesive.

1) Remove the teflon adhesive tape from the acoustic panel.

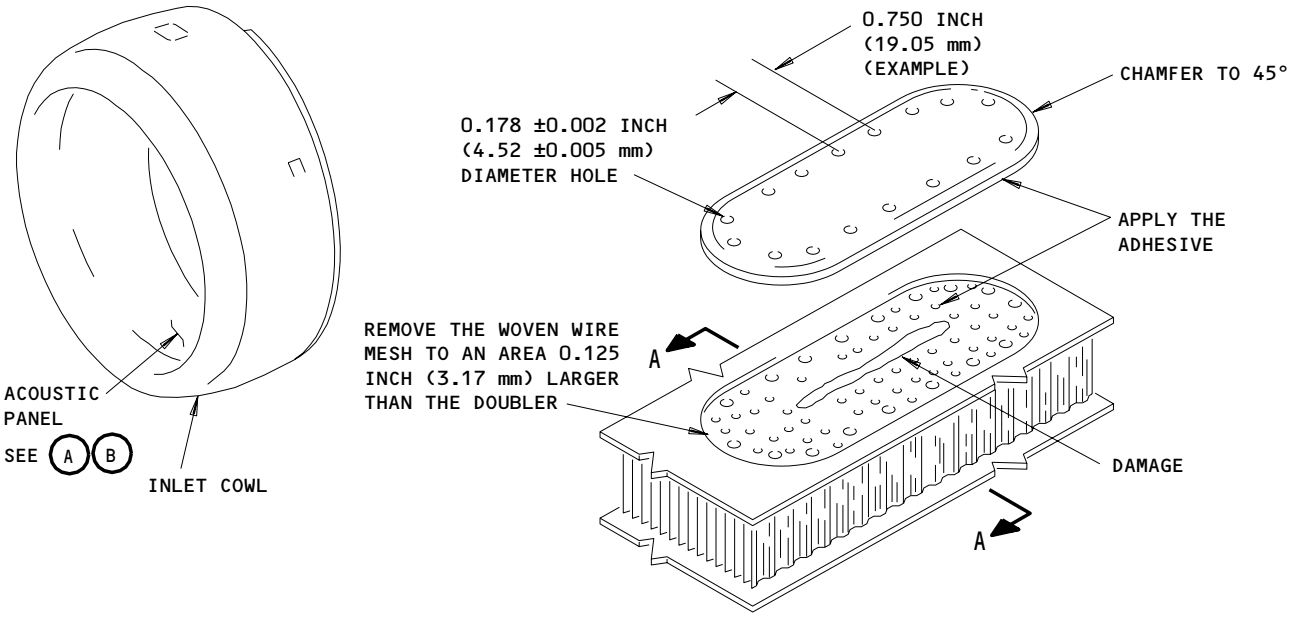
S 328-048-R00

(3) Make a doubler plate (Fig. 802).
(a) Get aluminium sheet clad 2024-0, 0.031 in. (0.79 mm) thick. Get the workshop tools to make a doubler plate.
(b) Cut a doubler plate to the correct dimensions to do the repair.

NOTE: Make the doubler plate so that it extends 1.000 in. (25.40 mm) more than the damage on all sides.

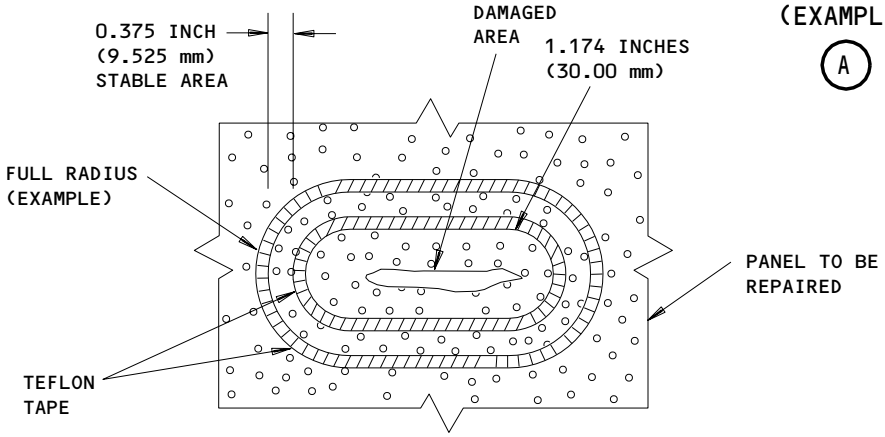
S 328-049-R00

(4) Remove the wire from around the damaged area (Fig. 802).



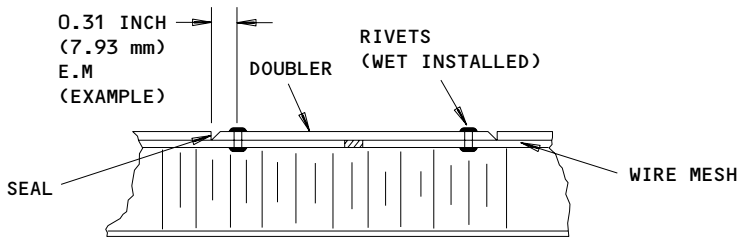
ACOUSTIC PANEL DAMAGE (EXAMPLE)

A



INSTALLATION OF TEFLON TAPE (EXAMPLE)

B



A–A

62200C

Acoustic Panel Repair
Figure 802

(a) Remove the wire from around the damaged area. Use fingernail scissors.

NOTE: Make sure the shape of the wire that is removed is the same as the doubler plate.

When the doubler plate is installed, a gap of 0.125 in. (3.17 mm) must remain between the doubler plate and the wire mesh material. The gap must be all around the edge of the doubler plate. Make sure the hole in the wire is the correct dimension to let the gap be there.

S 328-050-R00

(5) Drill the rivet holes (Fig. 802).

WARNING: YOU MUST USE THE CORRECT EYE PROTECTION WHEN YOU DO THE DRILLING PROCEDURE. THE DRILLING PROCEDURE MAKES METAL SWARF. IF THE METAL SWARF GETS IN YOUR EYES, INJURY CAN OCCUR.

(a) Put the doubler plate in the correct position on the repair area.

NOTE: Make sure the doubler plate is held tightly in position.

(b) Drill rivet holes in the doubler plate and the acoustic panel. Use a 0.176 - 0.180 in. (4.47 mm - 4.57 mm) drill for the rivet holes. Use drilling equipment.

NOTE: The rivet hole centres must be 0.750 in. (19.05 mm) apart.

(c) Remove the doubler plate from the repair area.
(d) Deburr the rivet holes in the doubler plate. Use workshop tools.

S 118-051-R00

(6) Degrease the repair area.

WARNING: DO NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET FLUID IN YOUR MOUTH OR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY AND/OR DAMAGE.

(a) Make a lint-free cloth moist with degreasing fluid.
(b) Clean the repair area and the doubler plate. Make the repair area and the doubler plate dry before the liquid becomes a gas.
(c) Discard the dirty cloth.

S 378-052-R00

(7) Apply surface protection.

WARNING: DO NOT GET THE ALUMINIUM CHROMATE CONVERSION FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET THE FLUID ON YOUR SKIN, IN MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IMMEDIATELY IF YOU GET ADHESIVE IN YOUR MOUTH OR EYES.

(a) Apply a layer of aluminium chromate conversion to the rivet holes and all the cut edges. Use a brush.

NOTE: Make sure the application instructions for the aluminium chromate conversion layer are obeyed.

S 328-053-R00

(8) Install the doubler plate on the repair area (Fig. 802).

WARNING: DO NOT GET THE ADHESIVE ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU THE ADHESIVE ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET ADHESIVE IN YOUR MOUTH OR EYES.

(a) Get the two part adhesive. Mix the grey paste before it is weighed out.
(b) Weigh out 100 parts of grey paste. Weigh out 33 parts of amber liquid.

(c) Mix the grey paste and amber liquid together.

NOTE: If the adhesive is kept at 22°C (72°F) use in less than 1 hour.

(d) Apply the adhesive to the repair area.
1) Apply adhesive to the surfaces of the doubler plate and acoustic panel that will touch when assembled.

(e) Install the doubler plate.
1) Install the doubler plate in the correct position on the repair area.

NOTE: Make sure all the rivet holes align.

2) Get the correct quantity of NAS1738E5-2 blind rivets.
3) Apply a small quantity of adhesive to the rivets.
4) Install the blind rivets in the repair area. Use riveting equipment.
5) Apply adhesive to the gap between the doubler plate and the wire.

NOTE: Make the adhesive smooth.

6) Use a heat lamp to cure the adhesive. Refer to Table 1 for the adhesive cure times and temperatures.

S 328-054-R00

(9) Make the repair area smooth.

WARNING: DO NOT GET PARTICLES OF THE MATERIAL ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. USE THE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. DO NOT BREATHE THE PARTICLES. IF YOU GET THE PARTICLES ON YOUR SKIN REMOVE THEM WITH SOAP AND WATER. GET MEDICAL AID IF YOU GET THE PARTICLES IN YOUR MOUTH OR EYES.

(a) Rub the repair area with abrasive paper to make the surface smooth.

NOTE: The repair area must have the same aerodynamic contour as the adjacent areas.

S 118-055-R00

(10) Clean the repair area.

WARNING: DO NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET FLUID IN YOUR MOUTH OR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY AND/OR DAMAGE.

(a) Make a lint-free cloth moist with degreasing fluid.
(b) Clean the repair area. Make the repair area dry before the liquid becomes a gas.
(c) Discard the dirty cloth.

S 218-069-R00

(11) Do a visual inspection of the repaired area (Fig. 802).

S 938-056-R00

(12) Record the repair.
(a) Write FRS6154 adjacent to the part number. Use a permanent marker that can be easily seen on the surface adjacent to the part number.

TASK 71-11-01-328-057-R00

6. Inlet Cowl - Engine Attachment Ring Flange - Remove Corrosion and Reprotect the Flange Surface

A. General
(1) The repair in this procedure is FRS5971.
(2) This repair procedure removes corrosion from the rear face of the engine attachment ring flange. A layer of surface protection is applied to the flange surface to complete the repair.
(3) The corrosion removal in local areas must not be more than 0.085 in. (2.16 mm) in depth.
(4) This repair procedure can be used to repair inlet cowls on RB211-535E4 engines. Repair inlet cowls that have the part numbers that follow:

535E4: LJ35708, LJ38036, LJ35810, LJ38066, LJ39448, LJ38068

B. Equipment
(1) Workshop tools

(2) Paint brush
(3) Vibro-engraving equipment

C. Consumable Materials
(1) Methylethylketone (MEK) CS3CO C2 C5
British Spec - Technical (MEK) grade, BDH26268
OMat No. - 135
(2) Wetting agent
British Spec - Synperonic 'N'
OMat No. - 2/7
(3) Phosphoric acid, H3PO4
British Spec - S.G.1.65 (O-O-670B Class 1)
OMat No. - 117
(4) Chromate conversion coating for aluminum, brush type
British Spec- Alocrom 1200 Part A, F821/1201; Part B, F821/1201.
American Spec - MIL-C-81706 type C1A
OMat No. - 175D
(5) Epoxy primer and catalyst (Strontium chromate), two pack
British Spec - Base component, PR143R; Catalyst, ACT149R.
American Spec - MIL-P-2337F
OMat No. - 766
(6) Lint-free cloth - local resource

D. Access
(1) Location Zones
412 No. 1 Inlet Cowl
422 No. 2 Inlet Cowl

E. Repair the engine attachment ring flange

S 118-058-R00
(1) Remove the corrosion from the flange.
(a) Do a visual inspection to identify the areas that have corrosion damage.
(b) Remove all the corrosion from the surface of the flange. Use workshop tools.

NOTE: Corrosion removal in local areas must not be more than a depth of 0.085 in. (2.16 mm).

S 118-059-R00
(2) Degrease the rear face of the flange.

WARNING: DO NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET FLUID IN YOUR MOUTH OR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY AND/OR DAMAGE.

(a) Make a lint-free cloth moist with degreasing fluid.
(b) Clean the repair area. Make the area dry before the liquid becomes a gas.
(c) Discard the dirty cloth.

S 218-060-R00

(3) Do a visual inspection of the rear face of the flange.

S 218-065-R00

(4) Do a visual inspection of the repair area on the rear face of the flange.

NOTE: Make sure there is no corrosion damage on the surface.

S 378-061-R00

(5) Apply surface protection to the repair area.

WARNING: DO NOT GET THE CORROSION RESISTANT FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA THAT HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET THE CORROSION-RESISTANT FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IF YOU GET IF YOU GET CORROSION RESISTANT FLUID IN YOUR MOUTH OR EYES.

THE MATERIALS THAT ARE USED TO APPLY OR REMOVE THE CONVERSION SOLUTION MUST NOT BE PERMITTED TO DRY. IF THE MATERIALS BECOME DRY, IT IS POSSIBLE FOR A FIRE TO OCCUR. WASH THE APPLICATION AND REMOVAL MATERIALS WITH COLD WATER BEFORE THEY ARE DISCARDED.

(a) Clean the rear face of the flange again.
1) Get the wetting agent.

2) Mix one part of the wetting agent with 99 parts of water.

NOTE: Measure the liquid quantity by its volume.

The solution must be kept in an applicable container.

The temperature of the solution must be kept at 15 to 25°C (59 to 77°F).

3) Use a brush to apply the wetting agent solution to the rear face of the flange.
4) Clean the area with clean, cold water.
5) Get the phosphoric acid.
6) Mix 330 ml of phosphoric acid with 670 ml of water to make a phosphoric acid solution.

NOTE: The solution must be kept in a polythene tank.

The temperature of the solution must be kept at 15 to 25°C (59 to 77°F).

7) Use a brush to apply phosphoric acid solution to the rear face of the flange.
8) Clean the area with clean, cold water.

(b) Apply the corrosion resistant layer to the rear face of the flange. Use a brush.
1) Get the two-part chromate conversion layer solutions.
2) Mix equal quantities of parts A and B together.

NOTE: The solution that is mixed must not be kept.

Prepare the correct quantity of the solution to be used immediately.

3) Apply the chromate conversion layer to the rear face of the flange.

NOTE: Apply the solution until the color of the surface is gold/brown in color. This change in color will usually occur between 2 and 7 minutes after application.

4) Clean the repair area with clean, cold water. Dry the repair area with a warm air supply or a clean, dry, lint-free cloth.

(c) Apply primer to the rear face of the flange.

NOTE: The primer must be prepared 30 minutes before it is applied.

1) Get the epoxy primer and the catalyst.
2) Mix equal quantities of the epoxy primer and the catalyst.

NOTE: Thinners can be mixed with the primer and the catalyst to get the correct mixture.

When the primer is mixed, it must be used in less than 8 hours.

3) Apply a thin layer of primer to the rear face of the flange.

NOTE: The primer must be applied in a thin and continuous layer to make sure the surface cover is sufficient.

4) Let the primer dry for 4 to 16 hours.

S 218-062-R00

(6) Do a visual inspection of the repaired area.

NOTE: Make sure the surface protection has no breaks in its surface.

Make sure the layer of surface protection is not too thick.

S 938-063-R00

(7) Record the repair.
(a) Vibro-engrave FRS5971 adjacent to the part number. Use vibro-engraving equipment.

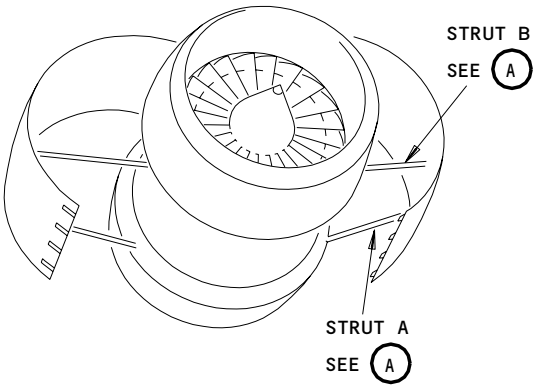
FAN COWL PANELS - MAINTENANCE PRACTICES

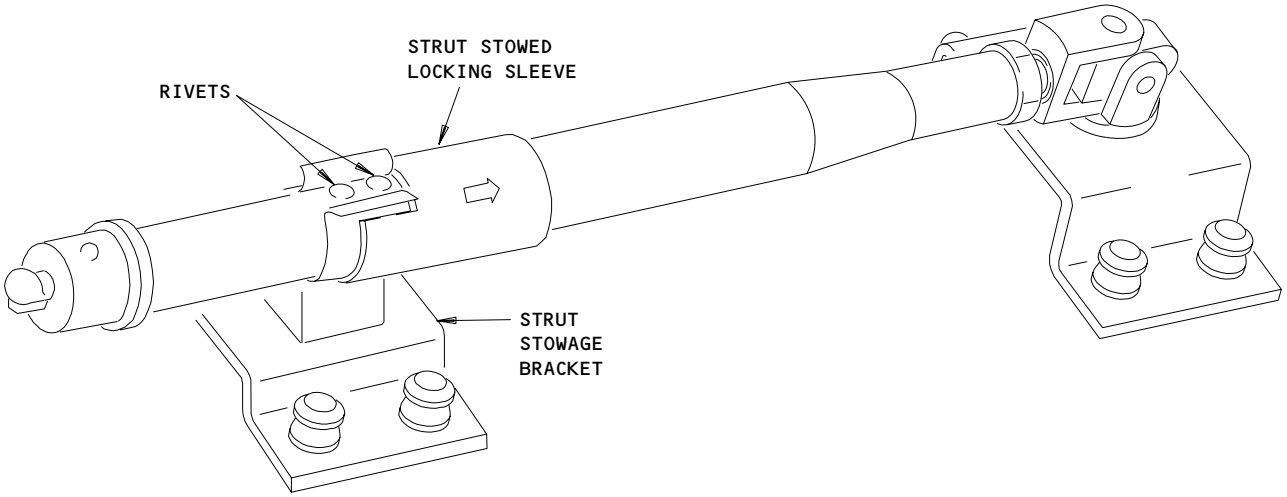
1. General
   A. This procedure contains data to open and close the left and right fan cowl panels on each engine. The fan cowl panels are found to the rear of the inlet cowl. The fan cowl panels are the cover for the engine fan case.

   TASK 71-11-04-012-002-R00

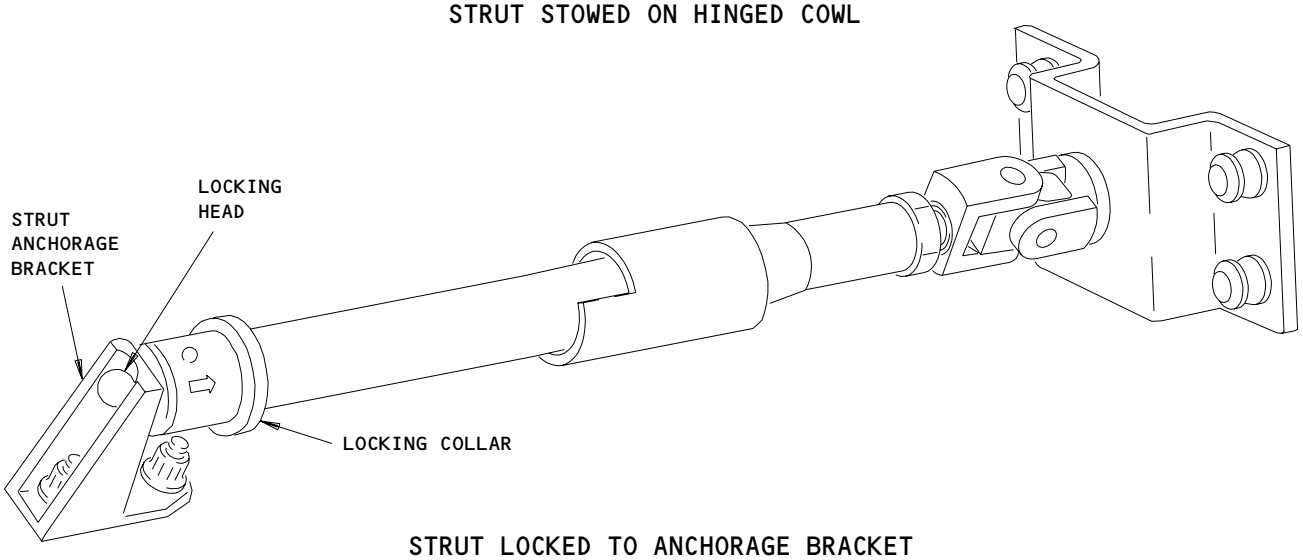
2. Open the Fan Cowl Panel
   A. References
      (1) AMM 72-34-10/601, LP Compressor (Fan) Case
   B. Access
      (1) Location Zones
         (a) 410 Left Power Plant
         (b) 420 Right Power Plant
      (2) Access Panels
         (a) 413AL Left Engine Fan Cowl Panel (LH)
         (b) 414AR Left Engine Fan Cowl Panel (RH)
         (c) 423AL Right Engine Fan Cowl Panel (LH)
         (d) 424AR Right Engine Fan Cowl Panel (RH)
   C. Open the Fan Cowl Panel (Fig. 201)

      S 012-001-R00
      (1) Do these steps to open the fan cowl panels.





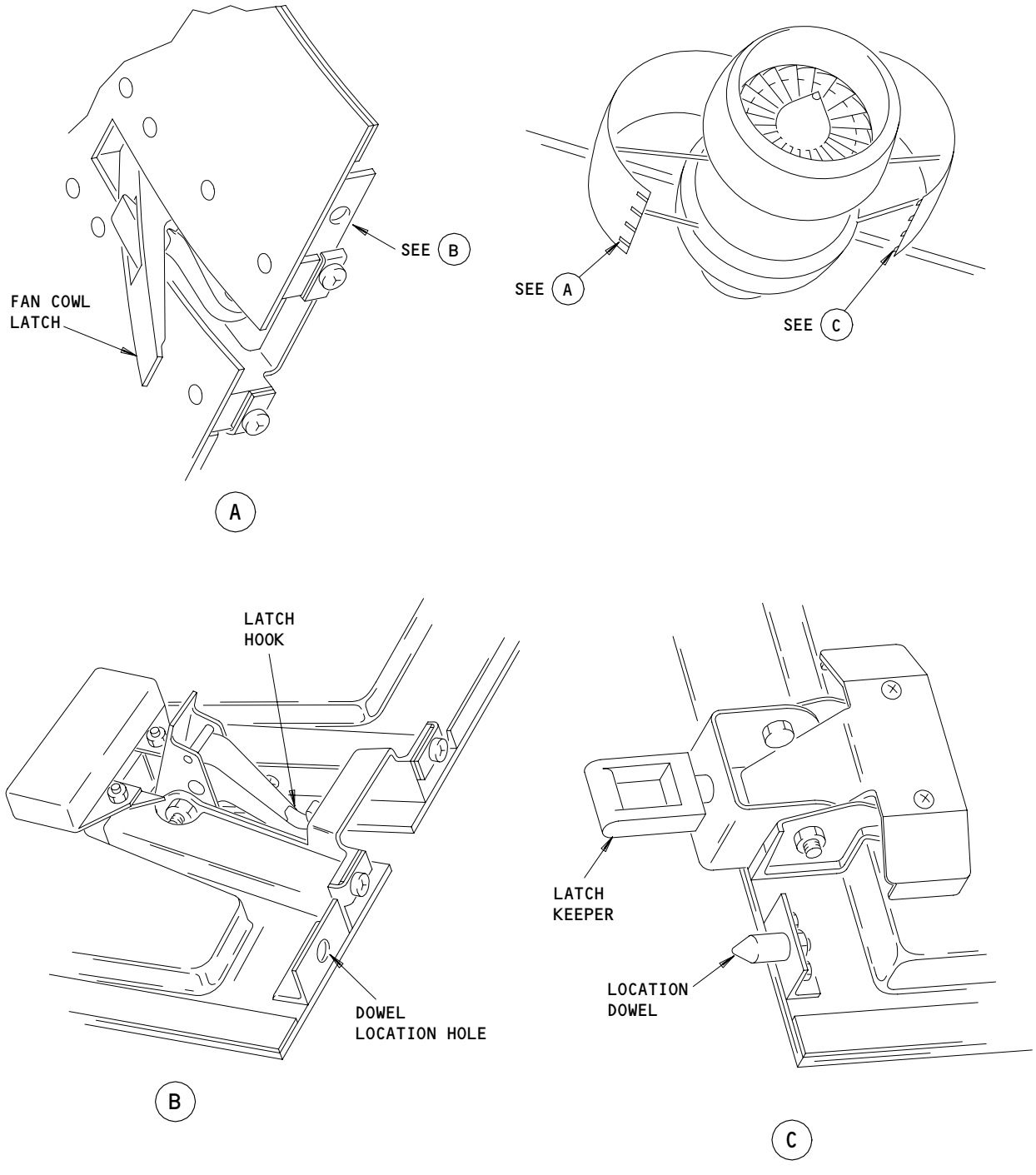
STRUT STOWED ON HINGED COWL



STRUT LOCKED TO ANCHORAGE BRACKET

A

Fan Cowl Panel Opening
Figure 201



Fan Cowl Panel Closing
Figure 202

WARNING: ENGINES POST RR SB 71-9088;
WHEN WORK IS DONE IN THE AREA OF THE OIL BREATHER, BE CAREFUL OF THE SHARP EDGES AT THE FRONT AND REAR OF THE BREATHER MAST. INJURY TO PERSONS COULD OCCUR.

CAUTION: WHEN YOU OPEN THE FAN COWL PANELS OR WORK IN THE AREA OF THE LOW PRESSURE COMPRESSOR CASE, BE CAREFUL TO PREVENT DAMAGE TO THE NON-METALLIC, WOVEN BLADE CONTAINMENT KEVLAR-WRAPPING. FOR ANY DAMAGE TO THE KEVLAR-WRAPPING, DO THE LP COMPRESSOR (FAN) CASE - INSPECTION/CHECK (AMM 72-34-10/601).
BE CAREFUL WHEN YOU HANDLE THE FAN COWL PANEL TO PREVENT DAMAGE TO THE PANEL ACOUSTIC LINING OR INNER CORE.

DO NOT OPEN THE FAN COWL PANEL MORE THAN IS NECESSARY TO ENGAGE THE SUPPORT STRUTS IN THE APPLICABLE ANCHORAGE BRACKET.

BE CAREFUL WHEN YOU OPEN THE FAN COWL PANELS IN WIND SPEEDS MORE THAN 30 M.P.H. (26 KNOTS).

FAN COWL PANEL MUST NOT REMAIN IN THE OPEN POSITION OR BE OPENED IN WIND SPEEDS MORE THAN 60 M.P.H. (52 KNOTS).

ENGINES PRE RR SB 71-8481;
DO NOT INSERT IMPROVISED LEVERS INTO THE FAN COWL LATCH STIRRUPS. THE BAYONET TYPE MAGNETIC CHIP DETECTOR COULD OPEN AND CAUSE AN OIL LEAK.

(a) Release and disengage the fan cowl panel latches in sequence from front to rear.

CAUTION: DO NOT USE THE POWER LEVER ANGLE (PLA) TRANSDUCER AS A FOOT-HOLD OR HAND-HOLD. DAMAGE TO THE TRANSDUCER SHAFT MAY OCCUR.

CAUTION: ENGINES POST RR SB 71-9088;
DO NOT USE THE OIL BREATHER MAST AS A HAND-HOLD OR DAMAGE TO THE FAN COWL PANEL MAY OCCUR.

(b) Open the fan cowl panel and hold the panel in the open position.
(c) Move the locking-sleeve on strut A in the direction of the arrow to release the strut from the strut-stowage-bracket.
(d) Move the locking-collar in the direction of the arrow to engage the strut locking-head in the applicable anchorage bracket on the engine fan case.

(e) Release the locking-collar to lock the strut in the anchorage-bracket.
(f) Do these steps again for strut B.

WARNING: MAKE SURE THAT BOTH SUPPORT STRUTS ARE CORRECTLY INSTALLED AND LOCKED BEFORE YOU RELEASE THE FAN COWL PANEL. THE FAN COWL PANEL CAN CLOSE SUDDENLY AND CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

MAKE SURE THAT THE LOCKING SLEEVE COMPLETELY SURROUNDS THE STOWAGE SPRINGS.

(g) Make sure that both struts A and B are installed and latched before you release your hold on the fan cowl panel.

TASK 71-11-04-412-003-R00

3. Close the Fan Cowl Panel

A. References
(1) AMM 79-21-03/401, Master Chip Detector

B. Access
(1) Location Zones
(a) 410 Left Power Plant
(b) 420 Right Power Plant
(2) Access Panels
(a) 413AL Left Engine Fan Cowl Panel (LH)
(b) 414AR Left Engine Fan Cowl Panel (RH)
(c) 423AL Right Engine Fan Cowl Panel (LH)
(d) 424AR Right Engine Fan Cowl Panel (RH)

C. Close the Fan Cowl Panel (Fig. 201)

S 412-004-R00

(1) Do these steps to close the fan cowl panels.
(a) Hold the fan cowl panel in the open position.
(b) Move the locking-collar on strut A in the direction of the arrow to disengage the strut locking-head from the anchorage bracket.

CAUTION: MAKE SURE THAT THE RIVETS ON THE STRUT ADJACENT TO THE STRUT LOCKING-SLEEVE ARE AT 90 DEGREES TO THE FAN COWL PANEL. THE RIVETS MUST BE SEEN WHEN THE STRUT IS ENGAGED WITH THE STOWAGE-BRACKET-SPRING-CLIP.

(c) Move the strut locking-sleeve (1) in the direction of the arrow and engage the strut in stowage-bracket (2).
1) Make sure that the rivets (6) can be seen.

CAUTION: THE LOCKING-SLEEVE MUST ENGAGE WITH THE STOWAGE-BRACKET-SPRING-CLIP.

(d) Release the locking-sleeve to lock the strut in the stowage-bracket.
    1) Make sure that the locking-sleeve engages fully with the stowage-bracket-spring-clip.
(e) Do these steps again for strut B.

CAUTION: MAKE SURE THAT THE STRUTS ARE CORRECTLY ENGAGED ON THE BRACKET. THE ENGINE THRUST CONTROLS CAN BECOME LOCKED IF THE STRUT BECOMES DISENGAGED FROM THE BRACKET.

(f) Make sure that the struts are locked onto the stowage-brackets.
(g) Carefully lower the fan cowl panel and make sure the panel location dowels are correctly engaged in the panel location holes.
(h) Engage the latch hooks in the latch keepers, then close the latches in sequence from rear to forward.
(i) ENGINES PRE RR SB 71-8035;
    Make a check that the master-chip-detector (MCD) is correctly installed.
    1) Open the master-chip-detector (MCD) access door in RH fan cowl panel.
    2) Make a check that the MCD is correctly installed (AMM 79-21-03/401).
    3) Close the MCD access door.
(j) Make a check that the fan cowl panels are closed and all latches are correctly engaged and locked.

FAN COWL PANELS - REMOVAL/INSTALLATION

1. General
   A. This removal/installation procedure is the same for both fan cowl panels.
   B. This procedure provides instructions to remove the fan cowl panel with ladders or with a sling.

   TASK 71-11-04-004-019-R00

2. Remove the Fan Cowl Panel
   A. Equipment
      (1) Sling - Fan Cowl Panel, CP30401 Rolls-Royce
   B. References
      (1) 71-11-04/201, Fan Cowl Panels
      (2) 71-11-05/501, Fan Cowl Panel Latches
   C. Access
      (1) Location Zone
          410 Left Power Plant
          420 Right Power Plant
      (2) Access Panel
          413AL Fan cowl panel, left engine
          414AR Fan cowl panel, left engine
          423AL Fan cowl panel, right engine
          424AR Fan cowl panel, right engine

   D. Remove the Fan Cowl Panel

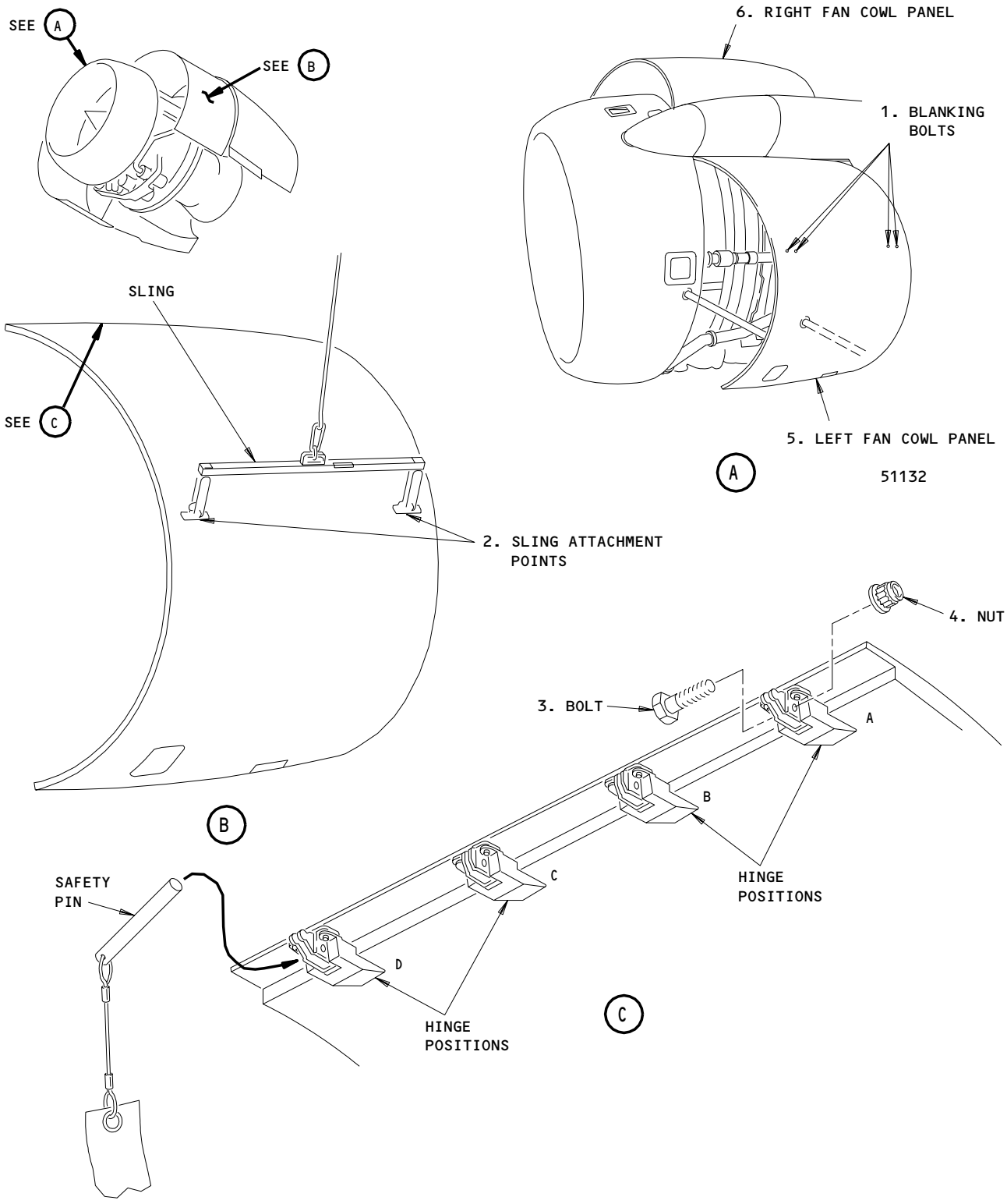
      S 944-020-R00

      WARNING: ON ENGINES WITH RR SB 71-9088,
      WHEN WORK IS DONE IN THE AREA OF THE OIL BREATHER, BE CAREFUL OF THE SHARP EDGES AT THE FRONT AND REAR OF THE BREATHER MAST. INJURY TO PERSONS COULD OCCUR.

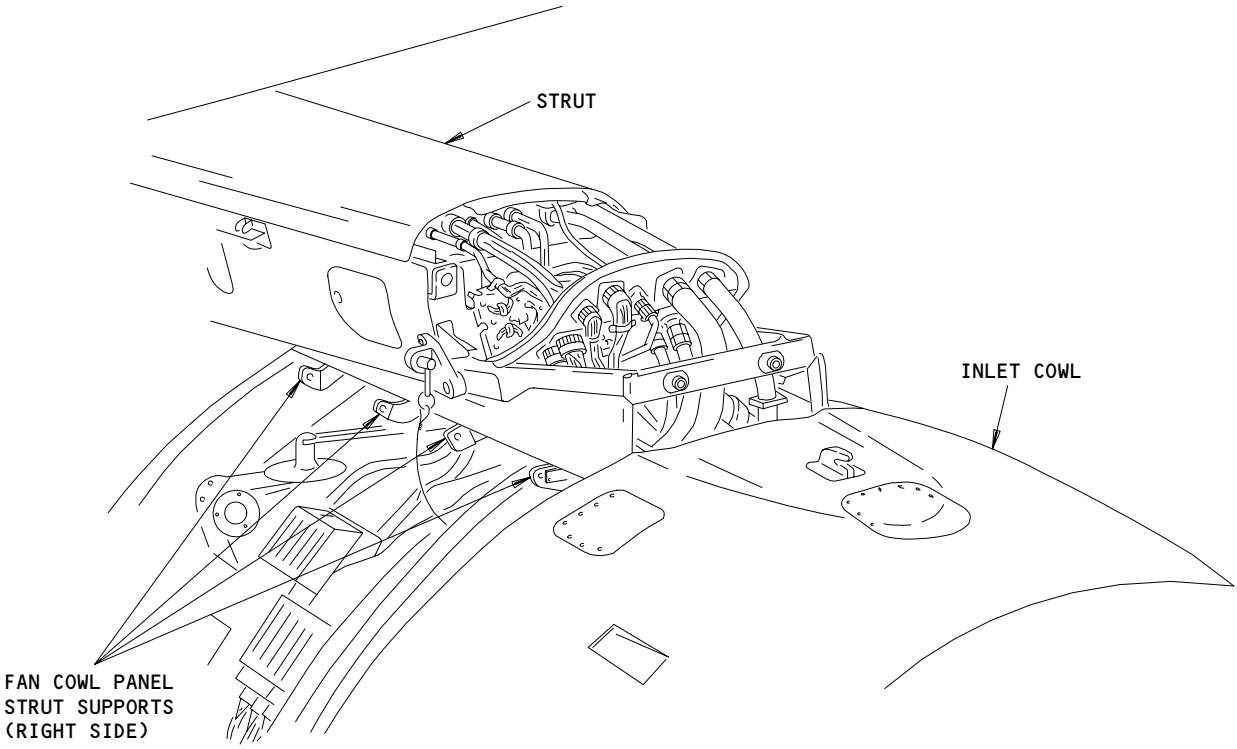
      (1) Be careful of the sharp edges on the oil breather mast.

      S 944-021-R00

      CAUTION: ON ENGINES WITH RR SB 71-9088,
      DO NOT USE THE OIL BREATHER MAST AS A HAND-HOLD OR DAMAGE TO THE FAN COWL PANEL MAY OCCUR.



Fan Cowl Panels Installation
Figure 401 (Sheet 1)



NOTE: FOR CLARITY FAN COWL PANELS AND STRUT FORWARD FAIRING SHOWN REMOVED

Fan Cowl Panels Installation
Figure 401 (Sheet 2)

(2) Do not use the oil breather mast as a hand hold.

S 024-025-R00

CAUTION: BE CAREFUL WHEN YOU HANDLE THE FAN COWL PANELS OR YOU WILL CAUSE DAMAGE TO THE PANELS ACOUSTIC LINING AND INNER CORE.

FAN COWL PANELS MUST NOT BE IN THE OPEN POSITION WHEN THE WIND SPEED IS MORE THAN 65 KNOTS (74MPH).

(3) Remove the Fan Cowl Panel With A Sling
- (a) Remove the bolts (1) from the points that you will attach the sling.
  1) Keep the bolts for the installation.
- (b) Release the latches of the fan cowl panel in sequence from front to rear.
- (c) Attach the hoist to the sling.
- (d) Lift the sling to a position near the points where you will attach the sling to the fan cowl panel.
- (e) Attach the sling to the fan cowl panel with the bolts that are supplied with the sling.
  1) Tighten the bolts to 80 pound-inches (9.0 newton meters).
- (f) Lift the fan cowl panel with the hoist until you can get to the hinge bolts and nuts.
- (g) Remove the bolts and nuts from the hinge positions B and D.
  1) Install the safety pins in these bolt holes.
- (h) Remove the bolts and nuts from the hinge positions A and C.
- (i) Make sure the hoist holds the weight of the fan cowl panel.
- (j) Remove the safety pins.
- (k) Lower the fan cowl panel (5, 6) to a protected surface on the ground.
  1) Turn the fan cowl panel on the front or rear flange.
  2) Put the panel on the protected surface.
- (l) Remove the sling.
- (m) Install the bolts (1) in the points where you attached the sling.

S 024-024-R00

CAUTION: FAN COWL PANELS MUST NOT BE IN THE OPEN POSITION WHEN THE WIND SPEED IS MORE THAN 65 KNOTS (74MPH).

BE CAREFUL WHEN YOU HANDLE THE FAN COWL PANELS OR YOU WILL CAUSE DAMAGE TO THE PANELS ACOUSTIC LINING OR INNER CORE.

(4) Remove the Fan Cowl Panel With Ladders
  (a) Release the latches of the fan cowl panel in sequence from front to rear.
  (b) Put two ladders in a position so you have access to the top of the forward and rear supports of the fan cowl panel.
  (c) Open the fan cowl panel.
    1) Use the hold open rods to keep the fan cowl panel in the open position.
  (d) Remove the bolts (3) and nuts (4) from the hinge positions B and D at the top of the fan cowl panel (5, 6).
    1) Install the safety pins in the hinge.
  (e) Release the hold open rods.
    1) Manually keep the fan cowl panel in the open position.
  (f) Remove the bolts (3) and nuts (4) from hinge positions A and C.

  WARNING: FAN COWL PANEL WEIGHS 85 POUNDS (39 KILOGRAMS). THE FAN COWL PANELS MUST BE HELD IN THE OPEN POSITION WHEN THE SAFETY PINS ARE REMOVED. BE CAREFUL WHEN YOU MOVE THE PANELS DOWN THE LADDERS TO PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

  (g) Tightly hold the fan cowl panel, remove the safety pins and move the fan cowl panel (5, 6) down to the ground.

TASK 71-11-04-404-017-R00

3. Install the Fan Cowl Panel

A. General
  (1) This procedure provides instructions for the installation of the fan cowl panels with ladders or with a sling.

B. Equipment
  (1) Sling - Fan Cowl Panel, CP30401 Rolls-Royce

C. Parts

MM		NOMENCLATURE	IPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	3	Bolt	71-00-02	04	15
	4	Nut			20
	5	Fan Cowl LH Panel Assy			25
	6	Fan Cowl RH Panel Assy			30

D. References
(1) 71-11-04/201, Fan Cowl Panels
(2) 71-11-05/501, Fan Cowl Panel Latches

E. Access
(1) Location Zone
410 Left Power Plant
420 Right Power Plant
(2) Access Panel
413AL Fan cowl panel, left engine
414AR Fan cowl panel, left engine
423AL Fan cowl panel, right engine
424AR Fan cowl panel, right engine

F. Install the Fan Cowl Panel.

S 424-023-R00

CAUTION: FAN COWL PANELS MUST NOT BE IN THE OPEN POSITION WHEN THE WIND SPEED IS MORE THAN 65 KNOTS (74MPH).

BE CAREFUL WHEN YOU HANDLE THE FAN COWL PANELS OR YOU WILL CAUSE DAMAGE TO THE PANELS ACOUSTIC LINING OR INNER CORE.

(1) Install the Fan Cowl Panel With A Sling.
(a) Remove the bolts (1) from the points (2) that you will attach the sling.
(b) Attach a hoist to the sling.
(c) Attach the sling to the fan cowl panel.
1) Attach the sling with the bolts that are supplied with the sling.
2) Tighten the bolts to 80 pound-inches (9.0 newton meters).

3) Support the weight of the fan cowl panel.

(d) Manually lift the fan cowl panel (5, 6) with the hoist into the correct position.
1) Align the bolt holes in the hinge bracket with the support lugs of the strut hinge.

(e) Install the bolts (3) and nuts (4).
1) Tighten the bolts to the usual value (Ref 70-51-00).

(f) Lower the fan cowl panel with the hoist.

(g) Remove the sling from the fan cowl panel.

(h) Install the bolts (1) in the fan cowl panel at the points that you attached the sling.

(i) Close the fan cowl panel (Ref 71-11-04).

(j) Examine the clearance between the lower edges of the fan cowl panels (Ref 71-11-05).

(k) Adjust the latches of the fan cowl panel to get the correct force for latch operation (Ref 71-11-05).

S 424-022-R00

CAUTION: FAN COWL PANELS MUST NOT BE IN THE OPEN POSITION WHEN THE WIND SPEED IS MORE THAN 65 KNOTS (74MPH).

BE CAREFUL WHEN YOU HANDLE THE FAN COWL PANELS OR YOU WILL CAUSE DAMAGE TO THE PANELS ACOUSTIC LINING OR INNER CORE.

(2) Install Fan Cowl Panel With Ladders

(a) Tightly hold the fan cowl panel at the base and at the two top sides.

WARNING: THE FAN COWL PANEL WEIGHS 85 POUNDS (39 KILOGRAMS). YOU MUST HOLD THE FAN COWL PANEL IN THE OPEN POSITION WHEN THE SAFETY PINS ARE INSTALLED. BE CAREFUL WHEN YOU MOVE THE FAN COWL PANEL UP THE LADDERS TO PREVENT INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Move the fan cowl panel (5, 6) up the ladders.

(c) Manually hold the fan cowl panel in the open position and install the safety pin at the hinge.

(d) Use the hold open rods to keep the fan cowl panel in the open position.
(e) At hinge positions A and C:
    1) Remove the safety pin from the hinge.
    2) Install the bolts (3) and the nuts (4).
(f) At hinge position B and D:
    1) Remove the safety pins from the hinge.
    2) Install the bolts (3) and nuts (4).
(g) Tighten the bolts at hinge postions A thru D to 150 inch-pounds (17.0 newton-meters).
(h) Close the fan cowl panel (Ref 71-11-04).
(i) Examine the clearance between the lower edges of the fan cowl panels (Ref 71-11-05).
(j) Adjust the latches of the fan cowl panel to get the correct force for latch operation (Ref 71-11-05).

FAN COWL PANELS - INSPECTION/CHECK

TASK 71-11-04-206-006-R00

1. Examine the Fan Cowl Panels (Fig. 601)

A. General

(1) This section gives the procedure to do visual inspections of 16 sections of the fan cowl panels.

(2) Refer to the Structural Repair Manual for the repair of the damaged structure.

B. References

(1) AMM 24-22-00/201, Electrical Power - Control

(2) AMM 71-11-04/201, Fan Cowl Panels

(3) AMM 71-11-04/801, Fan Cowl Panels

C. Access

(1) Location Zones

410	No. 1 Power Plant
420	No. 2 Power Plant

(2) Access Panels

413AL	Fan cowl panel, left engine
414AR	Fan cowl panel, left engine
423AL	Fan cowl panel, right engine
424AR	Fan cowl panel, right engine

D. Prepare to Examine the Fan Cowl Panel

S 866-015-R00

(1) Remove the electrical power (AMM 24-22-00/201).

S 016-016-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(2) Open the fan cowl panels (AMM 71-11-04/201).

E. Examine the Components of the Fan Cowl Panel

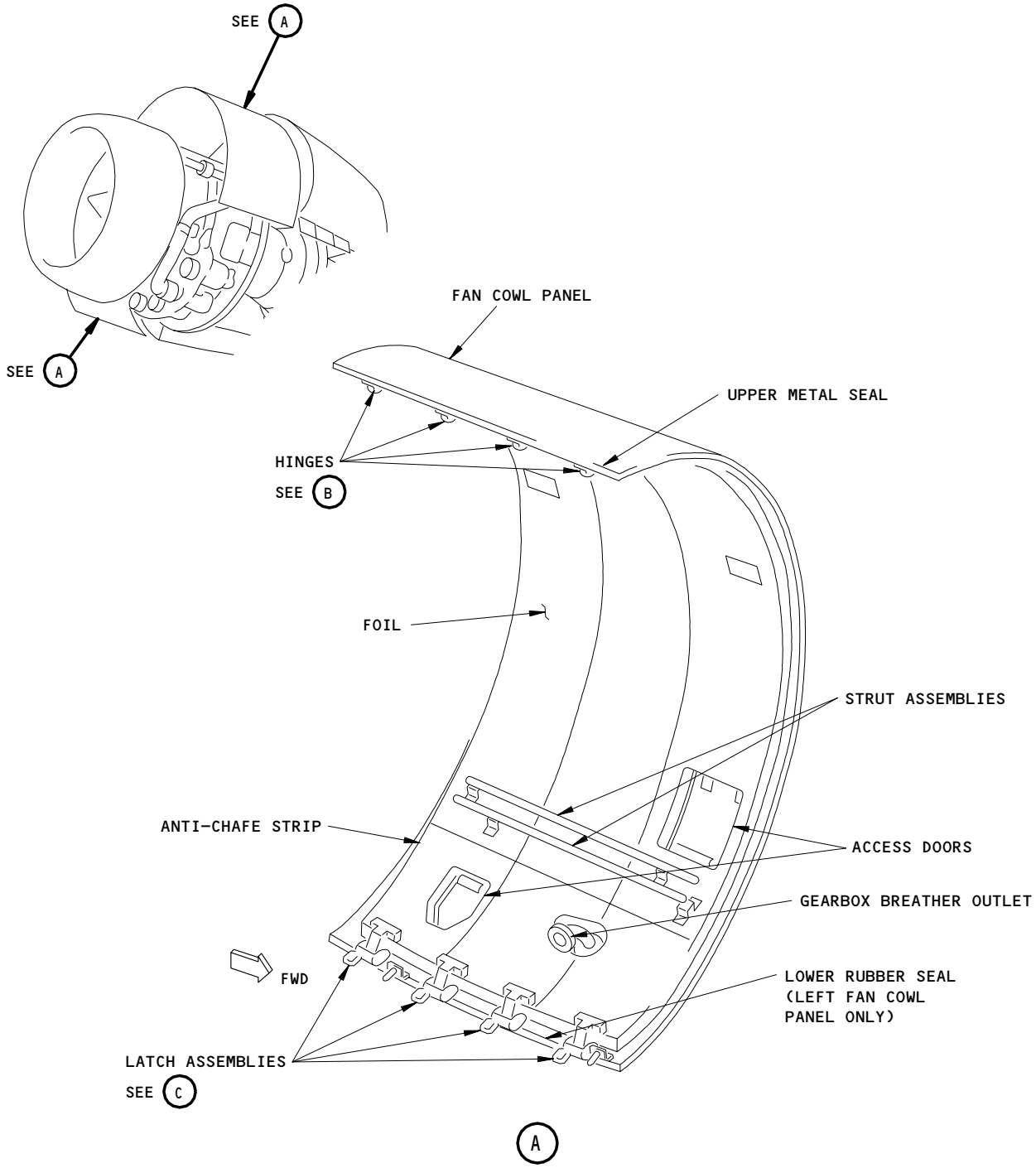
S 226-017-R00

(1) Examine the foil for holes, tears and blistered areas.

S 226-018-R00

(2) Examine the anti-chafe strips on the forward and aft inner edges of the fan cowl panel for damage.

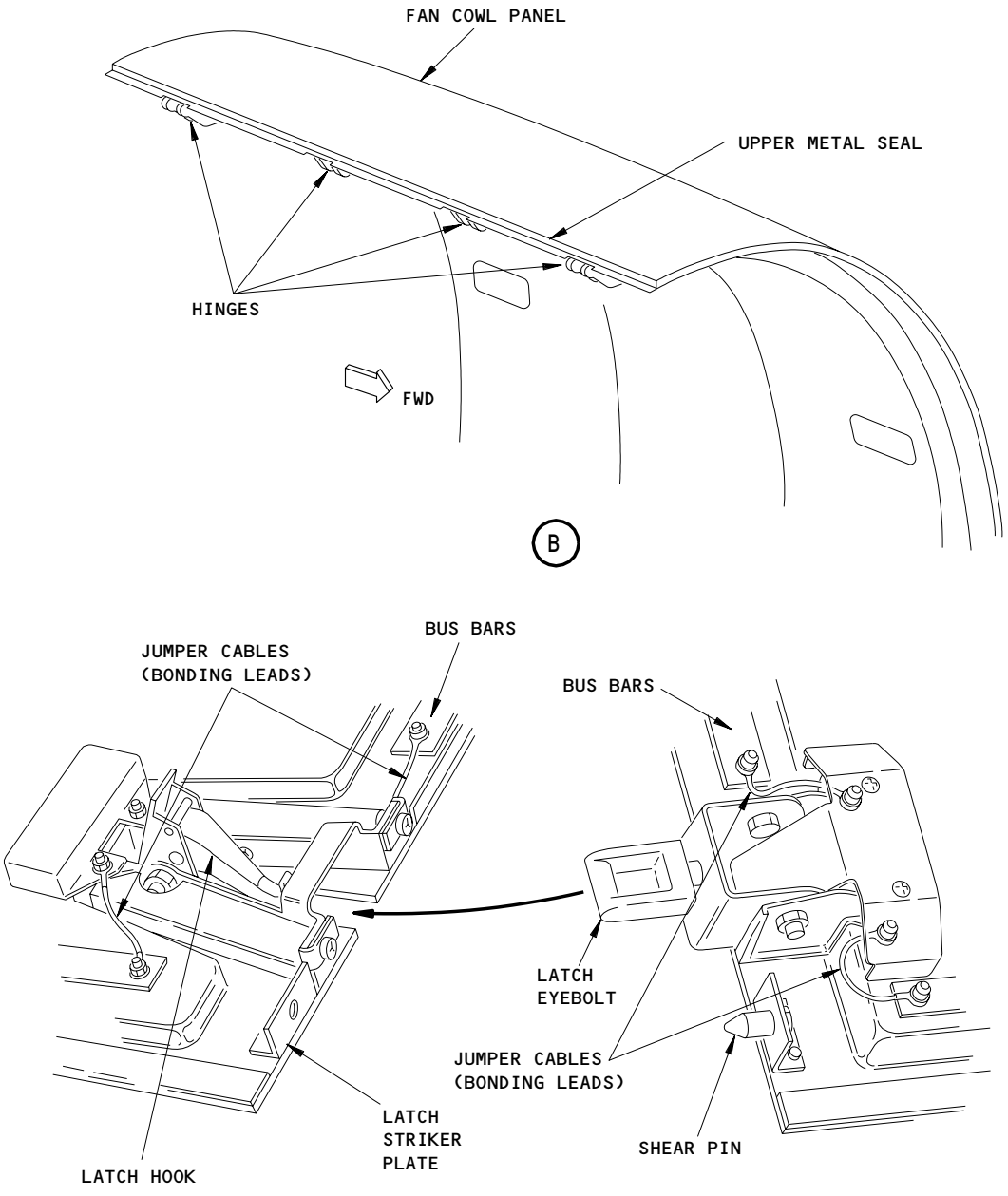
(a) Make sure each strip is attached correctly.



NOTE: THE LEFT SIDE FAN COWL PANEL IS SHOWN.
(THE RIGHT SIDE FAN COWL PANEL IS THE OPPOSITE)

A6508

Inspection of the Fan Cowl Panels
Figure 601 (Sheet 1)

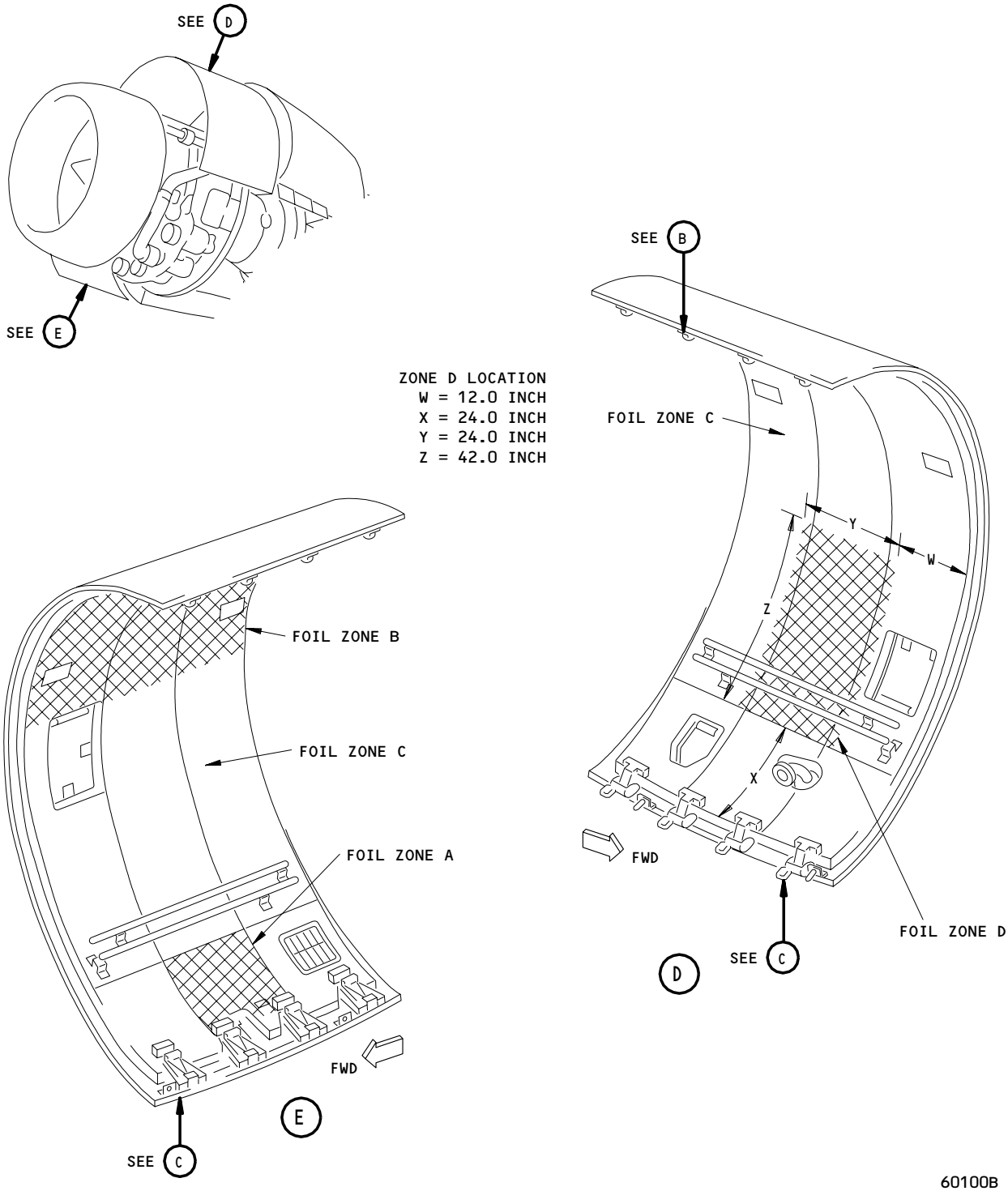


LATCH ASSEMBLIES - EXAMPLE
(4 LOCATIONS)

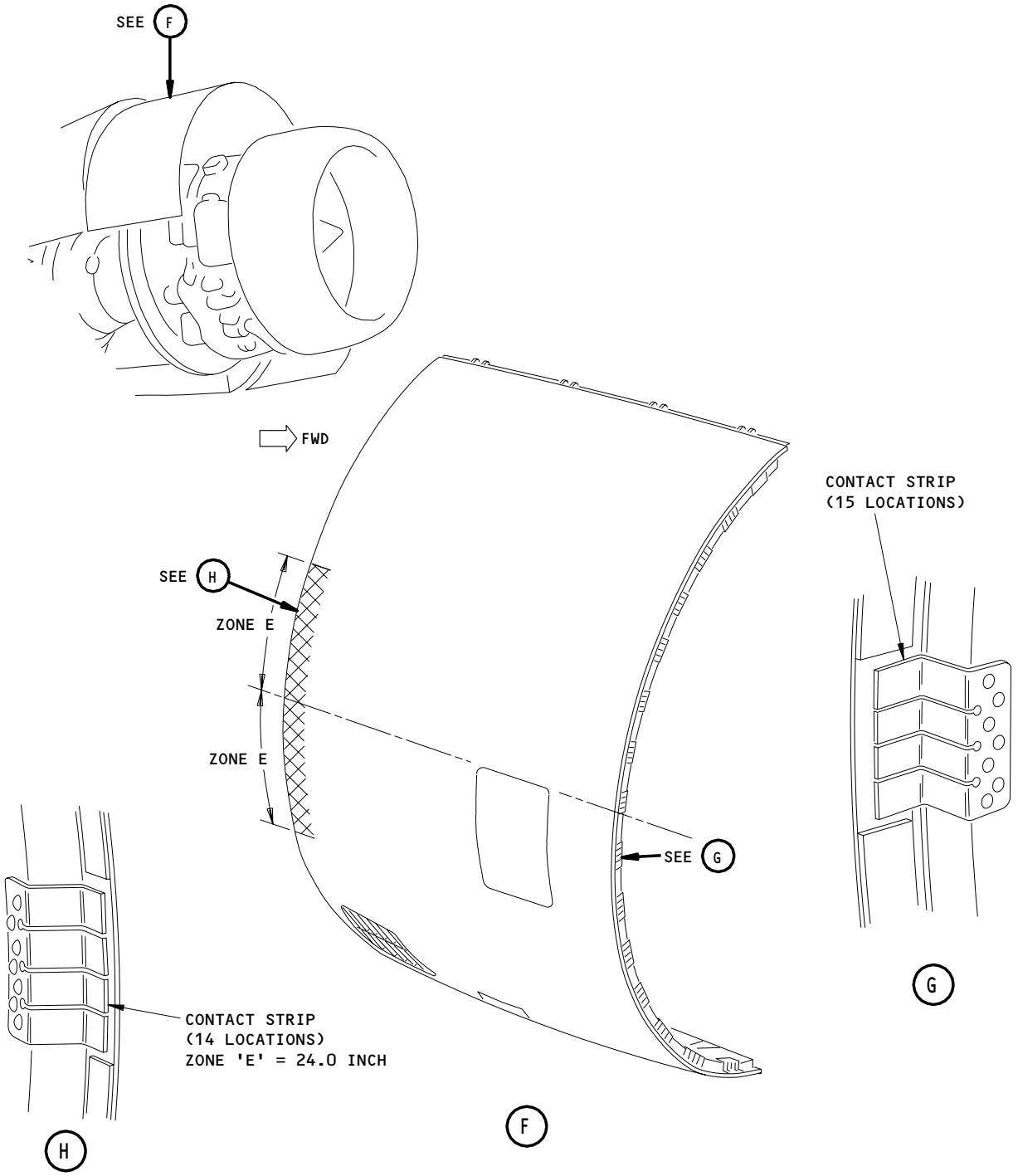
C

A6509

Inspection of the Fan Cowl Panels
Figure 601 (Sheet 2)



Fan Cowl Panels Inspection
Figure 601 (Sheet 3)



NOTE: RIGHT HAND INSTALLATION SHOWN, LEFT HAND INSTALLATION IS OPPOSITE.

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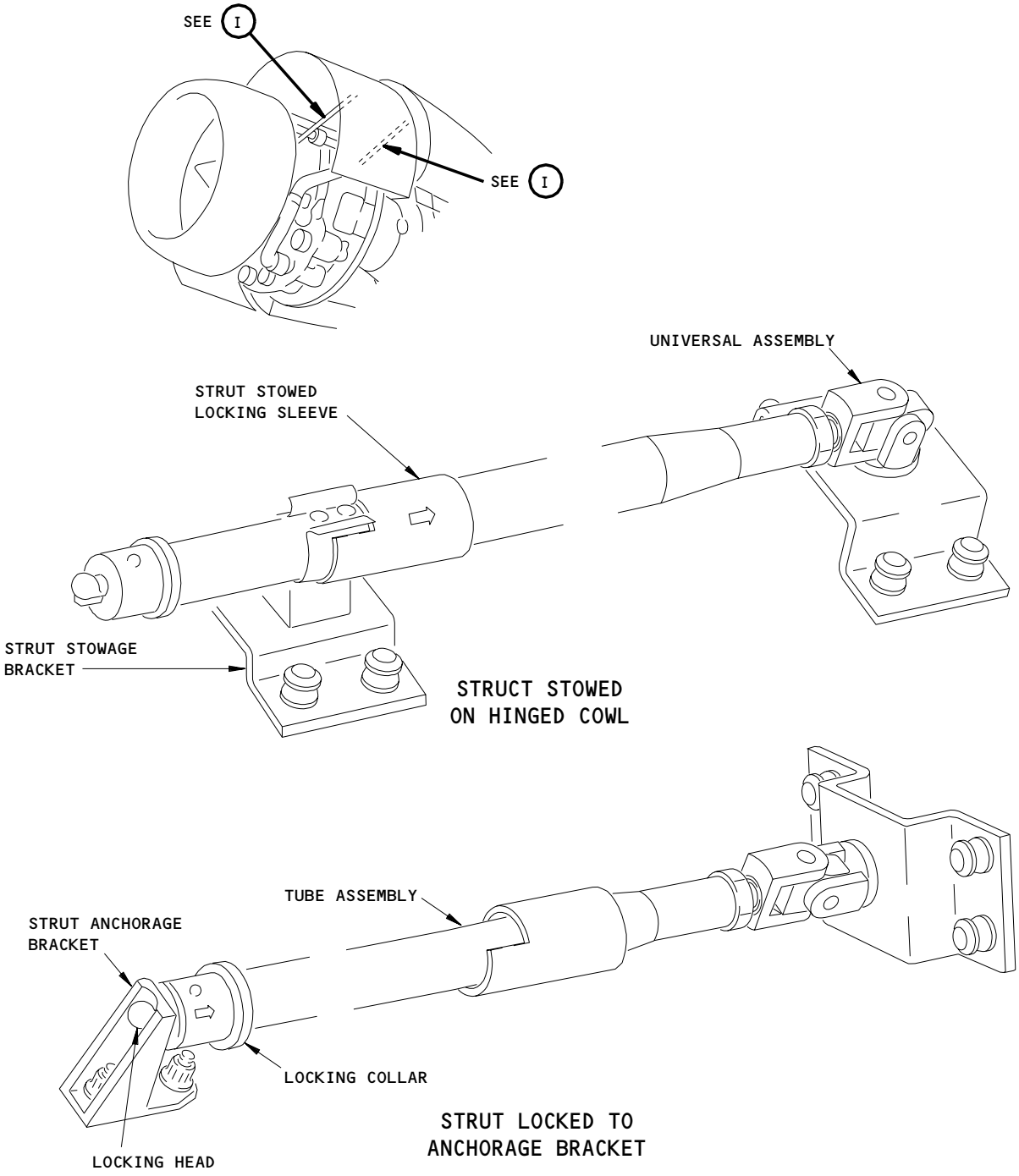
Fan Cowl Panels Inspection
Figure 601 (Sheet 4)



Fan Cowl Panels Inspection
Figure 601 (Sheet 5)

S 226-019-R00
(3) Examine the contact strips of the lightning strike protection for damage.
    (a) Make sure each strip is attached correctly.

S 226-020-R00
(4) Examine the special contact strip of the lightning strike protection for damage.
    (a) Make sure each special contact strip is attached correctly.

S 226-021-R00
(5) Examine the jumper cables for damage.
    (a) Make sure each cable is attached correctly.

S 226-022-R00
(6) Examine the top metal seal for cracks and distortion.

S 226-023-R00
(7) Examine the forward and rearward edges of the fan cowl panel for erosion.

S 226-024-R00
(8) Examine the access doors that follow for damage caused by rubbed areas, cracks and gouges:
    (a) The access door for the oil filler of the integral drive generator (IDG).
    (b) The access door of the starter.
    (c) The access door of the chip detector.
    (d) The access door of the oil filler.

S 226-013-R00
(9) Examine all access door hinges and latches for cracks, gouges and damage caused by rubbed areas.

S 226-014-R00
(10) Examine the striker plates for the access door of the oil filler for damage.

S 226-025-R00
(11) Examine the hinges and heatshields of the fan cowl panels for cracks and damage caused by rubbed areas.

S 226-026-R00
(12) Examine the parts of the fan cowl panel that follow for cracks and damage caused by rubbed areas.
    (a) The latches.

(b) The latch housings.
(c) The latch hooks.
(d) The eyebolts.

S 226-027-R00
(13) Examine the support struts and the parts that attach the support struts for the conditions that are listed below:
(a) Damage caused by rubbed areas
(b) Cracks
(c) Distortion
(d) Free movement.

S 226-028-R00
(14) Examine the lower rubber seal of the panel for the fan cowl for tears and distortion.

S 226-029-R00
(15) Examine the outlet seal of the gearbox breather for tears and distortion.

S 226-030-R00
(16) Examine the paint on the external surface of the fan cowl panel.

S 226-031-R00
(17) Do an inspection of the engine firewall and the inlet cowl where it touches the fan cowl panels as follows:
(a) Examine the locations areas for surface damage.
(b) Examine the location areas for cracks.

S 226-032-R00
(18) Inspection standards for the fan cowl panel (Fig. 601 Sheet 1):
(a) In Zone A, look for holes in the foil.
1) A single hole with an area not more than 144 square inches (929 sq cm) is permitted.
2) If the damage is more than the permitted limits, replace the fan cowl panel (AMM 71-11-04/401).
(b) In all Zones, look for holes in the foil.
1) These are the limits for all holes in the foil on the fan cowl panel.
a) The area of each hole cannot be more than 9.0 square inches (58.0 sq cm).
b) A minimum of 6.0 inches (152.40 mm) of serviceable foil between the holes.
c) Not more than four holes in an area of 4.0 square feet (3716 sq cm).
2) If the damage is more than the permitted limits, replace the fan cowl panels (AMM 71-11-04/401).
(c) In Zone B, look for tears in the foil.
1) These are the limits for all tears in the foil on the fan cowl panel.
a) A maximum of two tears in the foil.

b) The length of the tears cannot be more than 12.0 inches (304.80 mm).
c) The width of the tears cannot be more than 1/8 inch (3.175 mm).
d) The tears cannot connect with other damage.
e) The distance between tears must be more than 36.0 inches (914.40 mm).

2) If the damage is more than the permitted limits, replace the fan cowl panel (AMM 71-11-04/401).

(d) In Zone C, look for tears in the foil.
1) These are the limits for tears in the foil in Zone C.
a) The length of the tears cannot be more than 12.0 inches (304.80 mm).
b) The width of the tears cannot be more than 1/8 inch (3.175 mm).
c) The tears cannot connect with other damage.
more than 12.0 in (304.80 mm) apart, ACCEPT.
d) The distance between the tears must be more than 12.0 inches (304.80 mm).
2) If the damage is more than the permitted limits, replace the fan cowl panel (AMM 71-11-04/401).
(e) In Zone D, look for tears in the foil.
1) These are the limits for tears in the foil in Zone D.
a) The length of the tears cannot be more than 12.0 inches (304.88 mm).
b) The width of the tears cannot be more than 1/8 inch (3.175 mm).
c) The tears cannot connect with other damage.
d) The distance between the tears must be more than 24.0 inches (609.60 mm).
2) If the damage is more than the permitted limits, replace the fan cowl panels (AMM 71-11-04/401).
(f) Look for blisters in the foil.
1) For blisters on all of the foil area, ACCEPT.
(g) Look for anti-chafe strips that are loose.
1) All loose anti-chafe strips must be removed.
(h) Look for anti-chafe strips that are missing.
1) If less than a 2 foot length that cannot be found on the fan cowl panel, ACCEPT.
2) If the damage limits are more than the permitted limits, do the repair procedure that follows (AMM 71-11-04/801):
a) For the forward edge of the left panel of the fan cowl, do the procedure FRS6008.
b) For the rearward edge of the left panel of the fan cowl, do the procedure FRS6017.
c) For the forward edge of the right panel of the fan cowl, do the procedure FRS6029.
d) For the rearward edge of the right panel of the fan cowl, do the procedure FRS6030.

(i) In Zone E, examine the contact strips.
  1) Look for damaged contact strips.
    a) If there is continuity between the lightning strike foil and the contact strips, ACCEPT.
  2) Look for missing contact strips on the fan cowl panel.
    a) If one contact strip finger is missing from the rear edge, ACCEPT.
  3) If the damage is more than the permitted limits, do the repair procedure that follows (AMM 71-11-04/801).
    a) For the left panel of the fan cowl, do the procedure FRS6035.
    b) For the right panel of the fan cowl, do the procedure FRS6036.
    c) For the left panel of the fan cowl, with the special contact strips, do the procedure FRS6038.

(j) For the contact strips in all areas, not to include Zone E.
  1) Look for damaged contact strips.
    a) If there is continuity between the lightning strike foil and the contact strip, ACCEPT.
  2) Look for missing contact strips.
    a) On the forward and/or the rear edge, if continuity is between all other contact strips on that edge, ACCEPT.
  3) If the damage is more than the permitted limits, do the repair procedure that follows (AMM 71-11-04/801).
    a) For the left panel of the fan cowl, do the procedure FRS6035.
    b) For the right panel of the fan cowl, do the procedure FRS6036.

(k) Examine the the bonding leads.
  1) If one of the two leads that bond is broken on each latch and/or hinge, ACCEPT.
  2) If there is continuity between the lightning strike foil and the bus bar, ACCEPT.
  3) If the damage is more than the permitted limits, do the repair procedure that follows (AMM 71-11-04/801):

    a) For the left panel of the fan cowl, do the procedure FRS6040.
    b) For the right panel of the fan cowl, do the procedure FRS6054.

(l) Examine the upper metal seal.
  1) Look for cracks in the upper metal seal.
    a) For the left panel of the fan cowl, do the procedure FRS6091 to replace the seal (AMM 71-11-04/801).
    b) For the right panel of the fan cowl, do the procedure FRS.6090 (AMM 71-11-04/801) to replace the seal.
  2) Look for distortion of the upper metal seal.
    a) For the left panel of the fan cowl, do the procedure FRS6091 (AMM 71-11-04/801) to replace the seal.
    b) For the right panel of the fan cowl, do the procedure FRS.6090 (AMM 71-11-04/801) to replace the seal.

(m) Look for erosion of the edge.
  1) If the erosion is not more than 0.50 inch (12.7 mm) in length and 0.02 inch (0.5 mm) in depth, do the repair procedure that follows (AMM 71-11-04/801).
    a) For the left panel of the fan cowl, do the procedure FRS6100.
    b) For the right panel of the fan cowl, do the procedure FRS6101.
  2) If the erosion damage is more than the permitted limits, REJECT.

(n) Examine the access door of the oil filler of the Integrated Drive Generator (IDG).
  1) If any cracks are present - Reject
  2) Gouges or rubbed areas of not more than 0.01 inch (0.25 mm) in depth - Accept.
  3) Gouges or rubbed areas that are more than the permitted limits, do the repair procedure FRS6150 to replace the access door of the oil filter (AMM 71-11-04/801).
  4) The hinges and the latches must operate smoothly and move freely.
  5) If the hinges or the latches do not operate correctly, do the repair procedure FRS6150 (AMM 71-11-04/801).

(o) Examine the access door of the oil filler.
  1) If any cracks are present - Reject.
  2) Gouges or rubbed areas that is not more than 0.01 inch (0.25 mm) in depth - Accept.
  3) Gouges or rubbed areas that are more than the permitted limits, do the repair procedure FRS6171 (AMM 71-11-04/801).
  4) The hinges and the latches must operate smoothly and move freely.
    a) If the hinges are damaged, do the repair procedure FRS6171 to replace the hinges (AMM 71-11-04/801).
    b) If the latches are damaged, do the repair procedure FRS6170 to replace the latches (AMM 71-11-04/801).
  5) Missing or damaged striker plates.
    a) If the damaged striker plate does not allow you to close the door, do the repair procedure FRS6172 to replace the striker plate (AMM 71-11-04/801).

6) FAN COWLS POST-RR-SB 71-E072;
Damaged or broken hold open spring clips (Fig. 602):
a) If one hold open spring clip is damaged or broken - Accept. Replace damaged or broken spring clip at some subsequent time, not to exceed C check.
b) If both hold open spring clips are damaged or broken - Replace spring clips immediately.

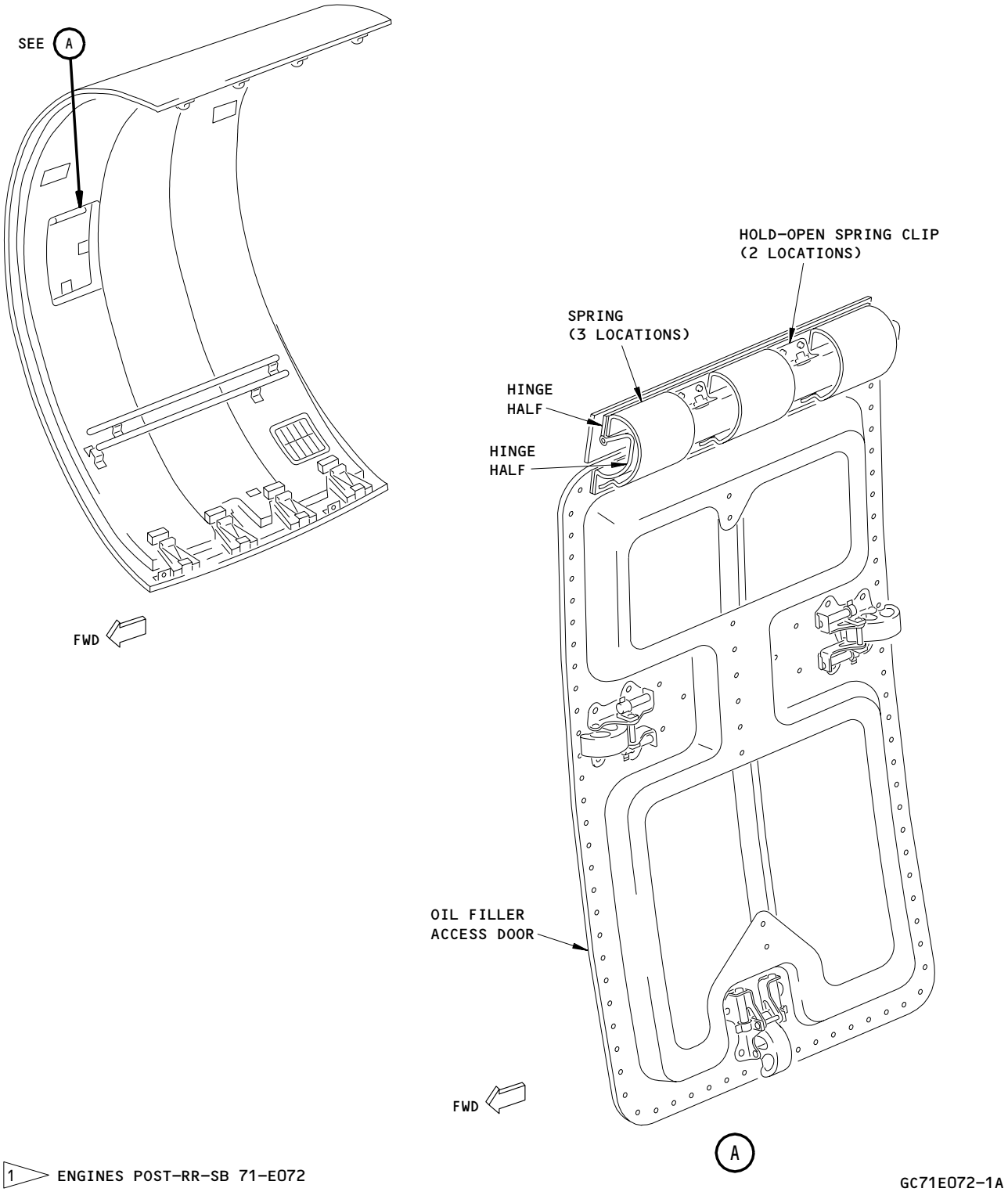
(p) Examine the starter access door.
1) If any cracks are present - Reject.
2) Gouges or rubbed areas that are not more than 0.01 inch (0.25 mm) in depth - Accept.
3) Gouges or rubbed areas that are more than the permitted limits - Reject.
4) The hinges and the latches must operate smoothly and must move freely.

(q) Examine the access door of the chip detector.
1) If any cracks are present - Reject.
2) Gouges or rubbed areas that are not more than 0.01 inch (0.25 mm) in depth - Accept.
3) Gouges or rubbed areas that are more than the permitted limits - Reject.
4) The hinges and the latches must operate smoothly and must move freely.

(r) Examine the hinges of the fan cowl panel.
1) If any cracks are present - Reject.
2) Hinge bushing damage caused by a rubbed area not more than 0.005 inch (0.127 mm) - Accept.
3) If the damage caused by a rubbed area is more than the permitted limits, do the repair procedure FRS6207 (AMM 71-11-04/801).

(s) Examine the heatshields.
1) Cracks that are not more than 2.0 inch (50.8 mm) - Stop drill and Accept.
2) Cracks more than 2.0 inch (50.8 mm) - Reject.

(t) Examine the latches of the fan cowl panel.
1) If any cracks are present - Reject.
2) Examine the latch hooks and the point where the eyebolt touches.
a) Fretting that is not more than 0.01 inch (0.25 mm) - Accept.
b) Fretting that is more than the permitted limits - Reject.
3) Examine the striker plates of the latch.
a) Damage caused by a rubbed area that is not more than 0.03 inch (0.76 mm) - Accept.
b) Damage caused by a rubbed area that is more than the permitted limits - Reject.
4) Examine the latch guard brackets.
a) Cracks that are not more than 2.0 inch (50.8 mm) - Stop drill and Accept.
b) Cracks that are more than 2.0 inch (50.8 mm) - Reject.



Fan Cowl Panel Oil Filler Access Door Hinge Spring Clip Inspection
Figure 602

(u) Examine the support strut.
  1) Cracks in any part of the support strut - Reject.
  2) Examine the stowed locking sleeve of the support strut.
    a) Scratches, scrapes or nicks that are not more than 0.02 inch (0.508 mm) in depth - Accept.
    b) Scratches, scrapes or nicks that are more than the permitted limits - Reject.
    c) The locking collar must operate smoothly and must move freely.
    d) The locking collar must not have too much play.
  3) Examine the tube assembly.
    a) Nicks and gouges that are not more than 0.01 inch (0.25mm) in depth - Accept.
    b) Nicks and gouges that are more than the permitted limits - Reject.
  4) The universal assembly must operate smoothly and must move freely.
    a) The universal must not have too nuch play.
  5) Examine the locking head.
    a) Nicks, gouges or rubbed areas that are not more than 0.015 inch (0.381 mm) in depth - Accept.
    b) Nicks, gouges or rubbed area that is more than the permitted limits - Reject.
  6) Cracks or distortion in the strut stowage bracket and clip - Reject.
  7) Cracks or distortion in the strut mounting bracket - do the repair procedure that follows:
    a) Do FRS6247 to replace the strut mounting bracket for the left panel of the fan cowl (AMM 71-11-04/801).
    b) Do FRS6248 to replace the strut mounting bracket for the right panel of the fan cowl (AMM 71-11-04/801).

(v) Examine the lower rubber seal of the left panel of the fan cowl.
  1) If more than 75% of the seal can be found on the fan cowl panel - Accept.
  2) If not more than 25% of the seal is torn - Accept.
  3) If the quantity of the seal that has a tear is more than the limits permitted, replace the seal.
  4) If the amount of the seal that cannot be found is more than the limits permitted, replace the seal.

(w) Examine the outer seal of the gearbox breather.
  1) If more than 75% of the seal can be found on the fan cowl panel - Accept.
  2) If not more than 25% of the seal has a tear - Accept.
  3) If the amount of the seal that has a tear is more than the permitted limits - Replace the seal.
  4) If the amount of the seal that cannot be found is more than the permitted limits - Replace the seal.

(x) Examine the external surface of the fan cowl panel.
  1) The external surface paint that is damaged does not have an effect on the structural strength of the cowl.

2) Do the repair procedure FRS6400 to apply paint to the external surface of the fan cowl panel (AMM 71-11-04/801).

F. Put the Airplane Back To the Usual Condition.

S 146-007-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Close the fan cowl panels (AMM 71-11-04/201).

FAN COWL PANELS - APPROVED REPAIRS

1. General
   A. This procedure has 28 tasks to repair the fan cowl panel. The list of these tasks follows:

Paragraph Number	Repair Number	Title
2.	FRS.6020/ FRS.6021	Left and Right Fan Cowl Panel - Repair Damage to Aluminum Foil Lining
3.	FRS.6008/ FRS.6029	Left and Right Fan Cowl Panel, Forward Edge - Anti-Chafe Strip Replacement
4.	FRS.6017/ FRS.6030	Left and Right Fan Cowl Panel, Rearward Edge - Anti-Chafe Strip Replacement
5.	FRS.6035/ FRS.6036	Lightning Strike Protection, Left and Right Fan Cowl Panel - Contact Strip Replacement
6.	FRS.6038	Lightning Strike Protection, Left Fan Cowl Panel - Special Contact Strip Replacement
7.	FRS.6040	Left Fan Cowl Panel - Jumper Cable (Bonding Lead) Replacement
8.	FRS.6054	Right Fan Cowl Panel - Jumper Cable (Bonding Lead) Replacement
9.	FRS.6090/ FRS.6091	Left and Right Fan Cowl Panel - Upper Metal Seal Replacement

10.	FRS.6100/ FRS.6101	Left and Right Fan Cowl Panel - Repair of Edge Erosion
11.	FRS.6150/1	Left Fan Cowl Panel - I.D.G. Oil Filler Access Door Replacement
12.	FRS.6150/2	Left Fan Cowl Panel, I.D.G. Oil Filler Access Door - Hinge Replacement
13.	FRS.6170	Right Fan Cowl Panel, Oil Filler Access Door - Latch Replacement
14.	FRS.6171	Right Fan Cowl Panel - Oil Filler Access Door Replacement
15.	FRS.6172	Right Fan Cowl Panel, Oil Filler Access Door - Latch Wear Strip Replacement
16.	FRS.6206	Fan Cowl Panel Hinges - Bushing Replacement
17.	FRS.6247/ FRS.6248	Left and Right Fan Cowl Panel - Strut (Hold Open Rod) Mounting Bracket Replacement
18.	FRS.6400	Restoration of Surface Protection and Finish for the Thrust Reverser, Inlet Cowl and the Fan Cowl Panels
19.	FRS.6245/ FRS.6246	Left and Right Fan Cowl Panel - Strut Assembly (Hold Open Rod) Stowage Bracket Replacement
20.	FRS.6301	Right Fan Cowl Panel, Oil Filler Access Door - Temporary Repair

21.	FRS.6015	Fan Cowl Panel - Repair of Latch Surround Ares
22.	FRS.6076/1	Left Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
23.	FRS.6076/2	Left Fan Cowl Panel - Repair of Corner Delamination
24.	FRS.6077/1	Right Fan Cowl Panel - Repair of Erosion and Impact Damage
25.	FRS.6077/2	Right Fan Cowl Panel - Repair of Corner Delamination
26.	FRS.6098	Left Fan Cowl - Repair of Damage to Edges of Access Door
27.	FRS.6099	Right Fan Cowl - Repair of Damage to Edges of Access Door
29.	FRS.6112	Left and Right Fan Cowl Panel - Repair of Lightning Strike Conductor

TASK 71-11-04-308-001-R00

2. Left and Right Fan Cowl Panel - Repair Damage to the Aluminium Foil Lining

A. General

(1) The repairs in this procedure are FRS6020 and FRS6021. Use FRS6020 for the left fan cowl panel and FRS6021 for the right fan cowl panel.

(2) This procedure gives the instructions for the repair of damaged aluminium foil and the application of a protective shield.

(3) This repair can be used for the fan cowl panel part numbers that follow:

Left Fan Cowl Panel - LJ71467, LJ71567, LJ71717

Right Fan Cowl Panel - LJ71468, LJ71568, LJ71718

(4) Refer to the Structural Repair Manual for the repair procedure for damaged structure.

(5) Refer to Rolls-Royce Service Bulletins that follow:

RR SB 71-7122 Power Plant - Left and Right Fan Cowl Panels, Introduction of Starter Exhaust Heatshields

B. Consumable Materials
(1) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(2) Silicone Compound (Silcoset 152)
OMat No. - 872
(3) Silicone Compound (RTV102)
OMat No. - 872B
(4) Primer (Silcoset O.P.1)
OMat No. - 876A
(5) Abrasive paper (60 grade)
OMat No. - 5/67
(6) Abrasive paper (80 grade)
OMat No. - 5/66
(7) Aluminum foil tape - Local resources
(3M No.425, 4 inch and 18 inch widths, 60 yd (55 m) roll)
3M Co. Ltd., 3M House
Bracknell, Berkshire, RG12 1JU, U.K.
or
3M's Company, 3M Center
St. Paul, Minnesota 55101, U.S.A.
(8) Potting Compound - Local resources
(Epocast H1843 Type 4 Grade B 9216 Catalyst)
M & T Chemicals Ltd.
5121 San Fernando Road West
Los Angeles, California, 90039, U.S.A.
(9) Primer (PR1436) - Local resources
Product Research and Chemical Company
Glendale, California, U.S.A.
(10) Lint free cloth - Local resources
(11) Conducting grid - Local Resources
(Aluminum ladder LJ71814)
1.5 in. (38.1 mm), 50 ft. (15m) roll
(12) Aluminium sheet - Local resources
(2024 temper 0)
0.020 in. (0.50 mm) thickness,
14.0 in. (355.6 mm) width,
28.0 in. (711.2 mm) length
(13) Permanent marker - Local resources
(14) Polyethene sheet - Local resources
C. Parts
(1) Rivet - NAS17384M4-2 or CR2539-4-2
(Non-preferred alternative NAS1398M4-2 or CR2563M4-2)
(2) Rivet - NAS1738M6-2 or CR2539-6-2
(Non-preferred alternative NAS1398M6-2 or CR2563M6-2)

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Repair of Damaged Aluminum Foil on the Fan Cowl Panels
(Fig. 801 and 802)

S 978-023-R00
(1) Make a record of all stencilled instructions in area of foil to be repaired.

S 358-024-R00
(2) Carefully cut and remove the damaged foil with hand tools.

S 028-037-R00
(3) If damage is 1.5 in. (38.0 mm) from the contactor and/or the bus-bar, do the steps that follow:
(a) Remove the left fan cowl panel contactor (FRS 6035 and 6038) and/or the bus-bar (FRS 6040).
(b) Remove the right fan cowl panel contactor (FRS 6036) and/or the bus-bar (FRS 6054).

S 118-232-R00

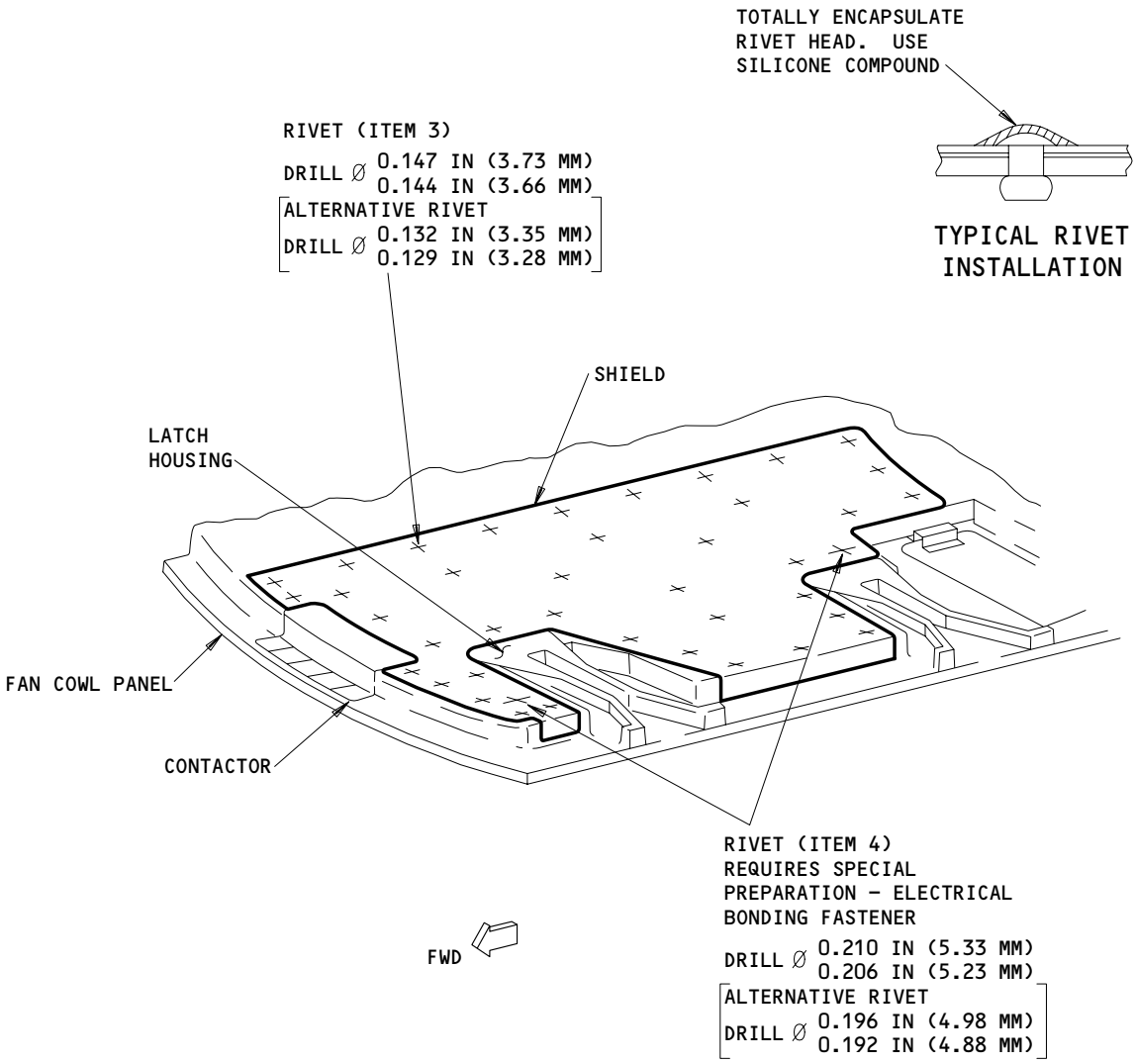
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING FLUID. PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN YOU USE DEGREASING FLUID. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAME, AND HEAT. THE DEGREASING FLUID CAN CAUSE INJURIES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

(4) Use degreasing fluid to remove the grease from the damaged area.

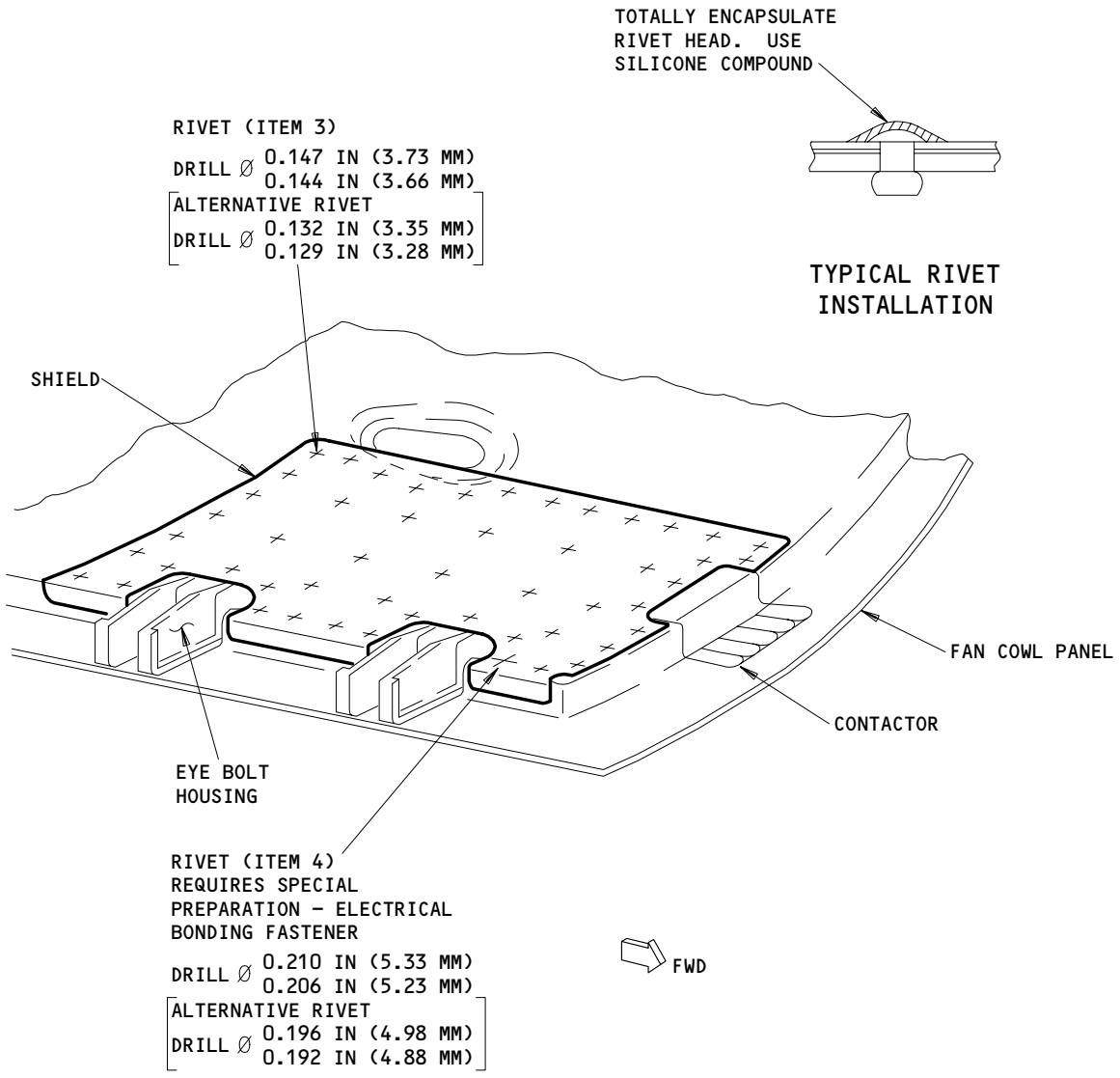
S 128-233-R00
(5) Lightly abrade the damaged area with abrasive paper to remove the paint.

NOTE: To keep the repair area to a minimum, be careful not to damage the aluminium foil that remains when the damaged area is abraded with abrasive paper.

(a) All paint must be removed from an area of 3.0 in. (76.2 mm) around the damaged area for electrical jointing.



Right Fan Cowl Panel - Protective Shield Installation
Figure 801



Left Fan Cowl Panel - Protective Shield Installation
Figure 802

S 118-146-R00
(6) Use a clean lint-free cloth that is moist with Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean and make the damaged area clean.

S 358-029-R00
(7) Cut the foil tape to make a patch that is not more than 0.5 inch (12.7 mm) undersize.
  (a) The patch can be made in one or more pieces.
  (b) All joint lines must be connected with the conducting grid.

S 428-030-R00
(8) Put the patch in the position.
  (a) Firmly push a roller over the patch to make sure there is no air under the patch.

S 428-031-R00
(9) Install the conducting grid as follows:
  (a) First Method
    1) Cut the conducting grid to the necessary size to cover the foil joint lines.
      a) Do not let the conducting grid cover the other conducting grids.
      b) Put the conducting grid into a position to equally displaced across the foil joint line interface.
    2) Make sure the conducting grids do not move.
      a) Put a 4 inch (101 mm) wide aluminum tape over the conducting grids.
      b) Firmly push a roller over the foil tape to make sure there is no air under the tape.
  (b) Second Method
    1) Cut the conducting grid to the necessary size.
    2) Put the conducting grid on strips of aluminum foil tape.
      a) Use a clean sheet of polythene and cover the grid and the tape.

b) Firmly push a roller over the polyethene sheet to roll the grid on the tape.
c) Remove the polythene sheet.

3) Put the tape strip in the correct position.
a) Firmly push the roller over the tape strips.

S 218-038-R00

(10) Examine the repair for air bubbles.
(a) If necessary, pierce the foil air bubbles and firmly push a roller over the foil tape to make sure there is no air under the tape.

S 118-032-R00

(11) Use Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean to remove the grease on all the open foil edges and pierce marks.

S 378-033-R00

(12) Apply a thin layer of Silcoset primer on the foil edges and the pierce marks.
(a) Let the primer dry for 30 minutes.

S 398-034-R00

(13) Apply silicone compound to seal the foil edges and pierce marks.
(a) Let the compound dry for 2 hours.

S 378-036-R00

(14) Find the record of the stencilled instructions.
(a) Stencil the instructions on the repair area of the fan cowl panel.

S 938-035-R00

(15) Use a permanent marker pen and write the repair number next to the part number of the fan cowl panel part number.
(a) The color of the marker must contrast with the color of the panel.

(b) Use FRS6020/1 on the left fan cowl panel and FRS6021/1 on the right fan cowl panel.

S 428-120-R00

CAUTION: DO NOT LET WATER GET IN THE CARBON FIBER HONEYCOMB PANEL. CORROSION OF THE HONEYCOMB STRUCTURE WILL OCCUR.

(16) Apply a Protective Shield to the Fan Cowl Panels
(a) Remove the bus-bar(s) as follows:
1) On the left fan cowl panel,
drill out all rivets from bus-bar located at approximately 3.0 in. (76.0 mm) rearward of the lower forward edge of the panel.
2) On the right fan cowl,
drill out all the rivets from the bus-bars located approximately 3.0 in. (76.0 mm) and 19.0 in. (482.00 mm) rearward of the lower forward edge of the panel.
3) Remove the bus-bar(s).
(b) Move the latch jumper cable(s) away from the repair area.
(c) On the left fan cowl panel,
remove the label plate that is installed approximately 24 in. (610.0 mm) rearward of the lower forward edge of the fan cowl panel.
1) Drill out the rivets and keep the plate for the installation.
(d) Carefully push the rivet parts that remain to the bottom of the cell cavity in the fan cowl panel.
1) Put the potting compound over the rivets.
2) Fill the holes in the panel surface with potting compound and make the surface smooth.
(e) Make a record of all stencilled instructions in the area of the repair.

WARNING: WHEN YOU USE DEGREASING FLUID MAKE SURE THE WORK AREA HAS A GOOD FLOW OF AIR. DO NOT LET THESE MATERIALS COME INTO CONTACT WITH YOUR SKIN. DO NOT BREATHE THE GAS FROM THESE MATERIALS. THESE MATERIALS CAN CAUSE INJURIES TO YOU.

(f) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to remove the grease on the aluminum foil repair area.
1) Make the repair area clean plus 1.0 inch (25.4 mm) around the repair area.

(g) Make the shield from the aluminum sheet and shape the shield to the contour of the inner surface of the fan cowl panel follows:
  1) For left fan cowl panel (Fig. 801), cut the shield to clear the latch attachment flanges, contactors and gearbox exhaust duct.
    a) Shape the 0.50 in. (12.7 mm) flange on the lower edge.
  2) For right fan cowl panel (Fig. 802), cut the shield to clear the latch attachment flanges, contactors and access door.
  3) Shape the 0.50 in. (12.7 mm) flange on the lower edge.
(h) Find the position of the rivet holes in the shield.
(i) Drill the rivet holes at 0.50 in. (12.7 mm) edge distance, 2.00 in. (50.8 mm) pitch and with a field spacing of 3.50 in. (88.9 mm).
(j) Make the edges of the shield smooth.

CAUTION: DO NOT DAMAGE THE FAN COWL PANEL EXTERNAL SKIN WHEN THE RIVET HOLES ARE DRILLED IN THE INTERNAL SKIN.

(k) Put the shield on fan cowl panel in the correct position.
(l) Drill the rivet holes through the internal skin.
(m) Remove the shield.
(n) Remove all the swarf from the area and the cell cavity in the fan cowl panel.
(o) Use Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean to remove the grease from the area of the fan cowl panel rivet holes.
(p) Apply primer (PR1436) to the inside of the rivet holes in fan cowl panel.
(q) To make sure there is a good electrical contact, abrade the inner side of shield and foil surface to a polished finish where the jumper cable(s) is attached.
(r) Use a clean lint-free cloth that is moist with Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean and remove grease from the inner side of the shield and the foil surface.

(s) Put the shield in the correct position.
1) Install the rivets with the wet primer (PR1436).

NOTE: Start at the center and move to the edges.

(t) Put the jumper cable(s) in the correct position and install the rivets with wet primer (PR1436).
(u) For the left fan cowl panel, do these steps:
1) Use Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean to remove grease from the lable plate.
2) Put the label plate in approximately the same position before the plate was removed.
3) Install the rivets with wet primer (PR1436).
4) Apply a thin layer of Silcoset primer to the label plate edges.
a) Let the primer dry for 30 minutes.
5) Seal the label plate edges with silicone compound.
a) Let the compound cure for 2 hours.
(v) Apply a thin layer of Silcoset primer to all rivet heads and shield edges.
1) Let the primer dry for 30 minutes.
(w) Seal all the rivet heads and shield edges with silicone sealant.
1) Let the compound cure for 2 hours.
(x) Apply the stencilled instructions that were recorded.

S 218-096-R00
(17) Make a visual examination of the completed repair.

S 938-097-R00
(18) Use a permanent marker pen and write the repair number next to the part number of the fan cowl panel.
(a) The color of the marker pen must contrast with the color of the fan cowl panel.
(b) Use FRS6020/2 for the left fan cowl panel and FRS6021/2 for the right fan cowl panel.

NOTE: If these instructions are used to do Rolls-Royce Service Bulletin 71-7122, identify the components as instructed in the Service Bulletin.

TASK 71-11-04-308-003-R00

3. Left and Right Fan Cowl Panel, Forward Edge - Anti-Chafe Strip Replacement

A. General

(1) The repairs in this procedure are FRS.6008 and FRS.6029. Use FRS.6008 for the left fan cowl panel and FRS.6029 for the right fan cowl panel.

(2) This procedure gives the instructions for the replacement of the anti-chafe strip on the forward edge of the fan cowl panels.

(3) If the damaged anti-chafe strip is attached with rivets, the replacement anti-chafe strip should be installed with rivets.

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:

(a) Use gloves when you use Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean to remove grease.

(b) Do not smoke when you use Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

(c) Acetone or Isoproyl alcohol or cleaning solvent Desoclean are very flammable. Keep this material away from flame or ignition sources.

(d) Use Acetone or Isopropyl alcohol or cleaning solvent Desoclean in work areas that have a good flow of air.

(e) Use epoxy compounds in work areas that have a good flow of air.

(f) Do not let epoxy compounds come in contact with your skin.

(g) Use sealants in work areas that have a good flow of air.

(h) Do not let sealants come in contact with your skin.

B. Equipment

(1) Hand Grinders

(2) Infra-red heat lamps (explosion proof)

(3) Drills and drill equipment
(4) Rivet equipment

C. Consumable Materials
(1) Adhesive (EA9309.3) - Local resources
Hysol Co.,
Hayward, California, U.S.A.
(2) Aluminum oxide abrasive paper (Grade 180) - Local Resources
OMat No. - 5/62
(3) Mushroom sanding disc - Local resources
(50 mm. dia., 150 grit)
(4) Lint free cloth - Local resources
(5) White cotton gloves - Local resources
(6) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(7) Plastic release film - Local resources
(8) Sealant (PR1436GB2)
Products Research Chemical Corp.,
Glendale, California, U.S.A.
OMat No. - 8/107A

D. Parts
(1) Anti-chafe strip (Item 1) - 0.010 inch thick, LJ71827
(2) Anti-chafe strip (Item 2) - 0.031 inch thick, LJ71833
(3) Rivet (Item 4) - NAS1097B3-4, (RR1012078)

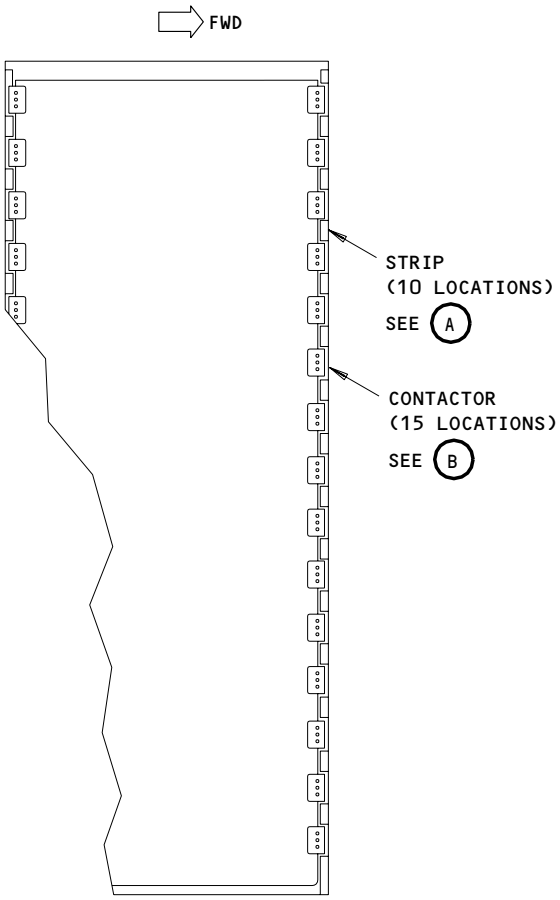
E. References
(1) AMM 71-11-01/801, Inlet Cowl

F. Access
(1) Location Zones

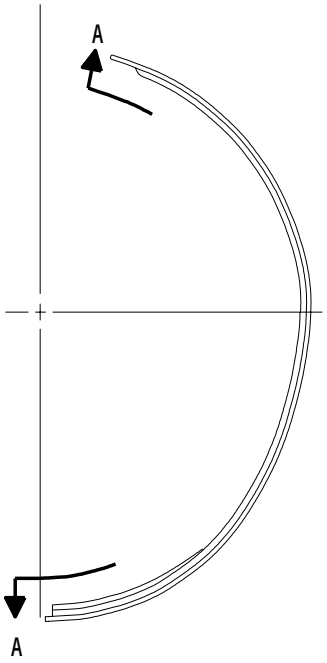
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

G. Procedure

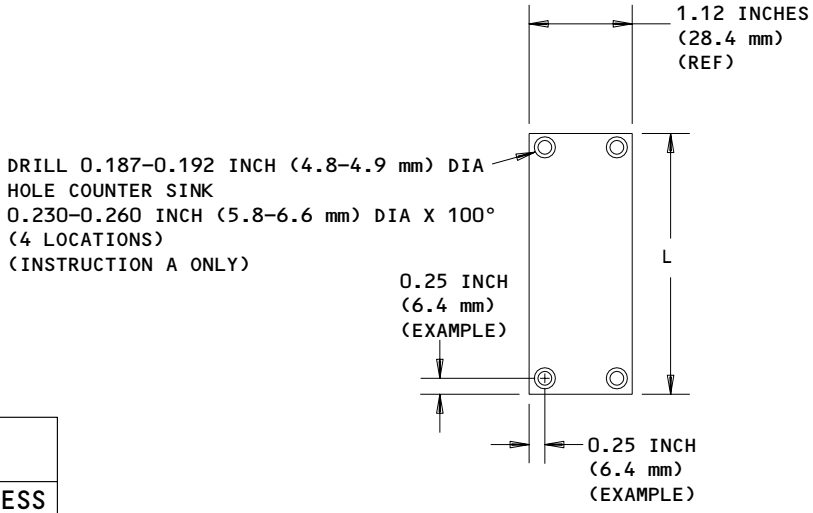
S 028-004-R00
(1) Remove the damaged anti-chafe strip.



(UNWRAPPED)
A-A



LEFT COWL PANEL LOOKING AFT
(RIGHT COWL PANEL ALMOST THE SAME)

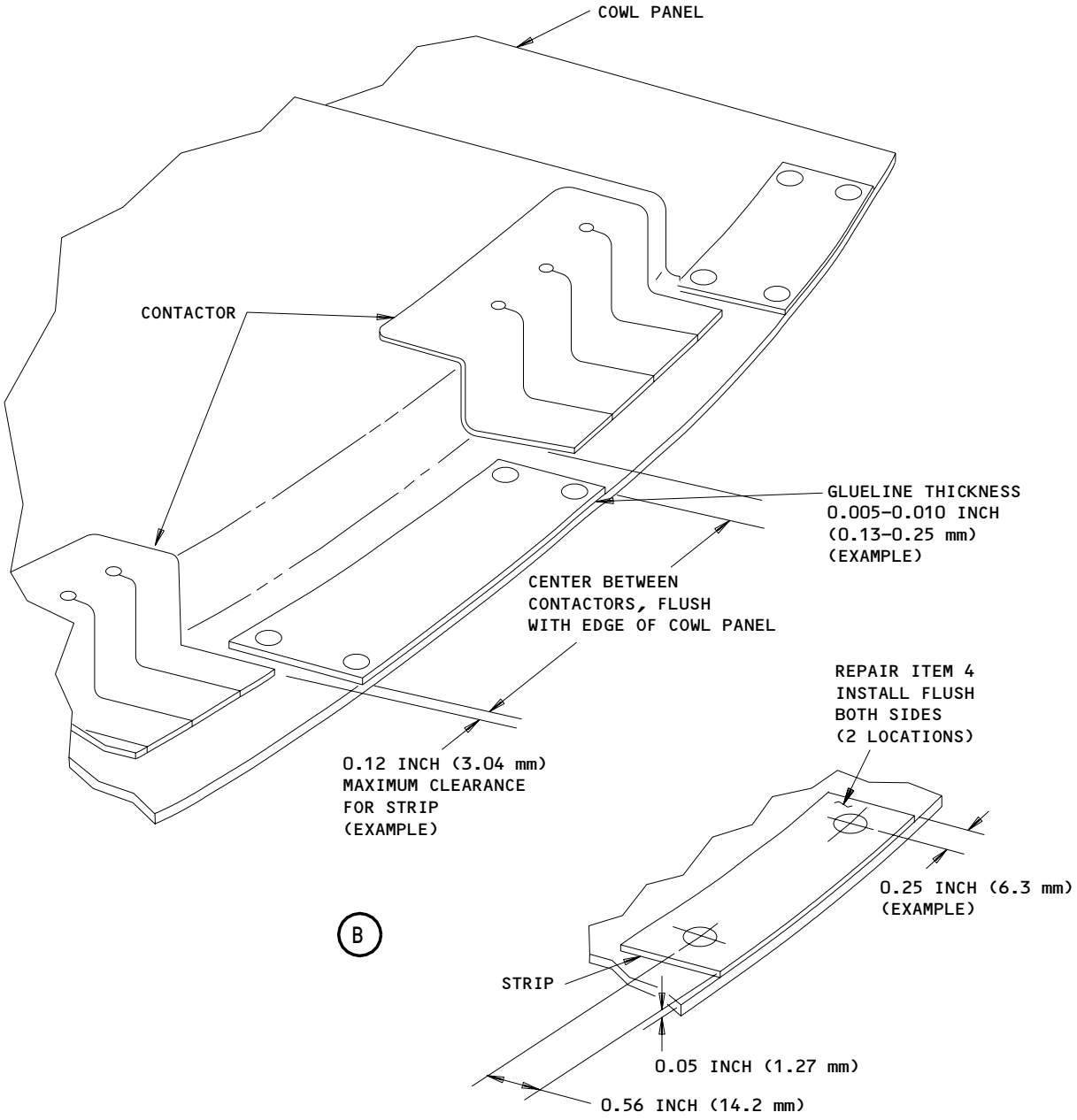


STRIP	
L INCH (mm)	MAT'L THICKNESS INCH (mm)
3.80 (96.5)	0.031 (0.79)

STRIP
(EXAMPLE)
A

55821A

Fan Cowl Panel, Forward Edge - Anti-Chafe Strip Replacement
Figfure 803 (Sheet 1)



ITEM	HOLE DIA INCH (mm)	CSK DIAX100° INCH (mm)
4	0.098 (2.48) 0.106 (2.96)	0.160 (4.06) 0.170 (4.31)

RIVET INSTALLATION

55846B

Fan Cowl Panel, Forward Edge – Anti-Chafe Strip Replacement
Figure 803 (Sheet 2)

(a) Use a drill to remove the anti-chafe strip attachment rivets.

WARNING: WHEN YOU CUT OR GRIND COMPOSITE MATERIALS, THE DUST PARTICLES FROM THE COMPOSITE MATERIALS CAN INJURE YOU. USE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES FOR PROTECTION. DO NOT BREATH THE DUST. DO NOT LET THE DUST COME IN CONTACT WITH YOUR SKIN FOR A LONG TIME.

(b) Use the hand grinder to carefully remove the damaged anti-chafe strip.
    1) Remove all the remaining pieces of the anti-chafe strip, rivets and old adhesive.
    2) Do not damage the surface of the fan cowl panel.

S 428-005-R00

(2) Install the replacement anti-chafe strip.

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(a) Make a check of the location on the fan cowl panel to find if the strip can be installed with rivets.
(b) Refer to Fig. 803. Find the anti-chafe strip that is necessary.
(c) Cut the replacement anti-chafe strip to the necessary length (Fig. 803).
(d) If rivets can not be used, use a drill and make countersunk holes in the anti-chafe strip (Fig. 803).
(e) Make the mating faces of the anti-chafe strip and the fan cowl panel rough with the abrasive paper.
(f) Remove all swarf from the area.
(g) Use a lint free cloth that is moist with MEK solvent and make the mating faces clean.
    1) Immediately make the area dry with a lint free cloth.
(h) Use the manufacturer's instructions to prepare the adhesive (EA9309.3).

NOTE: At room temperature, the adhesive that has been prepared can not be used after 40 minutes.

(i) Put the adhesive on the mating faces of the anti-chafe strip and the fan cowl panel.
(j) Put the anti-chafe strip in the correct position (Fig. 803).
(k) Use the adhesive to fill the countersunk holes in the anti-chafe strip or fill the rivet holes in the fan cowl panel.

NOTE: The anti-chafe strip must be bonded to the panel before the adhesive can not be used.

1) The filled holes must be smooth with the surface.
(l) Put plastic release film over the anti-chafe strip.
(m) Use a clamp and attach the anti-chafe strip to the fan cowl panel in the correct position.
1) Do not use too much pressure to keep the glueline thickness correct (Fig. 803).
(n) Let the adhesive dry at room temperature for 2 hours.
(o) After the adhesive has dried at room temperature, use an infra-red heat lamp to dry the adhesive for 1 - 2 hours at 60 - 82.2 C (140 - 180 F).
(p) If the anti-chafe strip can be attached with rivets, do the steps that follow:
1) Find the rivet hole positions in the fan cowl panel.
2) Use a drill and make holes in the anti-chafe strip at the same positions (Fig. 803).
a) Countersink both sides.
3) Carefully install the rivets with wet sealant (PR1436GB2).
a) Use the squeeze-type rivet equipment.

S 378-093-R00
(3) Do the procedure to put the fan cowl panel surface back to its usual condition (FRS6400) (AMM 71-11-01/801).

S 218-094-R00
(4) Make a visual inspection of the completed repair.

S 938-095-R00
(5) Use a permanent marker pen (contrast color) and write the repair number next to the fan cowl panel part number.
(a) Use FRS6008 on the left fan cowl panel and FRS6029 on the right fan cowl panel.

TASK 71-11-04-308-006-R00

4. Left and Right Fan Cowl Panel, Rearward Edge - Anti-Chafe Strip Replacement

A. General
   (1) The repairs in this procedure are FRS6017 and FRS6030. Use FRS6017 for the left fan cowl panel and FRS6030 for the right fan cowl panel.
   (2) This procedure gives the instructions for the replacement of the anti-chafe strip on the rearward edge of the fan cowl panels.
   (3) If the damaged anti-chafe strip is attached with rivets, the replacement anti-chafe strip should be installed with rivets.
   (4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
   (5) Be careful when you use the consumable materials for this repair:
      (a) Use gloves when you use degreasers.
      (b) Do not smoke when you use degreasers.
      (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
      (d) Use degreasers in work areas that have a good flow of air.
      (e) Use epoxy compounds in work areas that have a good flow of air.
      (f) Do not let epoxy compounds come in contact with your skin.
      (g) Use sealants in work areas that have a good flow of air.
      (h) Do not let sealants come in contact with your skin.

B. Equipment
   (1) Hand Grinder
   (2) Infra-red heat lamps (explosion proof)
   (3) Drills and hand drill equipment
   (4) Rivet equipment

C. Consumable Materials
   (1) Adhesive (EA9309.3) - Local resources
   Hysol Co.,
   Hayward, California, U.S.A.

(2) Aluminum oxide abrasive paper (Grade 180) - Local resources
OMat No. - 5/62
(3) Mushroom sanding disc - Local resources
(50 mm. dia., 150 grit)
(4) Lint free cloth - Local resources
(5) White cotton gloves - Local resources
(6) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning Solvent Desoclean OMat No. 1/257
(7) Plastic release film - Local resources
(8) Sealant (PR1436G32)
Products Research Chemical Corp.,
Glendale, California, U.S.A.
OMat No. - 8/107A

D. Parts
(1) Anti-chafe strip (Item 1) - 0.010 inch thick, LJ71827
(2) Anti-chafe strip (Item 2) - 0.031 inch thick, LJ71833
(3) Anti-chafe strip (Item 3) - 0.051 inch thick, LJ71834
(4) Rivet (Item 4) - NAS1097AD4-4, (RR2101675)
(5) Anti-chafe strip (Item 5) - 0.031 inch thick, LJ75510

E. References
(1) AMM 71-11-01/801, Inlet Cowl
(2) AMM 71-11-04/801, Fan Cowl Panel

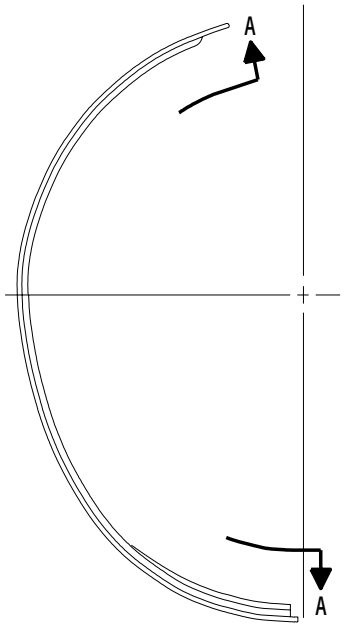
F. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

G. Procedure

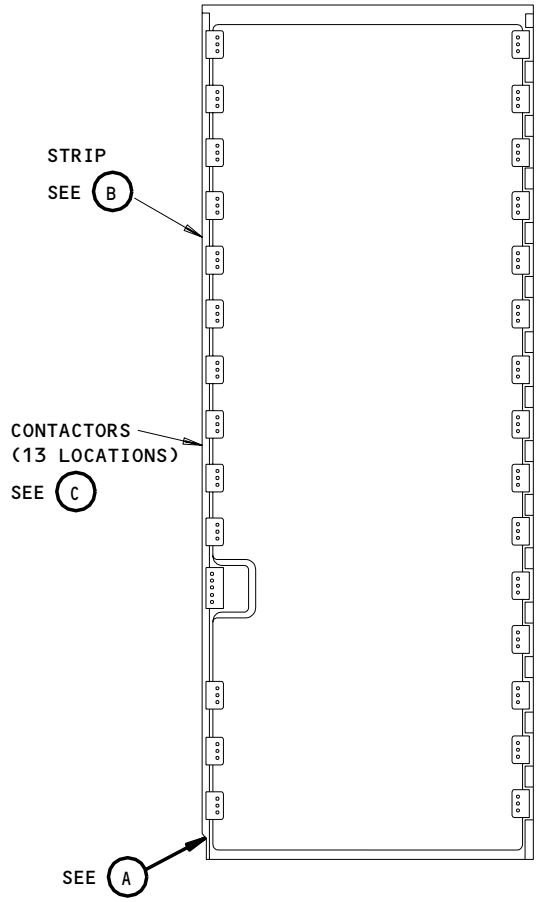
S 028-234-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Remove the damaged anti-chafe strip.

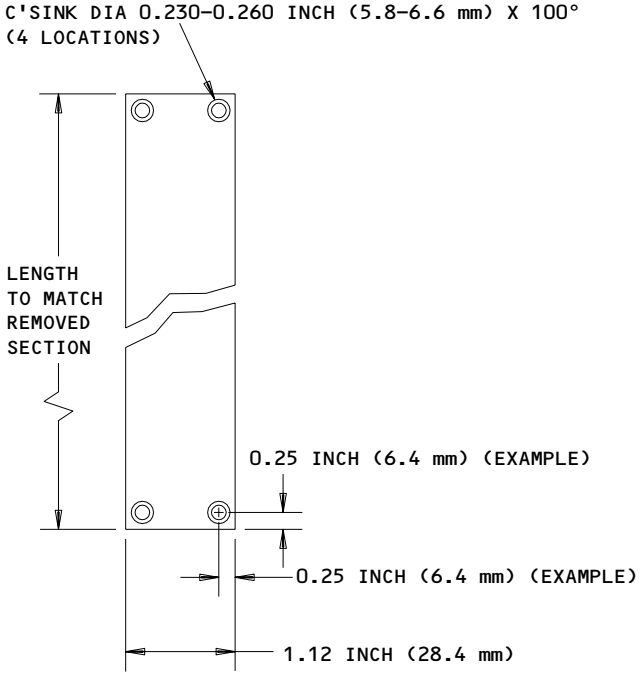


LEFT COWL PANEL
LOOKING FORWARD



(UNWRAPPED)
A-A

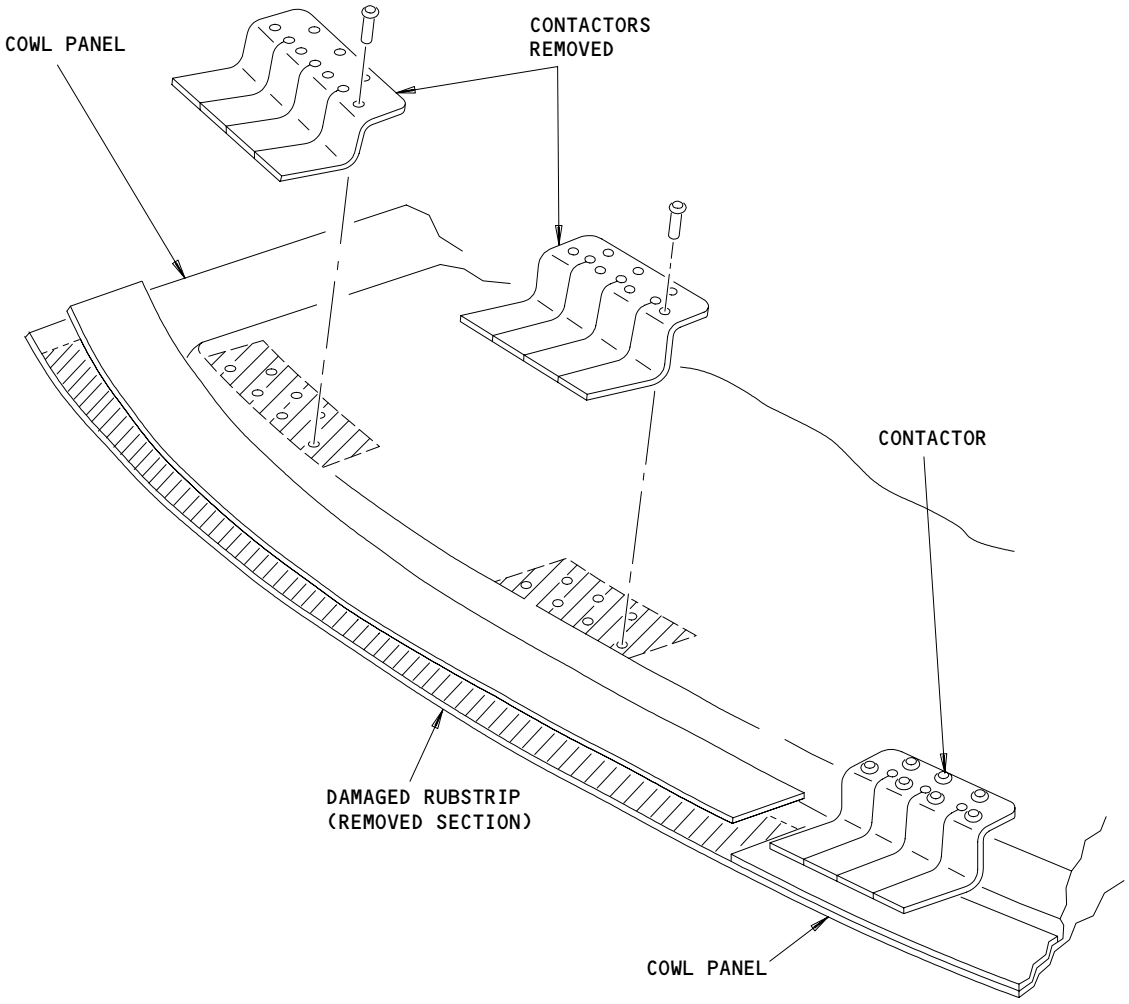
FWD



STRIP
(EXAMPLE)

55841A

Fan Cowl Panel, Aft Edge - Anti-Chafe Strip Replacement
Figure 804 (Sheet 1)



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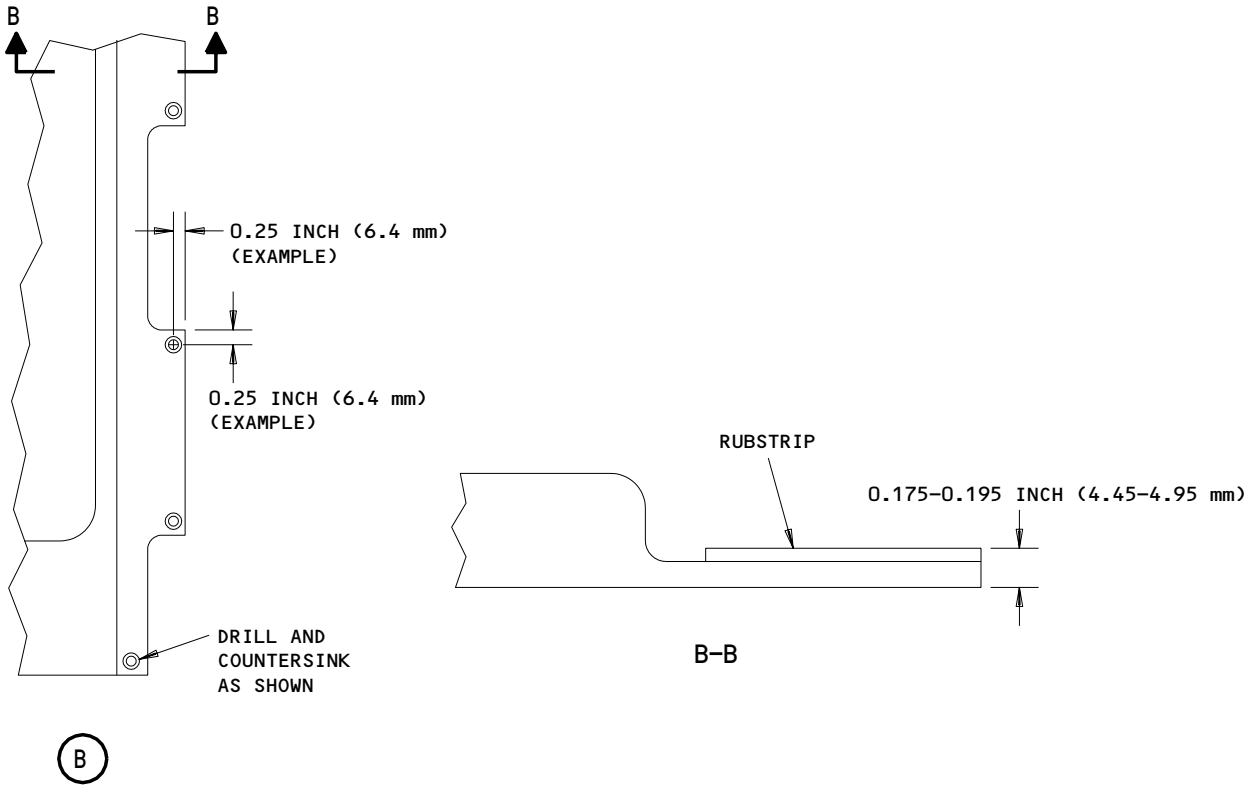
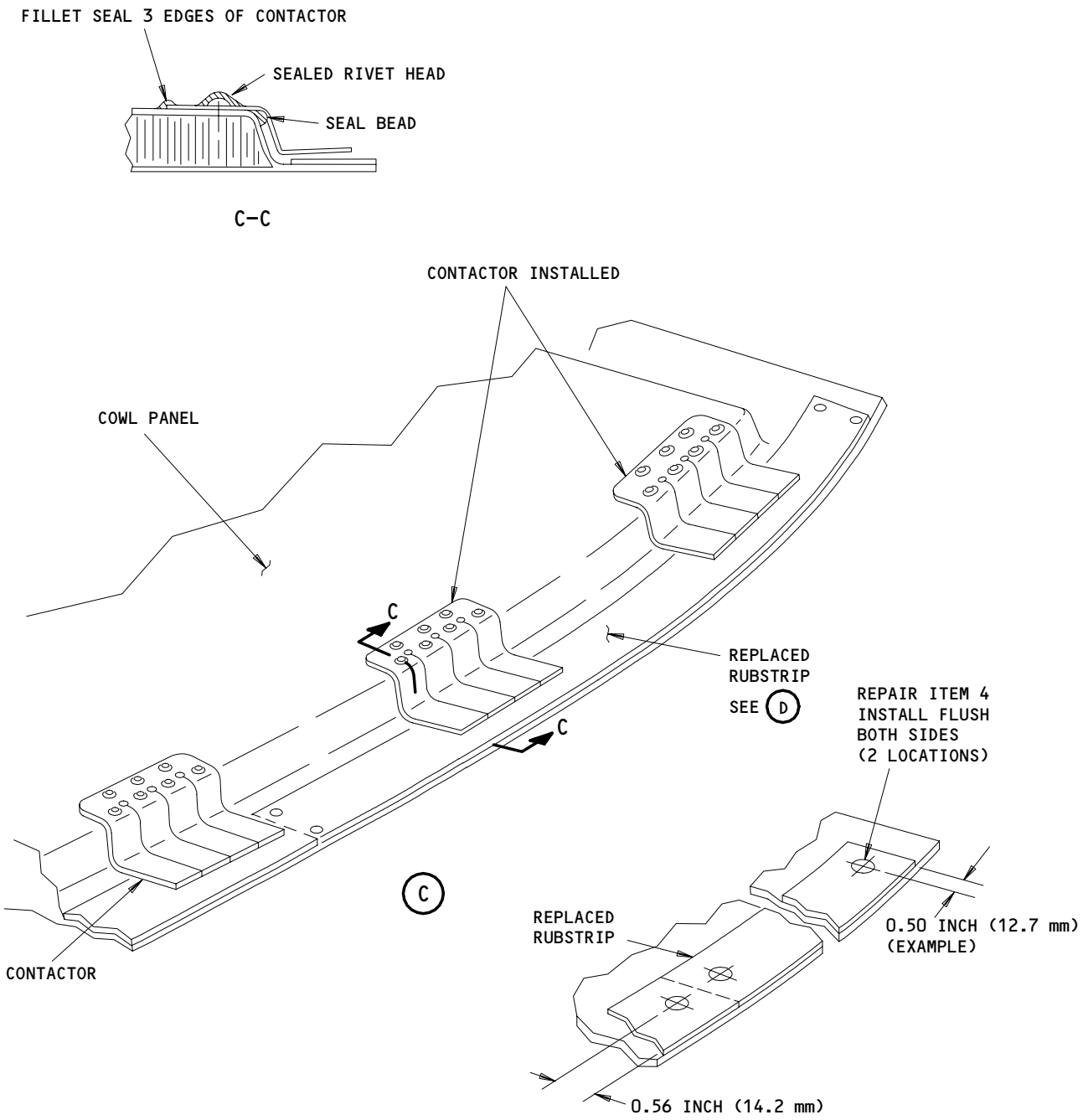
Fan Cowl Panel, Aft Edge - Anti-Chafe Strip Replacement
Figure 804 (Sheet 2)



STRIP	
REPAIR PART	THICKNESS
LJ75510	0.031 INCH (0.79 mm)

55850A

Fan Cowl Panel, Aft Edge – Anti-Chafe Strip Replacement
Figure 804 (Sheet 3)



Fan Cowl Panel, Aft Edge – Anti-Chafe Strip Replacement
Figure 804 (Sheet 4)

(a) Remove all contact strips that prevent the repair of the anti-chafe strip (Fig. 804).
    1) Identify each location on the fan cowl panel for each contact strip that must be removed.
    2) Drill out the anti-chafe strip attachment rivets where applicable.
    3) Remove the contact strip and keep it for the installation.
(b) Use a drill to remove the anti-chafe strip attachment rivets.

WARNING: WHEN YOU CUT OR GRIND COMPOSITE MATERIALS, THE DUST PARTICLES FROM THE COMPOSITE MATERIALS CAN INJURE YOU. USE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES FOR PROTECTION. DO NOT BREATH THE DUST OR LET THE DUST COME IN CONTACT WITH YOUR SKIN FOR A LONG TIME.

(c) Use the hand grinder to carefully remove the damaged anti-chafe strip.
    1) Remove all the remaining pieces of the anti-chafe strip, rivets and old adhesive.
    2) Do not damage the surface of the fan cowl panel.

S 428-142-R00

(2) Install the replacement anti-chafe strip.
(a) Make a check of the location on the fan cowl panel to find if the strip can be installed with rivets.
(b) Refer to Fig. 804 to find the anti-chafe strip that is necessary.
(c) Cut the replacement anti-chafe strip to the necessary length (Fig. 804).
(d) If rivets cannot be used, use a drill and make countersunk holes in the anti-chafe strip (Fig. 804).
(e) Make the mating faces of the anti-chafe strip and the fan cowl panel rough with abrasive paper.
(f) Remove all swarf from the area.
(g) Use a lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces clean.
    1) Immediately make the area dry with a lint free cloth.

(h) Use the manufacturer's instructions to prepare the adhesive (EA9309.3).

NOTE: At room temperature, the adhesive that has been prepared can not be used after 40 minutes.

(i) Put the adhesive on the mating faces of the anti-chafe strip and the fan cowl panel.
(j) Put the anti-chafe strip in the correct position (Fig. 804).
(k) Use the adhesive to fill the countersunk holes in the anti-chafe strip if rivets cannot be used to install the strip.

NOTE: The anti-chafe strip must be bonded to the panel before the adhesive can not be used.

(l) Put plastic release film over the anti-chafe strip.
(m) Use a clamp and attach the anti-chafe strip to the fan cowl panel in the correct position.
    1) Do not use too much pressure to keep the glueline thickness between 0.005 - 0.010 inch (0.13 - 0.25 mm).
(n) Let the adhesive dry at room temperature for 2 hours.
(o) After you dry the adhesive for 2 hours, use an infra-red heat lamp to dry the adhesive for 1 - 2 hours at 60 - 82.2 C (140 - 180 F).
(p) If the anti-chafe strip can be attached with rivets, do the steps that follow:
    1) Find the rivet hole positions in the fan cowl panel.
        a) Use a drill and make holes in the anti-chafe strip at the same hole positions.
        b) Countersink the rivet holes (Fig. 804).
    2) If there are no rivet holes in the fan cowl panel, drill holes and countersink both sides as shown (Fig. 804).
    3) Carefully install the rivets with wet sealant (PR1436GB2) (Fig. 804).
        a) Use the squeeze-type rivet equipment.

(q) Install the contact strips in the correct positions, use FRS6035, FRS6036, or FRS6038 as applicable (AMM 71-11-04/801).

S 378-098-R00

(3) Do the procedure to put the fan cowl panel external surface back to its usual condition (FRS6400) (AMM 71-11-01/801).

S 218-099-R00

(4) Make a visual inspection of the completed repair.

S 938-100-R00

(5) Use a permanent marker pen and write the repair number next to the part number for the fan cowl panel.
(a) The color of the marker must contrast with the panel color.
(b) Use FRS6017 on the left fan cowl panel and FRS6030 on the right fan cowl panel.

TASK 71-11-04-308-009-R00

5. Lightning Strike Protection, Left and Right Fan Cowl Panels - Contact Strip Replacement

A. General
(1) The repairs in this procedure are FRS6035 and FRS6036. Use FRS6035 for the left fan cowl panel and FRS6036 for the right fan cowl panel.
(2) This procedure gives the instructions for the replacement of the lightning strike protection contact strips on the forward and rearward edge of the fan cowl panels.
(3) If the special contact strips on the rearward edge of the left fan cowl panel are damaged, use repair FRS6038 (Fig. 805).
(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:
  (a) Use gloves when you use degreasers.
  (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
  (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
  (d) Use degreasers in work areas that have a good flow of air.
  (e) Use potting compounds in work areas that have a good flow of air.
  (f) Do not let potting compounds come in contact with your skin.
  (g) Use sealants in work areas that have a good flow of air.
  (h) Do not let sealants come in contact with your skin.

B. Equipment
  (1) Drills and drill equipment
  (2) Volt-ohm meter

C. Consumable Materials
  (1) Potting compound - Local resources
  (Epocast H1843, Type 4, Grade B with 9216 catalyst)
  M and T Chemicals,
  Los Angeles, California, U.S.A.
  (2) Abrasive paper (Grit size 240)
  OMat No. - 5/35
  (3) Accelerator (Proseal 815)
  Essex Polytec Inc.,
  Navato, California, U.S.A.
  OMat No. - 8/119
  (4) Lint free cloth - Local resources
  (5) Acetone OMat No. 150 or
  Isopropyl alcohol OMat No. 1/40 or
  Cleaning solvent Desoclean OMat No. 1/257
  (6) Sealant (PR1440)
  Products Research and Chemical Corp.,
  Glendale, California, U.S.A.

D. Parts
  (1) Contact strip (Item 1) - LJ71600

(2) Rivet (Item 2) - NAS1738C4-2 (RR2308551) or NAS1398M4-2 (RR2308423)
(3) Insert (Item 3) - 465HE632-07 (RR3408797)
(4) Screw (Item 4) - NAS1635-06-4 (RR2308526)

E. Access

(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

F. Procedure

S 028-010-R00

(1) Remove the damaged contact strip.

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

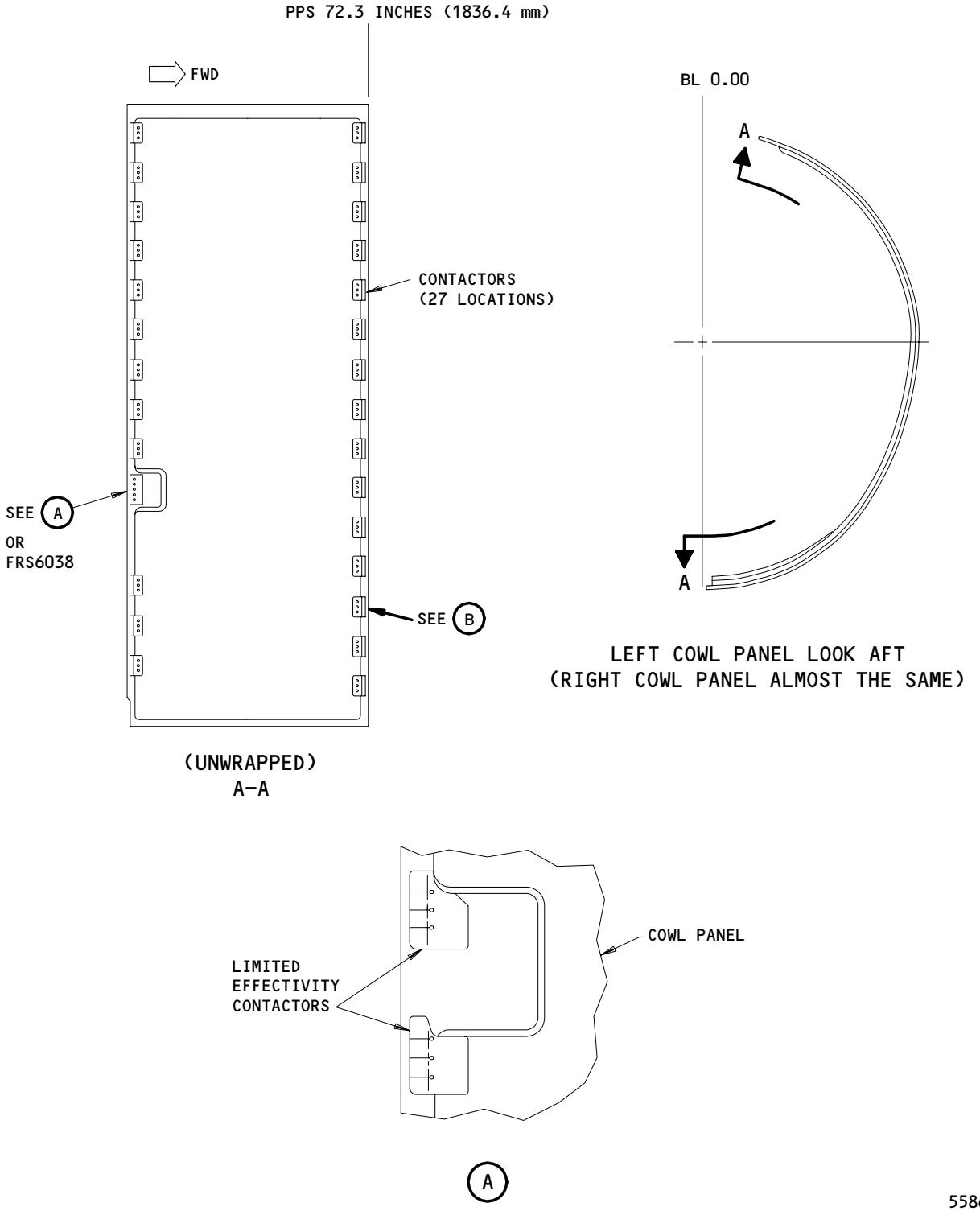
(a) Use a marker pen and make a mark of the contact strip position.
(b) Remove the contact strip.
1) If the contact strip is attached with rivets, drill out the rivets.
2) If the contact strip is attached with screws, remove the screws that attach the contact strip.
(c) Remove all swarf from the area.
(d) Use a sharp knife and carefully remove the old sealant.
1) Do not damage the protective aluminium layer.

S 218-011-R00

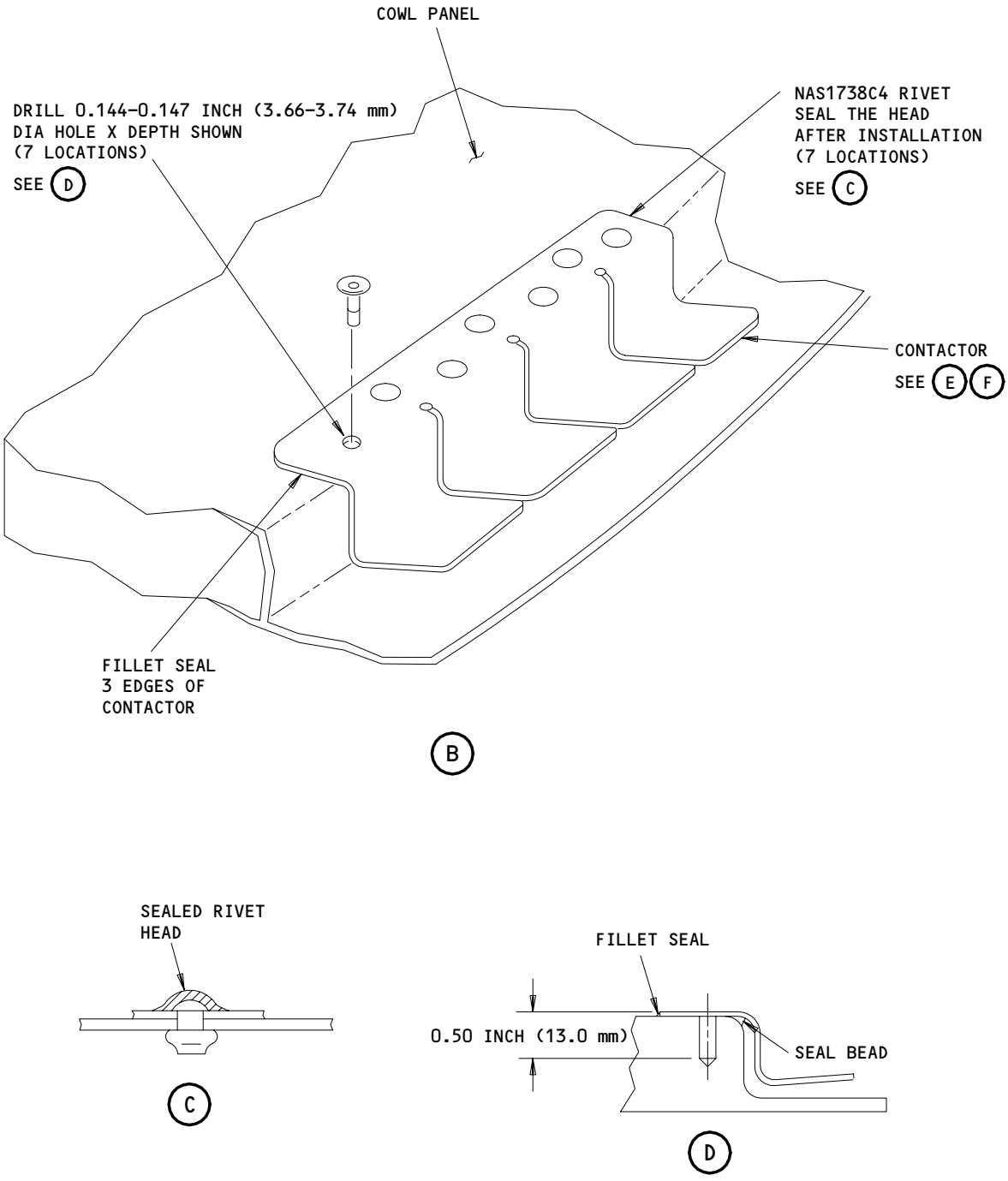
(2) Make an inspection of the rivet holes.
(a) If the rivet holes are too large or will be made larger when the new holes are drilled, replace the rivets with inserts and screws.

S 428-012-R00

(3) Install the contact strip with rivets.
(a) Put potting compound (H1843) in the cell cavities over the old rivets.
1) If a rivet hole is not used again, fill the hole with potting compound and make it smooth with the surface.



Fan Cowl Panel, Lightning Strike Protection - Contact Strip Replacement
Figure 805 (Sheet 1)



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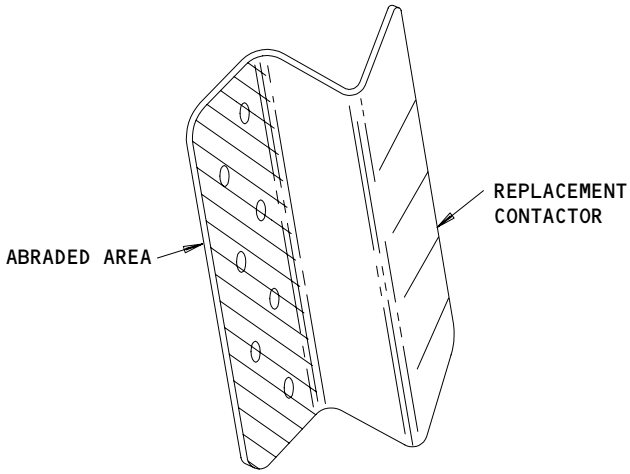
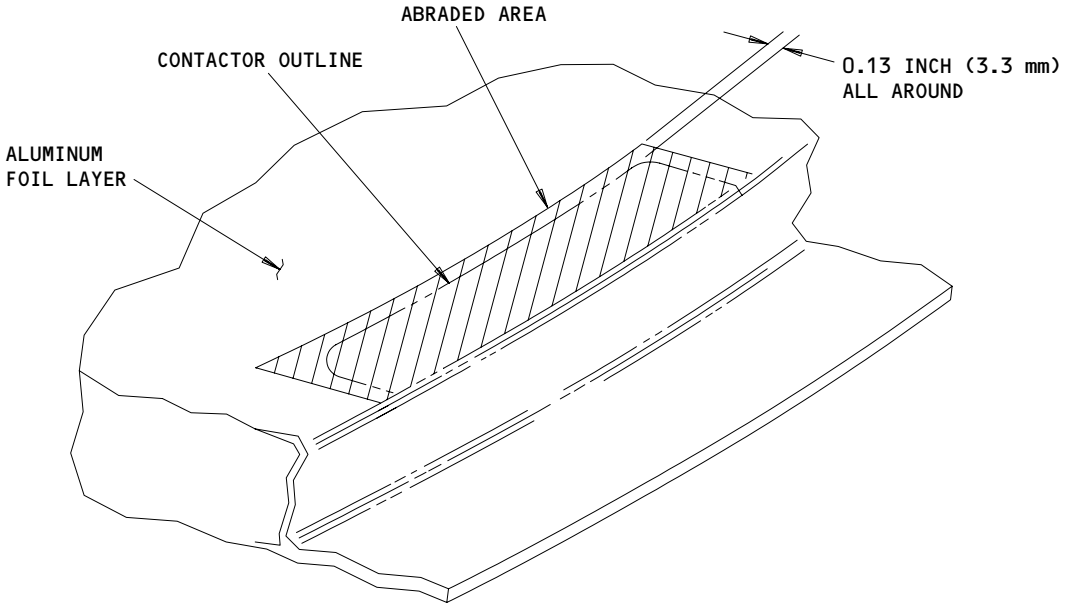
Fan Cowl Panel, Lightning Strike Protection - Contact Strip Replacement
Figure 805 (Sheet 2)





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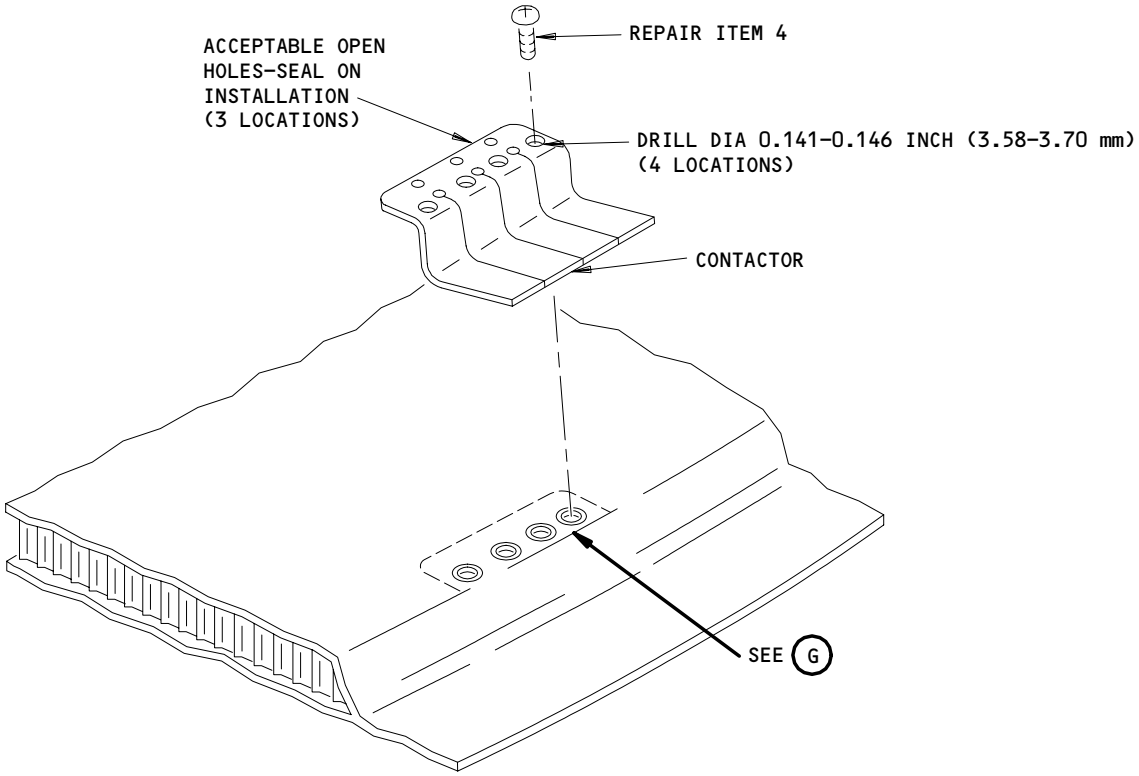
Fan Cowl Panel, Lightning Strike Protection - Contact Strip Replacement
Figure 805 (Sheet 3)



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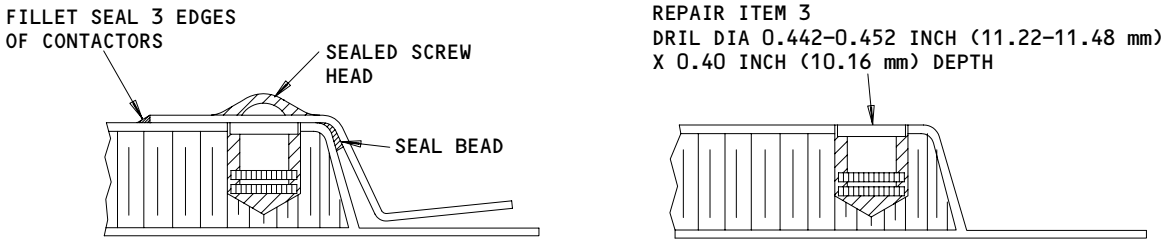

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55872

Fan Cowl Panel, Lightning Strike Protection – Contact Strip Replacement
Figure 805 (Sheet 4)

(b) Let the potting compound cure for 5 hours at room temperature.
(c) Put the contact strip in the correct position and drill the rivet holes in the fan cowl panel (Fig. 805).
1) Do not make the rivet hole depth more than what is necessary.
(d) Remove the contact strip and remove all swarf from the area.
(e) Make the mating surfaces of the contact strip and the fan cowl panel shiney with abrasive paper (Fig. 805).
1) Do not damage the protective aluminium layer.
(f) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the area clean.
1) Immediately make the area dry with the lint free cloth.
(g) Put a bead of sealant (PR1440) under the contact strip, next to the spring fingers (Fig. 805).
1) Do not use too much sealant to make sure there is a good electrical bond.
(h) Put the contact strip in the correct position and install the strip with rivets and wet potting compound (Fig. 805).
(i) Put sealant around 3 edges of the contact strip and around the rivet heads.
(j) Put the accelerator on the sealant with a spray gun.
(k) Let the sealant become dry for 3 hours at room temperature.

S 428-013-R00

(4) Install the contact strip with inserts and screws.
(a) Drill the holes for the inserts and screws (Fig. 805).
(b) Install the inserts into the fan cowl panel with potting compound.
1) Make sure the potting compound does not get into the threaded area of the insert.
2) Put potting compound into all holes that are not to be used.
(c) Remove the unwanted potting compound with a lint free cloth that is moist with Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean.
1) Make the area dry with the lint free cloth before the solvent becomes gas.

(d) Let the potting compound become dry for 5 hours at room temperature.
(e) Make the mating surfaces on the contact strip and the fan cowl panel shiney with the abrasive paper.
1) Do not damage the protective aluminium layer.
(f) Use a lint-free cloth that is moist with Acetone, or Isopropyl alcohol, or cleaning solvent Desoclean and clean the mating surfaces.
1) Immediately make the area dry with a lint free cloth.
(g) Put a bead of sealant under the contact strip next to the spring fingers (Fig. 805).
1) Do not use too much sealant to make sure there is a good electrical bond.
(h) Put the contact strip in the correct position and install the contact strip with screws (Fig. 805).
(i) Put the sealant around the 3 edges of the contact strip.
(j) Put the sealant around the heads of the screws.
(k) Put the sealant into all holes in the contact strip that are not used.
(l) Put accelerator on the sealant with a spray gun.
(m) Let the sealant become dry for 3 hours at room temperature.

S 218-145-R00

(5) Make a visual inspection of the completed repair.

S 768-019-R00

(6) Use a volt-ohm meter and measure the bond resistance between the contact strip and the foil on the fan cowl panel.
(a) If the bond resistance is more than 2.5 Mohms, the contact strip must be removed and then installed again.
1) Make sure the surfaces are clean, the surface is made shiney with the abrasive paper.
2) Make sure that the amount of sealant under the contact strip is not too much.

S 938-020-R00

(7) Use a permanent marker pen and write the repair number next to the part number for the fan cowl panel.
(a) The color of the marker pen must contrast with the color of the fan cowl panel.

(b) Use FRS.6035 for the left fan cowl panel and FRS.6036 for the right fan cowl panel.

TASK 71-11-04-308-014-R00

6. Lightning Strike Protection, Left and Right Fan Cowl Panel - Special Contact Strip Replacement

A. General

(1) The repair in this procedure is FRS6038.

(2) This procedure gives the instructions for the replacement of the contact strips for the lightning strike protection that have special or limited effectivity.

(3) This repair can used for the fan cowl panel part numbers that follow:

(4) During this repair, the surfaces that are to be bonded together must be clean.

(a) Dirt and grease on the surfaces will cause unsatisfactory bonds.

(b) Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded.

(c) The components must not be touched on the surfaces that are prepared to be bonded.

(d) The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:

(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.

(d) Use degreasers in work areas that have a good flow of air.

(e) Use potting compounds in work areas that have a good flow of air.

(f) Do not let potting compounds come in contact with your skin.

(g) Use sealants in work areas that have a good flow of air.

(h) Do not let sealants come in contact with your skin.

B. Equipment
(1) Drills and drill equipment
(2) Volt-ohm meter

C. Consumable Materials
(1) Potting compound - Local resources
(Epocast H1843, Type 4, Grade B with 9216 catalyst)
M and T Chemicals,
5121 San Fernando Road West,
Los Angeles, California, U.S.A.
(2) Sealant (PR1440)
Products Research and Chemical Corp.,
Glendale, California, U.S.A.
(3) Accelerator (Proseal 815)
Essex Polytec Inc.,
Navato, California, U.S.A.
OMat No. - 8/119
(4) Abrasive paper (Grit size 240)
OMat No. - 5/35
(5) Lint free cloth - Local resources
(6) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning Solvent Desoclean OMat No. 1/257
(7) Sealant (PR1436G)
Products Research Chemical Corp.,
Glendale, California, U.S.A.
OMat No. - 8/118

D. Parts
(1) Contact strip (special) (Item 1) - LJ71522
(2) Rivet (Item 2) - NAS1739C4-2, (RR1012112)

E. References
(1) AMM 71-11-01/801, Inlet Cowl

F. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

G. Procedure

S 028-235-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

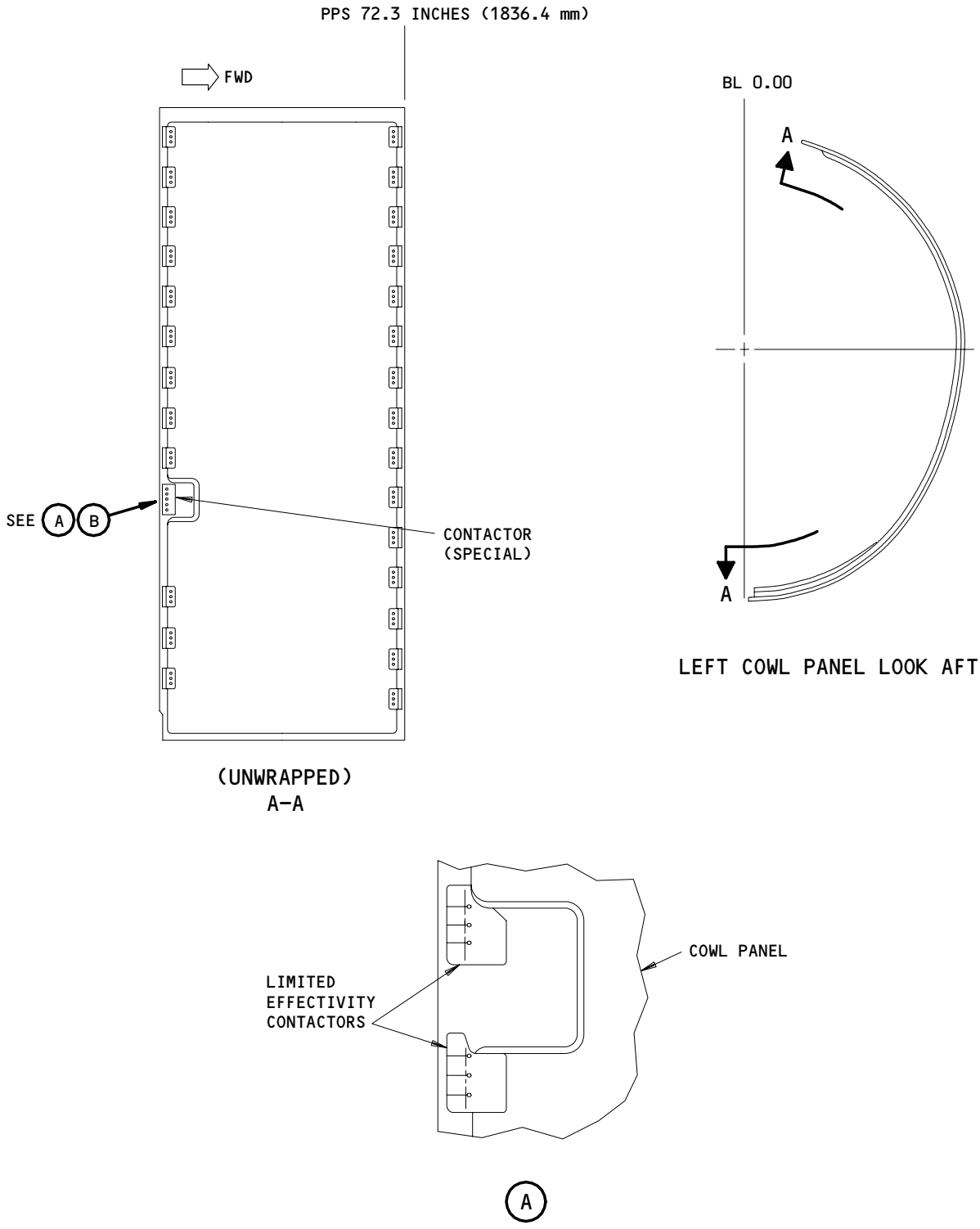
(1) Remove the damaged contact strip.

NOTE: If one of these contact strips with limited effectivity is damaged, you must replace the two contact strips with the special contact strip (Item 1)(Fig. 806, Sheet 1).

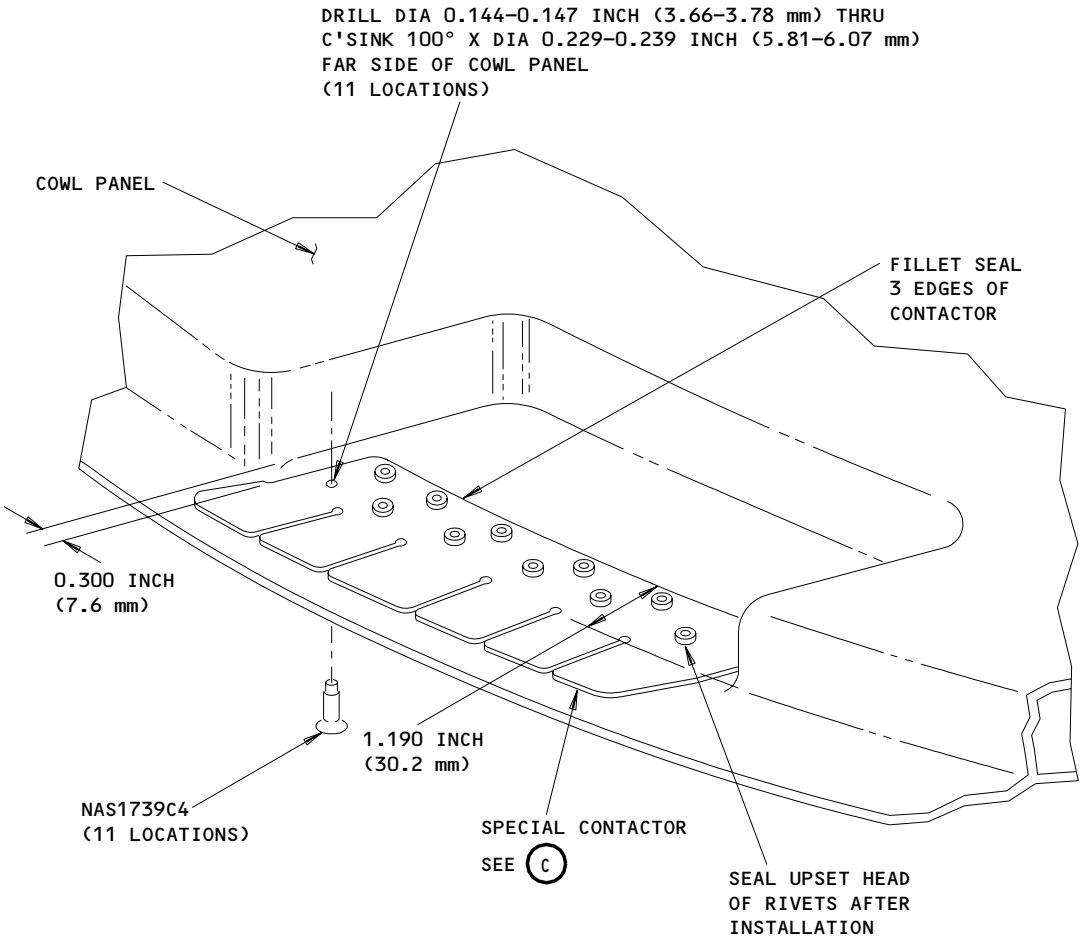
(a) Drill out the contact strip attachment rivets.
(b) Remove the contact strip.
(c) Remove all swarf from the area.
(d) Clean the area with a lint free cloth that is moistened with the MEK.
1) Immediately make the area dry with a lint free cloth.
(e) If the contact strips with the limited effectivity is removed, fill the rivet holes with potting compound (H1843).
1) Make the compound smooth with the two surfaces.
(f) Let the potting compound become dry for 5 hours at room temperature.
(g) Use a sharp knife to carefully remove the sealant from the contact strip location.
1) Do not damage the protective aluminium layer.

S 428-141-R00

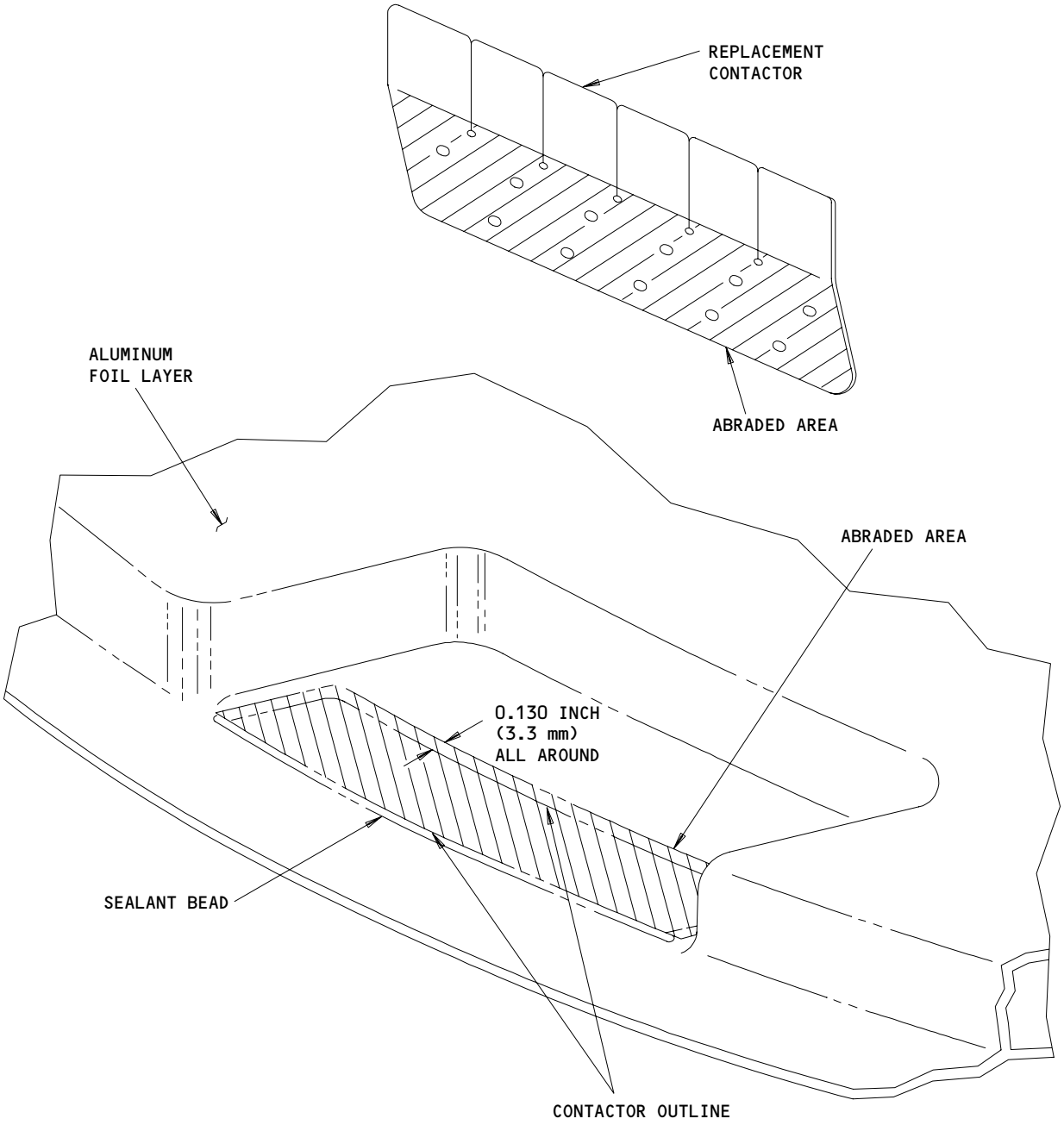
(2) Install the contact strip with rivets.
(a) Put the special contact strip in the correct position and drill the rivet holes in the fan cowl panel (Fig. 806).
(b) Remove the special contact strip.
(c) Make a countersink for the rivets.
1) The depth of the countersink must be large enough for a 0.004 inch (0.10 mm) underflush of the installed rivet head on the external surface (Fig. 806).
(d) Remove all swarf from the area.
(e) Make the mating surfaces of the special contact strip and the fan cowl panel shiney with abrasive paper.
1) Do not damage the protective aluminium layer (Fig. 806).



Left Fan Cowl Panel, Lightning Strike Protection - Special Contact Strip Replacement
Figure 806 (Sheet 1)



Left Fan Cowl Panel, Lightning Strike Protection – Special Contact Strip Replacement
Figure 806 (Sheet 2)



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Left Fan Cowl Panel, Lightning Strike Protection - Special Contact Strip Replacement
Figure 806 (Sheet 3)

(f) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to remove the grease on the aluminum foil repair area.
1) Immediately make the area dry with the lint free cloth.
(g) Put a bead of sealant (PR1440) along the back edge of the special contact strip, forward of the spring fingers (Fig. 806).
(h) Put the special contact strip in the correct position and install the strip with rivets and wet sealant (PR1436G) (Fig. 806).

NOTE: Because of the total added tolerances, it is recommended that the assembly is measured with a gauge to make sure the rivets of the correct length are installed. It is permitted to use oversize rivets.

(i) Put sealant around 3 edges of the special contact strip and around the upset heads of rivets, and all potted holes on the internal surface of the fan cowl panel.
(j) Put the accelerator on the sealant with a spray gun.
(k) Let the sealant become dry for 3 hours at room temperature.
(l) Make the external surface where the rivet heads or potted heads are exposed rough with abrasive paper.
(m) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to remove the grease on the aluminum foil repair area.
1) Immediately make the area dry with a lint free cloth.

S 378-022-R00
(3) Do the procedure to put the external surface of the fan cowl panel back to its usual condition (FRS6400)(AMM 71-11-01/801).

S 218-023-R00
(4) Make a visual inspection of the completed repair.

S 768-024-R00
(5) Use a volt-ohm meter and make a check of the bond resistance between the special contact strip and the foil on the fan cowl panel.
(a) If the bond resistance is more than 2.5 Mohms, the special contact strip must be removed and then installed again.
1) Make sure the surfaces are clean, the surface is made shiney with the abrasive paper.

2) Make sure the amount of sealant under the contact strip is not too much.

S 938-003-R00

(6) Use a permanent marker pen and write the repair number FRS6038 next to the part number of the fan cowl panel.
(a) The color of the marker pen must contrast with the color of the fan cowl panel.

TASK 71-11-04-308-017-R00

7. Left Fan Cowl Panel - Jumper Cable (Bonding Lead) Replacement

A. General
(1) The repair in this procedure is FRS6040.
(2) This procedure gives the instructions for the replacement of the jumper cables at the hinge or latch positions on the fan cowl panels.
(3) This repair can used for the fan cowl panel part numbers that follow:

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
(5) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use a degreaser.
(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.

(f) Do not let epoxy compounds come in contact with your skin.
(g) Use sealants in work areas that have a good flow of air.
(h) Do not let sealants come in contact with your skin.

B. Equipment
(1) Infra-red heat lamps (explosion proof)
(2) Rivet equipment
(3) Hi-Lok installation tools

C. Consumable Materials
(1) Acetone OMat No. 150 or
Isopropyl alcohol OMat 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(2) Lint free cloth - Local resources
(3) Abrasive paper (Grit size 240)
OMat No. - 5/35
(4) Sealant (PR1436GA)
Products Research and Chemical Corp.,
Glendale, California, U.S.A.
OMat no. - 8/118
(5) Accelerator (Proseal 815)
Essex Polytec Inc., Navato, California, U.S.A.
OMat No. - 8/119
(6) Adhesive (EA934NA)
Hysol Div-Dexter Corp.,
P.O. Box 132, Pittsburg, California, U.S.A.
OMat no. - 8/52

D. Parts
(1) Jumper cable (Item 1) - MS25083-7BC4 (RR2308250)
(2) Bus bar (Item 4) - LJ71548
(3) Rivet (Item 5) - CSR904B6-6 (RR3408602)
(4) Blind rivet (Item 6) - NAS1738C6-2 (RR2308552) or NAS1738M6-2 (RR2308407)
(5) Hi-Lok pin (Item 7) - HL11V8-5 (RR3408521)
(6) Hi-Lok collar (Item 8) - HL97-8 (RR3408736)
(7) Self-locking screw (Item 11) - NAS1190E3P3L (RR2308528)
(8) Blind rivet (Item 12) - NAS1738C4-2 (RR2308551) or NAS1738M4-2 (RR2308258)

(9) Hi-Lok pin (Item 13) - HL11V8-19 (RR3408522)
(10) Self-locking nut (Item 14) - MS21043-4 (RR2308217)
(11) Washer (Item 15) - AN960C416 (RR1205523)
(12) Jumper cable (Item 16) - MS25083-7BC5 (RR2308349)

E. References
(1) AMM 71-11-01/801, Inlet Cowl
(2) AMM 71-11-04/801, Fan Cowl Panel

F. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

G. Remove the damaged jumper cable.

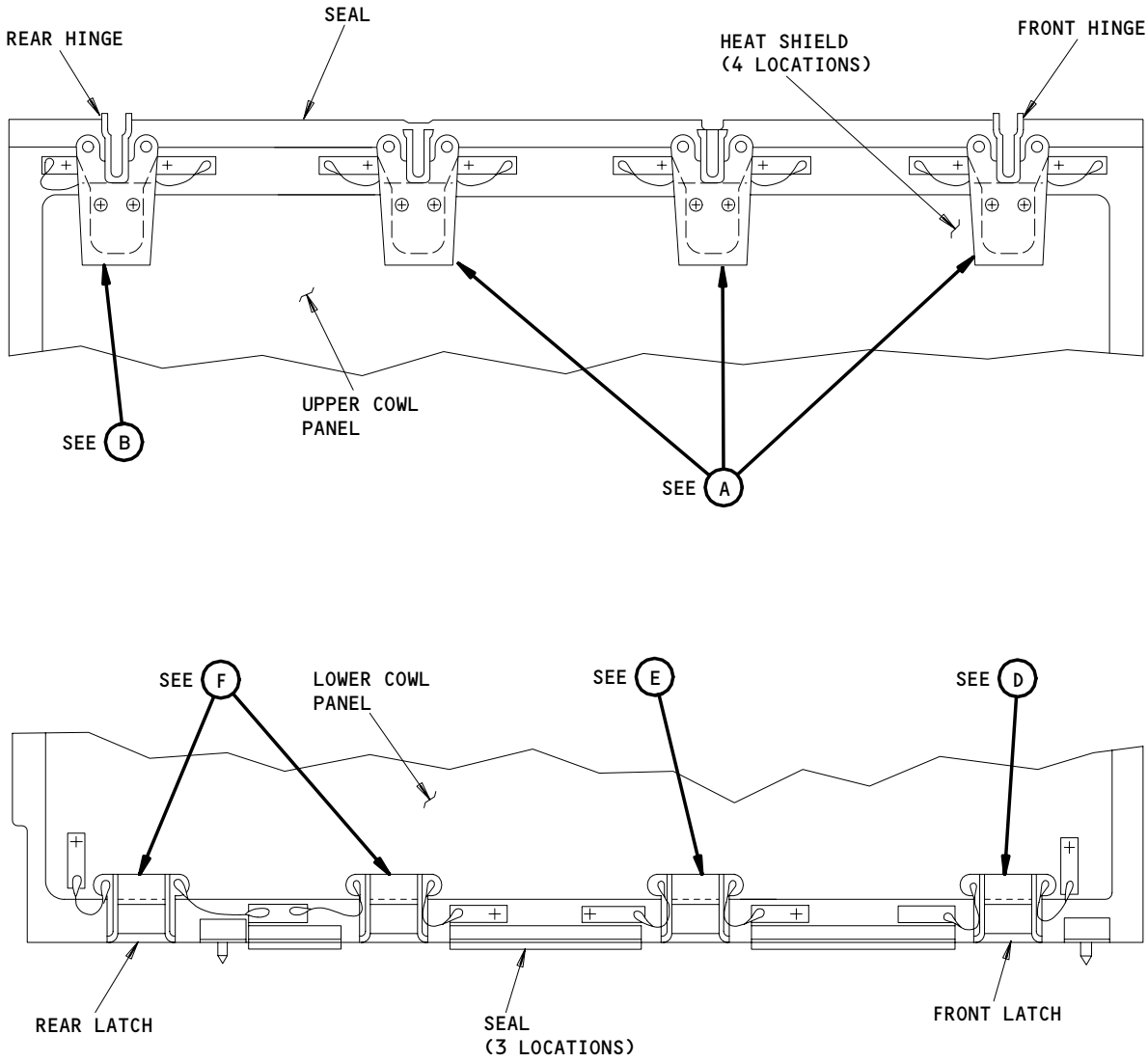
S 028-236-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) If the jumper cable is replaced on the upper fan cowl panel, remove the heatshield (Fig. 807).
(a) Remove the Hi-Lok fasteners and the screws that attach the heatshield.
(b) Remove the heatshield and keep it for the installation.
(c) Use a lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the area clean.
(d) Immediately make the area dry with a lint free cloth.

S 028-018-R00
(2) Remove the damaged jumper cable.
(a) Drill out the rivets that attach the jumper cable to the bus bar.
(b) Remove the Hi-Lok fastener or the nut and bolt that attaches the jumper cable to the fitting.

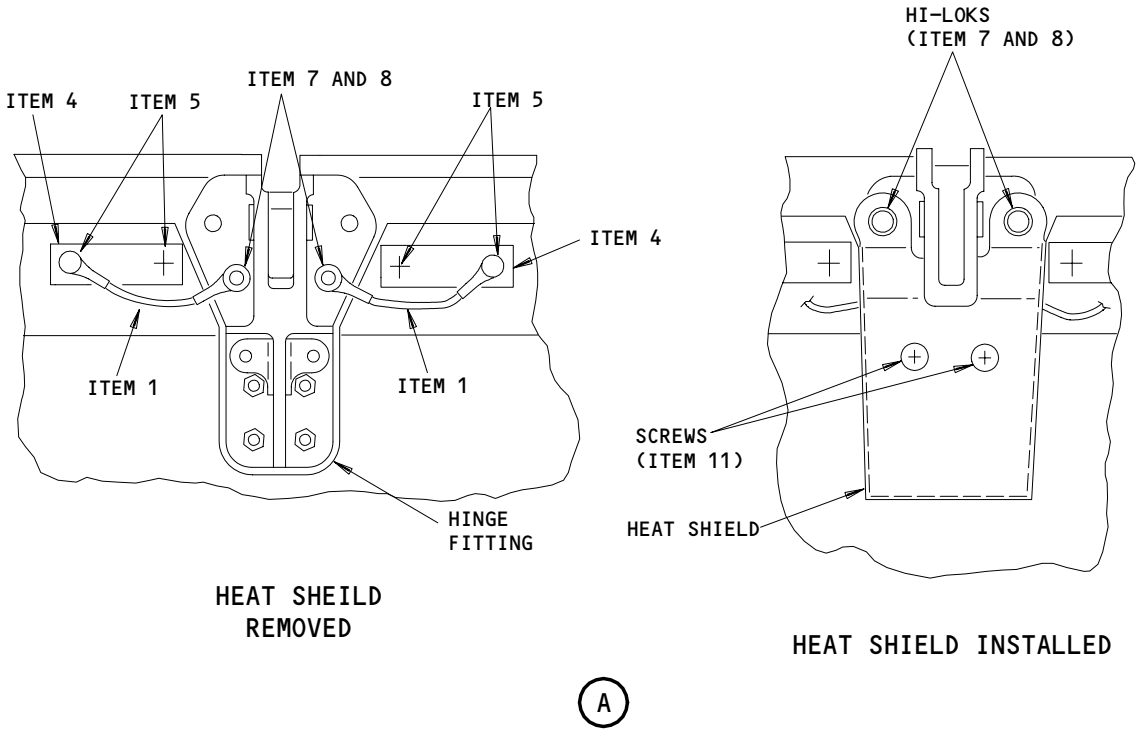
NOTE: If the nut and bolt is removed, keep all shims for the installation.

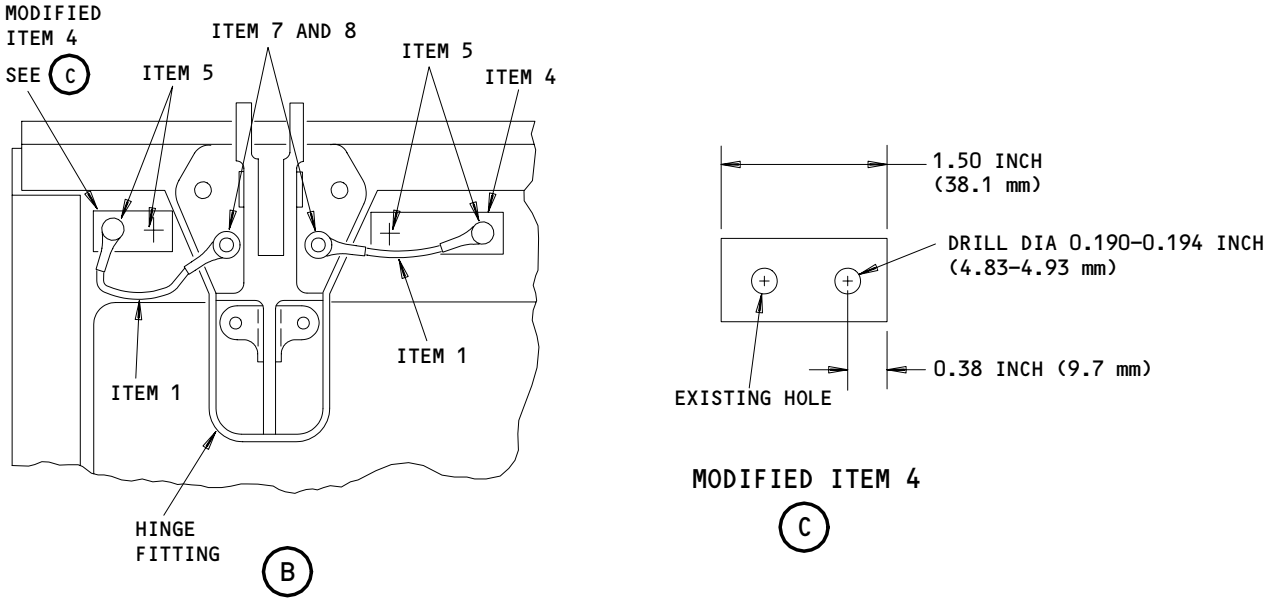


LEFT FAN COWL PANEL
(RIGHT FAN COWL PANEL ALMOST THE SAME)

55901

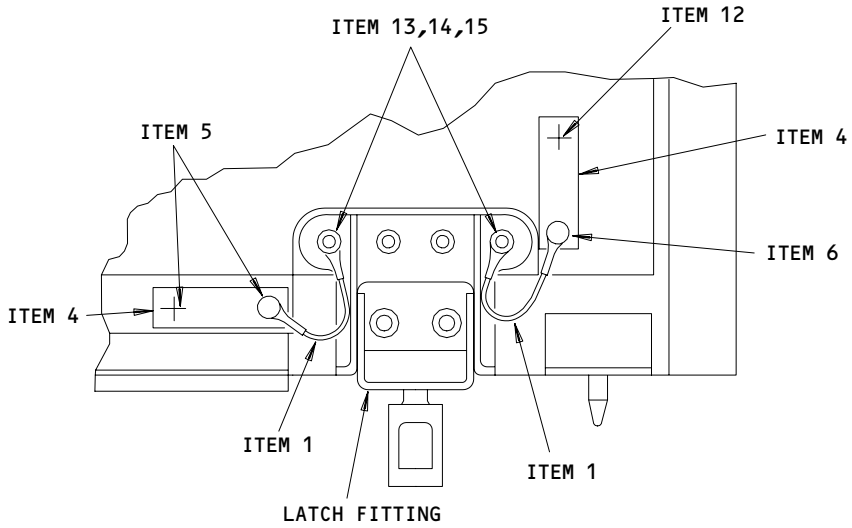
Left Fan Cowl Panel Jumper Cable Replacement
Figure 807 (Sheet 1)





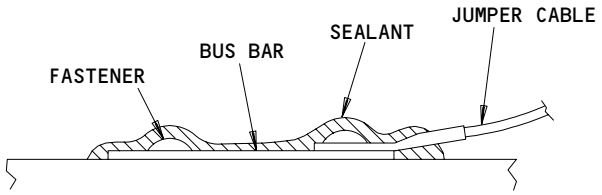
55902

Left Fan Cowl Panel Jumper Cable Replacement
Figure 807 (Sheet 2)

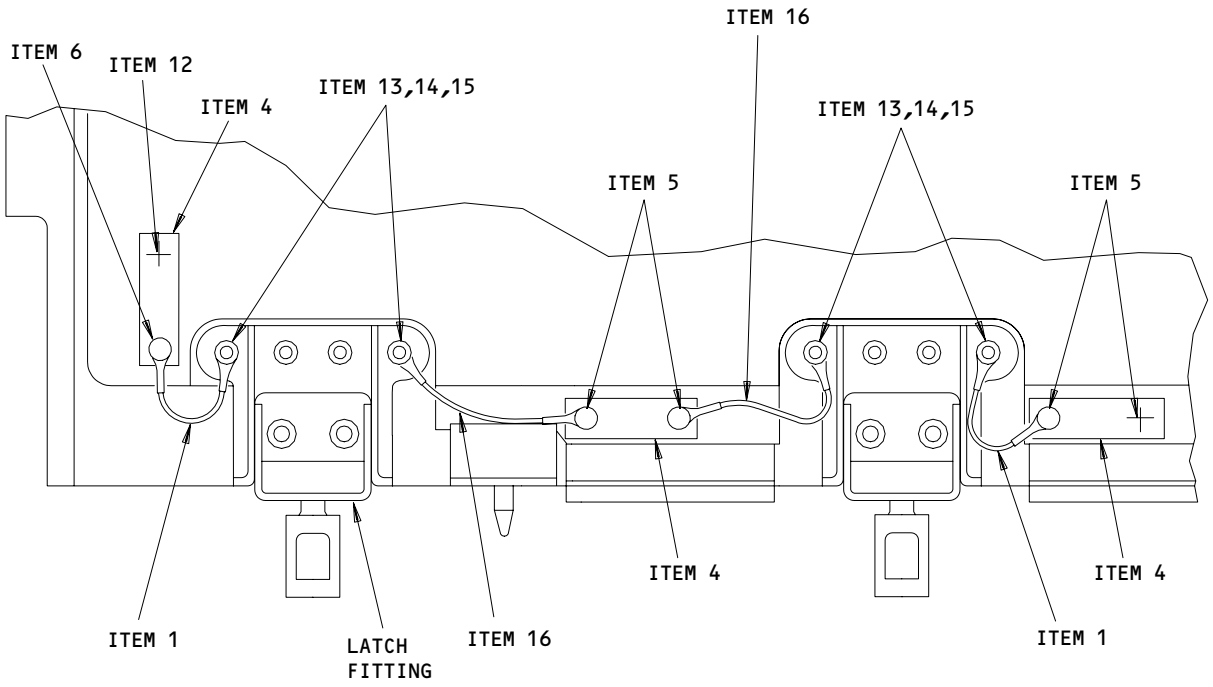


55903A

Left Fan Cowl Panel Jumper Cable Replacement
Figure 807 (Sheet 3)



BUS BAR ENCAPSULATION



F

55904A

Left Fan Cowl Panel Jumper Cable Replacement
Figure 807 (Sheet 4)

(c) Use a sharp knife to carefully remove the old sealant in the area of the fasteners that you removed.
1) Do not damage the aluminum foil.
2) If the foil is damaged, refer to FRS6020 (AMM 71-11-04/801).

S 968-049-R00

(3) Find the correct rivets for the location of the bus bar (Fig. 807).

S 228-025-R00

(4) Make an inspection of the rivet holes.
(a) If the hole size is too large, do the procedure to replace the jumper cable with a rivet hole size that is too large.
(b) If the hole size is not more than the limits permitted, do the procedure to replace the jumper cable with a rivet hole size that is permitted.
(c) For the rivet (Item 5), the maximum hole size that is permitted is 0.196 inch (4.98 mm) diameter.
(d) For the blind rivet (Item 6), the maximum hole size that is permitted is 0.209 inch (5.31 mm) diameter.
(e) For the blind rivet (Item 12), the maximum hole size that is permitted is 0.147 inch (3.73 mm) diameter.

H. Install the jumper cable with the rivet hole size that is too large.

S 028-000-R00

(1) Remove the bus bar.
(a) Drill out the rivet that remains that attaches the bus bar.
(b) Remove the bus bar.

S 148-002-R00

(2) Use a sharp knife to carefully remove the old sealant.
(a) Do not damage the aluminium foil.
(b) If the foil is damaged, do the repair procedure FRS6020.

S 398-001-R00

(3) Fill the holes in the fan cowl panels with adhesive (EA934NA).
(a) Use the infra-red heat lamps for 1 hour at 60 C to make the adhesive dry.

S 358-005-R00
(4) Put the bus bar in the correct position and drill new rivet holes.

NOTE: Make sure the jumper cable is of sufficient length for the new bus bar position.

(a) The new holes must be a minimum of 2 rivet diameters from the old hole.
(b) Remove all swarf from the area.

S 148-006-R00
(5) Make the mating faces of the bus bar and the fan cowl panel shiney with abrasive paper.
(a) Do not damage the aluminium foil.
(b) Use a lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating surfaces clean.
(c) Immediately make the area dry with a lint free cloth.

S 868-129-R00
(6) Find the jumper cable to be installed (Fig. 807).

S 148-009-R00
(7) Make the ends of the jumper cable shiney with abrasive paper.

S 428-007-R00
(8) Put the bus bar and the jumper cable in the correct position and install the rivets with wet sealant (PR1436GA) (Fig. 807).

S 428-140-R00
(9) Put the other end of the jumper cable over the hole and install the Hi-Lok with wet sealant (Fig. 807).

S 218-010-R00
(10) Make a visual inspection of the installed rivets and Hi-Lok fasteners.

I. Install the jumper cable when the rivet hole is correct.

S 398-011-R00

(1) If the rivet hole is in honeycomb, put sealant (PR1436GA) over the old rivet in the cell cavity.

NOTE: The blind rivet (Item 6) and the jumper cable must be installed before the sealant becomes dry.

S 148-012-R00

(2) Make the bus bar area where the jumper cable is to be attached shiney with abrasive paper.
   (a) Use a lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the bus bar clean.
   (b) Immediately make the area dry with a lint free cloth.

S 968-048-R00

(3) Find the jumper cable to be installed (Fig. 807).

S 148-014-R00

(4) Make the ends of the jumper cable shiney with abrasive paper.

S 428-015-R00

(5) Put one end of the jumper cable over the rivet hole and install the rivet with wet sealant (Fig. 807).

S 428-143-R00

(6) Put the other end of the jumper cable over the hole and install the Hi-Lok fastener or the nut and bolt with wet sealant (Fig. 807).

S 218-017-R00

(7) Make a visual inspection of the installed rivets, Hi-Lok fasteners or nut and bolt.

S 398-018-R00

(8) Apply the sealant.
   (a) Put sealant (PR1436GA) on the jumper cable ends and the attachment fasteners (Fig. 807).
   (b) Put accelerator on the sealant with a spray gun.
   (c) Let the sealant become dry for 3 hours at room temperature.

S 428-019-R00

(9) Install the heatshield with screws (Item 11).
   (a) Install the Hi-Lok fasteners with wet sealant (PR1436GA) (Fig. 807).

S 378-020-R00

(10) Do the procedure to put the external surface of the fan cowl panel to its usual condition (FRS6400)(AMM 71-11-01/801).

S 218-139-R00

(11) Make a visual inspection of the completed repair.

S 938-022-R00

(12) Use a permanent marker pen and write the repair number next to the part number of the fan cowl panel.
   (a) The color of the marker pen must contrast with the color of the fan cowl panel.
   (b) For the repair on the left fan cowl panel that used the procedure with rivet holes that were too large, use FRS6040/1.
   (c) For the repair on the left fan cowl panel that used the procedure with rivet holes that were correct, use FRS6040/2.

TASK 71-11-04-308-040-R00

8. Right Fan Cowl Panel - Jumper Cable (Bonding Lead) Replacement

A. General
   (1) The repair in this procedure is FRS6054.
   (2) This procedure gives the instructions for the replacement of the jumper cables at the hinge or latch position on the fan cowl panels.
   (3) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
   (4) Be careful when you use the consumable materials for this repair:
      (a) Use gloves when you use degreasers.
      (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.
(g) Use sealants in work areas that have a good flow of air.
(h) Do not let sealants come in contact with your skin.

B. Equipment
(1) Infra-red heat lamps (explosion proof)
(2) Rivet equipment
(3) Hi-Lok installation tools

C. Consumable Materials
(1) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(2) Lint free cloth - Local resources
(3) Abrasive paper (Grit size 240)
OMat No. - 5/35
(4) Sealant (PR1436GA)
Products Research and Chemical Corp.,
Glendale, California, U.S.A.
OMat no. - 8/118
(5) Accelerator (Proseal 815)
Essex Polytec Inc., Navato, California, U.S.A.
OMat No. - 8/119
(6) Adhesive (EA934NA)
Hysol Div-Dexter Corp.,
P.O. Box 132, Pittsburg, California, U.S.A.
OMat no. - 8/52

D. Parts
(1) Jumper Cable (Item 3) - MS25083-7BB5 (RR2308249)
(2) Bus bar (Item 4) - LJ71548
(3) Rivet (Item 5) - CSR904B6-6 (RR3408602)
(4) Blind rivet (Item 6) - NAS1738C6-2 (RR2308552) or NAS1738M6-2 (RR2308407)

(5) Blind rivet (Item 9) - NAS1738C4-2 (RR2308551) or NAS1738M4-2 (RR2308258)
(6) Screw (Item 13) - NAS6203-1 (RR2308527)
(7) Self-locking screw (Item 14) - NAS1190E3P3L (RR2308528)
(8) Jumper cable (Item 15) - MS25083-7BC5 (RR2308349)
(9) Screw (Item 16) - NAS603-12P (RR2308587)

E. References
(1) AMM 71-11-01/801, Inlet Cowl
(2) AMM 71-11-04/801, Fan Cowl Panel

F. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

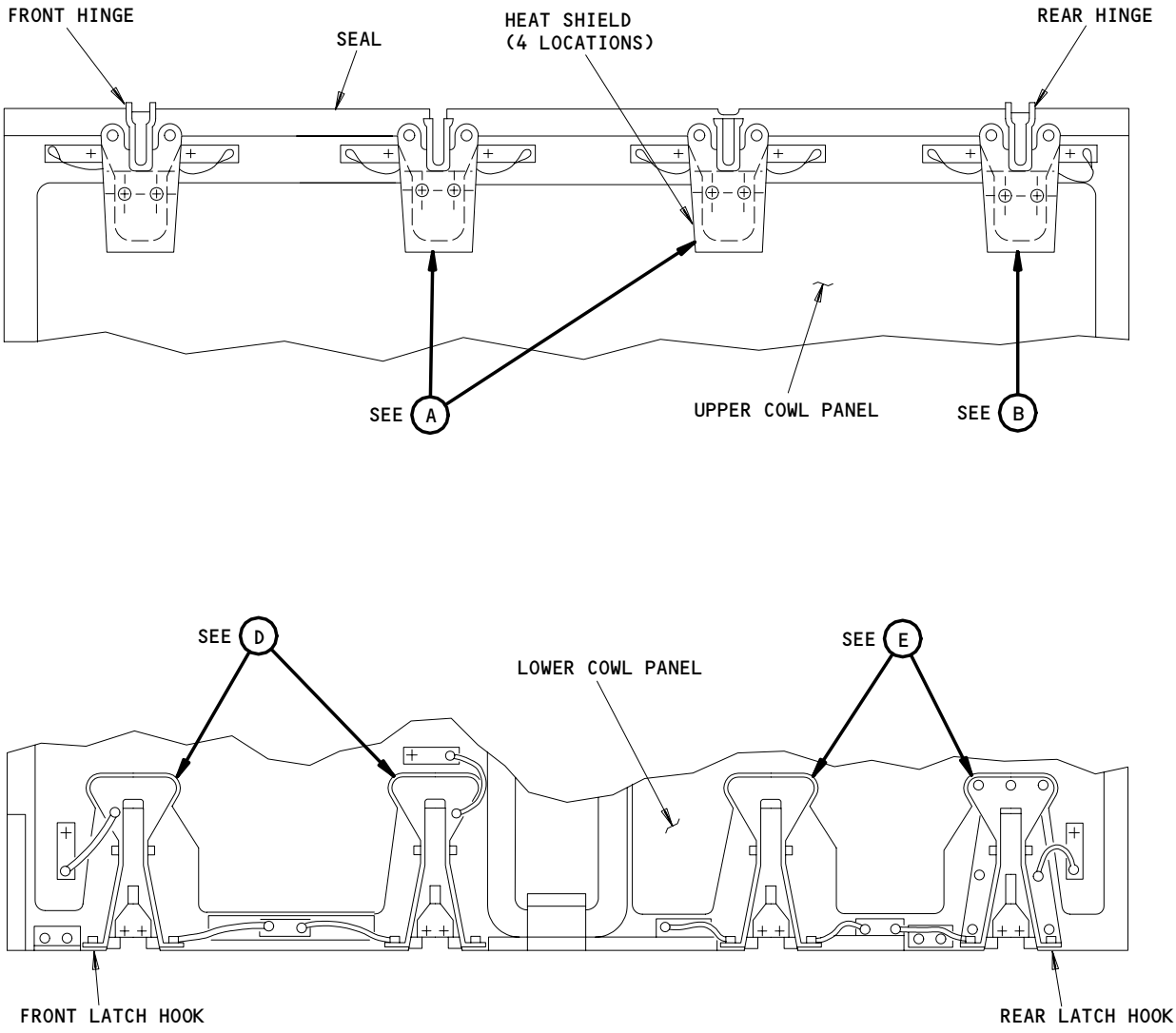
G. Procedure

S 028-237-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Remove the damaged jumper cable.
(a) If the jumper cable is replaced on the upper fan cowl panel, remove the heatshield (Fig. 808).
1) Remove the Hi-Lok fasteners and the screws that attach the heatshield.
2) Remove the heatshield and keep it for the installation.
(b) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the area clean.
1) Immediately make the area dry with a lint free cloth.
(c) Drill out the rivets that attach the jumper cable to the bus bar.
(d) Remove the Hi-Lok fastener or the nut and bolt that attaches the jumper cable to the fitting.

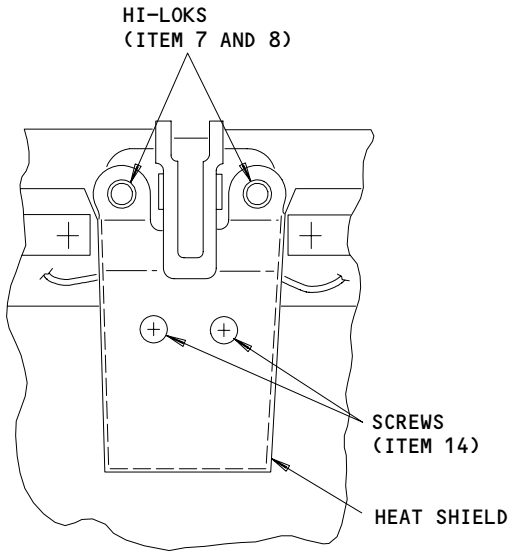
NOTE: If the nut and bolt is removed, keep all shims for the installation.



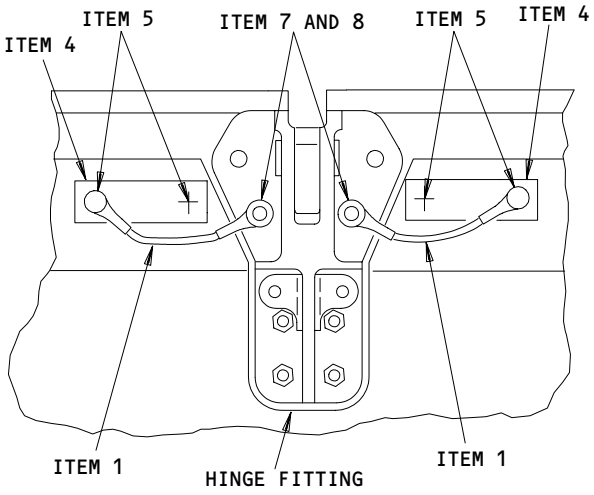
RIGHT COWL PANEL

55905

Right Fan Cowl Panel - Jumper Cable Replacement
Figure 808 (Sheet 1)

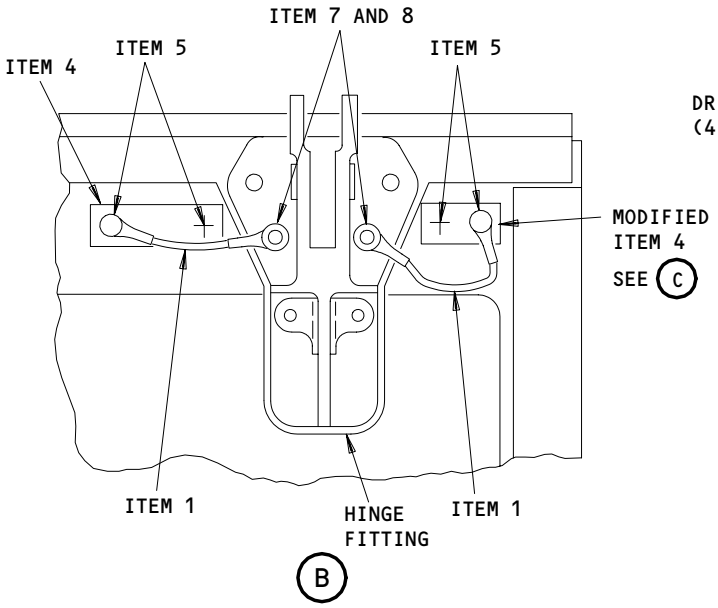


HEAT SHIELD INSTALLED

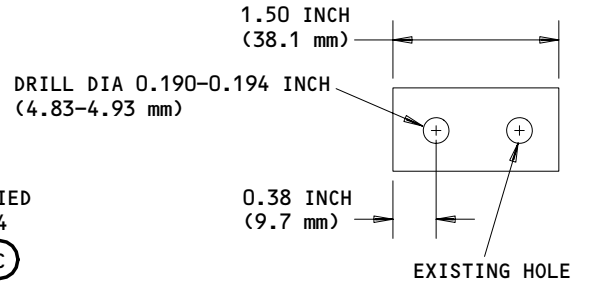


HEAT SHIELD REMOVED

(A)



(B)

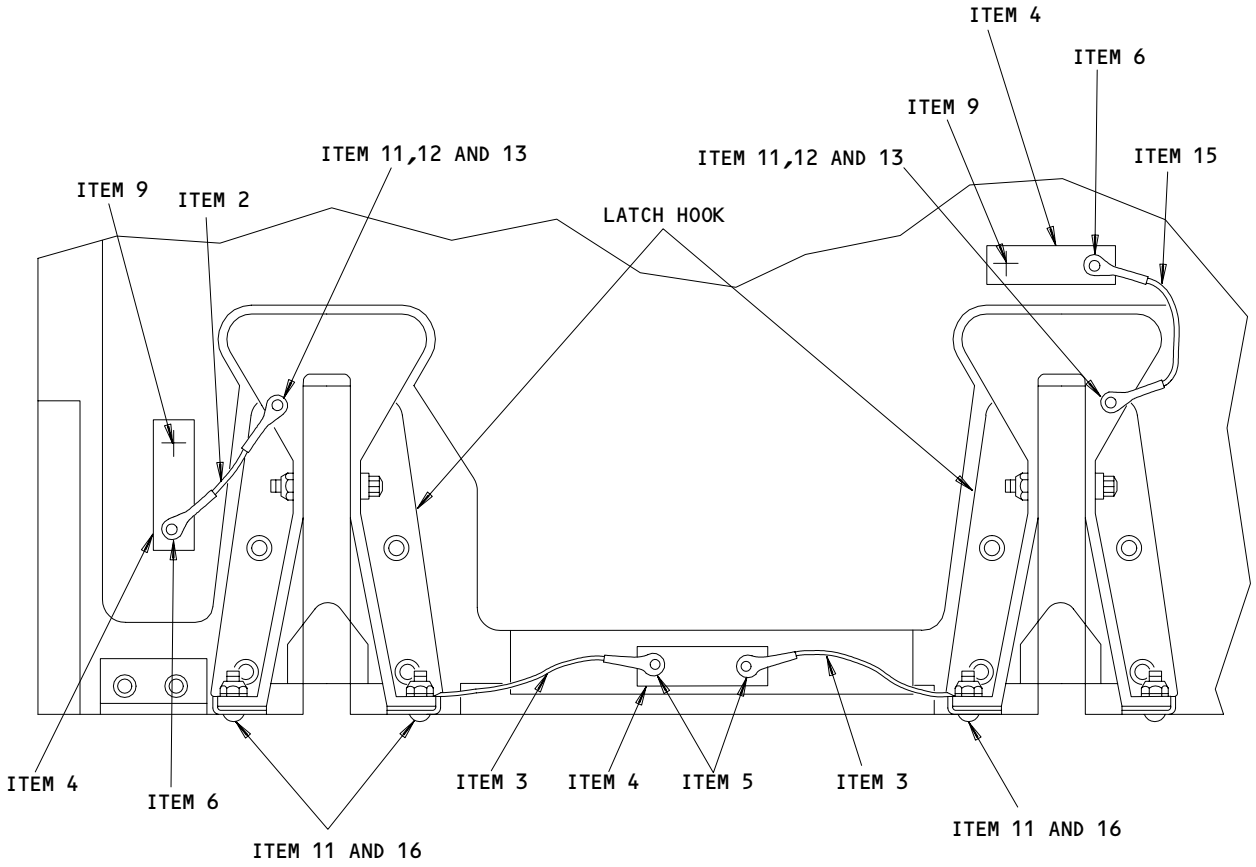


MODIFIED ITEM 4

(C)

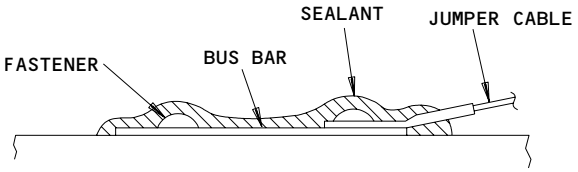
55906

Right Fan Cowl Panel - Jumper Cable Replacement
Figure 808 (Sheet 2)

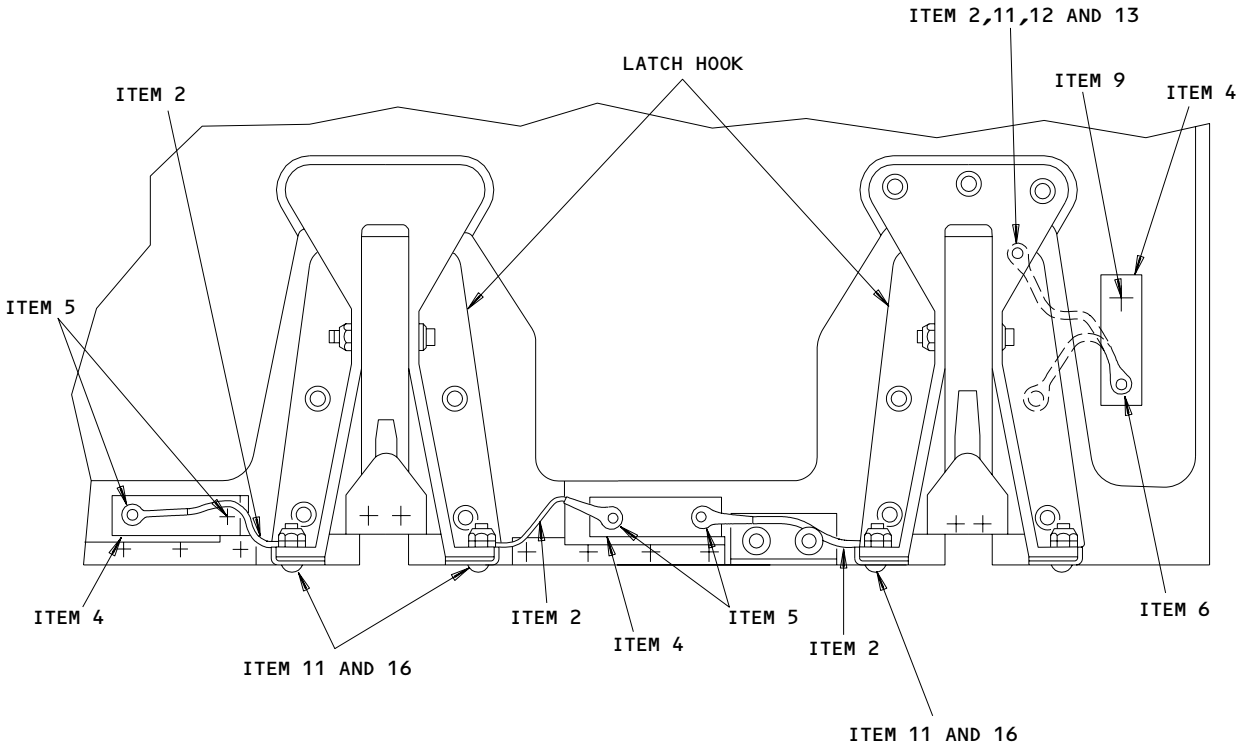


55907A

Right Fan Cowl Panel – Jumper Cable Replacement
Figure 808 (Sheet 3)



BUS BAR ENCAPSULATION



E

55908A

Right Fan Cowl Panel - Jumper Cable Replacement
Figure 808 (Sheet 4)

(e) Use a sharp knife to carefully remove the old sealant in the area of the fasteners that were removed.
1) Do not damage the aluminium foil.
2) If the foil is damaged, do the repair procedure FRS6020. (AMM 71-11-01/801).

S 968-042-R00

(2) Find the correct rivets for the location of the bus bar (Fig. 808).

S 218-043-R00

(3) Make an inspection of the rivet holes.
(a) If the hole size is too large, do the procedure to replace the jumper cable with a rivet hole size that is too large.
(b) If the hole size is not more than the limits permitted, do the procedure to replace the jumper cable with a rivet hole size that is permitted.
(c) For the rivet (Item 5), the maximum hole size that is permitted is 0.196 inch (4.98 mm) diameter.
(d) For the blind rivet (Item 6), the maximum hole size that is permitted is 0.209 inch (5.31 mm) diameter.
(e) For the blind rivet (Item 9), the maximum hole size that is permitted is 0.147 inch (3.73 mm) diameter.

S 428-044-R00

(4) Replace the jumper cable with the rivet hole size that is too large.
(a) Drill out the rivet that remains that attaches the bus bar.
(b) Remove the bus bar.
(c) Use a sharp knife to carefully remove the old sealant.
1) Do not damage the aluminium foil.
2) If the foil is damaged, do the repair procedure FRS6020 (AMM 71-11-01/801).
(d) Fill the holes in the fan cowl panels with adhesive (EA934NA).
(e) Use the infra-red heat lamps for 1 hour at 60 C to cure the adhesive.
(f) Put the bus bar in the correct position and drill new rivet holes.

NOTE: Make sure the jumper cable is of sufficient length for the new bus bar position.

1) The new holes must be a minimum of 2 rivet diameters from the old hole.
(g) Remove all swarf from the area.

(h) Make the mating faces of the bus bar and the fan cowl panel shiney with abrasive paper.
1) Do not damage the aluminium foil.
(i) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to make the mating surfaces clean.
1) Immediately make the area dry with a lint free cloth.
(j) Find the jumper cable to be installed (Fig. 808).
(k) Make the ends of the jumper cable shiney with abrasive paper.
(l) Put the bus bar and the jumper cable in the correct position and install the rivets with wet sealant (PR1436GA) (Fig. 808).
(m) Put the other end of the jumper cable over the hole and install the Hi-Lok with wet sealant (Fig. 808).
(n) Make a visual inspection of the installed rivets and Hi-Lok fasteners.

S 428-045-R00

(5) Replace the jumper cable when the rivet hole is correct.
(a) If the rivet hole is in honeycomb, put sealant (PR1436GA) over the old rivet in the cell cavity.

NOTE: The blind rivet (Item 6) and the jumper cable must be installed before the sealant becomes cured.

(b) Make the bus bar area where the jumper cable is to be attached shiney with abrasive paper.
(c) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to make the bus bar clean.
1) Immediately make the area dry with a lint free cloth.
(d) Find the jumper cable to be installed (Fig. 808).
(e) Make the ends of the jumper cable shiney with abrasive paper.
(f) Put one end of the jumper cable over the rivet hole and install the rivet with wet sealant (Fig. 808).
(g) Put the other end of the jumper cable over the hole and install the Hi-Lok fastener or the nut and bolt with wet sealant (Fig. 808).
(h) Make a visual inspection of the installed rivets, Hi-Lok fasteners or nut and bolt.

S 398-046-R00

(6) Apply the sealant.
(a) Put sealant (PR1436GA) on the jumper cable ends and the attachment fasteners (Fig. 808).

(b) Put accelerator on the sealant with a spray gun.
(c) Let the sealant become dry for 3 hours at room temperature.
(d) Install the heatshield with screws (Item 11) (Fig. 808).
1) Install the Hi-Lok fasteners with wet sealant (PR1436GA).

S 378-117-R00

(7) Do the procedure to put the external surface of the fan cowl panel to its usual condition (FRS6400)(AMM 71-11-01/801).

S 218-118-R00

(8) Make a visual inspection of the completed repair.

S 938-047-R00

(9) Use a permanent marker pen and write the repair number next to the fan cowl panel part number.
(a) The color of the marker pen must contrast with the color of the fan cowl panel.
(b) For the right fan cowl panel repair that used the procedure with rivet holes that where too large, use FRS6054/1.
(c) For the right fan cowl panel repair that used the procedure with rivet holes that where correct, use FRS6054/2.

TASK 71-11-04-308-050-R00

9. Right and Left Fan Cowl Panel - Upper Metal Seal Replacement

A. General

(1) The repairs in this procedure are FRS.6090 and FRS.6091.
(2) This procedure gives the instructions for the replacement of the upper metal seal at the hinge location of the right and left fan cowl panel.
(3) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(4) Be careful when you use the consumable materials for this repair:
  (a) Use gloves when you use degreasers.
  (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
  (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
  (d) Use degreasers in work areas that have a good flow of air.
  (e) Use epoxy compounds in work areas that have a good flow of air.
  (f) Do not let epoxy compounds come in contact with your skin.
  (g) Use sealants in work areas that have a good flow of air.
  (h) Do not let sealants come in contact with your skin.

B. Equipment
  (1) Infra-red heat lamps (explosion proof)
  (2) Rivet equipment
  (3) Drills and Drilling Equipment
  (4) Hi-Lok installation equipment
  (5) Permanent Marker Pen

C. Consumable Materials
  (1) Adhesive (EA934NA)
    Hysol Div-Dexter Corp.,
    P.O. Box 132, Pittsburg, California, U.S.A.
    OMat no. - 8/52
  (2) Aluminum oxide abrasive paper (Grade 180) - Local resources
    OMat No. - 5/62
  (3) Lint free cloth - Local resources
  (4) Acetone OMat No. 150 or
    Isopropyl alcohol OMat 1/40 or
    Cleaning solvent Desoclean OMat No. 1/257
  (5) Cotton gloves - Local resources
  (6) Release agent
    OMat No. - 8/32
  (7) Locking compound
    OMat No. - 8/67
  (8) Sealant (PR1436GA)
    Products Research and Chemical Corp.,
    Glendale, California, U.S.A.
    OMat no. - 8/118

(9) Accelerator (Proseal 815)
Essex Polytec Inc., Navato, California, U.S.A.
OMat No. - 8/119
(10) Brush, small
OMat No. 2/12

D. Parts
(1) Seal (Item 1) - Left Fan Cowl Panel - LJ71861
Right Fan Cowl Panel - LJ71862
(2) Rivet (Item 2) - MS20427M4-6 (RR2308535)
(3) Hi-Lok collar (Item 3) - HL97-8 (RR3408736)
(4) Hi-Lok pin (Item 4) - HL11V8-5 (RR3408521)
(5) Seal (Item 5) - Left Fan Cowl Panel - LJ76156
Right Fan Cowl Panel - LJ76240

E. References
(1) AMM 71-11-01/801, Inlet Cowl
(2) AMM 71-11-04/801, Fan Cowl Panel

F. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

G. Procedure

S 028-238-R00

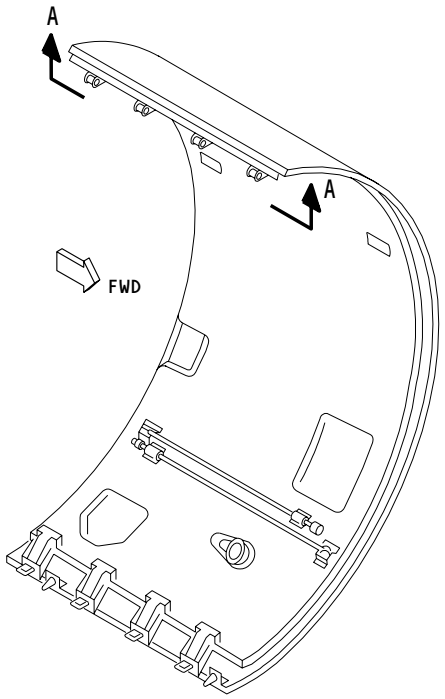
WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Remove the damaged seal (Fig. 809).
(a) Remove the heatshields.
1) Remove the heatshield Hi-Lok fasteners and the attachment screws.
2) Remove the heatshields and keep them for the installation.
(b) Disconnect the jumper cables.
1) Remove the Hi-Lok fasteners that attach the jumper cables.
2) If the jumper cables are damaged, replace the cables with repair procedure FRS6040 (Left) and FRS6054 (Right) (AMM 71-11-04/801).
(c) Drill out the rivets that attach the seal.
(d) Carefully remove the seal and the shim material.

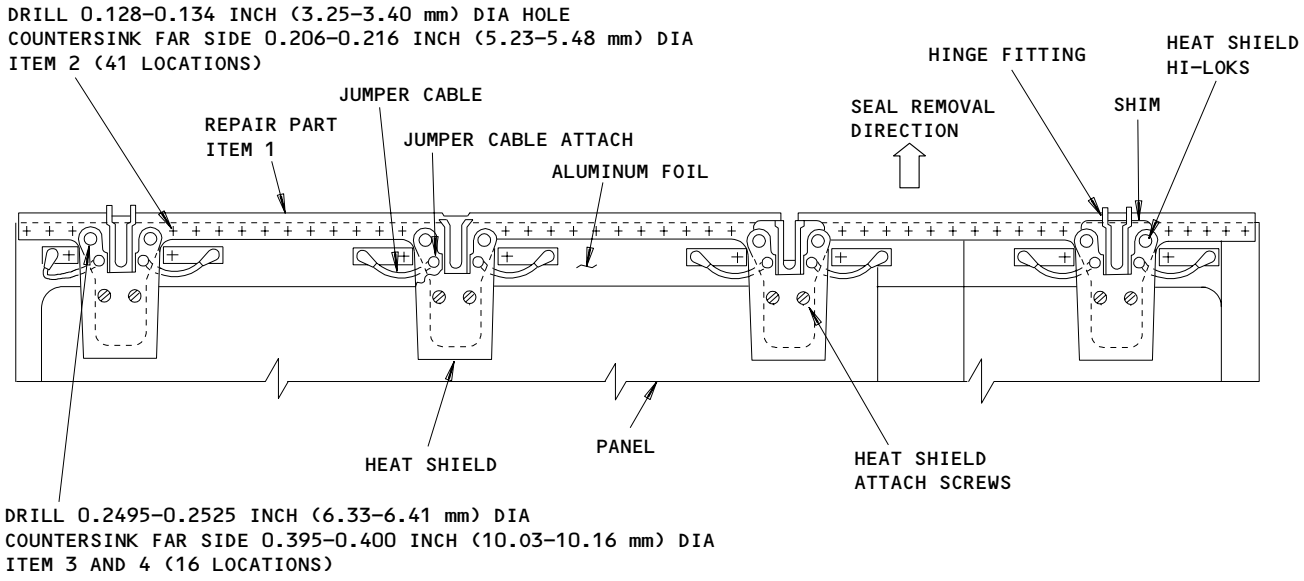
NOTE: It may be necessary to hit one end of the seal to release the seal from the hinge fitting.

The seal can be cut into small sections to make the removal of the seal easy.

1) Do not damage the aluminium foil.



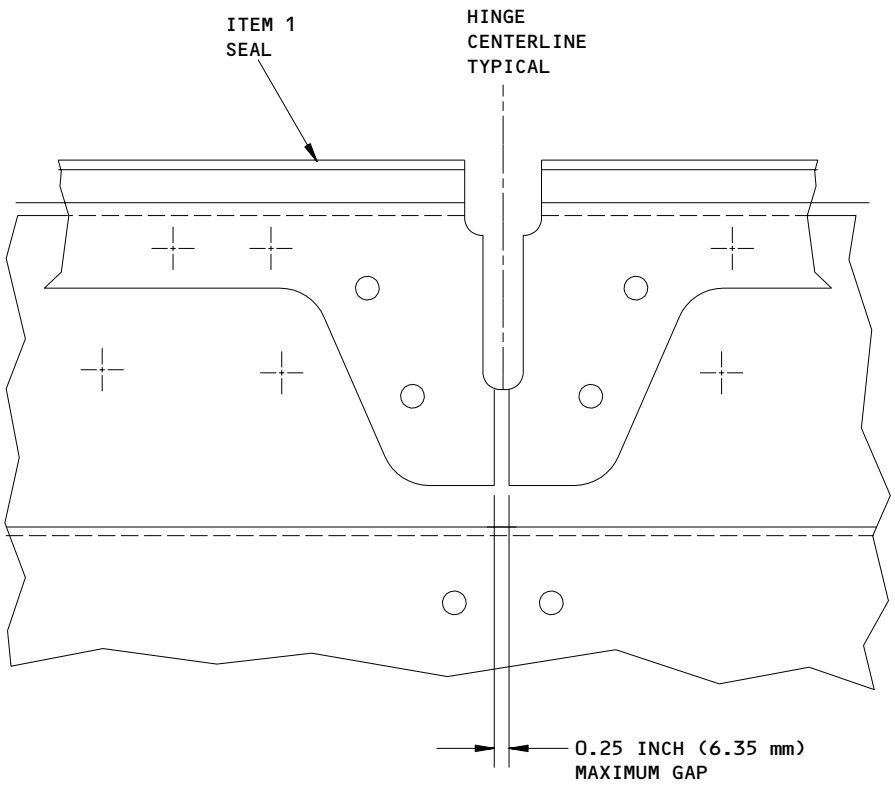
VIEW OF LEFT
FAN ACCESS COWL



SEAL VIEWED FROM HINGE SIDE
A-A

62123B

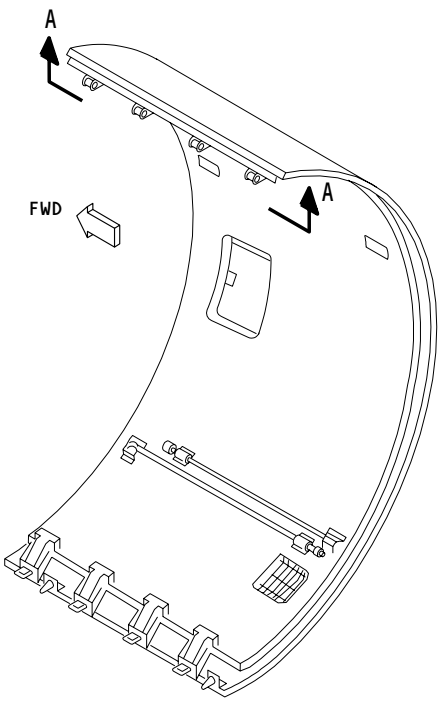
Fan Cowl Panel Metal Seal Replacement
Figure 809 (Sheet 1)



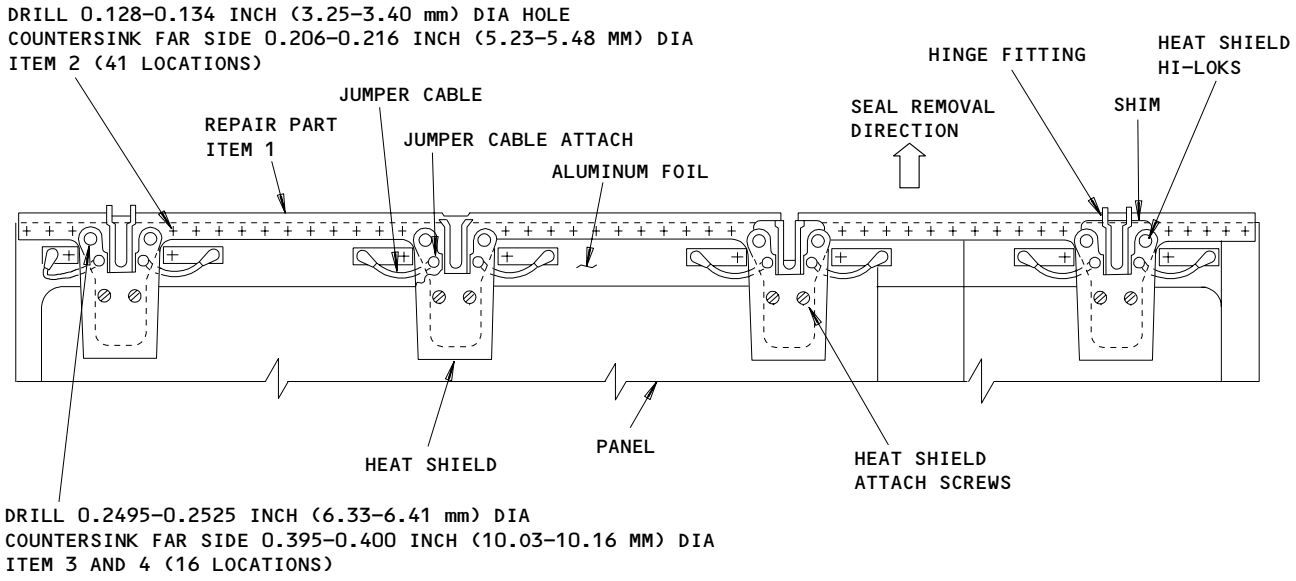
SEAL SPLICE
HINGE REMOVED FOR CLARITY

62587

Fan Cowl Panel Metal Seal Replacement
Figure 809 (Sheet 2)



VIEW OF RIGHT
FAN ACCESS COWL



SEAL VIEWED FROM HINGE SIDE
A-A

62538A

Fan Cowl Panel Metal Seal Replacement
Figure 809 (Sheet 3)

2) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the seal installation area and jumper cable attachment area on the hinge fitting clean.
3) Immediately make the areas dry with a lint free cloth.

S 428-052-R00

(2) Install the replacement seal (Fig. 809).
(a) Find the seal that is necessary.
1) Use Item 5 as the repair part.
(b) Put the replacement seal in the correct position.
1) Find the holes that are in the fan cowl panel.
2) Drill the holes in the seal in the same position for the rivets and Hi-Lok fasteners.
3) Make the internal edge of the holes smooth.
(c) Remove all swarf from the area.
(d) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces of the seal and fan cowl panel clean.
(e) Use a lint free cloth that is moist with MEK solvent and make the mating faces of the seal and the fan cowl panel clean.
1) Immediately make the areas dry with a lint free cloth.
(f) Put a release agent on the hinge fitting and on the aluminium foil where the seal touches.
(g) Use the manufacturer's instructions to prepare the adhesive (EA934NA).
(h) Put the adhesive on the mating face of the seal.
(i) Put the seal in the correct position and install the rivets.
1) Use squeeze rivet equipment to carefully close the rivets.
(j) Use infra-red heat lamps to make the adhesive dry for 1 hour at 60 C (140 F).
(k) Put the jumper cables in the correct position and install the Hi-Lok fasteners with wet sealant (PR1436GA).
1) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the Hi-Lok fasteners that attach the jumper cables clean.
2) Immediately make the area dry with a lint free cloth.

(l) Put sealant on the jumper cable ends and the attachment Hi-Lok fasteners.
(m) Put accelerator on the sealant with a spray gun.
(n) Install the heatshields.
1) Install the heatshields with screws and locking compound.
2) Install the Hi-Lok fasteners with wet sealant.

S 378-060-R00

(3) Do the procedure to put the fan cowl panel external surface back to its usual condition with repair procedure FRS6400 (AMM 71-11-01/801).
(a) Make a visual inspection of the area that was repaired.

S 938-053-R00

(4) Use a permanent marker pen and write the repair number FRS6091 next to the fan cowl panel part number.
(a) The color of the marker must contrast with the panel color.

TASK 71-11-04-308-072-R00

10. Left and Right Fan Cowl Panel - Repair of Edge Erosion

A. General
(1) The repairs in this procedure are FRS6100 and FRS6101. Use FRS6100 for the left fan cowl panel and FRS6101 for the right fan cowl panel.
(2) This procedure gives the instructions for edge erosion repairs.
(a) The edge erosion that can be repaired with this procedure must not be longer than 0.50 inch (12.7 mm) and not deeper than 0.02 inch (0.5 mm).
(3) This repair can be used for the fan cowl panel part numbers that follow:

Left Fan Cowl Panel - LJ71467, LJ71567, LJ71717, LJ71545, LJ71777, LJ75747, LJ76299, LJ76378

Right Fan Cowl Panel - LJ71468, LJ71568, LJ71718, LJ71546, LJ71778, LJ75748, LJ75814, LJ76379

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:
   (a) Use gloves when you use degreasers.
   (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
   (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
   (d) Use degreasers in work areas that have a good flow of air.
   (e) Use potting compounds in work areas that have a good flow of air.
   (f) Do not let potting compounds come in contact with your skin.
   (g) Use sealants in work areas that have a good flow of air.
   (h) Do not let sealants come in contact with your skin.

B. Equipment
   (1) Weight Measurement Equipment, 0-200 grams
   (2) Infra-red Heat Lamps (Explosion proof)

C. Consumable Materials
   (1) Adhesive (EA934NA)
   Hysol Div-Dexter Corp.,
   P.O. Box 132, Pittsburg, California, U.S.A.
   OMat no. - 8/52
   (2) Abrasive paper (Grade 180)
   OMat No. - 5/62
   (3) Lint free cloth - Local resources
   (4) Acetone OMat No. 150 or
   Isopropyl alcohol OMat No. 1/40 or
   Cleaning solvent Desoclean OMat No. 1/257
   (5) Adhesive tape (P.T.F.E.)
   OMat No. - 256

D. References
   (1) AMM 71-11-01/801, Inlet Cowl
E. Access
   (1) Location Zones
       410 No. 1 Power Plant (Left)
       420 No. 2 Power Plant (Right)

F. Edge Erosion Repair (Fig. 810)

S 128-055-R00

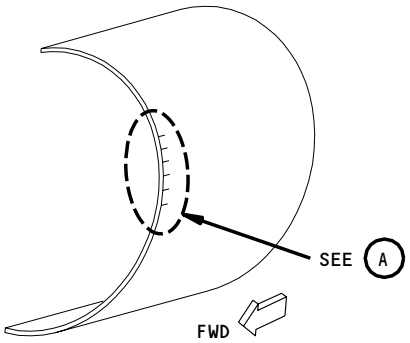
WARNING: WHEN YOU CUT OR ABRADE COMPOSITE MATERIALS, THE DUST PARTICLES FROM THE COMPOSITE MATERIALS CAN INJURE YOU. USE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES FOR PROTECTION. DO NOT BREATH THE DUST OR LET THE DUST COME IN CONTACT WITH YOUR SKIN FOR A LONG TIME.

(1) Carefully remove the surface finish with abrasive paper.
   (a) Do not go into the surface of the composite material.
   (b) Abrade the edge of the surface finish around the repair area until it is smooth with the repair area.
   (c) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the repair area clean.
   (d) Immediately make the area dry with a lint free cloth.

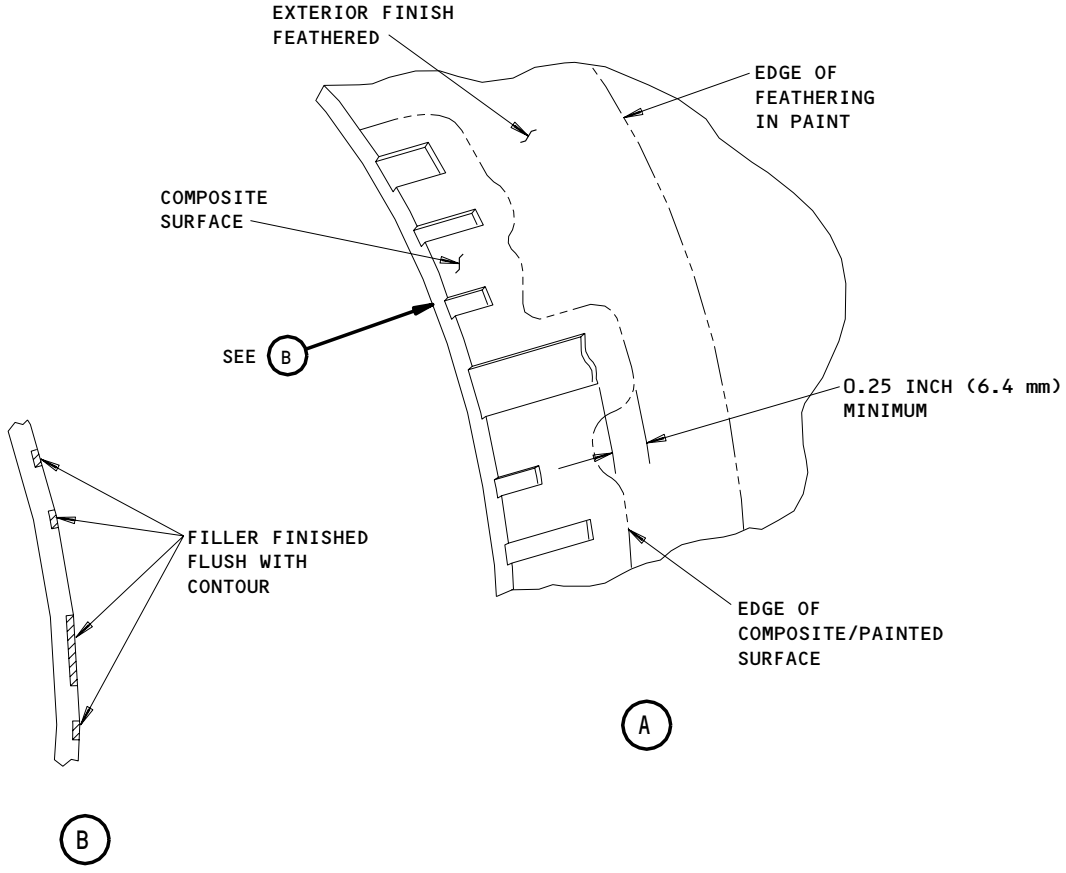
S 348-239-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(2) Do the edge repair.
   (a) Use the manufacturer's instructions to prepare the adhesive (EA934NA).



LEFT COWL PANEL



Fan Cowl Panel Edge Erosion Repair
Figure 810

(b) Apply the adhesive to the area of the erosion.
(c) Put the adhesive tape (P.T.F.E.) over the adhesive.
1) Apply pressure over the tape if necessary to make a smooth surface finish.
(d) Use infra-red heat lamps to dry the adhesive for 1 hour at 60 C (140 F).
(e) Remove the adhesive tape.
(f) Carefully abrade the adhesive with abrasive paper until the adhesive is smooth with the adjacent area.

S 378-058-R00
(3) Do the procedure to put the external surface of the fan cowl panel back to its usual condition (FRS6400)(AMM 71-11-01/801).
(a) Make a visual inspection of the completed repair.

S 938-059-R00
(4) Use a permanent marker pen and write the repair number next to the part number of the fan cowl panel.
(a) The color of the marker must contrast with the panel color.
(b) Use FRS6100 on the left fan cowl panel and FRS6101 on the right fan cowl panel.

TASK 71-11-04-308-071-R00

11. Left Fan Cowl Panel - Integrated Drive Generator (I.D.G.) Oil Filler Access Door Replacement

A. General
(1) The repair in this procedure is FRS6150/1.
(2) This procedure gives the instructions for the replacement of the integrated drive generator (I.D.G.) oil filler access door in the left fan cowl panel.
(3) This repair can be used with the fan cowl panel part numbers that follow:
(4) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers.
(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.
(g) Use sealants in work areas that have a good flow of air.
(h) Do not let sealants come in contact with your skin.

B. Consumable Materials
(1) Polysulfide sealant (PR1750) and Primer, two part kit Products Research and Chemical Corp.,
Glendale, California, U.S.A.
OMat No. - 8/120A or OMat No. 8/120B
(2) Acetone OMat No. 150 or
Isopropyl alchol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(3) Lint free cloth - Local resources
(4) Cotton gloves - Local resources
(5) Paint brush
OMat No. - 2/12

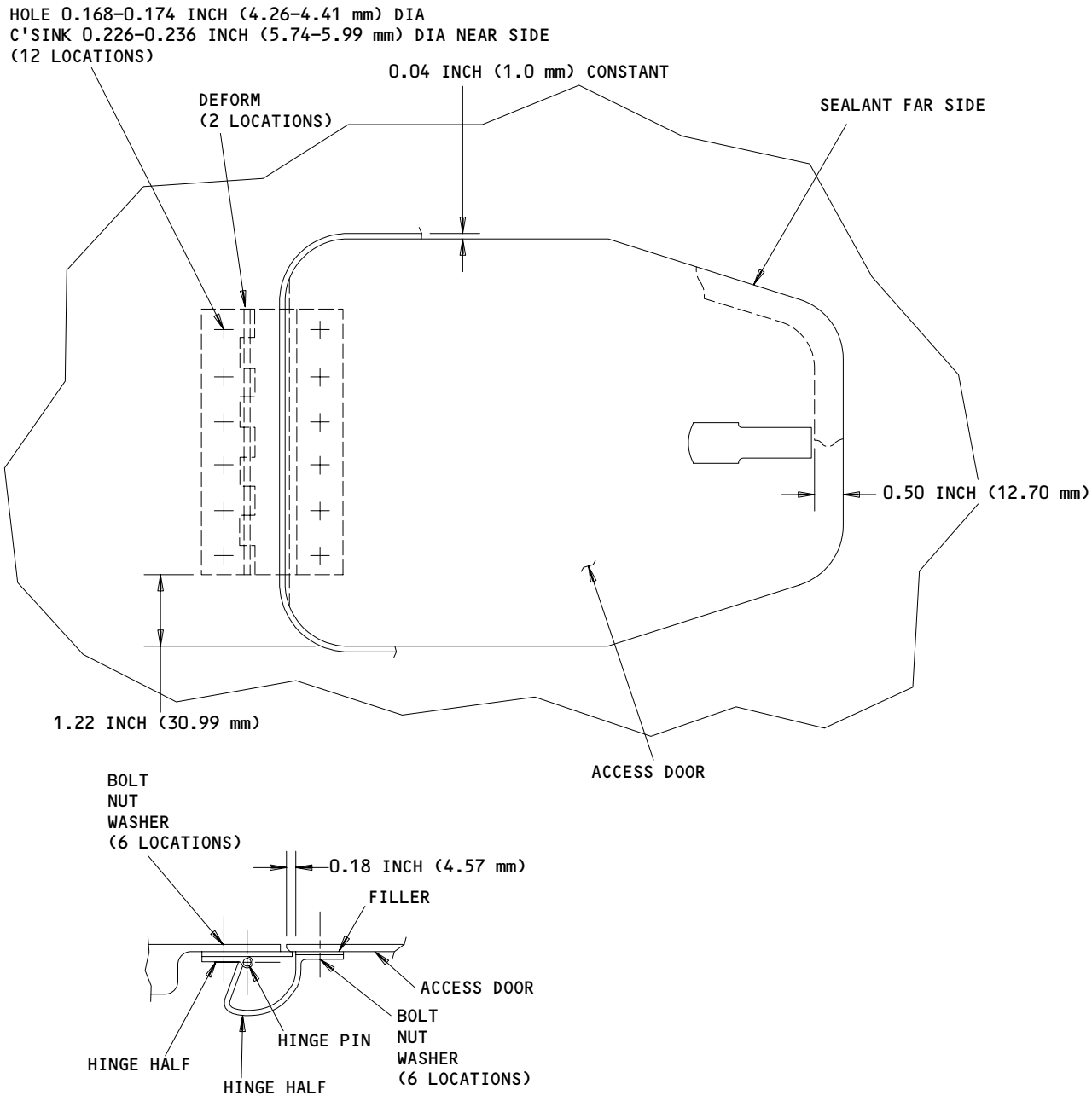
C. Parts
(1) Access door (Item 1) - LJ70705
(2) Bolt (Item 2) - NAS1202-6 (RR1011193)
(3) Nut (Item 3) - MS21042L08 (RR2206994)
(4) Washer (Item 4) - AN960-8L (RR2308499)

D. Access
(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

E. Procedure

S 028-061-R00
(1) Remove the damaged access door (Fig. 811).
(a) Remove the Hi-Lok fasteners.



62195A

Left Fan Cowl Panel IDG Oil Filler Access Door Replacement
Figure 811

(b) Remove the access door.

S 428-240-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(2) Install the replacement access door (Fig. 811).
   (a) Put the access door into the door opening. Use a clamp to hold the door.
   (b) Find the holes in the fan cowl panel and drill holes in the access door at the same positions.
   (c) Remove the access door.
   (d) Remove all swarf from the area.
   (e) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces of the fan cowl panel and the access door clean.
      1) Immediately make the area dry with a lint free cloth.
   (f) Apply primer (PR1750) to the mating faces of the access door hinge and the fan cowl panel.
   (g) Let the primer become dry for 30 minutes.
   (h) Use the manufacturer's instructions to prepare the sealant (PR1750).
   (i) Apply the sealant to the mating faces of the access door hinge and the fan cowl panel.
   (j) Put the access door into the correct position and install the fasteners with wet sealant.
   (k) Make sure the access door is in the correct position and the door operates correctly.
   (l) Adjust the position of the access door as follows.
      1) Bend the door hinge and cut the door seal to remove seal thickness as necessary.

         NOTE: Refer to the SRM 51-11-01 for the clearances.

S 378-063-R00

(3) Do the procedure to put the external surface finish of the fan cowl panel back to its usual condition (FRS6400) (AMM 71-11-01/801).

S 218-102-R00

(4) Make a visual inspection of the completed repair.

S 938-064-R00

(5) Use a permanent marker pen and write the repair number FRS6150/1 adjacent to the part number of the fan cowl panel.
   (a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-070-R00

12. Left Fan Cowl Panel - Integrated Drive Generator (I.D.G.) Oil Filler Access Door Hinge Replacement

A. General
   (1) The repair in this procedure is FRS6150/2.
   (2) This procedure gives the instructions for the replacement of the I.D.G. oil filler access panel hinge in the left fan cowl panel.
   (3) Be careful when you use the consumable materials for this repair:
      (a) Use gloves when you use degreasers.
      (b) Do not smoke when you use degreasers.
      (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
      (d) Use degreasers in work areas that have a good flow of air.
      (e) Use epoxy compounds in work areas that have a good flow of air.
      (f) Do not let epoxy compounds come in contact with your skin.
      (g) Use sealants in work areas that have a good flow of air.
      (h) Do not let sealants come in contact with your skin.

B. Consumable Materials
   (1) Polysulfide sealant (PR1750) and Primer, two part kit Products Research and Chemical Corp.,
   Glendale, California, U.S.A.
   OMat No. 8/120A or OMat No. 8/120B
   (2) Acetone OMat No. 150 or
   Isopropyl alchol OMat No. 1/40 or
   Cleaning solvent Desoclean OMat No. 1/257
   (3) Lint free cloth - Local resources
   (4) Cotton gloves - Local resources

(5) Paint brush
OMat No. - 2/12

C. Parts
(1) Hinge half (Item 1) - LJ70707
(2) Hinge half (Item 2) - LJ70706
(3) Hinge pin (Item 3) - LJ70708
(4) Bolt (Item 4) - NAS1202-5 (RR2308444)
(5) Nut (Item 5) - MS21042L08 (RR2206994)
(6) Washer (Item 6) - AN960-8L (RR2308499)
(7) Bolt (Item 7) - NAS1202-6 (RR1011193)

D. References
(1) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Procedure

S 028-065-R00
(1) Remove the damaged hinge (Fig. 811)
(a) Remove the Hi-Lok fasteners.
(b) Remove the hinge from the access door and the fan cowl panel.

S 428-241-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(2) Install the replacement hinge (Fig. 811).
(a) Put the hinge halves on the access door and the fan cowl panel in the correct position.
1) Use a clamp to hold the hinge.
(b) Find the holes in the access door and the fan cowl panel.
1) Drill holes for the fasteners.

(c) Remove the hinge halves.
(d) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces clean.
1) Immediately make the area dry with a lint free cloth.
(e) Install the hinge pin in the hinge halves.
(f) Apply primer (PR1750) to the mating faces.
(g) Let the primer become dry for 30 minutes.
(h) Use the manufacturer's instructions to prepare the sealant (PR1750).
(i) Apply the sealant to the hinge mating faces.
(j) Put the access door and the hinge in the correct position and install the fasteners with wet sealant.
(k) Deform the ends of the hinge to keep the pin in the hinge.
(l) Make sure the access door is in the correct position and the door operates correctly.
(m) Adjust the position of the access door as follows.
1) Bend the door hinge and cut the door seal to remove seal thickness as necessary.

NOTE: Refer to SRM 51-11-01 for the clearances.

(n) Apply sealant to the mating faces on the fan cowl panel to make a seal that is 0.032 - 0.048 inch (0.8 - 1.2 mm) thick.

S 378-067-R00
(3) Do the procedure to put the external surface finish of the repaired area back to its usual condition (FRS6400) (AMM 71-11-01/801).

S 218-101-R00
(4) Make a visual inspection of the completed repair.

S 938-068-R00
(5) Use a permanent marker pen and write the repair number FRS6150/2 adjacent to the part number of the fan cowl panel.
(a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-069-R00

13. Right Fan Cowl Panel, Oil Filler Access Door - Latch Replacement

A. General
   (1) The repair in this procedure is FRS6170.
   (2) This procedure gives the instructions for the replacement of the oil filler access door latch on the right fan cowl panel.
   (3) This repair can be used on oil filler access doors with the part numbers that follow:

       LJ75505 (Pre SB 71-B449)
       LJ76871 (Pre SB 71-B449)
       LJ76872 (Post SB 71-B592)
   (4) Be careful when you use the consumable materials for this repair:
       (a) Use gloves when you use degreasers.
       (b) Do not smoke when you use degreasers.
       (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
       (d) Use degreasers in work areas that have a good flow of air.
       (e) Use epoxy compounds in work areas that have a good flow of air.
       (f) Do not let epoxy compounds come in contact with your skin.
       (g) Use sealants in work areas that have a good flow of air.
       (h) Do not let sealants come in contact with your skin.

B. Consumable Materials
   (1) Epoxy primer and catalyst, two pack, (Base: 463-6-27, Catalyst: X-337); AKZO coatings Inc., OMAT No. - 766C.
   (2) Acetone OMat No. 150 or
       Isopropyl alchol OMat No. 1/40 or
       Cleaning solvent Desoclean OMat No. 1/257
   (3) Lint free cloth - Local resources, OMAT No. - 2/101.

C. Parts
   (1) (Fig. 812)
       Latch assembly, (Item 1)
       H2884-31 (RR1023379)

(2) Hi Lok pin, (Item 2)
HL11V-5-2
(3) Washer, (Item 3)
NAS1149CN832R (RR1017942)
(4) Nut, (Item 4)
MS21043-08

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Procedure

S 028-242-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

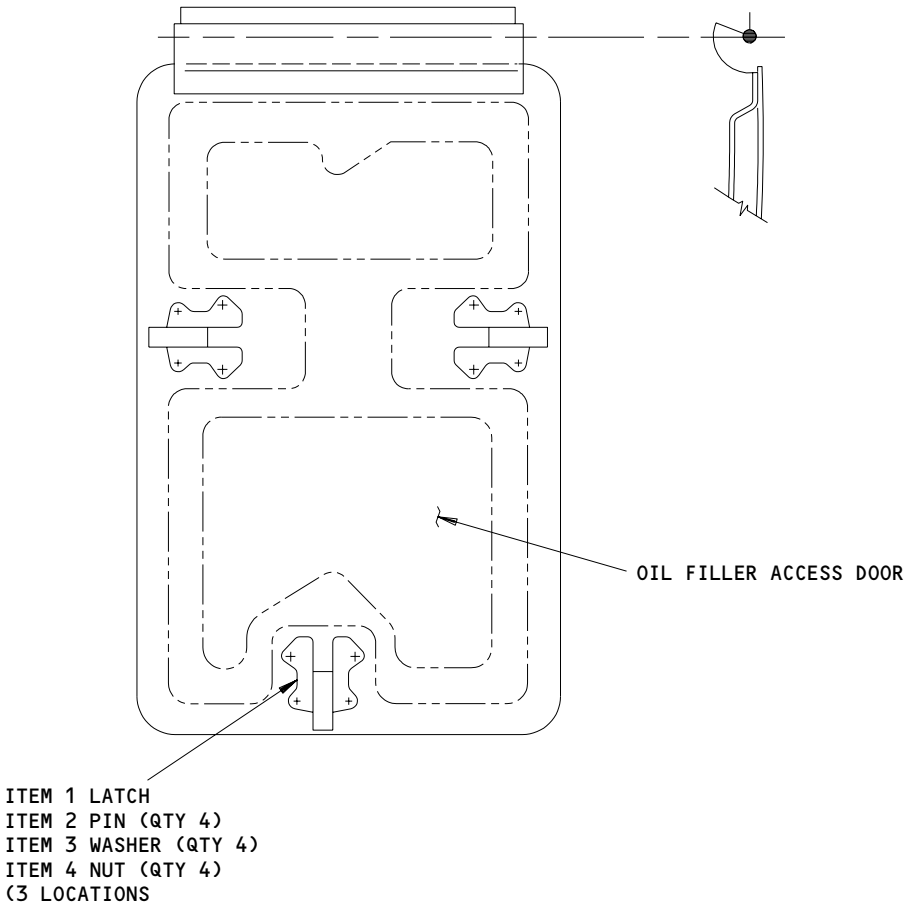
(1) Remove the damaged latch (Fig. 812).
(a) Remove the Hi-Lok fasteners.
(b) Remove the latch.

S 428-074-R00
(2) Install the replacement latch (Fig. 812).

S 118-216-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE DEGREASER (MEK). IF YOU DO NOT OBEY THE INSTRUCTIONS YOU CAN CAUSE INJURY TO YOUR HEALTH.

(3) Take the following precautions when using Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
(a) Use gloves when you apply Acetone or Isopropyl alcohol or cleaning solvent Desoclean.



62612

Right Hand Fan Cowl Panel Oil Filler Access Door Latch Replacement
Figure 812

(b) Do not smoke where Acetone or Isopropyl alcohol or cleaning solvent Desoclean are present.
(c) Acetone or Isopropyl alcohol or cleaning solvent Desoclean are very flammable. Keep it away from open flame and ignition sources.
(d) Use Acetone or Isopropyl alcohol or cleaning solvent Desoclean where there is good ventilation.
(e) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to make the mating faces of the latch and access door clean.
(f) Use a lint free cloth that is moist with MEK solvent and make the mating faces of the latch and the access door clean.
1) Immediately make the area dry with a lint free cloth.

S 118-217-R00

WARNING: OBEY THE INSTRUCTIONS WHEN USING THE EPOXY PRIMER. IF YOU DO NOT OBEY THE INSTRUCTIONS YOU CAN CAUSE INJURY TO YOUR HEALTH.

(4) Take the following precautions when using the epoxy primer:
(a) Use the epoxy primer where there is good ventilation.
(b) Do not let the epoxy primer come in contact with your skin.
(c) The epoxy primer is very flammable. Keep it away from open flames and ignition sources.

S 348-218-R00
(5) Apply the primer.
(a) Mix the two-pack epoxy primer per the manufacturer's instructions.
(b) Apply the primer to the mating faces of the latch and the oil filler access door.
(c) Let the primer become dry for 30 minutes.

S 408-219-R00
(6) Install the latch assembly with the Hi Lok fasteners.
(a) Apply the epoxy primer to the fasteners and install them "wet".

S 358-220-R00

(7) Repair the surface protection of the fan cowl panel and the oil filler access door (Refer to FRS6400).

S 218-221-R00

(8) Make a visual inspection of the completed repair.

S 718-222-R00

(9) Make sure the latch operates correctly.

S 938-223-R00

(10) Use a permanent marker pen and write the repair number FRS6170 adjacent to the part number of the fan cowl panel.
   (a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-075-R00

14. Right Fan Cowl Panel - Oil Filler Access Door Replacement

A. General
   (1) The repair in this procedure is FRS6171.
   (2) This procedure gives the instructions for the replacement of the oil filler access door in the right fan cowl panel.
   (3) This repair can be used with the fan cowl panel part numbers that follow:

      (a) LJ75748, LJ75814, LJ76379 SB71-9190.
   (4) Be careful when you use the consumable materials for this repair:
      (a) Use gloves when you use degreasers.
      (b) Do not smoke when you use degreasers.
      (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
      (d) Use degreasers in work areas that have a good flow of air.
      (e) Use epoxy compounds in work areas that have a good flow of air.
      (f) Do not let epoxy compounds come in contact with your skin.
      (g) Use sealants in work areas that have a good flow of air.
      (h) Do not let sealants come in contact with your skin.

B. Equipment
   (1) Drills and drill equipment

C. Consumable Materials
   (1) Polysulfide sealant PR1750 and Primer, two part kit Products Research and Chemical Corp., Glendale, California, USA, OMat No. - 8/120A or OMat No. 8/120B
   (2) Acetone OMat No. 150 or Isopropyl alcohol OMat No. 1/40 or Cleaning solvent Desoclean OMat No. 1/257
   (3) Lint free cloth - Local resources
   (4) Cotton gloves - Local resources
   (5) Paint brush, OMat No. - 2/12

D. Parts
   (1) Oil filler access door (Item 1) - LJ75505
   (2) Spring (Item 2) - LJ70568
   (3) Screw (Item 3) - FS2041-08-5
   (4) Nut (Item 4) - MS21043-08
   (5) Washer (Item 5) - AN960C8L

E. References
   (1) AMM 71-11-01/801, Inlet Cowl

F. Access
   (1) Location Zones
       410 No. 1 Power Plant (Left)
       420 No. 2 Power Plant (Right)

G. Procedure

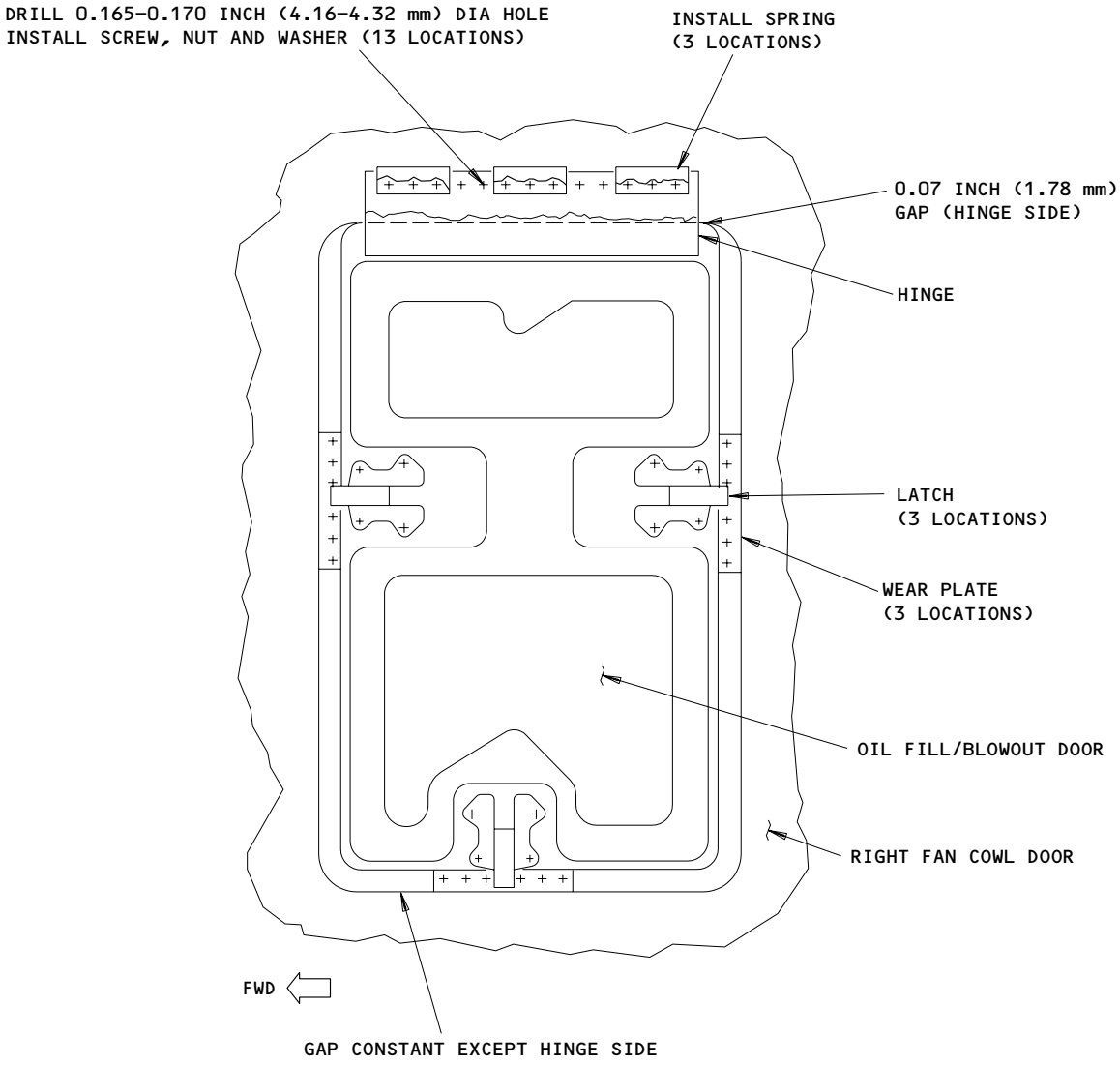
   S 028-076-R00

   (1) Remove the damaged access door (Fig. 813).
      (a) Remove the fasteners and the spring.
      (b) Remove the access door.

   S 428-243-R00

   WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

   (2) Install the replacement oil filler access door (Fig. 813).
      (a) Put the access door into the door opening.
         1) Use a clamp to hold the door.
      (b) Find the holes in the fan cowl panel and drill holes in the access door at the same positions.
      (c) Remove the access door.
      (d) Remove all swarf from the area.



Right Fan Cowl Panel Oil Filler Access Door Replacement
Figure 813

(e) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces of the fan cowl panel and access door clean.
1) Immediately make the area dry with a lint free cloth.
(f) Apply primer (PR1750) to the mating faces of the access door and the fan cowl panel.
(g) Let the primer become dry for 30 minutes.
(h) Use the manufacturer's instructions to prepare the sealant (PR1750).
(i) Apply the sealant to the mating faces of the access door and the fan cowl panel.
(j) Put the access door into the correct position and install the fasteners with wet sealant in the 4th and 5th holes from each end of the hinge.
(k) Install the spring with wet sealant and the fasteners that remain.
(l) Make sure the access door is in the correct position and the door operates correctly.
(m) Adjust the position of the access door as follows.
1) Bend the door hinge and cut the door seal to remove seal thickness as necessary.

NOTE: Refer to the SRM 51-11-01, for the clearances.

S 378-079-R00
(3) Do the procedure to put the external surface finish of the fan cowl panel back to its usual condition (FRS6400) (AMM 71-11-01/801).

S 218-080-R00
(4) Make a visual inspection of the completed repair.
(a) Make sure the door operates correctly.

S 938-078-R00
(5) Use a permanent marker pen and write the repair number FRS6171 adjacent to the part number of the fan cowl panel part number.
(a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-081-R00

15. Right Fan Cowl Panel, Oil Filler Access Door - Latch Wear Strip Replacement

A. General
(1) The repair in this procedure is FRS6172.
(2) This procedure gives the instructions for the replacement of the latch wear strips on the oil filler access door in the right fan cowl panel.
(3) This repair can used for the fan cowl panel part numbers that follow:

(4) Be careful when you use the consumable materials for this repair:
  (a) Use gloves when you use degreasers.
  (b) Do not smoke when you use degreasers.
  (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
  (d) Use degreasers in work areas that have a good flow of air.
  (e) Use sealants in work areas that have a good flow of air.
  (f) Do not let sealants come in contact with your skin.

B. Equipment
(1) Drills and drill equipment
(2) Rivet equipment - squeeze type

C. Consumable Materials
(1) Polysulfide sealant (PR1750) and Primer, two part kit Products Research and Chemical Corp.,
Glendale, California, USA.
OMat No. - 8/120 or OMat No. 8/120B
(2) Acetone OMat No. 150 or
Isopropyl alchol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(3) Lint free cloth - Local resources
(4) Titanium sheet (6A1-4V) AMS4911, 0.020 inch (0.5 mm) thick, Local Resources
(5) Titanium sheet (6A1-4V) AMS4911, 0.050 inch (1.3 mm) thick, Local resources

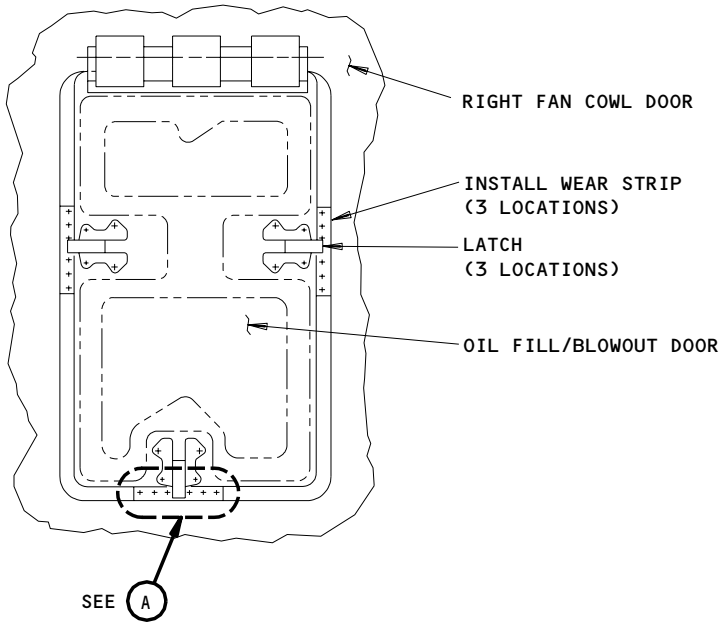
D. Parts
(1) Rivet (Item 2) - MS20427M4-6
(2) Rivet (Item 4) - NAS1200M4-6

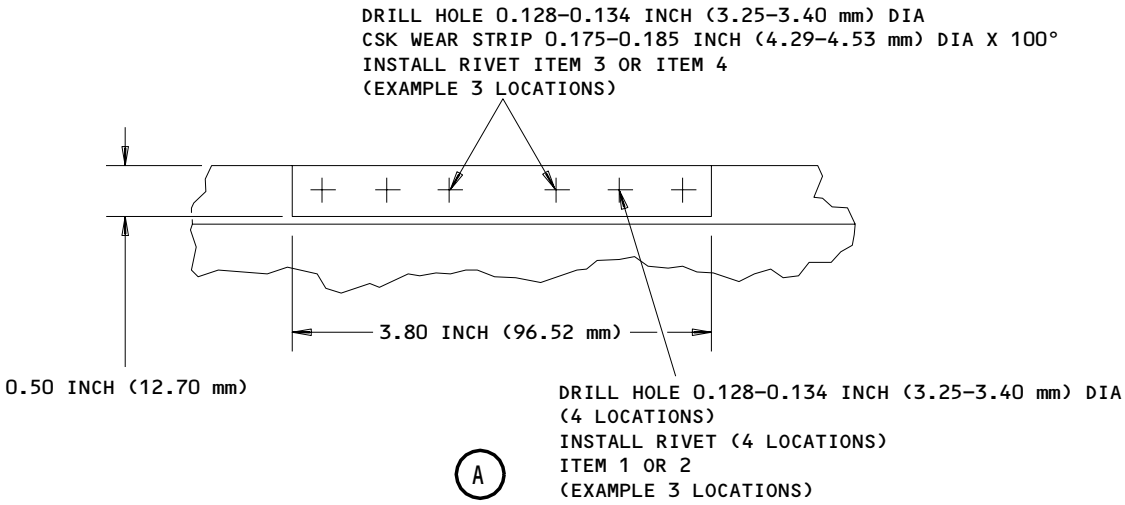
E. References
(1) AMM 71-11-01/801, Inlet Cowl

F. Access
(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

G. Procedure





62248

Right Fan Cowl Panel Oil Filler Access Door Latch Wear Strip Replacement
Figure 814

S 028-244-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Remove the damaged latch wear strip (Fig. 814).
  (a) Carefully drill out the attachment rivets.
  (b) Remove the wear strip.

S 428-083-R00

(2) Install the replacement latch wear strip (Fig. 814).
  (a) Make the replacement latch wear strip.
    1) Use the titanium sheet 0.050 inch (1.3 mm) thick.
  (b) Put the wear strip in the correct position.
    1) Use a clamp to hold the strip.
  (c) Find the holes in the oil filler access door.
  (d) Drill holes in the wear strip for the rivets.
  (e) Remove the wear strip.
  (f) Remove all swarf from the area.
  (g) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces of the oil filter access door and wear strip clean.
    1) Immediately make the area dry with a lint free cloth.
  (h) Apply primer (PR1750) to the mating faces on the door and the wear strip.
  (i) Let the primer become dry for 30 minutes.
  (j) Use the manufacturer's instructions to prepare the sealant (PR1750).
  (k) Apply the sealant to the mating faces of the access door and the wear strip.
  (l) Put the wear strip in the correct position.
  (m) Carefully install the rivets with wet sealant.
    1) Use the squeeze type rivet equipment.

S 378-084-R00

(3) Do the procedure to put the external surface finish back to its usual condition (FRS 6400)(AMM 71-11-01/801).

S 218-085-R00

(4) Make a visual inspection of the completed repair.
  (a) Make sure the door is in the correct position and operates correctly.
  (b) Make sure the latches and the wear strips interface correctly.

S 938-086-R00

(5) Use a permanent marker pen and write the repair number FRS6172 adjacent to the part number of the fan cowl panel.
   (a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-103-R00

16. Fan Cowl Panel Hinges - Bushing Replacement

A. General
   (1) The repair in this procedure is FRS6207.
   (2) This procedure gives the instructions for the replacement of a damaged or missing bushing(s) on the fan cowl panel hinges.
   (3) The repair can be used on the fan cowl panel part numbers that follow:

Left fan cowl panel	Right fan cowl panel
LJ75747	LJ75748 (without RR SB71-7722)
LJ76299	LJ75814 (with RR SB71-7722)
LJ76378	LJ76379

   (4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
   (5) Be careful when you use the consumable materials for this repair:
      (a) Use gloves when you use degreasers.
      (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
      (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
      (d) Use degreasers in work areas that have a good flow of air.
      (e) Use epoxy compounds in work areas that have a good flow of air.
      (f) Do not let epoxy compounds come in contact with your skin.

B. Equipment
   (1) Heat lamps (explosion proof)
   (2) Standard workshop tools
   (3) Permanent marker pen

C. Consumable Materials
   (1) Adhesive (EA934NA),
   Hysol Div-Dexter Corp., P.O. Box 132, Pittsburg, California, USA,
   OMat No. - 8/52
   (2) Acetone OMat No. 150 or
   Isopropyl alcohol OMat No. 1/40 or
   Cleaning solvent Desoclean OMat No. 1/257
   (3) Lint free cloth - Local resources, OMAT No. - 2/101

(4) Temporary rust preventative (DEF 2331A) or Rustban 392 (Exxon) or equivalent corrosion inhibitor, OMat No. - 1005

D. Parts
(1) Bushing (Item 1) - NAS77-6-018 (RR1013140)
(2) Bushing (Item 1A) - MS14238C06-018 (alternative to item 1)
(3) Bushing (Item 2) - NAS77-6-025 (RR1013141)
(4) Bushing (Item 2A) - MS14238C06-025 (alternative to item 2)
(5) Bushing (Item 3) - oversize, LJ76217
(6) Bushing (Item 4) - oversize, LJ76218

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Procedure

S 028-246-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

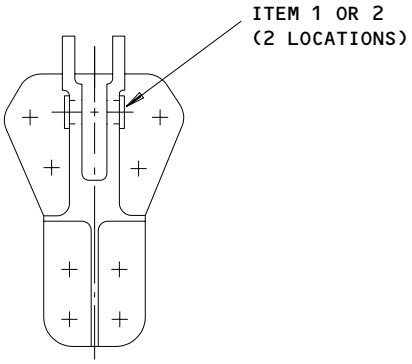
(1) Remove the damaged bushing (Fig. 815A).
(a) Using standard workshop equipment carefully push the damaged bushing out of the hinge lug bore.

NOTE: You can press the damaged bushing out of the hinge lug without damage to the lug bore. It is not ususlly necessary to machine the lug bore after you have removed the bushing.

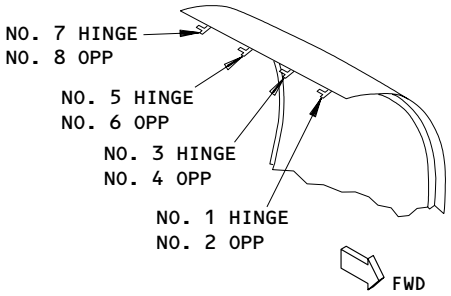
(b) Using standard workshop equipment carefully remove all burrs or unwanted foreign material from the mating surfaces of the lug bore.
1) Do not make the bore larger.

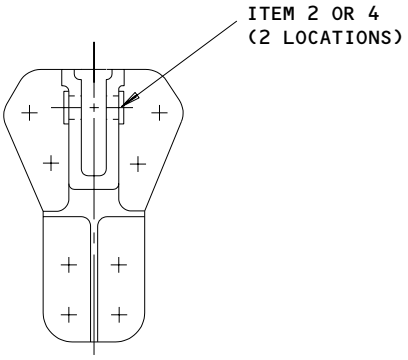
S 218-106-R00
(2) Do an inspection of the lug bore size (Fig. 815A).
(a) Find the replacement bushing that is required.
1) Measure the bore diameter.
2) If the bore size is between 0.4998 and 0.5010 inches (12.695 and 12.720 mm), use the standard size bushing (Item 1 or 2). 30

3) If the bore diameter is between 0.501and 0.531 inches (12.72 and 13.48 mm) in diameter, use the oversize bushing (Item 3 or 4) .
4) Using standard workshop equipment, machine the replacement bushing to make the outside diameter a 0.0005-0.0015 inch (0.013-0.038 mm) interference fit in the bore.

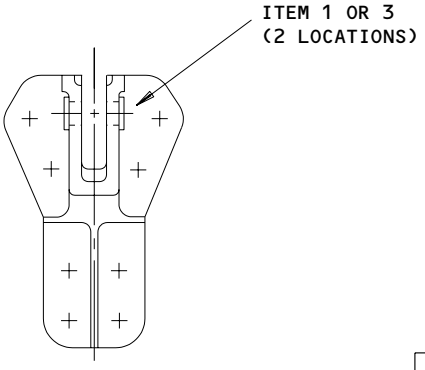


HINGE NO. 1,2,7 OR 8





HINGE NO. 3 OR 4



HINGE NO. 5 OR 6

LUG BORE DIAMETER	USE REPAIR ITEM	IN-LINE BORE BUSHINGS
0.4998-0.501 INCH (12.695-12.72 mm)	1 OR 2	0.3750-0.3765 INCH (9.525-9.563 mm)
0.501-0531 INCH (12.72-13.48 mm)	3 OR 4	0.3750-0.3765 INCH (9.525-9.563 mm)

62391B

Fan Cowl Panel Hinge Bushing Replacement
Figure 815A

S 428-107-R00

(3) Install the replacement bushing (Fig. 815A).
  (a) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean and make the mating faces of the bushing and hinge lug clean.
    1) Immediately make the area dry with a lint free cloth.
  (b) Use the manufacturer's instructions to prepare the adhesive (EA934NA).
  (c) Apply the adhesive to the bore of the lug.
  (d) Using standard workshop equipment, push the bushing into the lug bore until the bushing flange touches the lug.

S 348-225-R00

(4) Cure the adhesive.
  (a) Use heat lamps to dry the adhesive for 1 hour at 82-93 C (180-200 F).

S 328-226-R00

(5) Bore the bushings.
  (a) Use standard workshop tools to in-line bore the bushings of each hinge to 0.3750 - .03765 inches (9.525 - 9.563 mm).

S 218-108-R00

(6) Make a visual inspection of the repair.

S 628-227-R00

(7) Apply a layer of temporary rust preventative to the inside bore of the bushing.

S 938-109-R00

(8) Use a permanent marker pen and write the repair number FRS6207 adjacent to the part number of the fan cowl panel.
  (a) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-308-110-R00

17. Left and Right Fan Cowl Panel - Strut (Hold Open Rod) Mounting Bracket Replacement

A. General

(1) The repairs in this procedure are FRS6247 and FRS6248. Use FRS6247 for the left fan cowl panel and FRS6248 for the right fan cowl panel.

(2) This repair can be used on the fan cowl panel part numbers that follow:

(3) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use degreasers.
(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.

B. Equipment
(1) Drills and drill equipment
(2) Hi-Lok installation equipment

C. Consumable Materials
(1) Primer
OMat No. - 7/157
(2) Methyl-ethyl-ketone (MEK)
British Spec - B.S. 1940, 1968
OMat No. - 135
(3) Lint free cloth - Local resources

D. Parts
(1) Bracket (Item 1) - LJ76442
(2) Pin (Item 2) - LGPL9SCV06A18AC (RR3408644)
(3) Hi-Lok pin (Item 2a) - HL11V6-18 (RR3408493)
(4) Collar (Item 3) - SLFCAC06 (RR3408674)
(5) Hi-Lok collar (Item 3a) - HL79-6 (RR3408524)
(6) Spring washer (Item 4) - B1000-043S (RR3408529)
(7) Nut (Item 5) - MS21042L6 (RR2308059)
(8) Washer (Item 6) - AN960-616 (RR1205629)
(9) Spacer (Item 7) - NAS43HT6-16 (RR2308287)
(10) Bracket Assembly, (Item 8) - LJ76443

E. Access
(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

F. Procedure

S 028-247-R00

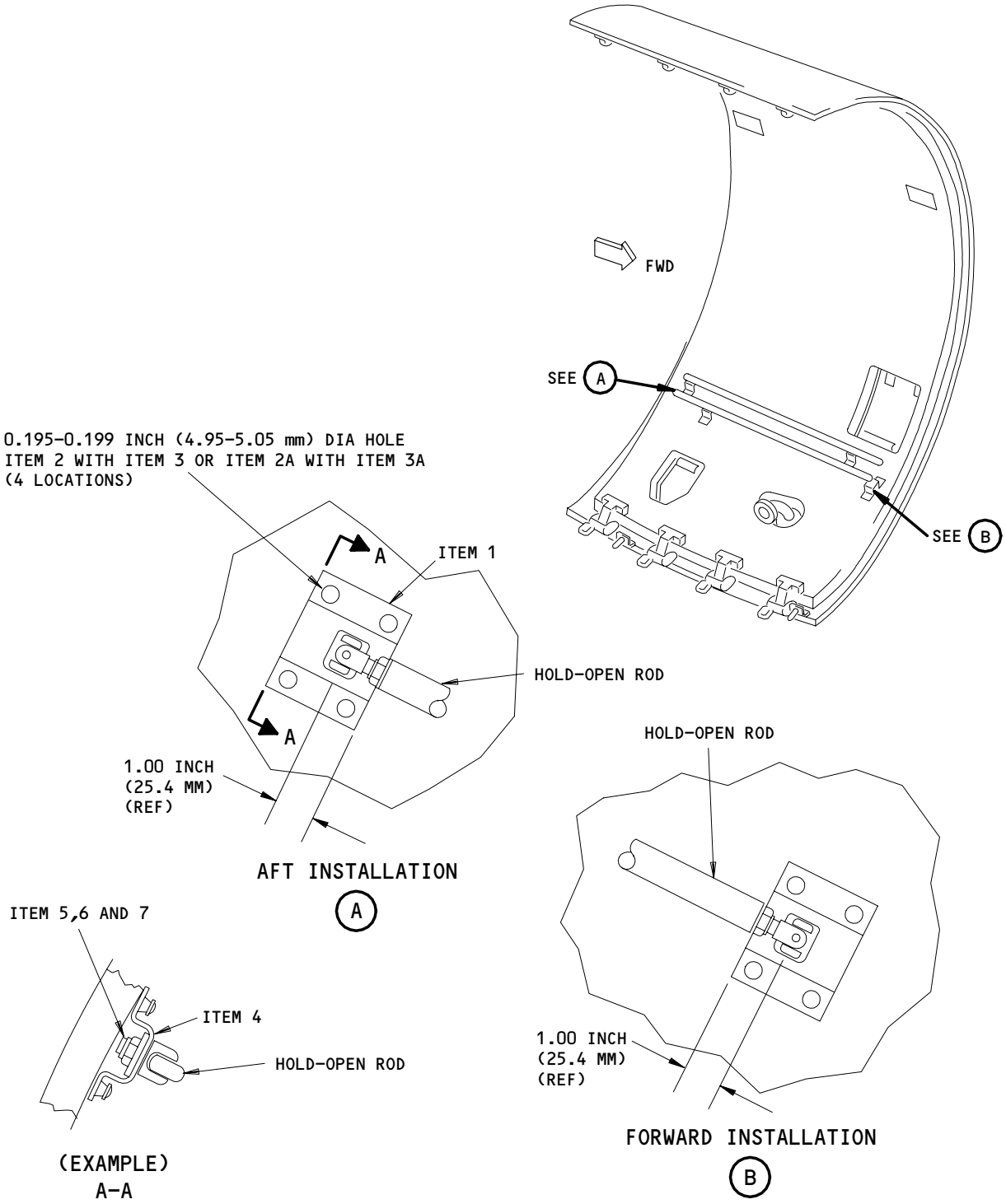
WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Remove the damaged bracket (Fig. 816)
  (a) Remove the strut assembly from the bracket.
  (b) Keep the strut assembly and the attachment fasteners for the installation.
  (c) Remove the fasteners that attach the bracket to the fan cowl panel.
  (d) Remove the damaged bracket.

S 428-130-R00

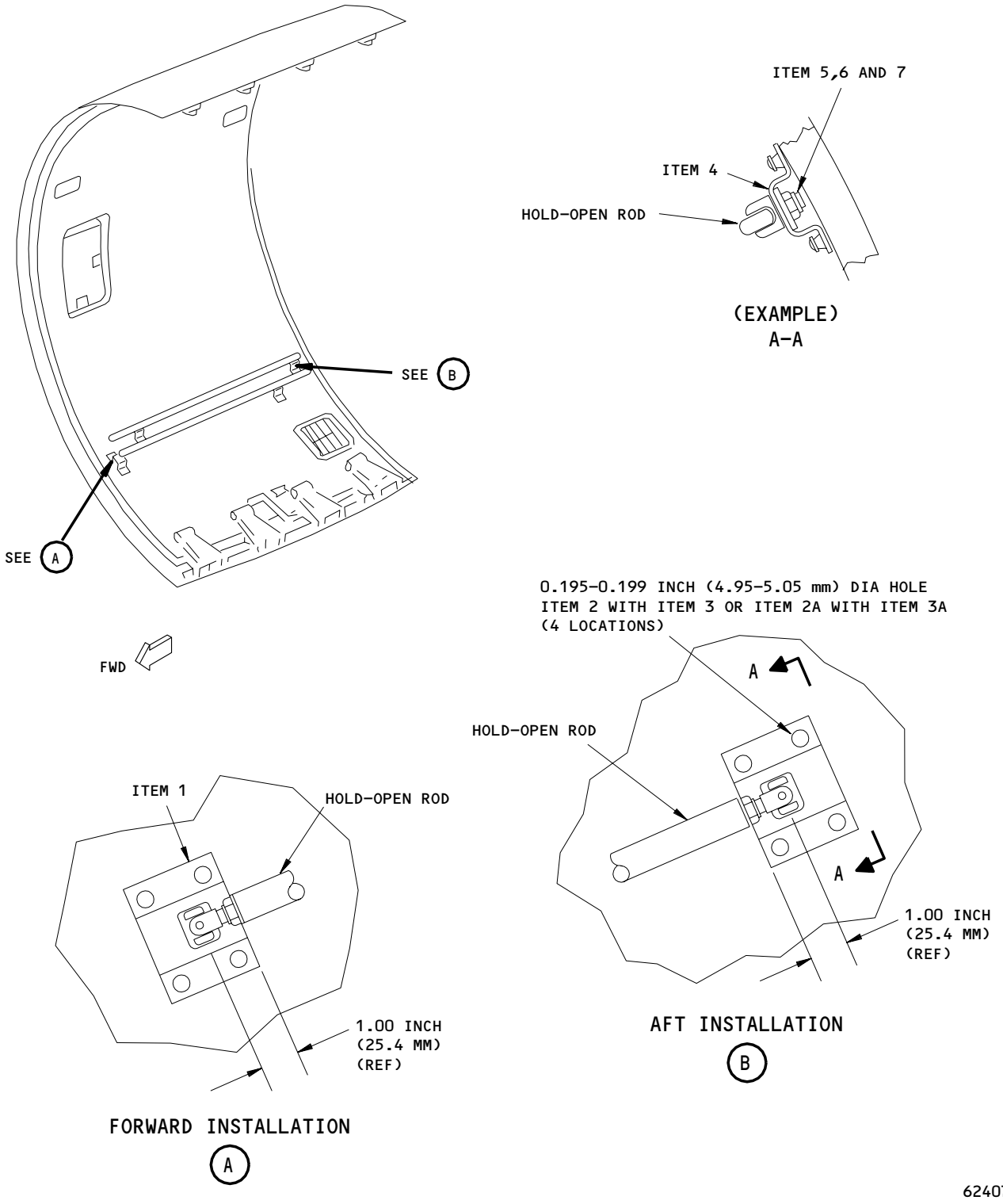
CAUTION: MAKE SURE THAT YOU CORRECTLY ALIGN THE NEW BRACKET WHEN YOU INSTALL IT. IF THE BRACKET IS NOT CORRECTLY ALIGNED, IT CAN CAUSE DAMAGE TO THE EQUIPMENT.

(2) Install the replacement bracket (Fig. 816).
  (a) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to make the area clean.
  (b) Use a lint free cloth that is moist with MEK solvent to make the area clean.
    1) Immediately make the area dry with a lint free cloth.
  (c) Put the bracket in the correct position.
    1) Use a clamp to hold the bracket.
  (d) Find the holes in the fan cowl panel and drill holes in the bracket at the same position.
  (e) Remove the bracket and make the edges of the hole smooth.
  (f) Remove all the swarf from the area.

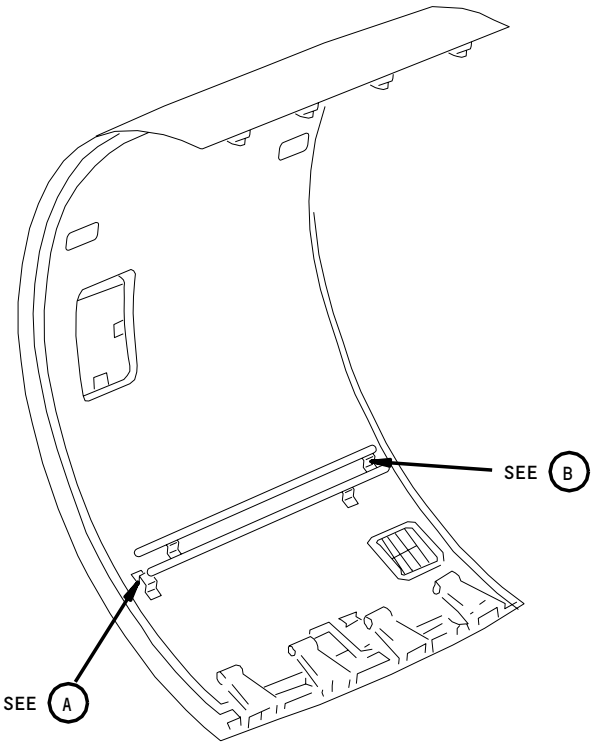


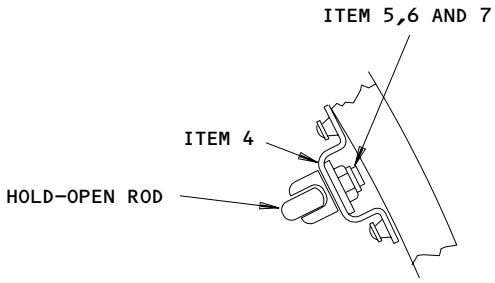
62406A

Left Fan Cowl Panel Strut Assembly Mounting Bracket Repair
(RB 211-535C and RB 211-535E4/E4B)
Figure 816 (Sheet 1)



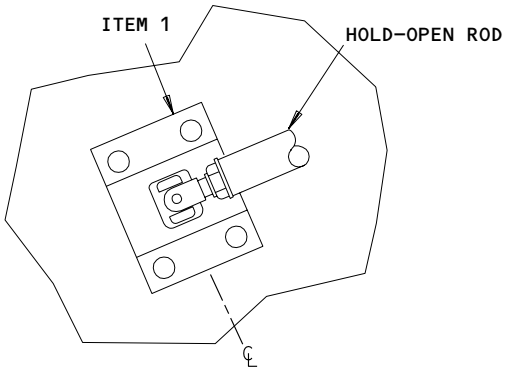
Right Fan Cowl Panel Strut Assembly Mounting Bracket Bracket Repair
(RB 211-535C)
Figure 816 (Sheet 2)



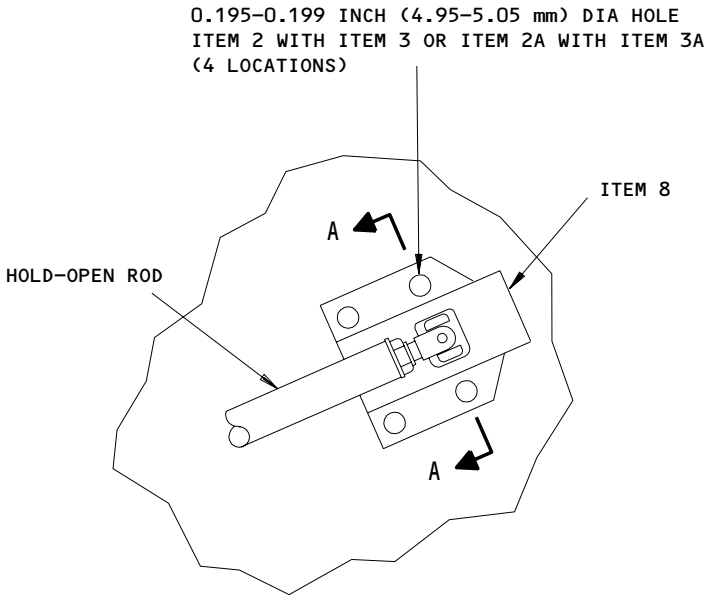


(EXAMPLE)
A-A

FWD



FORWARD INSTALLATION
A



AFT INSTALLATION
B

62553

Right Fan Cowl Panel Strut Assembly Mounting Bracket Repair
(RB 211-535E4/E4B)
Figure 816 (Sheet 3)

WARNING: MAKE SURE THAT YOU OBEY THE MANUFACTURERS INSTRUCTIONS WHEN YOU USE THE PRIMER. DO NOT GET THE PRIMER IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT ON PROTECTIVE GOGGLES AND GLOVES WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS A POISONIOUS AND FLAMMABLE FLUID THAT CAN CAUSE INJURIES AND DAMAGE TO THE EQUIPMENT.

(g) Use the manufacturer's instruction to prepare the primer.
(h) Put the bracket in to the correct position.
(i) Install the Hi-Lok fasteners (Item 2 and 3 or Item 2a and 3a) with wet primer.

NOTE: It is recommended that the bracket is measured with a gauge to make sure that the Hi-Lok fasteners of the correct length are installed.

(j) Install the strut assembly with the spring washer, the nut, the washer and the spacer (Items 4, 5, 6, and 7).

S 218-113-R00

(3) Make a visual inspection of the completed repair.

S 938-114-R00

(4) Use a permanent marker pen and write the repair number next to the part number of the fan cowl panel.
(a) The color of the marker must contrast with the panel color.
(b) Use FRS6247 on the left fan cowl panel and FRS6248 on the right fan cowl panel.

TASK 71-11-04-308-115-R00

18. Put The Fan Cowl Panel External Surface Protection and Finish Back To It's Usual Condition

A. General
(1) The repair in this procedure is FRS6400.

(2) This procedure can be used for the components that follow:
(a) Inlet Cowl
(b) Fan Cowl Panels
(c) Fan C-Duct and Thrust Reverser

B. References
(1) AMM 71-11-01/801, Inlet Cowl

C. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

D. Procedure

S 378-116-R00
(1) Do the Inlet Cowl - Approved Repairs procedure (AMM 71-11-01/801).

TASK 71-11-04-308-128-R00

19. Left and Right Fan Cowl Panel - Strut Assembly (Hold Open Rod) Stowage Bracket Replacement

A. General
(1) FRS6245 and FRS6246 are contained in this procedure. FRS6245 replaces the stowage bracket for the hold open rod on the left fan cowl panel. FRS6246 replaces the stowage bracket for the hold open rod on the right fan cowl panel.
(2) Use this table to identify the correct bracket assembly, pins, and collars for the bracket replaement:
(a) Fan Cowl Location - Left Fwd/Aft
Bracket Assembly - LJ71811 (Item 2)
Fasteners - HL11V6-17 Pin (Item 7) with HL79-6 Collar (Item 8)
(b) Fan Cowl Location - Right Fwd/Aft
Bracket Assembly - LJ71810 (Item 1)
Fasteners - HL11V6-17 Pin (Item 7) with HL79-6 Collar (Item 8)
(c) Fan Cowl Location - Left Aft
Bracket Assembly - LJ78205 (Item 6)
Fasteners - LGPL9SC-V06A17AC Pin (Item 9) with SLFCA06 Collar (Item 10)

(d) Fan Cowl Location - Left Fwd
Bracket Assembly - LJ78204 (Item 5)
Fasteners - LGPL9SC-V06A17AC Pin (Item 9) with SLFCA06 Collar (Item 10)
(e) Fan Cowl Location - Right Fwd
Bracket Assembly - LJ78202 (Item 3)
Fasteners - LGPL9SC-V06A17AC Pin (Item 9) with SLFCA06 Collar (Item 10)
(f) Fan Cowl Location - Right Aft
Bracket Assembly - LJ78203 (Item 4)
Fasteners - LGPL9SC-V06A17AC Pin (Item 9) with SLFCA06 Collar (Item 10)

B. Equipment
(1) Hi-Lock or Huck installation equipment

C. Consumable Materials
(1) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(2) Prime Base - Bostik 463-6-27, OMat 7/157
(3) Lint free cloth - local supply

D. Parts
(1) Bracket assembly, LJ71810 (Item 1)
(2) Bracket assembly, LJ71811 (Item 2)
(3) Bracket assembly, LJ76202 (Item 3)
(4) Bracket assembly, LJ76203 (Item 4)
(5) Bracket assembly, LJ76204 (Item 5)
(6) Bracket assembly, LJ76205 (Item 6)
(7) Pin, HL11V6-17 (RR 3408492) (Item 7)
(8) Collar, HL79-6 (RR 3408524) (Item 8)
(9) Pin, LGPL9SC-V06A17AC (RR 3408643) (Item 9)
(10) Collar, SLFCAC06 (RR 3408674) (Item 10)

E. Procedure

S 938-122-R00
(1) Make a mark to show the location of the bracket assembly that is to be removed.

S 038-121-R00
(2) Remove the damaged bracket assembly (Fig 817).

CAUTION: MAKE SURE THAT YOU DO NOT ENLARGE OR ELONGATE THE HOLES IN THE FAN COWL PANEL. IF THE HOLES ARE TOO LARGE, THE REPLACEMENT BRACKET WILL NOT FIT CORRECTLY ON THE PANEL.

(a) Use a hand drill to remove out the attachment pins and collars.
(b) Remove the bracket assembly.

S 848-123-R00
(3) Prepare the repair area:

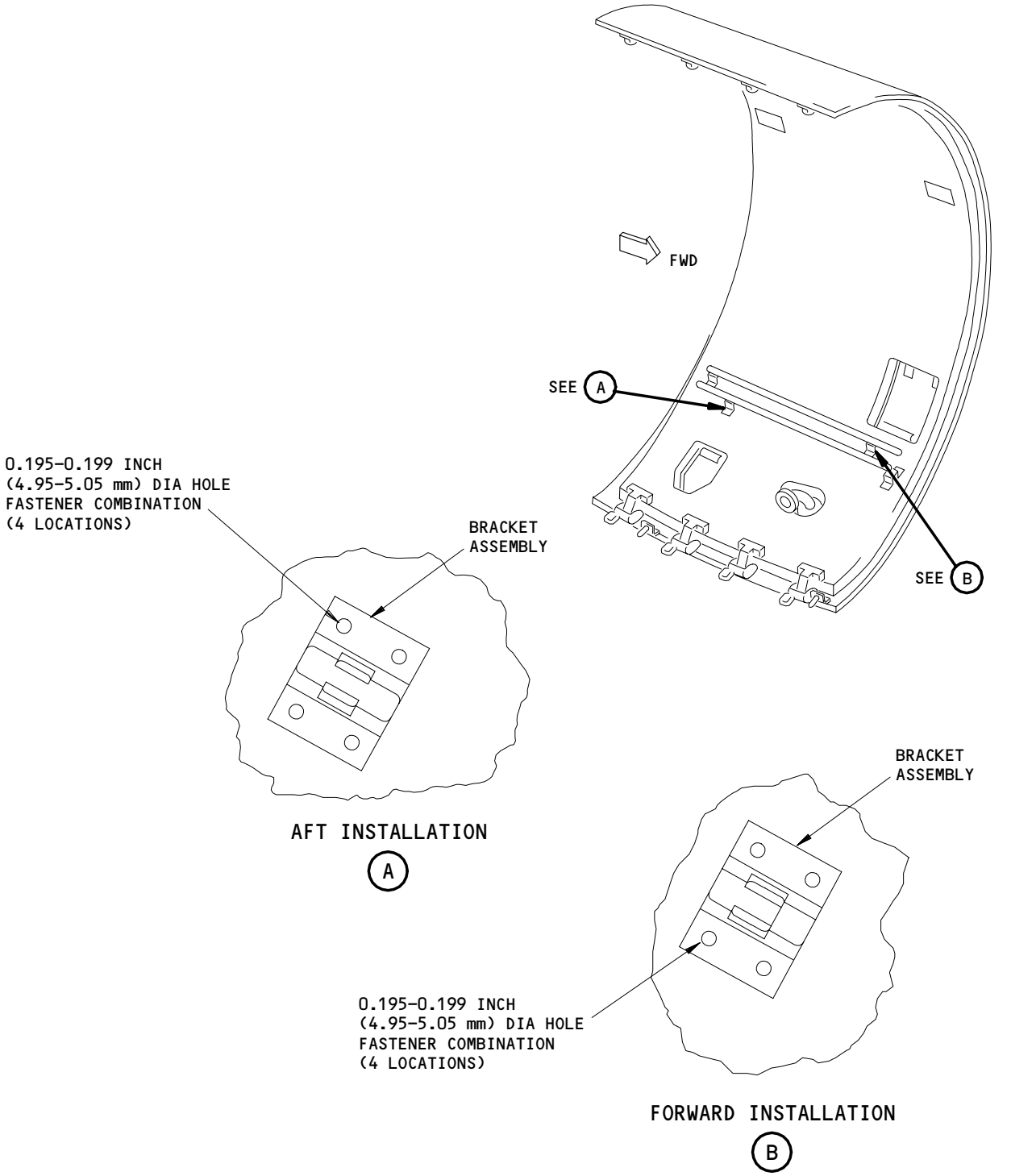
WARNING: DO NOT GET THE DEGREASING FLUID IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING FLUID. PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN YOU USE THE DEGREASING FLUID. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAME, AND HEAT. THE DEGREASING FLUID CAN CAUSE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

(a) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to clean the mating surfaces of the fan cowl panel and the new bracket assembly.
(b) Use the clean lint free cloth that is moistened with MEK to clean the mating surfaces of the fan cowl panel and the new bracket assembly.

S 848-124-R00
(4) Prepare the replacement bracket assembly:
(a) Use the list at the beginning of the procedure and make sure that you the correct bracket assembly.
(b) Put the new bracket in its correct postion of the fan cowl panel.
(c) Use a clamp to hold the bracket in its correct position.

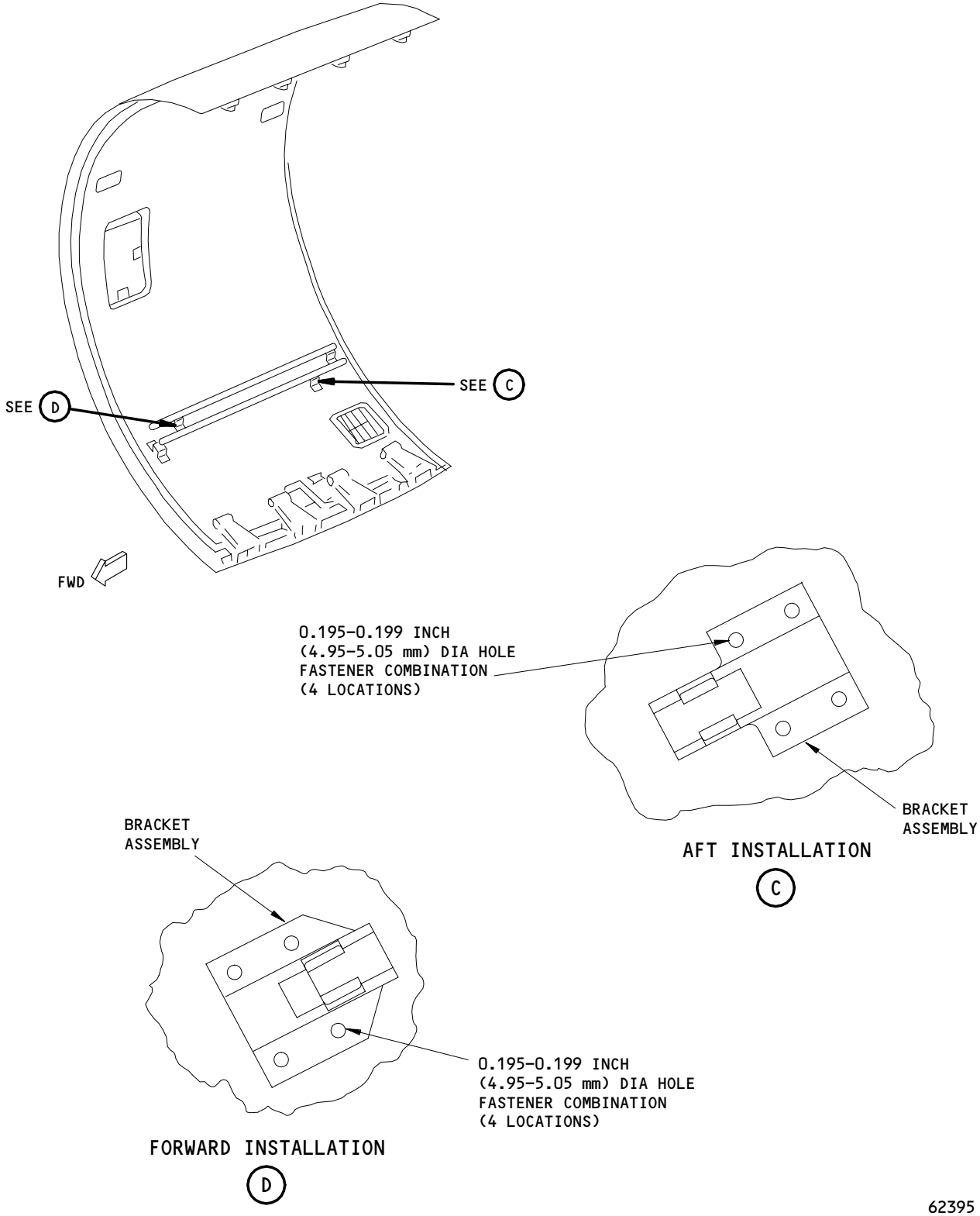
CAUTION: MAKE SURE THAT YOU DO NOT ENLARGE OR ELONGATE THE HOLES IN THE FAN COWL PANEL. IF THE HOLES ARE TOO LARGE, THE REPLACEMENT BRACKET WILL NOT FIT CORRECTLY ON THE PANEL.

(d) Use the drilling equipment to put holes in the bracket that match the holes in the cowl panel.
(e) Remove the clamp and the bracket assemble.
(f) Remove the burrs and clean the holes in the bracket assembly.



62394

Fan Cowl Panel Strut Assembly Stowage Bracket Repair
Figure 817 (Sheet 1)



Fan Cowl Panel Strut Assembly Stowage Bracket Repair
Figure 817 (Sheet 2)

S 438-125-R00

(5) Install the bracket assembly:

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

(a) Use a clean lint-free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to clean the fan cowl panel and the new bracket assembly.
1) Make sure that you dry the mating surfaces with a clean, dry, lint-free cloth before the Acetone or Isopropyl alcohol or cleaning solvent Desoclean dries.
(b) Use the manufacturers instruction to mix the primer base.
(c) Use the primer base and the correct fasteners to wet install the bracket assembly.
(d) Use the Hi-Lock or Huck installation equipment to fully install the fasteners.

S 218-126-R00

(6) Examine the completed repair:
(a) Make sure that the repair was done correctly.
(b) Make sure that the bracket assembly operates correctly.

S 938-127-R00

(7) Identify the repair area:
(a) Write FRS6245 for the left fan cowl panel, adjacent to the panel nameplate, with a permanent marking pen of contrasting color.
(b) Write FRS6246 for the right fan cowl panel, adjacent to the panel nameplate, with a permanent marking pen of contrasting color.

TASK 71-11-04-358-131-R00

20. Right Fan Cowl Panel, Oil Filler Access Door - Temporary Repair

A. General

(1) The repair in this procedure is FRS6301.

(2) This procedure gives the instructions for the installation of a repair plate in place of the oil filler access door in the right fan cowl panel.
(3) This repair is time limited. You must replace the plate with a new oil access door at the next avalilable maintenance base but not more than five flights from the time of temporary repair.
  (a) Do this task to install the access door, "Right Fan Cowl Panel - Oil Filler Access Door Replacement".
  (b) Seal the fastener holes in the door land of the fan cowl (AMM 70-42-22/201).
(4) This repair can be used for these fan cowl panels with part numbers:
  (a) LJ75748, LJ75814, LJ76379.
(5) Parts
  (a) Screw (Item 1) - NAS601-8P
  (b) Washer (Item 2) - AN960-6
  (c) Nut - Self lock (Item 3), MS21042-06

NOTE: Equivalent fasteners with self locking nuts may be used. A quantity of four each are needed.

B. Equipment
(1) Drills and drill equipment
C. Consumable Materials
(1) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(2) Absorbent cloth, lint free
OMat 2/101
(3) Adhesive tape (Aluminum foil) (Alternate to 3M Scotch Y436)
3M Scotch 425, OMat 298
(4) Adhesive tape (Aluminum foil) (Alternate to 3M Scotch 425)
3M Scotch Y436, OMat 2/115
(5) Aluminum plate 2024-O, 0.063 inch thick,
D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Procedure

S 038-132-R00
(1) Remove the door hinge if it is necessary.
  (a) Remove the 13 screws that attach the hinge half to the fan cowl panel.

S 118-133-R00
(2) Clean the repair area where the tape will be applied.

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

(a) Use the absorbent cloth wet with Acetone or Isopropyl alcohol or cleaning solvent Desoclean to clean the inner and outer surfaces of the fan cowl and the door land area.
(b) Wipe dry with a clean cloth before the Acetone or Isopropyl alcohol or cleaning solvent Desoclean evaporates.

S 358-134-R00

(3) Make the repair plate from the 2024-0 Aluminum to fit the door opening (Fig. 818).
(a) Make the plate agree with the contour of the fan cowl.
(b) The gaps of the plate/door opening must not be more than 0.04 inch (1.01 mm).
(c) Use light finger pressure to make the plate agree with the door opening contour.
(d) Drill the 0.140-0145 inch (3.56-3.68 mm) holes in the four places through the repair plate and forward land.

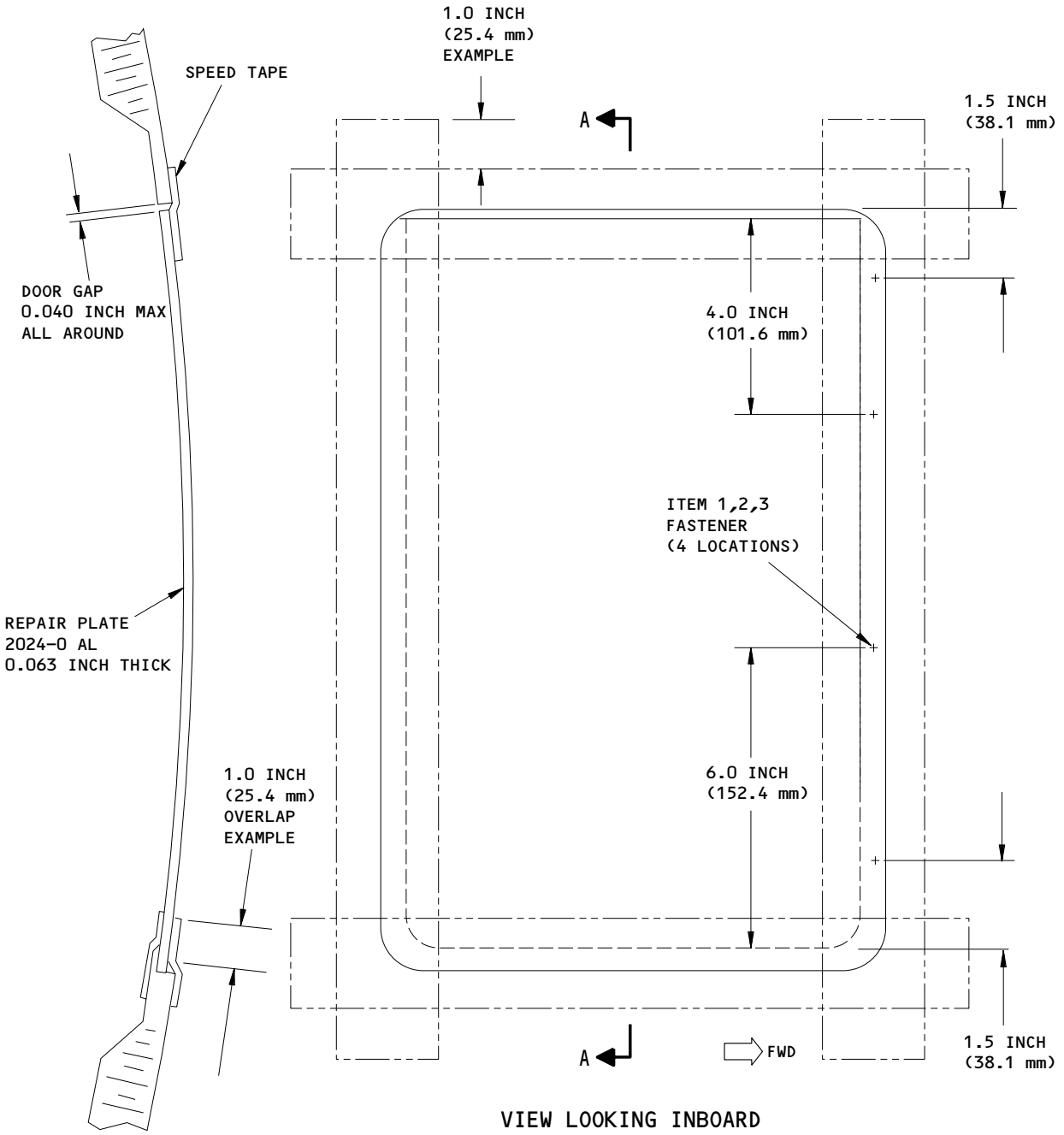
NOTE: Fasteners are installed through the forward edge of the repair plate and forward door land only.

S 428-135-R00

(4) Install the repair plate.
(a) Install the plate from the outside of the fan cowl against the door land.
(b) Install the fasteners in the four holes.
(c) Install the screws from the outside of the plate and the washers and nuts on the inside.
1) Tighten the screws the 12-15 pound-inches.
(d) Apply the aluminum tape to the outside and inside edges of the plate and fan cowl.
1) It is difficult to apply tape over the hinge and the tape is not necessary on the inside top edge.
2) Make sure the tape extends at least 1.0 inch (25.4 mm) past the edges of the door opening and repair plate.

S 218-136-R00

(5) Examine the repair area.
(a) Wrinkles or tears in the tape are not permitted.



VIEW LOOKING INBOARD

NOTES: SPEED TAPE NOT REQUIRED
ON INSIDE HINGE AREA
INSTALL ITEM 1 FROM OUTSIDE,
ITEM 2 AND 3 FROM INSIDE.

6301A

Right Fan Cowl Panel Oil Access Door Temporary Repair
Figure 818

(b) Examine the right fan cowl (AMM 71-11-04/601).

S 938-137-R00

(6) Identify the repair area:

(a) Write FRS6301 for the right fan cowl panel, adjacent to the panel nameplate, with a permanent marking pen of contrasting color.

TASK 71-11-04-358-157-R00

21. Fan Cowl Panel - Repair of Latch Surround Area

A. General

(1) The repair in this procedure is FRS6015.

(2) The repair is for superficial damage to the exterior surface of the latch surround area on the fan cowl panel.

(3) Superficial damage consists of scratches, cuts and abrasions less than 0.005 inch (0.12 mm) in depth and where there is no damage to the grahite fibers. Any damage more than superficial damage is not covered by this repair.

(4) The repair can be used on the fan cowl panel part numbers that follow:
LJ71467, LJ71567, LJ71717, LJ71773,
LJ71777, LJ75747, LJ76299, LJ76378,

(5) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(6) Be careful when you use the consumable materials for this repair:

(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.

(d) Use degreasers in work areas that have a good flow of air.

(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.

B. Equipment
(1) Heat lamps (explosionproof)

C. Consumable Materials
(1) Abrasive paper - Aluminum oxide, 180 grit
OMat No. 5/62
(2) Adhesive EA934NA
OMat No. 8/52
(3) Lint-free cloth
OMat No. 2/101
(4) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(5) Pen - Permanent Marker

D. References
(1) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Procedure

S 848-248-R00

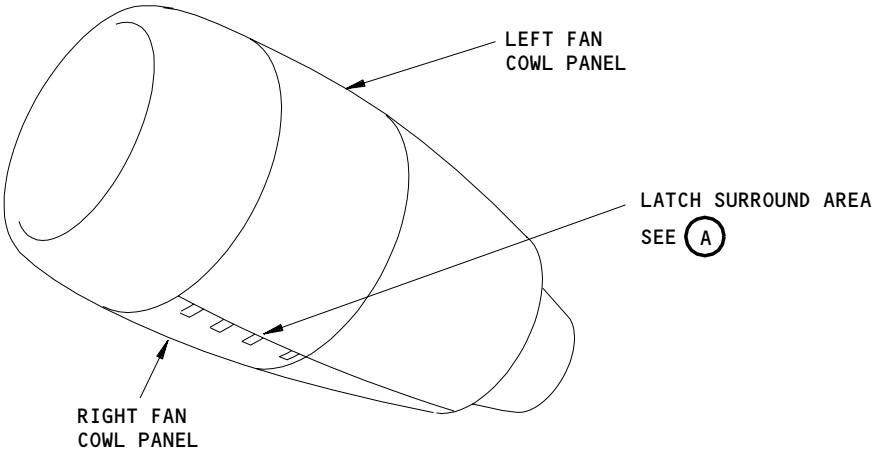
WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

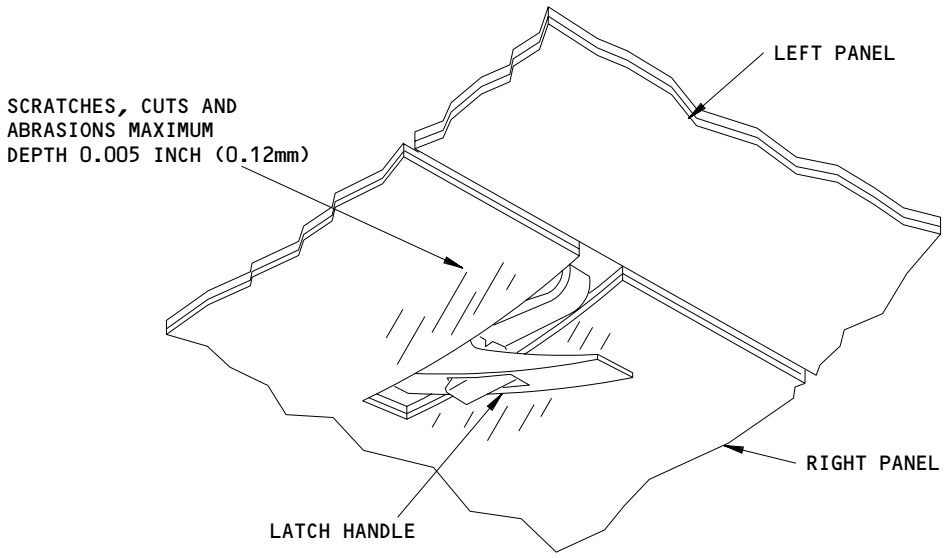
(1) Prepare the surface for repair (Fig. 819).

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

(a) Carefully remove the surface finish with the abrasive paper.
1) Do not penetrate the surface of the composite material and feather the edge of the surface finish around the repair area.
(b) Clean the repair area with a clean lint free cloth wet with MEK.
1) Wipe the area dry with a lint-free cloth before the solvent dries.

S 338-156-R00
(2) Repair the damaged area(s).
(a) Use the manufacturer's instructions to prepare the adhesive filler (EA934NA).





LATCH SURROUND AREA
(A)

62130

Fan Cowl Panel – Repair of Latch Surround Area
Figure 819

(b) Apply the adhesive filler to the repair area and make the filler flush with the surface around the repair area.
(c) Use a heat lamp (explosion proof) to dry the adhesive filler for one hour at 60 degrees C (140 degrees F).
(d) Use the abrasive paper to make the adhesive filler flush with the area around the repair.
1) Do not penetrate the surface of the composite material.
(e) Clean the repair area with a clean lint-free cloth wet with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.
(f) Do the procedure to put the external surface finish of the fan cowl panel back to it's usual condition (FRS6400) (AMM 71-11-01/801).
(g) Make a visual inspection of the completed repair.
(h) Use a permanent marker pen and write the repair number FRS6015 adjacent to the part number of the fan cowl panel.
1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-158-R00

22. Left Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners

A. General

(1) The repair in this procedure is FRS6076/1.
(2) The repair is for erosion and impact damage on the corners of the left fan cowl panel.

NOTE: Use this repair when the corner damage is not more than the specified limits (Fig. 820).

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71467, LJ71567, LJ71717, LJ71545,
LJ71777, LJ75747, LJ76299, LJ76378,
(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
(5) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use degreasers.
(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.

B. Equipment
(1) Heat lamps (explosionproof)

C. Consumable Materials
(1) Abrasive paper - Aluminum oxide, 180 grit
OMat No. 5/62
(2) Adhesive EA934NA
OMat No. 8/52
(3) Adhesive EA956, two part
OMat No. 8/117
(4) FEP non-porous parting film
(5) Fiberglass
British Spec - 120-38" Greige
American Spec - 120-38" Greige
(6) Graphite fiber
British Spec - A-370-8H
American Spec - A-320-8H
(7) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(8) Clamping block - Aluminum plate 0.190 inch thick
(9) Spacer - Aluminum plate 0.125 inch thick
(10) Lint-free cloth
OMat No. 2/101
(11) Pen - Permanent Marker

D. References
(1) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

F. Procedure

S 848-249-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

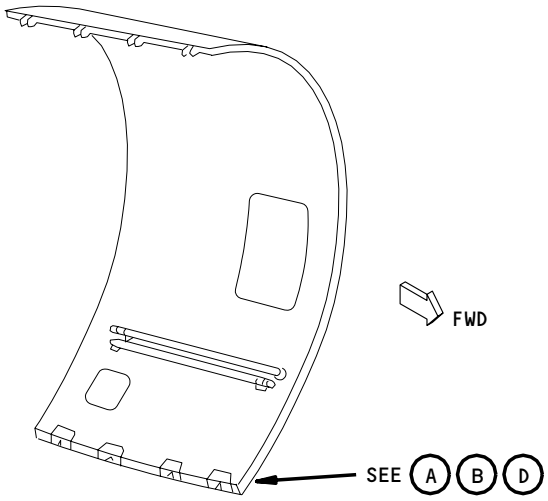
(1) Prepare the panel for repair.

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

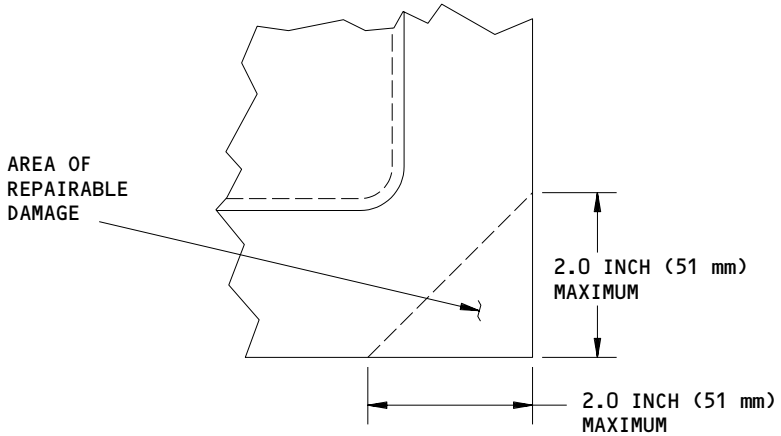
(a) Trim the damaged area to the specified limits (Fig. 820).
(b) Use abrasive paper to make the repair surfaces rough.
1) Make sure to remove all paint and surface protection from the repair area.
(c) Clean the repair area with a clean lint-free cloth wet with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.

S 358-165-R00

(2) Repair the damaged area(s).
(a) Use the manufacturer's instructions to prepare the adhesive (EA956).
(b) Apply the graphite fabric and fiberglass to the outer surface with the adhesive (EA956).
(c) Apply the FEP parting film and attach clamping block to the outer surface.
(d) Apply the graphite fabric and fiberglass to the inner surface with the adhesive (EA956).
(e) Apply the FEP parting film and install spacers and attach clamping block to the inner surface with clamps.



LEFT HAND FAN COWL

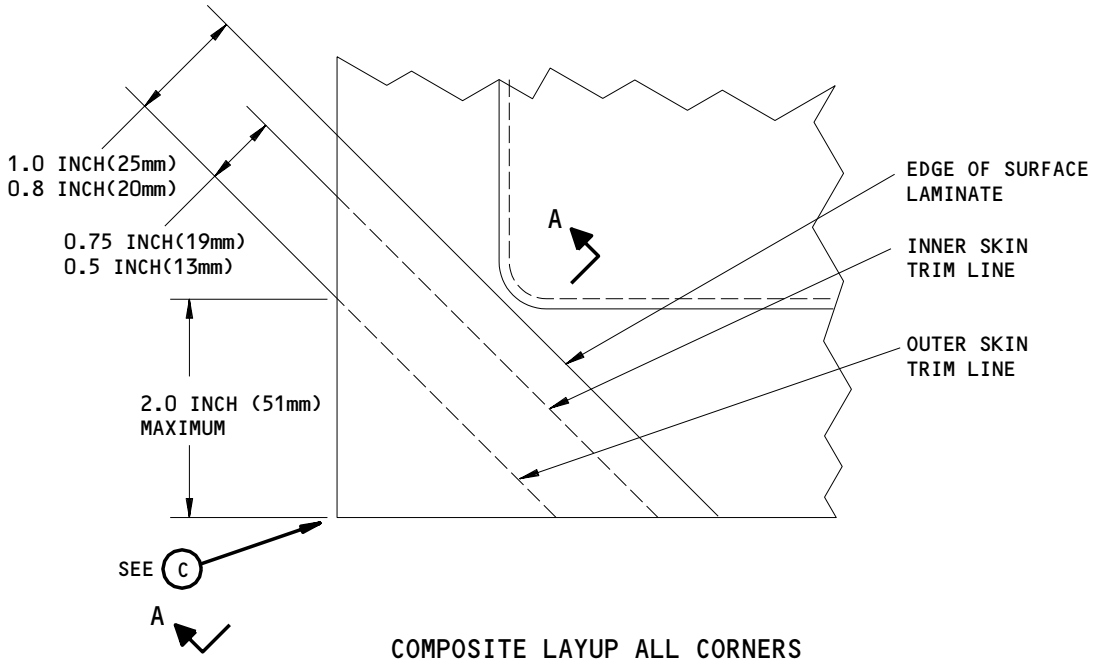


EXAMPLE ALL CORNERS MAXIMUM
EXTENT OF REPAIRABLE EROSION
AND IMPACT DAMAGE

A

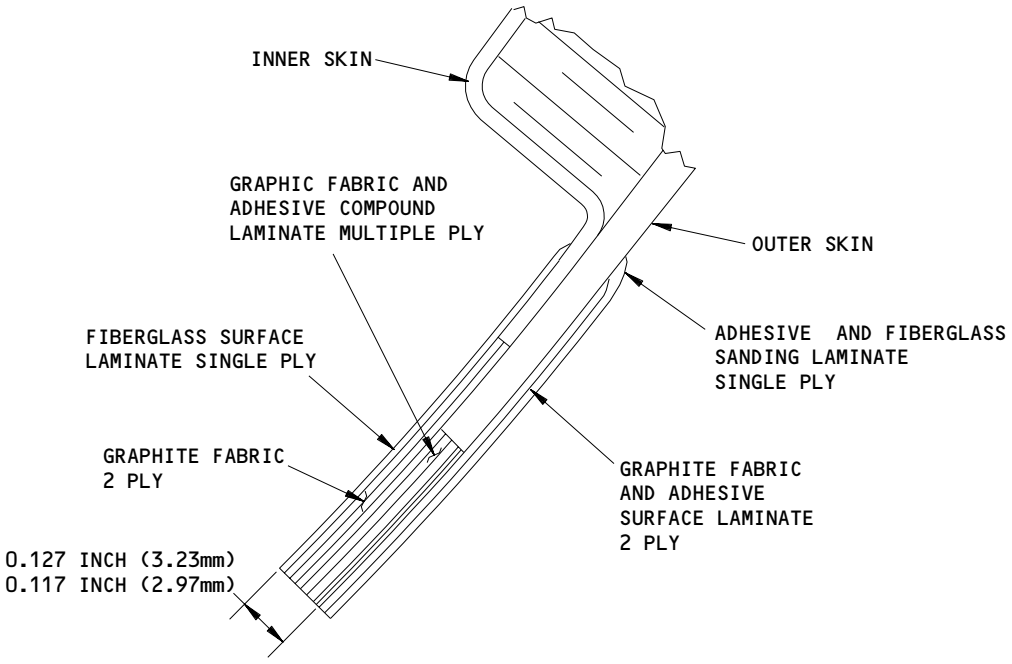
C8150

Left Fan Cowl Panel – Repair of Erosion and Impact Damage to Corners
Figure 820 (Sheet 1)



COMPOSITE LAYUP ALL CORNERS

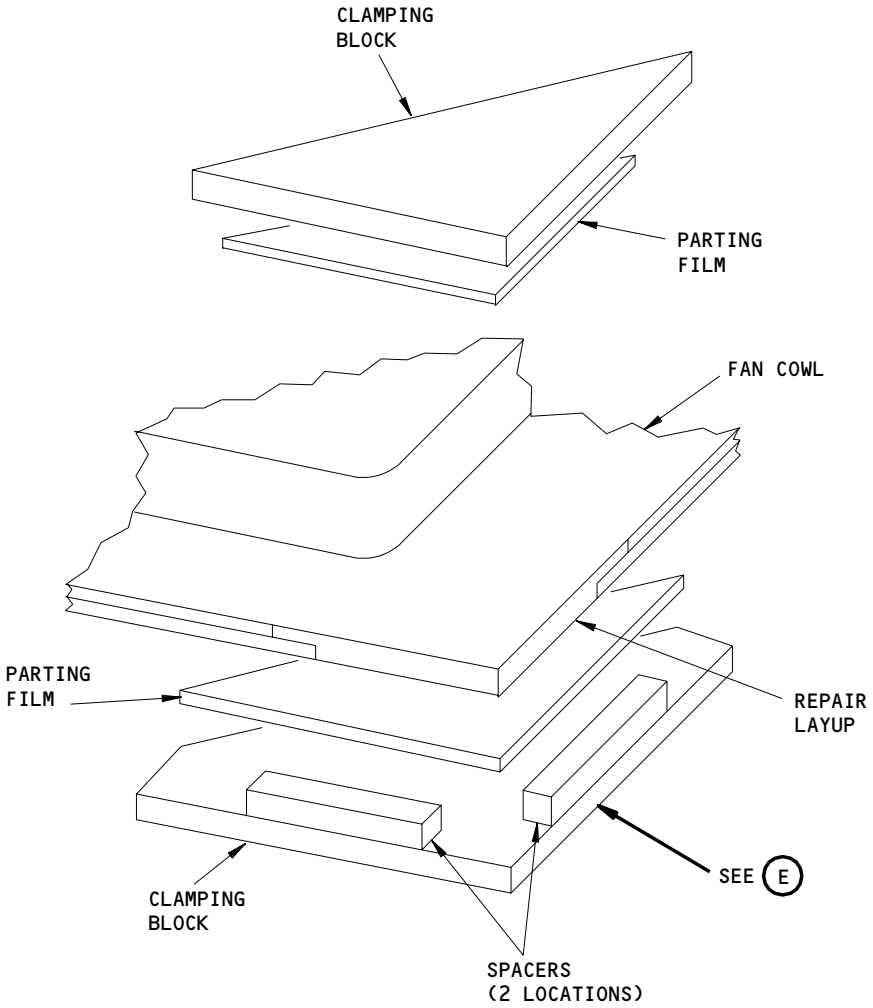
B



COMPOSITE LAYUP
A-A

C8116

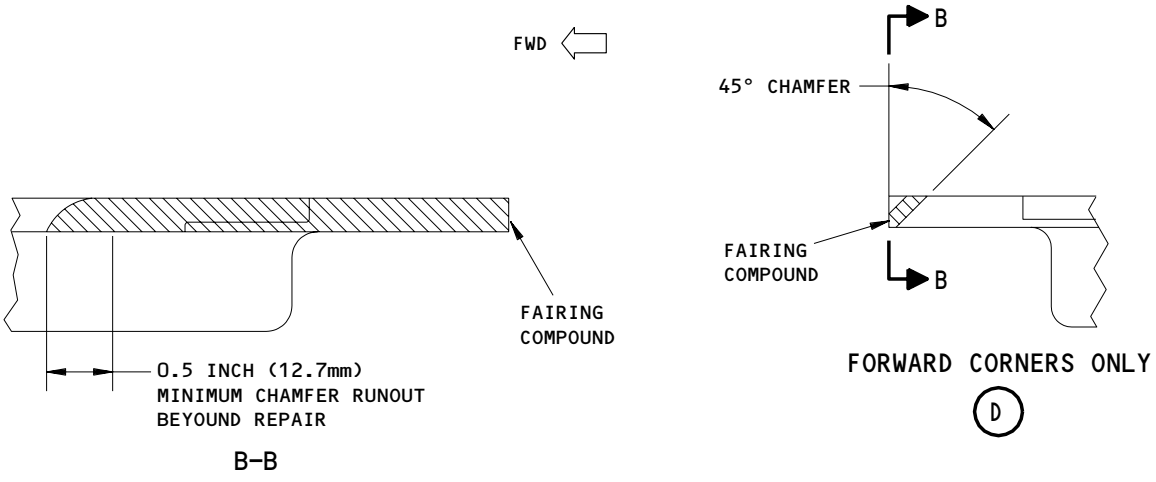
Left Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 820 (Sheet 2)

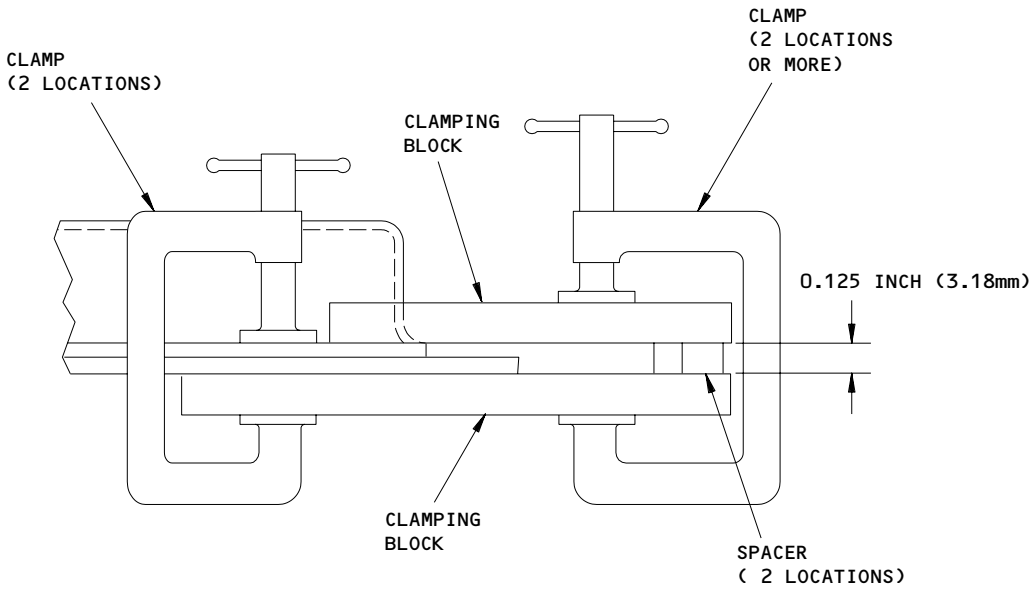


EXPANDED CLAMP-UP CONFIGURATION
DURING CURE ALL CORNERS
C

C8117

Left Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 820 (Sheet 3)





C8118

Left Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 820 (Sheet 4)

(f) Use a heat lamp (explosion proof) to dry the repair area for two hours at 65-120 degrees C (150-250 degrees F).
1) Apply heat and pressure to both surfaces.
(g) Remove the clamps, clamping blocks, spacers and parting film.
(h) Use a tool and abrasive paper to make the edges of the corner square.
(i) On the forward corners:
1) Use a tool and abrasive paper to chamfer the leading edge of the corner.
(j) Use the abrasive paper to make the outer surface of the repair smooth.
(k) Clean the chamfered repair area with a clean lint-free cloth wet with Acetone or isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.
(l) Use the manufacturer's instructions to prepare the adhesive filler (EA934NA).
(m) Apply the adhesive filler to the chamfered leading edges on the forward corners of the panel.
(n) Use a heat lamp (explosion proof) to dry the adhesive filler for one hour at 60 degrees C (140 degrees F).
(o) Use the abrasive paper to make the chamfered edges smooth.
(p) Clean the repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.
(q) Do the procedure to put the external surface finish of the fan cowl panel back to it's usual condition (FRS6400) (AMM 71-11-01/801).
(r) Make a visual inspection of the completed repair.
(s) Use a permanent marker pen and write the repair number FRS6076/1 adjacent to the part number of the fan cowl panel.
1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-166-R00

23. Left Fan Cowl Panel - Repair of Corner Delamination

A. General

(1) The repair in this procedure is FRS6076/2.
(2) The repair is for delamination of the corners on the left fan cowl panel.

NOTE: Use this repair when the corner damage is not more than the specified limits (Fig. 821).

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71467, LJ71567, LJ71717, LJ71545,
LJ71777, LJ75747, LJ76299, LJ76378,

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:
   (a) Use gloves when you use degreasers.
   (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
   (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
   (d) Use degreasers in work areas that have a good flow of air.
   (e) Use epoxy compounds in work areas that have a good flow of air.
   (f) Do not let epoxy compounds come in contact with your skin.

B. Equipment
   (1) Heat lamps (explosionproof)

C. Consumable Materials
   (1) Abrasive paper - Aluminum oxide, 180 grit
   OMat No. 5/62
   (2) Adhesive EA934NA
   OMat No. 8/52
   (3) Adhesive EA956, two part
   OMat No. 8/117
   (4) Acetone OMat No. 150 or
   Isopropyl alcohol OMat No. 1/40 or
   Cleaning solvent Desoclean OMat No. 1/257
   (5) Clamping block - Aluminum plate 0.190 inch thick
   (6) Lint-free cloth
   OMat No. 2/101
   (7) Pen - Permanent Marker

D. References
   (1) AMM 71-11-01/801, Inlet Cowl

E. Access
   (1) Location Zones
   410 No. 1 Power Plant (Left)
   420 No. 2 Power Plant (Right)

F. Procedure

S 848-250-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

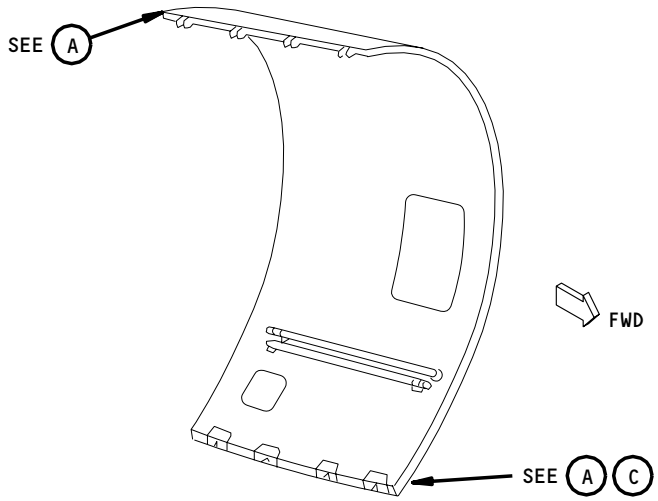
(1) Prepare the panel for repair.
   (a) Clean the delaminated surfaces with a clean lint-free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
      1) Wipe the area dry with a lint-free cloth before the solvent dries.

S 358-173-R00

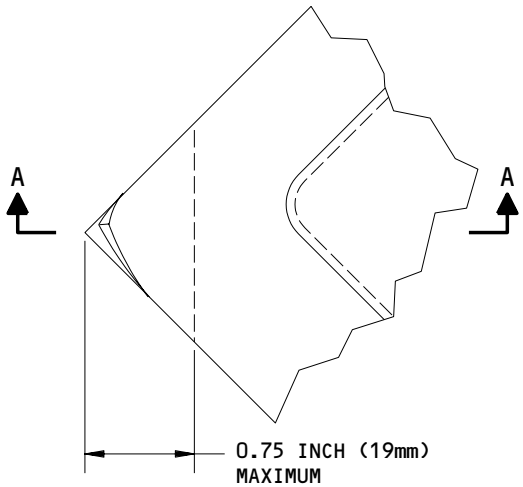
(2) Repair the damaged area(s).

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

   (a) Use the manufacturer's instructions to prepare the adhesive (EA956).
   (b) Apply the adhesive to the delaminated surfaces.
   (c) Install a clamping block to the repair area with clamps.
   (d) Use a heat lamp (explosionproof) to dry the repair area for two hours at 65-120 degrees C (150-250 degrees F).
      1) Apply heat and pressure to both surfaces.
   (e) Remove the clamps and clamping blocks.
   (f) Use a tool and abrasive paper to make the edges of the corner square.
   (g) FORWARD CORNERS;
      Use a tool and abrasive paper to chamfer the leading edge of the corner.

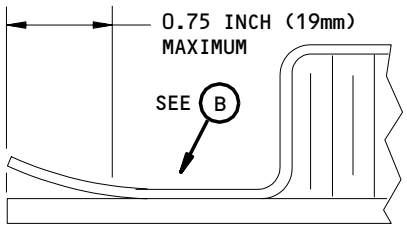


LEFT HAND FAN COWL



EXAMPLE ALL CORNERS
MAXIMUM EXTENT OF
REPAIRABLE DELAMINATION

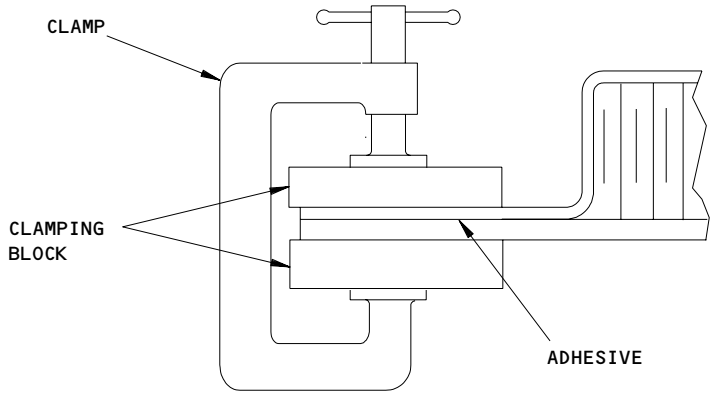
A



A-A

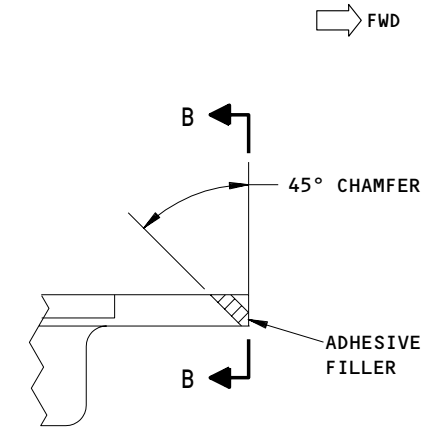
C8177

Left Fan Cowl Panel - Repair of Corner Delamination
Figure 821 (Sheet 1)



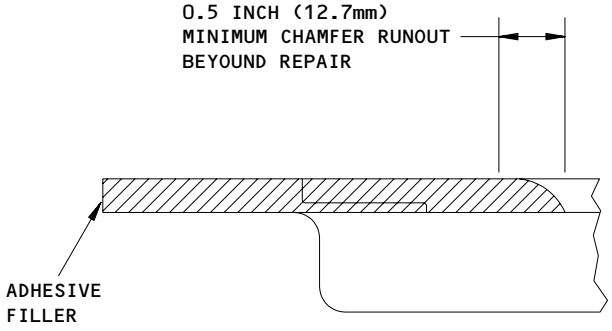
CLAMP UP CONFIGURATION DURING CURE

B



FORWARD CORNERS ONLY

C



B-B

C8118

Left Fan Cowl Panel - Repair of Corner Delamination
Figure 821 (Sheet 2)

(h) Use the abrasive paper to make the outer surface of the repair smooth.
(i) Clean the chamfered repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.
(j) Use the manufacturer's instructions to prepare the adhesive filler (EA934NA).
(k) Apply the adhesive filler to the chamfered leading edges on the forward corners of the panel.
(l) Use a heat lamp (explosionproof) to dry the adhesive filler for one hour at 60 degrees C (140 degrees F).
(m) Use the abrasive paper to make the chamfered edges smooth.
(n) Clean the repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.
(o) Do the procedure to put the external surface finish of the fan cowl panel back to it's usual condition (FRS6400) (AMM 71-11-01/801).
(p) Make a visual inspection of the completed repair.
(q) Use a permanent marker pen and write the repair number jj FRS6076/2 adjacent to the part number of the fan cowl panel.
1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-174-R00

24. Right Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners

A. General

(1) The repair in this procedure is FRS6077/1.
(2) The repair is for erosion and impact damage on the corners of the right fan cowl panel.

NOTE: Use this repair when the corner damage is not more than the specified limits (Fig. 822).

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71468, LJ71568, LJ71718, LJ71758,
LJ71778, LJ75748, LJ75814, LJ76379,
(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
(5) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.

B. Equipment
(1) Heat lamps (explosionproof)

C. Consumable Materials
(1) Abrasive paper - Aluminum oxide, 180 grit
OMat No. 5/62
(2) Adhesive EA934NA
OMat No. 8/52
(3) Adhesive EA956, two part
OMat No. 8/117
(4) FEP non-porous parting film
(5) Fiberglass
British Spec - 120-38" Greige
American Spec - 120-38" Greige
(6) Graphite fiber
British Spec - A-370-8H
American Spec - A-320-8H
(7) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(8) Clamping block - Aluminum plate 0.190 inch thick
(9) Spacer - Aluminum plate 0.125 inch thick
(10) Lint-free cloth
OMat No. 2/101
(11) Pen - Permanent Marker

D. References
(1) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Procedure

S 848-251-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

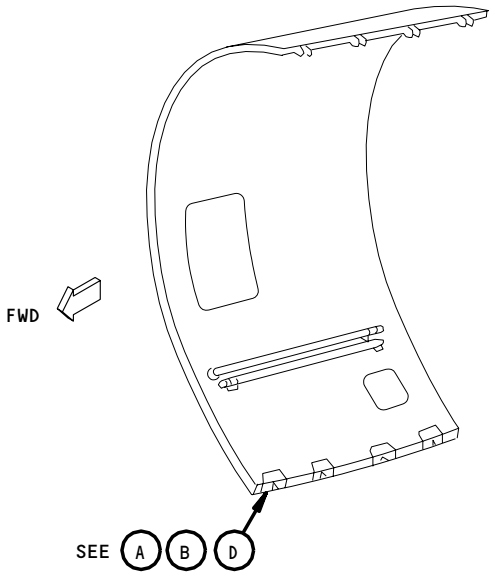
(1) Prepare the panel for repair.

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

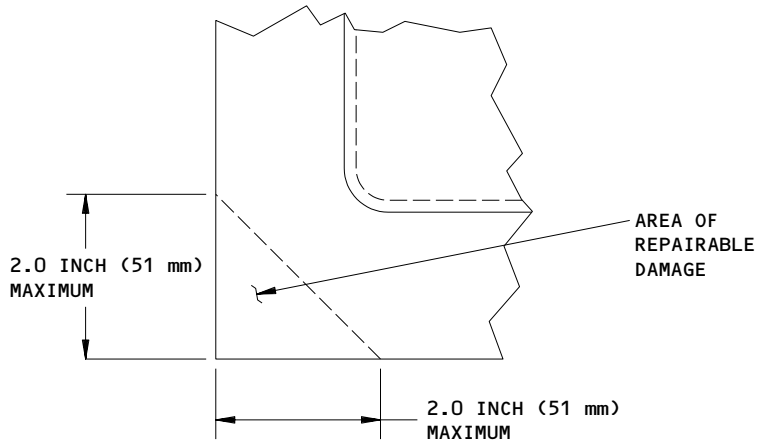
(a) Trim the damaged area to the specified limits (Fig. 822).
(b) Use abrasive paper to make the repair surfaces rough.
1) Make sure to remove all paint and surface protection from the repair area.
(c) Clean the repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.

S 358-181-R00

(2) Repair the damaged area(s).
(a) Use the manufacturer's instructions to prepare the adhesive (EA956).
(b) Apply the graphite fabric and fiberglass to the outer surface with the adhesive (EA956).
(c) Apply the FEP parting film and attach clamping block to the outer surface.
(d) Apply the graphite fabric and fiberglass to the inner surface with the adhesive (EA956).
(e) Apply the FEP parting film and install spacers and attach clamping block to the inner surface with clamps.



RIGHT HAND FAN COWL

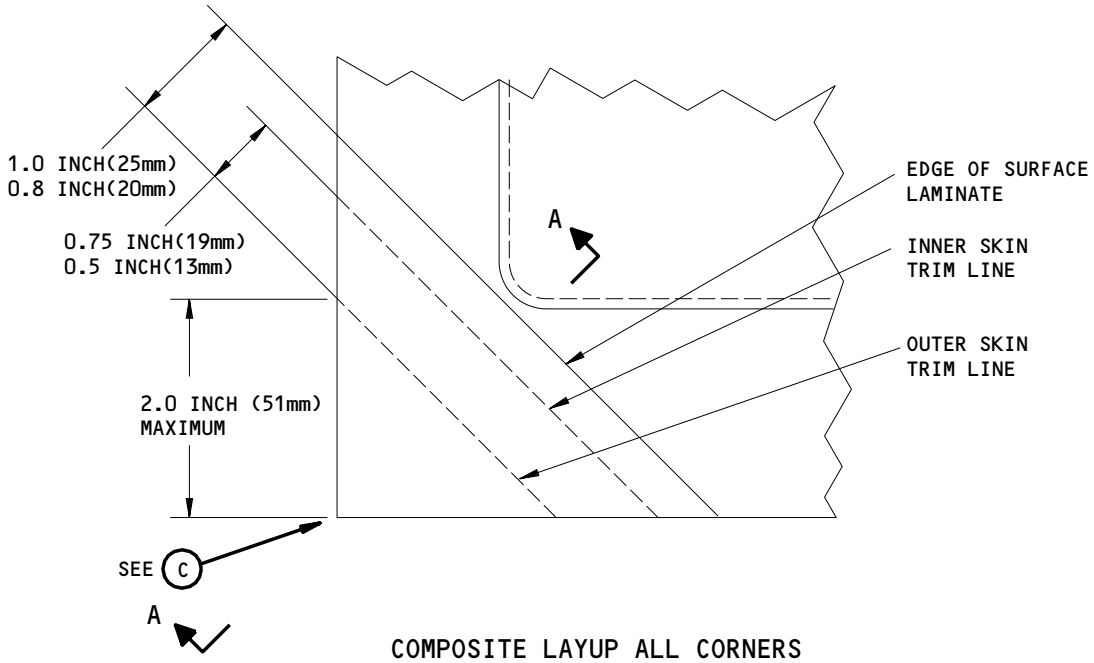


EXAMPLE ALL CORNERS MAXIMUM
EXTENT OF REPAIRABLE DAMAGE

A

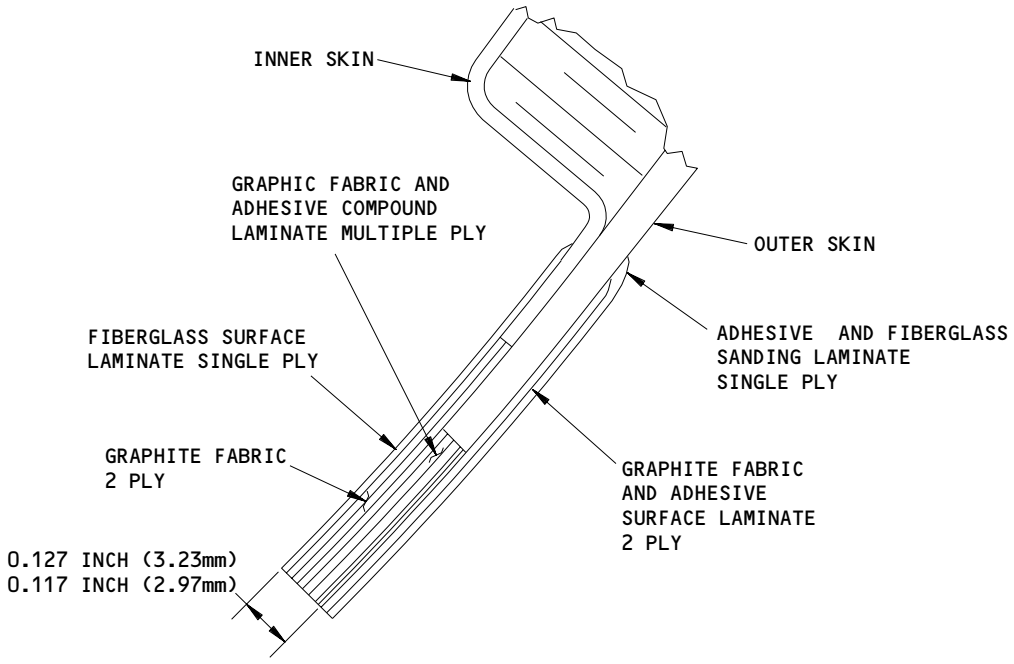
C8115

Right Fan Cowl Panel – Repair of Erosion and Impact Damage to Corners
Figure 822 (Sheet 1)



COMPOSITE LAYUP ALL CORNERS

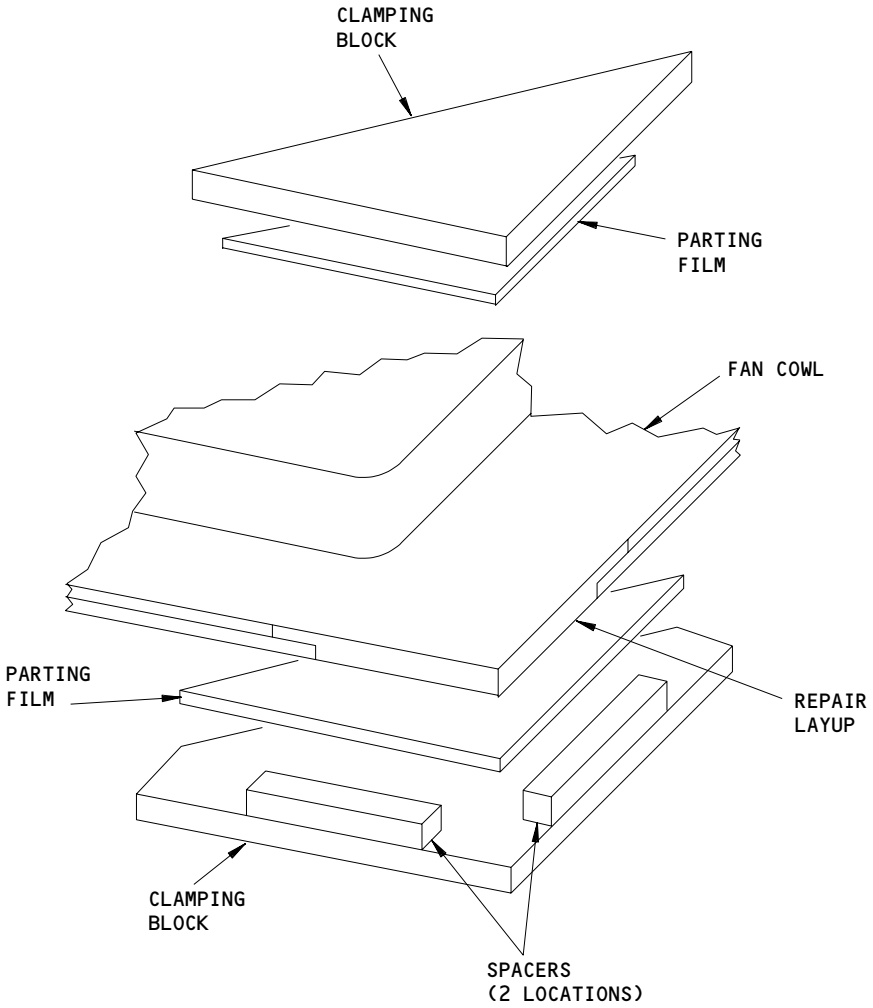
B



COMPOSITE LAYUP
A-A

C8116

Right Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 822 (Sheet 2)

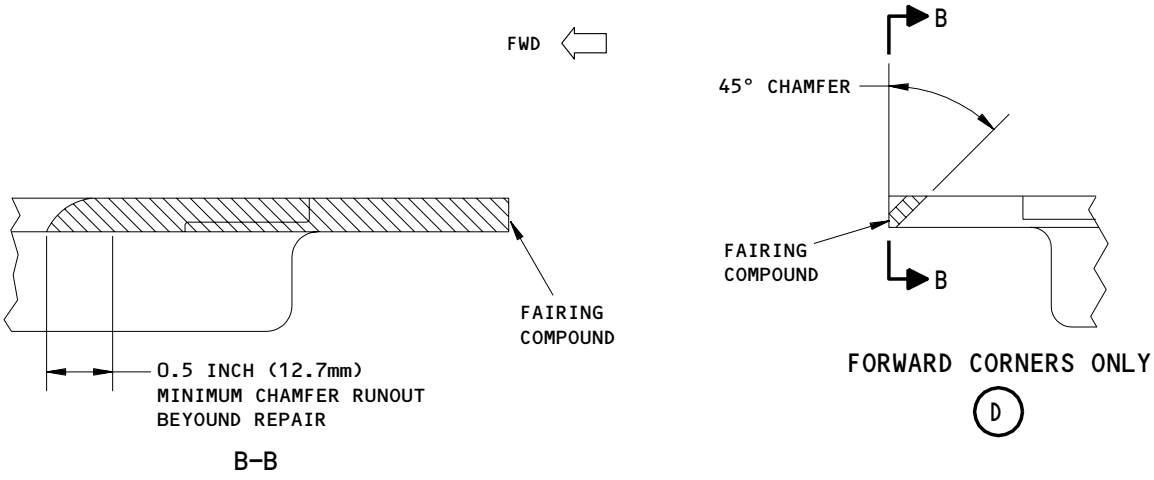


EXPANDED CLAMP-UP CONFIGURATION
DURING CURE ALL CORNERS

(C)

C8117

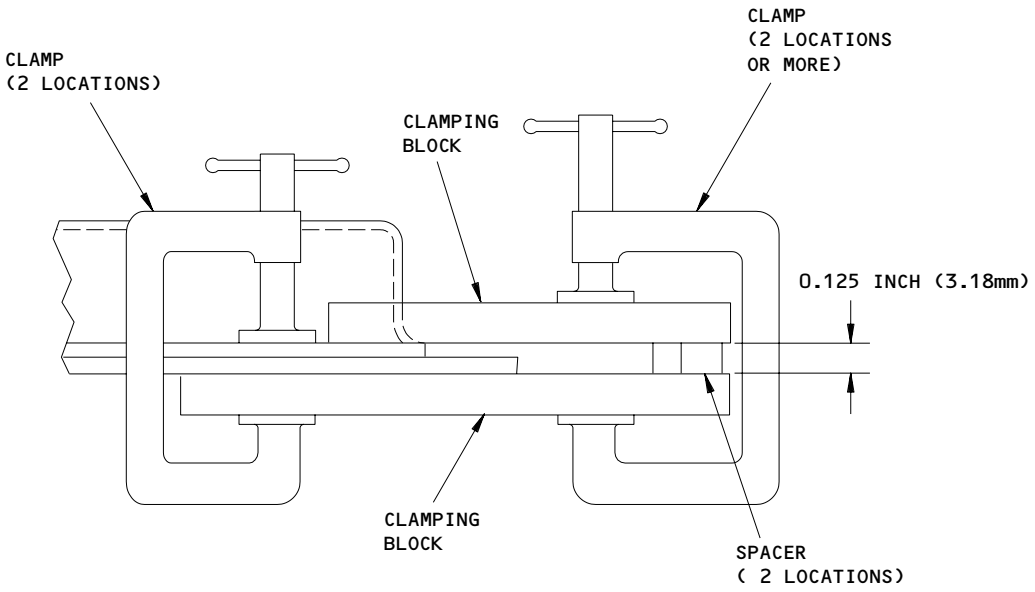
Right Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 822 (Sheet 3)



B-B

FORWARD CORNERS ONLY

D



CLAMP UP CONFIGURATION DURING CURE

E

C8118

Right Fan Cowl Panel - Repair of Erosion and Impact Damage to Corners
Figure 822 (Sheet 4)

(f) Use a heat lamp (explosionproof) to dry the repair area for two hours at 65-120 degrees C (150-250 degrees F).
    1) Apply heat and pressure to both surfaces.
(g) Remove the clamps, clamping blocks, spacers and parting film.
(h) Use a tool and abrasive paper to make the edges of the corner square.
(i) FORWARD CORNERS;
    Use a tool and abrasive paper to chamfer the leading edge of the corner.
(j) Use the abrasive paper to make the outer surface of the repair smooth.
(k) Clean the chamfered repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
    1) Wipe the area dry with a lint-free cloth before the solvent dries.
(l) Use the manufacturer's instructions to prepare the adhesive filler (EA934NA).
(m) Apply the adhesive filler to the chamfered leading edges on the forward corners of the panel.
(n) Use a heat lamp (explosionproof) to dry the adhesive filler for one hour at 60 degrees C (140 degrees F).
(o) Use the abrasive paper to make the chamfered edges smooth.
(p) Clean the repair area again with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
    1) Wipe the area dry with a lint-free cloth before the solvent dries.
(q) Do the procedure to put the external surface finish of the fan cowl panel back to it's usual condition (FRS6400) (AMM 71-11-01/801).
(r) Make a visual inspection of the completed repair.
(s) Use a permanent marker pen and write the repair number FRS6077/1 adjacent to the part number of the fan cowl panel.
    1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-182-R00

25. Right Fan Cowl Panel - Repair of Corner Delamination

A. General

(1) The repair in this procedure is FRS6077/2.

(2) The repair is for delamination of the corners on the right fan cowl panel.

NOTE: Use this repair when the corner damage is not more than the specified limits (Fig. 823).

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71468, LJ71568, LJ71718, LJ71758,
LJ71778, LJ75748, LJ75814, LJ76379,

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:

(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.

(d) Use degreasers in work areas that have a good flow of air.

(e) Use epoxy compounds in work areas that have a good flow of air.

(f) Do not let epoxy compounds come in contact with your skin.

B. Equipment

(1) Heat lamps (explosionproof)

C. Consumable Materials

(1) Abrasive paper - Aluminum oxide, 180 grit
OMat No. 5/62

(2) Adhesive EA934NA
OMat No. 8/52
(3) Adhesive EA956, two part
OMat No. 8/117
(4) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(5) Clamping block - Aluminum plate 0.190 inch thick
(6) Lint-free cloth
OMat No. 2/101
(7) Pen - Permanent Marker

D. References
(1) AMM 71-11-01/801, Inlet Cowl

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

F. Procedure

S 848-252-R00

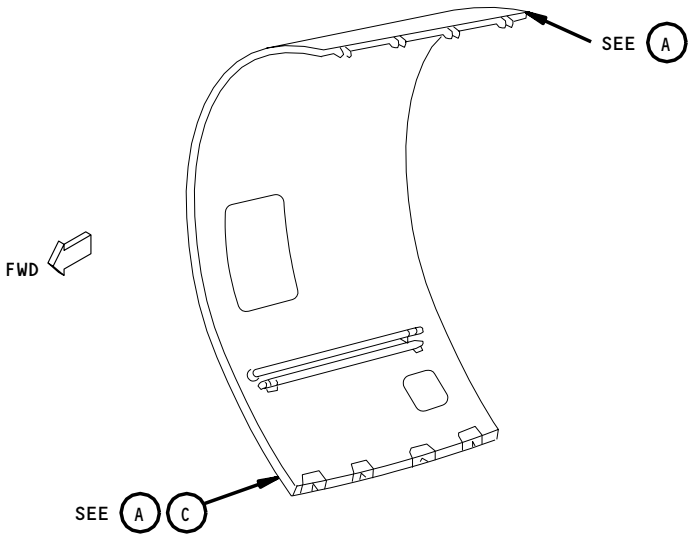
WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Prepare the panel for repair.
(a) Clean the delaminated surfaces with a clean lint-free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.

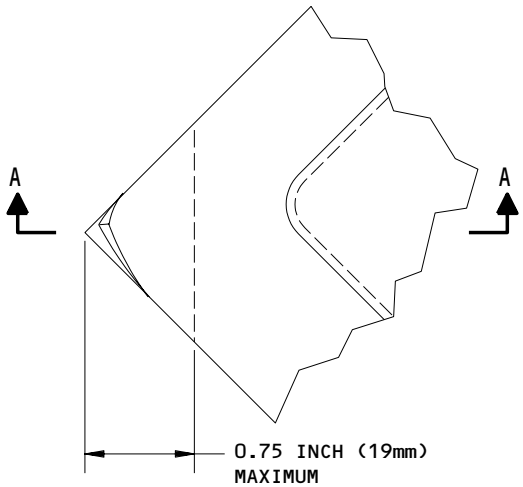
S 358-188-R00
(2) Repair the damaged area(s).

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

(a) Use the manufacturer's instructions to prepare the adhesive (EA956).

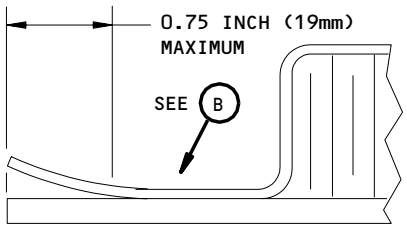


RIGHT HAND FAN COWL



EXAMPLE ALL CORNERS
MAXIMUM EXTENT OF
REPAIRABLE DELAMINATION

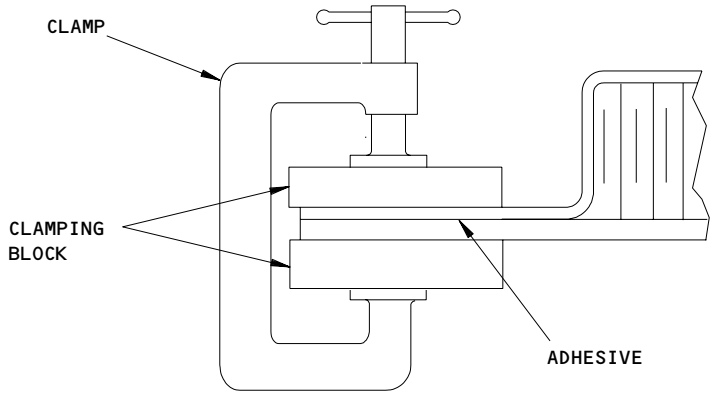
A



A-A

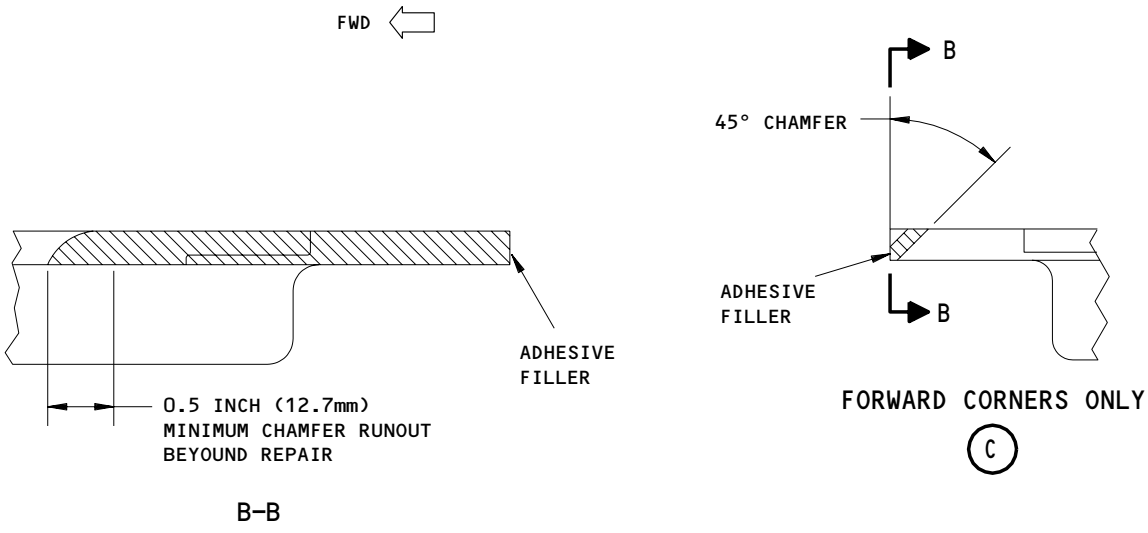
C8177

Right Fan Cowl Panel - Repair of Corner Delamination
Figure 823 (Sheet 1)



CLAMP UP CONFIGURATION DURING CURE

B



C8114

Right Fan Cowl Panel - Repair of Corner Delamination
Figure 823 (Sheet 2)

(b) Apply the adhesive to the delaminated surfaces.
(c) Install a clamping block to the repair area with clamps.
(d) Use a heat lamp (explosionproof) to dry the repair area for two hours at 65-120 degrees C (150-250 degrees F).
    1) Apply heat and pressure to both surfaces.
(e) Remove the clamps and clamping blocks.
(f) Use a tool and abrasive paper to make the edges of the corner square.
(g) FORWARD CORNERS;
    Use a tool and abrasive paper to chamfer the leading edge of the corner.
(h) Use the abrasive paper to make the outer surface of the repair smooth.
(i) Clean the chamfered repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
    1) Wipe the area dry with a lint-free cloth before the solvent dries.
(j) Use the manufacturer's instructions to prepare the adhesive filler (EA934NA).
(k) Apply the adhesive filler to the chamfered leading edges on the forward corners of the panel.
(l) Use a heat lamp (explosionproof) to dry the adhesive filler for one hour at 60 degrees C (140 degrees F).
(m) Use the abrasive paper to make the chamfered edges smooth.
(n) Clean the repair area again with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
    1) Wipe the area dry with a lint-free cloth before the solvent dries.
(o) Do the procedure to put the external surface finish of the fan cowl panel back to it's usual condition (FRS6400) (AMM 71-11-01/801).
(p) Make a visual inspection of the completed repair.
(q) Use a permanent marker pen and write the repair number FRS6077/2 adjacent to the part number of the fan cowl panel.
    1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-189-R00

26. Left Fan Cowl Panel - Repair of Damage to Edges of Access Door

A. General

(1) The repair in this procedure is FRS6098.

(2) The repair is for the edges of access doors which nicks, cracks, scratches or gouges.

(a) It is not necssary to remove nicks, cracks, scratches or gouges that do not go through the aluminum clad.

(b) Refer to Fig. 824 for the repair limits for the nicks, cracks, scratches and gouges.

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71467, LJ71567, LJ71717, LJ71773,
LJ71777, LJ75747, LJ76299, LJ76378,

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.

(5) Be careful when you use the consumable materials for this repair:

(a) Use gloves when you use degreasers.

(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.

(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.

(d) Use degreasers in work areas that have a good flow of air.

(e) Use epoxy compounds in work areas that have a good flow of air.

(f) Do not let epoxy compounds come in contact with your skin.

B. Consumable Materials

(1) Abrasive paper - 150 grit
OMat No. 5/62

(2) Lint-free cloth
OMat No. 2/101

(3) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(4) Primer, Base and converter
OMat No. 766c
(5) Pen - Permanent Marker
(6) Thinner
OMat No. 7/159

C. References
(1) AMM 71-11-01/801, Inlet Cowl

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Procedure

S 848-253-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Prepare the surface for repair.

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

(a) Use the abrasive paper to remove the damage at the door edge.
1) Make the material contours smooth per the limits (Fig. 824).
(b) Clean the repair area again with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint-free cloth before the solvent dries.

S 358-196-R00

(2) Repair the damaged area(s).
  (a) Use the manufacturer's instructions to mix the primer, base, converter and thinner.
  (b) Apply the primer with a glue brush.
  (c) Let the primer dry for 2 hours at room temperature.
  (d) Do the procedure to put the exterior surface finish of the fan cowl panel back to its usual condition (FRS6400) (AMM 71-11-01/801).
  (e) Make a visual inspection of the completed repair.
  (f) Use a permanent marker pen and write the repair number FRS6098 adjacent to the part number of the fan cowl panel.
    1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-197-R00

27. Right Fan Cowl Panel - Repair of Damage to Edges of Access Door

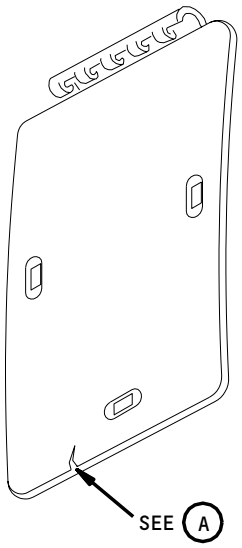
A. General

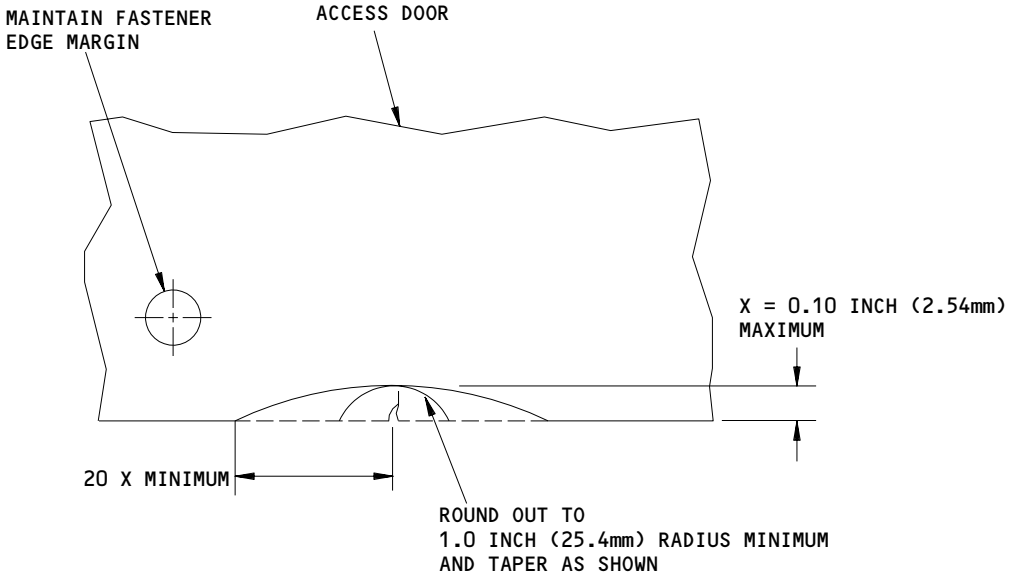
(1) The repair in this procedure is FRS6099.

(2) The repair is for the edges of access doors which nicks, cracks, scratches or gouges.
  (a) It is not necssary to remove nicks, cracks, scratches or gouges that do not go through the aluminum clad.
  (b) Refer to Fig. 825 for the repair limits for the nicks, cracks, scratches and gouges.

(3) The repair can be used on the fan cowl panel part numbers that follow:
LJ71468, LJ71568, LJ71718, LJ71546,
LJ71778, LJ75748, LJ75814, LJ76379,

(4) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.



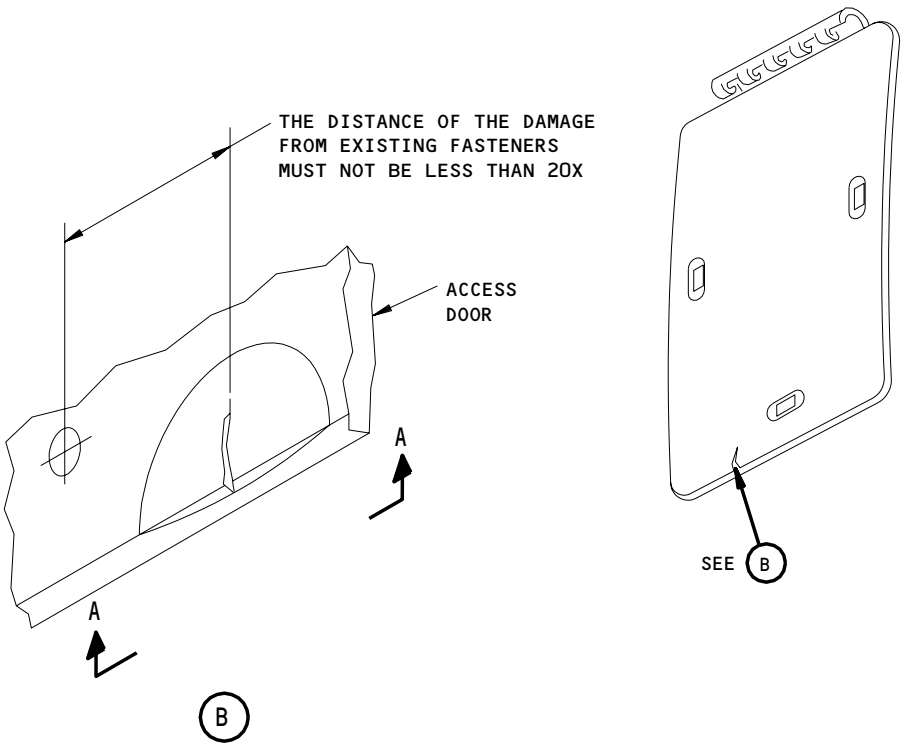


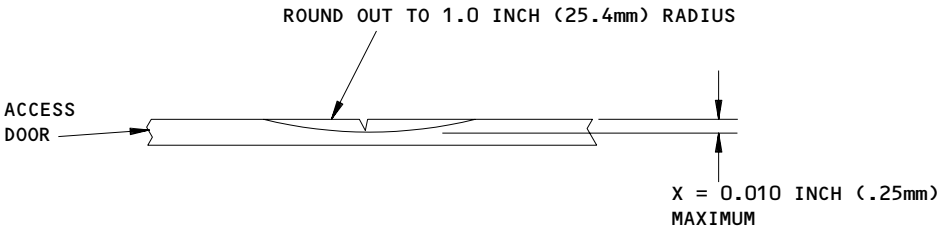
DETAIL OF NICK OR CRACK REMOVED

A

C8151

Left Fan Cowl Panel – Repair of Damage to Edges of Access Door
Figure 824 (Sheet 1)





DETAIL OF SCRATCH OR GOUGE REMOVED
A-A

NOTE: MAXIMUM LENGTH OF SCRATCH OR GOUGE FOR
THIS REPAIR IS 0.5 INCH (12.7mm)

C8152

Left Fan Cowl Panel - Repair of Damage to Edges of Access Door
Figure 824 (Sheet 2)

(5) Be careful when you use the consumable materials for this repair:
  (a) Use gloves when you use degreasers.
  (b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
  (c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
  (d) Use degreasers in work areas that have a good flow of air.
  (e) Use epoxy compounds in work areas that have a good flow of air.
  (f) Do not let epoxy compounds come in contact with your skin.

B. Consumable Materials
(1) Abrasive paper - 150 grit
OMat No. 5/62
(2) Lint free cloth
OMat No. 2/101
(3) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(4) Primer, Base and converter
OMat No. 766c
(5) Pen - Permanent Marker
(6) Thinner
OMat No. 7/159

C. References
(1) AMM 71-11-01/801, Inlet Cowl

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Procedure

S 848-254-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Prepare the surface for repair.

WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

(a) Use the abrasive paper to remove the damage at the door edge.
1) Make the material contours smooth per the limits (Fig. 825).
(b) Clean the repair area again with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint free cloth before the solvent dries.

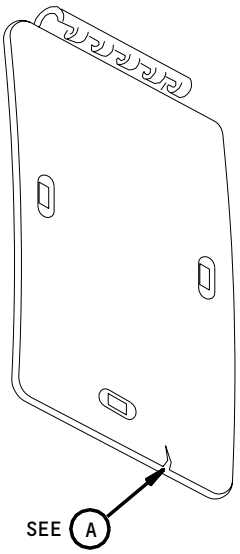
S 358-204-R00

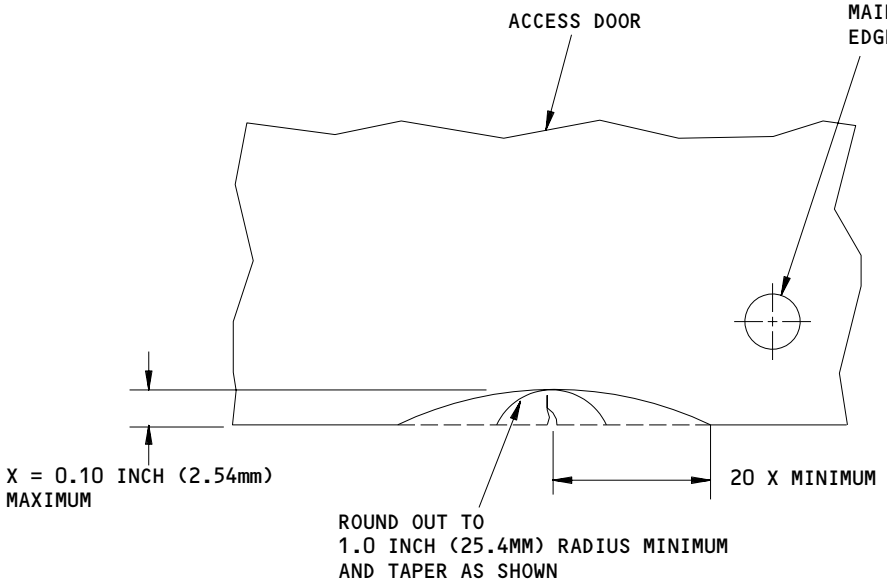
(2) Repair the damaged area(s).
(a) Use the manufacturer's instructions to mix the primer, base, converter and thinner.
(b) Apply the primer with a glue brush.
(c) Let the primer dry for two hours at room temperature.
(d) Do the procedure to put the exterior surface finish of the fan cowl panel back to its usual condition (FRS6400) (AMM 71-11-01/801).
(e) Make a visual inspection of the completed repair.
(f) Use a permanent marker pen and write the repair number FRS6099 adjacent to the part number of the fan cowl panel.
1) The color of the marker must contrast with the color of the panel.

TASK 71-11-04-358-205-R00

28. Left and Right Fan Cowl Panel - Repair of Lightning Strike Conductor

A. General
(1) The repair in this procedure is FRS6112.
(2) The repair is for damaged conductor material with new conductor material, new cover strip and new overlay strip.



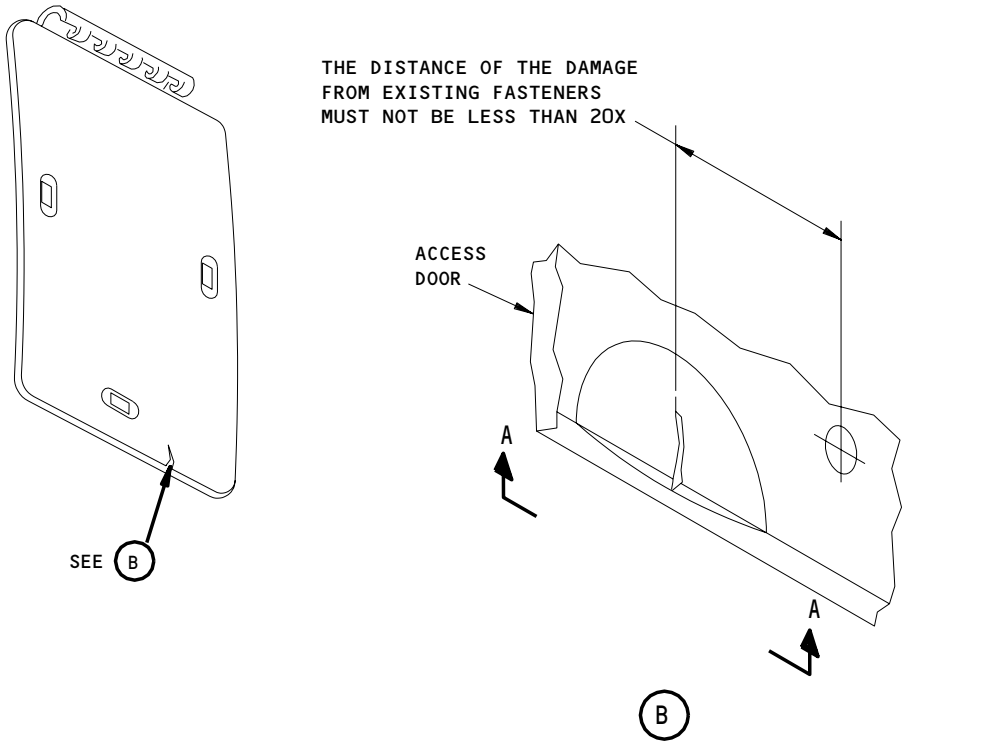


DETAIL OF NICK OR CRACK REMOVED

A

C8175

Right Fan Cowl Panel – Repair of Damage to Edges of Access Door
Figure 825 (Sheet 1)



DETAIL OF SCRATCH OR GOUGE REMOVED
A-A

NOTE: MAXIMUM LENGTH OF SCRATCH OR GOUGE FOR THIS REPAIR IS 0.5 INCH (12.7mm)

C8176

Right Fan Cowl Panel - Repair of Damage to Edges of Access Door
Figure 825 (Sheet 2)

(3) If it is necessary, do repairs FRS6035, FRS6036, FRS6038 or FRS6040 when you do this repair.
(4) The repair can be used on the fan cowl panel part numbers that follow:
LJ71467, LJ71567, LJ71717, LJ71757,
LJ71773, LJ71777, LJ75747, LJ76299, LJ76378,
LJ75748, LJ75814, LJ76379
(5) During this repair, the surfaces that are to be bonded together must be clean. Dirt and grease on the surfaces will cause unsatisfactory bonds. Clean cotton or polythene gloves must be used by all persons who touch the parts to be bonded. The components must not be touched on the surfaces that are prepared to be bonded. The components must not be moved or touched too much when the parts are bonded.
(6) Be careful when you use the consumable materials for this repair:
(a) Use gloves when you use degreasers.
(b) Do not smoke when you use degreasers. The gas decomposes to make very poisonous products.
(c) Degreasers are very flammable. Keep the degreasers away from open flame or ignition sources.
(d) Use degreasers in work areas that have a good flow of air.
(e) Use epoxy compounds in work areas that have a good flow of air.
(f) Do not let epoxy compounds come in contact with your skin.

B. Consumable Materials
(1) Abrasive pad - Scotch Brite
OMat No. 583
(2) Adhesive - Acrylic
OMat No. 8/121
(3) Adhesive tape - Aluminum foil
OMat No. 298
(4) Foil - Aluminum
OMat No. 2/95
(5) Lint free cloth
OMat No. 2/101
(6) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257

(7) Pen - Permanent Marker
(8) Primer - Silcoset OP1
OMat No. 876A
(9) Sealant - Silcoset 152
OMat No. 872

C. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

D. Procedure

S 848-255-R00

WARNING: OBEY THE INSTRUCTIONS WHEN YOU USE THE CONSUMABLE MATERIALS FOR THIS REPAIR. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO YOU COULD OCCUR.

(1) Prepare the panel for repair (Fig. 826).

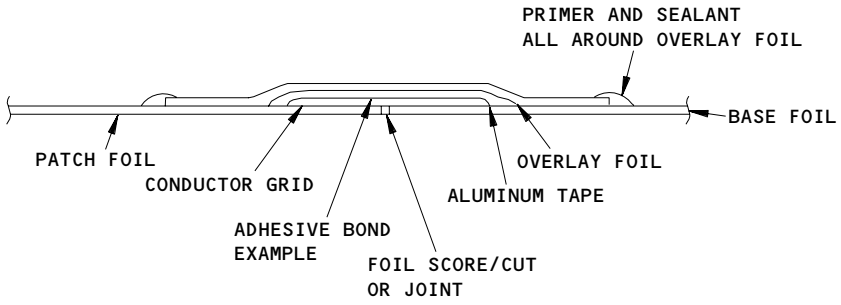
WARNING: SANDING OR CUTTING OF COMPOSITE MATERIALS PRODUCES DUST AND FLYING PARTICLES WHICH ARE POTENTIAL HEALTH HAZARDS. WEAR PROTECTECTIVE CLOTHING, GLOVES, DUST MASKS AND SAFETY GLASSES. AVOID BRATHING OF DUST OR PROLONGED CONTACT OF DUST ON THE SKIN.

(a) Remove any disbonded or loose aluminum foil.
(b) Make a record of all stenciled instructions in the repair area.
(c) Remove the nameplate if it is in the repair area and keep for subsequent installation.
(d) Remove any bonding leads, contactors, or bus bars in the area if the they are nearer than 2.0 inches (50.8 mm) from the damage.
1) Keep the items for the subsequent installation.

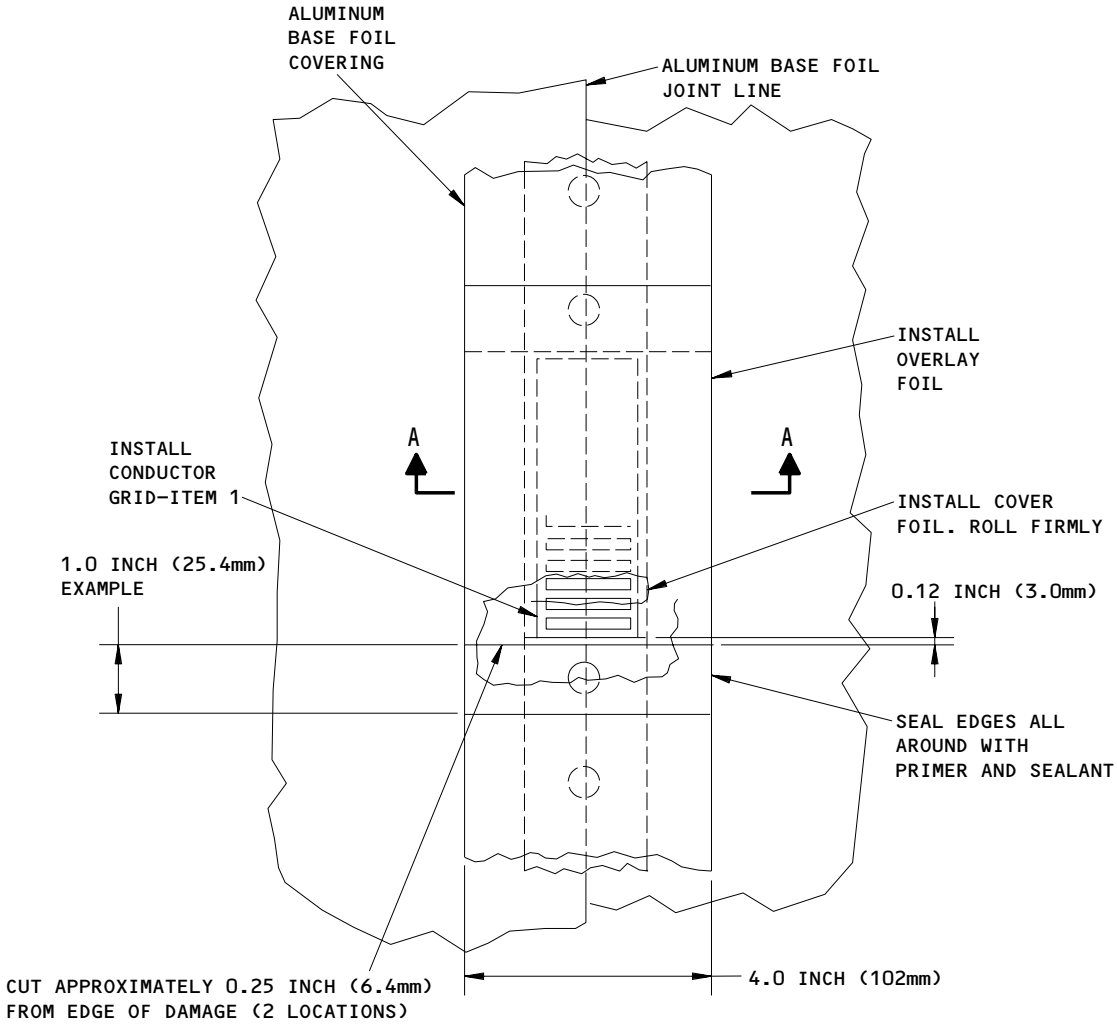
CAUTION: DO NOT CUT INTO THE INNER SKIN OF THE COWL PANEL TO PREVENT DAMAGE TO THE PANEL.

(e) Cut away the damaged part of the foil cover and conductor.

NOTE: It is not necessary to remove hinges, latches or access doors in the damaged area. The cover foil does not fit under these items.

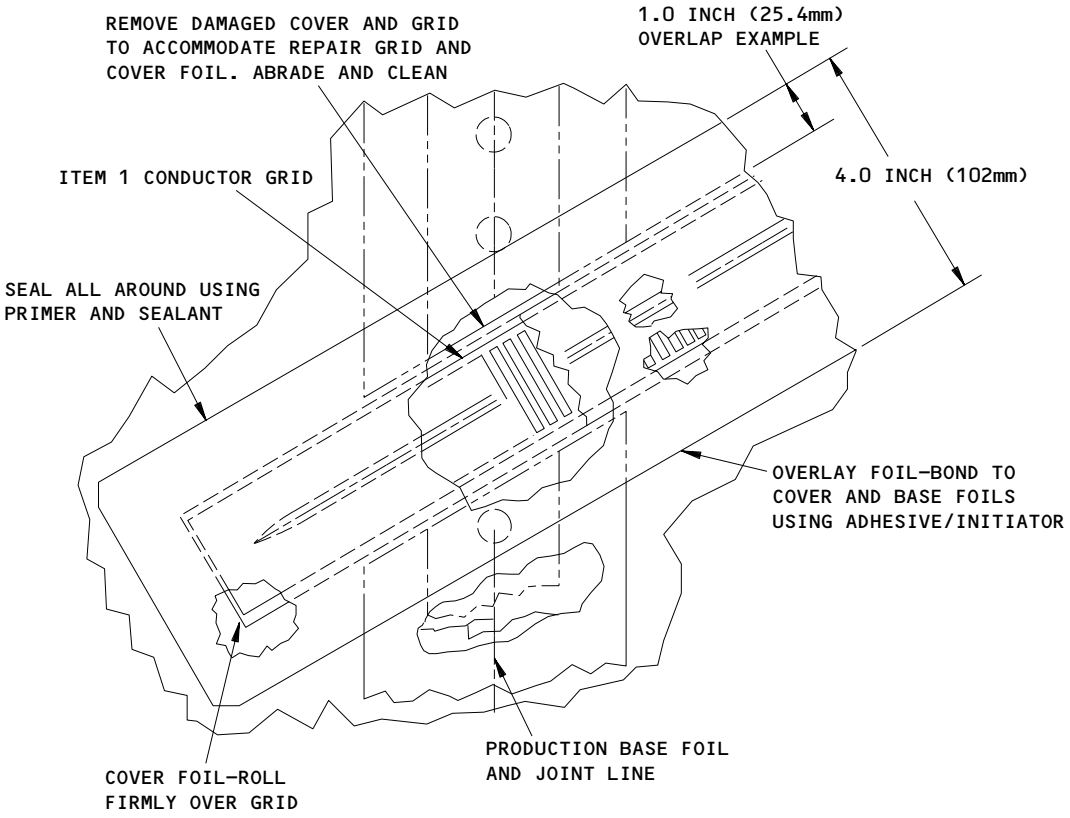


A–A



62131

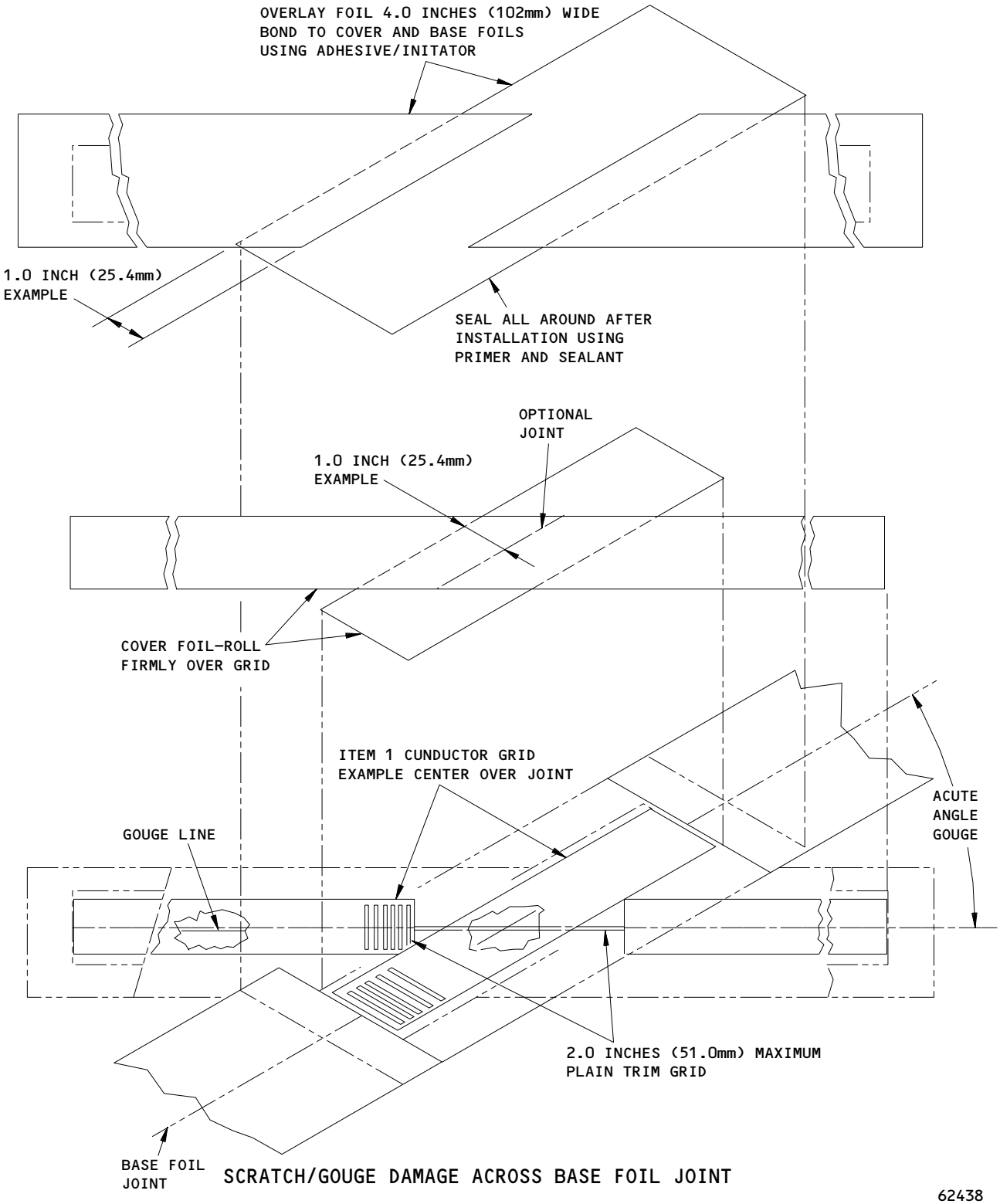
Left and Right Fan Cowl Panel – Repair of Lightning Strike Conductor
Figure 826 (Sheet 1)



MINIMUM DAMAGE SCRATCH/CUT ACROSS BASE FOIL JOINT

62437

Left and Right Fan Cowl Panel – Repair of Lightning Strike Conductor
Figure 826 (Sheet 2)



Left and Right Fan Cowl Panel – Repair of Lightning Strike Conductor
Figure 826 (Sheet 3)

(f) Clean the repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the area dry with a lint free cloth before the solvent dries.

S 358-213-R00

(2) Make the repair parts.
(a) Make the overlay foil strip(s) from the aluminum foil (OMat 2/95).
(b) Make the cover foil strip(s) from the masking tape (OMat 298).
(c) Make the conductor from the LJ71814 part.
1) Cut the conductor to length and width to fit the repair.
(d) Use an abrasive pad (OMat 583) to make rough the surfaces of the repair parts and base foil that will touch in the repair.
1) Make rough the surfaces that will touch the adhesive, sealant, or adhesive side of the cover foil strip when assembled.
(e) Clean the repair area with a clean lint-free cloth wet with Acetone, Isopropyl alcohol or cleaning solvent Desoclean.
1) Wipe the parts dry with a lint free cloth before the solvent dries.

S 358-214-R00

(3) Repair the damaged area (Fig. 826).
(a) Install the conductor with its center line on the joint/cut/scratch line.
1) Use the cover foil strip(s) to attach the conductor to the base foil.
2) Apply pressure to cover foil strip(s) to make sure the surfaces touch.
3) Make sure the surfaces between the conductor ladder steps touch each other.
(b) Use a glue brush to apply a thin film of initiator (OMat 8/121) to the surface of the overlay foil strips.
(c) Apply acrylic adhesive with initiator along the center of the cover foil strip and also along the base foil all around the edges of the cover foil strip.

(d) Immediately place the overlay foil strip(s) over the cover foil strip(s).
(e) Remove air from the foil strip(s) by rolling flat.
(f) Make a hole in any air bubbles and roll flat again.

NOTE: Remove excessive adhesive from under the overlay foil strip(s) by rolling from the center to the edges.

(g) Clean the excessive adhesive from the overlay strip with a lint free cloth wet with Acetone, Isopropyl alcohol, or cleaning solvent Desoclean.
(h) Let the adhesive dry at room temperature for one hour.
(i) Make a visual inspection of the repair.
(j) Apply primer to all open edges of the overlay foil strip(s).
(k) Dry primer at room temperature for 30 minutes.
(l) Apply sealant to all open edges of overlay foil strip(s).
(m) Dry sealant at room temperature for two hours.
(n) Write stenciled instructions recorded earlier on the panel in in the same area were the repair was made.
(o) Install the nameplate on the panel in the same place it was removed from.
(p) Make a visual inspection of the completed repair.
(q) Use a permanent marker pen and write the repair number FRS6112 adjacent to the part number of the fan cowl panel.
    1) The color of the marker must contrast with the color of the panel.

FAN COWL PANEL LATCH - ADJUSTMENT/TEST

TASK 71-11-05-825-007-R00

1. Fan Cowl Panel Latch Adjustment

A. General

WARNING: ENGINES WITH RR SB 71-9088, WHEN WORK IS DONE IN THE AREA OF THE OIL BREATHER, BE CAREFUL OF THE SHARP EDGES AT THE FRONT AND REAR OF THE BREATHER MAST. INJURY TO PERSONS COULD OCCUR.

CAUTION: ENGINES WITH RR SB 71-9088, DO NOT USE THE OIL BREATHER MAST AS A HAND-HOLD OR DAMAGE TO THE FAN COWL PANEL MAY OCCUR.

(1) This procedure contains two tasks. The adjustment and test of the fan cowl panel latch operation load and the adjustment of the fan cowl panel lower edge clearance.
(2) The four latches per fan cowl panel are located at the lower edge of the fan cowl panels.

B. Equipment

(1) Load Gage - 0-100 pounds, HU21580 Rolls Royce

NOTE: Alternative tools are permitted.

C. References

(1) 71-11-04/201, Fan Cowl Panels

D. Access

(1) Location Zones
(a) 410 Left Power Plant
(b) 420 Right Power Plant
(2) Access Panels
(a) 413AL Left Engine Fan Cowl Panel (LH)
(b) 414AR Left Engine Fan Cowl Panel (RH)
(c) 423AL Right Engine Fan Cowl Panel (LH)
(d) 424AR Right Engine Fan Cowl Panel (RH)

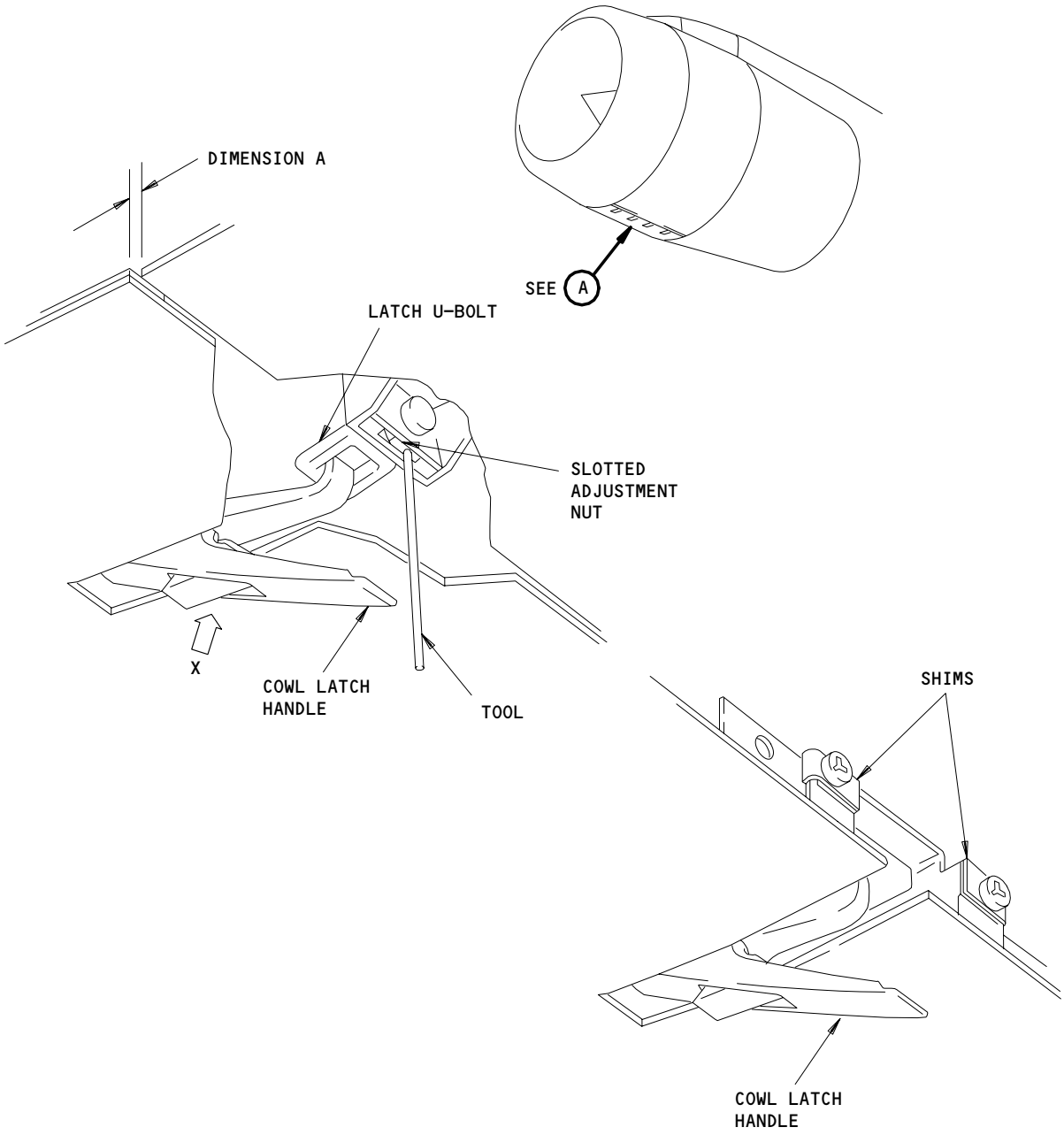
E. Adjust the Fan Cowl Panel Latch Operation Load (Fig. 501)

S 015-003-R00

(1) Open the applicable fan cowl panel latch. Make sure the adjacent latches are engaged (Ref 71-11-04).

S 485-005-R00

(2) Position the load gage 0.50 inch (12.70 mm) from the free end of the latch handle (1) and apply a load in the direction of arrow X (Fig. 501).



LATCH IN OPEN POSITION
(ALL OTHER LATCHES ENGAGED)

A

68987

Fan Cowl Panel Latch Adjustment and Test
Figure 501

S 725-004-R00

(3) Make a check that the load necessary to operate the latch is 35 to 45 pounds (155 to 200 N).

S 825-006-R00

(4) If load necessary to operate the cowl latch is not within the limits given in the last step, adjust the latch operation load.
   (a) With cowl latch open, adjust nut (3) with the locally manufactured tool (4). Make a check of the load necessary to operate the latch with each adjustment until you get the correct load.

S 415-008-R00

(5) Close the fan cowl panels (Ref 71-11-04).

F. Adjust the Fan Cowl Panel Clearance (Fig. 501)

S 225-001-R00

(1) With fan cowl panels closed and all latches engaged, make a check of the clearance between the bottom edges of the fan cowl panels. The clearance (Dimension A) should be 0.010 to 0.150 inch (0.254 to 3.81 mm).

S 825-002-R00

(2) If the clearance is not within the limits given in the last step, adjust the fan cowl panels as follows:
   (a) Open the fan cowl panel (Ref 71-11-04).
   (b) Install or remove the shims (2) as applicable.
   (c) Close the fan cowl panel (Ref 71-11-04).
   (d) Make a check of the fan cowl panel clearance again.

S 825-009-R00

(3) Do the fan cowl panel latch operation load adjustment again (Ref par. 4).

STRUT TO COMMON NOZZLE FAIRING SEAL - REMOVAL/INSTALLATION

1. General
   A. This section gives the procedures to remove and to install the seal between the strut and the common nozzle fairing.

TASK 71-11-07-004-001-R00

2. Remove the Seal Between the Strut and the Common Nozzle Fairing
   A. References
      (1) 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones
          410 No. 1 Power Plant
          420 No. 2 Power Plant

   C. Prepare for the Removal

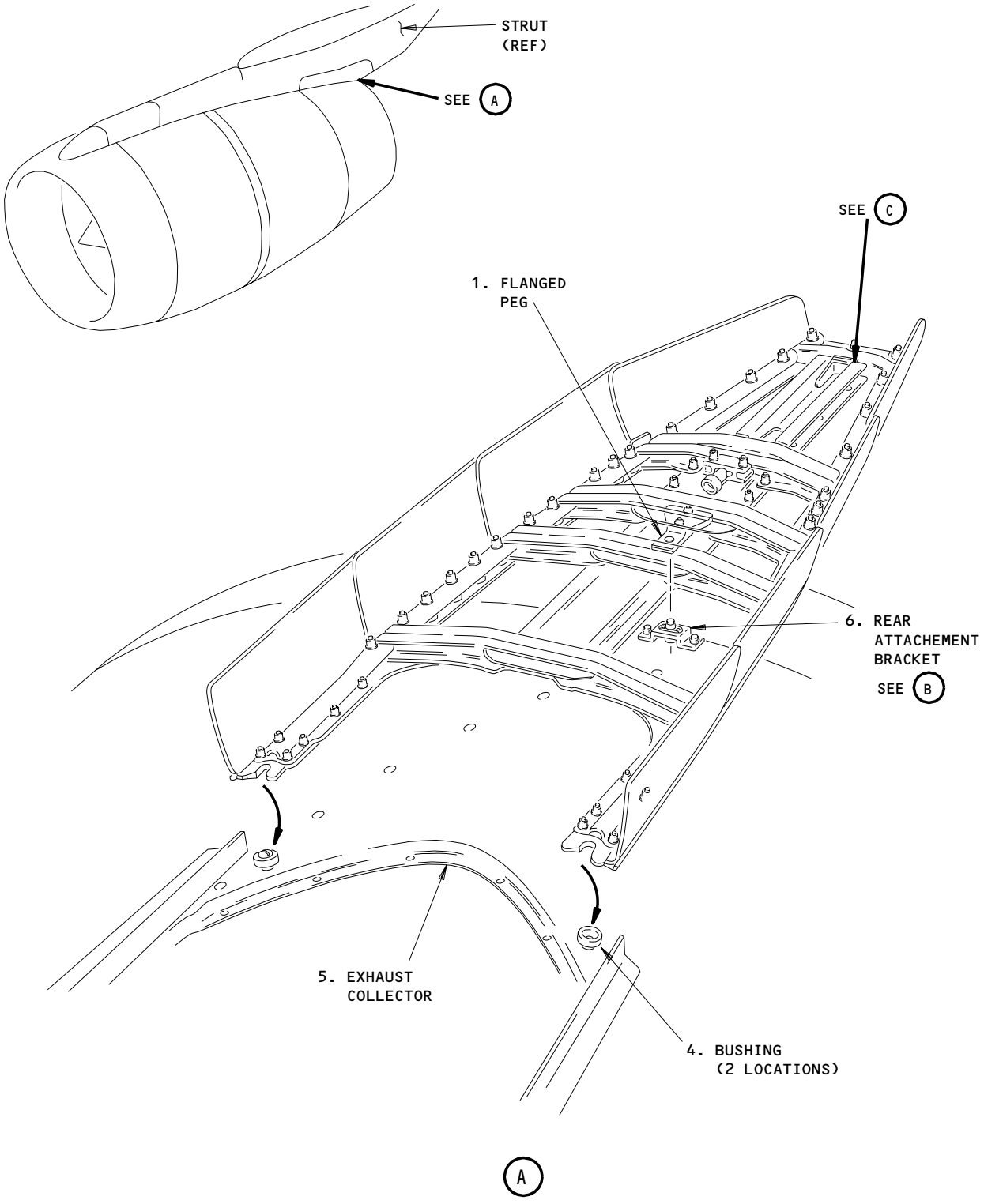
      S 864-013-R00
      (1) For the left engine, open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE identifiers:
          (a) 11D7, ENGINES STBY IGNITION LEFT 1
          (b) 11D8, ENGINES STBY IGNITION LEFT 2
          (c) 11D19, ENGINE START CONT LEFT
          (d) 11L1, LEFT ENGINE IGN 1

      S 864-007-R00
      (2) For the right engine, open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE identifiers:
          (a) 11D9, ENGINES STBY IGNITION RIGHT 1
          (b) 11D10, ENGINES STBY IGNITION RIGHT 2
          (c) 11D20, ENGINE START CONT RIGHT
          (d) 11L28, RIGHT ENGINE IGN 1

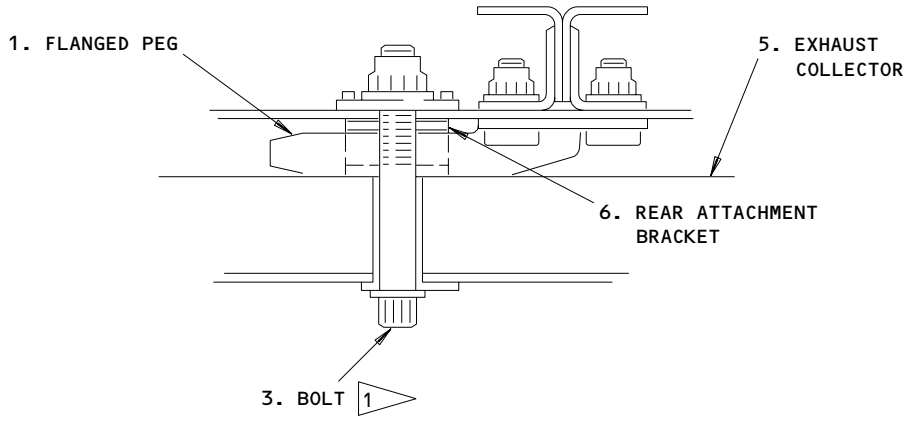
      S 044-003-R00

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

      (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).



Strut To Common Nozzle Fairing Seal
Figure 401 (Sheet 1)



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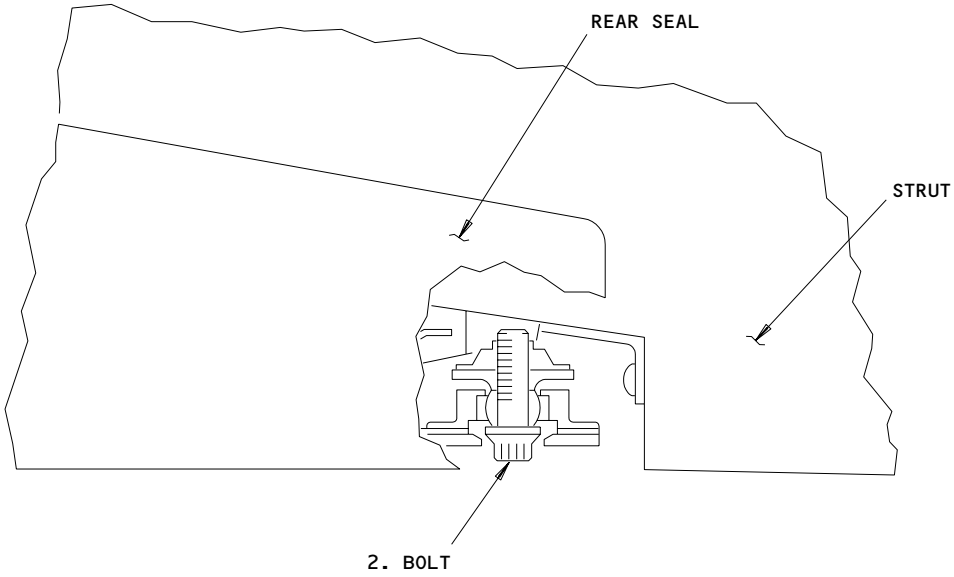


C

1 GET ACCESS TO THE BOLT FROM THE INSIDE OF THE COMMON NOZZLE

Strut to Common Nozzle Fairing Seal
Figure 401 (Sheet 2)

D. Remove the Seal Between the Strut and the Common Nozzle Fairing

S 024-004-R00

(1) Do these steps to remove the fairing seal (Fig. 401):
   (a) Remove the bolt (3) that attaches the front seal to the common nozzle.
   (b) Carefully remove the bolt (2).
   (c) Lower the rear seal from the strut.
   (d) Move the rear section of the seal forward to be clear of the strut structure and lower the rear section from the strut.

CAUTION: BE CAREFUL WHEN YOU REMOVE THE SEAL ASSEMBLY FOR THE COMMON NOZZLE. DAMGE TO THE SURFACE OF THE COMMON NOZZLE CAN OCCUR IF THE SEAL ASSEMBLY TOUCHES THE COMMON NOZZLE.

   (e) Carefully move the seal assembly aft to disengage the front seal from the bushings (4) and the rear attachment bracket (6).
   (f) Remove the seal assembly from the engine.

TASK 71-11-07-404-012-R00

3. Install the Seal Between the Strut and the Common Nozzle Fairing

A. General
   (1) Use the procedures in 70-51-00/201 to tighten the fasteners. Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is specified in this procedure.

B. References
   (1) 70-51-00/201, Torque Tightening Technique
   (2) 78-31-00/201, Thrust Reverser System

C. Access
   (1) Location Zones
      410 No. 1 Power Plant
      420 No. 2 Power Plant

D. Procedure

S 424-008-R00

(1) Do these steps to install the seal between the strut and the common nozzle fairing (Fig. 401):

CAUTION: BE CAREFUL WHEN YOU REMOVE THE SEAL ASSEMBLY FOR THE COMMON NOZZLE. DAMGE TO THE SURFACE OF THE COMMON NOZZLE CAN OCCUR IF THE SEAL ASSEMBLY TOUCHES THE COMMON NOZZLE.

   (a) Put the seal assembly on the exhaust collector (5).
   (b) Carefully move the front seal forward to the correct location on the bushings (4).
   (c) Make sure the front seal engages the flanged peg (1) below the attachment bracket (6).
   (d) Align the bolt hole of the flanged peg (1) with the attach nut of the rear attachment bracket (6).

(e) Hold the rear seal and install the bolt (3). Do not tighten the bolt (3).
(f) Lift the rear seal to the correct position.
(g) Install the bolt (2).
(h) Tighten the bolt (2) to 300-350 pound-inches (33.9-39.6 newton meters).
(i) Tighten the bolts (3).

E. Put the Airplane Back to Its Normal Condition

S 444-009-R00

(1) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 864-010-R00

(2) For the left engine, remove the DO-NOT-CLOSE identifiers and close these circuit breakers on the overhead panel, P11:
(a) 11D7, ENGINES STBY IGNITION LEFT 1
(b) 11D8, ENGINES STBY IGNITION LEFT 2
(c) 11D19, ENGINES START CONT LEFT
(d) 11L1, LEFT ENGINE IGN 1

S 864-011-R00

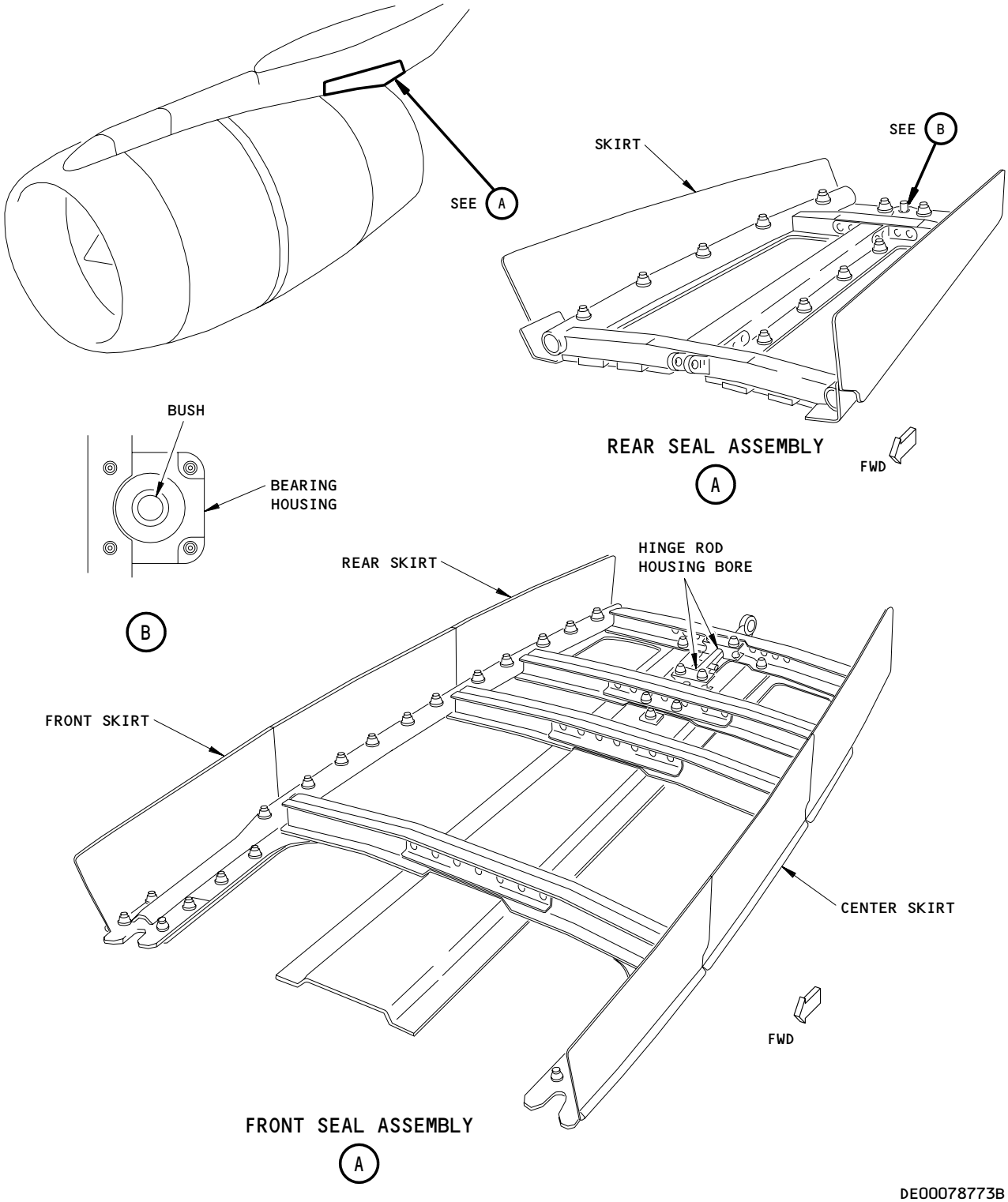
(3) For the right engine, remove the DO-NOT-CLOSE identifiers and close these circuit breakers on the P11 panel:
(a) 11D9, ENGINES STBY IGNITION RIGHT 1
(b) 11D10, ENGINES STBY IGNITION RIGHT 2
(c) 11D20, ENGINE START CONT RIGHT
(d) 11L28, RIGHT ENGINE IGN 1

STRUT TO COMMON NOZZLE EXHAUST FAIRING SEAL - INSPECTION/CHECK

TASK 71-11-07-206-001-R00

1. Strut to Common Nozzle Exhaust Fairing Seal Inspection (Fig. 601)
   A. References
      (1) 70-42-26/201, Acceptable Cracks, Stop Drilling (FRS.3255)
   B. Access
      (1) Location Zones
         (a) 410 Left Power Plant
         (b) 420 Right Power Plant
   C. Strut to Common Nozzle Exhaust Fairing Seal Check

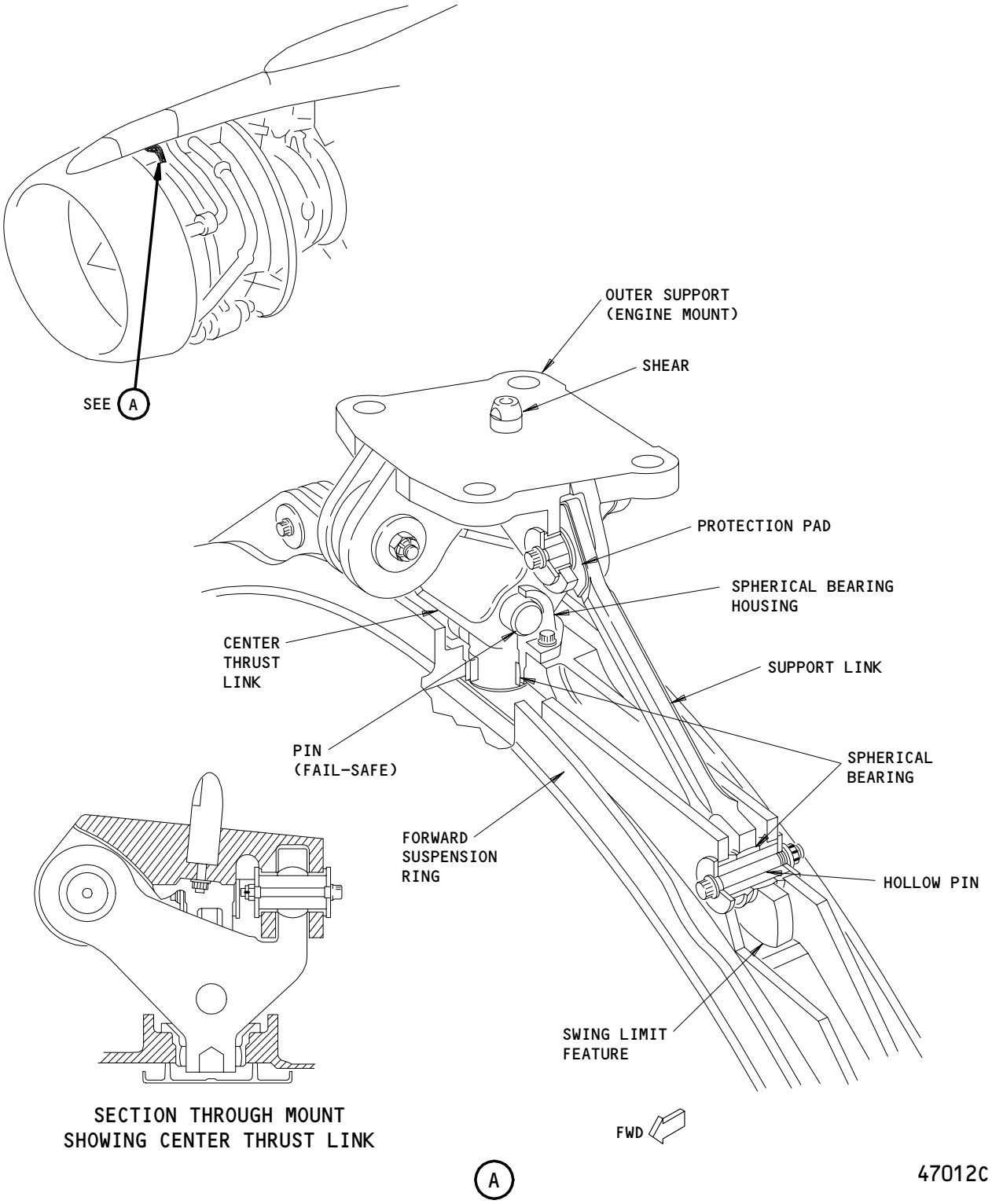
      S 226-002-R00
      (1) Do the check of the fairing seal for cracks and wear.
         (a) Cracks up to 3.0 inches (76.2 mm) in length should be repaired with FRS.3255 (Ref 70-42-26).
         (b) Wear on any seal skirt contact surface up to 50% of material thickness is permitted.
            1) Wear at the hinge rod housing bore up to 0.020 in. (0.51 mm) - Accept.
            2) Wear more than above - Reject.
         (c) Axial movement between the rear seal bearing housing and the bush is permitted.



Strut To Common Nozzle Exhaust Fairing Seal
Figure 601

ENGINE MOUNTS - DESCRIPTION AND OPERATION

1. General
   A. The engine is suspended from the aircraft strut by two mounting assemblies, one forward and one aft, positioned in tandem. The forward mount is located at the top center of the low pressure (L.P.) compressor case and transmits engine thrust, vertical and side loads to the aircraft structure. The aft mount is located at the top center of the L.P. turbine bearing and support assembly and transmits torsional, vertical and side loads to the aircraft structure.
   B. Spherical bearings, incorporated in the mounts, allow for thermal expansion and relative movement between engine and strut. Fail safe features are included in both mounts.
2. Component Details
   A. Forward Mount (Fig. 1)
      (1) The forward mount comprises two support links, an outer support, a center thrust link and a spherical bearing housing. Each end of the support links and the upper end of the center thrust link incorporate spherical bearings.
      (2) The support links are connected to lugs on the outer support and to the front suspension ring by hollow pins. The center thrust link is connected at its upper end, by hollow pins, to transversely and axially positioned lugs on the outer support. At its lower end, the thrust link is located in the spherical bearing housing. The spherical bearing housing is bolted to the front suspension ring at the top center position. Each hollow pin is retained by washers, bolt, nut and split cotter pin. The outer support is located by a mount mounted shear pin and secured by four bolts to the aircraft strut.
      (3) To provide a fail-safe feature in the mount, a pin is fitted transversely through the lower section of the center thrust link and extends into two lugs integral with the spherical bearing housing. Adequate clearance is left between the pin and the lugs such that no load is carried by the pin unless failure of a support link occurs.
      (4) To prevent excessive rotation of each support link and to prevent rotation of the engine about either support link end with all other connections severed, the swing of the support links is limited. To prevent excessive movement, the support link ends are profiled to butt against the root of the outer support at the outer end and with machined pads on the front suspension ring at the inner end.



Engine Forward Mount
Figure 1

(5) Engine thrust is transmitted through the spherical bearing housing, center thrust link and outer support to the aircralt strut. The transversely and axially positioned spherical bearing assemblies allow the center thrust link to pivot, so ensuring that torque is not transmitted to the aircraft. The support links transmit vertical and side loads through the outer support to the aircraft strut.

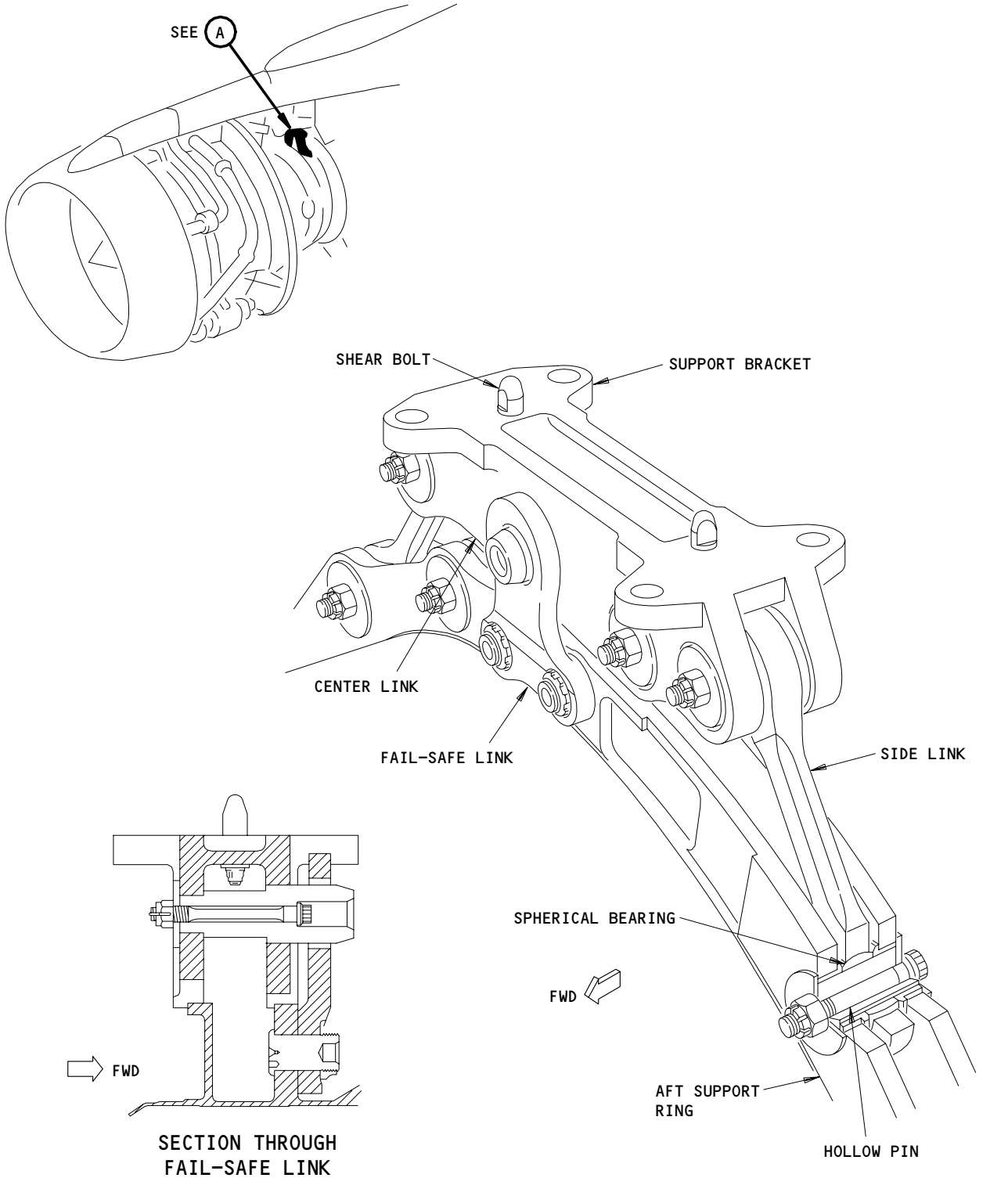
B. Aft Mount (Fig. 2)

(1) The aft mount comprises two side links a center link and a support bracket. Each end of the three links incorporate spherical bearings.

(2) The links are connected to lugs on the support bracket and to the rear support ring by hollow pins, each of which is retained by washers, bolt, nut and split cotter pin. Stabilization rings, incorporated in the support bracket lugs, prevent the links rotating about their own axis and stabilize the link arrangement. The support bracket is located by two shear bolts and secured by four bolts to the aircraft strut.

(3) To provide a fail-safe feature in the mount, a fail-safe link is fitted. This link is secured to the front rig of the rear support ring with solid pins and self-locking shaft nuts. A stepped pin, secured through the support bracket, projects into the eye at the top of the fail-safe link. Adequate clearance is left between the pin and the link such that no load is carried by the link unless failure of slide link occurs.

(4) The aft mount transmits vertical and side loads to the aircraft strut through the side links and the support bracket. The center link is positioned tangentially to transfer engine torsional loads through the support bracket to the aircraft strut.

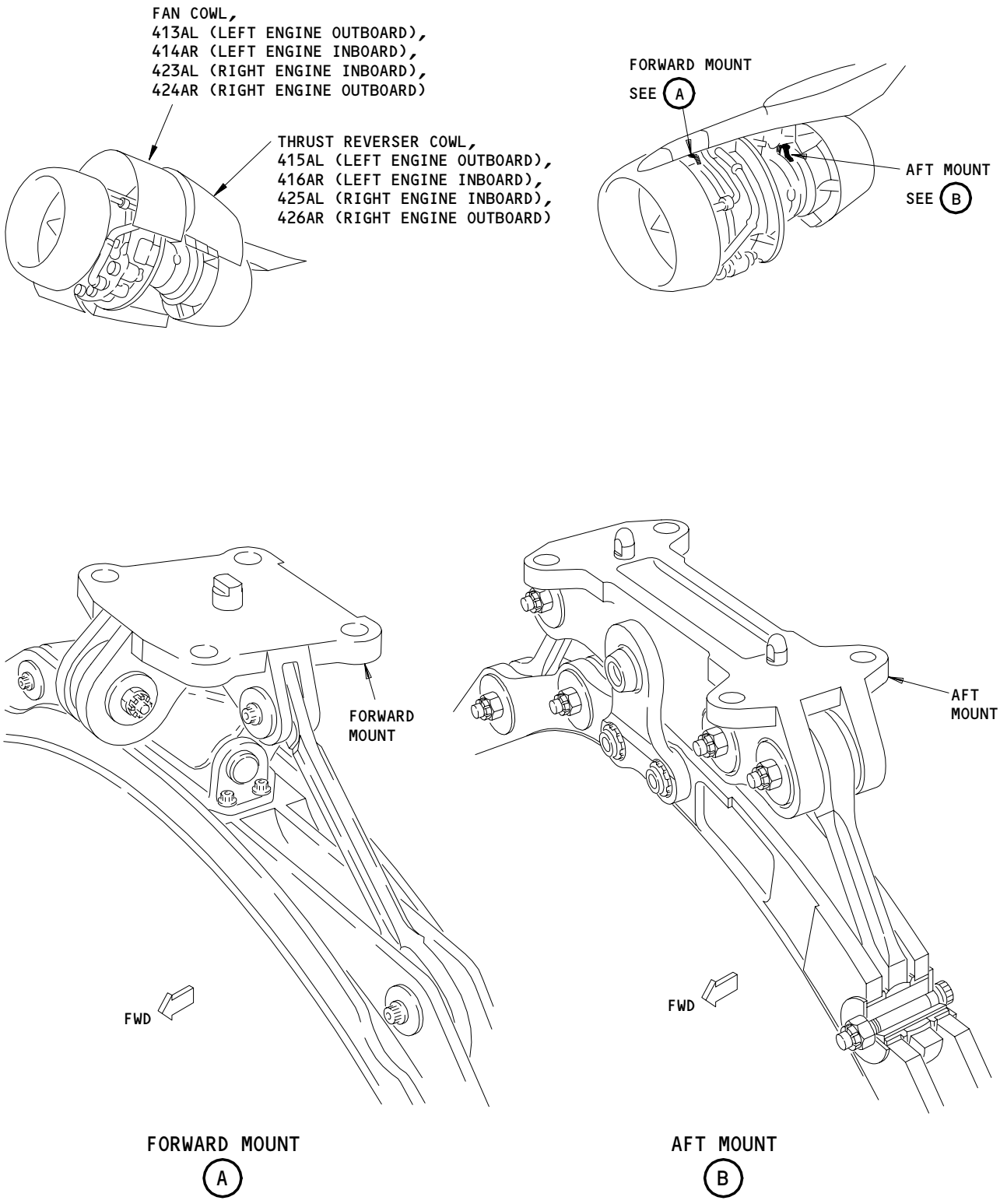


Engine Aft Mount
Figure 2

ENGINE MOUNTS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
MOUNT - AFT	--	2	415AL,416AR,425AL,426AR T/R COWL	71-21-02
MOUNT - FORWARD	--	2	413AL,414AR,423AL,424AR, FAN COWL	71-21-01

Engine Mounts - Component Index
Figure 101



Engine Mounts - Component Location
Figure 102

FORWARD MOUNT - REMOVAL/INSTALLATION

1. General
   A. This section gives the procedures to remove and install the engine forward mount.
   B. It is necessary to remove the engine from the airplane before you remove the forward mount (AMM 71-00-02/401).
   C. Use the procedures in (AMM 70-51-00/201) to tighten the fasteners. Tighten the fasteners to the torque values in (AMM 70-51-00/201) unless a torque value is specified in this procedure.

TASK 71-21-01-004-001-R00

2. Remove the Forward Mount (Fig. 401)
   A. Equipment
      (1) Lifting tool - Rolls-Royce HU27557/1
      (2) Extractor - Rolls-Royce HU 28907/3
   B. References
      (1) AMM 71-00-02/401, Power Plant
   C. Access
      (1) Location Zones
          410 No. 1 Power Plant
          420 No. 2 Power Plant

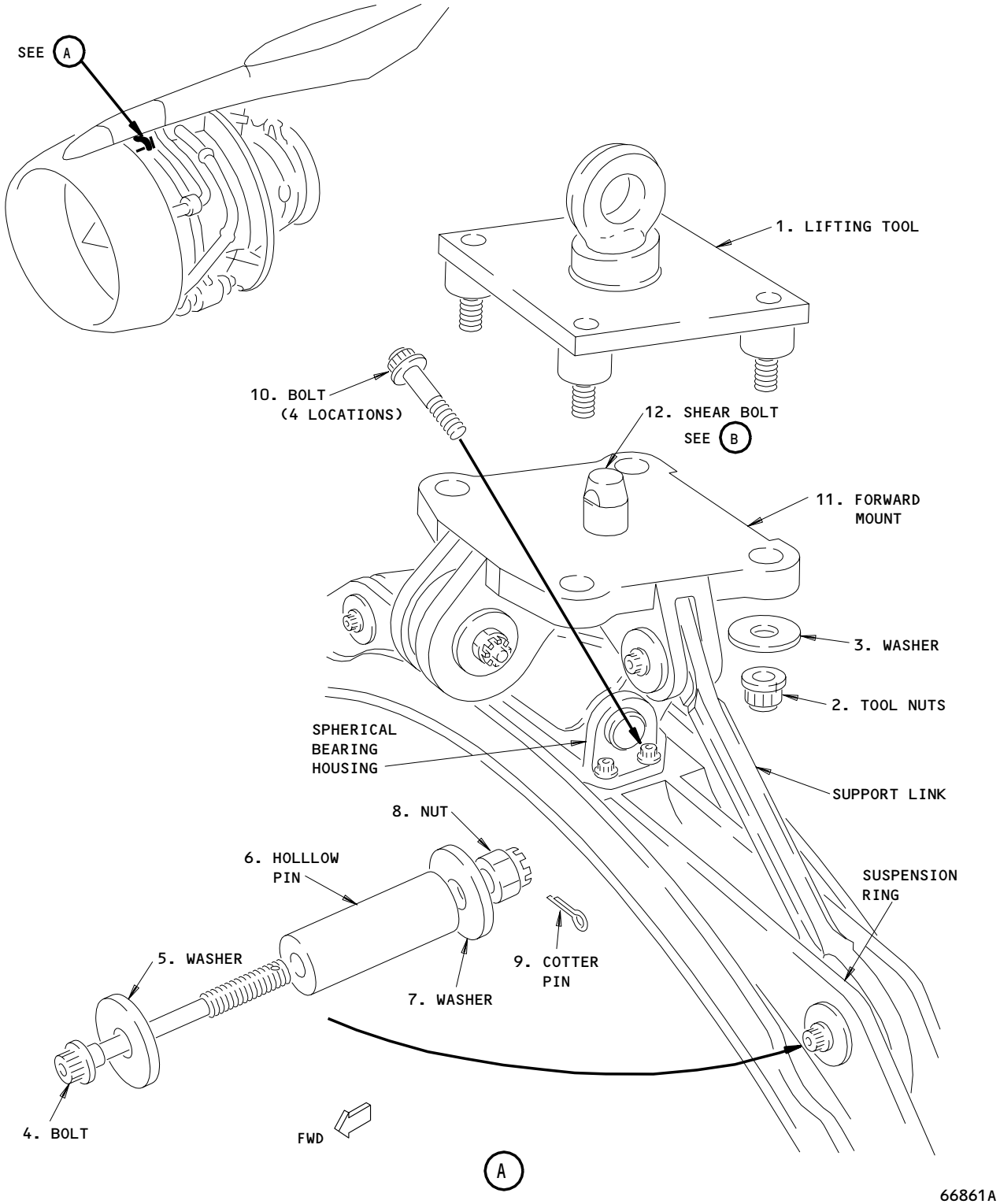
   D. Remove the forward mount (Fig. 401).

      S 024-002-R00
      (1) Remove the power plant (AMM 71-00-02/401).

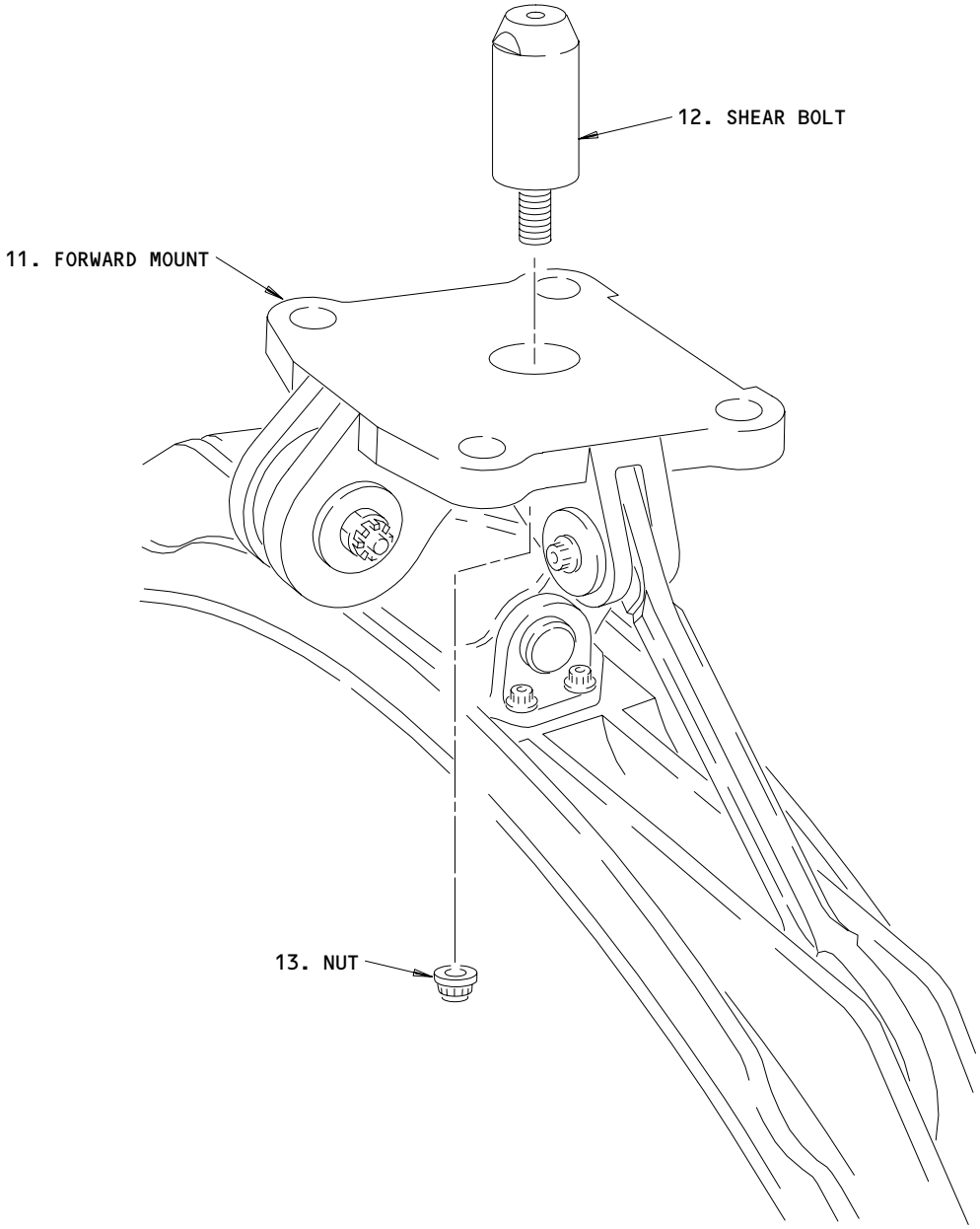
      S 944-003-R00
      (2) Install the lifting equipment as follows:
          (a) Attach the lifting tool (1) to the forward mount.
              1) Attach the tool nuts (2) and the washers (3).
          (b) Attach the hoist to the lifting tool.

      S 034-004-R00
      (3) Remove the support links from the suspension ring as follows:
          (a) At the suspension ring, remove the washers (7), the nuts (8), and the cotter pins (9) from the support links of the forward mount.
              1) Keep these parts for the installation procedure.
          (b) Use the extractor tool to remove the bolts (4), the washers (5) and the pins (6).

              NOTE: This procedure releases the support link from the suspension ring.



Forward Mount Installation
Figure 401 (Sheet 1)



SHEAR BOLT INSTALLATION

B

93051

Forward Mount Installation
Figure 401 (Sheet 2)

S 034-005-R00

(4) Remove the spherical bearing housing as follows:
  (a) Hold the forward mount.
  (b) Remove the bolts (10) that hold the spherical bearing housing to the low pressure (LP) compressor case.

S 034-006-R00

(5) Carefully remove the forward mount (11).

S 034-007-R00

(6) Do the steps that follow to remove the shear bolt (12) from the forward engine mount (11):
  (a) Remove the nut (13) that holds the shear bolt (12).
  (b) Remove the shear bolt (12) from the forward mount (11).

TASK 71-21-01-404-008-R00

3. Install the Forward Mount (Fig. 401)

A. Equipment
  (1) Lifting tool - Rolls-Royce HU27557/1
  (2) Extractor - Rolls-Royce HU 28907/3

B. Consumable Materials
  (1) D00006 Lubrication Fluid
    British Spec - Never Seez NSN-165-A
    OMat No. - 4/23

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	4	Bolt	71-21-01	01	5
	5	Washer			17
	6	Pin			20
	7	Washer			17
	8	Nut			30
	9	Pin			4
	10	Bolt			75
	11	Mount - Forward			3
	12	Shear Bolt			69

D. References
(1) AMM 71-00-02/401, Power Plant
E. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

F. Do the steps that follow to install the forward mount

S 434-009-R00
(1) If the shear bolt is removed, install the shear bolt (12) on the forward engine mount (11) as follows:
(a) Put the shear bolt (12) in the mount (11).
1) Hold the shear bolt (12) with the nut (13).
a) Tighten the nut.

S 434-011-R00
(2) Attach the lifting tool (1) to the forward mount as follows:
(a) Hold the lifting tool with the nuts (2) and the washers (3).
(b) Attach the hoist to the lifting tool.

S 434-012-R00
(3) Attach the spherical bearing housing as follows:
(a) Carefully set the forward mount (11) on the LP compressor case.
(b) Install the bolts (10) at 4 locations to hold the spherical bearing housing.

S 434-013-R00
(4) Attach the support links to the suspension ring as follows:
(a) Put the support links of the forward mount in their correct positions on the suspension ring.
(b) Apply the lubricant to the pins (6).
1) Assemble the pins to the suspension ring and the support links.
(c) Install the bolts (4), the washers (5, 7), and the nuts (8) to secure the pins (6).

(d) Install new cotter pins (9).
(e) Make sure all engine mount castellated nuts have correctly installed cotter pins (9).

NOTE: Before you replace the missing cotter pins, make sure the castellated nut is correctly torque tightened.

(f) Remove the lifting tool (1).

S 414-014-R00

(5) Install the power plant (AMM 71-00-02/401).

FORWARD MOUNT - INSPECTION/CHECK

1. General
   A. This procedure has two tasks. The first task examines the clearance of the fail safe pin of the forward mount. The second task examines the forward mount.
   B. This procedure is used to do visual inspections of the engine forward mount. You can do this procedure with the engine either on or off-the-wing. This inspection is done to make sure all of the mount parts are on the engine and that they do not have damage. If the mounts do have damage, it is necessary to repair or replace them before the next flight.

TASK 71-21-01-206-024-R00

2. Examine the Fail Safe Pin of the Forward Mount (Fig. 601)
   A. Equipment
      (1) Inspection mirror - commercially available
      (2) Inspection lamp - commerically available
   B. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
   C. Access
      (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

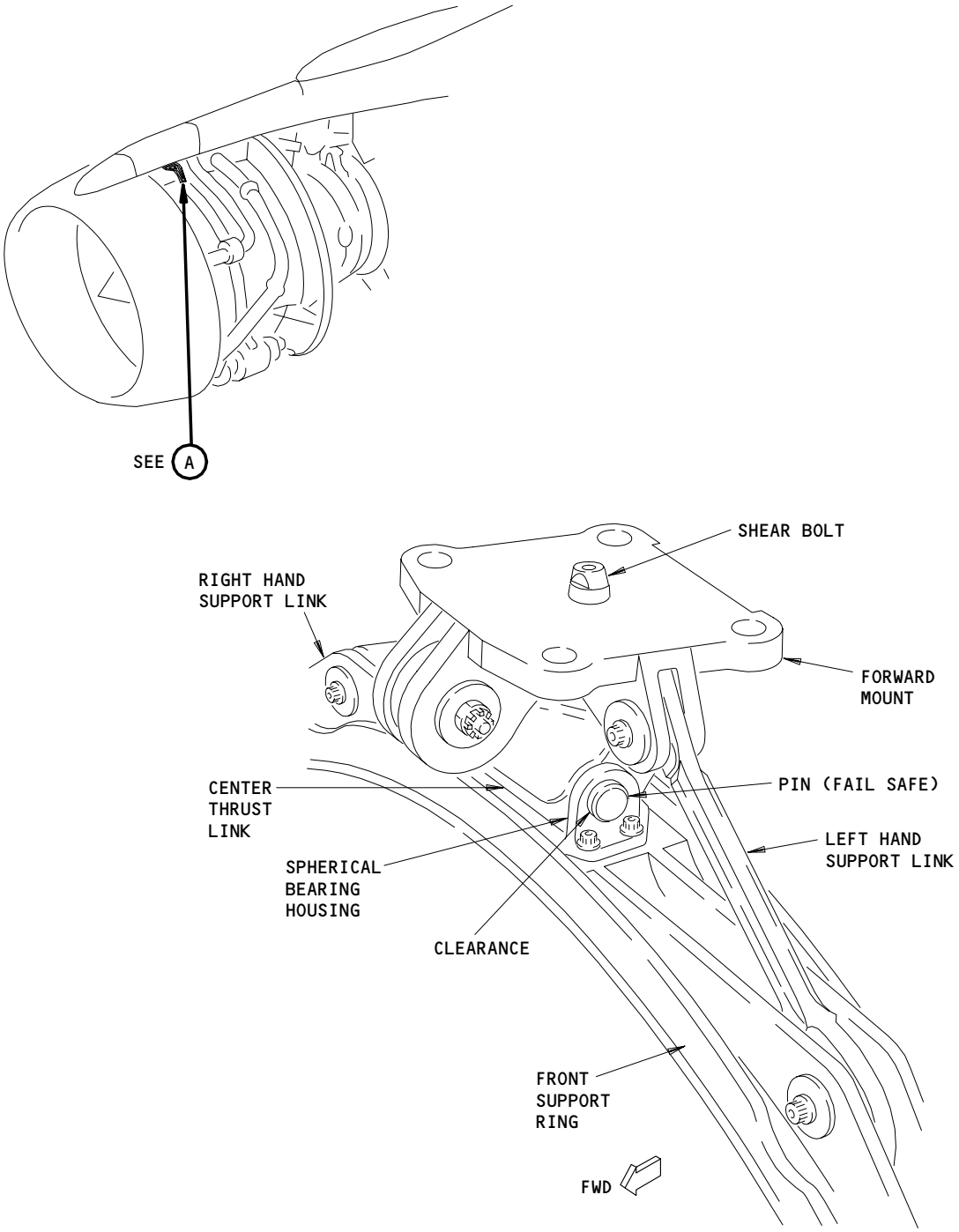
413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)

   D. Procedure

S 866-025-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING ON THE FAN CASE WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the fan cowl panels (AMM 71-11-04/201).



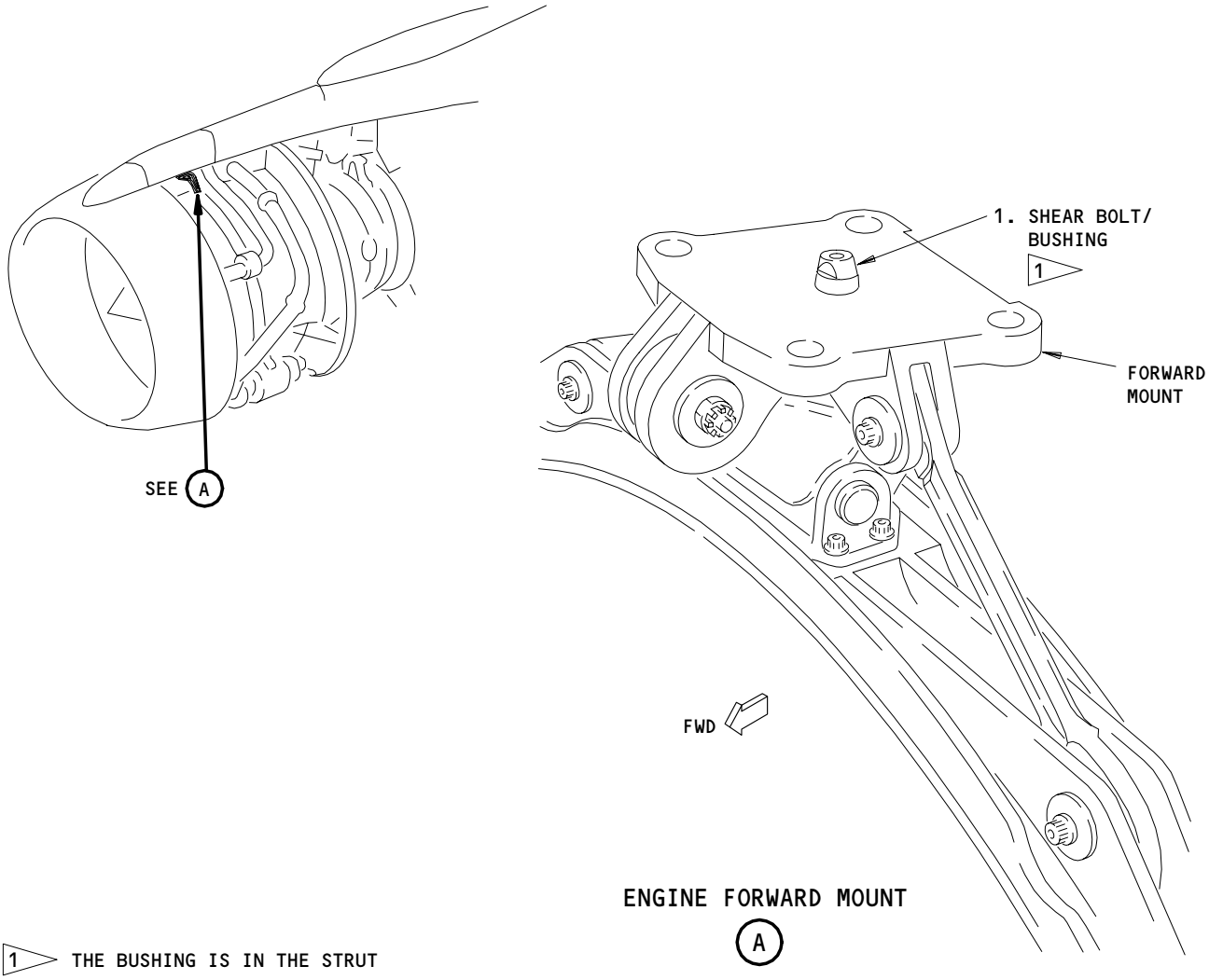
ENGINE FORWARD MOUNT

A

Engine Forward Mount Inspection
Figure 601

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM	MAX WEAR CLEAR-ANCE			
			MIN	MAX					
1	SHEAR BOLT		1.1234	1.1239	1.1220	0.00435	X		
	BUSHING		1.1250	1.1263	1.1278		X		

FORWARD MOUNT



ENGINE FORWARD MOUNT
A

1 THE BUSHING IS IN THE STRUT

Engine Forward Mount Shear Bolt and Bushing Wear Limits
Figure 602

S 216-026-R00

(2) Make sure there is a clearance between the fail safe pin and the spherical bearing housing.

(a) If the fail safe pin touches the spherical bearing housing, there is a failure in the forward mount.

S 866-027-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING ON THE FAN CASE WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(3) Close the fan cowl panels (AMM 71-11-04/201).

TASK 71-21-01-216-002-R00

3. Examine the Forward Mount (Fig. 601)

A. General

(1) This procedure is used to do visual inspections of the engine forward mount. You can do this procedure with the engine either on or off-the-wing. This inspection is done to make sure all of the mount parts are on the engine and that they do not have damage. If the mounts do have damage, it is necessary to repair or replace them before the next flight.

B. Equipment

(1) Inspection mirror - commercially available

(2) Inspection lamp - commerically available

C. References

(1) AMM 71-11-04/201, Fan Cowl Panels

D. Access

(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)

E. Examine the forward mount when the engine is on the wing.

S 016-003-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING ON THE FAN CASE WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the fan cowl panels (AMM 71-11-04/201).

S 216-004-R00
(2) Use an inspection mirror and a lamp to visually examine the support links for corrosion or cracks.

S 216-005-R00
(3) Examine the spherical bearing housing.
(a) Make sure the support links of the spherical bearing housing attach correctly to the support bracket and to the LP compressor case.

S 216-006-R00
(4) If it is possible, visually examine the support bracket for cracks.

S 216-007-R00
(5) Examine the spherical bearing housing of the center thrust link.
(a) Make sure the spherical bearing housing attaches correctly to the low pressure compressor case.

S 216-008-R00
(6) Examine the center thrust link for cracks.

S 216-009-R00
(7) If it is possible, examine the fail-safe pin for corrosion.

S 216-010-R00
(8) If it is possible, examine the spherical bearing housing for corrosion or cracks.

S 226-011-R00
(9) Examine the clearance between the fail-safe pin and the spherical bearing housing (Fig. 601).

NOTE: The mount has had a failure when the pin and the spherical bearing housing touch.

S 216-030-R00
(10) Examine all of the castellated nuts to make sure correct installation of cotter pins.

F. Examine the forward mount when the engine is off the wing.

S 216-012-R00
(1) Do the inspection for the forward engine mount with the engine off the wing.

S 216-013-R00
(2) Examine the face of the engine mount joint for cracks and scores.

S 216-014-R00
(3) Examine the shear bolt for any damage.

S 716-015-R00
(4) Move the support bracket to make sure the spherical bearings can turn.

S 216-031-R00
(5) Examine all of the castellated nuts to make sure correct installation of cotter pins.

G. Use the standards that follow to find the permitted limits:

S 216-016-R00
(1) All damage that you can see is not permitted.

S 216-017-R00
(2) Corrosion that causes the discoloration of the support links or the fail-safe pins is permitted if it there are not pits or a decrease in size.

S 216-018-R00
(3) Cracks on the support links, the center thrust link, the support bracket, or the spherical bearing housing is not permitted.

S 716-019-R00
(4) It is not permitted if the spherical bearing cannot turn.

S 226-020-R00
(5) Use these limits for scores on the mount face and the shear bolt.
(a) Scores with a depth of 0.020 inches or more are not permitted.
(b) Scores with a depth of less than 0.020 inches are permitted.

S 216-021-R00
(6) Coating that is gone on the shear bolt is not permitted.

S 226-028-R00
(7) Make sure the shear bolts and bushings are not worn beyond the limits of Figure 602.

S 216-032-R00

(8) Missing or damaged cotter pins are not permitted.

NOTE: Before you replace the missing cotter pins make sure the castellated nut is correctly torque tightened.

S 416-022-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING ON THE FAN CASE WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(9) Close the fan cowl panel (AMM 71-11-04/201).

AFT MOUNT - REMOVAL/INSTALLATION

1. General
   A. This procedure contains data for the removal and the installation of the aft engine mount. The removal is first.

TASK 71-21-02-004-001-R00

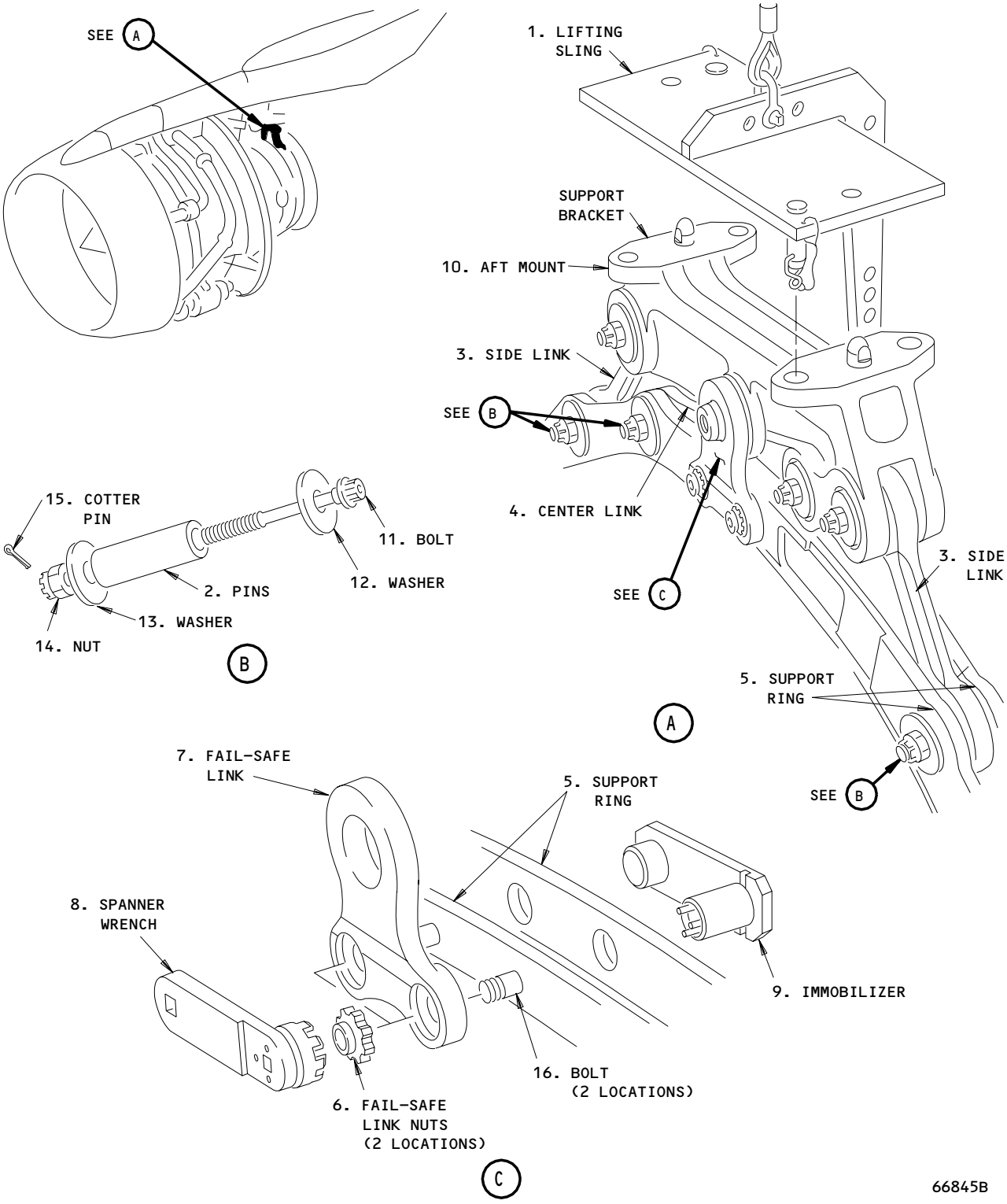
2. Remove the Aft Mount (Fig. 401)
   A. General
      (1) The power plant must be removed from the strut to do this procedure.
   B. Equipment
      (1) CP30481 Lifting Sling, Rolls-Royce
      (2) HU28952 Extractor Tool, Rolls-Royce
      (3) HU29530 Spanner, Rolls-Royce
      (4) HU29529 Immobilizer, Rolls-Royce or
          HU38857 Immobilizer, Rolls-Royce
      (5) E2J55625 Expanding Fixture, Rolls-Royce
   C. References
      (1) AMM 71-00-02/401, Power Plant
   D. Access
      (1) Location Zones
          410 No. 1 Power Plant
          420 No. 2 Power Plant

   E. Prepare for the Removal of the Aft Mount

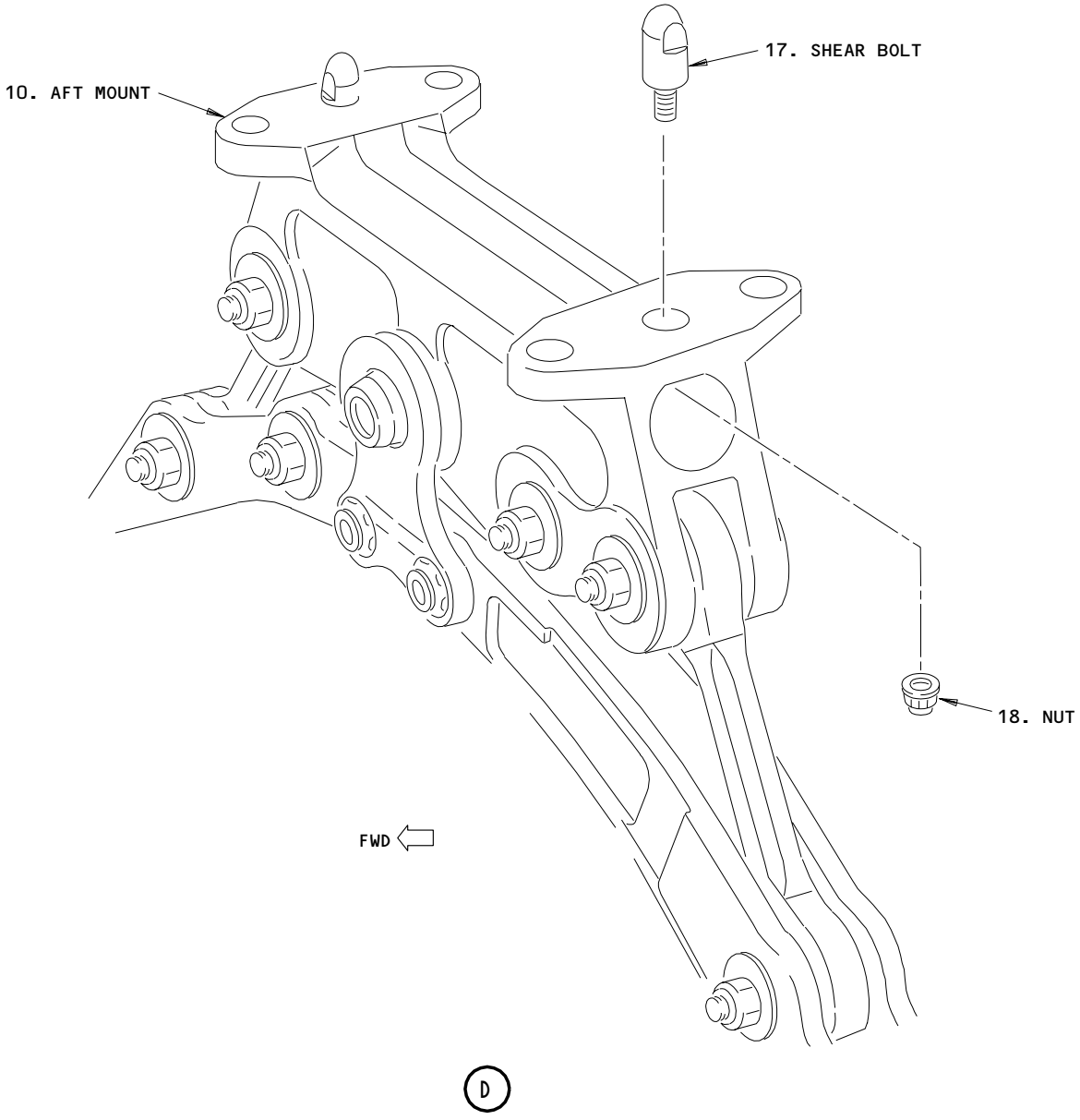
      S 014-002-R00
      (1) Remove the power plant (AMM 71-00-02/401).

      S 944-003-R00
      (2) Install the lifting equipment.
          (a) Attach the lifting sling (1) to the support bracket.
          (b) Tighten the lifting sling (1) to the support bracket.
          (c) Attach the hoist to the lifting sling and the aft mount of the engine support.
   F. Remove the Aft Mount (Fig. 401)

      S 024-004-R00
      (1) Do these steps to remove the aft mount:
          (a) Remove the bolts (11), washers (12, 13), nuts (14), and cotter pins (15) from the side links of the mount and the center link at the support ring.



Aft Mount Installation
Figure 401 (Sheet 1)



Aft Mount Installation
Figure 401 (Sheet 2)

(b) Use an extractor tool to remove the pins (2).
(c) Put the immobilizer (9) on the support ring (5) with the pegs in the bolts (16).
(d) Use a spanner wrench (8) and immobilizer (9) to remove the nuts (6) and bolts (16) from the fail-safe link.
(e) Disconnect the fail-safe link (7) from the support ring (5).
(f) Remove the immobilizer (9) from the support ring (5).
(g) Remove the aft mount (10) from the airplane.
(h) Release the side center links from the LP turbine case.

NOTE: Use expanding fixture E2J55625, if available, to make the support ring larger.

S 094-005-R00

(2) Remove the lifting equipment.

S 034-006-R00

(3) If it is necessary, remove the shear bolt (17) and nut (18) from the aft mount (18).

TASK 71-21-02-424-010-R00

3. Install the Aft Mount

A. General
(1) The power plant must be removed from the strut to do this procedure.
(2) Use the procedure in (AMM 70-51-00/201) to tighten the fasteners. Tighten the fasteners to the torque values in (AMM 70-51-00/201) unless a torque value is specified in this procedure.

B. Equipment
(1) CP30481 Lifting Sling, Rolls-Royce
(2) HU28952 Extractor Tool, Rolls-Royce
(3) HU29530 Spanner, Rolls-Royce
(4) HU29529 Immobilizer, Rolls-Royce or HU38857 Immobilizer, Rolls-Royce
(5) E2J55625 Expanding Fixture, Rolls-Royce

C. Consumable Materials
(1) D00010 Lubrication Fluid

British Spec./Ref.	American Spec./Ref.	OMat Item No.
Never Seez NSN-165-A	-	4/23

D. Parts

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	2	Pin	71-21-02	01	40
	6	Nut			15
	7	Link-Eng Rear Mount Fail Safe			5
	10	Mount-Aft			2
	11	Bolt			23
	12	Washer			28
	13	Washer			28
	14	Nut			30
	15	Pin			38
	16	Bolt			10
	17	Shear Bolt			55
	18	Nut			65

E. References
(1) AMM 71-00-02/401, Power Plant

F. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

G. Install the Aft Mount (Fig. 401)

S 434-012-R00

(1) If it is necessary, install the shear bolt (17) and the nut (18) on the aft engine mount (10). Tighten the nut (18).

S 494-009-R00

(2) Do these steps to attach the lifting equipment:
(a) Attach the lifting sling (1) to the support bracket.

(b) Tighten the lifting sling (1) to the support bracket.
(c) Attach the hoist to the lifting sling (1).

S 424-006-R00

(3) Do these steps to install the aft mount:
(a) Use the expanding fixture E2J55625, if available, to carefully set the mount (10) on the support ring (5).
(b) Put the side links (3) and the center link (4) in the correct positions on the support ring (5).
(c) Apply a lubricant to the pins (2).
(d) While the lubricant is wet, install the pins (2) in the support ring (5), side links (3), and center link (4).
(e) Install the bolts (11), washers (12, 13), and nuts (14) which safety the pins (2).
(f) Tighten the nuts (14).
(g) Install new cotter pins (15).
(h) Do these steps to install the fail-safe link:
1) Attach the immobilizer (9) to the support ring (5) with the pegs in the bolt (16).
2) Put the fail-safe link (7) on the support ring (5) and the bolts (16).
3) Use the spanner wrench (8) to install and tighten the fail-safe nuts (6) to 1020 pound-inches (115.25 Newton meters).
4) Remove the immobilizer (9) from the support ring (5).

S 094-010-R00

(4) Remove the lifting equipment.

S 414-008-R00

(5) Install the power plant (AMM 71-00-02/401).

AFT MOUNT - INSPECTION/CHECK

1. General
   A. This procedure has two tasks. The first task examines the fail-safe link of the aft mount. The second task examines the aft mount of the engine.

TASK 71-21-02-206-020-R00

2. Examine the Fail-Safe Link of the Aft Mount
   A. Equipment
      (1) Inspection mirror - commercially available
      (2) Inspection lamp - commercially available
   B. References
      (1) AMM 78-31-00/201, Thrust Reverser System
   C. Access
      (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

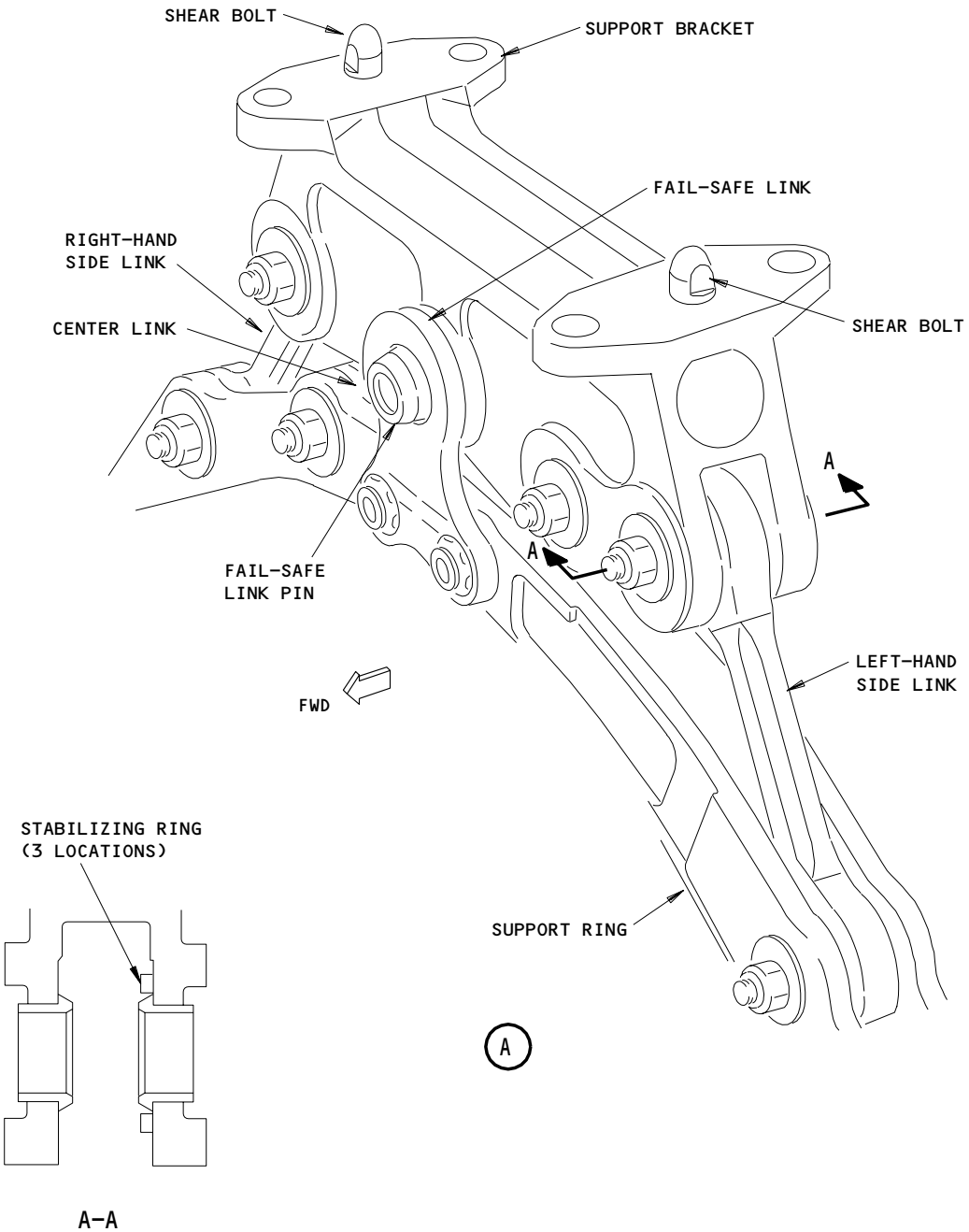
415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

   D. Procedure (Fig. 601)

S 046-003-R00

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

(1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).



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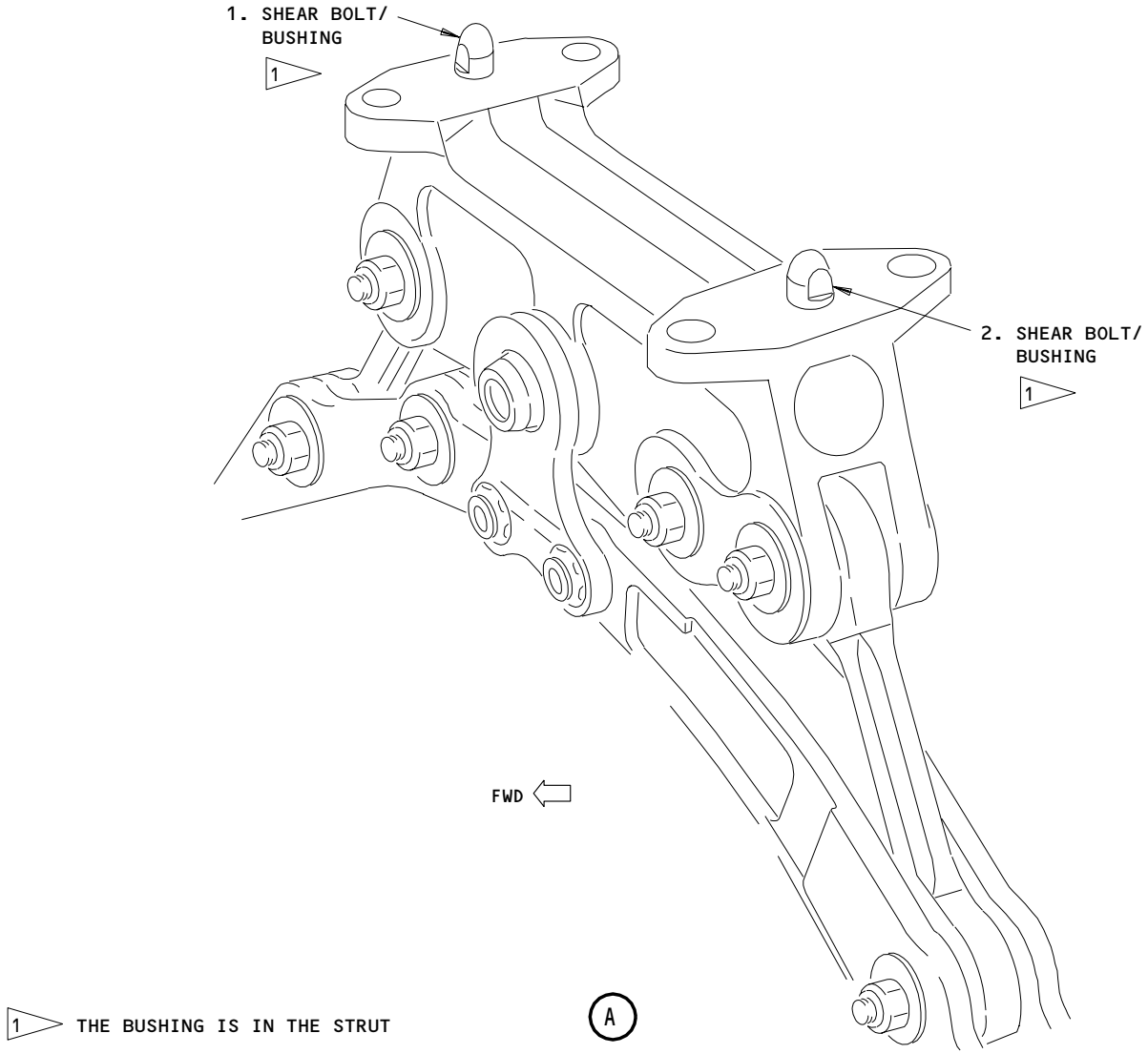
Engine Aft Mount Inspection
Figure 601

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM	MAX WEAR CLEAR-ANCE			
			MIN	MAX					
1	RIGHT SHEAR BOLT		0.7484	0.7492	0.7389	0.0285	X		
	RIGHT BUSHING		0.7634	0.7674	0.7769		X		
2	LEFT SHEAR BOLT		0.7484	0.7492	0.7472	0.0036	X		
	LEFT BUSHING		0.7500	0.7508	0.7520		X		

AFT MOUNT



Engine Aft Mount Shear Bolts and Bushings Wear Limits
Figure 602

S 016-004-R00

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

(2) Open the thrust reverser (AMM 78-31-00/201).

S 216-023-R00

(3) Make sure the the fail-safe link does not touch the pin of the fail-safe link.
   (a) If the fail-safe link touches the pin of the fail-safe link, the link has failed in the rear mount.

S 416-006-R00

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

(4) Close the thrust reverser (AMM 78-31-00/201).

S 446-007-R00

(5) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 71-21-02-206-009-R00

3. Examine the Aft Mount

A. Equipment
   (1) Inspection mirror - commercially available
   (2) Inspection lamp - commercially available

B. References
   (1) AMM 78-31-00/201, Thrust Reverser System

C. Access
   (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

   (2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

D. Procedure (Fig. 601)

S 046-011-R00

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

(1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 016-012-R00

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

(2) Open the thrust reverser (AMM 78-31-00/201).

S 216-027-R00

(3) Examine the fail safe link with the engine on-wing.
  (a) Make sure the fail safe link does not touch the fail safe pin.
    1) If the fail safe pin touches the fail safe link, the aft mount is defective.

S 216-013-R00

(4) Examine the aft mount with the engine on the wing.
  (a) Visually examine the left side link for corrosion and cracks with the inspection mirror and the lamp.
  (b) Visually examine the right side link for corrosion and cracks with the inspection mirror and the lamp.
  (c) Visually examine the center link for corrosion and cracks with the inspection mirror and the lamp.
  (d) Make sure the right side link is correctly installed to the rear support ring.
  (e) Make sure the left side link is correctly installed to the rear support ring.
  (f) Make sure the center link is correctly installed to the rear support ring.
  (g) Visually examine the support bracket for cracks where it is possible.
  (h) Visually examine the fail safe link for corrosion and cracks where it is possible.

(i) Make sure the fail safe link is not damaged and is correctly installed.

S 216-014-R00

(5) Examine the aft mount with the engine not on the wing.
  (a) Do the steps in the paragraph for the examination of the aft mount with the engine installed.
  (b) Visually examine the joint faces of the aft mount for cracks, scores and pitting.
  (c) Visually examine the shear bolts for damage and scoring.
  (d) Put a lateral force on the support bracket and check for freedom of movement.
  (e) Visually examine the support bracket stabilizing rings at the three upper attachment bolt locations (Fig. 601).

S 216-015-R00

(6) Use the standards that follow to find the permitted limits:
  (a) Damage
    1) All the damage that you can see - Reject
  (b) Corrosion
    1) The discoloration on the support links that is caused by surface corrosion is permitted with these conditions:
      a) The corrosion does not pit the support link.
      b) The corrosion does not decrease the section of the support link.
    2) The discoloration on the fail safe links that is caused by surface corrosion is permitted with these conditions:
      a) The corrosion does not pit the fail safe link.
      b) The corrosion does not decrease the section of the fail safe link.
  (c) Cracks
    1) Cracks on the side links, the center link, the fail safe link or the support bracket are not permitted.
  (d) Seizure
    1) If a spherical bearing is seized, reject the mount for further inspections.

(e) Scores
1) Scoring on the joint face of the aft mount and the shear bolts is permitted if the depth of the scoring is not more than 0.020 inch (0.051 mm).

(f) Pitting
1) Pitting on the joint face of the aft mount that is not more than 50 percent of the face is permitted.

(g) Loose or Missing
1) Loose support bracket stabilizing rings - accept.
2) Missing support bracket stabilizing rings - replace the stabilizing rings.

S 226-025-R00

(7) Make sure the shear bolts and bushings are not worn beyond the limits in Figure 602.

S 416-016-R00

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

(8) Close the thrust reverser (AMM 78-31-00/201).

S 446-017-R00

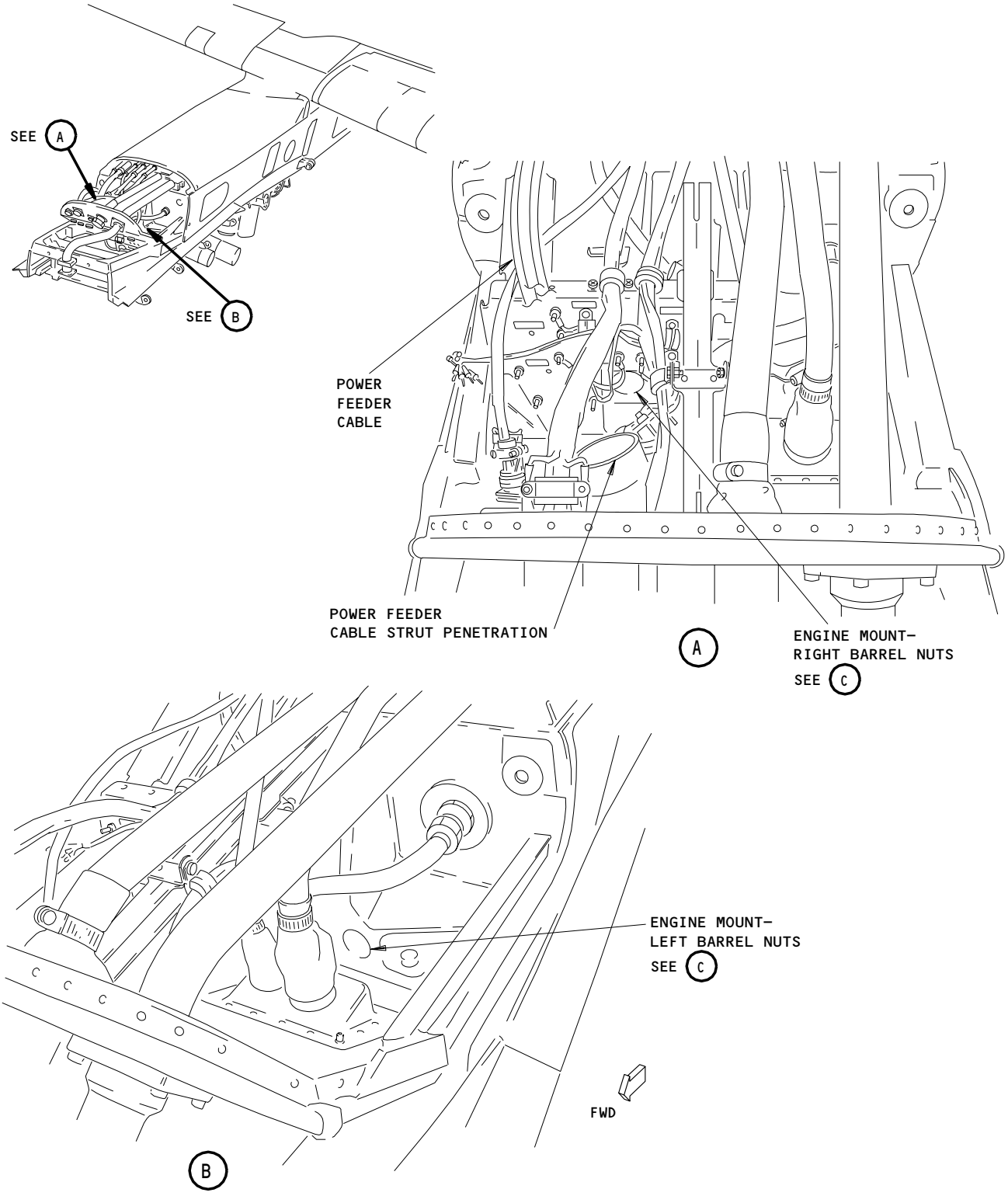
(9) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

ENGINE MOUNT BARREL NUTS - REMOVAL/INSTALLATION

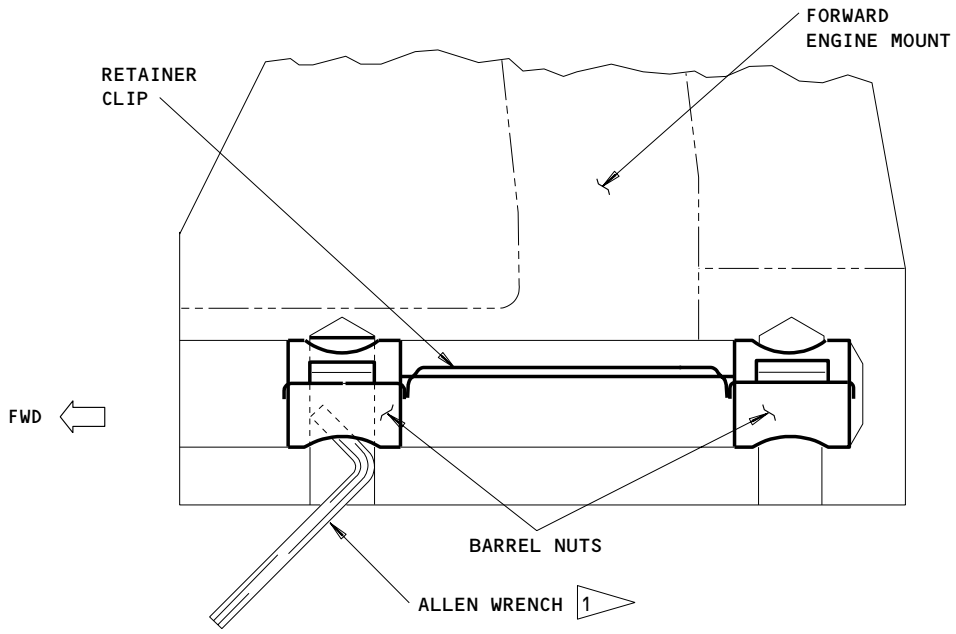
1. General
   A. This procedure contains the removal and the installation of the barrel nuts of the engine mounts for the forward strut. The procedure also contains the removal and installation procedures for the barrel nuts of the engine mounts for the aft strut. The procedure is divided into four tasks as follows:
      - the removal of the forward barrel nuts,
      - the installation of the forward barrel nuts,
      - the removal of the aft barrel nuts, and
      - the installation of the aft barrel nuts.
   B. The barrel nuts of the forward engine mount are found below the forward strut fairing. There are four barrel nuts. Two are in each hole of the forward engine mount connected by a retainer clip. The engine must be removed prior to the removal of the barrel nuts.
   C. The barrel nuts of the aft engine mount are found in the strut. They are found on the top side of the engine mount fittings in the strut. There are 4 barrel nuts, connected in pairs by the guide tubes. Each barrel nut has a lanyard attached to help with the removal.

TASK 71-21-03-004-001-R00

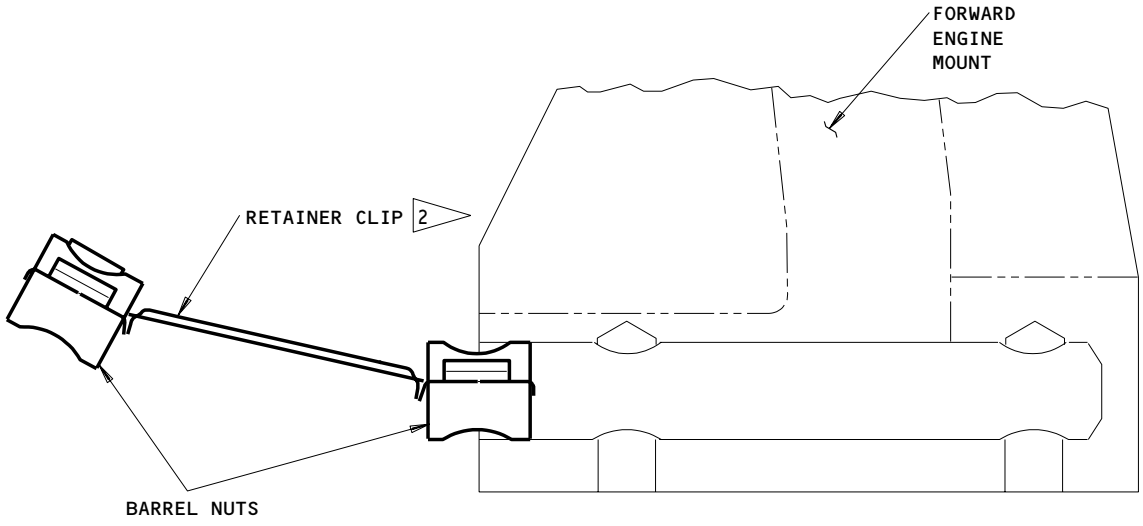
2. Remove the Barrel Nuts of the Forward Engine Mount
   A. Equipment
      (1) Rod, Nonmetallic - (wood dowel)
          0.75 to 1.00 inch dia.,
          local manufacture.
      (2) Engine Mount Barrel Nut Removal Equipment -
          B71039
      (3) Wrench - Allen (L-shaped bar)
   B. References
      (1) 54-52-01/401, Strut Fairings
      (2) 71-00-02/401, Power Plant
   C. Access
      (1) Location Zones
          410 No. 1 Power Plant
          420 No. 2 Power Plant



Forward Barrel Nut Installation
Figure 401 (Sheet 1)



REMOVAL



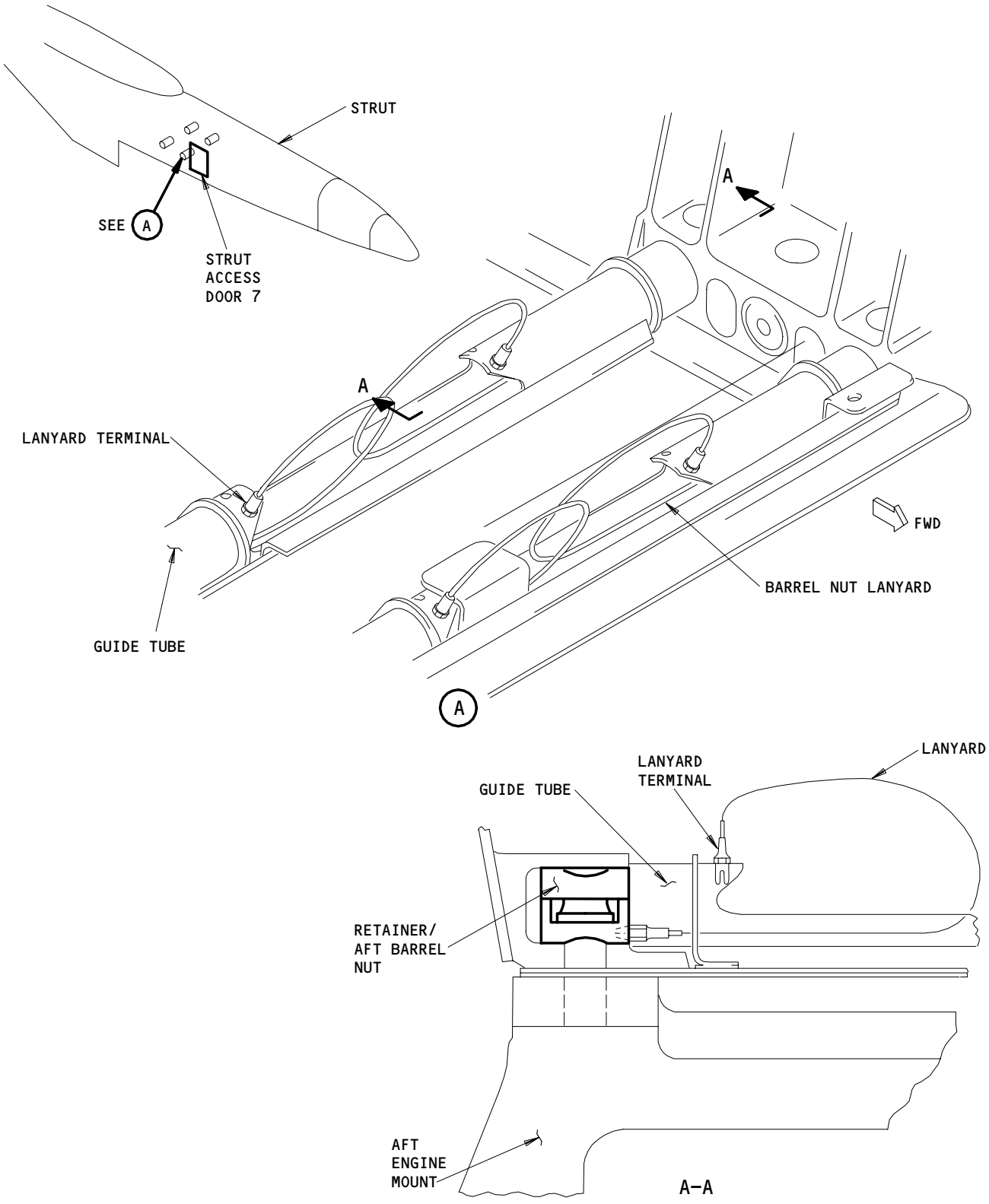
INSTALLATION

C

1 LEVER THE RETAINER/BARREL NUT FORWARD

2 BEND RETAINER CLIP FOR CLEARANCE WITH STRUCTURE

Forward Barrel Nut Installation
Figure 401 (Sheet 2)



Aft Barrel Nut Installation
Figure 402

D. Prepare to remove the barrel nuts of the forward engine mount.

S 014-002-R00

(1) Remove the aft section (Ref 54-52-01) of the strut forward fairing.

S 014-025-R00

WARNING: DO NOT REMOVE THE BARREL NUTS OF THE FORWARD ENGINE MOUNT WITH THE POWER PLANT INSTALLED. A POWER PLANT THAT FALLS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Remove the power plant (Ref 71-00-02/401).

S 034-004-R00

(3) After the removal, move the power feeder cable of the engine out of the work area.
   (a) This procedure gives access to the mount hole on the right side of the engine.

S 024-005-R00

(4) Remove the left side or the right side plug from the forward engine mount.

NOTE: Two barrel nuts connected together with a retainer clip are accessible below each plug.

S 024-006-R00

(5) Remove each set of barrel nuts with the tools that follow:
   (a) If you do not have equipment B71039, do the steps that follow:
      1) Put an L-shaped bar the same as an allen wrench through the front hole of the engine mount.
         a) The front hole of the engine mount is on the bottom of the strut.
      2) The engine mount hole on the bottom of the strut.
      3) Push the front barrel nut forward.
      4) When the barrel nut can be held, pull the two barrel nuts out of the engine mount.
   (b) If the removal equipment B71039 is used, do the steps that follow:
      1) Put the tool to bend the retainer thru the barrel nut retainer.
         a) There is a bolt hole in the forward engine mount for this task.
         b) The tool to bend the retainer in this chapter is referred to as the retainer extractor tool.
      2) Twist the retainer extractor tool 90 degrees.
         a) Pull down to bend the barrel nut retainer.
      3) Remove the retainer extractor tool.

4) Put the puller into the front of the engine mount to the threaded hole of the barrel nut.
a) Pull to remove the barrel nut.

NOTE: The retainer clip can be bent to permit clearance with the areas that follow:

Hold tight to the front retainer of the retainer clip to easily remove the barrel nuts from the mount.

b) The cable harness bracket.
c) The strut structure wire.
d) The forward strut structure.

(c) Discard the barrel nuts and the retainer clip.

TASK 71-21-03-404-007-R00

3. Install the Forward Engine Mount Barrel Nuts

A. Equipment
(1) Rod, Nonmetallic - (wood dowel) 0.75 to 1.00 inch dia., local manufacture.
(2) Equipment, Engine Mount Barrel Nut Removal - B71039
(3) Wrench - Allen (L-shaped bar)

B. Consumable Materials
(1) Sealant - BMS 5-95
(2) Sealant - DC93-006
(3) Primer - DC1200

C. References
(1) 54-52-01/401, Strut Fairings
(2) 71-00-02/401, Power Plant

D. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

E. Prepare to install the barrel nuts of the forward engine mount.

S 424-008-R00
(1) Install the two barrel nuts together with a retainer clip.

S 414-009-R00
(2) Bend the retainer clip near the barrel nuts to allow clearance with the strut parts that follow:

NOTE: The arrow from the ink mark on the retainer clip shows the end of the retainer/barrel nut first installed into the engine mount.

(a) The structure.
(b) The wire.

(c) The cable harness bracket.

S 424-010-R00

(3) Put the aft barrel nut into the engine mount.
(a) Try to keep the retainer clip straight while the barrel nut is pushed into the mount.
(b) Use a wood dowel or equivalent, not a metallic rod, to push the barrel nuts into position.
1) Make sure the dowel or rod is correctly aligned with the engine mount bolt.

S 374-011-R00

(4) Paint the area of the engine mount hole with a primer.
(a) Install a plug with sealant DC93-006.
(b) Do not seal the hole in the plug with sealant.

S 424-012-R00

(5) Move the power feeder cable of the engine into position.

S 414-013-R00

(6) Install the engine (Ref 71-00-02).

S 424-014-R00

(7) Install the aft section (Ref 54-52-01) of the strut forward fairing.

TASK 71-21-03-004-015-R00

4. Remove the Aft Engine Mount Barrel Nut

A. Equipment
(1) Rod, Nonmetallic - (wood dowel)
0.75 to 1.00 inch dia.,
local manufacture.
(2) Engine Mount Barrel Nut Removal Equipment -
B71039
(3) Wrench - Allen (L-shaped bar)

B. References
(1) 54-52-01/401, Strut Fairings
(2) 71-00-02/401, Power Plant

C. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

D. Prepare to remove the barrel nut of the aft engine mount.

S 014-016-R00

(1) Open the strut access door.

NOTE: Use the door 7 for aft pressure relief of the strut to get access to the lanyard terminal. In this chapter refer to the door 7 as the strut access door. The lanyard removes the aft barrel nuts.

(a) Get access to the barrel nuts of the aft engine mount.

NOTE: The strut access door is found on the inboard side of strut for the two engines. For the left engine, the door is 433LR. For the right engine, the door is 443LL.

S 014-017-R00

(2) Remove the lanyard terminal of the barrel nut from the hole used for stowage in the strut.
(a) This is where the barrel nut is kept.

S 014-018-R00

(3) Use the lanyard to pull the barrel nut through the top of the guide tube.
(a) The guide tube has an open hole to do this step.

S 024-026-R00

WARNING: DO NOT REMOVE MORE THAN ONE AFT ENGINE MOUNT BARREL NUT AT A TIME WITH THE POWER PLANT INSTALLED. A POWER PLANT THAT FALLS COULD CAUSE IN INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

(4) Remove the barrel nut.

NOTE: It can be necessary to align the guide tube prior to the removal of the barrel nut.

TASK 71-21-03-404-020-R00

5. Install the Barrel Nut of the Aft Engine Mount.
A. Equipment
(1) Rod, Nonmetallic - (wood dowel)
0.75 to 1.00 inch dia.,
local manufacture.
(2) Engine Mount Barrel Nut Removal Equipment -
B71039
(3) Wrench - Allen (L-shaped bar)
B. Consumable Materials
(1) Sealant - BMS 5-95

(2) Sealant - DC93-006
(3) Primer - DC1200

C. References
(1) 54-52-01/401, Strut Fairings
(2) 71-00-02/401, Power Plant

D. Access
(1) Location Zones
410 No. 1 Power Plant
420 No. 2 Power Plant

E. Install the barrel nut of the aft engine mount.

S 404-022-R00
(1) Put the barrel nut in the guide tube through the top open hole.

S 434-021-R00
(2) Point the lanyard terminal end of the nut to the center of the guide tube.
(a) Use a wood dowel or an equivalent not metallic rod to push the barrel nut into position.
(b) Make sure you align the barrel nut and the engine mount bolt.

S 394-023-R00
(3) Apply sealant BMS 5-95 to the lanyard terminal and the hole used for stowage.
(a) Put sealant on the lanyard terminal.
1) Install the lanyard terminal in the hole used for stowage.

S 414-024-R00
(4) Close the strut access door.

POWER PLANT - LIGHT DUTY ELECTRICAL HARNESSES - INSPECTION/CHECK

1. General
   A. This procedure has one task. This task examines the electrical harness on the power plant.
   B. You can do the inspection of the electrical harness when you do other engine maintenance.

   TASK 71-51-00-206-001-R00

2. Electrical Harness Inspection
   A. References
      (1) 71-51-00/801, Power Plant - Light Duty Electrical Harness
   B. Access
      (1) Location Zones
          410 No. 1 Power Plant (Left)
          420 No. 2 Power Plant (Right)

   C. Examine the electrical harness.

      S 216-002-R00
      (1) Examine the electrical harness for loom assemblies on the fancase and the core engine for electrical cable casings that are frayed, scuffed, chafed, burned, fused or severed.

          NOTE: Areas close to bulkheads and panels should be carefully examined.

          (a) If the cable casing is not fully frayed away from the loom assemblies, do the repair procedure FRS3595 (AMM 71-51-00/801).
          (b) If the cable casing is not fully scuffed or chafed away from the loom assemblies, do the repair procedure FRS3595 (AMM 71-51-00/801).
          (c) If the cable casing is fully frayed, scuffed or chafed from the loom assemblies, replace the electrical harness/cable.
   D. Examine the Electronic Engine Control (EEC) Patch Module Junction Box internal electrical harness (Fig. 601).

      S 216-004-R00
      (1) Examine the internal electrical harness loom for chafed or cable damage.
          (a) Disconnect the electrical connectors (1).

(b) Remove the six bolts (4), Washers (3) and nuts (2) from the front panel of the EEC patch module junction box.
(c) Remove the front panel and loom assembly from the junction box.
(d) Examine the internal harness for signs of chafed or cable damage. If chafed or cable damage - refer to the previous procedure for inspection limits.
(e) Put the front panel and loom assemblies back onto the junction box.

NOTE: Make sure that the internal loom assembly does not come into contact with the junction box.

1) Install the six bolts (4), washers (3) and nuts (2).
2) Tighten the bolts to the standard loading (AMM 70-51-00/201).

(f) Connect the electrical connectors (1) (AMM 70-50-02/201).

E. Examine the Electronic Engine Control (EEC) electrical harness (Fig. 602).

S 216-005-R00

(1) Examine the electrical harness loom for fretting.
(a) ENGINES PRE RR SB 71-B611;
Do an inspection of these components.
1) Clip point 2281 (Fig. 602) should be disassembled and the loom examined for signs of fretting.
2) Examine the P clip for signs of damage to the rubber cushion.
(b) ENGINES POST RR SB 71-B611;
Clip point 2281 was removed to prevent fretting.
(c) If fretting or damage is present on the loom - refer to the previous inspection limits.
(d) If the P clip is damaged it must be replaced.

F. Examine the Diode Block (Fig. 603).

S 216-006-R00

(1) Examine the diode block for fretting by the retaining tangs.
(a) Examine the diode block in the position above the Bleed Valve Control Unit/Electronic Engine Control (BVCU/EEC) ground test switch. Look for fretting of the retaining tangs into the insulation of the diode block.
(b) If there are signs of fretting or damage to the diode block - replace the diode block.

G. Examine the Bleed Valve Control Unit/Electronic Engine Control (BVCU/EEC) Ground Test Switch (Fig. 604).

S 216-007-R00

(1) Examine the electrical cables from the BVCU/EEC ground test switch.

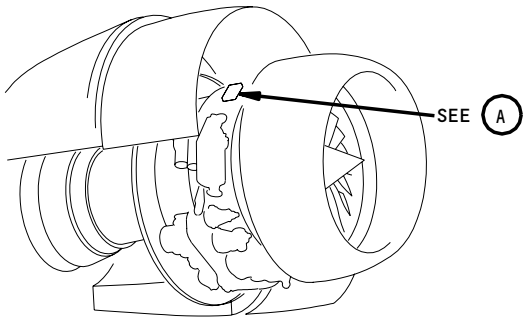
NOTE: Electrical cable routing from the ground test switch to the diode block must the carefully examined for signs of fretting.

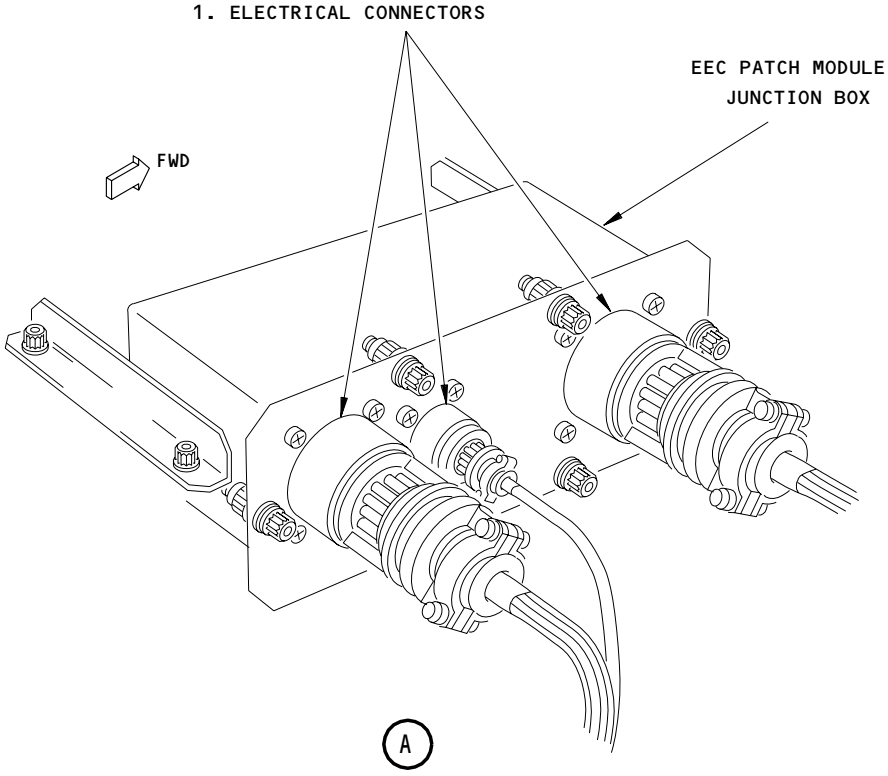
(a) If fretting or damage to the electrical cables is present - refer to the previous inspection limits.

H. Examine the Electrical Cables to the N3 (HP) Tachometer Generator (Fig. 605).

S 216-008-R00

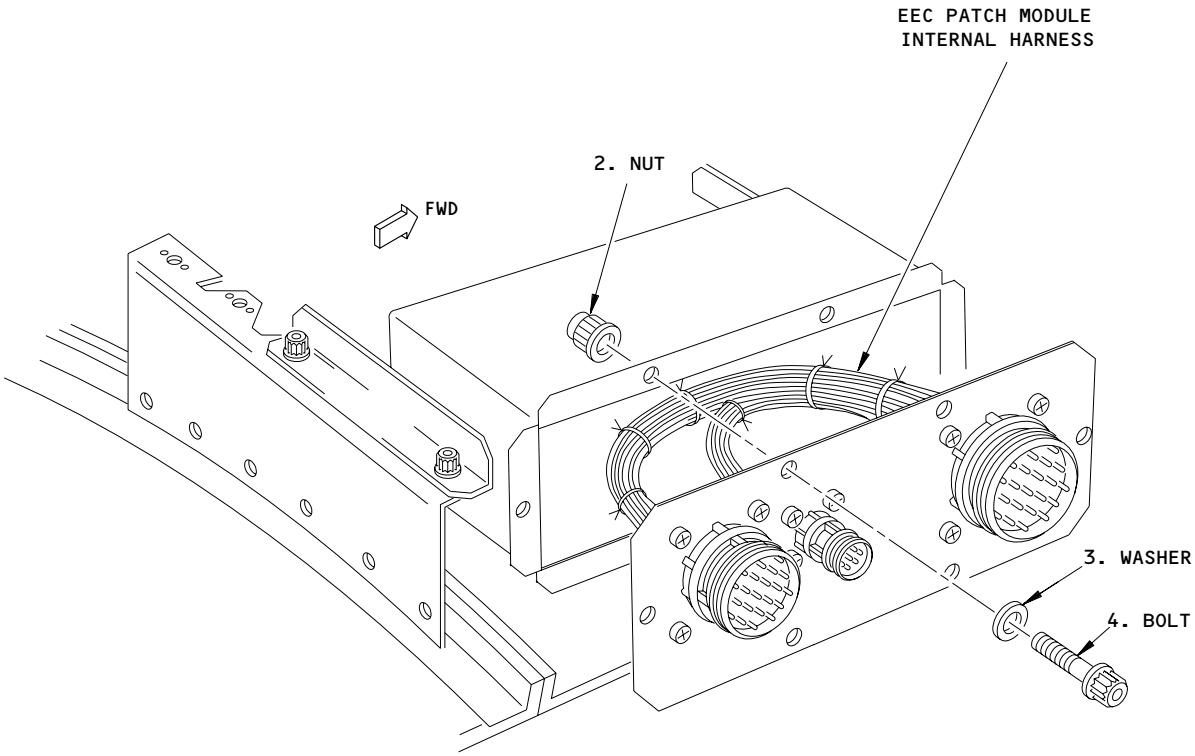
(1) Examine the electrical cables for fretting or damage.
(a) Examine the electrical cables for signs of fretting or damage, if fretting or damage is present - refer to the previous inspection limits.
(b) Examine the electrical connector for damage to the shell or contacts, if the connector is damaged - repair or replace the connector (AMM 70-50-02/201).





DEE0004179

Electronic Engine Control (EEC) Patch Module Junction Box
Figure 601 (Sheet 1)



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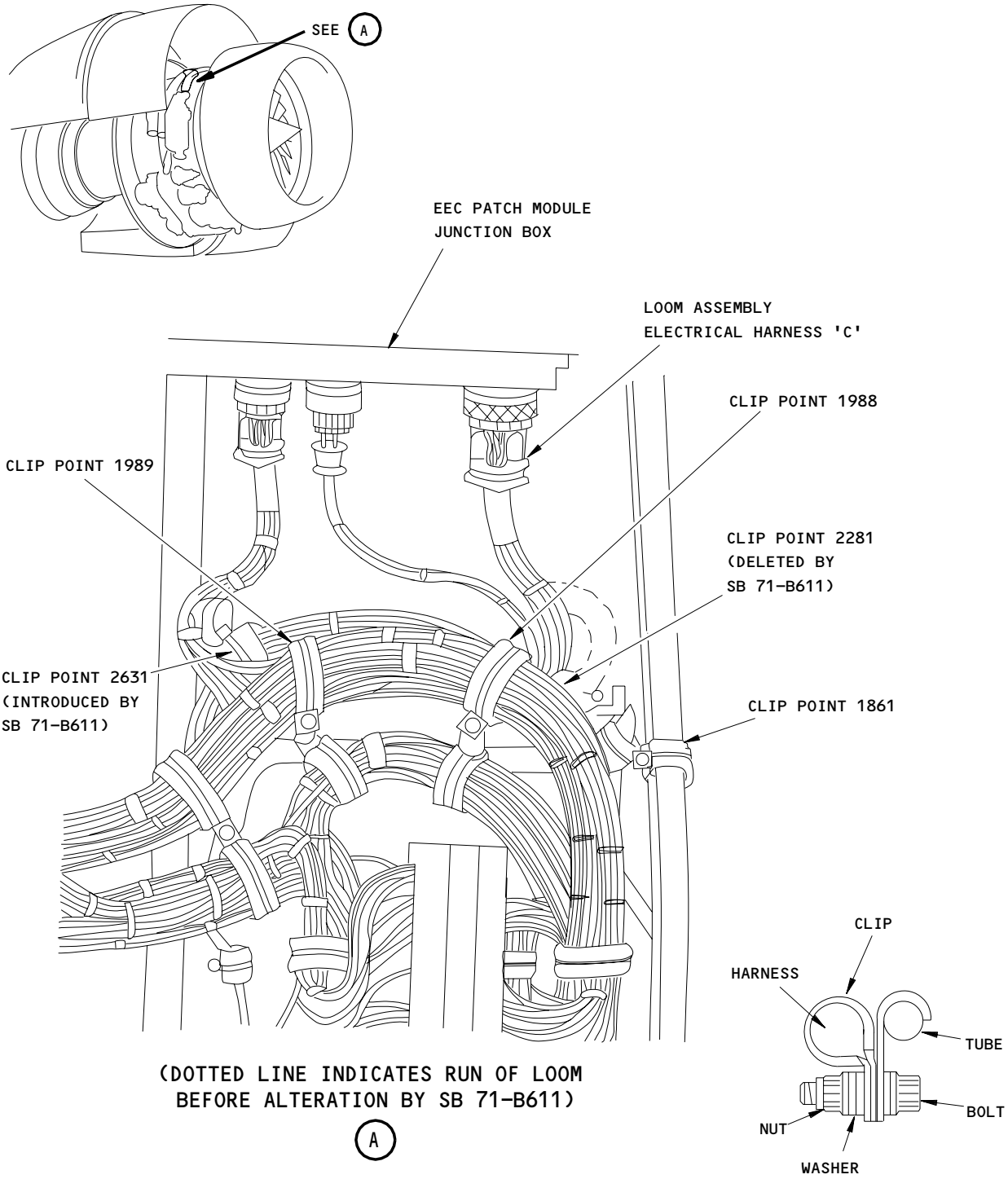
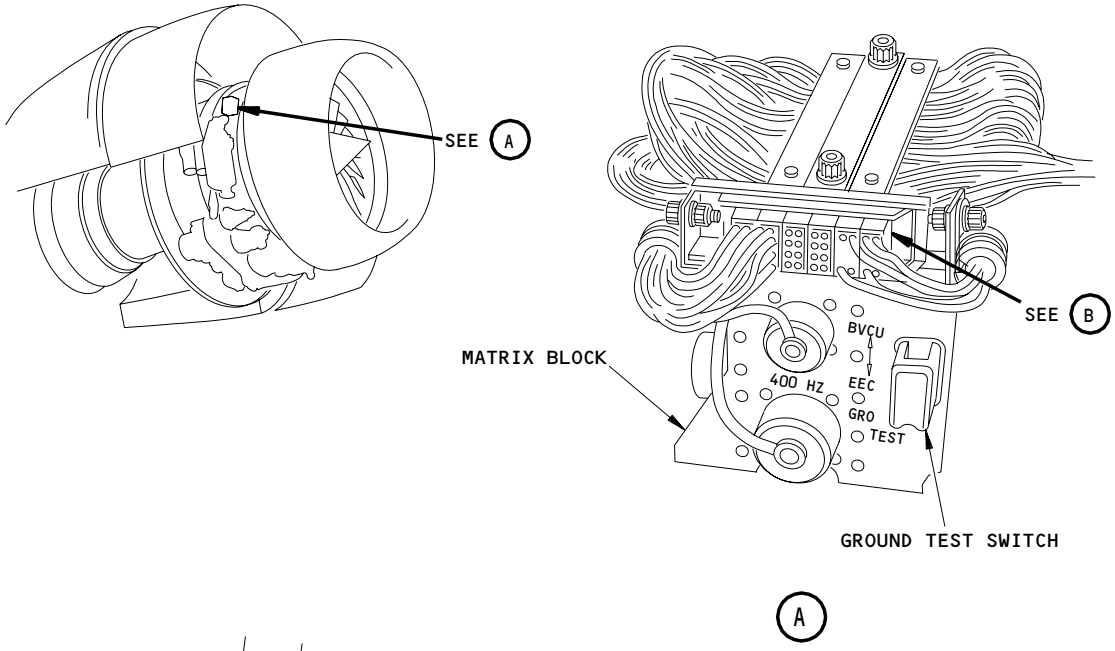
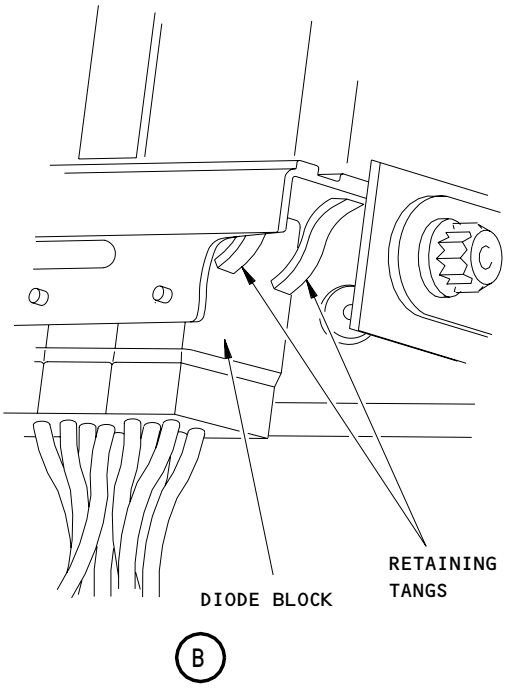
Electronic Engine Control (eec) Patch Module Junction Box
Figure 601 (Sheet 2)



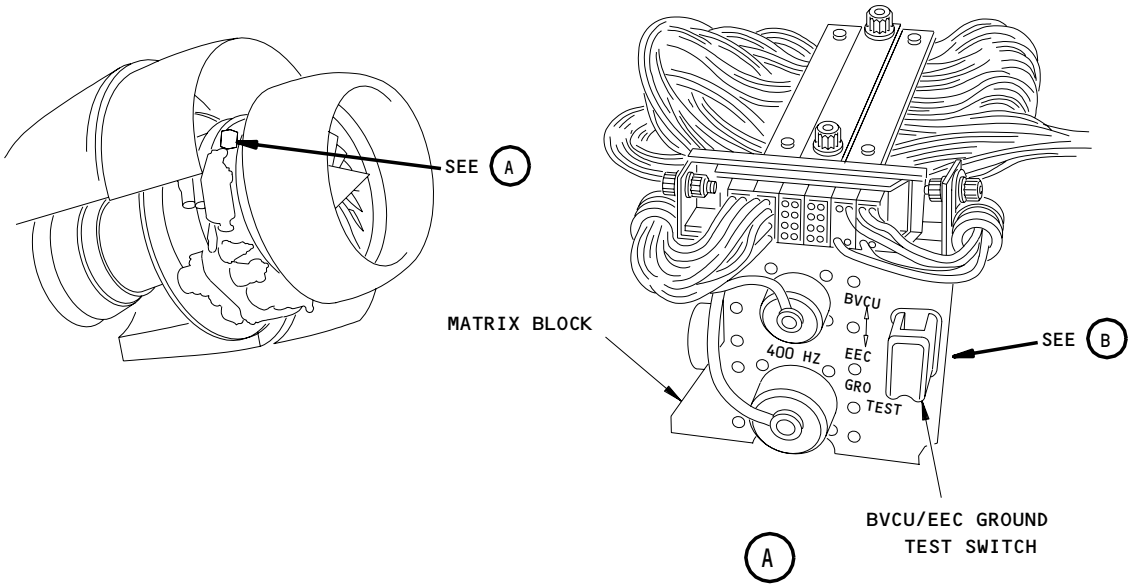
Electronic Engine Control (EEC) Electrical Harness
Figure 602

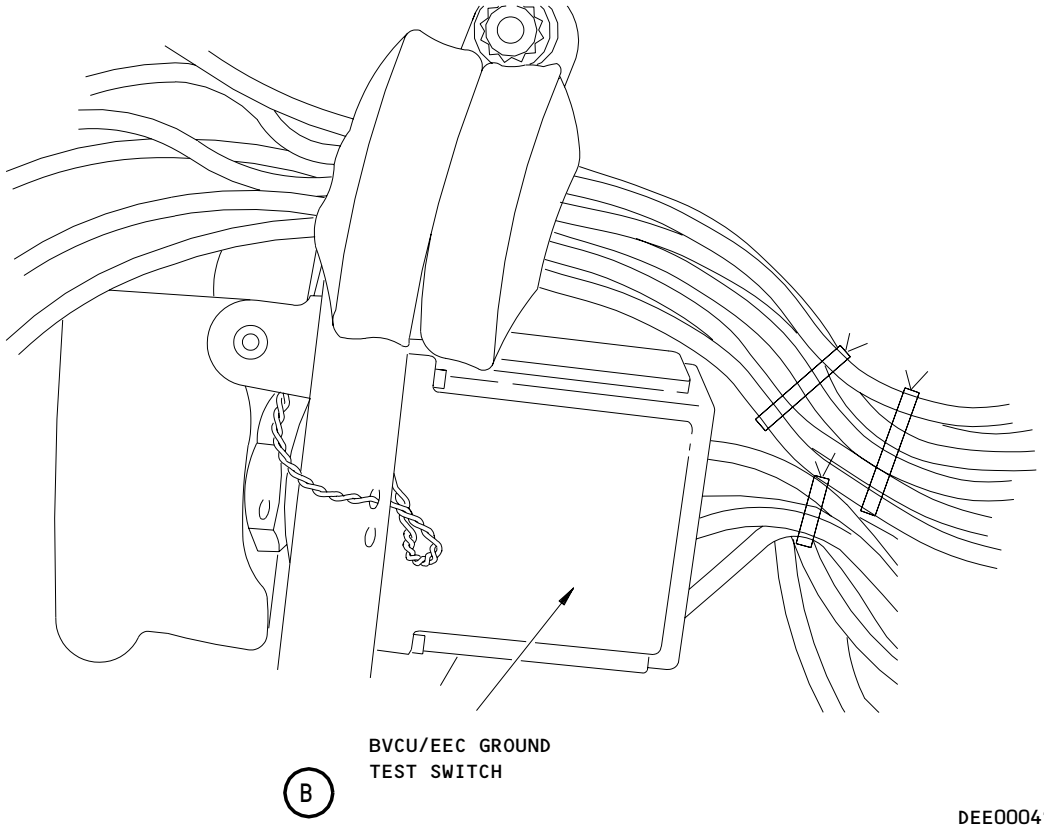




DEE0004189

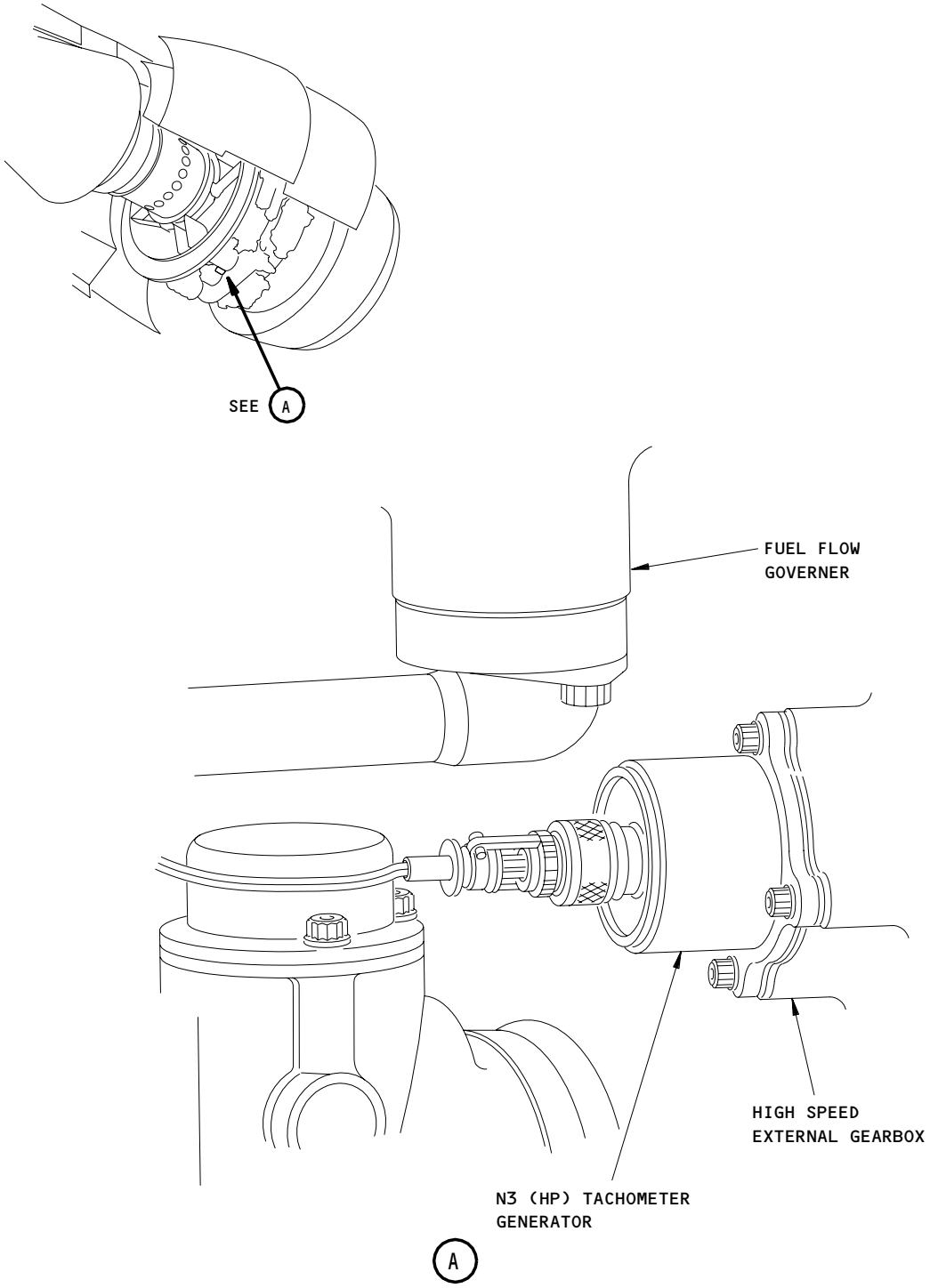
Diode Block
Figure 603





DEE0004193

Bleed Valve Control Unit/Electronic Engine Control (BVCU/EEC) Ground Test Switch
Figure 604



DEE0004181

N3 (HP) Tachometer Generator
Figure 605

POWER PLANT - LIGHT DUTY ELECTRICAL HARNESSES - APPROVED REPAIRS

1. General
   A. This procedure has one task. This task is the repair procedure for the cable casing on the electrical harness.
   B. The task in this procedure is identified as follows:

Paragraph Number	Repair Number	Title
2	FRS3595	Repair the Frayed or the Scuffed Loom Assemblies of the Electrical Harness

TASK 71-51-00-358-001-R00

2. Repair the Frayed or the Scuffed Cable Casing of the Electrical Harness
   A. General
      (1) You can do this procedure, FRS3595, only when the cable casing is not fully frayed or scuffed from the electrical harness.
      (2) You can do this repair on frayed or scuffed loom assemblies that have the part numbers that follow:

          LJ35381 SB 71-7854
          LJ50528 SB 71-9634

   B. Consumable Materials
      (1) Sleeve, antichafe - Rolls Royce (U440054) (Ref 20-30-07)
   C. Access
      (1) Location Zones
          410 No. 1 Power Plant (Left)
          420 No. 2 Power Plant (Right)

   D. Do the repair of the electrical harness.

          S 348-002-R00
      (1) Install an antichafe sleeve on the electrical harness.
          (a) Remove the harness ties in the area where you will install the antichafe sleeve.
          (b) Cut the antichafe sleeve to get the correct length.
          (c) Wind the antichafe sleeve around the frayed or the scuffed cable casing once.
              1) Make sure the edges of the sleeve come together.

2) If there are short branches that come from the main branch, the short sleeves must be woven together before you wind a sleeve around the main branch.

(d) Remove the sharp corners from the ends of the sleeve that were cut.

(e) Lock sleeving by passing end through cable bundle and taking two turns around a single wire.

MODULE BLOCK - REMOVAL/INSTALLATION

TASK 71-51-01-024-001-R00

1. Module Block

A. General

(1) This section gives you the procedure for the removal and installation of the module blocks that are in the module terminal block and terminal block assemblies.

(2) Identification of the wire harness parts is as follows:

(a) Wire - A single electrical conductor with insulation around it.

(b) Cable - A group of wires in a metal shield and an insulated jacket.

(c) Harness - One or more cables with connectors or terminal lugs attached to the ends of the cables.

(d) Receptacle - A receptacle is the fixed half of a connector.

(e) Plug - A plug is the free half of a connector.

TASK 71-51-01-024-002-R00

2. Removal of the Module Block from the Module Terminal Block Assembly

A. Equipment

(1) Multimeter - Standard

B. References

(1) AMM 24-22-00/201, Electrical Power - Control

(2) AMM 70-50-03/201, Wire Identification Marker

(3) AMM 70-50-04/201, Modular Terminal Block/Terminal Block Pins

(4) AMM 70-51-00/201, Torque Tightening Technique

(5) AMM 71-11-04/201, Fan Cowl Panels

(6) WDM 71-51-11 through -25 (dependant on mark number of engine)

C. Access

(1) Location Zones

410	Left Engine
420	Right Engine

(2) Access Panels

413/423	Fan Cowl Panel (LH)
414/424	Fan Cowl Panel (RH)

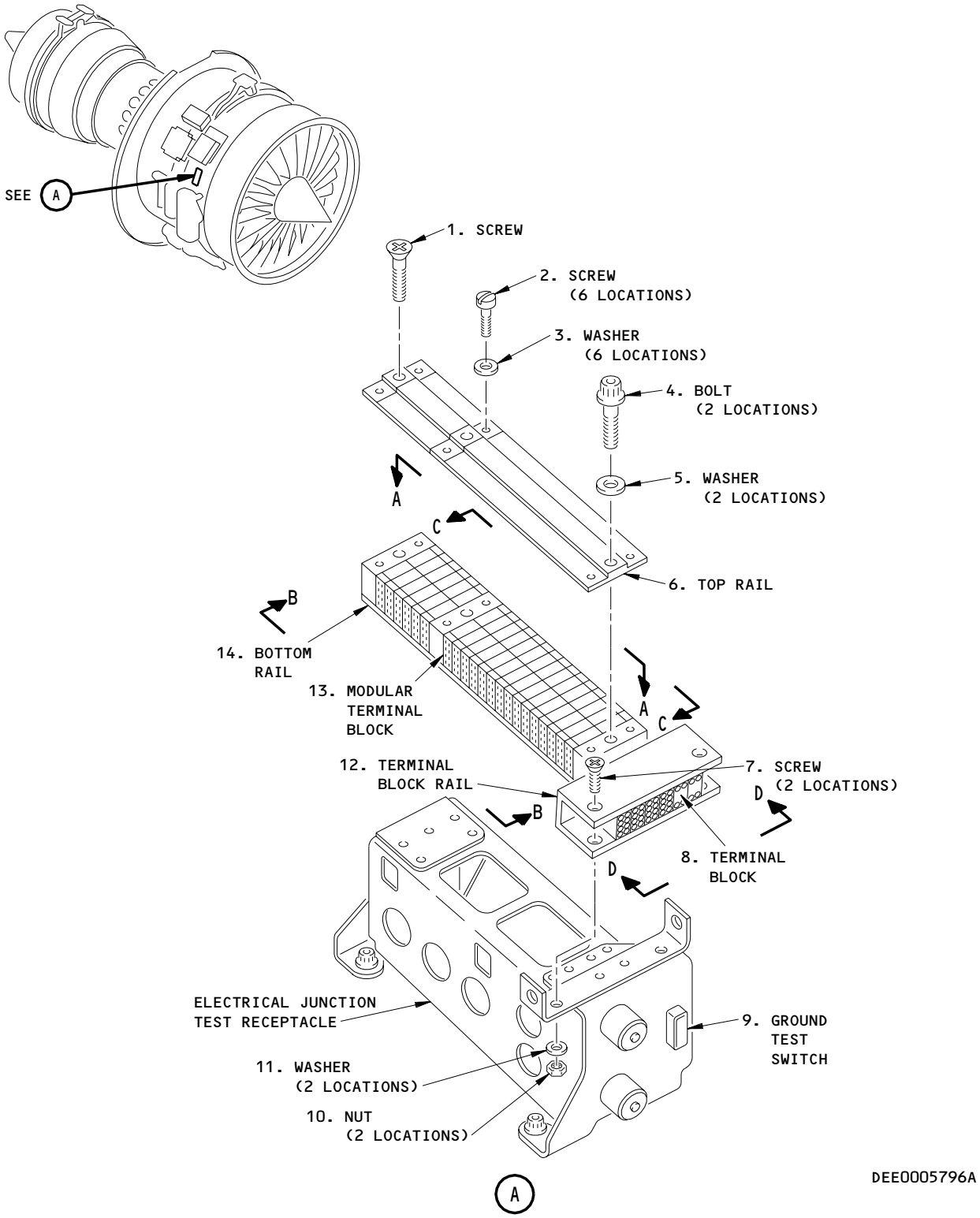
D. Prepare to remove the Module Block from the Modular Terminal Block Assembly.

S 044-004-R00

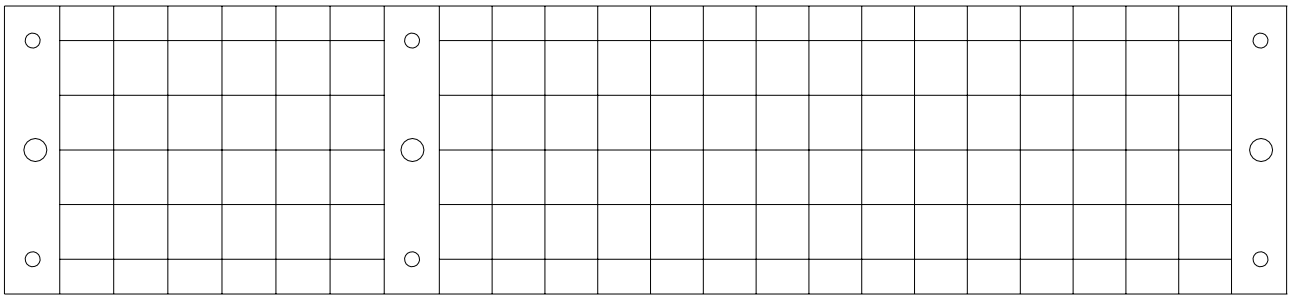
(1) Remove the electrical power (AMM 24-22-00/201).

S 014-005-R00

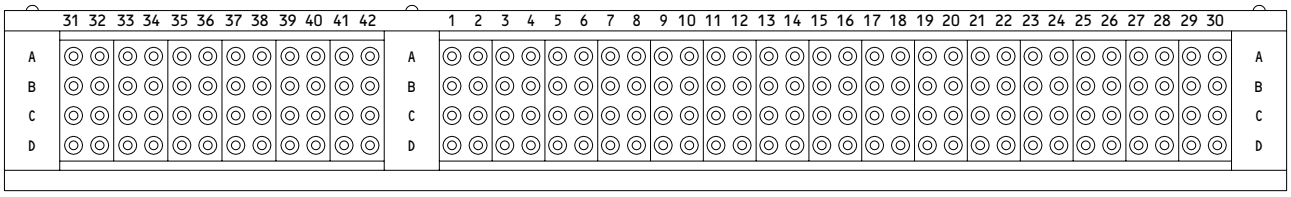
(2) Open the fan cowl panels (AMM 71-11-04/201).



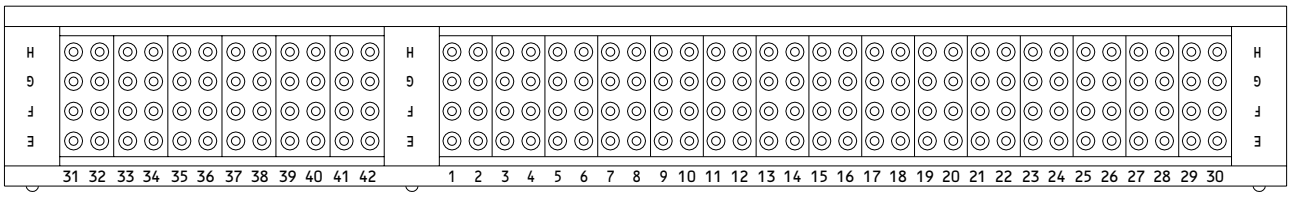
Modular Terminal Block/Terminal Block Installation
Figure 401 (Sheet 1)



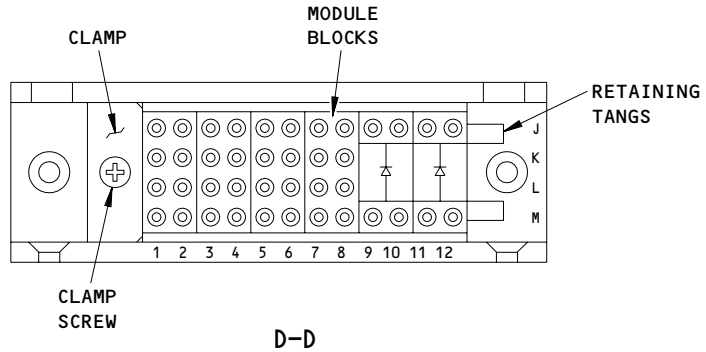
(TOP RAIL REMOVED FOR CLARITY)
A–A



B–B



C–C



D–D

DEE0005797A

Modular Terminal Block/Terminal Block Installation
Figure 401 (Sheet 2)

CAUTION: YOU MUST REMOVE ONLY ONE MODULE BLOCK AT A TIME. YOU MUST COMPLETE THE INSTALLATION PROCESS FOR ONE MODULE BLOCK BEFORE YOU REMOVE A DIFFERENT MODULE BLOCK.

E. Remove the Module Block from the Modular Terminal Block Assembly.

S 214-006-R00
(1) Identify the terminal number of the rejected module block.
(a) Make a note of the terminal number (Fig. 401).

S 024-007-R00
(2) Remove all cable ties near to the module block to be removed.
(a) Make a note of the positions of the cable ties.

NOTE: This is to prevent loads on the module block when the top rail is removed.

S 214-008-R00
(3) Examine all of the wire tags for damage.
(a) Make sure that you can read the wire tags and that they agree with their related terminal number.
(b) Replace damaged tags or tags that you cannot read (AMM 70-50-03/201).

S 024-009-R00
(4) Remove thc wires/pins from the rejected module block (AMM 70-50-04/201).
(a) Make a note of their positions.
(b) Move the wires away from the module terminal block assembly.

S 024-010-R00
(5) Remove the top rail (6).
(a) Release the screw (1) and screws (2), but do not remove.
(b) Remove the bolts (4) and washers (5).
(c) Remove the screw (1) and screws (2) and washers (3).
(d) Remove the top rail (6).

S 214-011-R00
(6) Do a visual inspection of all of the module blocks for damage/debond.
(a) Make a note of the damaged blocks.

(b) Replace the damaged block only after completion of the installation process of the rejected module block.

NOTE: You must remove only one module block at a time. You must complete the installation process for one module block before you remove a different module block.

S 024-012-R00

(7) Remove the module block.

(a) Move the module block out from the bottom rail.

F. Installation of the Module Block

S 424-013-R00

(1) Install the new module block.

(a) Install sealing plugs to module block in the positions that are not used (AMM 70-50-04/201).

(b) Make sure that the polarity of the module block is the same as the other installed module blocks.

NOTE: If the module block is installed with the incorrect polarity, the block will not fully engage with the bottom rail (14) or with the other module blocks.

(c) Install the module block at the bottom rail (14).

1) Engage the module block in the bottom rail (14) and the other module blocks.

S 424-014-R00

(2) Install the top rail (6).

(a) Push the top rail (6) on the modular terminal block (13).

1) Make sure that the module blocks engage the top rail (6) and bottom rails (14).

(b) Install the screw (1) and screws (2) and washers (3) that attach the top rail (6) to the modular terminal block (13).

1) Do not tighten the screws.

(c) Make sure that all of the blocks and the plates are correctly engaged.

(d) Tighten the six screws (2) to 2.5 inch-pounds (0.28 newton-meters).

(e) Tighten the screw (1) to 5 inch-pounds (0.56 newton-meters).

(f) Install the two bolts (4) and washers (5) that attach the modular terminal block (13) and top rail (6) to the electrical junction test receptacle.

1) Tighten the bolts (AMM 70-51-00/201).

S 424-015-R00

(3) Install the wires/pins to the module block (AMM 70-50-04/201).
  (a) Use the identified position from earlier in the removal procedure.
  (b) Do a check of the wiring positions (WDM 71-51-11 through -25).

S 424-016-R00

(4) Install the cable ties.
  (a) Use the position identified in the removal procedure.

S 764-017-R00

(5) Do a continuity and insulation resistance test on the electrical wiring.
  (a) Identify the terminal code number of the module block that is replaced (Fig. 401).
  (b) Identify the interconnection of each wire in the module block that has been replaced (WDM 71-51-11 through -25).
  (c) Do a test of the continuity between all points that the module block connects (WDM 71-51-11 through -25).
    1) Isolate each of the wires that you will test and remove connectors as necessary.
    2) Use an ohmmeter with cable ends that are the same as the pins/socket in the connector.
      a) Do the test between the ends of the points listed.
    3) The maximum resistance is 1 ohm.
  (d) Do a test of the insulation of each wire and ground (WDM 71-51-11 through -25).

    NOTE: Only do this step after the continuity test is completed.

    1) The insulation resistance is from the engine case ground point to the wiring.
      a) The minimum insulation resistance must be 20 megohms.
    2) You must do an insulation test of each ground point at a connector or terminal to engine case ground.
      a) When the shell of a connector is used as an alternative to a pin:
        1. You must insulate the connector shell from ground.
        2. Do a test of the shell of the connector to an engine case ground point.
        3. The minimum insulation resistance must be 20 megohms.

TASK 71-51-01-024-003-R00

3. Removal of the Module Block(s) from the Terminal Block Assembly

A. Equipment
   (1) Multimeter - standard

B. References
   (1) AMM 24-22-00/201, Electrical Power - Control
   (2) AMM 70-50-03/201, Wire Identification Marker
   (3) AMM 70-50-04/201, Modular Terminal Block/Terminal Block Pins
   (4) AMM 70-51-00/201, Torque Tightening Technique
   (5) AMM 71-11-04/201, Fan Cowl Panels
   (6) WDM 71-51-11 through -25 (dependant on mark number of engine)

C. Access
   (1) Location Zones
       410 Left Engine
       420 Right Engine

   (2) Access Panels
       413/423 Fan Cowl Panel (LH)
       414/424 Fan Cowl Panel (RH)

D. Prepare to remove the Module Block from the Terminal Block Assembly.

   S 044-018-R00
   (1) Remove the electrical power (AMM 24-22-00/201).

   S 014-019-R00
   (2) Open the fan cowl panels (AMM 71-11-04/201).

E. Removal of a Module Block from the Terminal Block Assembly

   S 214-020-R00
   (1) Identify the terminal number of the rejected module block.
       (a) Make a note of the terminal number (Fig. 401).

   S 024-021-R00
   (2) Remove all cable ties near to the module block to be removed.
       (a) Make a note of the positions of the cable ties.

   S 214-022-R00
   (3) Examine all of the wire tags for damage.
       (a) Make sure that you can read the wire tags and that they agree with their related terminal number.
       (b) Replace damaged tags or tags that you cannot read (AMM 70-50-03/201).

S 024-023-R00

(4) Remove the wires/pins from the rejected module block (AMM 70-50-04/201).
   (a) Make a note of their positions.
   (b) Move the wires away from the terminal block assembly.

S 024-024-R00

(5) Remove the screws (7), washers (11) and the nuts (10) that attach the terminal block rail (12) to the mounting electrical junction test receptacle.

NOTE: If the rejected module block is close to the removal end of the terminal block, then this step may not be necessary.

S 024-025-R00

(6) Loosen the clamp screw and remove the clamp.

S 214-026-R00

(7) Do a visual inspection of all of the module blocks for damage.
   (a) Make a note of the damaged blocks.
   (b) Replace the damaged block only afler completion of the installation process of the rejected module block.

NOTE: You must remove only one module block at a time. You must complete the installation process for one module block before you remove a different module block.

S 024-027-R00

(8) Remove the rejected module block.
   (a) Move the module blocks (8) from the terminal block rail (12).
   (b) Remove other module block(s) as necessary from the open end of the terminal block rail (12).
   (c) Remove the rejected module block from the open end of the terminal block rail (12).

F. Installation of the Module Block

S 424-028-R00

(1) Install the new module block.
   (a) Install sealing plugs to module block in the positions that are not used (AMM 70-50-04/201).

S 424-029-R00

(2) Install the new module block.
  (a) Install the new module block in the correct order together with the module blocks that were installed before.
  (b) Move the module block up to the retaining tangs.
  (c) Install the clamp and tighten the clamp screw.

    NOTE: Make sure that the clamp is installed tight up against the module block before you tighten the clamp screw.

S 424-030-R00

(3) Install the terminal block rail (12).
  (a) Install the terminal block rail (12) on the electrical junction test receptacle.
  (b) Install the screws (7), nuts (10) and washers (11) and tighten (AMM 70-51-00/201).

S 424-031-R00

(4) Install the wires/pins to the module block (AMM 70-50-04/201).
  (a) Use the identified position from earlier in the removal procedure.
  (b) Do a check of the wiring positions (WDM 71-51-11 through -25).

S 424-035-R00

(5) Install the cable ties.
  (a) Use the identified position from earlier in the removal procedure.

S 764-032-R00

(6) Do a continuity and insulation resistance test on the electrical wiring.
  (a) Identify the terminal code number of the module block that is replaced (Fig. 401).
  (b) Identify the interconnection of the wire in the module block that has been replaced (WDM 71-51-11 through -25).
  (c) Do a test of the continuity between all points that the module block connects (WDM 71-51-11 through -25).
    1) Isolate each of the wires that you will test and remove connectors as necessary.
    2) Use an ohmmeter with cable ends that are the same as the pins/socket in the connector.
      a) Do the test between the ends of the points listed.
    3) The maximum resistance is 1 ohm.

(d) Do a test of the insulation of each wire and ground (WDM 71-51-11 through -25).

NOTE: Only do this step after the continuity test is completed.

1) The insulation resistance is from the engine case ground point to the wiring.
   a) The minimum insulation resistance must be 20 megohms.
2) You must do an insulation test of each ground point at a connector or terminal to engine case ground.
   a) When the shell of a connector is used as an alternative to a pin:
      1. You must insulate the connector shell from ground.
      2. Do a test of the shell of the connector to an engine case ground point.
      3. The minimum insulation resistance must be 20 megohms.

G. Put the Airplane Back to Its Usual Condition

S 414-033-R00

(1) Close the fan cowl panels (AMM 71-11-04/201).

S 444-034-R00

(2) Supply electrical power if it is necessary (AMM 24-22-00/201).

MODULE BLOCK - INSPECTION/CHECK

1. General
   A. This procedure has one task. This task examines the Module Block.

   TASK 71-51-01-206-004-R00

2. Module Block Inspection
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 70-50-03/201, Wire Identification Marker
      (3) AMM 70-51-00/201, Torque Tightening Technique
      (4) AMM 71-11-04/201, Fan Cowl Panels
      (5) AMM 71-51-01/401, Module Block
   B. Access
      (1) Location zone
          410 Left engine
          420 Right engine

      (2) Access panels
          413/423 Fan Cowl Panel (LH)
          414/424 Fan Cowl Panel (RH)

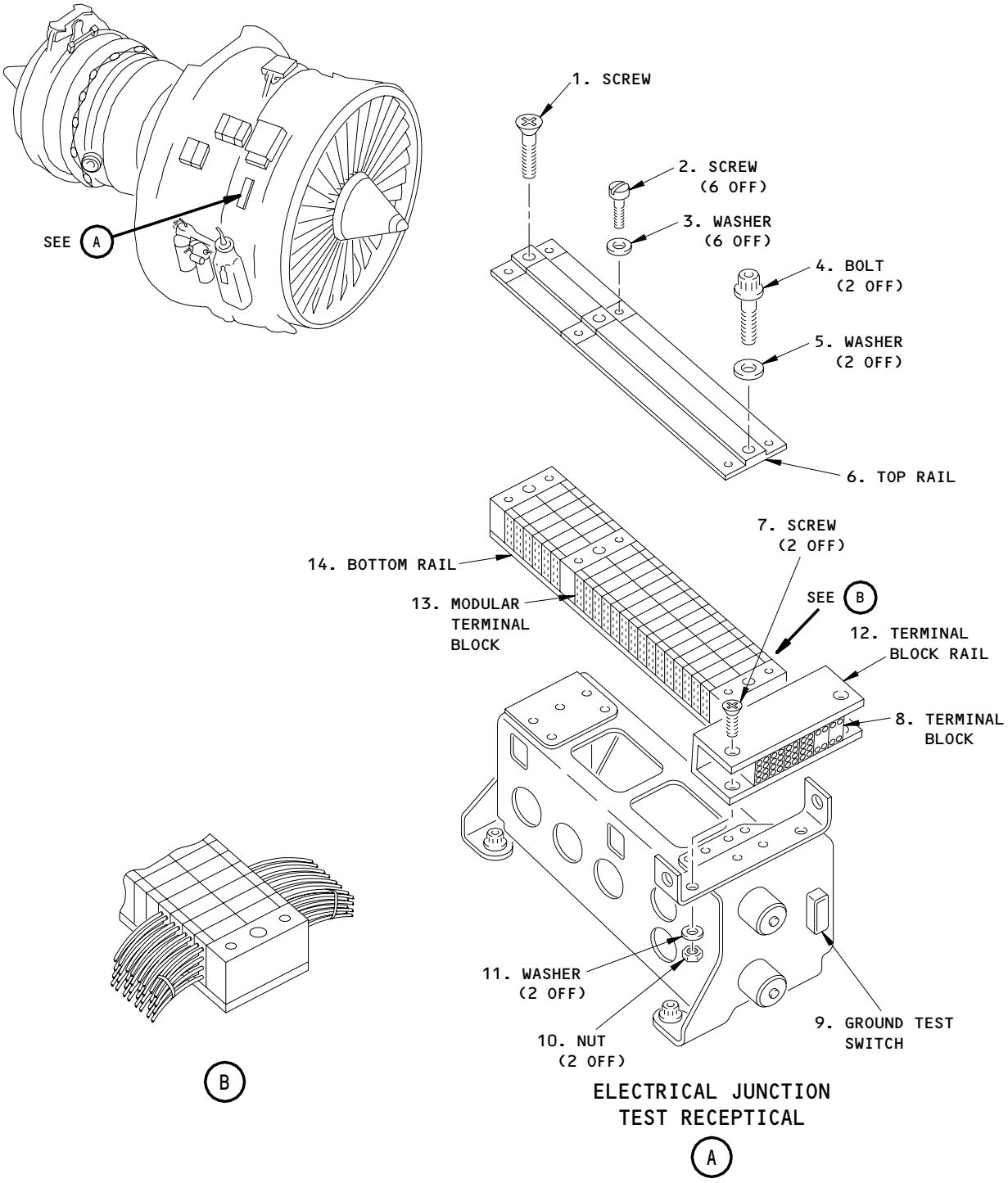
   C. Prepare the Airplane for the inspection

      S 866-002-R00
      (1) If it is necessary, remove electrical power (AMM 24-22-00/201).

      S 016-010-R00
      (2) Open the fan cowl panels (AMM 71-11-04/201).

      S 906-003-R00
      (3) Remove the top rail (Fig. 601).
          (a) Release the screw (1) and screws (2) but do not remove them.
          (b) Remove the bolts (4) and washers (5).
          (c) Remove the screw (1) and the screws (2) and washers (3).
          (d) Remove the top rail (6).
   D. Examine the Module Block

      S 216-011-R00
      (1) Examine all wire identification tags for damage.
          (a) Make sure that you can read the wire tags and that they agree with their related terminal number.
          (b) Replace damaged tags or tags that you cannot read (AMM 70-50-03/201).



Modular Terminal Block/Terminal Block - Inspection Check
Figure 601

S 216-012-R00
(2) Examine the module block for debonding (Fig. 601).
(a) If you find debonding, reject the module block.
1) Replace the module block (AMM 71-51-01/401).

E. Put the Airplane back to its usual condition

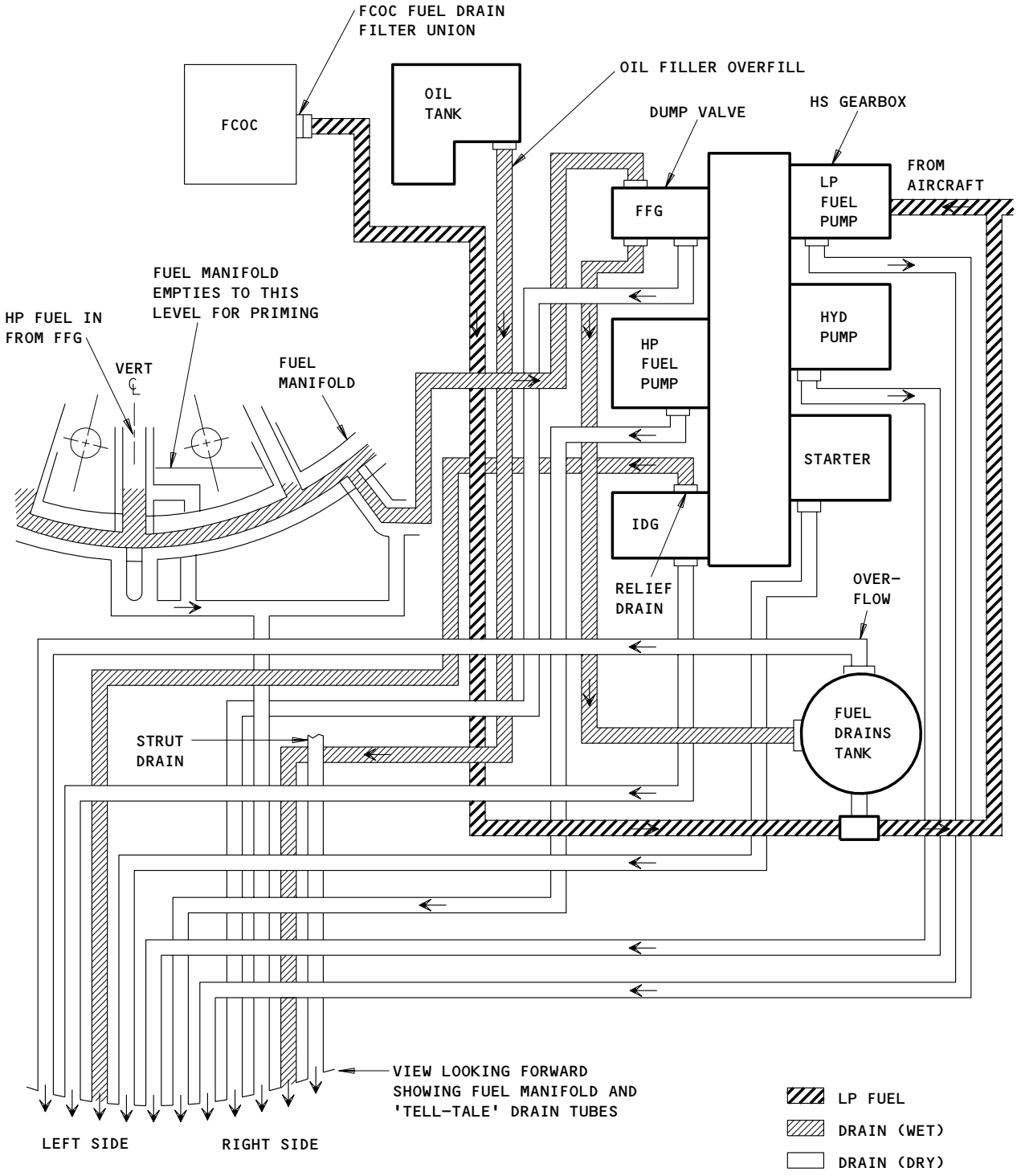
S 906-007-R00
(1) Install the top rail (6).
(a) Push the top rail on the module block (13).
1) Make sure that the module block engages the top rail (6) and bottom rails (14).
(b) Install the screw (1) and screws (2) and washers (3) that attach the top rail (6) to the module block (13).
1) Do not tighten the screws.
(c) Make sure that all of the blocks and the plates are correctly engaged.
(d) Tighten the screws (2) to 2.5 inch-pounds (0.28 newton-meters).
(e) Tighten the screw (1) to 5 inch-pounds (0.56 newton-meters).
(f) Install the two bolts (4) and washers (5) that attach the module block (13) and top rail (6) to the electrical junction test receptacle.
1) Tighten the bolts (AMM 70-51-00/201).

S 906-008-R00
(2) Close the fan cowl panels (AMM 71-11-04/201).

S 866-009-R00
(3) If it is necessary, supply electrical power (AMM 24-22-00/201).

ENGINE VENTS AND DRAINS - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The engine vents and drains system collects and discharges oil contaminated air and fluids consisting of fuel or oil.
   B. The vented air is from the sumps, oil tank, and gearbox. The fluids are from the accessory components and cowling.
   C. The vent system is comprised of four vent tubes going into a breather and then into an overboard duct. The drain system is comprised of 28 drain tubes.
2. Component Details
   A. Vent System
      (1) The vent system vents the high pressure (HP)/intermediate pressure (IP) turbine bearings, location bearings and internal gearbox, low pressure (LP)/IP compressor front bearings, oil tank, and external gearbox. These areas are vented into a breather which seperates the oil from the air and discharges the air overboard through the engine breather outlet. The oil is returned to the HS gearbox for reuse.
   B. Drains System
      (1) The engine drains system collects and discharges drain fluids overboard. These fluids come from seal leakage or overflow of engine components, engine zones 2, 3, and 4, strut, and inlet cowl.
      (2) The drain fluids coming from the engine components each has a separate drain tube. These tubes go to the forward side of the firewall assembly flange. There are 11 drains located at this flange. When the cowling is closed these drain tubes line up with a drain hole on the cowling for discharge overboard. These drain tubes and the fluids they discharge from left to right looking forward are called:
         (a) Fuel drains tank overflow drain (fluid is fuel).
         (b) IDG seal drain (fluid is oil).
         (c) IDG seal at gearbox mounted spline drain (fluid is oil).
         (d) Starter seal drain (fluid is oil).
         (e) Hydraulic pump seal drain (fluid is either hydraulic fluid or oil).
         (f) HP fuel pump seal drain (fluid is either fuel or oil).
         (g) LP fuel pump seal drain (fluid is either fuel or oil).
         (h) Fuel flow governor seal drain (fluid is either fuel or oil).

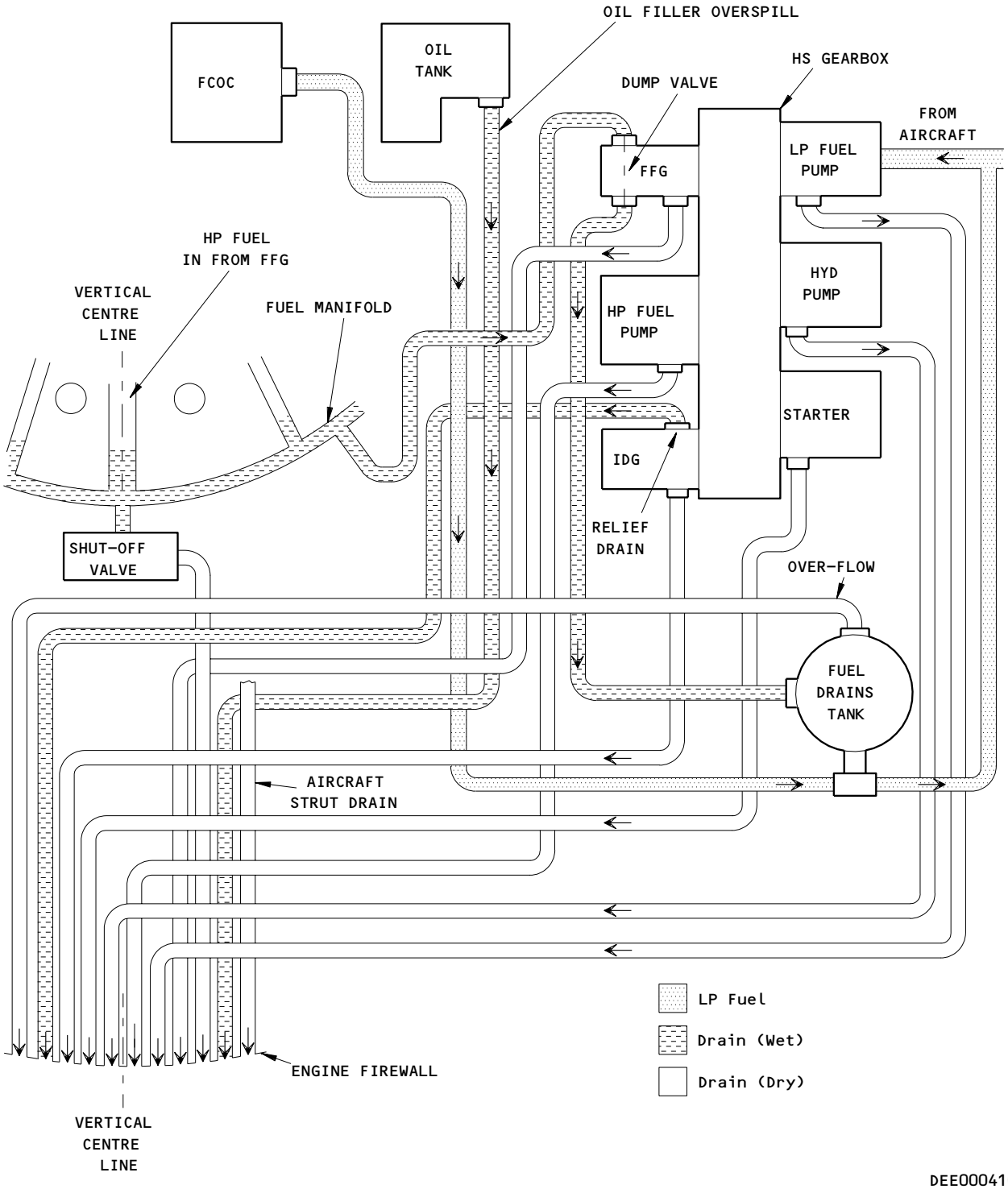


51513B

Engine Drain Schematic
Figure 1 (Sheet 1)

EFFECTIVITY
RB211-535E4 ENGINES PRE RR SB 72-C230
(PHASE II COMBUSTOR)

L00742



VIEW LOOKING FORWARD

Engine Drain Schematic
Figure 1 (Sheet 2)

EFFECTIVITY
RB211-535E4 ENGINES RR POST-SB 72-C230
(PHASE V COMBUSTOR)

L00750

(i) Refer to the data that follows:
1) ENGINES PRE-RR-SB 72-C230;
Fuel manifold shroud drain (fluid is fuel).
2) ENGINES POST-RR-SB 72-C230;
Engine shut-off valve drain (fluid is fuel).
(j) Oil tank overfill drain (fluid is oil).
(k) Strut drain (fluid could be water, fuel, or hydraulic fluid).

(3) Zones 2, 3, and 4 drains through holes in the cowling. Zones 2 and 3 each have 4 drain holes located in the thrust reverser. Zone 4 has 2 holes in the exhaust nozzle. The holes are positioned to allow drainage no matter what side of the airplane the engine is hung.

(4) The strut drain is one of the drains on the firewall assembly flange.

(5) The inlet cowl has 8 drain holes located on the bottom aft of the cowl. They allow drainage of fluids from the inlet cowl. This fluid would be water.

(6) The fuel drains tank accepts fuel drainage from the fuel flow governor, which receives the fuel from the fuel manifold when the engine is shutdown. This drains the fuel manifold to the level of the lowest burners.

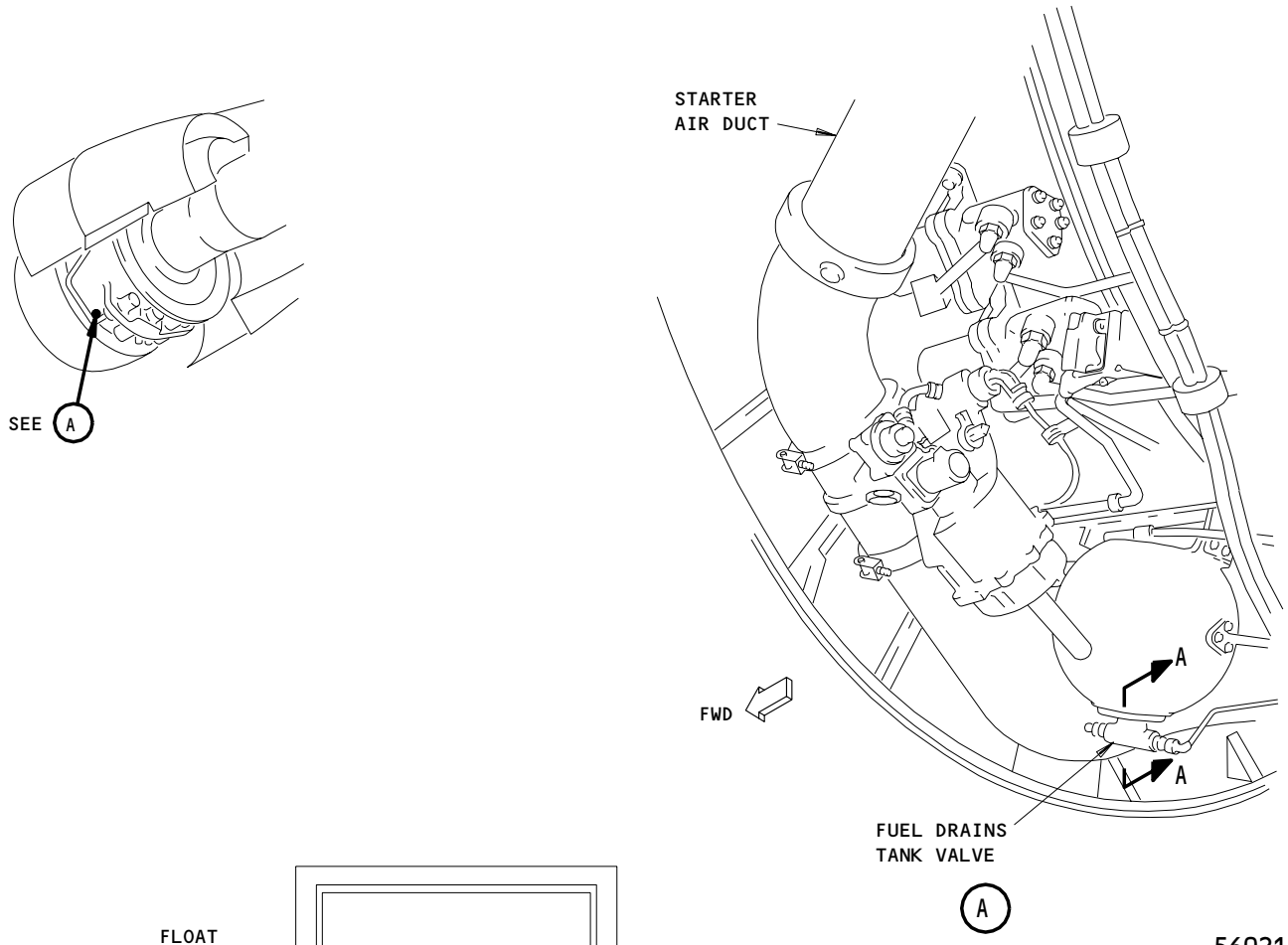
C. Drains Collector Tank (Fig. 2)

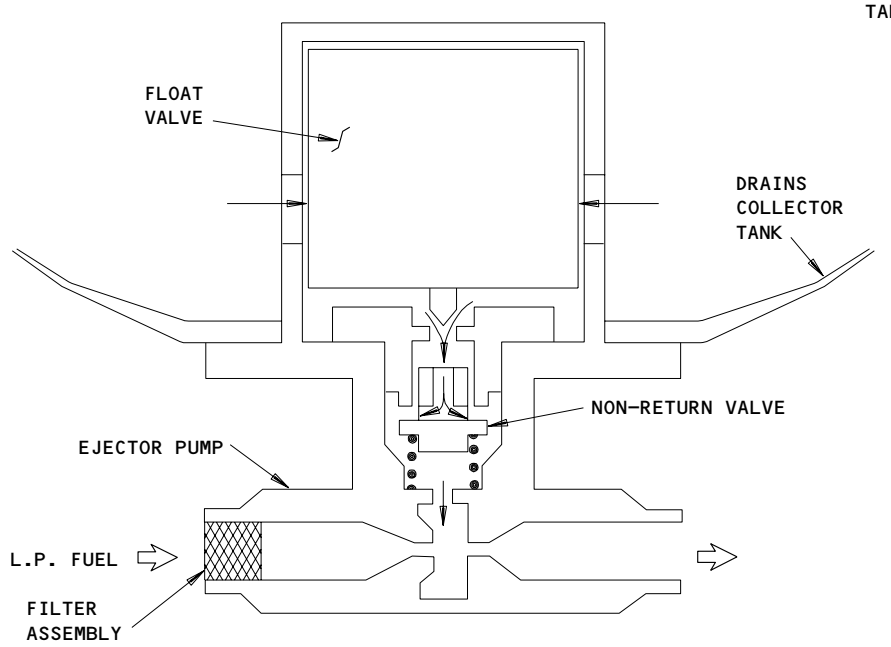
(1) The drains collector tank is mounted on the lower left side of the the LP compressor case. It is spherical in shape and is comprised of an inlet, an overflow, and a float/ejector valve. The inlet is connected to the shut-off valve on the fuel flow governor (AMM 73-21-00). The overflow drain tube is routed to the overboard outlet at the bottom of the firewall.

3. Operation

A. LP fuel is taken from a tapping at the inlet to the fuel cooled oil cooler and passed through a filter and float/ejector valve fitted in the base of the drains tank. The action of the fuel flowing through the valve extracts any drains fuel that has collected in the tank and returns it to the inlet of the LP fuel pump.

B. If the drains collector tank becomes full, the excess fuel is drained to atmosphere through the overflow drain tube.





FLOAT/EJECTOR VALVE
A-A
51514A

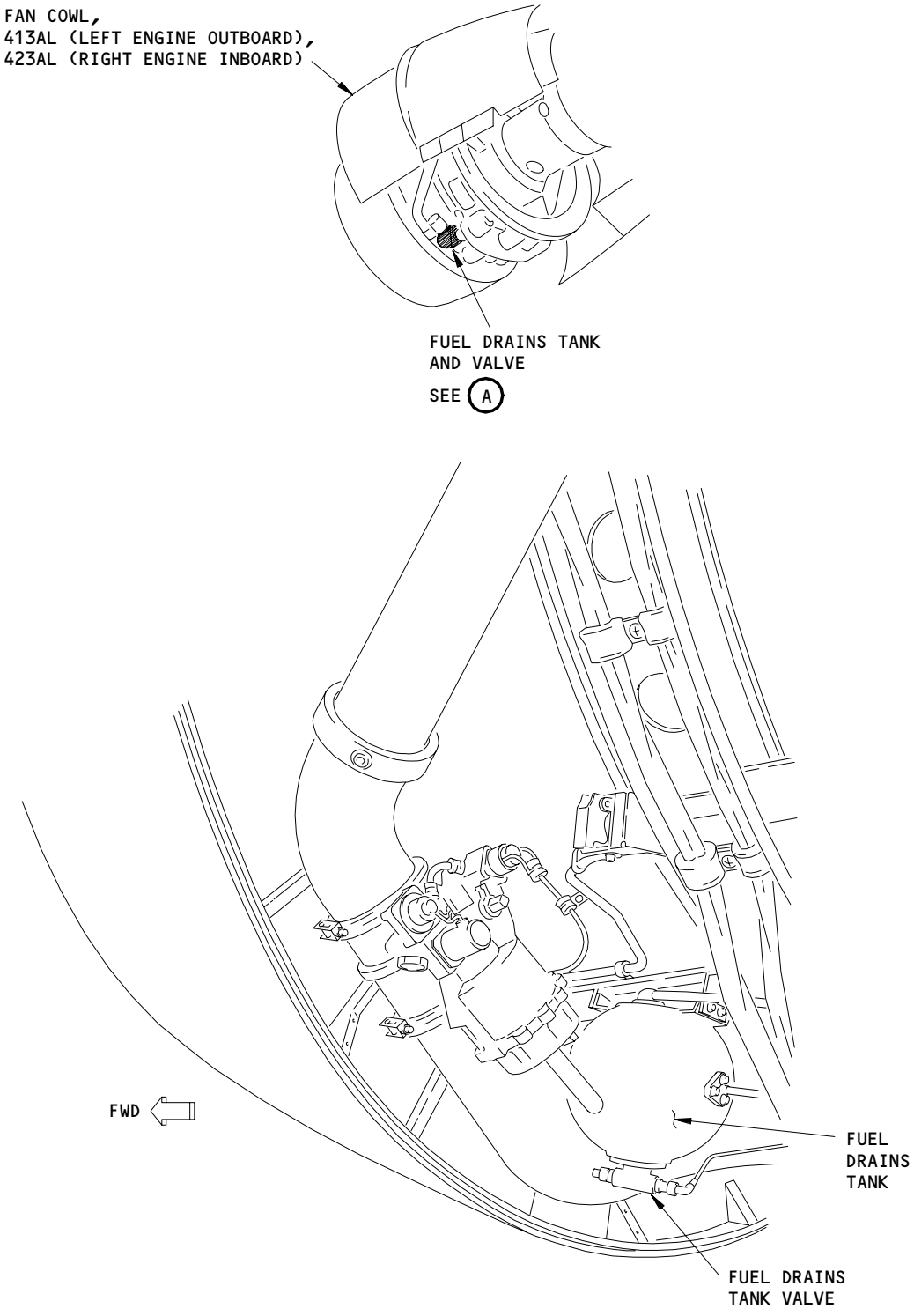
Engine Drain System - Fuel Drains Tank Valve Description
Figure 2

ENGINE VENTS AND DRAINS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
TANK - FUEL DRAINS	--	2	413AL, 423AL, FAN COWL	71-71-01
VALVE - FUEL DRAINS TANK	--	2	413AL, 423AL, FAN COWL	71-71-04

Engine Vents and Drains - Component Index
Figure 101

E46819



Engine Vents and Drains - Component Location
Figure 102

ENGINE VENTS AND DRAINS - INSPECTION/CHECK

1. General
   A. This procedure has two tasks. The first task examines the engine vents and the drains. The second task examines the strut drains.
   B. The strut drains prevent the collection of fluids in the strut.
   C. You must measure the leakage from the drain tank or overboard outlets located at the bottom of the engine firewall.

TASK 71-71-00-206-001-R00

2. Engine Drains and Vents Inspection
   A. Equipment
      (1) Container - clean, graduated, transparent, minimum capacity of 10 cubic centimeters
   B. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 78-31-00/201, Thrust Reverser System
   C. Access
      (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

   D. Examine the Vents and the Drains of the Engine.

S 016-002-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the fan cowl panels (AMM 71-11-04/201).

S 046-012-R00

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

(2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 016-003-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open the thrust reverser (AMM 78-31-00/201).

S 216-004-R00

(4) Examine the fuel drain tubes from the engine component to the bottom of the nacelle where the tube comes out (Fig. 601).
   (a) The fuel drain tubes must not be damaged and must be correctly installed.
   (b) Make sure the fuel drain tube does not have a blockage.

S 216-006-R00

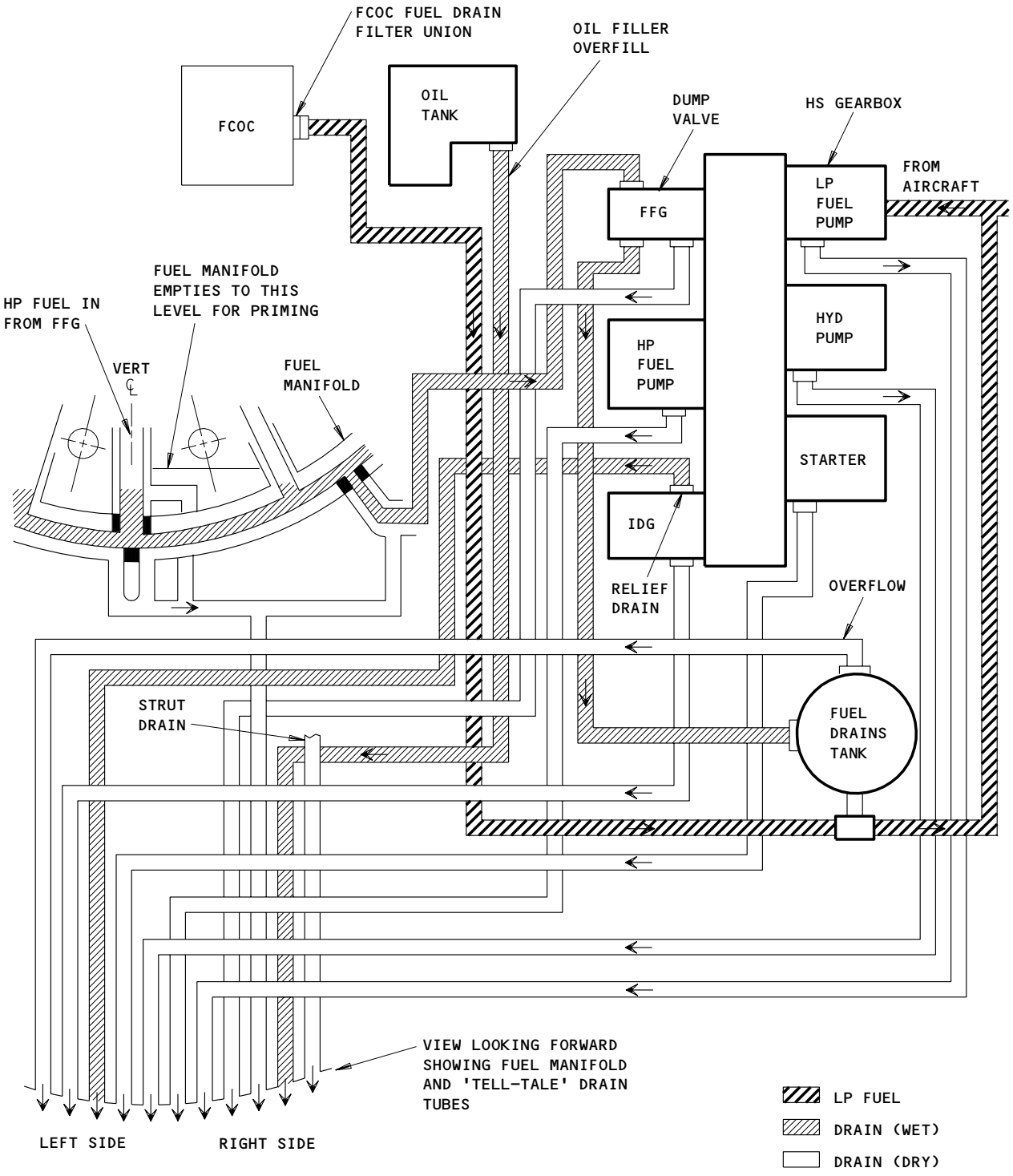
(5) Examine the oil drain tubes from the engine component to the bottom of the nacelle where the tube comes out (Fig. 601).
   (a) The oil drain tubes must not be damaged and must be correctly installed.
   (b) Make sure the oil drain tubes do not have a blockage.
   (c) The other drain tubes must not be damaged and must be correctly installed.

S 216-008-R00

(6) Examine the fuel drains tank for leakage.
   (a) The fuel drains tank must not be damaged and must be correctly installed.

S 226-009-R00

(7) Visually examine the engine and the engine drain tubes for leakage.
   (a) If you see leakage, you must identify the drain tube and applicable engine component (Fig. 601).

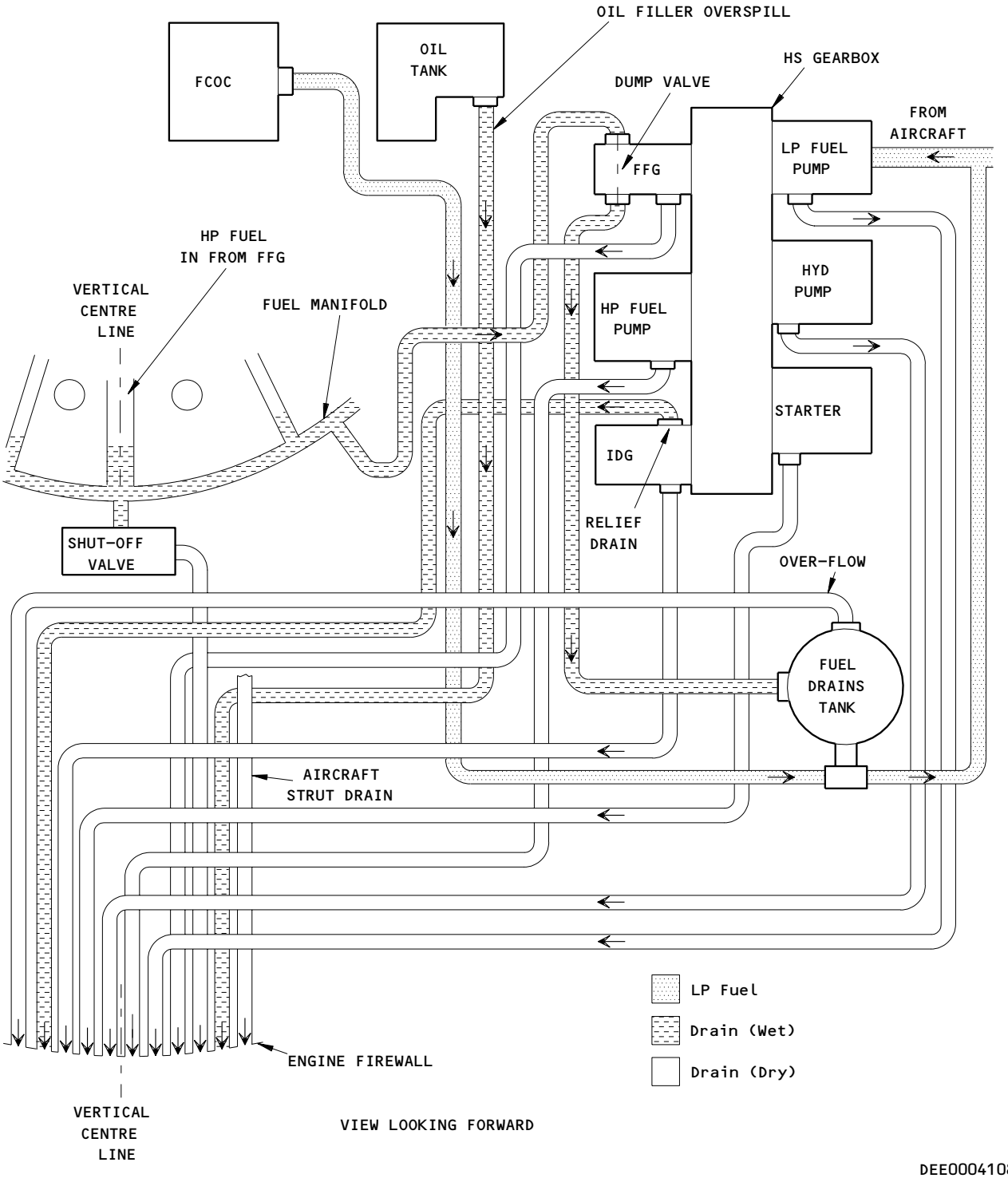


51513B

Engine Vents and Drains Inspection
Figure 601 (Sheet 1)

EFFECTIVITY
RB211-535E4 ENGINES PRE RR SB 72-C230
(PHASE II COMBUSTOR)

K99330



Engine Vents and Drains Inspection
Figure 601 (Sheet 2)

(b) Use the graduated container to measure the leakage rate.
1) The leakage rate must not be more than the limits in Fig. 602.
2) The conversion is 1 drop/minute equals 3 cc/hr.

S 416-010-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(8) Close the thrust reverser (AMM 78-31-00/201).

S 416-011-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(9) Close the fan cowl panels (AMM 71-11-04/201).

S 446-013-R00

(10) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 71-71-00-206-014-R00

3. Examine the Strut Drains

A. Equipment
(1) Flashlight - Explosion-proof
(2) Mirror - Inspection, with handle 12 inches long

B. References
(1) AMM 54-52-01/401, Strut Fairings
(2) AMM 54-53-01/401, Strut Pressure Relief and Access Doors
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 78-31-00/201, Thrust Reverser System

UNIT	FLUID	LEAKAGE RATE
Low Pressure Fuel Pump Assembly	Fuel – engine running Fuel – engine static Engine oil	10 drops/min maximum Approx 7 drops/min maximum 1 Approx 1 drop/3 min maximum
High Pressure Fuel Pump Assembly	Fuel – engine running Fuel – engine static Engine Oil	15 drops/min maximum 4 10 drops/min maximum 1 Approx 1 drop/3 min maximum
Fuel Flow Governor 5 1	Fuel Engine Oil	Approx 60 drops/min maximum 2 Approx 1 drop/3 min maximum
Hydraulic Pumps/ Gearbox Interface	Engine Oil	Approx 1 drop/3 min maximum
Air Starter	Oil (starter system) Engine Oil	Weepage only Approx 1 drop/3 min maximum
Integrated Drive Generator	Oil (IDG system) Engine Oil	Approx 2 drops/3 min maximum Approx 1 drop/3 min maximum
Fuel Manifold Shroud Drain	Fuel	Nil
Turbine Case Drain	Fuel	Fuel discharge and smoke emissions are usual after a new engine installation, aborted start, or shutdown and are possible after a normal start 3.

1 Limits given above for engine static are with tank pumps switched off.

2 Fuel flow governor fuel drain leakage limit of 120 drops/min maximum may be adopted for one flight to permit return to a maintenance base for fuel flow governor replacement.

3 Fuel discharge and smoke emissions will decrease and stop as the turbine case dries.

4 HP fuel pump drain leakage limit of 50 drops/min may be adopted for one flight to permit return to a maintenance base for HP fuel pump replacement.

5 RB211-535 E4/E4B ENGINES;
Refer to AMM 12-33-01/301 for external fuel leakage of the FFGs with viton seals in extreme cold conditions (FFG Type No. FFG022AA or other types with SB 73-B392 identified on the unit modification data plate).

Acceptance Standards – Unit Drain Leakage Rates
Figure 602 (Sheet 1)

UNIT	FLUID	LEAKAGE RATE
Low Pressure Fuel Pump Assembly	Fuel – engine running Fuel – engine static Engine oil	10 drops/min maximum Approx 7 drops/min maximum 1 Approx 1 drop/3 min maximum
High Pressure Fuel Pump Assembly	Fuel – engine running Fuel – engine static Engine Oil	15 drops/min maximum 4 10 drops/min maximum 1 Approx 1 drop/3 min maximum
Fuel Flow Governor 5 1	Fuel Engine Oil	Approx 60 drops/min maximum 2 Approx 1 drop/3 min maximum
Hydraulic Pumps/ Gearbox Interface	Engine Oil	Approx 1 drop/3 min maximum
Air Starter	Oil (starter system) Engine Oil	Weepage only Approx 1 drop/3 min maximum
Integrated Drive Generator	Oil (IDG system) Engine Oil	Approx 2 drops/3 min maximum Approx 1 drop/3 min maximum
Fuel Shut-off Valve	Fuel	Approx 20 drops/min maxium
Turbine Case Drain	Fuel	Fuel discharge and smoke emissions are usual after a new engine installation, aborted start, or shutdown and are possible after a normal start 3 .

1 Limits given above for engine static are with tank pumps switched off.

2 Fuel flow governor fuel drain leakage limit of 120 drops/min maximum may be adopted for one flight to permit return to a maintenance base for fuel flow governor replacement.

3 Fuel discharge and smoke emissions will decrease and stop as the turbine case dries.

4 HP fuel pump drain leakage limit of 50 drops/min may be adopted for one flight to permit return to a maintenance base for HP fuel pump replacement.

5 RB211-535 E4/E4B ENGINES;
Refer to AMM 12-33-01/301 for external fuel leakage of the FFGs with viton seals in extreme cold conditions (FFG Type No. FFG022AA or other types with SB 73-B392 identified on the unit modification data plate).

Acceptance Standards – Unit Drain Leakage Rates
Figure 602 (Sheet 2)

C. Access

(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

431AL	Hydraulic Fuel and Electronics Access, Left Engine
433AL	Forward Pressure Relief Door, Left Engine
433EL	Underwing Fairing - Outboard, Left Engine
433FL	Strut-to-Wing Attach Pin - Outboard, Left Engine
433LR	Aft Pressure Relief Door - Inboard, Left Engine
434AL	Aft Fairing Access Door - Outboard, Left Engine
441AL	Hydraulics, Fuel and Electrical, Right Engine
443AR	Forward Pressure Relief Door, Right Engine
443ER	Underwing Fairing - Outboard, Right Engine
443FR	Strut-to-Wing Attach Pin - Outboard, Right Engine
443LL	Aft Pressure Relief Door - Inboard, Right Engine
444AL	Aft Fairing Access Door - Outboard, Right Engine

D. Examine the Strut Drain Tubes

S 046-015-R00

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

(1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 016-016-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(2) Open the fan cowl panels (AMM 71-11-04/201).

S 016-031-R00
(3) Remove the aft section of the forward fairing (AMM 54-52-01/401).
(a) For the left engine, this fairing is 431AL.
(b) For the right engine, this fairing is 441AL.

S 016-017-R00
(4) Remove the underwing fairings on the strut (AMM 54-52-01/401).
(a) For the left engine, these fairings are 433EL and 433FL.
(b) For the right engine, these fairings are 443ER and 443FR.

S 016-018-R00
(5) Open the forward pressure relief doors (AMM 54-53-01/401).
(a) On the left engine, 433AL is door 1.
(b) On the right engine, 443AR is door 4.

S 016-019-R00
(6) Open the aft pressure relief door (AMM 54-53-01/401).
(a) On the left engine, 433LR is door 7.
(b) On the right engine, 443LL is door 7.

S 016-020-R00
(7) Open the aft fairing access door, 434AL or 444AL, to get access to the strut hydraulic compartment.

S 216-007-R00
(8) Examine the strut drain inlets for blockage (Fig. 603).
(a) Examine the two drain inlets for the forward strut drain line for blockage.

NOTE: A mirror and a flashlight will help you do this inspection.

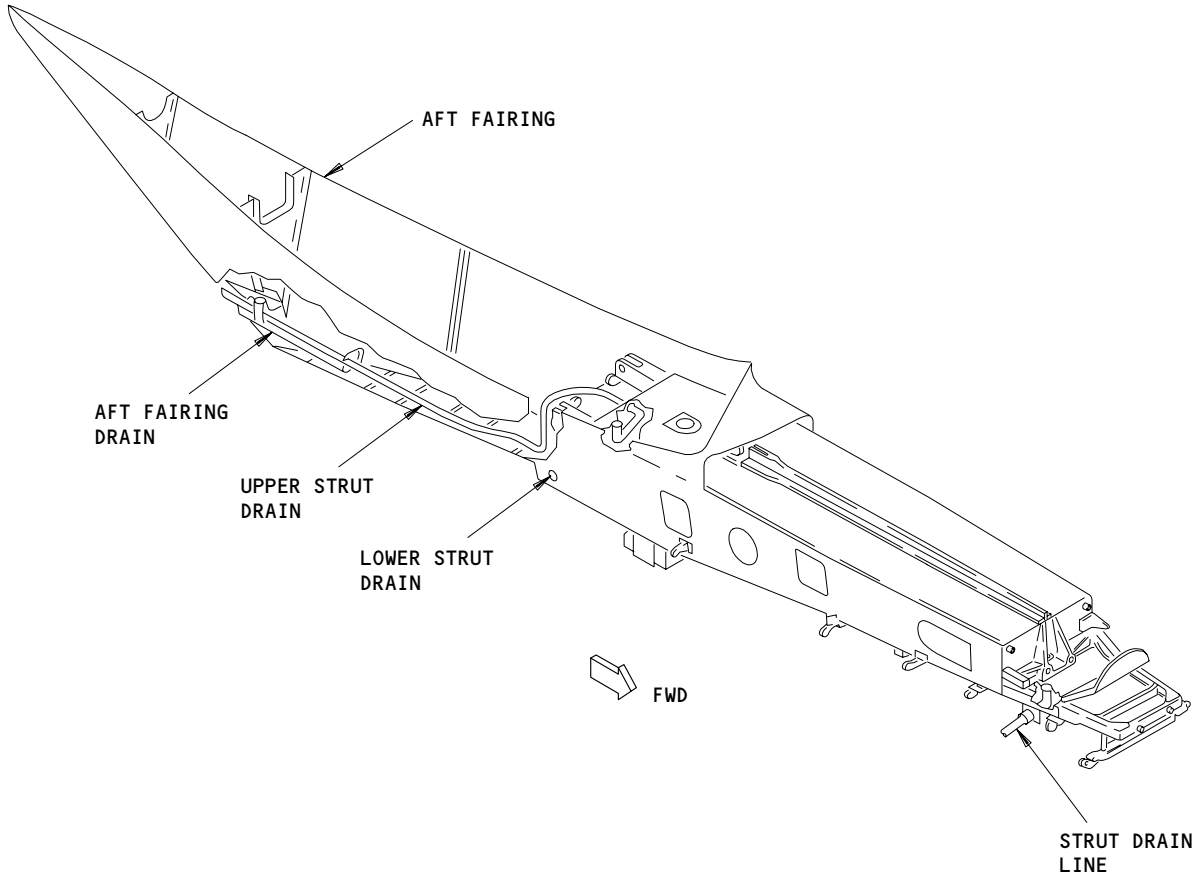
1) Use the forward pressure relief doors 433AL/433GR or 443AR/443GL to get access to the drain inlets.
(b) Examine the floor of the forward strut compartment for fluid accumulation.

NOTE: A mirror and a flashlight will help you do this inspection.

1) Use the forward pressure relief doors 433AL/433GR or 443AR/443GL to get access to the forward strut compartment.
(c) Examine the 0.25 - 0.375 inch hole for the lower strut drain on the right side of the strut for blockage.

NOTE: A mirror and a flashlight will help you do the inspection.

1) Get access to the drain inlet through the aft pressure relief door, 433LR or 443LL.



Strut Drain Locations
Figure 603

(d) Examine the drain inlet for the upper strut drain for blockage.
1) Use the underwing fairings, 433EL or 443ER to get access to the drain inlet.

S 216-021-R00
(9) Examine the drain tubes for the forward strut drains for damage.

NOTE: The two drain tubes come out of the bottom of the strut and goes out on the right side of the strut. The drain tubes attaches to a drain tube on the engine, that goes to the bottom of the engine and exits.

S 216-022-R00
(10) Examine the drain tube for the upper strut drain for damage.

NOTE: The drain tube removes fluid from the upper, aft, inboard side of the strut. The tube turns and goes aft, through the aft bulkhead of the strut. The tube then goes down to the bottom of the aft fairing and goes to the aft corner of the fairing and exits.

(a) To see the part of the drain tube in the strut, go through the aft bulkhead coverplate, door 8 (AMM 54-53-01/401).
(b) You can examine the drain tube on the bottom of the hydraulic compartment through the aft fairing access door.
(c) You can examine the drain tube exit at the aft corner of the aft fairing.

S 216-023-R00
(11) Examine the aft fairing drain tube for damage.

NOTE: This drain tube removes fluid from the bottom of the hydraulic compartment. The drain tube exits from the aft corner of the aft fairing, below the drain tube from the upper strut drain.

S 416-024-R00
(12) Close the aft fairing access door, 434AL or 444AL.

S 416-025-R00
(13) Install the underwing fairings on the strut (AMM 54-52-01/401).
(a) For the left engine, install fairings 433EL and 433FL.

(b) For the right engine, install fairings 433ER and 443FR.

S 416-026-R00

(14) Close the forward pressure relief doors 433AL or 443AR (AMM 54-53-01/401).

S 416-027-R00

(15) Close the aft pressure relief door, 433LR or 443LL (AMM 54-52-01/401).

S 416-032-R00

(16) Install the aft section of the forward fairing (AMM 54-52-01/401).
(a) For the left engine, install fairing 431AL.
(b) For the right engine, install fairing 441AL.

S 416-028-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(17) Close the fan cowl panels (AMM 71-11-04/201).

S 446-029-R00

(18) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

FUEL DRAINS TANK - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. The first task removes the fuel drains tank. The second task installs the fuel drains tank.
   B. Use the procedures in 70-51-00/201 to tighten the fasteners. Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is specified in this procedure.
   C. Use the procedures in 70-02-01/201 to install the seal rings.

TASK 71-71-01-004-001-R00

2. Remove the Fuel Drains Tank
   A. References
      (1) 24-22-00/201, Electrical Power - Control
      (2) 71-11-04/201, Fan Cowl Panels.
      (3) 71-71-05/401, Fuel Drains Tank Valve
   B. Access
      (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

413AL	Fan Cowl Panel (Left)
423AL	Fan Cowl Panel (Left)

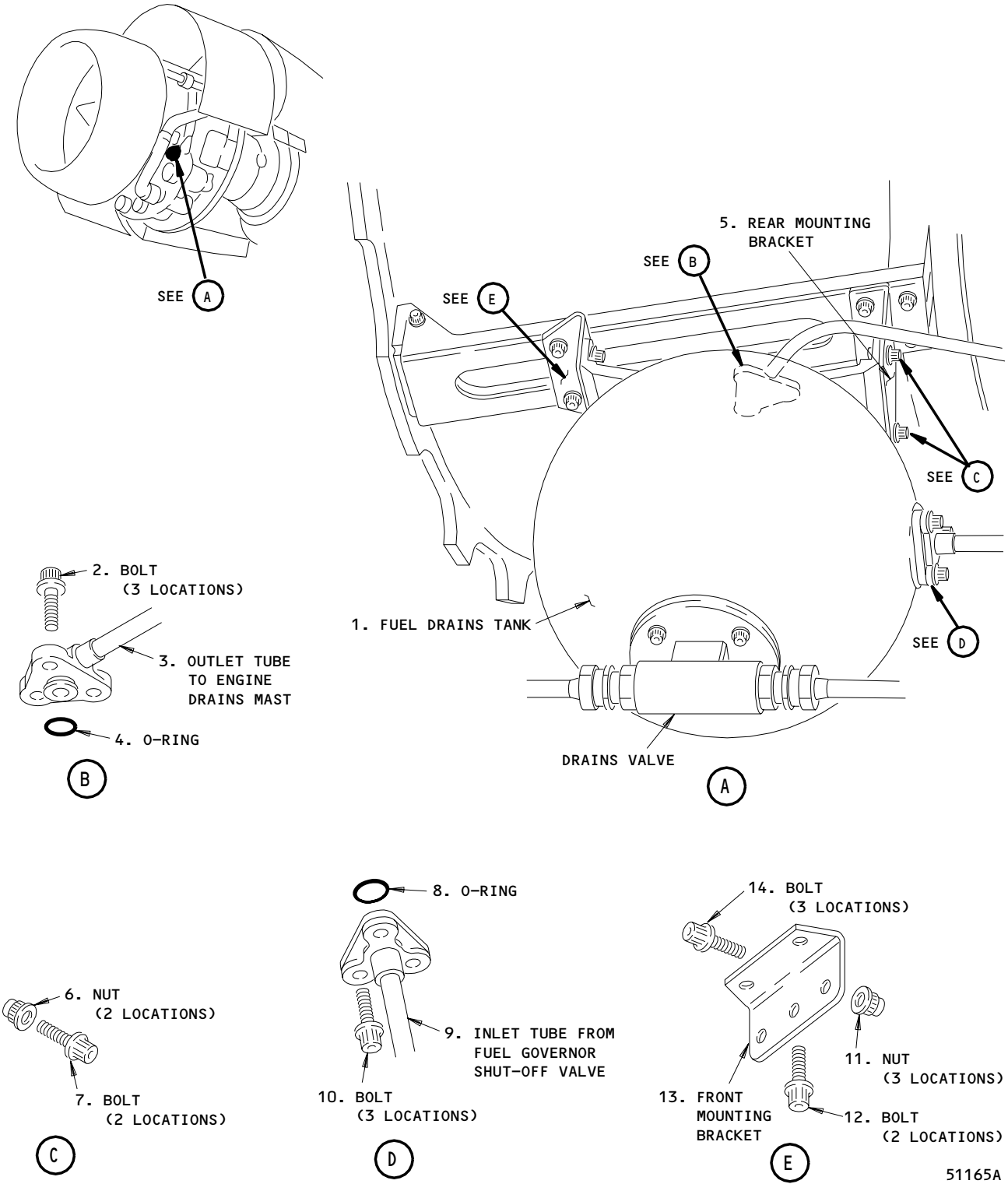
   C. Remove the Fuel Drains Tank.

      S 864-002-R00
      (1) Supply the electrical power (Ref 24-22-00).

      S 864-003-R00
      (2) For the left engine, make sure this circuit breaker on the main pwr distr panel P6 is closed.
      (a) 6E1, L SPAR FUEL VALVE

      S 864-004-R00
      (3) For the right engine, make sure this circuit breaker on the main pwr distr panel P6 is closed.
      (a) 6E2, R SPAR FUEL VALVE

      S 864-005-R00
      (4) Make sure the fuel control switch on the control stand is in the CUTOFF position and attach a DO-NOT-OPERATE tag.



Fuel Drains Tank Installation
Figure 401

S 864-006-R00

(5) Make sure the ENG VALVE lights and the SPAR VALVE lights on the control stand are out.

S 864-007-R00

(6) For the left engine, open this circuit breaker on the main pwr distr panel, P6, and attach a DO-NOT-CLOSE tag.
   (a) 6E1, L SPAR FUEL VALVE

S 864-008-R00

(7) For the right engine, open this circuit breaker on the main pwr distr panel, P6, and attach a DO-NOT-CLOSE tag.
   (a) 6E2, R SPAR FUEL VALVE

S 864-009-R00

(8) Remove the electrical power (Ref 24-22-00).

S 014-010-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(9) Open the left fan cowl panel (Ref 71-11-04).

S 034-011-R00

(10) Remove the valve on the fuel drains tank (Ref 71-71-04).

S 024-012-R00

(11) Remove the tank (Fig. 401).
   (a) Remove the bolts (2) that hold the tube (3).
   (b) Remove the bolts (10) that hold the tube (9).
   (c) Remove the bolts (12, 14), the nuts (11) and remove the bracket (13).
   (d) Remove the bolts (7) and the nuts (6) that hold the tank to the bracket (5).
   (e) Move the two tubes (3, 9) and remove the tank (1).
   (f) Remove the two seal rings (4, 8) on the tubes (3, 9).
      1) Discard the seal rings.
   (g) Put the dust caps to all the tubes.

TASK 71-71-01-404-013-R00

3. Install the Fuel Drains Tank

A. References

(1) 24-22-00/201, Electrical Power - Control

(2) 71-11-04/201, Fan Cowl Panels.
(3) 71-71-05/401, Fuel Drains Tank Valve

B. Access

(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

413AL	Fan Cowl Panel (Left)
423AL	Fan Cowl Panel (Left)

C. Install the Fuel Drains Tank.

S 424-014-R00

(1) Install the tank (Fig. 401).
(a) Remove all the dust caps.
(b) Install a new seal ring (4, 8) on each tube (3, 9) (Ref 70-02-01).
(c) Put the tank (1) in the correct position with the tubes (3, 9) and the bracket (5).
(d) Install the bolts (7) and the nuts (6) to hold the tank (1) to the bracket (5).
(e) Put the front bracket (13) in the correct position on the tank.
(f) Install the bolts (12, 14) and nuts (11) through the front bracket.
(g) Install the bolts (2, 10) through the flanges on the tubes (3, 9).
1) Tighten the bolts.
(h) Tighten the bolts (7, 12, 14) and the nuts (6, 11) to hold the brackets (5, 13).

S 434-015-R00

(2) Install the valve on the fuel drains tank (Ref 71-71-04).

S 414-016-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(3) Close the left fan cowl panel (Ref 71-11-04).

S 864-017-R00
(4) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on panel P6.
(a) 6E1, L SPAR FUEL VALVE

S 864-018-R00
(5) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker on panel P6.
(a) 6E2, R SPAR FUEL VALVE

S 864-019-R00
(6) Remove the DO-NOT-OPERATE tag from the fuel control switch.

FUEL DRAINS TANK - INSPECTION/CHECK

1. General
   A. This procedure has one task. This task examines the fuel drains tank.

   TASK 71-71-01-216-001-R00

2. Fuel Drains Tank Inspection
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 71-71-01/401, Fuel Drains Tank
   B. Procedure

      S 866-003-R00

      WARNING: ON ENGINES WITH RR SB 71-9088;
      YOU MUST BE CAREFUL WHEN YOU WORK NEAR THE OIL BREATHER. THE FRONT AND THE REAR EDGES OF THE BREATHER MAST ARE VERY SHARP. INJURY TO YOU CAN OCCUR.

      (1) Be careful when you work near the oil breather mast.

      S 016-006-R00

      CAUTION: DO NOT OPEN THE FAN COWL PANELS WHEN THE WIND SPEED IS MORE THAN 60 MPH (96 KPH). OBEY THE INSTRUCTIONS IN AMM 71-11-04/201. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE CAN OCCUR.

      (2) Open the left fan cowl panel (AMM 71-11-04/201).

      S 216-004-R00
      (3) Examine the fuel drains tank assembly for dents and cracks.
         (a) Smooth dents are permitted with these limits:
            1) The maximum dimension measured across the dent is 2.0 inches.

2) The depth of the dent is less than 10 percent of the shortest dimension across the dent.

(b) If you see cracks in the fuel drains tank assembly, replace the fuel drains tank assembly (AMM 71-71-01/401).

S 416-005-R00

(4) Close the left fan cowl panel (AMM 71-11-04/201).

ENGINE DRAIN TUBES - INSPECTION/CHECK

1. General
   A. This procedure has one task. This task examines the engine drain tubes.

   TASK 71-71-02-206-001-R00

2. Engine Drain Tubes Inspection
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 73-11-01/401, Low Pressure Fuel Pump
      (3) AMM 73-11-03/401, High Pressure Fuel Pump
      (4) AMM 73-21-01/401, Fuel Flow Governor
      (5) AMM 78-31-00/201, Thrust Reverser System
      (6) AMM 70-20-02/201, Carbon Removal from the Fuel Drain Tube
      (7) AMM 78-11-04/401, Common Nozzle Exhaust Collector
   B. Access
      (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

413AL	Fan Cowl Panel (Left)
414AR	Fan Cowl Panel (Right)
415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
423AL	Fan Cowl Panel (Left)
424AR	Fan Cowl Panel (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

   C. Examine the Engine Drain Tubes.

      S 016-002-R00

      CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

      (1) Open the fan cowl panels (AMM 71-11-04/201).

      S 046-003-R00

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

      (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 016-004-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open the thrust reverser (AMM 78-31-00/201).

S 216-009-R00

(4) Examine these fuel drain tubes for carbon particles:

LK80829, LK80830, LK80831, LK86053, UL11273, UL14909, UL16488, UL16609, and UL27870.

(a) If you see carbon particles inside the fuel drain tubes, do the steps that follow:

1) Remove the fuel drain tube.
   a) For the UL11273 tube, use AMM 78-11-04/401.
   b) For the UL14909 and LK80831 tubes, use AMM 73-11-01/401.
   c) For the LK80830 and UL27820 tubes, use AMM 73-11-03/401.
   d) For the LK80829 and LK86053 tubes, use AMM 73-21-01/401.
   e) For the UL16488 and UL16609 tubes use AMM 72-52-06/401.
2) Clean the fuel drain tube (AMM 70-20-02/201).
3) Install the fuel drain tube.
   a) For the UL11273 tube, use AMM 78-11-04/401.
   b) For the UL14909 and LK80831 tubes, use AMM 73-11-01/401.
   c) For the LK80830 and UL27820 tubes, use AMM 73-11-03/401.
   d) For the LK80829 and LK86053 tubes, use AMM 73-21-01/401.
   e) For the UL16488 tube use AMM 72-52-06/401.

S 226-005-R00

(5) Examine the tubes for the cracks, dents, nicks, fretting and scoring.

(a) Cracks are not permitted.

(b) Dents are permitted with these limits:

1) If the dent has a larger area than depth, make this dent smooth if it has these conditions:
   a) The dent does not decrease the diameter of the tube more than 10 percent at one point.
   b) The dent is not less than one diameter or 0.500 inch (12.7 mm) from the fitting at the end of the tube.
2) If the dent has a small area (the area is not more than 0.125 square inch (80.60 sq. mm)), make this dent smooth if it has these conditions:
   a) The dent has a round bottom.

b) The depth of the dent is not more than 0.015 inch (0.381 mm) on the outside surface of a bend.
c) The depth of the dent is not more than 0.025 inch (0.635 mm) on the remaining section of tube.
d) The dent is not less than one diameter or 0.500 inch (12.725 mm) from the fitting at the end of the tube.

(c) Nicks are permitted with these limits:
1) The nick has a round bottom.
2) The depth of the nick is not more than 0.004 inch (0.102 mm).
3) All burrs are removed.

(d) Fretting is permitted with these limits:
1) The depth of the fretting on the outside surface of a bend must not be more than 0.007 inch (0.178 mm).
2) The depth of the fretting on the remaining sections of the tube must not be more than 0.010 inch (0.254 mm).

(e) Make the scoring smooth with the area around it if it has these limits.
1) The scoring must not be on the outside surface of a bend.
2) You must not remove more than 0.005 inch (0.127 mm) of the metal.

S 416-006-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Close the thrust reverser (AMM 78-31-00/201).

S 446-007-R00

(7) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 416-008-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(8) Close the fan cowl panels (AMM 71-11-04/201).

FUEL DRAINS TANK EJECTOR VALVE FILTER ASSEMBLY - MAINTENANCE PRACTICES

1. General
   A. This procedure has three tasks. The first task removes the ejector valve filter. The second task cleans the filter. The third task installs the ejector valve filter.

TASK 71-71-04-002-001-R00

2. Remove the Ejector Valve Filter
   A. Equipment
      (1) Clean container - Capacity: 5 U.S. gallons, 4 Imperial gallons, 18 Litres
   B. References
      (1) 24-22-00/201, Electrical Power - Control
      (2) 71-11-04/201, Fan Cowl Panels
   C. Access
      (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

413AL	Fan Cowl Panel (Left)
423AL	Fan Cowl Panel (Left)

   D. Remove the Ejector Valve Filter

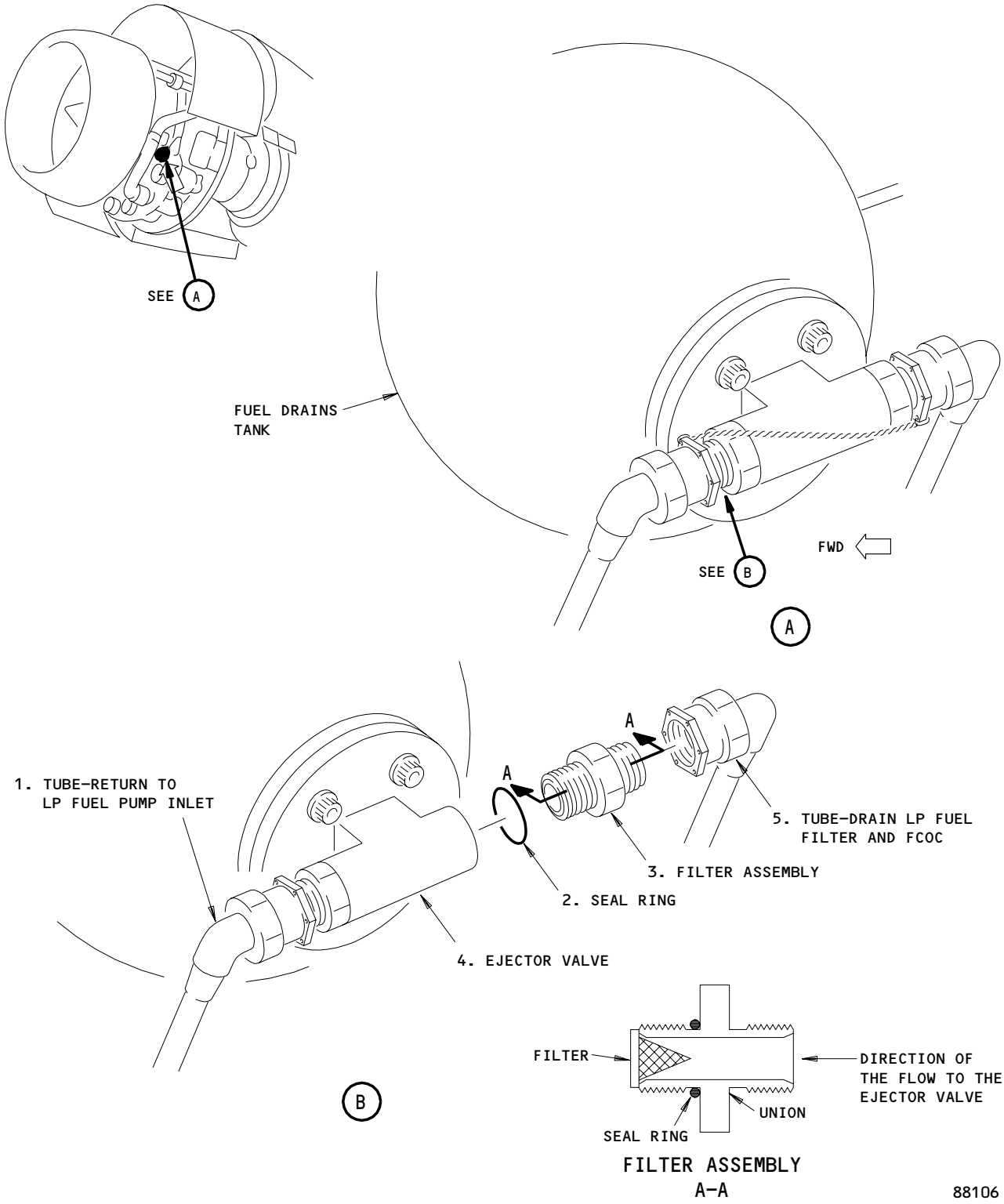
      S 862-002-R00
      (1) Supply the electrical power (AMM 24-22-00/201).

      S 862-003-R00
      (2) Make sure these circuit breakers on the MAIN PWR DISTR panel P6 are closed.
         (a) 6E1, L SPAR FUEL VALVE
         (b) 6E2, R SPAR FUEL VALVE

      S 862-004-R00
      (3) Make sure the FUEL CONTROL switch is at the CUTOFF position and attach a DO-NOT-OPERATE tag.

      S 862-005-R00
      (4) Make sure the ENG VALVE light and the SPAR VALVE light are out.

      S 862-006-R00
      (5) Open the applicable circuit breaker that follows on the panel P6 and attach a DO-NOT-CLOSE tag.
         (a) 6E1, L SPAR FUEL VALVE



Fuel Drains Tank Ejector Valve and Filter Assembly
Figure 201

(b) 6E2, R SPAR FUEL VALVE

S 862-007-R00

(6) Remove the electrical power (AMM 24-22-00/201).

S 012-008-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(7) Open the left fan cowl panel (AMM 71-11-04/201).

S 022-009-R00

(8) Remove the filter assembly (Fig. 201).
(a) Put the container below the drains tank.
(b) Disconnect the tube (5).
(c) Remove the filter assembly (3) from the ejector valve (4).
(d) Remove the seal ring (2) and discard the ring.
(e) Install the dust caps to all the tube ends.

TASK 71-71-04-102-010-R00

3. Clean the Filter Assembly

A. Consumable Materials
(1) B00728 Kerosene
British Spec - D. Eng. RD2494
OMat No. - 101

B. Clean the Filter.

S 112-011-R00

(1) Clean the filter assembly (3) in new kerosene.

S 162-012-R00

(2) Make the filter dry with compressed air.

TASK 71-71-04-402-013-R00

4. Install the Ejector Valve Filter

A. Consumable Materials
(1) Lockwire
British Spec - DTD 189A: 22 S.W.G.
American Spec - 21 A.W.G.
OMat No. - 238

B. References
(1) 24-22-00/201, Electrical Power - Control
(2) 70-02-01/201, Identification, Lubrication and Fitting of Rubber Sealing Rings
(3) 70-51-00/201, Torque Tightening Technique
(4) 71-11-04/201, Fan Cowl Panels

C. Access
(1) Location Zones
211/212 Control Cabin
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panels
413AL Fan Cowl Panel (Left)
423AL Fan Cowl Panel (Left)

D. Install the Ejector Valve Filter

S 422-014-R00
(1) Install the filter (Fig. 201).
(a) Remove all the dust caps.
(b) Lubricate and install the new seal ring (2) to the filter assembly (3) (AMM 70-02-01/201).

CAUTION: DO NOT INSTALL THE END OF THE UNION WITHOUT THE FILTER IN THE EJECTOR VALVE. YOU MUST INSTALL THE FILTER END OF THE UNION IN THE EJECTOR VALVE OR THE FILTER CANNOT OPERATE CORRECTLY.

(c) Install the filter end of the filter assembly (3) in the ejector valve (4).
(d) Tighten the filter assembly (AMM 70-51-00/201).
(e) Connect the tube (5) to the filter assembly (3) and tighten (Ref 70-51-00/201).
(f) Install the lockwire on the union nut of tube (5) to the union nut of tube (1).

S 862-015-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(2) Close the left fan cowl panel (AMM 71-11-04/201).

S 862-016-R00
(3) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switch.

S 862-017-R00
(4) Remove the DO-NOT-CLOSE tag and close these circuit breakers on the panel P6.
(a) 6E1, L SPAR FUEL VALVE
(b) 6E2, R SPAR FUEL VALVE

S 722-019-R00

(5) Do the required tests for installation of the ejector valve filter (AMM 71-00-00/501).

FUEL DRAINS TANK VALVE - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. The first task removes the tank valve. The second task installs the tank valve.

TASK 71-71-05-004-001-R00

2. Remove the Valve for the Fuel Drains Tank
   A. Equipment
      (1) Clean container - Capacity:
          5 U. S. gallons
          4 Imperial gallons
          18 Litres

   B. Consumable Materials
      (1) Lockwire
          British Spec - DTD 189A 22 S.W.G.
          American Spec - 21 A.W.G.
          OMat No. - 238
   C. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 70-02-01/201, Identification, Lubrication and Fitting of Rubber Sealing Rings
      (3) AMM 70-51-00/201, Torque Tightening Techniques
      (4) AMM 71-11-04/201, Fan Cowl Panels
   D. Access
      (1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

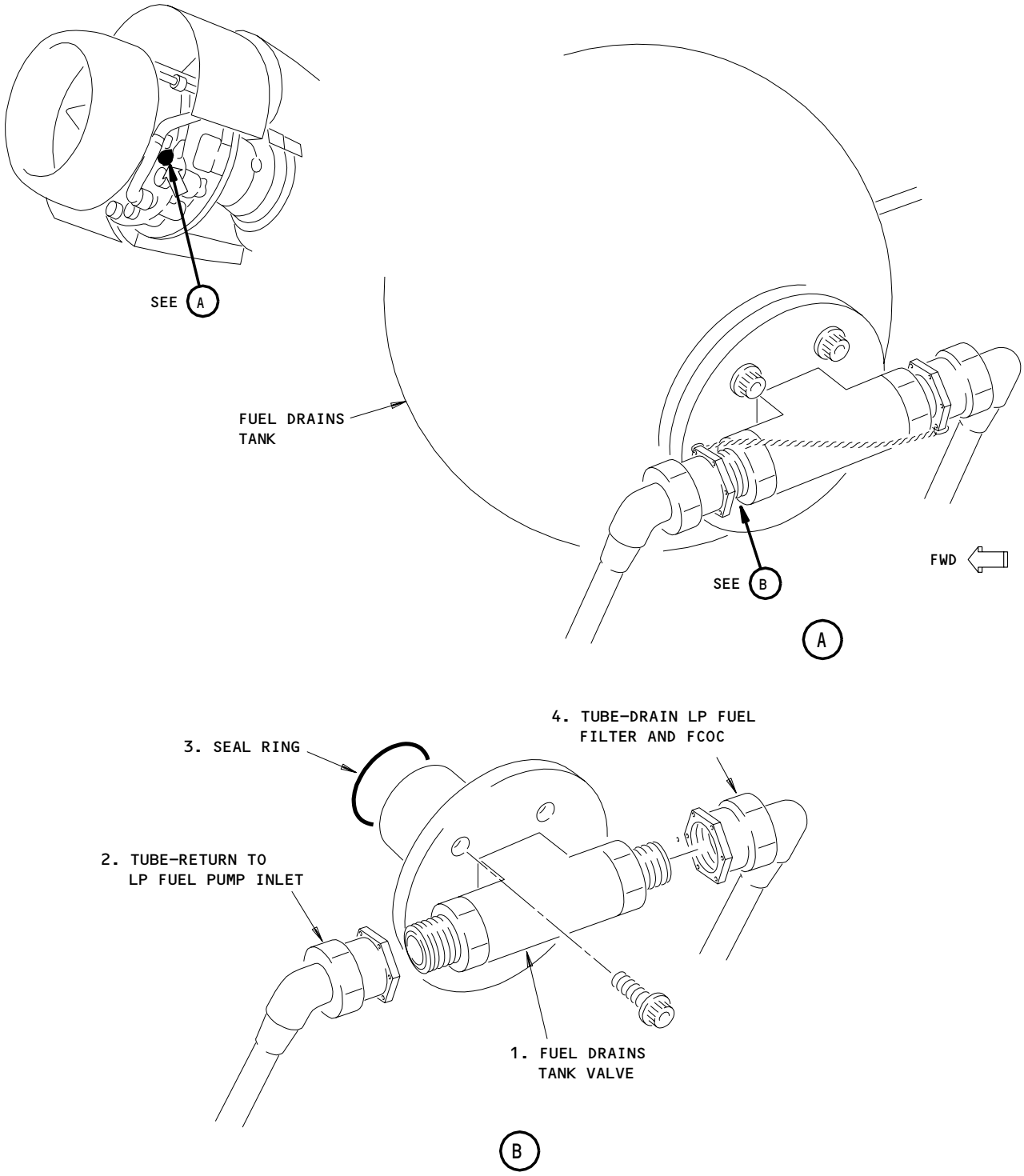
      (2) Access Panels

413AL	Fan Cowl Panel (Left)
423AL	Fan Cowl Panel (Left)

   E. Remove the Valve on the Fuel Drains Tank (Fig. 401).

      S 864-002-R00
      (1) Supply the electrical power (AMM 24-22-00/201).

      S 864-003-R00
      (2) Make sure these circuit breakers on the MAIN PWR DISTR panel P6 are closed.
          (a) 6E1, L SPAR FUEL VALVE
          (b) 6E2, R SPAR FUEL VALVE



Fuel Drains Tank Valve Installation
Figure 401

S 864-004-R00
(3) Make sure the left or right FUEL CONTROL switch on the control stand is at the CUTOFF position and attach a DO-NOT-OPERATE tag.

S 864-005-R00
(4) Make sure the ENG VALVE and FUEL SPAR lights are out on the control stand.

S 864-006-R00
(5) Open the applicable circuit breaker that follows on the panel P6 and attach a DO-NOT-CLOSE tag.
(a) 6E1, L SPAR FUEL VALVE
(b) 6E2, R SPAR FUEL VALVE

S 864-007-R00
(6) Remove the electrical power (AMM 24-22-00/201).

S 014-008-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(7) Open the left fan cowl panel (AMM 71-11-04/201).

S 024-009-R00
(8) Remove the valve.
(a) Put the container below the drains tank.
(b) Disconnect the tubes (2) and (4).
(c) Remove the four bolts and remove the valve (1).
(d) Remove the seal ring (3) and discard.
(e) Put the dust caps to all the tube ends.

TASK 71-71-05-404-010-R00

3. Install the Valve for the Fuel Drains Tank

A. Equipment
(1) Clean container - Capacity:
5 U. S. gallons
4 Imperial gallons
18 Litres

B. Consumable Materials
(1) Lockwire
British Spec - DTD 189A 22 S.W.G.
American Spec - 21 A.W.G.
OMat No. - 238

C. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 70-02-01/201, Identification, Lubrication and Fitting of Rubber Sealing Rings
(3) AMM 70-51-00/201, Torque Tightening Techniques
(4) AMM 71-11-04/201, Fan Cowl Panels

D. Access
(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

413AL	Fan Cowl Panel (Left)
423AL	Fan Cowl Panel (Left)

E. Install the Valve on the Fuel Drains Tank (Fig. 401).

S 424-011-R00
(1) Install the valve.
(a) Remove the dust caps from all the tube ends.
(b) Lubricate and install the new seal ring (3) to the drains tank valve (1) (AMM 70-02-01/201).
(c) Put the valve (1) on the tank mounting face.
1) Make sure the off-set bolt hole is aligned correctly.
(d) Install four bolts and tighten (AMM 70-51-00/201).
(e) Connect the tubes (2) and (4) and tighten (AMM 70-51-00/201).
(f) Install the lockwire to connect the tubes together.

S 864-012-R00
(2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the panel P6.
(a) 6E1, L SPAR FUEL VALVE
(b) 6E2, R SPAR FUEL VALVE

S 864-013-R00
(3) Remove the DO-NOT-OPERATE tag from the FUEL CONTROL switch.

S 414-014-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(4) Close the left fan cowl panel (AMM 71-11-04/201).